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European Congress on Osteoporosis & Osteoarthritis (IOF-ECCEO12)

Poster Presentation Abstracts

P101
PHASE III CLINICAL STUDY OF TRAMADOL HYDROCHLORIDE/ACETAMINOPHEN COMBINATION TABLET IN PATIENTS WITH CHRONIC OSTEOARTHRITIS PAIN OR CHRONIC LOW BACK PAIN – A RANDOMIZED WITHDRAWAL, DOUBLE-BLIND, PARALLEL-GROUP, PLACEBO-CONTROLLED STUDY

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Objective(s): The objective of this study was to evaluate the efficacy and safety of the tramadol hydrochloride (TRAM)/acetaminophen (APAP also known as paracetamol) combination tablet (JNS013: 37.5 mg of TRAM and 325 mg of APAP); an analgesics for controlling a variety of pain conditions by having a different mechanism of action from that of nonsteroidal anti-inflammatory drugs (NSAIDs), in Japanese patients with chronic pain caused by the osteoarthritis (OA) of the knee or low back pain (LBP) poorly controlled with NSAIDs.
Material & Methods: The study was a phase III randomized/withdrawal study for 11 weeks. 277 patients out of 321 entered into an open run-in phase received JNS013. 187 out of 277 entered into a double-blind period having been randomized to receive either JNS013 (n=94) or placebo (n=93).
Results: Primary efficacy endpoint, the time from the start of the double-blind period to the occurrence of inadequate analgesia (withdrawal data), was significantly longer in the JNS013 group than the placebo group (p=0.0001), confirming the superiority of JNS013 over placebo. Analyzing the withdrawal data by OA and LBP, the superiority of JNS013 over placebo was kept for each condition. Secondary efficacy endpoints included assessing patient's QOL using RDQ for LBP, WOMAC for knee OA and SF-36. The scores tabulated improved after a 2-week treatment with JNS013 in the open run-in phase. In the subsequent double-blind period RDQ and WOMAC scores tended to improve in the JNS013 group; however, they tended to worsen or remained unchanged in the placebo group. Improvement of QOL of patients with pain from OA or LBP was suggested. Adverse events characteristic to opioid analgesics including nausea, somnolence, vomiting and constipation were frequently seen in the open run-in phase but there were no significant safety concerns in the double-blind period.
Conclusion(s): JNS013 appears to be highly promising as a drug for the control of chronic pain.

P102
EFFECTS OF INTRAARTICULAR COMBINED TREATMENT WITH CORTICOSTEROID AND CHONDRATIN CONTAINING PRODUCTS IN PATIENTS WITH KNEE JOINT OSTEOARTHRITIS

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Objective(s): Osteoarthritis of knee joint is the most common location of degenerative disease of joints. More than 60% of women in their post menopause years complain of knee joint pain and edema. Patients especially of regions where total knee replacement is not being carried out more often, depend upon the conservative treatment.
Material & Methods: All patients were presented with pain during walking more than 150 m and edema at the end of day. All patients were used to take NSAIDs for pain relief and chondroitin sulfate tablets everyday before our study started. All patients were divided in two groups on the basis of roentgen findings. Group A 5 patients with stage II; Group B 5 patients with stage III. The 1.0 ml triamcinalone solution was injected intraarticularly in knee joint once in all

patients and after a period of 7 days the treatment with 1 ml solution of chondroitin sulfate intraarticularly injection was started. 5 injections were injected in a patient after a day, total 10 days course.

Results: After 3 months the following result was observed on the appearance of pain during walking: Group A, 3 patients (60%), pain after 300 m, 2 patients (40%) pain after 200 m. Group B, 1 patient (20%), pain after 300 m, 2 patients (40%) pain after 200 m and 2 patients (40%) pain after 150 m. The intake of NSAIDs after 3 months was also noted as follow: 6 patients, no NSAIDs intake (60%); 3 patients, dose reduced by half (30%); 1 patient continuously taking NSAIDs (10%).

Conclusion(s): It can be concluded that the combined treatment with corticosteroids and chondroitin containing products intraarticularly significantly improves the walking distance without pain almost in all patients, i.e., 8 patients, (80%) can walk more than before (>150 m) as compared to 2 patients (20%). It also significantly reduces the demand for NSAIDs intake (90% compared to 10%). Thus overall stabling the disease progression and markedly delays the need of knee joint replacement especially in regions with limited resources.

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A PHASE III, OPEN-LABEL, LONG-TERM CLINICAL TRIAL OF TRAMADOL HYDROCHLORIDE/ ACETAMINOPHEN COMBINATION TABLET IN PATIENTS WITH CHRONIC PAIN

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Objective(s): JNS013 was a combination tablet containing 37.5 mg of tramadol hydrochloride and 325 mg of acetaminophen controlling a various pain by having different mechanism of action from that of nonsteroidal anti-inflammatory drugs (NSAIDs). The aim of this study was to evaluate efficacy and safety of 52-week administration of JNS013 in chronic pain patients with nociceptive pain from low back pain, osteoarthritis of the knee or, rheumatoid arthritis and neuropathic pain from postherpetic neuralgia, diabetic neuropathic pain and so on, poorly controlled with NSAIDs.

Material & Methods: This study was a phase III open-label, noncontrolled study. 143 out of 190 patients received JNS013 orally and 97 patients completed the study. Analgesic effects assessed by VAS_{24} and overall pain relief on a 6-category scale (worsening to complete relief) and improvements of QOL assessed by SF-36 were evaluated.

Results: JNS013 showed analgesic effects immediately after administration and it persisted until Week 52. Absolute changes in VAS_{24} score from the pre-observation period was -22.3±21.19 mm on Week 4 of treatment (Treatment Period I). This parameter further improved during Treatment Period II, being -35.5±23.17 mm and -36.6±21.94 mm on Week 28 and 52, respectively. There were no marked differences in absolute changes in VAS_{24} score by each condition. The frequencies of patients in whom overall pain relief was rated as "moderately" or better increased over time (Week 4, 45.3%; Week 28, 67.6%; Week 52, 72.9%). The frequencies of patients rated as "moderately" or better on Week 52 ranged from 63.2% to 87.5% in all conditions. The score for each subcategory of SF-36 increased over time during the treatment period. Summary scores for both physical and mental components increased over time until Week 52. In safety analysis, rate of adverse events was 96.3%. Major adverse events were nausea, vomiting and constipation, dizziness and drowsiness frequently seen initially, which subsided over time (less than 10%).

Conclusion(s): These results suggest that long term (52 weeks) use of JNS013 is tolerated to noncancer chronic pain patients.

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PLAIN VITAMIN D OR ALFACALCIDOL AS FOLLOW-UP TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS AFTER CONTINUOUS LONG-TERM ONCE WEEKLY BISPHOSPHONATE INTAKE

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Objective(s): Long-term oral bisphosphonate (BP) therapy of osteoporosis may be associated with negative effects on bone quality. A "drug holiday" after about 5 years of treatment is suggested. There is however very limited experience with follow-up treatments. We designed this study to compare plain vitamin D with alfacalcidol as treatments during such a "drug holiday".

Material & Methods: In a 2 year, comparative study based on retrospective chart analysis we compared 2 different follow-up treatments in 85 women with postmenopausal osteoporosis after an average oral BP intake of 4.2 years. Group A (n=42) received plain vitamin D 800 IU+calcium 1200 mg/d, group B (n=43) alfacalcidol 1 μg+calcium 500 mg/d. BMD was measured at onset and after 12 and 24 months at the lumbar spine, femoral neck and total hip by DXA (LUNAR). Parallel to BMD measurements lateral spine morphometry was performed to assess prevalent and incident vertebral fractures. Furthermore incidence of falls (2 years before and during the trial), back pain (VAS 0-10), adverse events and prevalent and incident nonvertebral fractures were documented.

Results: The 2 groups had well matched baseline characteristics. BMD at LS did not change significantly during the 2 years of follow-up in A, but increased significantly in B by +2.1% (B vs. A $p<0.01$) in spite of cessation of BP therapy. At the two femur sites we found slight decreases with plain vitamin D and significant increases in the alfacalcidol group. The average number of falls per patient year was reduced significantly only in group B ($p<0.05$). The number of patients with new vertebral fractures was not significantly different between A and B after 2 years, but there was a significantly lower rate of non-vertebral fractures in the alfacalcidol group ($p<0.05$). Furthermore there was a significantly stronger decrease in average back pain score in patients receiving alfacalcidol. The numbers of adverse events did not differ between the 2 follow-up groups.
Conclusion(s): This retrospective pilot study shows very clearly that switching treatment of postmenopausal osteoporosis from long-term bisphosphonate to alfacalcidol plus calcium is superior to plain vitamin D plus calcium.

P105
IS THERE A CORRELATION BETWEEN SYMPTOMS AND BONE SCINTIGRAPHIC FINDINGS IN PATIENTS WITH COMPLEX REGIONAL PAIN SYNDROME?

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Objective(s): Complex Regional pain syndrome (CRPS) is characterized by pain in combination with sensory, vasomotor, sudomotor, trophic and motor abnormalities. The diagnosis of CRPS is based primarily on clinical criteria and the presence of distinct signs and symptoms. The role of bone scintigraphy in the diagnosis of these patients has been limited by its variable sensitivity. In this study we aim to look if the presence of specific symptoms or symptom subgroups in patients with clinically diagnosed CRPS correlates with scintigraphic findings in bone scan.
Material & Methods: We retrospectively reviewed clinical records of patients referred for bone scintigraphy with the clinical diagnosis of CRPS during the period December 2006 - February 2011. Patients were classified into 4 distinct subgroups according to the presence of specific symptoms namely sensory subgroup, sudomotor and /or edema subgroup, vasomotor subgroup and finally motor and/or trophic changes subgroup. We looked specifically for the correlation between these specific symptoms and scintigraphic bone findings.
Results: 37 patients referred for bone scintigraphy with the clinical diagnosis of CRPS and were enrolled in the study. The presence of vasomotor symptoms and (motor and/or trophic changes) was significantly higher in patients with positive bone scintigraphy (P-value 0.0133, 0.018, respectively). There was no other statistically significant correlation between the presence of specific symptoms or symptom subgroup on one hand and the result of bone scintigraphy on the other hand.
Conclusion(s): The probability of positive bone scintigraphy increased significantly in patients with vasomotor symptoms and in patients with motor and/or trophic changes. This may contribute to the reported variability of the diagnostic performance of bone scintigraphy in CRPS patients.

P106
MISSED OPPORTUNITIES FOR PREVENTION OF HIP FRACTURE IN OLDER PATIENTS

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Objective(s): Osteoporotic fractures are a major cause of morbidity in the population. Therefore, fracture prevention strategies should be a *major concern,* and one of the priorities in the primary health care system. The aim of the study was to assess fracture and fall risk factors, and fracture risk level in patients with acute hip fracture, and to evaluate if there was adequate osteoporosis treatment prior to fracture in this group of patients.
Material & Methods: Fracture and fall risk factors were assessed in 343 patients ≥65 years hospitalized due to acute hip fracture at the Clinic for Orthopaedic Surgery and Traumatology, Serbia during a 12 month period. Fall risk factors were assessed with FRAX® algorithm, and patients were classified in respect to fracture risk level.
Results: Hip fracture occurred in majority of patients in the high risk group (74.2%), where no additional MKG testing was needed. Less than 10% patients had a diagnosis of osteoporosis before injury, while less than 2% were treated. Cognitive impairment (95.3%), visual impairment (58.2%), decreased activities of daily living index (51.8%), and depression (47.1%) were the most frequently observed fall risk factors.
Conclusion(s): The results of our investigation reveal insufficient identification of clinical fracture risk factors in the primary care setting, inadequate treatment of osteoporosis, and consequently ineffective prevention of hip fractures in the geriatric population. FRAX® introduction into clinical practices enables more effective acknowledgment of patients with elevated fracture risk, even if bone density measurement is not available. The results of this study have a special significance for everyday clinical practice, because they impose a need for reviewing existing approaches in osteoporosis prevention, and precise definement of hip prevention strategies.

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COMPARING DAILY STRONTIUM RANELATE WITH ONCE WEEKLY ALENDRONATE IN THE TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS

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Objective(s): The bisphosphonates are considered as a first-line therapy for the treatment of postmenopausal osteoporosis. Alendronate 70 mg the most commonly used failed to reduce the risk of fractures. Strontium ranelate is the first antiosteoporotic agent that appears to simultaneously increase bone formation and decrease bone resorption having demonstrated its efficacy to decrease the risk of fractures. The objective of this prospective observational study was to compare the effectiveness of alendronate and strontium ranelate in postmenopausal osteoporotic women by measuring the effects on BMD change.
Material & Methods: We enrolled 150 postmenopausal osteoporotic women. Their mean age was 66.05 years old (range: 44-76) and their mean menopausal age was 47.8± 3.7 years old. There were no differences in the basal characteristics between groups. The drugs used included weekly 70 mg alendronate in 78 patients (group 1) and daily 2 g strontium ranelate in 72 women (group 2). BMD was measured by DXA-BMD at lumbar spine L_1-L_4, total hip and femoral neck at baseline and after 1-2 and 3 years of treatment.
Results: The BMD change under the two medicines is presented in the Table 1.

Table 1

	BMD(g/cm^2)/ treatment	Baseline	1 year	2 years	3 years
Lumbar spine	Alendronate	0.739	0.759	0.770	0.782
	gain%		+2.7	+4.1	+5.8
	Strontium ranelate	0.718	0.754	0.775	0.792
	gain%		+5.0	+7.9	+10.3
Total hip	Alendronate	0.824	0.840	0.853	0.867
	gain%		+1.9	+3.5	+5.2
	Strontium ranelate	0.679	0.692	0.702	0.715
	gain%		+1.9	+3.3	+5.2
Femoral neck	Alendronate	0.664	0.673	0.679	0.687
	gain%		+1.3	+2.2	+3.4
	Strontium ranelate	0.584	0.593	0.600	0.607
	gain%		+1.5	+2.7	+3.9

In our study we found that the treatment with strontium ranelate during 3 years induced a significantly increased in BMD in lumbar spine. Comparing both groups we did not find significant differences in BMD at total hip and femoral neck.
Conclusion(s): The both medicine increased significantly the BMD in lumbar spine, total hip and femoral neck after 3 years given the baseline; strontium ranelate was more effectiveness on lumbar spine like alendronate. It is possible that the different way of action of the two drugs to explain the magnitude of difference in BMD change at lumbar spine.

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GENDER DIFFERENCES IN THE EFFECT OF BEING OBESE OR OVERWEIGHT ON GEOMETRIC INDICES OF HIP BONE STRENGTH IN LEBANESE ADOLESCENTS AND YOUNG ADULTS

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Objective(s): The aim of this study was to investigate whether gender may influence the effect of being obese or overweight on geometric indices of hip bone strength in a group of Lebanese adolescents and young adults.
Material & Methods: This study included 138 Lebanese subjects (61 females and 77 males) aged from 13-25 years. The girls were divided into three groups: Obese (n=13), Overweight (n=20), and Normal weight (n=28) using international cutoffs for BMI. The boys were divided into three groups: Obese (n=27), Overweight (n=22), and Normal weight (n= 28) using international cutoffs for BMI. Weight and height were measured, and BMI was calculated. Body composition and BMD were assessed by DXA. To evaluate hip bone strength, DXA scans were analyzed at the narrow-neck (NN), the intertochanteric (IT), and the femoral shaft (FS) by the Hip Structure Analysis (HSA) program. Cross-sectional area (CSA), an index of axial compression strength and section modulus (Z), an index of bending strength were measured from hip BMD profiles.
Results: In both females and males, body weight, lean mass and BMI were significantly higher in obese and overweight subjects compared to normal weight peers ($P<0.05$). In both females and males, CSA and Z of the three regions (NN, IT and FS) were significantly higher in obese and overweight subjects compared to normal-weight peers after adjusting for age ($P<0.05$). In males, obese subjects displayed lower NN CSA, FS CSA and FS Z values compared to overweight and normal weight subjects after adjusting for body weight ($P<0.05$). However, in females, there were no differences among obese, overweight and normal weight subjects concerning HSA variables after adjusting for body weight.
Conclusion(s): This study suggests that the effect of obesity on geometric indices of hip bone strength in adolescents and young adults is influenced by gender. During growth and early adulthood, obese males but not obese females do not increase their hip bone strength indices to fully compensate for their excessive weight.

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COMORBIDITY INDICES FOR CLINICAL TRIALS: DEVELOPING AN INDEX USING THE FREEDOM TRIAL IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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Objective(s): Comorbidities are important considerations in adjusting for risk of outcomes in clinical trials, however, comorbidity indices currently available are not designed for use with clinical trial data. We adapted and applied two published algorithms to develop comorbidity indices for a clinical trial enrolling postmenopausal women with osteoporosis.

Material & Methods: FREEDOM (Cummings, 2009) enrolled women aged 60-90 years with total hip or lumbar spine DXA T-score<-2.5 and not<-4.0 at either site. Comorbidity indices were calculated using methods described by Wolfe (Wolfe, 2010) and Sangha (Sangha, 2003). We present results based on the Wolfe method as it allowed for weighting of disorders. The modified index included pulmonary disorders, cardiovascular disorders, hypertension, diabetes, depression, gastrointestinal ulcer or disorders, and cancer. The index ranges from 0-8; higher scores indicate greater comorbidity. Four clinicians independently reviewed subjects' medical history data based on MedDRA preferred terms corresponding to each comorbid condition. Any disagreements were adjudicated by a fifth clinician who facilitated discussions to reach consensus. Spearman correlations between the index and subject characteristics expected to be associated with comorbidities were examined.

Results: A total of 7808 subjects were included in this study; 60% of subjects had ≤1 comorbidity. The mean modified Wolfe comorbidity index was 1.4 (SD: 1.3) for all subjects. The comorbidity index distribution was: 0, 29.2% of the population; 1, 29.9%; 2, 23.5%; 3, 10.8%; 4, 4.5%; 5, 1.7%; and 6-7, 0.3%. Correlations between the comorbidity index and baseline characteristics are shown in the table.

Baseline characteristics	Correlation with the modified Wolfe Comorbidity Index*	p-value
Number of medications	0.54	< 0.0001
Osteoporosis Assessment Questionnaire (OPAQ) physical function dimension	-0.28	< 0.0001
OPAQ emotional status dimension	-0.28	< 0.0001
EuroQol-5 Dimensions (EQ-5D) visual analog scale	-0.26	< 0.0001
OPAQ back pain	-0.22	< 0.0001
BMI (kg/m^2)	0.16	< 0.0001
Age (years)	0.16	< 0.0001

*Fracture history in the original Wolfe algorithm was excluded from the calculation because FREEDOM was a fracture study.

Conclusion(s): The modified Wolfe comorbidity index was found to be significantly correlated with the number of medications and impaired health status at baseline. The index may be adapted for clinical trial data, and would allow for the appropriate adjustment of covariates in the evaluation of clinical trial outcomes.

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P110
A PREDICTIVE TOOL FOR ORAL BISPHOSPHONATE THERAPY DISCONTINUATION WITHIN INCIDENT USERS: A POPULATION-BASED COHORT STUDY

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Objective(s): Although oral bisphosphonates can reduce fractures by 50%, patients need to adhere to therapy for 5 years to obtain full benefit. We investigated a list of potential predictors for therapy discontinuation. Based on these, we designed a predictive tool to help clinicians identify patients at high risk of discontinuation.

Material & Methods: We screened the SIDIAP database to identify incident users of oral bisphosphonates between 1/01/2006 and 31/12/2007. SIDIAP includes pharmacy invoice data and clinical information for about 5.5 million people in Catalonia (Spain) as recorded by general practitioners. Exclusion criteria: Paget disease, under 40 years of age or bisphosphonate treatment in the previous two years. Prognostic factors were determined a priori: age, gender, nationality, BMI, smoking status, alcohol drinking, previous fracture, pre-existing comorbidities, and number of pre-existing medications. Medication possession ratios were calculated for participants with an existing prescription for statins or antihypertensives. Multivariable backwards-stepwise selection Cox regression was used to identify key predictors (p-entry 0.049; p-exit 0.05). Patients in the highest quintile of predicted hazard for discontinuation were considered high risk. Internal validity, discrimination and calibration for the final model were confirmed using bootstrapping.
Results: 26,118 patients were recruited, and 25,851 (98.9%) completed up to 5 years of follow-up. Cumulative incidence of discontinuation was 49.9% (49.3-50.5), and 73.7% (73.1-74.3) at years 1 and 5, respectively. The final tool (HR and score for each predictor) is presented below:

Table 1 Predictors of Therapy Discontinuation

Predictor		N	Adjusted HR	Risk Score
Gender	Male	5541	2.08 [2.00-2.16]	100
Age	40-60 years	7407	1.08 [1.05-1.12]	11
	>80	3164	1.33 [1.27-1.39]	38
Nationality	Non-national	392	1.29 [1.15-1.44]	33
BMI	<18.5 kg/m^2	147	1.06 [0.87-1.28]	6
	25.0-29.9	9256	1.04 [1.00-1.09]	6
	30.0-34.9	5242	1.09 [1.04-1.15]	12
	35 and over	1941	1.25 [1.18-1.34]	30
	Not available	4411	1.14 [1.08-1.20]	17
Smoking	Current	2467	1.19 [1.13-1.25]	23
	Ex	1852	1.01 [0.95-1.07]	1
	Not Available	2842	1.11 [1.05-1.16]	14
Alcohol Drinking	Never/Mild	281	1.08 [0.94-1.24]	11
	Not Available	5958	1.26 [1.10-1.45]	32
Previous Fracture	No Fracture	21946	1.27 [1.20-1.36]	34
	>6 Months ago	4172	1.13 [1.04-1.22]	17
Pre-existing Dementia		333	1.28 [1.13-1.45]	35
Pre-existing Renal Failure		2038	1.06 [1.01-1.12]	8
Pre-existing Diabetes		3577	1.06 [1.003-1.12]	8
Pre-existing Atrial Fibrillation		1019	1.11 [1.03-1.20]	14
Pre-existing Osteoporosis	no	19663	1.34 [1.29-1.39]	39
Pre-existing Osteoarthritis	no	22373	1.05 [1.003-1.09]	7
Pre-existing Vitamin D Deficiency	no	26011	1.39 [1.07-1.81]	44
Pre-existing Rheumatoid Arthritis or Lupus	no	25445	1.29 [1.17-1.43]	34
Number of Pre-existing Comorbidities	1	6087	1.09 [1.05-1.14]	12
	2	1164	1.14 [1.05-1.24]	18
	3 or more	120	1.46 [1.19-1.78]	51
Number of Pre-existing Prescriptions	0	7100	1.89 [1.35-2.65]	86
	1	8926	1.54 [1.10-2.15]	58
	2	6783	1.32 [0.95-1.83]	37
	3	2668	1.13 [0.81-1.57]	16
	4	590	1.06 [0.75-1.49]	6
	5	51	REF group	0
MPR for Statins (if taken)	MPR<20%	604	1.45 (0.07)	51
	MPR≥20%	7596	1.19 (0.03)	24
MPR for Antihypertensives (if taken)	MPR<20%	1323	1.36 (0.05)	41
	MPR≥20%	9711	1.24 (0.03)	29
TOTAL SCORE				

A total risk score of 327 or higher indicates high risk of discontinuation. A score of 327 or higher identified the 20% earliest failures with 39% sensitivity and 86% specificity. Optimism-corrected area under the curve to predict failure at 1 year was 64%.

Conclusion(s): Therapy discontinuation rates among incident oral bisphosphonate users are high. We propose a predictive tool to identify patients at risk for discontinuation, who could be targeted either for interventions to improve adherence or for parenteral therapies.

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THE RELATIONSHIP BETWEEN BONE MINERAL DENSITY AND INSULIN RESISTANCE IN KOREAN POPULATION STUDY

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Objective(s): The relationships between insulin resistance and BMD are not clear. Therefore, we conducted a cross-sectional study to examine the relationship between insulin resistance and BMD among Korean population which was divided with glucose level.

Material & Methods: This study is based on the Korea National Health and Nutrition Examination Survey (KNHANES) IV (2008). BMD and body composition were measured by DXA method. Insulin resistances were obtained by HOMA-IR equation. We divided the population according to fasting glucose level (NGT, IFG, DM). The relationship between BMD and HOMA-IR were analyzed with multiple regression models which were adjusted with age, body weight, body fat mass, body lean mass, alcohol drink, exercise level and 25(OH) vitamin D level.

Results: Among 3290 persons, 1368 (41.6%) persons were men and 1922 (58.4%) persons were women. In whole population, HOMA-IR Showed positive correlations with total body BMD and lumbar BMD in men but not femur BMD in men and all BMD in women. However, NGT group showed negative correlation with all site BMD in both gender and IFG group also have negative relations with BMD in total body BMD of men ($B=-0.007$, $p<0.001$) and femur BMD in women ($B=-0.013$, $p<0.001$) even after adjust all factor that were mentioned above. However BMD and insulin resistance had no relationships in DM.

Conclusion(s): In this study, BMD were decreased with the increase of insulin resistance in normal fasting glucose. And with the increase fasting glucose, these relations were weakening (IFG) and disappeared (DM).

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CHANGES IN BONE TURNOVER MARKERS BY ORAL ALENDRONATE IN LONG-TERM SURVIVORS AFTER KIDNEY TRANSPLANTATION

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Objective(s): Post kidney transplantation (KTx) recipients are of frequently suffered from secondary or tertiary hyperparathyroidism, which could deteriorate bone metabolism. Bone loss during the first year after transplantation is most pronounced, but bone density development in long-term transplant recipients is still controversial. In the present study, we explored the effect of 3-year treatment with oral alendronate (ALN) on bone metabolism in long-term survivors after KTx.

Material & Methods: Subjects: Post-KTx recipients were recruited ($n=24$, $M/F=12/12$, age, 52.0 ± 7.8 years old). Mean duration after renal transplantation was 10.8 ± 3.4 years. All the patients were prescribed methylprednisolone with various immunosuppressive agents.

Results: Before the treatment with oral ALN (35 mg/week), mean concentrations of intact parathyroid hormone (iPTH) and 25-hydroxyvitamin D (25-OHD) were 139.2 ± 71.4 pg/ml and 20.8 ± 4.1 ng/ml, respectively. After 36 months with ALN treatment, mean iPTH levels slightly increased (+20.9%) by ALN. The treatment with ALN significantly reduced bone specific alkaline phosphatase (-35.4%), serum type I collagen N-terminal telopeptide (-31.2%) and osteocalcin (-55.6%) levels. On the other hand, ALN did not affect serum creatinine (+5.5%), calcium (+1.8%), phosphate (+1.3%), 25-OHD (+10.9%) or $1,25(OH)_2$ vitamin D (+5.1%) levels.

Conclusion(s): These findings suggest us that hyperparathyroidism exists even in long-term survivor after KTx, and ALN effectively reduce bone turn over in these patients.

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NEUROPATHIC PAIN IN PATIENTS WITH OSTEOARTHRITIS

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Objective(s): Chronic pain is the most typical clinical presentation of osteoarthritis (OA). Today, the exclusively

nociceptive nature of OA pain is being reconsidered, and neuropathic and psychogenic aspects are increasingly discussed. To improve diagnostics of a pain syndrome at OA and to advance approaches to drug therapy for better outcomes, surveys were conducted to identify neuropathic components in the chronic pain structure.

Material & Methods: We recruited 112 patients with OA (male:female ratio 1:5), aged 45-72 (average 62.3±4.7). OA duration ranged from 5-26 years (average 13.2±8.1 y). Using the DN4 neuropathic pain questionnaire, we divided patients with OA into two groups: first group – patients with no NP (0-3 points), second group – patients with NP (4-8 points). We performed clinical, neurological and rheumatologic examination and administered the quality of life (EQ-5D), LANSS and Beck depression.

Results: In OA patients 34.8% had signs of NP by DN4. In OA patients with NP were older than patients without NP (68.6±4.7 vs. 49.3±10.6 y, $p<0.05$), had longer disease duration (13.6±7.6 y vs. 9.8±6.3 y, $p<0.05$), had synovitis and R-stage 3-4 (69.6% vs. 30.4%), and had higher functional disability (stage 2-3 84.9% and 71.6%, accordingly). We found no significant differences between the two groups in quality of life. NP presented with numbness 93.4%, tingling 88.7%, "electric shock" 74.2% and creeping 71.7% in the second group, and 25.8%>31.7%>38.3%> 14.7% in the first group, accordingly. As compared to patients with high DN4 scores, patients who scored 4-5 points on DN4 demonstrated higher depression. LANSS measuring scale was used to differentiate nociceptive and neuropathic pain syndromes. In the questioning by LANSS 42 (37.5%), patients gained more than 12 points, indicating that they have neuropathic pain. NP is more often diagnosed in women, with 2 and 3 stages of osteoarthritis, while reactive synovitis is present as well.

Conclusion(s): More than a third of patients with OA may have elements of NP, which is the cause of insufficient response to standard therapy, aimed at elimination of nociceptive pain. Questioning allows us to identify neuropathic pain in patients with OA and thus improves treatment results.

P114
OSTEOPOROSIS AND TARGETED BREAST CANCER THERAPIES

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Objective(s): Researchers looked at women aged 50-79 taking a combination of conjugated equine estrogens 0.625 mg and medroxyprogesterone acetate 2.5 mg. This confirmed the long held assumption that HRT prevents osteoporotic fractures. HRT was widely prescribed to women to relieve the menopausal symptoms. Researchers found that women who took the hormones had an increased risk of developing breast cancer. Aim was to search for new answers in the link between breast cancer, osteoporosis and targeted breast cancer therapies.

Material & Methods: We have performed a bibliography review in a worldwide basis and from our own experience.

Results: While the exact cause of breast cancer is not known, 1 in 8 women risk of undergoing it increases with age, with 81% of cases occurring in women aged 50 years and over. Risk factors associated with the disease could be viruses, environmental factors or others acting on breast cell. Women in developed countries are at increased risk of breast cancer compared with women from less developed countries. A large part of this variation can be explained by the fact that women in developed countries have fewer children on average and a limited duration of breastfeeding, it is said. But in reality reproductive factors that influence breast cancer risk do not explain it. Breast cancer is one of the few cancers where incidence rates are higher for more affluent women and there is a clear trend of decreasing rates from least to most deprived groups. Postmenopausal osteoporosis usually affects women over the age of 60. The leading cause of osteoporosis is a lack of estrogens in women and opposite drugs. Osteoporosis, affects 1 in 2 women, is now three times more common that breast cancer. Bisphosphonates may contribute to fewer breast cancers. The cell cycle consists of four phases. DNA and RNA viruses have been shown to be able to cause cancer and referred to as carcinogens.

Conclusion(s): The natural lack of estrogen does not decrease breast cancer incidence. Targeted breast cancer therapies are to be studied. Viruses can attack cells in different phases and that could explain the different breast cancer types.

P115
HYPOVITAMINOSIS D ASSOCIATIONS WITH ADVERSE METABOLIC PARAMETERS ARE ACCENTUATED IN PATIENTS WITH DIABETES MELLITUS TYPE 2: A BMI-INDEPENDENT ROLE OF ADIPONECTIN?

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Objective(s): Hypovitaminosis D has been associated with an increased prevalence of diabetes mellitus type 2 (DMT2) and metabolic syndrome manifestations. The purpose of this

study was to examine the association between 25-hydroxyvitamin D (25-OHD) levels and indices of insulin resistance, including adipocytokines, in a Saudi population with or without DMT2.

Material & Methods: A total of 266 subjects (153 DMT2 and 113 healthy controls) aged 26-80 years old were randomly selected from the existing Biomarkers Screening in Riyadh Program (RIYADH Cohort). Subjects were assessed clinically, anthropometry was performed, morning blood chemistries, including fasting glucose, triglycerides, total cholesterol, LDL-C, and HDL-C were obtained. HOMA-IR was calculated, and serum 25-OHD, leptin, adiponectin, resistin, insulin, hsCRP, and TNFα concentrations were measured using specific assays.

Results: In DMT2 subjects, negative correlations between 25-OHD and BMI, fasting glucose, insulin, HOMA-IR, cholesterol, LDL-C and hsCRP were observed, while a positive correlation between 25-OHD and adiponectin was detected. The later remained significant after controlling for BMI. Interestingly, only weak and nonsignificant associations between 25-OH-VitD and metabolic parameters were observed in the control group, whereas, when the entire population was examined, negative correlations were evident primarily between 25-OH-VitD and fasting glucose, HOMA-IR, total cholesterol, LDL-C. These associations remained significant after controlling for BMI.

Conclusion(s): These results suggest that hypovitaminosis D associations with metabolic disturbances are accentuated in DMT2. The BMI-independent positive correlation between 25-OH-VitD and adiponectin suggests a potential role for this adipocytokine as a link between 25-OH-D and insulin resistance in patients with DMT2.

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RENAL STONES AND CALCIFICATIONS IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM: ASSOCIATIONS WITH BIOCHEMICAL VARIABLES

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Objective(s): To study the prevalence of renal stones and nephrocalcinosis in patients with primary hyperparathyroidism (PHPT) and to appraise biochemical variables as risk factors for developing renal calcifications.

Material & Methods: Cross-sectional study in all patients (n=177) undergoing diagnostic evaluation and surgery for PHPT at the Department of Endocrinology and Internal Medicine and the Department of Surgery, Aarhus University Hospital between 2007-2009. All patients underwent routine spiral CT scans of the abdomen to determine presence or not of renal calcification before parathyroid surgery. Biochemical measurements included plasma levels of ionized calcium (Ca2+), phosphate, creatinine, 25-hydroxyvitamin D (25OHD), calcitriol ($1,25(OH)_2D$), alkaline phosphatase, and PTH. We also measured urinary NTx/creatinine ratio and 24 h urinary excretions of calcium and creatinine. Finally we calculated creatinine clearance, tubular reabsorption of calcium (TRCa%) and urine calcium/creatinine ratio (CaE mmol/mmol).

Results: A total of 45 patients (25.4%, 95% CI: 19.0-31.4%) had renal stones (15.3%) and/or renal calcifications (10.2%) on the CT scans. Compared to those without calcification (n=132), the group with calcification had a significantly lower plasma creatinine level (67.0±25.1 vs. 74.6±17.5 μmol/l, 2p=0.03). Moreover, CaE was higher in PHPT patients with renal calcification than in PHPT patients without (0.91±0.28 vs. 0.74±0.40 mmol/mmol, 2p=0.02). The other measured or derived biochemical variables were similar in the two groups. No biochemical variable was predicative for renal calcifications in a multiple regression analysis.

Conclusion(s): We found a high prevalence of renal calcifications among PHPT patients, but no deterioration of renal function. The occurrence of calcifications was related to low plasma creatinine and a high urine calcium/creatinine ratio. However, biochemical markers in general were poor predictors for the risk of renal stones or nephrocalcinosis indicating that routine image diagnostics may be needed for the identification of these complications in order to establish indication for surgery and ensure proper treatment.

P117
BURDEN AND MEDICAL NEEDS IN OLDER PATIENTS WITH HIP FRACTURES AND MUSCLE ATROPHY OR WEAKNESS

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Objective(s): The number of hip fractures worldwide is expected to reach 2.6 million in 2025. Hip fractures substantially increase risk of death, and muscle atrophy/weakness is associated with an increased risk of hip fracture. Our systematic review assessed disease burden and medical needs related to muscle atrophy/weakness in older patients

with hip fractures in the US, Canada, Australia, and five countries (UK, Germany, France, Italy, and Spain) in Europe.

Material & Methods: Using keywords related to muscle atrophy/weakness and hip fracture, we systematically searched English-language, Medline- and Embase-indexed literature published between 5/2001-5/2011 and materials available from governmental or professional organizations. Included articles pertained to epidemiologic, economic, humanistic, and treatment burden of muscle atrophy/weakness (defined as evaluations of muscle atrophy, strength, or performance) in adults ages 50+ with hip fracture. Excluded articles were molecular biology and genetic studies, case reports, and evaluations of muscle atrophy/weakness in <20 patients.

Results: Thirty-four articles examined muscle atrophy/weakness in hip fracture patients aged 50+ years. Most focused on the natural history of muscle weakness and function or non-pharmaceutical interventions for improving strength or performance post-fracture. Functional status and muscle strength are diminished one month to two years post-fracture. Substantial differences in strength between operated and nonoperated limbs may contribute to poor mobility during recovery. Physical therapy (PT) and exercise improve strength and function. With few clinical trials, efficacy of specific regimens remains ill-defined. Treatment guidelines on hip fracture, available only from the UK, do not recommend specific settings and PT types. No studies describe real-world treatment patterns for PT regimens that restore muscle strength. Length of stay associated with hip fracture varies across countries (range: 5-7 days in US to 40 days in UK orthopedic rehabilitation units postsurgical repair). Data gaps include estimates of prevalence or incidence, productivity or work loss, and costs related to muscle strength or function.

Conclusion(s): Muscle atrophy/weakness after hip fracture is disabling, but its collective impact on the frequency, cost, or treatment of hip fractures remains unknown. With few rehabilitation strategies restoring muscle strength and function to pre-surgical levels, more effective interventions are needed to speed recovery.

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THE ROLE OF COUNSELLING AND OTHER FACTORS IN COMPLIANCE OF POSTMENOPAUSAL OSTEOPOROSIS PATIENTS TREATED WITH ALENDRONATE 70

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Objective(s): More than 50% of subjects with chronic diseases, including osteoporosis, discontinue treatment during the first year of its administration. The aim of this study was to assess the role of patient counselling, nurse assistance and effects of biochemical examinations on adherence to alendronate 70 administration over the period of 12 months by women with postmenopausal osteoporosis.

Material & Methods: Compliance and persistence to alendronate 70 therapy was assessed in a prospective study of 123 postmenopausal women, followed up for one year. The patients were divided into 4 groups (Controls, Counselled Group, Biochemical Group and Nurse Assisted Group) with monitoring every 6 months; in the Nurse Assisted Group, additional phone contact was made after 3 and 9 months of treatment. After 12 months, compliance and persistence were analyzed. The Medication Possession Ratios (MPRs), was regarded as optimal when its value exceeded 80%.

Results: The compliance to alendronate 70 therapy was 54.03% in the control group and the mean persistence with medication was 197 days. MPR>80% was observed in 37.5%, and, after one year, 43.75% patients were found persistent with the therapy. In the remaining groups both compliance and persistence were higher but not statistically significant, compared to the control group (Counselled Group: 75.71% and 276.17 days, MPR>80% was observed in 65.52% and 68.97% persisted with therapy; Biochemical Group: 68.29%, 249.2 days, MPR>80% - 64.52%, with 64.52% of patients persisted; Nurse Assisted Group: 71.18%, 259.71 days, MPR>80% - 61.29% and 61.29% women persisted with therapy). Neither patient's age, education, diet, nor physical activity did influence compliance with prescribed therapy. The most common reason to discontinue therapy was either the side effects of prescribed treatment or smoking.

Conclusion(s): The obtained results suggest that better adherence with medical recommendations is observed in patients who receive additional interest, e.g., counselling, biochemical tests or nurse care. The critical elements for therapy discontinuation were its side effects and smoking.

Disclosures: The study was sponsored by the Scientific Polpharma Foundation (Medical University Grant No. 501-91-269).

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THE ASSOCIATION OF BODY MASS INDEX AND BONE MINERAL DENSITY IN A MALE POPULATION REFERRED FOR DUAL-ENERGY X-RAY ABSORPTIOMETRY SCAN IN ISFAHAN, IRAN

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Objective(s): In this study the relation between BMI and BMD of a male population was investigated.

Material & Methods: In this study 224 male patients from Isfahan province of Iran who showed no sign of secondary osteoporosis underwent a bone densitometry scan using a Norland XR-46 (Norland Co, Fort Atkinson, WI, USA), to examine the relationship between their BMI and BMD. Demographic and osteoporosis related risk factors were gathered on a computer based questionnaire. The subjects were divided into three groups according to the WHO classification of BMI (Table-1). ANOVA test showed no significant difference in age of the three groups. Each patient underwent a standard hip and AP spine BMD scan and osteoporosis/osteopenia was diagnosed based on the definition of WHO.

Table 1

Group	Number of Subjects	BMI Ranges (kg/m^2)	BMI Classification	Age (Years) Mean±SD
1	94	18.50<BMI< 24.99	Normal	63.9±8.1
2	92	25≤BMI<30	Overweight	62.2±7.7
3	38	BMI≥30	Obese	64.0±7.7

Results: ANOVA test on the mean total standardized BMD (sBMD) showed significant difference in hip and spine regions between groups 1 and 2 ($P<0.004$), and 1 and 3 ($P<0.001$) but no significant difference was found between groups 2 and 3. BMD was classified as osteoporotic/osteopenic in 94.7% of people within group 1, 82.6% among people in group 2, and 81.6% among people in group 3. Of all subjects 28 (12.5%) had normal bone density while 196 (87.5%) were diagnosed as osteoporotic/osteopenic.

Table 2

Group	Hip Total sBMD (g/cm^2)	AP Spine Total sBMD (g/cm^2)
1	0.879±0.10	0.994±0.16
2	0.929±0.14	1.078±0.18
3	0.954±0.13	1.130±0.16

Conclusion(s): The results of the study suggest that patients classified as overweight/obese have a significantly higher BMD value in comparison to patients with normal BMI.

P121
BONE MINERAL DENSITY AMONG RA-PATIENTS TREATED WITH TOCILIZUMAB

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Objective(s): According to the latest data during rheumatoid arthritis osteoporosis develops along with the inflammatory process which should be explained by common pathogenetic mechanisms existing between these two illnesses.

Material & Methods: 75 patients diseased with rheumatoid arthritis, 68 women and 7 men aged from 28-64, were under medical observation. In all cases the diagnosis corresponded to ARA of 1987 and EULAR of 2010 criteria. Among examined patients osteoporosis and osteopenic syndrome were revealed in 82% of cases. Diagnosis of osteoporosis was fulfilled by means of DXA (Hologic – 1000).

Results: As a result of performed studies it has been stated that the lowest index of BMD is marked in the proximal and femoral neck, in the distal part of forearm. A correlative link has been revealed between a high index of CRP and a low index of BMD ($p=0.04$). During one year all patients underwent a medical treatment with intravenous tocilizumab (8 mg/kg), once a month. It should be taken into consideration that all patients with RA-diagnosis were taking a stable dose of methotrexate, 12.5 mg/week.

Conclusion(s): After one year of treatment the condition of all patients was evaluated. Remission (DAS 28 <2.72) was marked in 72% of patients. An pain syndrome became nominal, quality of life took a turn for the better, but the most interesting thing was that the increase of BMD was noticed among the patients treated with tocilizumab. In 48% in the proximal part of a femoral neck the increase was equal to 4.2%. 54% of BMD index improved in lumbar spine and was equal to 5.7%. None of the patients underwent an antiosteoporotic medical treatment. Is it possible that tocilizumab could have an antiosteoporosis effect?

P123
ZOLENDRONIC ACID: MAXIMUM EFFECTIVENESS – MINIMUM SIDE EFFECTS

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Objective(s): In recent years the area of use of zolendronic acid increased significantly. It started with postmenopause osteoporosis, although today men actively undergo medical treatment with zolendronic acid.

Material & Methods: The purpose of the presented work was evaluation of zolendronic acid effectiveness in the cases of different clinical forms of osteoporosis. During 3 years 220 patients underwent medical treatment – 160 women and 70 men, aged from 40-70. Among examined patients 80 patients were diagnosed with postmenopause osteoporosis (group 1); in 55 cases it was a thyroid osteoporosis (group 2); in 21 patients osteoporosis developed simultaneously

with a rheumatoid arthritis (group 3); drug addiction was revealed in 14 men with low BMD (group 4); 60 men suffered from hypogonadotropic osteoporosis (group 5). Diagnosis of osteoporosis was fulfilled by means of DXA QDR-Hologic 1000. All patients received an intravenous zolendronic acid infusion once a year, along with an everyday use of a calcium and vitamin D combined preparation (1000-1500 mg/day) during the year.

Results: After a three year course of medical treatment a fracture risk in the proximal part of a femoral neck decreased: in group1for 56%; in group 2 for 60%; in group 3 for 68%; in group 4 for 70%. The increase of a bone mineral solidity index in a femoral neck equalled to 5.2-6.1% - the highest index among the men patients, i.e., in group 5.

Conclusion(s): After a three year course of medical treatment a fracture risk in the proximal part of a femoral neck decreased: in group 1for 56%; in group 2 for 60%; in group 3 for 68%; in group 4 for 70%. The same tendency is revealed in the decrease of fractures of peripheral bones: in group 1 for 24%; in group 2 for 30%; in group 3 for 32%; in group 4 for 52% and in group 5 for 62%. The increase of a bone mineral solidity index in a femoral neck equalled to 5.2-6.1% - the highest index among the men patients, i.e., in group 5.

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SARCOPENIA AND OSTEOPENIA AMONG 70-80 YEAR OLD FINNISH WOMEN: PREVALENCE AND ASSOCIATION WITH FUNCTIONAL PERFORMANCE

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Objective(s): Consensus diagnostic criteria for age-related sarcopenia have recently been published by the European Working Group on Sarcopenia in Older People (EWGSOP) and the International Working Group on Sarcopenia (IWG). However, recommended cut-off points for outcome variables differ for each. The WHO definition of osteopenia rests on DXA-measured femur T-score. This study assessed the prevalence of sarcopenia and osteopenia among a sample of 70-80 year old independently living Finnish women with normal or somewhat declined functional ability (n=409), compared the consensus diagnostic criteria for sarcopenia and examined the associations between sarcopenia, osteopenia and functional ability.

Material & Methods: Femoral BMD and body composition were measured with DXA. Skeletal muscle mass index (SMI) was defined as appendicular skeletal muscle mass/height^2. Gait speed and handgrip strength defined physical performance and muscle strength. Prevalence of sarcopenia was determined by the EWGSOP criteria (using the presence of low muscle mass, strength and performance for diagnosis) and the IWG (low walking speed and muscle mass). Data analyses included independent samples t-tests to test differences in functional performance according to muscle mass and multiple regression to study correlates of muscle mass.

Results: Prevalence of sarcopenia was 0.9% (n=4) and 2.7% (n=11) according to the EWGSOP and IWG, respectively. Three of the four EWGSOP sarcopenic women fulfilled IWG criteria as well. Nine women had bilateral hip prostheses, and 36% (n=144) of the remaining 400 women had femur T-score<-1. Two of the four sarcopenic women also had osteopenia. Women with greater walking speed (≥0.8 m/s) had significantly lower weight and fat mass percentage, higher lean mass percentage and better functional performance. Women with a low SMI(<5.5 kg/m^2) weighed significantly less, with no significant differences in other outcome measures. SMI, walking speed and grip strength significantly correlated with each other. BMI and grip strength explained 57.5% of the variance in SMI.

Conclusion(s): Our study suggests that when using the above described EWGSOP and IWG definitions, sarcopenia is infrequent among older home-dwelling Finnish women while every third of these women had osteopenia.

Disclosures: Academy of Finland

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PREVALENCE OF FRACTURE RISK FACTORS IN WOMEN WITH OSTEOPOROSIS AND OSTEOPENIA: RESULTS FROM THE PROSPECTIVE OBSERVATIONAL SCIENTIFIC STUDY INVESTIGATING BONE LOSS EXPERIENCE IN THE UNITED STATES (POSSIBLE US™) TREATMENT COHORT

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Objective(s): To describe the prevalence of fracture risk factors in a cohort of postmenopausal women receiving osteoporosis treatment. Subject-reported on-study fractures for women with and without multiple risk factors were also compared.

Material & Methods: From October 2005 - January 2007, 134 primary care physicians enrolled 5015 postmenopausal women receiving pharmacologic and/or calcium/vitamin D therapy for bone loss into the POSSIBLE US™. Analyses included women with a physician-reported diagnosis of

osteoporosis or osteopenia at entry. Risk factors based on FRAX® were identified from physician- and patient-reported data at entry: age >70; fracture history since age 50; minimum T-score (hip/spine)≤-2.5 at diagnosis; BMI <18.5; rheumatoid arthritis; parental history of hip fracture; current smoking; and oral glucocorticoid use within the past 6 months. Subjects provided on-study fracture data using semiannual self-administered questionnaires over ≤3 years of follow-up. Osteoporosis-related fractures were identified using a published classification schema (Warriner, 2011).

Results: Data for women diagnosed with osteoporosis (N= 1916; mean age: 67.8 years; 87% white) and osteopenia (N =2513; mean age: 62.2 years; 90% white) were analyzed. Multiple risk factors were more common than single risk factors among osteoporotic women, (54% vs. 35% of women, $p<0.0001$), but not osteopenic women (14% vs. 34%, $p<0.0001$). Age >70 was the most common risk factor (osteoporotic: 35%; osteopenic: 35%) followed by T-score≤-2.5 at diagnosis in the osteoporotic group (24%) and low BMI (11%) in the osteopenic group. At least one on-study fracture was reported in 12% of osteoporotic compared with 9% of osteopenic women ($p=0.0059$). Osteoporosis-related fractures were more common in women with multiple risk factors compared with those with one risk factor in both osteoporotic (10% vs. 6%; $p=0.0092$) and osteopenic women (11% vs. 5%; $p< 0.0001$).

Conclusion(s): In this treatment cohort, 1 in 2 osteoporotic and nearly 1 in 7 osteopenic women had multiple risk factors for fracture. Osteoporosis-related fractures were significantly more common in women with multiple risk factors.

References: Warriner et al. J Clin Epidemiol 2011;64:46.

Disclosures: Aalok Nadkar/Patrick Ventura analyzed the data. Mandy Suggitt/Erica Rockabrand provided editorial assistance. This study was sponsored by Amgen Inc.

P126
OSTEOPOROSIS AWARENESS AND KNOWLEDGE OF GREEK MEN

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Objective(s): The aim of the study was to estimate the level and quality of knowledge Greek adult men have about osteoporosis, its risk factors and the available preventive measures.

Material & Methods: The study was performed at the Orthopaedic Outpatients Department of a tertiary military hospital in Thessaloniki, Greece, between April-July 2011. 330 men were enrolled in the study. Healthcare professionals were not included in the study. The research tools were the revised Facts on Osteoporosis Quiz (FOOQ) and the Male Osteoporosis Knowledge Quiz (MOKQ). It was the first time they were both translated into Greek. They consist of 20 and 6 questions/statements, respectively, with "yes", "no" or "don't know" answer options. Only correct answers score 1 point. Statistical analyses were conducted with the SPSS 19 software. Pearson's coefficient, ANOVA, Tuckey Honestly Significant Difference and t tests were used to reveal any correlation between age and other demographic parameters with the level of knowledge.

Results: The mean age of the participants was 28.3 years (SD=8.18), ranging between 18- 65 ears. The median age was 26 years. 148 men (44.8%) had a higher education degree, but only 43 (13%) of the participants had been informed about osteoporosis in the past. The average score for the FOOQ was 7.67 (SD=3.58) and the maximum score was 17 points. A subgroup of six questions of the FOOQ (FOOQ-female) refers to female osteoporosis. The mean score for these questions was 1.28 (SD=1.37) points. There were men who answered wrong all the questions of the FOOQ. The average score for the MOKQ was 1.13 (SD=1.23). Each question of the MOKQ was answered correctly by less than 50% of the participants. Scores at the MOKQ and the FOOQ-female were comparable, with a Spearman's correlation coefficient of 0.48 ($p<0.001$). The level of knowledge on osteoporosis was positively correlated with the profession, the level of education and previous information about the disease.

Conclusion(s): The findings prove the poor level of knowledge and highlight the necessity of implementing educational and health promotion programmes, in order to eventually improve osteoporosis prevention among men.

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THE IMPACT OF MENOPAUSE AND HRT IN GINGIVAL TISSUE AND ALVEOLAR BONE

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Objective(s): Menopause is an unavoidable change that every woman will experience, assuming she reaches middle age and beyond. Many women arrive at their menopause transition years without knowing anything about what they might expect. Hormonal changes during menopause influence oral cavity and women may experience unpleasant symptoms. The aim of this study is to show the effect of HRT in preventing the changes in gingival tissue and alveolar bone.

Material & Methods: We examined 64 menopause women aged from 49-64 years old. Half of them received HRT from 6 months to 2 years. We evaluated the gingival tissue, alveolar bone loss and by a questionnaire the mouth burning syndrome, xerostomia and altered taste perception. Osteoporosis evaluation was conducted by rheumatologic specialist.
Results: Gingival atrophy was present in 19 patients untreated with HRT and 3 patients treated with HRT. Xerostomia was present in 18 patients of the first group and in only 2 patients of the second group, while mouth burning syndrome and altered taste perception were not present in patients treated with HRT. We found a correlation between osteoporosis and alveolar bone loss. Hormonal changes during menopause may cause hypertrophic inflammatory changes, which were noted in 5 patient of the first group and 2 patients of the second group.
Conclusion(s): Hormonal changes during menopause effect gingival tissue and alveolar bone. HRT will improve significantly the clinical situation and symptoms of oral cavity in general. Osteoporosis correlates with alveolar bone loss.

P128
BONE STRUCTURE, BONE MINERAL DENSITY, AND FRACTURE: A 15-YEAR FOLLOW-UP IN A DENTAL CLINIC

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Objective(s): To follow up fracture rate 15 years after an osteoporosis information intervention.
Material & Methods: 134 women who had participated in a previous study in 1996 answered a fracture questionnaire in 2011. Initial age ranged between 20-75 years; mean age: 48.3± 10.3 years. In the first investigation all women received information about osteoporosis, the importance of appropriate diet and exercise. Dental radiographs and BMD measurements were obtained. The BMD method was DXA examinations of the forearms. The radiographic alveolar bone structure was evaluated with a visual index as sparse or nonsparse trabeculation, and digitally by the alveolar bone texture. This method used a statistical description of features such as the repeated occurrence of grey-scale configurations (transition from trabeculae to intertrabecular spaces, edges and spots), to classify the radiographic images into four groups. Kruskal Wallis nonparametric test was used to test differences between groups.
Results: Fracture rate was 21.3%. The fractured women had significantly lower BMD (T-score: -1.43) than nonfractured women (T-score: -0.86; $p=0.014$). Mean BMD in sparse trabeculation group was significantly lower (T-score: -2.0) than in the nonsparse group (T-score: -0.80, $p<0.0001$). Odds ratio for getting a fracture when having osteoporosis 1996 was 3.1, $p=0.052$. Sparse trabeculation was found in 15% of the women. This group had a significantly higher fracture rate than the nonsparse group (40%><17%; $p=0.02$). Odds ratio for getting a fracture when having sparse trabeculation 1996 was 3.3, $p=0.023$. When adding age in the logistic regression analysis OR for sparse trabeculation remained significant predictor of fracture (OR=2.8; $p<0.05$; age: OR=1.04; $p=0.09$). However, for osteoporosis diagnosis as fracture predictor the adding of age decreased OR to 2.08 ($p=0.25$). Bone texture was significantly better in the nonfractured group than in the fractured group (2.2 vs. 1.6; $p=0.03$). Odds ratio for using bone texture as fracture predictor was 4.32 ($p=0.019$).
Conclusion(s): In this sample with few fractures, bone texture and sparse trabeculation was a slightly better predictor of fracture than the osteoporosis diagnosis.

P129
THE RELATIONSHIP BETWEEN THE RADIOLOGICAL PARAMETERS FROM PLAIN HIP RADIOGRAPHS AND THE BONE MINERAL DENSITY IN A KOREAN POPULATION

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Objective(s): Radiological parameters from the plain radiographs might be used to provide information on osteoporosis of the proximal femur. The purpose of this study was to investigate the association of the Singh index, CTI and CC (calcar-to-canal) ratio with BMD as well as their relationship with the physical parameters to assess their potential as an indirect indicator of osteoporosis.
Material & Methods: The BMD, Singh index, CTI and CC ratio as well as the physical parameters [age, gender, height, and BMI were obtained from hip radiographs and the clinical records of 150 Korean adults. Linear relationships between the areal BMD of the femoral neck and the parameters as well as between each parameter were obtained. To determine the association of the BMD with the radiological parameters, multiple regression analyses were performed after adjusting for the four physical parameters.
Results: The CTI was positively associated with the BMD ($p=0.019$), whereas the Singh index ($p=0.125$) or CC ratio ($p=0.585$) was not. The CTI was negatively associated with age ($p=0.03$) and positively associated with height ($p=0.019$) and BMI ($p=0.004$). The CC ratio was also positively associated with age ($p=0.0001$) and negatively associated with height ($p=0.024$).
Conclusion(s): Of three parameters available from plain radiograph, only CTI was significantly associated with BMD. CTI can provide a tool for rapid assessment of osteoporosis from plain hip radiographs.

Disclosures: This work was supported by the research grant from the National Research Foundation of Korea (2011-0000057).

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THE IMPROVEMENT ON THE FUNCTIONAL PARAMETERS OF PATIENTS WITH KNEE OSTEOARTHRITIS USING TWO THERAPEUTIC EXERCISES

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Objective(s): The aim of this study is to evaluate the therapeutic effects of two muscle-strengthening exercises on the functional parameters of patients with knee osteoarthritis.
Material & Methods: The study included nineteen patients with knee osteoarthritis, using three random groups: in group I were included 30 patients with isotonic muscle strengthening exercise, in group II were included 30 patients with isometric muscle strengthening exercise, and group III (30 patients) was control group. For the evaluation of the functional parameters were used: Visual Analog Scale, muscular testing, gait speed, Lequesne Index, before and after treatment.
Results: In patients with knee osteoarthritis of groups I and II, were improved the pain, the disability and gait speed, after treatment.
Conclusion(s): Isometric exercise were used for initial strengthening in patients with knee osteoarthritis and isotonic exercise were used for improving joint stability.
References: 1. Huang MH, Lin YS, Jang RC, Lee CL (2003) A comparison of various therapeutic exercises on the functional status of patients with knee osteoarthritis. Semin Arthritis Rheum. 2. Roddy E, Zhang W, Doherty M (2005) Aerobic walking or strengthening exercise for osteoarthritis of the knee? A systematic review. Ann Rheum Dis. 3. Shelbourne KD, Biggs A, Gray T (2007) Deconditioned knee: The Effectiveness of a Rehabilitation Program that Restores Normal Knee Motion to Improve Symptoms and Function. N Am J Sports Phys Ther.

P131
THE INTERACTING EFFECTS OF COGNITIVE COMPLIANCE AND REHABILITATION ON THE ELDERLY PATIENTS WITH LOW BACK PAIN

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Objective(s): Carrying out a randomized, prospective study regarding the efficiency of the programme for physical and kinetic rehabilitation using two groups of elderly patients with: LBP, radiculopathy, canal stenosis and operated disc herniation, with or without cognitive dysfunctions. Identification the role that the decrease of mental and cognitive compliance plays in emphasizing the decline of the physical functional ability of these patients.
Material & Methods: The study was performed to NIRPMB, in two groups (group I – a study group and group II – the control group), either of 50 patients, males and females, elderly, with LBP, radiculopathy, canal stenosis and operated disc herniation. Distinction between the two group was made based on the Folstein test, after a screening: in the control group (group II) included patients with a greater score than 15 points, in the study group (group I) included patients with a lower score than 15 points. The clinical and functional parameters assessed: pain, physical and cognitive dysfunctions, disabilities, quality of life. We also used the scales: VAS, MMSE, GDS, Zigmond-Snaith Anxiety Scale, muscular and articular testing, Tinetti Gait Scale, Tinetti Balance Scale, ADL 24.
Results: The improvement recorded were: pain with 41.6% (group I) and 51% (group II); physical dysfunctions with 28.1% (group I) and 37.1% (group II); cognitive dysfunctions with 37.2% (group I) and 47.8% (group II); disabilities with 48.9% (group I) and 57.3% (group II), quality of life with 39.1% (group I) and 48.2% (group II).
Conclusion(s): Improvement of pain, physical and cognitive dysfunctions, disabilities, quality of life for both groups after physical-kinetic program was applied to the two groups of elderly patients with low back pain. Higher percentages recorded at the control group (without cognitive disorders) highlighted the negative effects of cognitive disorders, depression and anxiety in the evolution of the score for the parameters that we mentioned.
References: 1. Haggman S et al (2004) Phys Ther 84:1157. 2. Jarvik JG et al (2005) Spine 30:1541.

P132
THE ROLE OF OPEN AND CLOSED KINETIC CHAIN EXERCISES AT THE PATIENTS WITH KNEE OSTEOARTHRITIS

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Objective(s): The aim of this study is to evaluate the pain, the dysfunction and the disability in the patients with knee osteoarthritis, using open and closed kinetic chain exercises.

Material & Methods: The study included 16 patients with knee osteoarthritis: in group I were included open kinetic chain exercises, in group II were included closed kinetic chain exercises. Reevaluation was made at 6 months. For the evaluation of the functional parameters were used: pain, dysfunction and disability.
Results: In patients with knee osteoarthritis of groups I and II, were improved the pain, dysfunctions and disability, after treatment.
Conclusion(s): Open kinetic chain exercises were used for initial treatment in patients with knee osteoarthritis.
References: 1. French HP, Keogan F, Gilsenan C, Waldron L, Oconnell P (2010) Measuring patient satisfaction with exercise therapy for knee osteoarthritis: evaluating the utility of the physiotherapy outpatient survey. Musculoskeletal Care. 2. Thorstensson CA, Roos EM, Petersson IF, Ekdahl C (2005) Six-week high-intensity exercise program for middle-aged patients with knee osteoarthritis: a randomized controlled trial. BMC Musculoskelet Disord. 3. Fransen M, McConnell S, Bell M (2002) Therapeutic exercise for people with osteoarthritis of the hip or knee. A systematic review. J Rheumatol.

P133
THE ROLE OF POSTURAL THERAPY IN IMPROVEMENT SELF-ASSESSMENT OF HEALTH CONDITION AND QUALITY OF LIFE AT THE PATIENTS WITH ANKLE FRACTURES

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Objective(s): We intended to study the efficiency of a selected physical and kinetic rehabilitation methodology, with emphasis on postural evidence based therapy, using objective and quantifiable evaluation criteria at the patients with ankle fractures.
Material & Methods: The study was performed to NIRPMB, in two groups (group I – a study group and group II – the control group), either of 50 patients, males and females, with post traumatic afections (fractures) of ankle. Distinction between the two group was made based on the physical and kinetic rehabilitation methodology: study group was emphased on postural therapy. The clinical and functional parameters assessed: pain, physical and cognitive dysfunctions, disabilities, self-assessment of health condition, quality of life. We also used the scales: VAS, muscular and articular testing, Hamilton Scale, movement ability, absenteeism and work ability**,** ADL 24**.**
Results: The improvement recorded were: the pain with 45.7% (group I) and 36.8% (group II); physical dysfunctions with 27% (group I) and 19.6% (group II); cognitive dysfunctions with 39.7% (group I) and 32% (group II); disabilities with 36.6% (group I) and 29.5% (group II), self-assessment of health condition with 29.2% (group I) and 21.3% (group II), quality of life with 36.9% (group I) and 28.9% (group II).
Conclusion(s): Improvement of pain, physical and cognitive dysfunctions, disabilities, self-assessment of health condition, quality of life for both groups after physical-kinetic program was applied to the two groups of patients with ankle fractures. Higher percentages recorded at the study group (emphasis on postural therapy) showed the role of postural therapy in the physical and kinetic rehabilitation methodology.
References: 1. Bhandari M, Sprague S (2004) J Orthop Trauma 18:338. 2. Chaiwanichsiri D, Lorprayoon E (2005) J Med Assoc Thai 88(Suppl 4):S90. 3. Dimulescu DM (2008) Terapia posturala în afectiunile aparatului locomotor, Editura Universitatii din Bucuresti. 4. Simanski CJ, Maegele MG (2006) J Orthop Trauma 20:108.

P134
SERUM LEVELS OF CARTILAGE OLIGOMERIC MATRIX PROTEIN AS A THERAPEUTIC INDICATOR FOR ONGOING TREATMENT OF KNEE OSTEOARTHRITIS

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Objective(s): Osteoarthritis is commonest form of arthritis, a leading cause of disability in older adults. Various treatment options present, ranging from lifestyle modification to knee replacement. Questions like “What is the effect of ongoing treatment over disease? At what stage, patient requires change of therapy?” are still need to be answered. It is highly required to develop an investigatory modality, providing information about efficacy of ongoing treatment. Aim of present study is to estimate and compare serum levels of Cartilage Oligomeric Matrix Protein (COMP) for assessing efficacy of ongoing treatment and disease prognosis in patients having knee osteoarthritis.
Material & Methods: A prospective randomized control trial, conducted within a period of one year recruiting 100 cases. All cases were asked to fill WOMAC questionnaire and get a bilateral knee radiograph done for confirming severity of disease with Kellgren Lawrence grading scale. 5 ml venous blood sample were drawn from cases and serum COMP level was estimated by ELISA. The value of COMP obtained was compared with WOMAC score and KL grading scale. Cases were then divided into mild,

moderate and severe grade and prescribed medications according to standard management guidelines of OARSI with few modifications, depending upon disease severity. Follow up was done after every four weeks assessing efficacy of treatment and disease progression.

Results: Out of 100 cases screened, there were 32% mild, 61% moderate and 7% severe cases. The serum COMP levels corresponded to the severity of disease, as higher the severity, more the value of serum COMP. During follow ups, serum COMP levels responded differently to different treatment modalities, with a generalized decreasing trend in most of the groups.

Conclusion(s): A directly proportional relation between the severity of disease and serum COMP levels is observed. The estimated serum COMP level followed a decreasing trend with most of the treatment modalities, which corresponded to the functional improvement, symptomatic relief and gradually increasing WOMAC score in the cases. Hence estimation of serum COMP levels is reliable therapeutic indicator to assess efficacy of ongoing treatment and disease progression in knee osteoarthritis.

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PREDICTION OF TOTAL KNEE REPLACEMENT IN A 6-MONTH MULTICENTRE CLINICAL TRIAL WITH CHONDROITIN SULFATE IN KNEE OSTEOARTHRITIS: RESULTS FROM A 4-YEAR OBSERVATION

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Objective(s): To identify predictive factors for the incidence of total knee replacement (TKR) during long-term follow-up of knee OA patients who formerly received treatment with chondroitin sulfate (CS) or placebo in a multicentre trial using clinical and magnetic resonance imaging (qMRI) data.

Material & Methods: Knee OA patients participating in a previous 6-month randomized, double-blind controlled trial evaluating the impact of CS (400 mg b.i.d.) vs. placebo who had serial MRI acquisitions of the symptomatic knee[1] were recently contacted to evaluate retrospectively the incidence of TKR of the study knee. A subgroup of patients (n=70) who had taken all the study medication and had all clinical and MRI evaluations were selected for this post hoc retrospective analysis. Of this cohort, 51 patients were reachable for TKR incidence. The assessment was done blindly to treatment allocation with a standardized phone interview.

Results: Patients' mean age was 62.9 years, 61% were female and average BMI was 30.6 kg/m^2. A total of 7 (6 target knees and 1 contralateral) TKRs (13.7%) were performed on this subpopulation in the timeframe of 3-4 years after completion of the original study. Interestingly, more TKRs were performed within the placebo group (n=5) than the CS group (n=2) (71% vs. 29%, p=0.15, logistic regression). Predictors of long-term TKRs for the target knee were investigated by comparing the patients who had TKR (n=6) of the target knee to those who did not (n=45), using data at baseline or the change at 1 year. At baseline, the strongest predictors of TKR were WOMAC pain (p=0.02, logistic regression), stiffness (p=0.01) and function (p=0.04), bone marrow lesions of the medial tibia (p=0.03), and C reactive protein level (p=0.03). Changes at 1 year in medial cartilage volume (p=0.05) and WOMAC stiffness (p=0.01) also predicted the occurrence of TKR.

Conclusion(s): These data demonstrate that, from a knee OA clinical trial, it is possible to predict a "hard" outcome such as TKR using clinical and qMRI data. Moreover, CS appeared to protect cartilage volume loss and improved clinical parameters.

References: [1] Wildi LM, et al. Ann Rheum Dis 2011;70:982.

Disclosures: Supported by a grant from Bioibérica, Spain.

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FRAX™ ARGENTINA IN WOMEN WITH RHEUMATOID ARTHRITIS: COMPARATIVE STUDY WITH THE FRAX™ SPANISH MODEL

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Objective(s): FRAX™ in a tool designed by WHO to calculate 10-year risk of fracture. The aim of this study was to compare the Spanish model and the Argentine model applied to a population of patients with rheumatoid arthritis (RA) whose previously to the development of the argentine model were studied using the FRAX™ Spanish model.

Material & Methods: Argentine FRAX™ were applied to women with adult onset RA, aged between 40-90 years. Data were compared to the Spanish model obtained in a previous study by our group to the same population. Future risk (FR) for neck fracture (NF) and major osteoporosis (MO) were determined using the Spanish and the Argentine model of FRAX™.

Results: 205 women were included, mean age 59.8 years (40-85 years) BMI mean 26.24 (14.3-40.7). BMD FN mean

T-score - 1.39, SD 1.08 (-4.12 - 1.47). 157 patients were GC users (76.6%), 34 had history of fractures (16.6%), 15 patients had familial history of neck fractures (7.3%), smoking 44 pat (21.5%) and 4 patients consumed alcohol (2%), 14 pat (6.8%) had causes of secondary osteoporosis. FR of neck fracture and MO were compared using the Spanish and the Argentine model. FRAX™ Argentina: FR for NF: mean 4.54%, SD: 7.66, median 1.30. FR for MO mean: 11.01%, SD 10.66, median 7.00. When compared to the Spanish model we found that 10-year absolute risk for NF and MO was statistically higher using the Argentine FRAX model (test of Wilcoxon range $p<0.001$ for NF and MO. More frequently found risk factors were glucocorticoids, smoking and history of previous fractures.

Conclusion(s): Comparing the Spanish model with the Argentine model, developed later, FR for NF and for MO were significantly higher using the Argentine model in patients with RA.

P137
USE OF HEALTH-RELATED QUALITY OF LIFE (HRQOL) MEASURES TO PREDICT HEALTH UTILITY (HU) IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN: RESULTS FROM THE MULTIPLE OUTCOMES OF RALOXIFENE EVALUATION (MORE) STUDY

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Objective(s): To examine associations between HU and HRQoL at baseline in 1245 osteoporotic postmenopausal women who participated in the MORE study.

Material & Methods: The EuroQol 5D (EQ-5D) and EU Foundation of Osteoporosis Quality-of-Life Assessment (QualEFFO) measures of HU and disease-specific HRQoL, respectively, were administered to 551 European (EU) women while the McMaster Health Utility Index (HUI) and Osteoporosis Patient Assessment Questionnaires (OPAQ) measures of HU and disease specific HRQoL, were administered to 694 non-European (non-EU) women. The Nottingham Health Profile (NHP) was administered to all women to assess health status. Pearson's correlation coefficients identified correlations between HU and HRQoL, while stepwise regression models identified independent and unique HRQoL domains that predicted HU. Model performance for predicting HU was assessed by the amount of variance explained using R2.

Results: Mean age was 67.5 and 68 years for the EU and non-EU cohorts. Mean baseline scores were slightly lower for EU vs. non-EU cohorts on all NHP domains (5 vs. 10, emotional reaction; 12 vs. 17, energy; 10 vs. 14, physical mobility; 12 vs. 19, pain; 19 vs. 24, sleep; 3 vs. 5, social interaction). In both cohorts, HRQoL and HU scores were significantly correlated, particularly for important domains related to pain, physical function, emotional and mental health. In the EU cohort, 4 QualEFFO domains (daily activities, pain, mental health, mobility) were significantly correlated with EQ-5D scores ($p<0.05$) while in the non-EU cohort, 5 OPAQ domains (walking/bending, fear of falls, level of tension, back pain, fatigue) were significantly correlated with HUI scores ($p<0.05$) - variance explained was 61% and 41%, respectively. In the EU cohort 4 of the NHP domains (pain, physical mobility, emotional reaction, and energy) were significantly correlated with EQ5-D scores and in the non-EU cohort all 6 NHP domains were significantly correlated with HUI scores ($p<0.05$) - variance explained was 53% and 44%, respectively.

Conclusion(s): These results demonstrate that disease-specific HRQoL measures (OPAQ, QualEFFO) and generic (NHP) are significant predictors of HU scores (EQ5-D and HUI).

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BONE MINERAL DENSITY IN HAEMODIALYSIS PATIENTS: A STRONG RELATIONSHIP WITH AN HISTORY OF FRACTURE

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Objective(s): Diagnosis of osteoporosis (OP) is mainly based on BMD. Haemodialysis (HD) patients are exposed to secondary hyperparathyroidism (SHPT) and sometimes to steroid therapy that may favor OP. The objective of this study was to measure BMD in HD patients and to find the associated factors, especially the history of fractures.

Material & Methods: All prevalent HD patients were included. Wrist Z-score was applied as marker of SHPT and Hip T-score as marker of OP. Patients were compared according to their wrist Z-score and Hip T-score$<$or$\geq$-2.5. Routine biology, osteoprotegerin (OPG), FGF-23, bone alkaline phosphatase (BALP), β-crosslaps (CTX), Whole PTH, treatments and previous history of nontraumatic fractures from less than 10 years were recorded. An ROC curve analysis was applied between DMO score and history of fracture.

Results: 161 HD patients were studied, 67.2±13 y.o, 45% of female gender, on dialysis since 45 months (median), diabetics in 35% of cases. Administrated treatments were alfacalcidol (45%), calcifediol (94%), CaCo3 (15%) and sevelamer (39%). Mean hip T-score was -2.2±1.4, wrist Z-score was -1.2±2. In

logistic regression, OP (hip T-score<-2.5) associated factors were: male gender, history of fracture, low BMI and body weight. SHPT (wrist Z-score<-2.5) associated factors were: alfacalcidol treatment, history of fractures, higher nPCR and serum OPG and greater dialysis vintage. ROC curve analysis for the association with fractures showed a best cut off for wrist Z-score of -2.5 (sensibility 52.8%, specificity 84.6%) and hip T-score of -2.2 (sensibility 82.9%, specificity 47.1%). Factors associated with fractures were age, chronic liver disease and wrist Z-score<-2.5 (RR 3.1).

Conclusion(s): Wrist Z-score (29%) and hip T-score (50%) are frequently in the OP range in HD prevalent patients. The low mineral density was not associated with some expected factors like iPTH, female gender, steroid therapy or parathyroidectomy. The cut off for the association with fracture for T- and Z-score is close to that reported for general population. For HD patients with low BMD, the fracture prevention must lead to correct some modifiable factors related to nutrition and mineral metabolism.

P139
THE SIGNIFICANCE OF THE QUANTITATIVE CHARACTERISTICS OF NICOTINISM IN RELATION TO THE LEVEL OF FEMALE SKELETON DAMAGE

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Objective(s): Nicotinism has a serious negative effect on skeleton. Skeletal disability pathogenesis is multifactorial. It consists in the direct activation of osteoclastic resorption, decreased bone formation and bone matrix damage. This direct effect is modulated by the state of total hormonal homeostasis, neonatal parameters, musculoskeletal balance, the presence of some major system diseases and a general lifestyle (diet, physical activity). Many correlational studies with human has proved a negative relation of smoking to bone density and quality, however in some other papers these results has not been confirmed. The relation between these parameters has not been proved, likewise in some other authors' studies. The aim of the study was to monitor the influence of the length of smoking, a number of cigarettes smoked and the age of the first use of cigarettes on the whole-body bone density.

Material & Methods: Whole-body densitometry determining bone and soft tissues using DXA was measured with 40 women, where 22 women were premenopausal (average age 35±8) and 18 women postmenopausal (average age 57±5). All probands had been smoking in the long term continuously until the day of examination. Partial correlations adjusted to constant age and physical activity were used to evaluate relations between the smoking intensity indicators on one side and anthropometric characteristics and bone quality indicators on the other side.

Results: Monitoring the effect of smoking upon whole-body bone density and the volume of muscle mass with women, we have not proved statistically significant relation of the whole-body mass to the number of cigarettes smoked, or to the length of smoking, or to the age of the first use of cigarettes.

Conclusion(s): Though the study is not fully comparable with those monitoring the relation of smoking to bone density of the selected high risk skeleton localities, fundamentally it comes up with the identical results when compared with other studies.

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FACTORS ASSOCIATED WITH CHANGES IN BONE MINERAL DENSITY IN HAEMODIALYSIS PATIENTS

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Objective(s): Haemodialysis (HD) patients display a higher risk for fracture as compared to the general population and this risk has been associated with low BMD score. We aimed at assessing the BMD evolution and the associated factors in a stable HD population in one centre.

Material & Methods: Between 2006 (T0) and 2009 (T3), 2 BMDs were performed recording the results of the femoral neck (FN) and the ultradistal radius (UDR) bone density. Patients with a decreased BMD (BMD-) were compared to patients with stable or increased BMD scores (BMD+). A radiological vascular calcification (VC) score (0-3) was applied.

Results: 77/95 patients at T0 were still dialyzing in our centre at T3 and were recorded for analysis. Mean age was 67±10 (30-80) years, 50% were of female gender, 33% were diabetic, in dialysis since 75±82 months with a 3x5 to 3x8 h schedule. Mean FN BMD decreased of -8.5±11% (0.7±0.1 to 0.63±0.1 g/cm^2), UDR BMD decreased of -9.4±14% (0.49±0.1 to 0.43±0.1 g/cm^2). As compared to BMD+, FN-BMD- patients (64%) had more frequently peripheral artery disease (27 vs. 7%), more severe VC score (1.57±2 vs. 1.17±2), a decrease of serum FGF-23 (-2800 vs. +3800 RU/ml), an increased serum PTH (+120±250 vs. +28±120%) and were taking more frequently sevelamer (50 vs. 26%). Patients with UDR-BMD- (72%) have an increased serum PTH (+108±

250 vs. -8±44%), more severe VC score (1.55±2 vs. 1.1±2) and were less frequently treated with CaCO3 (2 vs.15%).
Conclusion(s): The decrease of BMD is frequently observed in HD patients after 3 years. We failed to found any relationship with age, gender and BMI but mostly with vascular calcification and increased PTH possibly related with less calcium intake.

P141
RADIOGRAPHIC EVALUATION OF THE NEW BONE TISSUE AFTER RHBMP-2 APPLICATION IN RATS SUBMITTED TO CHRONIC ALCOHOLISM

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Objective(s): Alcoholism may cause changes in bone structure and is considered a reduction factor on bone formation, whereas the rhBMP-2 is a morphogenetic protein known to play an important role on bone repair processes and induce bone formation. Thus, the aim of the present study was to investigate radiographically the action of chronic alcoholism in bone defects (5 mm of diameter) recuperation after rhBMP-2 insertion, pure or combined to a collagen matrix.
Material & Methods: It was used 80 male Wistar rats (250 g) divided equally into 8 groups, and sacrificed after 4 and 6 weeks. Animals were submitted to the following treatments: 1) water "ad libitum", 2) alcohol "ad libitum", 3) water "ad libitum"+5 μg rhBMP-2, 4) alcohol "ad libitum"+5 μg rhBMP-2, 5) water "ad libitum"+collagen sponge (carrier), 6) alcohol "ad libitum"+collagen sponge (carrier), 7) water "ad libitum"+5 μg rhBMP-2 / collagen sponge, 8) alcohol "ad libitum"+5 μg rhBMP-2 / collagen sponge. After these treatments, animals were sacrificed considering the respective periods of time, and the samples submitted to radiographic analysis using the X-ray machine GE-100 (General Electric, Milwaukee, USA) operating at 70 kVp, 10 mA, 12 pulses, and analyzed by the Digora digital system (Soredex, Orion Corporation, Helsinki, Finland).
Results: Data were statistically analyzed using Kruskal-Wallis and Dunn's Multiple Comparisons. At 4 weeks, there was no difference ($p>0.05$) for the used treatments, however, at 6 weeks, the groups that received rhBMP-2 with or without the carrier, and independent of the alcoholism induction, showed higher radiographic density compared with other groups, $p<0.05$.
Conclusion(s): We conclude that the rhBMP-2 was able to recover the surgical area in this experimental model, showed by the radiographical method used.

Disclosures: The authors are grateful to FAPESP for financial support.

P142
DISTAL RADIUS BONE STRENGTH ESTIMATED BY FINITE ELEMENT ANALYSIS BASED ON QCT IMAGES

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Objective(s): The distal radius is one of the most common sites for osteoporotic fractures and using tools such as pQCT and HR-pQCT, bone strength can be estimated using FE analysis. Since access to these tools is still limited, it is valuable to use clinical QCT as a basis to accurately estimate bone strength. Thus, the purpose of this study was to validate estimates of bone strength at the distal radius using FE analysis based on QCT images.
Material & Methods: Twelve fresh-frozen distal radii (6 left, 6 right; 4 female, 2 male; Age: 74.0±12.9 yrs) were thawed and scanned with QCT (GE Discovery CT750HD; 120 kVp, 60 mAs) and, as the gold standard, HR-pQCT (Scanco Medical XtremeCT, AG). QCT images were semi-automatically contoured to find the endosteal surfaces using Stradwin (v4.3, Cambridge, UK) [1]. HR-pQCT images (82 μm isotropic voxels) were segmented and contoured based on the standard manufacturer protocol. A matching 24.6 mm section of the distal radius was extracted from both the QCT and HR-pQCT images. Inhouse software was used to calibrate the QCT data based on a hydroxyapatite calibration phantom (B-MAS200, Kyoto Kagaku, Japan) and rescale the images to 0.625 mm isotropic voxels. Density values were converted to Young's modulus values [2]. HR-pQCT images were directly converted to FE models and assigned a Young's modulus of 6829 Mpa [3]. Uniaxial compression to 1% strain was applied and linear models were solved using FAIM (v5.3 Numerics88; Calgary, Canada).
Results: Bone strength (ultimate stress, MPa) was estimated for both sets of models. A linear regression analysis was performed relating the QCT estimates to the HR-pQCT measurements resulting in a R^2 value of 0.91.
Conclusion(s): This work provides insight into the ability of FE models based on QCT to estimate bone strength at the distal radius. This study is limited to linear FE analysis and the boundary conditions applied do not exactly represent those that would occur during a fall on an outstretched arm. Future work will apply advanced constitutive properties in the FE model in order to better predict bone strength.
References: [1] Treece, Med Image Anal, 2010. [2] Keyak, J Biomech, 1998. [3] MacNeil, Bone, 2008

P143

WOMEN WITH INSUFFICIENT 25-HYDROXYVITAMIN D WITHOUT HYPERPARATHYROIDISM HAVE ALTERED BONE TURNOVER AND GREATER INCIDENCE OF VERTEBRAL FRACTURES

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Objective(s): The connection of 25-hydroxyvitamin D [25 (OH)D] with bone metabolism is reported to occur indirectly through PTH activity. However, we hypothesized that 25(OH) D insufficiency raises the risk of bone fracture independent of PTH, since 25(OH)D insufficiency is not always accompanied by hyperparathyroidism. The aim of this study was to show a direct association between 25(OH)D, bone turnover markers, and fractures that was independent of PTH.

Material & Methods: We measured serum 25(OH)D in a group of 330 postmenopausal osteoporotic women who did not have secondary hyperparathyroidism. We analyzed the effects of 25(OH)D insufficiency [25(OH)D <20 ng/mL] on the expression of several bone markers, including serum bone alkaline phosphatase (BAP), osteocalcin (OC), urinary N-terminal telopeptide of type-I collagen and free deoxypyridinoline (DPD), and inorganic phosphorus (IP), as well as on the prevalence of vertebral fractures.

Results: OC/BAP ratios and IP levels were significantly lower and DPD was significantly higher in 25(OH)D insufficient patients. These effects were independent of age, PTH, and estimated glomerular filtration rate (eGFR). 25(OH)D insufficiency, a low OC/BAP ratio, and low IP were related to the presence of prior vertebral fractures independent of PTH, BMD, and eGFR.

Conclusion(s): We propose that 25(OH)D insufficiency is associated with a low OC/BAP ratio and high DPD in postmenopausal osteoporosis patients without hyperparathyroidism. This pathological condition is associated with an increased incidence of prior vertebral fractures independent of PTH, BMD, and eGFR.

P144

NUTRITIONAL FACTORS INFLUENCE BONE MICROARCHITECTURE DURING GROWTH

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Objective(s): The skeleton is responsive to environmental factors during growth, in part perhaps due to the intense cellular activity of modeling and remodeling which assemble its structure during the first two decades of life. High resorptive modeling (not followed by formation at the same location) and perhaps remodeling activity excavate the medullary canal determining cortical thickness together with periosteal apposition. At the ends of long bones, endochondral apposition and condensation of growth plate trabeculae form the metaphyseal cortex with varying degrees of porosity determined by the differing tempo of longitudinal and appositional growth. We hypothesized that a higher intake of calcium, vitamin D and protein during childhood are associated with attainment of a more robust appendicular skeleton; thicker and less porous cortices and a smaller medullary canal.

Material & Methods: We measured tibial macro- and microarchitecture using HR-pQCT. Dietary intakes were assessed using 3-day weighed-food diaries.

Results: Cross-sectional study of 62 healthy boys and girls aged from 6-18 years (mean 11 years) of whom 53.2% were prepubertal, 27.4% peripubertal and 19.4% postpubertal. Intakes were calcium (803 mg, range 216 to 1623), vitamin D (2.89 μg, range 0.6-9.9) and protein (82 g, range 25.9-208). Results were expressed as mean, 95% CI. In a General Linear Model multivariate analysis, the effect size (ES) estimated from the partial beta^2 is greater between cortical vBMD and calcium intake (ES=0.025%, 95% CI, -0.095 to 0.022) and vitamin D intake (ES=0.054%, 95%CI, -18.5 to 0.72). Protein intakes explained the greatest effect size (ES= 0.054, 95% CI, 0.107-3.206%) on total cross sectional area of the tibia compare to other bone macro- and microarchitecture results.

Conclusion(s): Two factors limit the power of this study, the small sample size and the range of nutritional intakes which may be above those defining 'insufficiency'. Within these constraints we infer that ensuring adequate protein intake may benefit the attainment of peak bone microstructure during growth.

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DENOSUMAB DISCONTINUATION AND ASSOCIATED FRACTURE RISK: A FREEDOM TRIAL ANALYSIS

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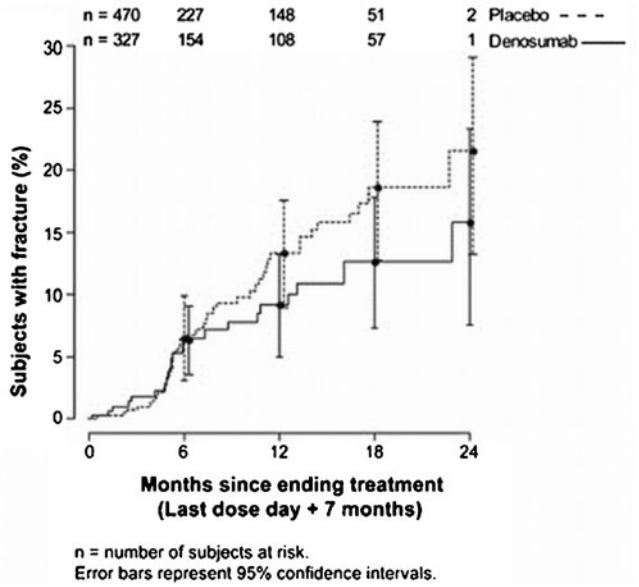
Objective(s): In FREEDOM, denosumab 60 mg every 6 months decreased the risk of fractures at 3 years vs. placebo.[1] Discontinuation of denosumab treatment is associated with transient increases in bone remodelling and declines in BMD,[2,3] but the effect on fracture risk is not well characterized. This analysis was conducted to understand fracture incidence in an osteoporotic population after treatment cessation.
Material & Methods: We evaluated FREEDOM subjects who discontinued treatment after 2-5 doses of investigational product, either denosumab or placebo, and continued study participation for ≥7 months (≥6 months since last dose+1-month study visit window). Off-treatment observation began 7 months after last dose and lasted approximately 6-24 months.
Results: The 797 subjects (470 placebo, 327 denosumab) evaluable for this assessment had similar age, prevalent fracture, and BMD T-scores (lumbar spine and total hip) at baseline. During treatment, more subjects treated with placebo than denosumab sustained a fracture and had significant decreases in BMD. Initiation of alternative therapy after last dose was more common in placebo than denosumab-treated subjects (42% vs. 28%). After treatment discontinuation, similar percentages of subjects in both groups sustained a new fracture (9% placebo, 7% denosumab; fracture rate/100 subject-years 13.5 and 9.7, respectively; HR 0.82; 95% CI 0.49, 1.38, adjusted for baseline age and total hip BMD T-score). There was no apparent difference in fracture occurrence pattern between treatment groups during the off-treatment period.

Figure: Time to first osteoporotic fracture during the off-treatment period



Conclusion(s): In this analysis, there was no excess fracture risk after treatment cessation of denosumab vs. placebo during the off-treatment period for up to 24 months.
References: 1. Cummings *NEJM* 2009. 2. Miller *Bone* 2008. 3. Bone *JCEM* 2011.

Disclosures: Study sponsored by Amgen Inc.

P146
IS BODY SHAPE ASSOCIATED WITH LOW BONE DENSITY

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Objective(s): BMI, weight, and lean mass are all known risk factors for either low bone density or fracture risk. Our objective was to identify body shape indices that may be associated of low bone density as a visual indicator of risk.
Material & Methods: Our study population was the NHANES 199-2004 data release providing body composition and bone density measures on a cross-section of the US population. Using the whole-body DXA scans, we converted the fat, lean, and bone mas measures of the total body and subregions to calibrated volumes using algorithms previously developed in our lab. The measures derived were absolute volumes in L for total body, arms, legs, trunk, and head. We also represented shape indices for combinations of these values including %trunk, %arms, %legs, trunk/legs ratio, arms/legs ratio. Logistic regression was used determine the association of each of these shape parameters to whole body BMD after adjusting for age, ethnicity, sex, and BMI.
Results: We found that there were unique body shapes for men and women of any ethnicity, and for black, white, and Hispanic Americans. In general, we found that white men and women had the largest overall body sizes for all ages vs. other ethnicities. Average body size also decreased for all participants at approximately the age of menopause for women (50 yrs) and andropause for men (60 yrs). Absolute trunk volumes showed similar trends to whole body. However, percent of trunk volume to total volume remained constant after the meno- and andropause ages implying that shape remained the same after these ages even though absolute body sizes were decreasing. Total trunk volume was significantly associated with BMD even after controlling for other known associations.
Conclusion(s): Body shape indices are associated with BMD independent of lean mass and other BMD predictors. Body shape may play an independent role in fracture risk or provide an anthropomorphic description of risk of fracture.

P147
TERIPARATIDE AND ANTIRESORPTIVE COMBINATION TREATMENT SUBSEQUENT TO 9 MONTHS OF TERIPARATIDE MONOTHERAPY

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Objective(s): Increased bone formation in the absence of accelerated resorption is resulting in a marked rapid anabolic response to teriparatide (TPTD). Due to coupling mechanisms, the sustained increase of bone formation and ongoing anabolic effects are accompanied by significantly increased bone resorption. Our aim was to investigate the effects of the addition of antiresorptives to the second half of TPTD cycle when resorption is already also markedly elevated.

Material & Methods: We prospectively randomized 117 postmenopausal women (mean age 71.7±8.5 years, T-score L1-L4 -2.45±1.38; 91.5% with prevalent fractures) after 9 months of TPTD treatment into three different open-label groups for another 9 months: alendronate (ALN, 70 mg/week, 41 patients), raloxifene (RAL, 60 mg/day, 34 patients) or no medication (TPTD mono, 42 patients) on top of ongoing TPTD treatment. Serum level of PINP and CTX as well as DXA measurement at the spine, total hip and femoral neck BMD were evaluated at TPTD treatment initiation, at baseline of randomization to antiresorptive therapy as well as at 3, 6 and 9 months during the combination treatment.

Results: After 18 months of TPTD treatment, lumbar spine BMD increase was significantly higher in the ALN (+0.08 g/cm^2, p=0.046) and RAL (+0.09 g/cm^2, p=0.026) group when compared with the TPTD mono group (+0.05 g/cm^2). In the total hip region, addition of RAL (+0.03 g/cm^2) did not alter the BMD effects of TPTD monotherapy (+0.03 g/cm^2), but addition of ALN induced a more pronounced increase in total hip BMD (+0.05 g/cm^2) than RAL (p=0.026) or TPTD alone (p=0.048). Elevation of PINP and CTX was significantly lower in the ALN and RAL group at the end of the 18 months treatment when compared to TPTD treatment alone.

Conclusion(s): Our data suggest that addition of ALN to the second 9 months of TPTD treatment cycle results in augmented BMD increase. This BMD increase may reflect either favorable balance of bone formation and resorption towards more formation or increased secondary mineralization of newly formed bone matrix.

References: Black DM et al. N Engl J Med 2003;349:1207. Cosman F et al. J Bone Miner Res 2011;26:503.

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TREATMENT WITH PTH 1-84 IN MALE PATIENTS WITH SEVERE OSTEOPOROSIS – RESULTS FROM A PROSPECTIVE 24 MONTH OPEN-LABEL TRIAL

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Objective(s): Recent findings support the hypothesis of osteoblast dysfunction in male osteoporosis This study investigated the effect of PTH 1-84 in severe male osteoporosis.

Material & Methods: 26 men (mean age 63.3±14.3 ys) were prospectively assigned to daily subcutaneous injections of 100 μg of PTH 1-84 for 24 months. 81% had prevalent fractures including vertebral fractures (20 pts, mean 3±1.8), nonvertebral fractures (11 pts) and hip fractures (5 pts). 6 pts had long term steroid medication (9.3±5.3 ys). 20 pts had prior antiresorptive treatment (6.3±2.6 ys) and 6 were treatment naïve (low BMD, ≥2 CRFs). Primary objectives were the gain of BMD at lumbar spine and hip and the changes of bone turnover markers (P1NP, S-CTX). Secondary objectives were reduction of new osteoporotic fractures and the evaluation of safety and tolerability. Patients had BMD measurements (DXA), X-ray of spine, assessment of P1NP, S-CTX at baseline and at months 6, 12, 18 and 24. A visual analogue scale (VAS) was assessed for general health.

Results: The increase of lumbar BMD at month 12 was 6.51% and at month 24 13.98%, at femoral neck from 1.17% and 8.5% and at total hip 1.5% and 7.72% compared to baseline (P<0.0001 for all). P1NP rapidly increased up to 421% at month 12 and remained till to the end of the observation period; S-CTX increased between 181% and 322% (maximum 347% at month 12) [P<0.001 for all]. One patient (GIOP) had a new morphometric vertebral fracture and one patient sustained a hip fracture after a major trauma (accident).PTH 1-84 was generally well tolerated. VAS score declined from 7.5 to 3.2 (P<0.05).

Conclusion(s): Our data suggest that PTH 1-84 rapidly increases BMD at different skeletal sites regardless of prior long-term treatment with bisphosphonates or steroid medication. The bisphosphonate induced suppression of the bone turnover does not seem to reduce the anabolic effect of PTH in male patients with severe osteoporosis.

References: Patsch JM, Kohler T, Berzlanovich A, et al. J Bone Miner Res 2011;26:1584.

P149

THE DISCRIMINATORY CAPACITY OF BMD MEASUREMENTS BY DXA AND DXL INCLUDING CLINICAL RISK FACTORS FOR DETECTING PATIENTS WITH VERTEBRAL FRACTURES

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Objective(s): Fracture risk in osteoporotic patients depends on BMD and clinical risk factors (CRFs). DXA of spine and hip is considered gold standard for BMD assessment. Due to frequent degenerative conditions in spine or hip calcaneal DXL (DXA and laser) is an easily obtainable and transportable alternative.
Material & Methods: Vertebral fracture risk was evaluated in an analysis of 591 females and males (mean age 64.4±9.2 years) without any prior osteoporotic medication except calcium/vitamin D comparing BMD measurements by DXL and DXA and CRFs with/without BMD. 160 had radiological verified vertebral fractures. Areas under ROC curve (AUC), univariate and multiple logistic regressions were calculated.
Results: Detection rates for subjects with diminished BMD according to WHO criteria were higher with DXL compared to DXA. AUC for detection of vertebral fractures was comparable for DXL at calcaneus and DXA at femoral neck (AUC: DXL 0.6654, DXA 0.6669). Odds ratio for vertebral fracture risk prediction was generally weak for DXA femoral neck (0.613) and DXL (0.521). Univariate logistic regression among CRFs without BMD revealed age, prevalent fragility fracture, and BMI significantly associated with increased fracture risk. (AUC=0.805). Combining BMD and CRFs, a prognostic improvement in case of DXA at femoral neck (AUC 0.8694, p=0.0227), DXL at calcaneus (AUC 0.8690, p=0.0594), and DXA at total hip (AUC 0.8610, p=0.0617) was found.
Conclusion(s): DXL was more sensitive compared to DXA for identification of subjects with vertebral fragility fractures, but both methods had less power than CRF alone. Combination of CRFs with BMD measurements by DXL or DXA further increased the discriminatory capacity for detection of patients at risk for vertebral fracture.
References: 1. Muschitz C, Patsch J, Buchinger E, et al (2009) Wien Klin Wochenschr 121:528. 2. Thorpe JA, Steel SA (2006) Br J Radiol 79:336. 3. Brismar TB, Janszky I, Toft LI (2010) J Osteoporos 875647. doi:10.4061/2010/875647.

P150
CONSERVATIVE TREATMENT RESISTENCE OF PAINFUL SHOULDER IN OLDER PATIENTS

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Objective(s): Identifying underlying sonographic alteration in conservative treatment resistance of painful shoulder in older patients (over 60 years old) in ambulatory practice.
Material & Methods: 78 patients (130 painful shoulders) over 60 years old, with pain in the shoulder for the first time, who underwent diagnostic and therapy course for 2 weeks and failed to improve. Inclusion criteria: age over 60, the first pain episode, failure of the 2 weeks conservative treatment (oral analgesic and physical therapy). Exclusion criteria: preexisting trauma, preexisting sportive activity with shoulder impact, inflammatory rheumatic disease, central and peripheral motor deficiencies with upper limb involvement, situations implying cane utilization. We defined treatment failure as a difference between VAS at first presentation (VASi) and VAS at the end of the conservative treatment (VASa) less or equal to 2. Patients underwent clinic and sonographic shoulder examination.
Results: 54% women, unilateral (33%) or bilateral (67%) shoulder pain. Mean VASi 8.94, mean VASa 8.62. Shoulder sonography: cuff rotator lesions (4%), bursitis (4%), long head biceps tendon lesions (3%), acromioclavicular osteoarthritis (44%), effusion in the lung head biceps sheet (without tendon alteration 67%), degenerative lesion of the humeral head (90%).
Conclusion(s): Osteoarthritic changes of acromioclavicular and glenohumeral joints are frequently found in older patients with conservative treatment failure of painful shoulder.

P151
IMPROVING MANAGEMENT OF LOW TRAUMA FRACTURES IN A TERTIARY HOSPITAL: THE FRACTURE CAPTURE PROJECT

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Objective(s): Follow up after admission for a low trauma fracture is low with a previous audit of the Austin Hospital indicating that less than 1% of inpatients were discharged with treatment related to a fragility fracture, and only 6% had follow up investigation. We aimed to determine if a designated fracture identification and treatment program improved treatment rates following a low trauma fracture.
Material & Methods: Patients admitted through the emergency department (ED) with a low trauma fracture (hip, spine upper and lower limbs) were identified weekly. Inpatients had clinical assessment and biochemical investigations for secondary causes of osteoporosis. Treatment was commenced according to standardised guidelines. After discharge, endocrine clinic review was scheduled following

outpatient DXA and pathology assessments. Patients discharged directly from the ED were contacted via mail to undergo secondary screening. Follow up reminder letters were sent to patients who failed to respond.

Results: Over a 24 month period, 955 females (mean age 74.8±11.4 years) and 325 males (mean age 71.1±11.8 years) with fragility fractures were identified. 587 were inpatients (309 hip, 35 wrist, 243 other) and 693 discharged directly from the ED (18 hip, 294 wrist, 381 other). 51% of inpatients were discharged with treatment, compared to <1% previously and 40% of inpatients underwent assessment and clinic review compared to 6% observed in the prior audit. 53% of those discharged directly from the ED underwent investigations and clinic review compared to no patients prior to the program. 14% elected to be treated by their own GP or specialist. Of all the low trauma fracture admissions, only 12% potentially went untreated (failed to respond to correspondence).

Conclusion(s): Implementation of a dedicated bone fragility identification and treatment program significantly improved initiation of therapy. Whether this translates into improved compliance and fracture risk reduction required further investigation.

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HIGH PREVALENCE OF VITAMIN D DEFICIENCY AMONG PREGNANT WOMEN AT TERM AND THEIR NEONATES IN THESSALONIKI, NORTHERN GREECE

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Objective(s): Maternal vitamin D status is integral to fetal development. There are few data from Greece, a country with abundant sunshine, regarding the prevalence of vitamin D deficiency in pregnancy. Our aim was to assess vitamin D status of women at term and their neonates in a region of Northern Greece.

Material & Methods: Maternal serum and cord blood levels of calcium (Ca), 25-hydroxyvitamin D (25-0H-D), alkaline phosphatase (ALP), phosphorus (P) and PTH were studied in 60 mother-newborn pairs at term. The study was conducted between February 2010 - March 2011. Dietary habits and skin phototype (Fitzpatrick's classification) were studied.

Results: Mean level of maternal serum 25(OH) D was 10.11±6.8 (6.2-21.2) ng/ml, significantly lower (P<0.001-paired samples test) than that of cord blood 14.2±9.5(10.2-23.8) ng/ml. Maternal serum 25-OH-D correlated positively with cord blood 25-OH-D(r=0.79, P<0.001) (Spearman's correlation). According criteria defining vitamin D deficiency, 82.3% of mothers and 62.5% of neonates were vitamin D deficient, respectively. Umbilical venous blood P was significantly (P<0.001) higher than maternal blood levels [5.2±1.2 (3.8-5.9) vs. 3.6±1.2 (2.9-3.8) mg/dl], while umbilical PTH levels were significantly lower (P<0.001) than maternal levels [4.5±2.5(3.1-7.1) vs.22.1±9.1 (6.5-36.2) pg/ml]. No differences were found between maternal and cord blood Ca and ALP levels (p=0.710). The intake of Ca and vitamin D was uniformly low [283±103 mg/d and 48±24 IU/d], respectively. Mothers who delivered during winter and spring had lower 25-OH-D levels (P<0.001), than those who delivered in summer and autumn [8.9±5.1 (4.2-11.1) vs. 9.6±6.8 (5.8-15.4)]. Finally, women with fair phototype had higher 25-OH-D (P<0.001) than women with darker phototypes.

Conclusion(s): We observed a high prevalence of hypovitaminosis D among pregnant women and their newborns in Northern Greece. Further public health intervention and vitamin D supplementation is needed to improve maternal and neonatal vitamin D status.

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UTILITY OF FRAX AND Q-FRACTURE TOOLS IN THE EVALUATION OF T2DM PATIENTS

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Objective(s): The WHO fracture risk assessment tool (FRAX) is implemented in several guidelines and most widely used at present, although the presence of diabetes is not included as a risk factor. Q-fracture includes the presence of diabetes, and could be better in the evaluation of patients with diabetes. Our objective was to evaluate the performance of FRAX tool and Q-fracture in a group of T2DM patients.

Material & Methods: Cross-sectional study including 78 patients with T2DM. Lumbar spine and femoral BMD were measured by DXA (Hologic QDR 4500). Ten-year major osteoporotic fracture risk and hip fracture risk were calculated using FRAX tool and Q-fracture. Results were analyzed using SPSS 15.0.

Results: Mean age was 57.8 years (57.8±6.4). 44.8% were females (n=35) and 55.2% males (n=43). 22.4% of patients have densitometric criteria for osteoporosis and 9% had a previous fracture. Prevalent radiographic vertebral fractures

were detected in 27.7%. Medium FRAX index was 2.52± 1.95 for major osteoporotic fractures and 0.35±0.40 for hip fractures. If BMD value was added to calculation medium FRAX index was 2.77±2.38 for major osteoporotic fractures and 0.35±0.59 for hip fractures. There were no differences between medium FRAX index calculated with or without BMD. When treatment thresholds were applied (7% ten-year probability for major osteoporotic fracture and 3% ten-year probability for hip fracture) few patients were selected for treatment. 2.6% of patients had a ten-year probability for major osteoporotic fracture >7% and the percentage rose to 5.1% when femoral neck BMD was added (p 0.002). No patients had a ten-year probability for hip fracture >3% and 2.6% meet criteria when femoral neck BMD was added. Using Q-fracture, 3.8% of patients had high fracture risk and 1.3% high risk of hip fracture.

Conclusion(s): In our group of T2DM patients a low percentage of T2DM patients are selected for treatment by FRAX tool or by Q-fracture despite the high risk of fracture demonstrated by high vertebral fracture rate. Additional studies are needed to establish the performance of those scales in the evaluation of fracture risk in T2DM patients.

P154

ALCOHOL-INDUCED OSTOPENIA IS LINKED TO OSTEOCYTE APOPTOSIS AND LIPID INFILTRATION INTO THE BONE

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Objective(s): Alcoholism is one of the main causes of secondary osteoporosis in men. Heavy alcohol consumption has been shown to induce osteocyte apoptosis and excess fat. The aim of this in vivo study in the rat was to study the relationship between osteocyte apoptosis and lipid metabolism in bone.

Material & Methods: 24 male Wistar rats, 8 weeks old at baseline, drank either a 35% v/v ethanol beverage (A) or water (C) during 17 weeks. Body composition and BMD were measured by DXA, osteocyte apoptosis was assessed through cleaved caspase-3 and toluidine blue staining on tibia sections. Fat content in osteocytes, bone marrow and cortical bone microvessels was evaluated on tibia sections stained with toluidine blue, nile red and on sections imaged with transmission electron microscopy.

Results: After alcohol treatment, the number of apoptotic osteocytes was increased, as shown by caspase-3 staining (186.2±42.7 vs. 23.9±7.2 in A and C, $p<0.001$) and the higher empty osteocyte lacunae in A vs. C. We observed lipid droplet accumulation within the osteocytes (95.5±7.2 vs. 11.2± 13.1%, $p<0.001$) (Fig 1A and C), the bone marrow (29.3± 13.0 vs. 4.1±4.9%, $p<0.001$) and the cortical bone microvessels in A vs. C (21.3±15.5 vs. 0.2±0.5%, $p<0.003$) (Fig 1B). There was an inverse correlation between BMD and osteocyte apoptosis ($r=-0.72$, $p=0.002$) and strong significant correlations between osteocyte apoptotic number and lipid droplet accumulation in osteocytes ($r=0.95$, $p<0.001$), bone marrow ($r=0.65$, $p<0.02$) and bone microvessels ($r=0.83$, $p<0.005$).

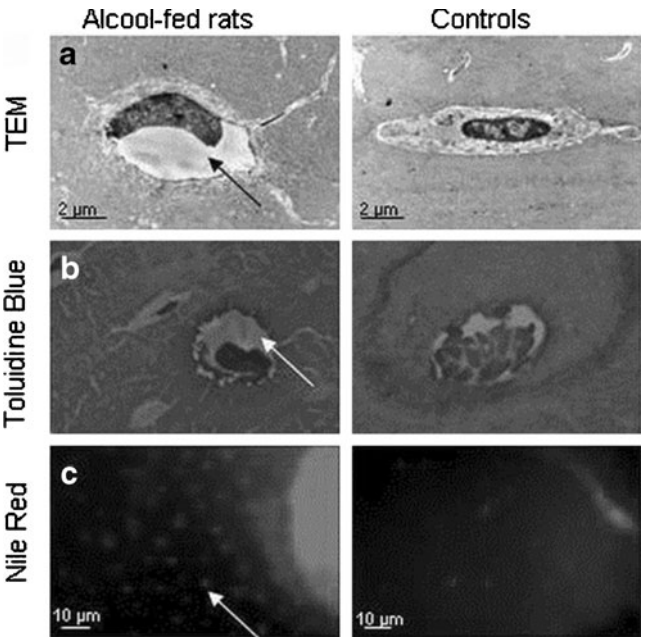

Figure 1

Conclusion(s): These data show that alcohol-induced bone loss is associated with osteocyte apoptosis and lipid accumulation in the bone tissue.

P155

BONE TISSUE MICROMECHANICAL PROPERTIES ARE ALTERED INDEPENDENTLY OF MINERALIZATION IN OSTEOPOROTIC WOMEN LONG-TERM TREATED ALENDRONATE

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Objective(s): Given recent concern about long-term safety of alendronate (ALN) therapy, the aim of the study was to

evaluate the variations of intrinsic properties on iliac cortical bone structural units (BSU).

Material & Methods: Biopsies were obtained in postmenopausal osteoporotic (PMOP) women treated for 8±2 yrs with ALN (n=6, age:69±2 yrs, ALN_{LT}) and 5 age-matched untreated PMOP women. Quantitative microradiography[1] of 100 µm-thick sections from embedded bone samples allowed the measurement of the degree of mineralization of bone (DMB) in 150 cortical BSUs chosen to get the widest range of DMB (95 and 55 in ALN_{LT} and PMOP, respectively). Elastic modulus (E), contact hardness (H_c), and the elastic and plastic energies of the microradiographed BSUs were measured on sections using high load (~500 mN) nanoindentation tests[2,3]. Mineral maturity, crystallinity index and collagen maturity were assessed in same BSUs using Fourier Transform InfraRed Microspectroscopy[4].

Results: Mean DMB was similar between the 2 groups. Compared to PMOP, prolonged ALN treatment was associated with lower E (-12%, $p<0.0001$) and H_c (-6%, $p<0.05$) and higher collagen maturity ($p<0.001$). However, crystallinity index, inversely proportional to crystal size/perfection, was higher in ALN_{LT} than in PMOP (25.29±0.76 vs. 24.78±0.70, $p<0.001$), and was inversely correlated with E and H_c ($r=-0.43$ and $r=-0.54$, $p<0.001$, respectively). Collagen maturity was positively correlated to E and H_c in the two groups (r ranged from 0.40-0.70, $p<0.0001$). Stepwise forward multiple regression including partial correlations revealed that in ALN_{LT}, crystallinity index had a significant entry in the definition of both E and H_c, contrary to PMOP. Treated bone was also less able to plastically resist to deformation at constant strain.

Conclusion(s): Long-term ALN treatment, while preserving the whole bone strength, may alter the mineral crystallinity and subsequently impair the mechanical behavior at BSU level. This provides rational to include multiscale analysis of material properties in the study of fragility associated with prolonged bisphosphonate therapies.

References: 1.Boivin et al, Bone 43, 2008 / 2.Bala et al, J Mech Behav Biomed Mater 4, 2011 / 3.Oliver & Pharr, J Mater Res 7, 1992 / 4.Farlay et al, J Bone Miner Metab 28:433, 2010.

P156
MENOPOST – CALCIUM AND VITAMIN D SUPPLEMENTATION IN POSTMENOPAUSAL OSTEOPOROSIS TREATMENT: A DESCRIPTIVE COHORT STUDY

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Objective(s): Adequate calcium/vitamin D supplementation should be taken in combination with antiresorptive drugs in osteoporosis (OP) treatment. Despite existing recommendations, supplementation appears to be insufficient. The objective of this study was to describe and estimate co-prescription rates of calcium/vitamin D and BMD testing among postmenopausal women initiating an OP treatment.

Material & Methods: A retrospective cohort study in women over 50 years with an initial prescription claim for bisphosphonates, raloxifene or strontium between May-August 2010 was performed using a health insurance claims database from the Rhône-Alpes area.

Results: Among 4415 women included, 77.0% had coprescription of calcium and/or vitamin D with initial OP treatment, among which 2150 (49.7%) had both calcium/vitamin D. A total of 23.0% of women were not supplemented. The proportion of women with calcium and/or vitamin D (81.7%) was significantly higher when OP treatment was a bisphosphonate compared to strontium (70.9%) or raloxifene (67.0%) ($p<0.05$). Among women prescribed both calcium/vitamin D, 7.6% received a bisphosphonate and vitamin D±calcium fixed-combination pack. GPs prescribed two-thirds of initial supplementation treatment (66.9%). Whereas patients were twice as likely to be prescribed supplementation when the prescriber was a rheumatologist (OR=2, 95%CI=[1.57-2.54]). A BMD test was performed in 39.5% of women before initiating OP treatment.

Conclusion(s): Three-quarters of women initiating OP treatment were supplemented with calcium and/or vitamin D in agreement with current recommendations and represents a high coprescription rate.

Disclosures: The authors gratefully acknowledge the contributions of Dr Roland Nublat and Dr Gilbert Weill, medical officers at the French Health Insurance of the Rhône-Alpes area.

P157
VITAMIN D SUPPLEMENTATION AMONG YOUNG ADULTS WITH VITAMIN D DEFICIENCY: A POPULATION-BASED COHORT STUDY

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Objective(s): Vitamin D (25(OH)D) deficiency is a worldwide condition. Its treatment motivated elaboration of guidelines, forged upon available study results. Although, those results seem sometimes conflictuals and may lead general practioners to uncertainty about guidelines validity.

This study aims to describe how the need for supplementation is routinely addressed in middle-aged adults with good general health status.

Material & Methods: We performed a retrospective cohort analysis using reimbursement data from the French Insurance Healthcare System in the Rhône-Alpes area. Subjects without any severe disease, aged 20-60 years who performed a 25(OH)D assay between 1 December 2008 and 31 January 2009 were selected. Patterns of 25 (OH)D supplementation in selected patients who initiated a curative treatment after the assay were observed through claims for pharmacy dispensation during seven months of follow-up.

Results: 790 patients were included in the study, 80.7% were women (n=638), mean age was 47.8 years (SD: 9.5) and 41.5% (n=328) received 25(OH)D supplementation. Over 116 different supplementation patterns were observed in supplemented patients. The two most frequent (33.4%) involved a one shot dose ranging from 100 000 to 200 000 UI of 25(OH)D3 over seven months.

Conclusion(s): Our results suggest a great variability surrounding treatment of 25(OH)D deficiency in France in a young community dwelling population. Moreover, that deficiency is treated mostly in a curative way rather than preventive way in at least one third of supplemented patients.

P158
INITIAL RESULTS WITH ZOLEDRONIC ACID IN A REFRACTURE PREVENTION PROGRAM IN BRAZIL

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Objective(s): To describe the initial results with the use of zoledronic acid 5 mg in PREVREFRAT (Refracture Prevention Program).

Material & Methods: 69 patients with minimal trauma fractures were assigned to receive yearly intravenous zoledronic acid at a dose of 5 mg and calcium and vitamin D supplementation. The patients features, fractures, risk factors, associated diseases, densitometric values related to fractures, serum vitamin D levels, adverse events and incidence of new fractures are reported.

Results: 63 women and 6 men with minimal trauma fractures were assigned to receive yearly intravenous zoledronic acid at a dose of 5 mg. The main fracture was wrist fracture (31.8%), vertebral fracture (27.5%), hip fracture (24.6%) and other fracture (15.1%). 36% of patients had more than one fracture. 48% of patients with non-vertebral fractures and hip fractures had prior vertebral fracture. 45% of patients with wrist fracture and 41% of the hip had prior vertebral fracture. 5 patients with hip fracture had a prior fracture of the wrist. 63.7% had no prior treatment for osteoporosis. According to WHO criteria, 70% were classified as osteoporosis, 26% as osteopenia and 4% normal. All fractures in the classified normal group were wrist fractures. In osteopenia, 50% were wrist fractures and 22% were hip fractures. 85.5% of the patients had vitamin D insufficiency or deficiency. Two cases of flu-like (one patient did not follow the prescription of paracetamol use) were found. An adverse effect not directly related to zoledronic acid use was a case of avascular necrosis of the femoral head 19 months after osteosynthesis of femoral neck fracture. One patient had a new wrist fracture 45 days after infusion.

Conclusion(s): The high percentage of patients with hip fractures who had previous fractures (fracture sentinel) reinforces that it is possible to decrease the rate of fractured hips, showing that liaison services as PREVREFRAT are rewarding. Despite the short follow-up, the low rate of new fractures using a high persistence and compliance drug is encouraging.

P159
COMPARISON OF ARTHROSCOPIC AND OPEN ARTHROTOMY TREATMENT OF SEPTIC ARTHRITIS OF THE KNEE IN THAI PATIENTS

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Objective(s): The aim of this study was to evaluate the efficacy of arthroscopic debridement with that of open arthrotomy for the treatment of septic arthritis of the knee.

Material & Methods: A retrospective study was performed in 77 Thai patients who had been admitted and underwent treatment with either arthroscopy debridement or open arthrotomy in Department of Orthropaedic, Siriraj hospital because of septic arthritis of the knee. The patient medical records were reviewed. The demographics, underlying medical condition, previous history of joint disease, clinical presentation, laboratory and microbiological finding, length of stay, operative detail, and postoperative complications were compared between these two groups.

Results: Between 2002-2011, 77 patients with septic arthritis of the knee were identified, out of which 44 patients were underwent open arthrotomy and 33 underwent arthroscopic debridement. No difference between two groups was observed with regard to patients' characteristics and demographics data (e.g., age, gender, weight, BMI, comorbidities, and pre-existing joint disease). No differences were also observed with regard to clinical presentation and laboratory investigations (e.g., onset, affected knee, blood white blood cell, erythrocyte sedimentation rate, C-reactive protein, serum albumin, arthrocentesis white blood cell, and arthrocentesis polymorphonuclear cells).

The most common organisms were Streptococcus spp. (39%) and Staphylococcus aureus (37%). Arthroscopic debridement had less blood loss ($p<0.01$) and less postoperative complications ($p<0.05$) than open arthrotomy with a statistically significance, even though it was prolonged operative time ($p<0.01$). However, there was no difference for the length of the hospital stay between two groups ($p>0.05$).

Conclusion(s): Arthroscopic debridement is an effective treatment for patients with septic arthritis of the knee, these patients had less blood loss and lower complication rates than did patients who had received open arthrotomy for treatment.

Disclosures: The authors thank the staff and surgeons of the Siriraj Orthopedic department, Dr. Pisit Lertwanich, Dr. Bavornrit Chuckpaiwong, Dr Ekavit Keyurapan, and Dr Chanin Lamsam for their assistance in providing clinical data.

P160
ATYPICAL FEMORAL FRACTURES: FROM THE PAIN WITHOUT FRACTURE TO THE FRACTURE WITHOUT PAIN

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Objective(s): To describe the clinical and radiological features of patients with atypical femoral fractures diagnosed in the last three years at the Hospital of Sabadell (Barcelona, Spain).

Material & Methods: Descriptive study. All consecutive patients admitted to the Orthopedics Department, Hospital of Sabadell (reference population 400,000) from January 2008 - December 2010 were reviewed. After the confirmation of an atypical fracture of the femur (major features[1]) the patient clinical chart was reviewed, collecting some data about demographics, osteoporosis treatment and phosphocalcium metabolism parameters on admission.

Results: Eight atypical fractures of the femur in 6 patients were registered. All patients were female. Mean age 76.7± 10.1 years (range 60-91). In all cases the fracture was located in the femoral shaft. In two patients the fracture was bilateral and in four patients unilateral (2 right, 2 left). Six out of eight fractures were transverse and two were oblique. Two patients had no previous symptoms and four patients had previous limb pain (lasting 1-8 months). All patients except one were receiving bisphosphonates: alendronate (2 patients), ibandronate (2 patients), risedronate (1 patient). Patients under risedronate and ibandronate had previously received other bisphosphonates for more than 7 years. The time of treatment with bisphosphonates in each patient ranged between 3-12 years. Five patients (83%) had hypovitaminosis D (25(OH)D <25 ng/ml), with a mean of 25(OH)D of 18±5.4 ng/ml. The only patient with normal vitamin D levels was receiving chronic treatment with glucocorticoids for pulmonary fibrosis.

Conclusion(s): Atypical fractures of the femur in our series were located in the diaphysis and occurred in women over 60 years with hypovitaminosis D and treated with bisphosphonates for more than 3 years. The clinical presentation of these fractures was variable: some patients had an incomplete fracture with previous limb pain and other patients had a complete fracture without any previous symptoms.

References: [1]Shane E, Burr D, Ebeling PR, et al (2010) J Bone Miner Res 25:2267.

P161
BENEFICIAL EFFECTS OF STRONTIUM RANELATE COMPARED TO ALENDRONATE ON BONE MASS AND STRENGTH PARAMETERS AT THE TIBIA IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN: A 2-YEAR STUDY

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Objective(s): We compared the effects of strontium ranelate (SrRan) and alendronate (ALN) on bone mass, bone geometry and bone strength measured by p-QCT in women with postmenopausal osteoporosis.

Material & Methods: In this randomised, double-blind and double-dummy study, 189 women were randomised to SrRan 2 g/day or ALN 70 mg/week during 2 years. Bone mass, geometrical and bone strength parameters were assessed by p-QCT at the tibia and radius after 6,12,18 and 24 months of treatment in the ITT population.

Results: Baseline characteristics were similar between groups with a mean age (±SD) of 67.6±5.7 years; L1-L4 and total hip T-scores of -3.1±0.6 and -2.0±0.8 respectively. Over 2 years, L1-L4 BMD increased significantly by +8.5% and total hip BMD by +5.7% in SrRan group compared with 6.8% and +2.6%, respectively, in ALN group. At the ultradistal tibia, total bone mineral content (BMC) increased

significantly by 3.3% and trabecular BMC by 2.3% in SrRan group and by 1.7% and 1.3%, respectively, in ALN group with a significant between-group difference in favor of SrRan ($p=0.001$ and $p=0.017$). Regarding the bone strength parameters measured at the distal tibia, the moment of inertia (MI) and density-weighted MI increased by 1.2±1.6% ($p<0.001$) and 1.7±2.1% ($p<0.001$), respectively, in the SrRan group and by 0.5±1.8% ($p=0.020$) and 0.9±2.4% ($p=0.001$) in the ALN group with a significant between-group difference in favor of SrRan ($p=0.018$ and $p=0.011$, respectively). Mean increases of 0.7±1.8% ($p=0.003$) for the Section modulus and 1.3±2.4% ($p<0.001$) for Strength Strain Index (SSI) were found in SrRan group, whereas no change was observed in the ALN group with a significant between-group difference in favour of SrRan ($p=0.013$ and $p=0.001$ for section modulus and SSI, respectively). At the radius level, no between-group differences were observed regarding bone strength parameters, density-weighted MI and SSI increased significantly in both groups. The two treatments were well tolerated.

Conclusion(s): SrRan demonstrates greater effects on bone mass and strength parameters at the tibia compared to ALN in women with postmenopausal osteoporosis after 2-year treatment. These findings consolidate the results of previous studies supporting a benefit of SrRan on bone strength.

P162
THE ABSENCE OF THE DIAGNOSIS OF OSTEOPOROSIS IN PATIENTS WITH HIP FRACTURES DUE TO FRAGILITY

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Objective(s): The objective of this study is based on the description of the medical features in patients with a history of prior fracture by fragility.

Material & Methods: Description of the following variables: sex, age, prior diagnosis of osteoporosis and the presence of prior osteoporotic fractures in a population of patients admitted to the Hospital for hip fractures from December 2010 - November 2011.

Results: The sample includes 103 patients with an average age of 82.43 (range: 55-93), of which 74.8% are female. 28 of 103 patients had prior diagnosis of osteoporosis, of which one patient (3.84%) was male ($P<0.001$). 44 patients had a previous fracture due to fragility (any location) and of these 23 had no previous diagnosis of osteoporosis.

Conclusion(s): 1.- Despite a history of prior fracture by fragility (any location) only 50% of patients had been diagnosed of osteoporosis and 2.- of males with hip fractures only 3.84% had a previous diagnosis of osteoporosis.

References: Cauley JA, Lui LY, Genant HK, et al (2009) J Bone Miner Res 24:943. Klotzbuecher CM, Ross PD, Landsman PB, Abbott TA (2000) J Bone Miner Res 15:721.

P163
AGING OF ILIAC CORTICAL BONE IN NORMAL WOMEN AND MEN

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Objective(s): In humans, bone structural changes with age have been mainly described rather in cancellous bone than in cortical bone (1). Thus, the aim of this study was to evaluate, in a normal human population, the structural changes with aging in cortical bone.

Material & Methods: Iliac bone samples were taken at necropsy from 99 men and 68 women aged from 17-91 years, who died suddenly without apparent bone disease. This population is well distributed with similar numbers of women before and after 50 years, and with 2/3 of men between 17 and 49 years. Undecalcified 100 μm-thick bone sections perpendicular to Haversian canals were microradiographed (2). Cortical thickness, cortical porosity, number of intact osteons, number of fragments of osteons, Haversian canal diameter, cortical mean wall thickness (MWT) and degree of mineralization (DMB) were measured on calcified cortical bone tissue.

Results: Cortical thickness decreases ($p<0.01$) and its porosity increases ($p<0.02$) with age in both sexes. These are explained by an increase of bone resorption with time leading to enlarged cavities incompletely refilled. The increase of cortical porosity with age can also be partly due to an augmentation of the number of Haversian canals in men (number of intact osteons, $p<0.05$), and by the enlargement of Haversian canals in women ($p<0.01$), especially after 50 years. In women, the increase of the number of fragments of osteons ($p<0.0001$), more marked from 50 years, results from increased bone remodeling, leading to extension of interstitial bone. To the contrary of trabecular MWT (3) but in agreement with data on rib cortical osteons (4), iliac cortical MWT does not change significantly with age in men and women. Cortical DMB increases with age in both sexes, but significantly only in men ($p<0.0001$).

Conclusion(s): To conclude, in women and men, aging and unbalanced bone remodeling lead to cortical thinning, extended cortical porosity and increased amount of interstitial bone.

References: 1-Courpron et al. In: Meunier PJ ed., Bone histomorphometry, 2nd Int Workshop, Lyon, 1976. 2-Boivin and Meunier, Calcif Tissue Int 2002;70:503. 3-Lips et al, Calcif Tissue Int 1978;26:13. 4-Frost, Calcif Tissue Res 1969;3:211.

P164
A NEW COLLABORATIVE ACUTE HIP UNIT IMPROVES CARE OF OSTEOPOROSIS AND ADHERENCE TO GUIDELINES

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Objective(s): To assess the impact of osteoporosis assessment and management in a new acute hip unit. RCP and NICE have recommended alendronic acid, calcium, vitamin D as cost effective first line options following a fragility fracture.

Material & Methods: A new 15 bedded ward was setup at Glangwili Hospital Carmarthen, Wales, UK in June 2011 providing collaborative surgical and orthogeriatric care. All hip fractures are admitted directly from Casualty as fast track. A new clerking proforma, falls and osteoporosis assessment proforma, operational policy, protocols, evidence based osteoporosis algorithms, standards of care (based on RCP,NICE,BOA,BGS,NOS, NOGG,SIGN) were introduced with regular MDM meetings led by orthogeriatrician and supported by Specialist nurse.

Results: Prior to opening new Unit, UK National Hip Fracture audit 2007 (joint project by BGS and BOA) showed that only 32% patients had multifactorial risk assessment, 67% prescribed osteoporosis medications with inconsistent approach towards investigation for secondary causes and DXA referrals. Since June 2011, amongst 167 hip fracture patients admitted to Acute Unit, 98% had assessment and management of osteoporosis, all appropriate patients prescribed calcium+vitamin D, majority received alendronic acid, those <75 year age were referred for DXA scan, majority had Bone profile test done, majority given leaflets on osteoporosis, 1 patient noted as Bisphosphonate induced Atypical femoral fracture.

Conclusion(s): A new acute hip fracture Orthogeriatric Unit - first in Wales, UK, is providing ideal quality seamless care driven by evidence based practice, to all elderly patients hospitalised following their hip fracture in one single ward. The Department of Health systematic prevention package describes first objective towards Falls and Fracture prevention is to improve care of hip fracture patients and this Unit is able to achieve evidence based management of osteoporosis and also comply with RCP and NICE hip fracture 2011 standards.

Disclosures: Hip fracture team

P165
A NEW CONSULTANT LED FRACTURE LIAISON SERVICE

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Objective(s): Royal College of Physicians Audit have recommended nationwide Fracture Liaison services(FLS)for secondary prevention of falls and fractures in UK. RCP 2007 Audit results locally showed only 12% had osteoporosis assessment, 8% had DXA scan, 44% prescribed medications. We assessed the impact of new Fracture Liaison service started for assessment and management of osteoporosis patients at a district hospital in Carmarthen, Wales, UK.

Material & Methods: A new secondary care service was commenced from October 2010. Fragility fracture patients >50 years attending A&E are proactively screened and appropriate patients seen in Consultant led clinic supported by specialist nurse. Referrals are also received from GPs/clinicians/ ward. Vertebral fractures are identified from hospital PACS and advice sent to GPs. Inpatient fragility fractures are given advice by Orthogeriatrician/specialist nurse. New treatment protocols and available evidence based guidelines are being implemented.

Results: From October 2010 - December 2011, from 305 AE cards screened 123 were suitable for clinic. Including referrals, total=211. Seen in clinic=110. Awaiting (40) declined (47) Followed up(77). Spine PACS reports screened (1469) advice letters to GPs sent for 156. Alendronate calcium and vitamin D prescribed as first line for osteoporosis. Other medications prescribed are strontium, risedronate, zoledronate (34) denosumab (17) PTH (4). All had standardised assessment on new proforma, written leaflets provided, lifestyle and medication advice given.

Conclusion(s): A new and complete FLS –previously nonexistent has been established within existing resources to close secondary fracture prevention management gap. Unlike other FLS, this is highest quality Consultant led, uses proactive case finding approach and fallers benefit from orthogeriatricians expertise on comorbidity, polypharmacy. A large inpatient and outpatient service is being provided locally by enthusiasm, innovation and strong leadership of Orthogeriatrician.

P166
FOURTEEN-MONTH CHANGES IN VOLUMETRIC BMD OF RADIUS AND TIBIA UPON ANTIDEPRESSANT DRUG ADMINISTRATION IN YOUNG DEPRESSIVE PATIENTS

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Objective(s): Depression and using antidepressant drugs, particularly SSRI, has been associated with lower areal BMD at the hip and spine and increased fracture risk compared to healthy controls. Most of the previous studies included postmenopausal patients. Using pQCT, the aim of the present study was to determine the longitudinal changes in trabecular volumetric BMD in young depressive patients under therapy with either SSRI vs. other antidepressants.
Material & Methods: Consecutive male and female (premenopausal) patients on therapy with SSRI or non-SSRI (TCA or NSRI) were recruited. pQCT measurements were performed at baseline and after 12 months at the distal 4% site of the radius and tibia. Of the epiphyseal bone scans cross-sectional area (CSA), total BMD and trabecular BMD (of the central 45% of total CSA) were analysed. Diaphyseal scans at the radius and tibia were performed at 66% from distal bone ends. From these, cortical CSA, total bone CSA, and cortical BMD were measured. Cortical wall thickness was calculated on the basis of a cylindric model. Reproducibility measurements resulted in a smallest detectable difference for trabecular vBMD at the radius of 4.74 mg/cm^3 and of 3.92 mg/cm^3 at the tibia.
Results: A total of 40 patients (34 females and 6 males) were recruited, of whom 26 were on SSRI and 14 on non-SSRI (TCA and SNRI) therapy. Mean age was 37 years and mean follow-up period 13.9 months. Within the SSRI group, none of the bone parameters changed between baseline to follow-up measurement. Within the Non-SSRI group trabecular vBMD increased by 1.8% at the distal radius ($p=0.021$) and by 1.0% at the distal tibia ($p=0.025$). When longitudinal changes were compared between the two groups, trabecular vBMD at the distal radius and total vBMD at the distal tibia increased significantly more in the non-SSRI group ($p=0.031$ and 0.038, respectively).
Conclusion(s): This longitudinal prospective pQCT study of the radius and tibia in young patients on antidepressant drug therapy does not support previous findings that use of SSRI and/or depression leads to bone loss. Under therapy with TCA or SNRI a small increase in vBMD at the distal radius and tibia was noted.

P167
IS THE ABILITY OF FRAX TO PREDICT FRACTURES COMPARABLE IN OBESE AND NONOBESE POSTMENOPAUSAL WOMEN?

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Objective(s): To compare FRAX-generated fracture probabilities ability of fracture prediction between obese (BMI≥ 30 kg/m^2) and nonobese (BMI<30 kg/m^2) postmenopausal women in the Study of Osteoporotic Fractures (SOF) cohort.
Material & Methods: SOF is a prospective population-based study of 9704 Caucasian older postmenopausal women followed up for a mean(SD) of 12.8(5.4) years. As FRAX generates 10-year probabilities, the follow-up was truncated to ten years. Data for FRAX clinical risk factors and femoral neck BMD were available in 6252 women. Incident fracture outcomes included hip fracture, major osteoporotic fracture (hip, clinical vertebral, wrist, or humerus), and any clinical fracture. Fracture probability was estimated using FRAX. ROC curve analysis was used to compare fracture prediction in obese and non-obese women.
Results: 18.5% women in the cohort were obese. Incident clinical fractures occurred during the follow-up period in 26.9% and 32.7% of obese and nonobese women, respectively. FRAX-derived probabilities in women with incident hip and major osteoporotic fractures were significantly lower in obese than in non-obese women (without BMD; 5.8 vs. 11.4% for hip and 17.6 vs. 23.6% for major osteoporotic fracture $p<0.0001$); with BMD: 7.1 vs. 10.9% for hip and 18.2 vs. 23.3% for major osteoporotic fracture $p<0.0001$). ROC analysis showed no significant differences in the ability of FRAX models without or with BMD to predict fractures in obese and nonobese women (Table 1).

Table 1 Comparison of the area under the curve [AUC (95% CI)] from receiver operating characteristic curve (ROC) for the FRAX algorithm between obese and nonobese women

	BMI<30 kg/m^2	BMI≥30 kg/m^2	P
FRAX algorithm not including BMD			
Women with hip fractures	0.689 (0.665,0.714)	0.656 (0.587,0.725)	0.19
Women with any major osteoporotic fracture (hip, clinical vertebral, wrist, and humerus)	0.630 (0.610,0.650)	0.633 (0.587,0.679)	0.13
Women with any clinical fracture (non-vertebral and clinical vertebral)	0.603 (0.586,0.620)	0.586 (0.547,0.624)	0.21
FRAX algorithm including BMD			
Women with hip fractures	0.734 (0.711,0.757)	0.755 (0.698,0.812)	0.48
Women with any major osteoporotic fracture (hip, clinical vertebral, wrist, and humerus)	0.675 (0.656,0.695)	0.696 (0.655,0.737)	0.18
Women with any clinical fracture (non-vertebral and clinical vertebral)	0.628 (0.611,0.645)	0.637 (0.600,0.674)	0.34

Conclusion(s): The ability of FRAX to predict fracture in obese postmenopausal women is similar to that in nonobese women, although its relatively poor performance for non-vertebral fractures indicates that addition of unmeasured risk factors may improve prediction. Addition of BMD to FRAX risk factors enhanced hip fracture prediction more in obese than non-obese women, probably reflecting the differing effect on fracture probability of BMI in the model with and without BMD.

Disclosures: N. Réf.: JYR/11/3531/al - IOF-ECCEO12 Congress

P168
ASSOCIATION BETWEEN MALE OSTEOPOROSIS AND CHRONIC PULMONARY OBSTRUCTIVE DISEASE

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Objective(s): The objective of this study was to analyze the association between osteoporosis and chronic obstructive pulmonary disease in male subjects.

Material & Methods: This prospective clinical study was conducted in 2004-2008, on a sample of 230 men aged between 35-85 years (mean age 66.22±11.72 years), clinically and radiologic diagnosed with osteoporosis or osteopenia. The control group was composed of 200 men with normal bone mass values determined by DXA method and the evaluation of bone metabolism. The patients evaluation consisted of: history and physical exam, simple radiographs of dorsal and lumbar spine, measuring BMD of lumbar spine and hip by DXA, common biochemical investigations, evaluation of phosphocalcic metabolism, spirometry.

Results: Chronic obstructive pulmonary disease (COPD) was observed in 15.65% of men (36 cases) from the study group and 10 cases from the control group (5.0%) (p=0.000, OR= 3.5, 95%CI=1.7-7.3). In the study group obstructive ventilatory dysfunction was moderate in 83.33% of patients and easy in rest. In the control group all COPD cases had an easy ventilator dysfunction. In the study group 11.11% of COPD patients were underweight. It is known that this condition causes a decrease in fat mass and BMD. Most subjects (55.55%) were normal weight, 27.77% overweight and 5.55% were obese. Mean BMI calculated in men with COPD in the study group was 23.86± 3.68, and in those without COPD 26.11±4.16 (p=0.003). Osteoporotic vertebral fractures were found only in men with moderate ventilatory dysfunction, with an incidence of 55.55%.

Conclusion(s): COPD can be considered as a risk factor for male osteoporosis. Osteoporotic vertebral fractures were frequently observed in men with obstructive ventilatory dysfunction. The study revealed that there is a close association between the severity of COPD and FV.

P169
THE POSITIVE ASSOCIATION OF LIGNAN AND FLAVONOID INTAKES WITH BONE MINERAL DENSITY (BMD) IN MEN FROM SOUTHERN CHINA

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Objective(s): There have been promising data showing that phytoestrogens may prevent bone loss in postmenopausal women. However there has been little data on the skeletal effect of specific phytoestrogens among young men and premenopausal women. The purpose of this study was to examine the relationship between phytoestrogens intake (isoflavones, coumestrol, flavonoids and lignans) and BMD at femoral neck and spine in a cohort of Southern Chinese young men and women.

Material & Methods: The participants of this cross-sectional study included 386 Southern Chinese men and 957 women aged 20-39 years. Linear regression analysis was used to examine the association between phytoestrogens intake (as continuous variable) adjusting for age, BMI, calcium intake, smoking and drinking history, number of pregnancy (for women), educational and exercise level, serum estradiol (for women and men) or testosterone (for men) level. Analysis of covariance was used to test for a linear trend across sex-specific tertiles of phytoestrogens intake.

Results: The findings from linear regression and ANCOVA were in agreement with each other. In particular, dietary lignan intake (β=0.093; p=0.009) and flavonoid intake (β=0.075; p=0.035) were significantly associated with lumbar spine BMD in young men. Interestingly, isoflavone intake was negatively associated (β=-0.024; p=0.011) with BMD at the lumbar spine in young men. Lignan intake was further associated with BMD at femoral neck (p=0.04) in young men. However, only marginally significant associations were observed for lignan and flavonoid intake in women (P range: 0.062-0.093).

Conclusion(s): Our study showed positive associations between specific phytoestrogens intake and BMD in Southern Chinese young men.

P170
MANAGEMENT OF HIP AND KNEE OSTEOARTHRITIS (OA) IN ELDERLY PATIENTS BY FRENCH RHEUMATOLOGISTS (RHS) AND GENERAL PRACTITIONERS (GPS) (GERIAS STUDY)

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Objective(s): To know decisions criteria and habits of prescription in the management of OA of the lower limbs in elderly population by RHs and GPs in France.
Material & Methods: Observational descriptive study, 113 French RHs and 583 GPs participating in different congresses were asked to fulfil a questionnaire.
Results: The clinicians participating were 59% for GPs and 41% for RHs.

- 29% of patients seen by week with OA of lower limbs are older than 85 years old. Knee OA is twice more frequent than Hip OA. In these old people, GPs and RHs quite always prescribe analgesics of level I (97% and 100%) or of level II (91% and 99%).
- The usual dosage of paracetamol prescribed is 3 g/d but when necessary 34% of GPs and 24% of RHs prescribe 4 g/d.
- GPs and RHs also prescribe NSAIDS in case of failure of analgesics of level I or II (74% and 75% of GPs; 54% and 83% of RHs). But they are only 39% for GPs and 24% for RHs to start by NSAIDS before analgesics of level II.
- When practioners use NSAIDS, 88% of RHs always associate proton pomp inhibitors (PPI) but only 70% of GPs.
- SYSADOA are majorally prescribed by GPs and RHs a part from flares (79% GPs, 94% Rhs) and quite 1/2 GPs and 1/3 RHs also use them during flare.
- 60% of GPs send their older patients (≥ 75 y.) to the rheumatologists for an intra-articular injection of hyaluronic acid (86%) or corticoids (80%).

Conclusion(s): For both RHs and GPs the prescribing habits are very close, the RHs generally prescribes higher dosage of paracetamol than GPs, they systematically use a PPI compared to the GPs, for both prescribing drugs for OA in elderly need special cautions especially with NSAIDs.

P171
SYSTEMIC TREATMENT WITH STRONTIUM RANELATE ACCELERATES THE FILLING OF A CRITICAL SIZE BONE DEFECT AND IMPROVES THE INTRINSIC QUALITY OF THE HEALING BONE

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Objective(s): Rapid bone defect filling with normal bone is challenging in orthopedics and dentistry. Systemic treatment with antiosteoporotic agents able to stimulate bone formation may be useful. Strontium ranelate (SrRan), shown to decrease bone resorption maintaining a high bone formation, represents a potential agent able to stimulate bone defect filling.
Material & Methods: We set up a model of critical bone defect in rat proximal tibia. Drilling of 2.5 mm diameter was created in the secondary spongiosa of 6 month-old female rats orally given SrRan (625 mg/kg/d, 5/7 days) or vehicle for 4, 8 or 12 weeks (10 rats *per* group and *per* time point), starting at the moment of surgery. The tibias were removed and a region encompassing the bone defect was selected and analyzed by μCT. To assess the material level properties of the healing bone, the same tibias were then embedded in methyl methacrylate and nanoindentation analysis was performed across the defect (wet conditions).
Results: μCT analysis showed that SrRan treatment significantly increased BV/TV and Tb.Th., and decreased SMI of trabecular bone growing into the defect after 8 (3.4-, 1.3- and 0.6-fold, respectively) and 12 weeks (2.7-, 1.3-, 0.7-fold, respectively) of treatment *vs.* vehicle. Moreover, SrRan treatment accelerated the growth of cortical bone over the defect but with different kinetics *vs.* trabecular bone, as effects were already significant after 4 weeks (1.6-fold *vs.* vehicle). Nanoindentation analysis showed that SrRan treatment significantly increased elastic modulus, hardness and working energy both of trabecular bone growing from the defect limit and cortical bone filling up the defect *vs.* vehicle, from 4 weeks (trabecular bone: 1.3-, 1.3-, 1.2-fold, respectively; cortical bone: 1.4-, 1.4-, 1.3-fold, respectively).
Conclusion(s): We showed that SrRan accelerates bone defect filling, improving firstly cortical and secondly trabecular bone microarchitecture. In addition SrRan rapidly and positively influences the quality of bone tissue healing in the defect (both in trabecular and cortical compartments), by increasing its capacity to withstand a plastic deformation. SrRan thus represents a potential intervention to accelerate and enhance the bone defect filling, with potential advantages in dental or orthopedic surgery for bone healing after tooth extraction or for implant osseointegration.

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BONE-SPECIFIC EPHB4 OVEREXPRESSION PROTECTS CARTILAGE DURING OSTEOARTHRITIS

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Objective(s): Our in vitro studies[1,2] suggest that members of the ephrin system, the ephrin-B2 ligand and its specific receptor ephrin B4 (EphB4), positively impact the abnormal metabolism of human OA subchondral bone osteoblasts and chondrocytes. We evaluated the in vivo role of EphB4 in the pathogenesis of OA, using bone-specific EphB4 overexpressing (TgEphB4) mice.
Material & Methods: The TgEphB4 was confirmed by PCR and Western blotting. Morphometry, morphological and radiological evaluations were performed. OA was surgically induced in 10-week-old male TgEphB4 and wildtype (WT) mice by destabilization of the medial meniscus (DMM), and medial compartment evaluations of cartilage performed using histological and immunohistological means, and of subchondral bone properties using histomorphometric and μCT.
Results: There was no gross phenotypic difference in bone development between TgEphB4 and WT mice evaluated on postnatal day 5 (P5) and 10 weeks. Histological evaluation at 8 and 12 weeks post-OA surgery revealed that TgEphB4 mice had significantly less cartilage alteration than the WT mice in both medial tibial plateau and femoral condyle. This was associated with a significant reduction in both medial compartments of operated TgEphB4 of aggrecan degradation products and type X collagen. Type II collagen degradation products and collagen fibril disorganization were also significantly reduced in operated TgEphB4 compared to WT mice, but only in the medial tibial plateau. The medial tibial plateau subchondral bone demonstrated at both times post-surgery that, compared to the WT, TgEphB4 mice had less joint space narrowing, and significant reduction in sclerotic subchondral bone, bone volume, and trabecular thickness.
Conclusion(s): This is the first in vivo evidence showing that bone-specific EphB4 overexpression exerts a protective effect on OA articular structural changes. This study first supports the notion that this system could be targeted as a specific therapeutic approach for OA and, secondly, demonstrates that during the OA process, the in vivo integrity of the overlying articular cartilage is related to the subchondral bone properties.
References: [1] Kwan Tat S, et al. Arthritis Rheum 2008;58:3820. [2] Kwan Tat S, et al. Arthritis Res Ther 2009;11:R119.

P173
OSTEOPATHY IN ADULT PATIENTS WITH β-THALASSAEMIA MAJOR

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Objective(s): Despite the major advances in diagnosis and treatment of thalassemia major, bone demineralization is still a common finding, even in optimally treated patients; etiology is complex and incompletely known. We present the preliminary data of a case-control study aiming to detect the distinctive characteristics of thalassemic patients with and without osteopathy and discover protective features, tackling the problem from an innovative perspective.
Material & Methods: 30 thalassemic patients (pts) followed-up at the Hereditary Anaemia Center of Fondazione Cà Granda Policlinico of Milan were enrolled; 15 pts (7 males, 18 females, 33±6 years) had normal bone mineralization at DXA and 15 pts (7 males, 18 females, 33±7 years) presented osteoporosis both at femur and lumbar spine. The groups were matched for physical and hematological characteristics (gender, BMI, age at first transfusion, serum ferritin, pretransfusional hemoglobin levels); endocrinopathies were optimally corrected when present. Statistical analysis was performed by Mann-Whitney, McNemar and Mantel-Haenszel tests as indicated ($p<0.05$).
Results: The statistical comparison of the two groups of thalassemic patients with and without osteopathy showed significantly different serum concentrations of IGF-1 (133± 56 vs. 102±62 μg/l). Further, comparing the numbers of patients with endocrine complications in the groups, a protective role of normal gonadic function against osteoporosis emerged, and a similar influence of hypoparathyroidism.

Number (%) of patients with endocrine complications in the 2 groups

	Patients without osteopathy	Patients with osteopathy	p
Hypoparathyroidism	6 (40)	2 (13)	0.04
Hypogonadism	9 (60)	13 (86)	0.02

Treatment-corrected hypothyroidism and diabetes did not affect bone mineralization in this series.
Conclusion(s): Our study confirms the crucial role of endocrine complications in thalassemic osteopathy, confirming the need for early and multi-disciplinary preventive intervention.
References: Vogiatzi MG et al (2009) J Bone Miner Res 24:543. Voskaridou E, Terpos E (2008) Pediatr Endocrinol Rev 6(Suppl 1):86. Angelopoulos NG et al (2006) J Bone Miner Metab 24:138

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THE EFFECT OF PHYSICAL EXERCISE ON THORACIC HYPERKYPHOSIS IN OSTEOPOROTIC ELDERLY WOMEN

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Objective(s): To evaluate the effect of 3 months of muscle strengthening training on degree of thoracic kyphosis in osteoporotic (T-score<- 2.5 DP) women.
Material & Methods: 20 elderly women with osteoporosis were divided into: Group 1 (n=10) women who performed physical exercises and Group 2 (n=10) who did not perform physical exercise. The thoracic kyphosis was evaluated by the flexicurve method, which employs a flexible ruler to measure the spine curvature in the sagittal plane. The flexible ruler is shaped along the patient's back in the format of the kyphotic curvature from spinal process C7 to T12. The flexicurve was removed and placed on a graph paper so that the curvature moulded on the flexible ruler could be transcribed. A straight line (X-total) was traced from C7 to T12. A straight line (called H) to determine the largest distance between curve and X-total and another (X-middle) between T12 and the point where H touches X-total were traced. To calculate the angle of thoracic kyphosis, the values obtained were entered into Microsoft Excel spreadsheet and then converted by a third-degree polynomial function. Women from Group 1 performed muscular strengthening exercises twice a week for 3 months, which consisted of warm-up, stretching, and strengthening of quadriceps, ischiotibial, triceps surae, paravertebral, and abdominal muscles. The evaluation was performed at the beginning of the study and after 3 months.
Results: Group 1 showed no significant difference in the degree of thoracic kyphosis after 3 months of exercise (p> 0.36). However, group2 had a significant increase in the degree of thoracic kyphosis (p<0.01) after the same period.

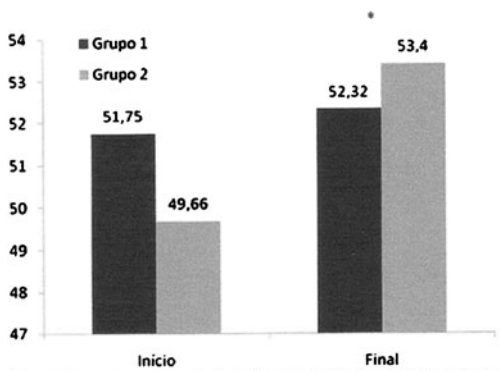

Figure 1.Mean values of thoracic kyphosis degree obtained in the Group 1 (with intervention) and Group 2 (without intervention) in the beginning and after 3 months.
* p < 0,01.

Conclusion(s): The exercise was effective in the maintenance of the degree of thoracic kyphosis in osteoporotic women.
Disclosures: The authors would like to thank the Research Foundation of São Paulo (FAPESP, #2007/54596-0; #2007/57685-4) for the support provided.

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HEALTHCARE UTILIZATION AND COSTS AMONG PATIENTS WITH HIP FRACTURE IN THE UNITED STATES

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Objective(s): To examine the demographics, clinical characteristics, and healthcare utilization and costs among patients with hip fractures in the United States.
Material & Methods: Medical and pharmacy claims from a large US population with commercial insurance (working adults and their dependents) or Medicare supplemental insurance (elderly aged 65+) were analyzed to identify patients aged 50+ who were hospitalized for hip fracture (first hospitalization denoted as the index stay) between 1/1/2006-9/30/2009. All patients selected had continuous enrolment during the 12 months prior to and after the index stay. Demographics, comorbid medical conditions, and characteristics of the index stay were summarized. Healthcare utilization and costs over the 12 months pre- and post-index stay were also examined.
Results: The study included 26,122 Medicare (mean age: 82.3; 72.8% females) and 5100 commercially-insured (mean age: 58.3; 61.9% female) patients who were hospitalized for hip fracture. For both the Medicare and commercially insured patients, the most common comorbid medical conditions were hypertension (49.6% and 38.3%), osteoarthritis (21.9% and 23.1%), and diabetes (18.4% and 20.0%). The average length of the index stay was 6.0 days (SD: 5.4) with an average cost of $19,488 (SD: 21,120) for the Medicare patients; the numbers for the commercially insured were 6.5 days (SD: 6.5) and $31,335 (SD: 40,585). Many of the Medicare and commercially insured patients were discharged to home (34.3% and 60.8%), or a skilled nursing facility (SNF; 28.2% and 13.1%). During the 12 months after the index stay, 64.9% of the Medicare patients had any SNF stay and 24.1% received physical therapy (PT), while the frequency of use was reversed for the commercially insured patients (PT: 62.0%; SNF: 24.4%). For both populations, the average healthcare costs increased from the 12 months pre- to the post-

index stay (Medicare: from $15,896 to $31,205; commercially insured: from $27,236 to $42,961).
Conclusion(s): Among the Medicare or commercially insured patients in the US, hip fracture is associated with significant healthcare resource utilization and costs.
Disclosures: This study was funded by Eli Lilly.

P176
ACCUMULATION OF METABOLIC RISK FACTORS SUCH AS OVERWEIGHT, HYPERTENSION, DYSLIPIDEMIA, AND IMPAIRED GLUCOSE TOLERANCE RAISES THE RISK OF OCCURRENCE AND PROGRESSION OF KNEE OSTEOARTHRITIS: A 3-YEAR FOLLOW-UP OF THE ROAD STUDY

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Objective(s): To clarify the association between the occurrence and progression of knee osteoarthritis (KOA) with components of metabolic syndrome (MS), including overweight (OW), hypertension (HT), dyslipidemia (DL), and impaired glucose tolerance (IGT), using a large-scale population cohort entitled ROAD (Research on Osteoarthritis/osteoporosis Against Disability).
Material & Methods: Among 1690 participants (596 men, 1094 women; mean age 65.2 years old, range 23-94 years) in mountain and seaside areas from the baseline ROAD study recruited in 2005-2007, 1384 individuals (81.9%; 466 men, 918 women) completed the second survey including knee radiography 3 years later. KOA was defined as Kellgren-Lawrence (KL) grade ≥2 using paired X-ray films. Based on changes in KL grades between the baseline and second survey, cumulative incidence and progression of KOA were determined. OW, HT, DL, and IGT at baseline were assessed using standard criteria.
Results: The cumulative incidence of KOA among the 1384 completers over 3 years for the age groups ≤39, 40-49, 50-59, 60-69, 70-79, and ≥80 years was 0.0%, 0.8%, 6.9%, 13.2%, 17.6%, and 25.0%, respectively. Progression in the KL grades for either knee over 3 years was observed in 5.1%, 5.2%, 15.1%, 26.5%, 32.3%, and 49.4% of the participants in these age groups, respectively. Logistic regression analyses after adjusting for age, gender, regional differences, smoking, alcohol consumption, regular exercise, and past history of knee injuries revealed that the odds ratio (OR) for the occurrence of KOA significantly increased according to the number of MS components present (vs. no component; 1 component: OR 2.20; 2 components: OR 2.84; 3 or more components: OR 9.95). Similarly, the logistic regression analysis adjusted for the above variables showed that the OR for progression of KOA in either knee also significantly increased according to the number of MS components present (vs. no component; 1 component: OR 1.38; 2 components: OR 2.31; 3 or more components: OR 2.79).
Conclusion(s): Accumulation of MS components is significantly related to both occurrence and progression of KOA. MS prevention may be useful in reducing future KOA risk.

P177
REFERENCE INTERVALS FOR SERUM N-MID OSTEOCALCIN CONCENTRATION MEASURED WITH THE IDS-ISYS AUTOMATED SYSTEM

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Objective(s): Osteocalcin (OC) is a bone-specific protein produced primarily by osteoblasts during bone formation. The OC concentration is used to assess fracture risk and monitor treatment of osteoporosis and other disorders of bone metabolism. To adequately interpret the OC concentration, it is necessary to calculate reference ranges from a healthy reference population, adapted to a specific laboratory method.
Material & Methods: We established a healthy reference population from the participants of the first follow-up of the Study of Health in Pomerania. Serum OC concentrations were measured from frozen aliquots with the IDS-iSYS N-Mid Osteocalcin assay on the IDS-iSYS Automated System (Immunodiagnostic Systems, Frankfurt am Main, Germany). The coefficients of variation were 6.98% at low, 6.44% at medium, and 5.44% at high levels of control material. The reference interval was defined as the central 95% range between the 2.5th and the 97.5th percentile. Age-specific reference intervals were calculated for men aged 25-80 years and for premenopausal women aged 25-54 years by means of quantile regression. As in postmenopausal women aged 50-80 years OC was not influenced by age, we calculated an age-independent reference interval.
Results: Median (1st-3 rd quartile) OC concentrations were 15.4 ng/ml (12.0-19.5 ng/ml) in 1119 men, 14.4 ng/ml (11.3-18.5 ng/ml) in 545 premenopausal women, and 18.7 ng/ml (13.7-25.6 ng/ml) in 502 postmenopausal women. Median OC concentrations were highest in 25-29 year-old men and women,

were stable during the middle ages, and rose again after 65 years of age in men, and at transition to postmenopause in women. We observed that subjects with type 2 diabetes, intake of oral contraceptives or hormone replacement therapy had lower OC concentrations than subjects without these conditions.

Conclusion(s): We present sex-specific reference intervals for the serum OC concentration over a broad range of age groups to assess bone metabolism.

P178
OSTEOPOROSIS IN HAEMOGLOBINOPATHIES

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Objective(s): Estimation of the osteoporosis in haemoglobinopathies.

Material & Methods: In the study were included patients diagnosed with haemoglobinopathies, sickle cell, thalassemia and sickle cell, and thalassemia, in the Diagnostic Center Harrison. All patients were doing blood tests and all parameters have been evaluated. DXA (osteodensitometria) examination was performed to all patients.

Results: We studied 113 patients with haemoglobinopathies, during the period May-November 2011. Eighteen of them were diagnosed with sickle cell with mean age 12.6±4.9 years, 86 patients with thalassemia (mean age 15.6±7.8 years) and with nine patients diagnosed with thalassemia & sickle cell (mean age of 9.6±6.5 years). From the DXA examination, 13.2% of patients were diagnosed with osteoporosis, 33.8% of patients were diagnosed with osteopenia and 52.9% of patients were resulted as normal. We found a statistically significant correlation between osteopenia and thalassemia ($p=0.031$). Through the coefficient of correlation of Kendal's, about all factors analyzed, it was found that there was a significant correlation between osteoporosis and treatment with cortisone for some time ($p=0.006$); between osteoporosis and the presence of any fracture to people themselves ($p=0.012$) or their relatives ($p=0.001$), between osteoporosis and if patients refer to have lost length in recent years ($p=0.002$), and between osteoporosis and if the patients declared to have a family history for osteoporosis ($p=0.012$). Through binary logistic regression, it was found that people who take cortisone over three months are 6 times more likely (OR: 6.25, 95% CI: 1.99-8.46) than those not receiving cortisone to suffer from osteoporosis, those who have lost length in recent years are 2 times more likely (OR: 2.15, 95% CI: 1:20 to 4:13) to suffer from osteoporosis, than those who have not lost a length.

Conclusion(s): Osteoporosis may affects patients with all types of haemoglobonopathies at all ages.

P179
DRESS STYLE OF WOMEN AND VITAMIN D3 STATUS IN THE SUNNY UAE

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Objective(s): To determine the level of 25(OH) D in cohorts of women with varying dressing style in the sunny UAE.

Material & Methods: 252 women were assayed for total 25-OH vit D (25-OH)D. None was on vitamin D supplement. 96 were fully covered and veiled (Group 1), 104 covered but face exposed (Group 2) and 52 Western-dressed women (Group 3). Age ranged from 15-87 years. 85% were Middle Eastern and North African individuals. The rest were heterogeneous. 51 and 68 in group 1& 2 indicated their adherence to the dressing style for a mean of 24.1± 15.6 and 20.5±10.3 years, respectively, $p=0.14$. Group 3 lived in UAE for >2 years.

Results: Hypovitaminosis D (0-30 ng/ml) and the mean of 25 OH D were 90.5%, 94% and 82.5% and 19.4±7.85, 17.4±8.26 and 22.4±12.8 ng/ml in the three groups, respectively. Significant differences were present between the prevalence of hypovitaminosis D and the mean of 25 OH D of group 2 & 3 (94% vs. 82.5%, $p=0.03$ and 17.4±8.26 vs. 22.4±12.8 ng/ml, $p=0.003$). Values of deficient D3 (12 ng/ml) were observed in 11 (11.5%), 22 (21%) and 6 (11.5%) in the 3 groups respectively, p=NS. Those who indicated the longevity of dressing style in group 2 had a mean of 25 (OH)D 16.6±5.1 vs. 19.9±7.95 ng/ml in group 1, $p=0.008$.

Conclusion(s): Hypovitaminosis D3 was highly prevalent in those women with diverse demography irrespective to the dressing style. The highest was surprisingly in covered but face-exposed women. Western dressed women remained vitamin insufficient but had significantly higher level as compared to the covered but face-exposed women. The outcome invites further work to determine the background of the problem considering the women all reside in a year-round sunny environment. For us there is more to the problem of hypovitaminosis D in women in this community than just a simple pattern and longevity of dressing style.

P180
REDUCED CORTICAL THICKNESS IN DAUGHTERS OF WOMEN WITH OSTEOPOROTIC FRACTURES – THE MODAM STUDY

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Objective(s): Daughters of women with fragility fractures had lower areal BMD (aBMD) compared with daughters of women without fractures. However, morphological basis underlying

this difference is not known. We compared aBMD, bone size and bone microarchitecture at the distal radius and tibia assessed by HR-pQCT in women according to the fracture status of their mothers.

Material & Methods: This study was performed on 156 women aged 47±10 whose mothers sustained fragility fractures and 240 women aged 41±11 whose mothers never sustained fragility fracture. Bone architecture and volumetric density (vBMD) were assessed at the distal radius and tibia using HR-pQCT (Xtreme CT Scanco). Areal BMD was measured at the spine, hip, and distal radius by DXA (Hologic 4500).

Results: Mothers who sustained fractures had lower aBMD and impaired bone microarchitecture compared with mothers without fracture. Women whose mothers sustained a fracture had lower aBMD at the total hip (-3.2%) and mid-distal radius (-2.8%) than women whose mothers never sustained fragility fracture. Both the differences remained significant ($p<0.05$) after adjustment for age, weight, height, menopausal status and smoking. Women whose mothers sustained fragility fractures had lower total vBMD at the distal radius (-5.5%, -0.29 SD) and distal tibia (-7.6%, -0.42 SD) compared with women whose mothers did not sustain fractures. Differences remained significant in the multivariable models ($p<0.05$ and $p=0.002$). The daughters had lower cortical thickness and area at the distal radius (-6.2%, -0.29 SD and -5.2%, -0.29 SD) and distal tibia (-6.7%, -0.35 SD and -6.3%, -0.38 SD). The differences remained significant in the multivariable models (radius: $p<0.05$, tibia: $p<0.005$). Women whose mothers sustained fractures had lower trabecular vBMD at the distal tibia (-6.8%, -0.32 SD, $p<0.01$) with a more spaced and heterogeneous trabecular network ($p<0.03$). Bone cross-sectional area did not differ between the daughters according to their mothers' fracture status ($p>0.4$).

Conclusion(s): Daughters of women with fragility fractures had lower cortical thickness and area at the distal radius and tibia as well as lower aBMD at the hip and radius compared with daughters of women who never sustained fragility fracture. Our data strengthen the hypothesis of the genetic determinism of bone microarchitecture in women.

P181
DURATION OF EXCESS MORTALITY AFTER HIP FRACTURES IN OSLO, NORWAY: A LONG TERM FOLLOW UP

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Objective(s): The aims of the study were to estimate the duration of excess mortality following hip fractures, and to investigate if the duration has changed over the past decades in Oslo, Norway.

Material & Methods: Hip fracture patients identified in previous incidence studies from three decades (1978/79, 1988/89, and 1996/97) in Oslo, were followed with respect to all causes of mortality until 31.12.2007. Age- and sex-specific mortality rates for the general population of Oslo from 1978-2007 were provided by Statistics Norway. Expected survival curves stratified for sex and predefined age groups were estimated for each of the three cohorts. Time framed Kaplan-Meier curves for 5 years intervals were compared with the corresponding expected survival curves. Where the observed curves started to parallel the expected curves, additional curves for five- and one-year survival were made to judge when mortality in hip fracture patients became the same as in the background population. One sample log rank tests were used to test for differences between the observed and expected curves. Analyses were performed using SPSS 14.0 and R 2.10.1.

Results: The longest duration of excess mortality was observed in women aged 65-84 years (Table), and lasted 22 years in the1978-79 cohort. In contrast, the duration of excess mortality lasted for only three years for women aged >85 years in the 1978-79 cohort. Men had all over a shorter duration of excess mortality than women. Except for in women aged >85, there was a trend towards a shortening of the period with excess mortality.

Duration of excess mortality according to sex, age-group, and cohort

Sex	Age-group, years	Cohort	n	Duration of excess mortality, years
Men	50-64	78/79	74	6
		88/89	63	9
		96/97	22	3
	65-84	78/79	281	15[1]
		88/89	363	11
		96/97	170	10[2]
	≥ 85	78/79	62	3
		88/89	120	4
		96/97	87	2
Women	50-64	78/79	180	17
		88/89	107	12
		96/97	38	9
	65-84	78/79	1041	22
		88/89	1243	14
		96/97	549	10
	≥ 85	78/79	299	3
		88/89	723	7
		96/97	388	8

[1] Further analysis not possible due to few patients left. [2] End of follow up at 10.7 years[1]

Conclusion(s): A trend towards shorter duration of excess mortality during the decades was observed. However, the excess mortality after hip fracture still lasts for up to 10 years in hip fracture patients aged 65-85. Studies focusing on modifiable risk factors for mortality after hip fractures are warranted.

P182
VITAMIN D [(25 –OH) D] STATUS IN ABU DHABI: IS THE WIDE SCREENING NEEDED?

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Objective(s): To determine the status of 25 OH vitamin D in patients assayed for the vitamin in Abu Dhabi.
Material & Methods: A review of 25 OH D records of individuals living in Abu Dhabi who were screened in a hospital in the first quarter of the year 2011. Hypovitaminosis D was either deficiency (<12 ng/ml) or insufficiency (12-30 ng/ml). The samples belonged to 587 individuals with age range between 4 months to 81 years. 522 (89%) were Arabs. The rest were heterogeneous individuals. 412 (72.5%) were females.
Results: 474 (80.5%) had hypovitaminosis D; 439 (74.5%) were insufficient and 35(6%) were deficient. The prevalence of each was statistically insignificant. Hypovitaminosis D was determined in 135 males (77%) and in 339 females (82.5%). The mean value of 25 OH D in the females was significantly lower to that in males (18.9±5.13 vs. 20.7±5.07 ng/ml, p=0.005). In pediatric males (<13 yrs), 25 (59.5%) had hypovitaminosis vs.17 (41.5%) of sufficient level, p=0.12 yet the mean value was 21.5±7.19 vs.34±4.6 ng /ml, respectively, p=0.0001. In pediatric females, 26(68%) were insufficient and 12(32%) sufficient for the vitamin, p=0.005 (mean of 20.8±4.91 vs.40.9±8.9 ng/ml, respectively), p=0.0001. Only 22/135 males (16.5%) underwent DXA scanning, 12 of them had hypovitaminosis (54.5%), 9 of whom (75%) exhibited low BMD vs. 3 (25%) with normal outcomes, p=0.04. Among females 46/344 (13.5%) underwent DXA, 38 (82.5%) had hypovitaminosis, 23 of them (60.5%) exhibited low BMD vs. 15 (39.5%) with normal outcomes, p=0.3.
Conclusion(s): A significant and common suboptimal vitamin D [25-(OH)D] status was present in this population of Abu Dhabi. Both genders (adults & children alike) were affected almost equally, nonetheless, lower levels of vitamin D were observed among the females including their pediatric population. Few patients with insufficiency were referred for DXA scanning reflecting a degree of discrepancy in the referral pattern between various medical disciplines. The results strongly recommend a wide screening of vitamin D in the community while attempting to determine the underlying causes of the condition. A more frequent referral for DXA scanning is also to be considered in those who have low levels of the vitamin.

P183
EPIDEMIOLOGICAL SURVEY FRACTURE – EVALUATION OF PATIENTS WITH OSTEOPOROTIC FRACTURES ON ORTHOPAEDIC DEPARTMENTS IN EVERYDAY PRACTICE IN SLOVAKIA

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Objective(s): Epidemiological survey Fracture has been designed to screen the patients with postmenopausal osteoporosis after osteoporotic (wrist, vertebral or proximal femur) fractures, treated at orthopedic departments. Objectives were to 1) to screen the risk profile of patients on orthopedic departments, who suffered osteoporotic fracture; 2) to evaluate satisfaction with the fracture healing and effect on quality of life with strontium ranelate treatment after 6 weeks and 3 months.
Material & Methods: In the period between October-December 2010, our project monitored treatment of patients (women) with postmenopausal osteoporosis, who suffered in this period osteoporotic fractures in typical localities (vertebrae, hip, wrist). The survey was joined by 13 centers with 169 patients. We analyzed the amounts and localities of fractures, the way they were attended to, subsequent treatment, occurrence of risk factors and pharmacological treatment of osteoporosis. The treatment with strontium ranelate started immediately after surgical reparation of fractures.
Results: The average age of patients was 68.3±9 years. Satisfaction with fracture healing after 6 weeks of treatment with Strontium ranelate evaluated by doctors according the x-rays represents 95.9%. The satisfaction increased to 98.2% after 3 months. Mobility was evaluated for patients after proximal femur fractures. After 6 weeks of strontium ranelate treatment were 19% of patients self-mobile and 75% of patients were mobile with assistance. After 3 months increased number of self-mobile patients to 59.6%. After the 3-month treatment, side effects occurred in 7.9% of patients. 3.6% patients suffered a subsequent osteoporotic fracture during the treatment.
Conclusion(s): The epidemiological survey confirmed some well-known facts in osteoporotic fractures epidemiology. It confirmed the occurrence of risk factors related to osteoporotic fractures. The survey confirmed safety, positive effect on quality of life and satisfaction with strontium ranelate treatment for postmenopausal osteoporotic women after fractures on orthopaedic departments.
References: Fracture Epidemiological survey 2011, P. Maresch, Data on file

P184
EVALUATION OF STRESS FIELDS IN TRABECULAR BONE LARGE SCALE FINITE ELEMENT SIMULATIONS: INFLUENCE OF MODEL PARAMETERS

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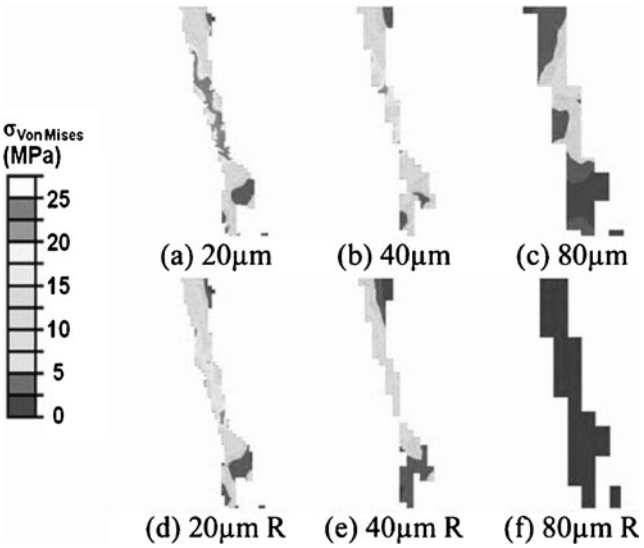
Objective(s): Numerical simulation using finite element models (FEM) has become more and more suitable to estimate the mechanical properties of trabecular bone. The size and kind of elements involved in the models, however, may influence the results. The purpose of this study is to analyze element formulation influence on the evaluation of mechanical stress applied to trabeculae bone during a compression test simulation.
Material & Methods: Trabecular bone cores (D=8.2 mm, L=15 mm) were extracted by necropsy from 18 L2 vertebrae (mean age: 76±11, BV/TV=7.5±1.9%). Samples were μCT scanned at 20 μm isotropic voxel size. μCT images have been subsampled (20, 40 and 80 μm) to create 5.6 mm cubic FEM. For each sample, six models of a compression test have been created, two for each voxel size, with reduced and full integration formulation. Bone mechanical properties have been supposed isotropic, homogenous, following a linear elastic behavior law (Young modulus: 8 GPa, Poisson ratio: 0.3).
Results: Increasing voxel size led to microarchitecture modifications (loss of connectivity, trabeculae thickening) and changed stress distribution in bone tissue. Even if apparent mechanical properties were similar, stress concentrations were altered. Increasing the voxel size leads to a higher underestimation of stress magnitude and to a smoother distribution. This trend was amplified with reduced integration formulation.



Elements with (a)-(c) non-reduced and (d)-(f) reduced formulation at 20, 40 and 80 μm.

With 80 μm size reduced elements, as used clinically, few stress variations were detectable. These observations also depended on trabecular thickness. Less than 2 elements within the trabeculae led to poor stress distribution assessment. The figure presents Von Mises stresses in a trabeculae depending of both voxel size and elements formulation.
Conclusion(s): We found that the element size and the integration formulation influence trabecular mechanical behavior evaluation. This statement should be accounted for in clinical measurements.
Disclosures: This work was performed using HPC resources from GENCI-CINES (Grant 2011035047).

P185
ESTABLISHING A NURSE LED SERVICE FOR THE TREATMENT OF VITAMIN D DEFICIENCY – IMPROVING PATIENT OUTCOMES

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Objective(s): Justify the need for and examine the usefulness of a nurse led service for the treatment of vitamin D deficiency.
Material & Methods: A total of 154 patients since Sept 2008 were referred to the day unit from rheumatology clinics who were susceptible to hypovitaminosis D. Serum 25-hydroxyvitamin D (25OHD), PTH, calcium, creatinine and alkaline phosphatase were measured. These samples were taken on ice and sent promptly to the laboratory which is located off site. All results were reviewed by the nurse manager and those with a 25OHD level ≤50 nmol/L were scheduled to attend the day unit for treatment with cholecalciferol 300,000 IU. Repeat sampling was done in 4 weeks post treatment. All patients were educated individually and information leaflets were provided
Results: A total of 82% (127 of the 154) of patients were treated for vitamin D deficiency. On repeat sampling after 4 weeks, an increase in Vitamin D levels was observed in 98%. All of these patients were seen in a nurse led clinic on our day unit where standard protocol was followed and not in routine Rheumatology clinics.
Conclusion(s): Our Nurse led service has resulted in the effective treatment of hypovitaminosis D with efficient detection and early intervention that does not increase the burden on rheumatology clinics. The provision of quality care, promptly and efficiently on a one-to-one basis has led to improved patient care and an increased patient knowledge and understanding of vitamin D deficiency.

This service has developed organically over time but due to its inherent efficiency it suggests a way in which the 'pandemic' of vitamin D deficiency can be tackled.

P186
THE GINERISK STUDY: A NONINTERVENTIONAL EPIDEMIOLOGICAL STUDY OF MORE THAN 4000 SPANISH POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Objective(s): Osteoporosis is a progressive, systemic skeletal disorder characterised by low bone mass and microarchitectural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture. The primary objective of this study was to identify the clinical profile of Spanish postmenopausal patients with a diagnosis of osteoporosis. A secondary objective was to establish possible associations between patients with osteoporosis and the presence of risk factors for cardiovascular disease, breast cancer and endometrial pathology.
Material & Methods: The GINERISK study is a cross-sectional, epidemiological one-visit study designed to investigate the clinical characteristics and risk profiles of developing cardiovascular disease, breast cancer or endometrial pathology in postmenopausal women (at least 12-month after last menstrual period) with osteoporosis, above 18-years old, who were attending outpatients clinics of Gynecology in Spain. In addition to sociodemographics and primary outcomes, bone densitometry, mammogram, cholesterol and blood glucose levels, blood pressure, vaginal ultrasound and HRQoL were recorded.
Results: Data were evaluable in 4157 of the 4517 (92%) subjects included in the study. The mean age at diagnosis of osteoporosis was 58.8 years, 49.8% (n=2070) had one or more risk factors for bone fractures and 16.6% (n=692) had two or more. Treatments of osteoporosis were recorded: 85.1% (n=3535) received treatment for osteoporosis, 83.6% of them (n=2956) received pharmacological treatment for osteoporosis, and among them, 41.8% (n=1237) were receiving SERMs. Data related to associated disease risk were as follows: 20.1% (n=835) showed high cardiovascular risk (three or more CV risk factors); 9.2% (n=301) had high endometrial risk (endometrial thickness ≥5 mm); 14.5% (n=423) had high risk of developing breast cancer in the next 5 years (according to the Gail model).
Conclusion(s): This study has documented that a relevant percentage of women with osteoporosis have also associated a high risk of cardiovascular disease and endometrial and breast cancer. These risks should be evaluated and taken into consideration when choosing a treatment for osteoporosis in postmenopausal women. The GINERISK study has provided a greater knowledge of the clinical profile of postmenopausal osteoporotic patients and their associated risk factors, meaning a comprehensive approach to their heathcare.

P187
IMPACT OF OSTEOPOROSIS AND BONE FRACTURE ON HEALTH-RELATED QUALITY-OF-LIFE IN POSTMENOPAUSAL WOMEN: THE GINERISK STUDY

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Objective(s): Complaints regarding osteoporosis are caused by fractures which are associated with decrease of physical and social functions. SF-12v2 is a generic instrument measuring Health-Related Quality-of-Life (HRQoL). The Cervantes scale is a specific instrument measuring the impact of menopause on women HRQoL, with higher scoring showing higher impact (worse HRQoL). The objective was to report the impact of osteoporosis with and without previous bone fracture (BF) on specific and generic HRQoL of postmenopausal women.
Material & Methods: A cross-sectional, epidemiological one-visit study (the GINERISK study) was designed to investigate the risk of developing cardiovascular disease, breast cancer or endometrial pathology along with HRQoL in postmenopausal women (at least 12-month after last menstrual period) with osteoporosis, above 18-years old, who were attending outpatients clinics of gynecology in Spain. Sociodemographics, bone densitometry (BD) and HRQoL were recorded. HRQoL was assessed in duplicate using the menopause specific self-administered 31-items Cervantes scale and the generic SF-12v2 questionnaire.
Results: BD and HRQoL scores were recorded in 3,328 (80.1%) out of 4157 postmenopausal women, with a mean (SD) age of 60.9 (7.4) years [range: 38-90]; 78.1% (n=2599) with osteoporosis (bone densitometry<-2.5 T-score), 15.1% (n=502) with osteopenia (<-1.0 T-score>-2.5) and the remaining 6.8% (n=227) formed the control group (>-1.0 T-score). Osteoporosis with previous BF was associated with worst impact on HRQoL in comparison with osteoporosis without BF, osteopenia or normal postmenopausal

women; mean Z-score (95% CI) in Cervantes total score of +0.42 (0.32;0.51) vs. +0.10 (0.07;0.14), +0.17 (0.09;0.25) and +0.12 (0.00;0.24), respectively ($F=13.3$, $p<0.001$). All domains of the SF-12v2 were significantly more negatively impacted in osteoporosis with BF patients than in the other groups; $p<0.001$ in all cases. Osteoporotics with BF showed a physical and mental summary componenT-scores located in the percentiles 20th and 30th, respectively, of the Spanish general population.

Conclusion(s): This study documented a loss of quality of life in postmenopausal women with osteoporosis and bone fracture in comparison with osteoporosis without bone fracture, osteopenia or normal densitometry. Both, the menopause-specific scale (The Cervantes scale) and the generic HRQoL instrument (SF-12v2) showed ability to capture such loss of quality of life.

P188

IS THE QUALITY-OF-LIFE IN PHARMACOLOGICALLY TREATED POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS TYPE-OF-THERAPY DRIVEN? THE EFFECT OF SELECTIVE-ESTROGEN-RECEPTOR MODULATORS

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Objective(s): Osteoporosis negatively impact patient´s Health-Related Quality-of-Life (HRQoL). SERMs are among the possible drug-based therapeutic strategies for preventing bone fracture in postmenopausal women with osteoporosis. The objective was to explore the HRQoL of postmenopausal women with osteoporosis receiving a SERM-based therapy in comparison with those not receiving such therapeutic strategy (bisphosphonates or other drugs) for osteoporosis in daily medical practice.

Material & Methods: A cross-sectional, epidemiological one-visit study (the GINERISK study) was designed to investigate the risk of developing cardiovascular disease, breast cancer or endometrial pathology along with HRQoL in postmenopausal women (at least 12-month after last menstrual period) with osteoporosis (lower spine and/or hips bone densitometry<-2.5 T-score), above 18-years old, who were attending outpatients clinics of gynecology in Spain. HRQoL was assessed in duplicate using the menopause specific self-administered 31-items Cervantes scale (high scoring means worst QoL) and the generic SF-12v2 questionnaire (Z-scores). Comparisons were adjusted by age, prior bone fracture, number of osteoporotic factors, exercise and ongoing treatment with calcium or calcium+vitamin D.

Results: BD and HRQoL scores were recorded in 3328 (80.1%) out of 4157 postmenopausal women, with a mean (SD) age of 60.9 (7.4) years [range: 38-90]; 78.1% (n=2599) with osteoporosis and 411 (15.8%) of them with previous fragility fracture. 72.5% were receiving calcium/calcium+vitamin D supportive therapy, 32.4% did exercise regularly, and 1950 (75.0%) were being treated with a drug-based therapy; SERMs in 787 (40.4%) women, while the remaining 1163 with a bisphosphonate (84.8%) or other drugs (12.7%). Sexuality domain of the Cervantes scale was worsT-scored in women not receiving a SERM; mean (95% CI) 12.7 (12.4;12.9) vs. 12.2 (11.8;12.5), $p=0.015$. In general, physical QoL domains of the SF-12v2 were more far from the mean in non-SERM patients, with physical summary component significantly worsT-scored; -0.73 (-0.77;-0.68) vs. -0.64 (-0.71;-0.57), $p=0.05$, mainly due to poorer general health; -0.95 (-1.00;-0.90) vs. -0.84 (-0.92;-0.76), $p=0.02$, and role physical; -0.56 (-0.60;-0.51) vs. -0.47 (-0.53;-0.40), $p=0.03$.

Conclusion(s): This study documented a loss of quality of life in postmenopausal women with osteoporosis not receiving a SERM-based therapy, mainly in their sexuality and physical domains.

P189

A NEW CLINICAL APPROACH TO QUANTITATIVE CT (QCT) BONE DENSITOMETRY WITH ASYNCHRONOUS CALIBRATION

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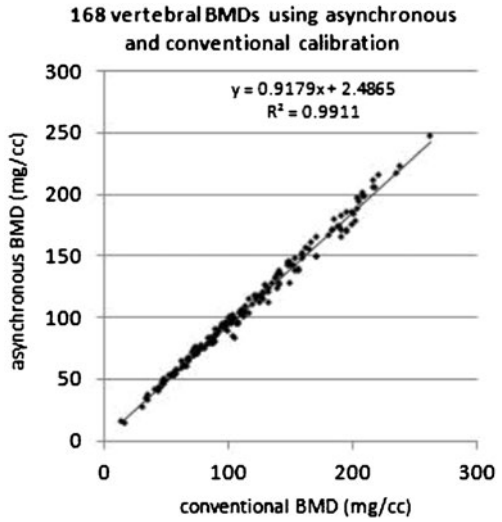
Objective(s): Asynchronous calibration for QCT bone densitometry permits extracting QCT measurements from other abdominal/pelvic CT procedures with zero additional radiation dose. Accuracy and precision in CT bone densitometry have previously relied on simultaneous scanning of a calibration phantom with the patient. We report here assessments of systematic and random measurement differences between a prototype commercial QCT device using asynchronous calibration and a commercially available conventional QCT device.

Material & Methods: Our retrospective cohort included 168 vertebrae from 78 subjects and 146 femoral scans from 73 subjects, ages ranged 3 to 97; the scans were from multiple scanner models from each of four major manufacturers. BMD for each vertebra or femur was measured in QCT PRO Version 5.0 (Mindways Software, Austin, TX, USA) in its conventional mode and a new mode for asynchronous calibration using independently acquired, scanner-specific QA scans.

Results: Vertebral BMD ranged from 13.4 mg/cc to 262.2 mg/cc. The linear least-squares regression line between calibration conditions lay slightly off unity, showing a consistent bias wherein asynchronously calibrated BMD averaged 5.4% lower than conventional BMD. The SEE of this regression was 5.0 mg/cc.



Results were similar in the proximal femur, with a correlation above 0.98, an average decrease of 5.8% vs. conventional BMD, and a SEE of 0.021 g/cm^2 for data ranging from 0.335-1.254 g/cm^2. In addition, we assessed correlations of the BMD measurement bias to CT manufacturer, X-ray energy, and patient size. These revealed no statistically significant trends.

Conclusion(s): The high correlations of asynchronously calibrated BMD with conventional BMD suggest this approach has substantially equivalent accuracy in reproducing T-Scores. A linear transformation suffices to correct the measurement bias (possibly caused by differences in beam hardening) without introducing significant variance. This approach may provide new clinical utility in dual-use and retrospective CT BMD screening.

P190
CALCIUM INTAKE PREDICTS BONE LOSS AT THE DISTAL FOREARM IN AMUBLATORY POSTMENOPAUSAL WOMEN

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Objective(s): Low calcium intakes lead to negative calcium balance and low bone densities due to higher rates of bone loss[1,2]. The low oestrogen status following menopause increases the calcium requirement and may exacerbate bone loss in those with low calcium intakes[3]. The present study investigates whether postmenopausal women with lower calcium intakes have higher rates of bone loss than those with higher calcium intakes.

Material & Methods: Ambulatory postmenopausal women (n=129) underwent bone density measurement (DXA) at the lumbar spine, femoral neck, standard hip, proximal and distal forearm at baseline and 6 monthly intervals for 18 months. They completed a food frequency questionnaire at baseline and at 12 months. The calcium intakes were grouped into tertiles [<910 mg/d (n=44); 911-1300 mg/d (n=45); >1301 mg/d (n=40)]. Rates of bone loss for each site at 6, 12 and 18 months for each tertile of calcium intake were compared using ANOVA.

Results: Baseline bone densities did not differ significantly between the tertiles of calcium intake. The rates of bone loss did not differ significantly between the tertiles of calcium intakes for the lumbar spine, femoral neck, standard hip or the proximal forearm. The rate of bone loss at the distal forearm at 12 months showed a significant difference between tertiles of calcium intake (P=0.04). Calcium intakes did not change from baseline when re-estimated at 12 months.

Conclusion(s): Baseline bone densities and the rates of bone loss at the lumbar spine, hip and the proximal forearm did not appear to be determined by the estimated calcium intakes in this group of women. The rate of bone loss in the distal forearm may be more sensitive to habitual calcium intake than other sites.

References: 1. Heaney RP. *et al. J Bone Miner Res* 1989;4:469. 2. Dawson-Hughes B. *et al. Am J Clin Nutr* 1987;46:685. 3. Nordin BEC. *et al. Am J Clin Nutr* 2004;80:998.

P191
TREATMENT WITH 4JOINTZ REDUCES KNEE PAIN OVER TWELVE WEEKS OF TREATMENT IN PATIENTS WITH CLINICAL KNEE OSTEOARTHRITIS: A RANDOMISED CONTROLLED TRIAL

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Objective(s): To assess the efficacy of topical 4jointz utilizing Acteev technology (a novel and patented combination of a standardized comfrey extract and a pharmaceutical grade tannic acid, 3.5 mg/day), in subjects with symptomatic knee osteoarthritis.

Material & Methods: This was a 12 week double-blind randomised controlled trial. Adults aged 50-80 years (n=133) with clinical knee OA according to the ACR criteria were randomised to receive either 4jointz or placebo in addition to existing medications. The primary outcome measure was the pain VAS at 12 weeks. Pain and function were measured using a visual analogue scale (VAS) and the Knee Injury and Osteoarthritis Outcome Score (KOOS) scale at baseline, 4, 8 and 12 weeks. Inflammation was measured using IL-6 and cartilage breakdown using CTX-2 at baseline and 12 weeks.

Results: Pain scores had a greater reduction in the group who received 4jointz compared to the group who received placebo after 12 weeks using both the VAS (-9.9 mm, p=0.034) and the KOOS pain scale (+5.7, p=0.047). Changes in IL-6 and CTX-2 were not significant (-0.1, p=0.96; -5.8, p=0.62). Reduction in paracetamol daily dose (mg) in patients using paracetamol at baseline was clinically (but not statistically) significant by twelve weeks (-404 mg, p=0.35) Post hoc analyses suggested that treatment may be most effective in women (VAS -16.8 mm, p=0.008) and those with milder radiographic osteoarthritis (VAS -16.1 mm, p=0.009). Local rash was more common amongst participants receiving 4jointz (19% vs. 1.6%, IRR 13.2, p=0.013), but only 22% (n=3) of participants with rashes discontinued treatment. There were no changes in systemic blood results and no differences in adverse events between patients receiving 4jointz and placebo.

Conclusion(s): Topical treatment using 4jointz reduces symptoms of osteoarthritis over 12 weeks of treatment.

P192
BMD DECREASES WITH INCREASING HbA1C LEVELS: A CROSS-SECTIONAL STUDY

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Objective(s): To investigate the effects of different blood glucose levels on BMD.

Material & Methods: A total of 26,856 subjects had undergone a DXA scan (13.5% men, 86.5% women, mean age 58.8±14.3 years, BMD in spine 0.931 g/cm^2, spine T-score -1.4±1.6, spine Z-score -0.1±1.6). Among these 1480 had diabetes. We divided the diabetes patients in three groups corresponding to their HbA1C level: a group consisting of patients with HbA1C ≤0.070, a group consisting of patients with HbA1C 0.071-0.080 and a group consisting of patients with HbA1C ≥0.081. Vitamin D (plasma 25OHD) and urine albumin/creatinine ratio were also measured.

Results: Among a total of 1480 patients we found a HbA1C level of ≤0.070 in 850 patients (57%), of 0.071-0.080 in 368 (25%) patients and of ≥0.081in 262 patients (18%). The majority of patients were women (84%, 81%, and 73%, respectively). The HbA1C groups did not differ significantly in BMD of the hip, BMD of the spine, BMD of the arm, weight, BMI, plasma 25OHD and urine albumin/creatinine ratio in a crude analysis (p>0.05). However, in a multiple linear regression model adjusted for age, BMI and sex we found a lower BMD of the spine (regression coefficient±SEM: -0.0071±0.0027 g/cm^2 per unit of HbA1C) and BMD of the hip, respectively, (-0.0070±0.0027) (see also Table). No association was present between BMD of the forearm and HbA1C (-0.2835±0.2999, p>0.05).

Table: Association between BMD (g/cm^2) and HbA1C adjusted for age, BMI and sex

Variable	Lumbar spine (n=1476)	Total hip (n=1480)	Total forearm (n=272)
Age (years)	-0.0031±0.0003*	-0.0031±0.0003*	-0.0031±0.0004*
BMI (kg/m^2)	0.0118±0.0006*	0.0116±0.0006*	0.0034±0.0006*
Sex (men vs. women)	0.0904±0.0088*	0.0906±0.0089*	0.1073±0.0103*
HbA1c (%)	-0.0071±0.0027*	-0.0070±0.0027*	-0.2835±0.2999

Multiple linear regression. *: p<0.05

Conclusion(s): Adjusted for age, BMI and sex we found an association between higher HbA1C levels and a lower BMD of the spine and BMD of the hip. No association was present for the forearm. It seems that blood glucose (HbA1C) is a predictor of lower BMD among diabetes patients, making this a valuable tool regarding BMD status.

P193
RADIOLOGICAL AND CLINICAL PROFIL OF OSTEOARTHRITIC PATIENTS UNDERGOING OF TOTAL JOINT REPLACEMENT

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Objective(s): We analyzed the preoperative radiologic and clinical status of 185 consecutive patients undergoing total joint replacement for symptomatic osteoarthritis of the lower limb.

Material & Methods: Our cohort included 75 men and 110 women aged from 33-86 years (mean 65.2±10.5). 98 of them received a total hip prosthesis and 87 of them a total knee prosthesis. The mean duration of OA was 3173.9 days±3381.8 (SD) or 8.6 years±9.3 years. They were all diagnosed with primary OA following the ACR criteria.

Results: *172 pre-operative X-ray assessments were analyzed:*

- 2.9% (n=5) were presenting with a KL-score of 1.
- 39.5% (n=68) were presenting with a KL-score of 2.
- 39.5% (n=68) with a KL-score of 3.
- 18% (n=31) with a KL-score of 4.

The mean value EQ-VAS pain was 62.4±.2. The mean WOMAC score values were 10.8±3.8 for pain, 4.6±1.8 for stiffness, 4.6±1.8 for function. The total WOMAC score was 51.4±17.2.

Conclusion(s): Patients undergoing total joint replacement in university setting, in Belgium, do present with a moderate to severe OA.

P194

BIOCHEMICAL MARKERS OF BONE TURNOVER FOR THE PREDICTION OF DEVELOPING VERTEBRAL FRACTURES IN POSTMENOPAUSAL WOMEN: THE JAPANESE POPULATION-BASED OSTEOPOROSIS (JPOS) COHORT STUDY

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Objective(s): The aim was to evaluate the ability of biochemical markers of bone turnover (BTM), to predict the event of vertebral fracture.

Material & Methods: Participants were 390 postmenopausal women ≥60 years old at the baseline survey in 1996 without disease or medication affecting bone metabolism. Vertebral fracture events were ascertained in the three follow-up surveys (in 1999, 2002, and 2006). The outcome was the first vertebral fracture event during the follow-up period diagnosed morphometrically when a vertebra with ≥20% height reduction from baseline satisfied the McCloskey-Kanis criteria or the definition of grade ≥2 fracture by the Genant method. Poisson regression model was applied to estimate rate ratio (RR) per 1SD increase of log-transformed BTM values as at the baseline: osteocalcin (OC) and bone-specific alkaline phosphatase (BAP) in serum, and type I collagen crosslinked C-terminal telopeptide (CTX), total deoxypyridinoline (tDPD) and free deoxypyridinoline (fDPD) in urine.

Results: The number of subjects developed the vertebral fracture event was 77 during the median follow-up time of 8.0 years (interquartile range [IQR], 4.5-10.0 years; total person-years, 2744.5 PY). The median time from baseline to the event was 4.5 years with IQR, 1.5-8.0 years. The RRs per SD for BAP, tDPD, and fDPD indicated increased risk of vertebral fractures with RR (95% CI) of 1.44 (1.16, 1.80), 1.31 (1.04, 1.65), and 1.38 (1.10, 1.74), respectively, after adjustment for age, weight and femoral neck (FN) BMD. The RRs for BAP and fDPD were 1.40 (1.08, 1.81) and 1.39 (1.07, 1.80), respectively adjusting for lumbar spine BMD substituted for FN BMD. Among total subjects, the 362 women were followed at least once during 6 years from baseline (1834.5 PY), while the event number was 47 with median time from baseline to the event was 1.5 years. The RR per SD for BAP was significant after adjustment for age, weight, and FN or LS BMD during the 6 years (RR [95% CI] of 1.39 [1.05, 1.85], 1.41 [1.01, 1.97], respectively).

Conclusion(s): BTM could predict for vertebral fractures among postmenopausal Japanese women independently of BMD during 10-year follow-up period.

P195

EXPERIENCE OF STRONTIUM RANELATE IN THE TREATMENT OF OSTEOPOROSIS IN A TERTIARY REFERRAL CENTRE IN THE UK

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Objective(s): To assess the outcomes of using strontium ranelate (SrRan) in a busy tertiary osteoporosis clinic.

Material & Methods: Using electronic clinic records, we identified all patients commenced on SrRan between 1.1.2008 and 31.12.2008. Clinic visit records and DXA reports were reviewed. DXA scans were performed on a Lunar Prodigy®. Calcium and Vitamin D intake was routinely assessed and optimized for all patients.

Results: 61 patients were identified. Of those, 35 (57%) patients continued SrRan beyond a year (mean±SD=25±7 months). No fracture was reported in these patients. Table 2 summarizes the treatment outcomes in this group.

Table 1: Baseline demographics and characteristics

Variable	All (n=61)	On SrRan †(n=35)	Off SrRan ‡(n=26)
Age (year)§	67.46±10.99	66.23±10.93	69.12±11.07
Females, n (%)	57 (93.4)	31 (88.6)	26 (100)
Vertebral Fractures, n (%)	12 (19.7)	6 (17.1)	6 (23.1)
Nonvertebral Fracture, n (%)	15 (24.6)	8 (22.9)	7 (26.9)
Previous treatment, n			
OBPs	37§§	23	14§§
IVBPs	15	6	9
HRT	2	1	1
Raloxifene	1	1	0

More than one treatment including teriparatide	4	2	2
No treatment (at the time when SrRan was considered)	4	2	2

[§]Value for age is shown as mean±SD. [†]continued therapy beyond 1 year. [‡]discontinued treatment ≤1 year. OBPs: Oral bisphosphonates, IVBPs: Intravenous bisphosphonates, HRT: Hormone Replacement Therapy. [§§]Two patients were tried on OBPs after finishing IVBPs course.

"Off SrRan" Group: Reasons for stopping treatment were side effects (n=22): gastrointestinal (n=15), rash (n=1), bone pain (n=1), renal angle pain (n=1), nocturnal leg cramps (n=1) and unspecified intolerance (n=3). Other reasons were deterioration in chronic kidney disease (n=1) and deterioration in BMD (n=1). In 2 cases, no clear reason was stated.
"On SrRan" Group: Reasons for changing from previous treatment to SrRan were deterioration of BMD on previous treatment (n=11), gastrointestinal side effects of BPs (n=8), having fractures while on previous treatment (n=1), been on OBPs or IVBPs for a long time (n=7), worsening back pain (n=1) and worsening breathlessness (n=1). In one case, the patient keen to try SrRan after been on IVBPs. No reason was stated in 3 cases.

Table 2: Treatment outcomes in those who continued SrRan beyond 1 year

Variable	Baseline* (n=27)	Follow up** (n=27)	P-value
L2-L4 BMD (g/cm^2)	0.904±0.156	0.939±0.198	0.09
Femoral Neck BMD (g/cm^2)	0.780±0.107	0.802±0.111	0.0001
L2-L4 T-score	-2.4±1.2	-2.1±1.4	0.03
Femoral Neck T-score	-1.8±0.9	-1.6±0.8	0.0004

*Values for variables are shown as mean±SD. *Time delay from performing baseline BMD measurement until starting Sr Ran was 7 months±6.7. **Follow up is defined from when SrRan is started until follow up DXA is done: 25±7 months (Median 25 months).*

Conclusion(s): SrRan improved T-scores in both the lumbar spine and femoral neck. However, only the femoral neck BMD improved significantly. Gastrointestinal side effects were the main reason for discontinuation.

P196
USE OF PARATHYROID HORMONE FOR THE TREATMENT OF THE NONUNION

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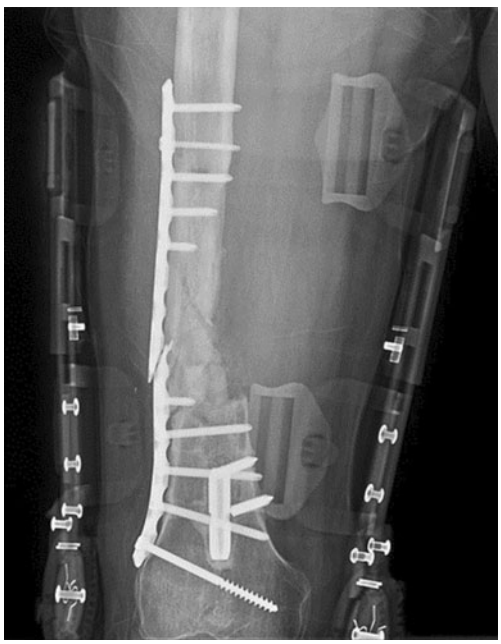
Objective(s): The objective was analyze the usefulness of PTH for the nonunion treatment in multioperated patients with osteoporosis.
Material & Methods: This is a prospective and descriptive revision which analyzes the evolution of three patients with nonunion in osteoporotic bones.
Nonunion was defined as the absence of union after 6 months.
The criteria for inclusion in the study are:

- Patients with osteoporotic.
- Nonunion operated at least on three times, and the lack of consolidation indicates a new intervention.
- Absence of factors that counter-indicates treatment with PTH.

Patients were operated again with a new osteosynthesis, autologous bone graft, electromagnetic therapy and PTH. PTH treatment was with PTH (1-84) recombinant 100 μg in subcutaneous injection once a day, for an average of 6 months. Revisions were in the 1st, 3 rd, 6th, 9th and 12th months. The study variable was the presence or absence of bone consolidation. The consolidation results were analyzed using X-Ray and CT.
Results: The nonunion who met the inclusion criteria were:

- A 42 year old male with atrophic nonunion of femoral shaft, osteoporosis associated with neurological injury and inability to use the limb for 27 months.



- A 78 year old woman with atrophic nonunion proximal femur.

– A 61 year old woman with atrophic humeral shaft nonunion with osteoporosis secondary to steroid treatment.

After surgery and treatment with PTH, three nonunions evolved towards the consolidation on a 6 months average. The consolidation was assessed by X-Ray and CT studies.
Conclusion(s): PTH may be a useful therapeutic tool for the treatment of nonunion in osteoporotic patients. Studies published demonstrate that PTH treatment increases the volume of callus, new bone formation and restoration of mechanical skills.

P197
EFFECTS OF TERIPARATIDE ON CORTICAL HISTOMORPHOMETRIC VARIBLES IN PATIENTS RECEIVING LONG-TERM ALENDRONATE THERAPY

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Objective(s): Teriparatide (TPTD) treatment increases bone turnover and bone formation in patients previously treated with potent antiresorptives, such as alendronate (ALN). However, no histological information exists on the effects of TPTD on cortical bone in the ALN pretreated patients. The aim of this post hoc analysis was to investigate the changes in cortical microstructure and dynamic histomorphometric indices in patients with osteoporosis with or without prior therapy with ALN, who were treated with TPTD 20 μg/day subcutaneous for 24 months.
Material & Methods: 66 postmenopausal women with osteoporosis, mean age (SD) of 68.0 (7.0) years and mean BMD T-score of -1.7 (0.9) at total hip and -2.8 (0.8) at lumbar spine; 62% with prevalent fractures) were included in the study. 38 stopped previous ALN treatment (10 mg/day or 70 mg/week for a mean duration of 63.6 months), and switched to TPTD, while 28 were osteoporosis pretreatment naive (TN). 45 paired iliac crest biopsies were collected and analyzed by μCT, static and dynamic histomorphometry at baseline and after 24-month. Nonparametric signed-rank test was used to compare the effect after TPTD treatment with baseline within each group or for the overall population.
Results: In the ALN pretreated group, MS/BS (%) values were lower than in the TN, at both the periosteal (baseline: 0.61±1.29 vs. 1.39±0.96; p=0.04; post-TPTD: 1.34±1.05 vs. 3.94±2.7; p<0.0001), and endocortical levels (baseline: 3.16 ±5.05 vs. 6.19±5.07; p=0.06; post TPTD: 4.95±4.03 vs. 11± 9.57; p=0.005). In the pooled analysis, indices of periosteal and endocortical dynamic variables, cortical thickness and porosity increased significantly compared to baseline (Table).

Table: Change from baseline (%)

% Change in indices	Pre-treatment naïve	ALN pre-treated	Pooled
3D Total cortical area	28	43 *	39 *
3D Cortical thickness	38	32 *	34 *
2D Cortical porosity	69	65*	67*
Periosteal MS/BS	184*	118*	164*
Periosteal BFR/BS	275*	312	282*
Endocortical MS/BS	78	57*	71*
Endocortical; BFR/BS	143	47	107*

*p<0.05, compared to baseline

Conclusion(s): Our results indicate the bone forming effects of TPTD in the cortical bone in patients previously treated with the ALN or treatment naive. The observed increase in cortical porosity in both groups may be the consequence of increased intracortical remodeling.

P198
EVALUATION OF THE EFFECT OF ADDING CORTICOSTEROID TO VISCOSUPPLEMENTATION: A PROSPECTIVE AND RANDOMIZED STUDY

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Objective(s): The objective is to assess if we can improve the initial results of viscosupplementation by the addition of corticosteroids to the procedure, watching for any interference on the long-term results
Material & Methods: We evaluated 104 patients with knee osteoarthritis (OA).All patients were receiving usual care, and those who underwent to intraarticular injection or knee surgery in the last 6 months, or had post-traumatic or rheumatoid arthritis were not included. We applied the visual analogic scale of pain (VAS) and WOMAC and Lequesne questionnaires. Patients were randomized into two groups of 52 patients each. Group 1 received a single intraarticular injection of the knee with 6 ml of Hylan GF-20 alone. Patients in group 2 received an intraarticular injection of the knee with 6 ml of Hylan GF-20 and 1 ml (20 mg) of hexacetonide triamcinolone. The questionnaires were applied prior to the injection (week zero) and at weeks 1, 4, 12 and 24 after the procedure.

Results: The two groups were homogenous. Most patients were female (76%). The mean age was 62,7 years old. The average BMI of patients was 29.52. Most patients (34.6%) had a level 3 Kellgreen and Lawrence radiological classification for knee OA. At Week 1, Group 2 showed a marked reduction for WOMAC and VAS scores, with a statistically significant difference compared with Group 1 results. At week 4, group 2 still had better results for WOMAC and VAS compared to group 1, but with a $p>0.05$. The WOMAC and VAS results for weeks 12 and 24 were similar within the 2 groups. The Lequesne results had no statistically significant difference between the 2 groups at any moment. However, each group had a statistically significant improvement at weeks 1, 4, 12 and 24 compared to the baseline. None of the individuals characteristics such as age, genre, BMI or K&L classification had any effects on the results. Adverse effects: 4.8% presented effusion and 19.2% related discomfort or pain, with no statistic difference between groups.

Conclusion(s): We concluded that the addition of 1 ml of triancinolone to viscosupplementation brings great improvement to its early results and does not affect the long-term results, so it should be performed.

P199
EFFECTS OF ROSEMARY CARNOSIC ACID ON BONE METABOLISM

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Objective(s): In bone tissues, both the formation and maintenance of bone are controlled by bone forming osteoblasts and bone resorbing osteoclasts, and an imbalance between these two types of cell leads to the bone metabolic diseases, such as osteoporosis and osteopetrosis. The formation of bone involves a complex series of events that include the proliferation and differentiation of osteoprogenitor cells and eventually result in the formation of a mineralized extracellular matrix. We used preosteoblastic cell MC3T3-E1. On the other hand, osteoclasts are multinucleated giant cells with the ability to resorb mineralized tissues. They are formed from haematopoietic cells of the monocyte/macrophage lineage. The formation and activation of osteoclasts are controlled by the combined action of the RANKL and M-CSF. In the present study, we used a culture of mouse spleen cells with stromal cell line ST2 had been treated with activated vitamin D_3. Polyphenols reportedly exert physiological effects against diseases such as cancer, arteriosclerosis, hyperlipidaemia and osteoporosis. We previously reported that quercetin from onion, curcumin from curcuma longa, and apigenin from pasley and olive inhibit the mineralization of osteoblastic cells and the formation of osteoclasts. Recently, we examined effects of olive polyphenols such as oleuropein, hydroxytyrosol, and tyrosol on bone formation using cultured osteoblasts and osteoclasts, and on bone loss in ovariectomized mice and we showed that oleuropein and hydroxytyrosol enhanced bone formation in vivo and in vitro. In the present study, we designed to clarify the effects of rosemary carnosic acid on bone metabolism using cultured osteoblasts and osteoclasts.

Material & Methods: We used preosteoblastic MC3T3-E1 cells as cultured osteoblastic cells. We also used coculture system (ST2 cells and splenic cells) as the formation of multinucleated osteoclastic cells.

Results: Carnosic acid inhibited the proliferation of preosteoblastic MC3T3-E1 cells. Furthermore, carnosic acid decreased in the activity of alkaline phosphatase and the deposition of calcium in a dose-dependent manner. On the other hand, this compound also inhibited the formation of multinucleated osteoclasts in a dose-dependent manner.

Conclusion(s): Our findings indicate that carnosic acid may have critical effects on the formation and maintenance of bone.

P200
EVALUATION OF EFFICACY AND SAFETY OF DENOSUMAB IN JAPANESE POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS – PHASE II (DOSE RESPONSE) STUDY

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Objective(s): To examine the efficacy and safety of three doses of denosumab (14, 60, and 100 mg) compared with placebo in Japanese postmenopausal women with osteoporosis.

Material & Methods: Multicenter, randomized, placebo controlled study was planned and 226 subjects were randomized (212 subjects received at least 1 dose). These subjects were administered with the investigational product subcutaneously every 6 months for 12 months (two doses) and received daily supplements of at least 600 mg elemental calcium and 400 IU vitamin D from the beginning of screening through treatment period. Subjects were no older

than 80 years old. All the subjects had a BMD T-score of -2.5 to -4.0 at the L1-L4 spine or -2.5 to -3.5 at either of the femoral neck or total hip.

Results: Denosumab treatments showed significant mean percent increases from baseline to 12 months in BMD at lumbar spine: 5.71% for 14 mg (n=53), 6.73% for 60 mg (n=54) and 7.45% for the 100 mg (n=50) group, respectively. All treatment groups showed a statistical difference compared with 0.46% in the placebo group (n=55, $p<0.0001$). All 3 denosumab cohorts had numerically greater mean percent increases from baseline in BMD of the total hip, femoral neck, and distal 1/3 radius at month 12 compared with the placebo cohort, with p-values<0.05 for each comparison, with the exception of the comparison of the 100 mg denosumab cohort at the distal 1/3 radius that it trended towards statistical significance (p=0.054). Denosumab significantly decreased the serum CTX-I and urinary NTX-I/Cr by 8 days, and Bone ALP and osteocalcin by 3 months. No new vertebral fracture was observed in either group. The overall incidences of adverse events, serious adverse events, treatment-related adverse events, and withdrawals due to adverse events were similar in the denosumab groups and the placebo group. No one developed antibodies to denosumab or developed ONJ.

Conclusion(s): Denosumab 60 mg could be an effective dose for Japanese postmenopausal women with osteoporosis as was shown in the Caucasian population.

References: T. Nakamura et al, Osteoporos Int 2011, *in press*

P201
FACTOR INCREASING ADHERENCE TO STRONTIUM RANELATE AT 2 YEARS OF TREATMENT

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Objective(s): According to some researches, the necessity for a daily administration of strontium ranelate reduces complaints.

Material & Methods: The study includes 107 patients with postmenopausal osteoporosis with the loss by BMD (T-score) more than -2.5 SD, aged >55. Results of treatment was assessed by the BMD at the lumbar spine (L2-L4) and femoral neck, with new vertebral fractures, side effects and complaints. Duration of observation was 2 years. All patients received a daily strontium ranelate dose 2 g and 1000 mg of calcium with 200 IU of vitamin D3. The paired Student's criterion with 95% CI was used for the analysis of two measurements.

Results: In one-year treatment completed 64 of 107 patients (59.8%). After 2-9 months from the beginning of treatment 43 patients stopped it. Of these, 18 patients (16.8%) due to side effects: 13- gastrointestinal tract, symptoms were detected during 1 or 3 months of starting treatment; in 3 cases (2.7%) increased frequency of hypertensive crises (after 6 months from the beginning of treatment); in 2 cases (1.8%) increased pain in the joints (prior to study entry in both cases there was a deforming arthrosis of the knee and hip joints). 20 patients stopped taking strontium ranelate in the period of 2-3 months without reasons, but continued to receive calcium and vitamin D3. Patients who were taking drugs for 1 year manifested a significant increase of BMD at the lumbar spine from 0.84±0.015 to 0.86±0.02 g/cm^2 ($p<0.005$) and at the femoral neck from 0.6932±0.01 g/cm^2 to 0.71±0.01 g/cm^2 ($p<0.001$). In the second year of treatment the study started 64 people, completed 56 (87.5%). 8 women stopped treatment in terms of 3-5 months for economic reasons. After 2 years BMD significantly increased from 0.86±0.02 to 0.91±0.021 g/cm^2 ($p<0.005$) and from 0.71±0.013 to 0.72±0.014 g/cm^2 ($p<0.001$) at the lumbar spine and the femoral neck respectively. Accordingly within 2-year treatment the increase of BMD at the lumbar spine was about 8% and at the femoral neck about 4%.

Conclusion(s): The increasing of BMD after the first year of treatment increased the adherence to receive strontium ranelate on the second treatments year.

P202
EFFECTS OF ALENDRONATE TOPICAL APPLICATION AS A COMPONENT OF A BIOCOMPOSITE MATERIAL ON OSTEOGENESIS IN OSTEOPLASTY

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Objective(s): The fact that topical application alendronate as a component of a biocomposite material can decrease the rate of bone synthesis has been prevented their utilization in orthopedic and traumatologic practice. Appropriate to assess effect of topical application alendronate as a component of biocomposite material on osteogenesis.

Material & Methods: Experiment was performed on 20 nonlinear female white mice divided into 2 groups. In the experimental group defect of shin bone was filled with nondemineralized freeze-dried bone implant combined with biocomposite material containing alendronate 1 mg/ml. In the control group biocomposite material was not containing bisphosphonate. Experiment lasted 90 days. Results evaluation was morphological (light microscope Zeiss Axioskop 40). Samples were stained with hematoxylin-eosin. BMD in

experimental area and in the whole segment was assessed with densitometer Hologic and analyzed with software "Performing and Analyzing Small Animal Studies". Rate of osteogenesis and changes in the experimental areas were graded according to the following scale: 1 – poor osteogenesis (area of bone defect is filled with loose connective tissue and fragments of bone implant presented with osteocytes-free bone trabeculas; 2 – moderate osteogenesis (area of bone defect contains foci of newly synthesized mature bone tissue around bone implant or marginal osteogenesis on the cartilage basis with remnants of bone implant); 3 – advanced osteogenesis (area of bone defect is filled with newly synthesized mature bone tissue without remnants of bone implant). Statistical analysis of data was performed on SPSS software, level of statistical significance was set to $p < 0.05$.

Results: In the experimental group the mean index of osteogenesis was 1.4, in the control group – 1.6. Difference in results between groups was not statistically significant.

Conclusion(s): Topical application of alendronate 1 mg/ml as a part of biocomposite material does not inhibit osteogenesis.

P203
THE ALENDRONATE EFFECT AFTER ARTHROPLASTY IN WOMEN PRE AND EARLY MENOPAUSAL PERIOD

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Objective(s): The period of pre and early menopause is "inevitable" risk factor for increased periprosthetic bone loss after arthroplasty. Appropriate to assess the effect of alendronate on bone mass (BMD) Gruen zones during the first 15 months after arthroplasty.

Material & Methods: 43 patients with dysplastic coxarthrosis (age 48-53) after athroplasty were divided into 2 groups. 12 of them have been taking alendronate 70 mg/week and 1000 mg of calcium daily during 1 year, 31 - control group received only 1000 mg of calcium. The first study of the BMD Gruen zones performed 1 month after surgery, then every 3 months, the last - after 15 months.

Results: 15 months after surgery in patients treated with alendronate, in all zones except R4 BMD was increase significantly (t-test for one sample) above the ratio relative to the 1-month. Increasing of BMD in the R1 and R6 zones, respectively, was 7.7±3.05% ($0.05 > p \geq 0.01$) and 8.8±4.13% ($p = 0.06$), in the R2 and R3 areas, respectively, 5.4±1.4% ($p < 0.01$) and 5.6±2.6% ($p = 0.059$). The increasing of BMD at the R5 and R7 zone was: 2.2±2.8% and 2.25±2.3%. BMD deficit remained only in the zone R4. In the control group BMD deficit was maintained in all zones, except for R2 and R3. In the R7, R5 and R6 areas ($p = 0.067$) BMD deficit was significantly highest to the baseline values. The safety chance of deficiencies in the treatment group was low and ranged from 0.09-0.2 in all zones, except for R4. In the control group chance was significantly higher (0.8-1.42).

Conclusion(s): During the first 12 months after joint replacement in women pre and early menopause which were received alendronate, bone around the femoral components increased significantly, creating the conditions for the secondary (biological) stability formation of the implant.

P204
SERUM SCLEROSTIN LEVELS ACROSS A WIDE RANGE OF BONE TURNOVER

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Objective(s): Evidence has been accumulating on the role of osteocytes, as players in the regulation of bone remodeling. One of the main products of these ubiquitous cells, sclerostin, regulates bone formation through inhibition of the Wnt signaling pathway. Circulating sclerostin levels have been evaluated in healthy individuals, but data are scarce regarding different ranges of bone turnover. To address this issue we evaluated serum sclerostin levels in patients with Paget's disease of bone (PD) with predominantly increased bone resorption at different stages of disease activity, and in patients with prostate cancer (PC) metastatic to the skeleton with predominantly increased bone formation at different levels of skeletal involvement.

Material & Methods: Sclerostin levels were measured in 94 patients with PD, 28 patients with PC and 77 healthy individuals. Patients with PD and PC had bone scintigraphy to establish the extent of skeletal involvement. Bone turnover was evaluated by measuring serum levels of procollagen type 1 amino-terminal propeptide (P1NP) in all individuals studied and β-carboxyterminal crosslinking telopeptide of type I collagen (β-CTX) only in patients. None of the patients had renal or liver dysfunction, vitamin D deficiency, or other diseases known to affect bone metabolism.

Results: The population studied had a wide age range (20-88 years) and a wide range of bone turnover with serum P1NP ranging from 8.4-1872 ng/ml and β-CTX ranging from 50-3120 pg/ml. Patients with PD and with PC had significantly higher serum sclerostin levels (53.58±22.4 pg/ml and 57.55±24.7 pg/ml, respectively) compared to healthy controls (40±12.8 pg/ml) ($p < 0.001$). Serum sclerostin levels significantly correlated with age ($r = 0.238$. $p < 0.001$) and with P1NP (r=

0.295, p<0.001), but not with β-CTX (r=0.094, p=0.303) across the wide range of bone turnover.

Conclusion(s): Circulating sclerostin levels are significantly increased in patients with increased bone turnover, regardless of underlying disease pathology, whether predominantly increased bone resorption as in Paget's disease or predominantly increased bone formation as in metastatic prostate cancer. Sclerostin levels also significantly correlate with bone formation but not resorption markers across a wide range of bone turnover.

P205
EFFECTIVENESS OF STRONTIUM RANELATE IN THE TREATMENT OF POSTMENOPAUSAL OSTEOPOROTIC WOMEN: OUR EXPERIENCE INTO DAILY CLINICAL PRACTICE

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Objective(s): This is an observational study to investigate BMD response in a "real-world" population of patients treated with strontium ranelate (SR) for the osteoporosis to confirm that this drug is actually effective in clinical practice as well.

Material & Methods: 74 women were recruited into the study: 16 were taking raloxifene or bisphosphonate (prior antiresorptive treatments group) and 58 had not received any previous treatment (naive group). Mean age were 68 years. They received SR 2 g/day during 2 years. The bone turnover markers assessed were P1NP and CTX (Elecsys 2010, Roche Diagnostics). BMD was measured by DXA Hologic® QDR 4500 (*c.v. in vivo* 1.2%), at lumbar spine (L2-L4) (LS), femoral neck (FN) and total hip (TH). Statistical analysis included: descriptive summaries of each variable, comparisons between variables by Student's t-test for paired samples and correlation analysis (Spearman).

Results: At baseline bone markers were lower in the prior antiresorptive treatment group, consistent with these antiresorptive effects, but the differences were not statistically significant. One year after switching to SR, there was a significant increase of 42.25% and 6.55% in P1NP and CTX, respectively. And after 2 years: 41.28% and 14.48%. However in the naive group, after 1 year of treatment there was a significant decrease of 7.85% in CTX and 8.19% in P1NP. And after 2 years, there was a decrease of 16.07% in CTX and 14% in P1NP. These differences between groups were not statistically significant. SR increased the BMD significantly at 2 years in LS 7.57%, FN 3.15% and TH 5.40%. When we compared between both groups, naive and non-naive, we did not find significant differences in BMD. There were not a correlation between changes in bone turnover markers and the BMD effects.

Conclusion(s): This study, in clinical practice population, demonstrates that the treatment with SR in postmenopausal osteoporotic women produces a significant increase of the bone mass at LS, FN and TH. And we observed that these effects do not depend on the received previous treatment, so that the use of an antiresorptive therapy before the treatment with SR does not decrease the effectiveness of this drug.

P206
PREVALENCE OF BAKER'S CYSTS IN ELDERLY PATIENTS WITH PAINFUL PRIMARY OSTEOARTHRITIS OF THE KNEE: A FUNCTIONAL AND ULTRASOUND STUDY

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Objective(s): To investigate the prevalence of the Baker's cyst (a fluid distension of a bursa between the gastrocnemius and semimembranosus tendons via a communication with the knee joint) in elderly patients with primary painful knee osteoarthritis (KOA) and to established the correlation between functional parameters and musculoskeletal ultrasound aspects.

Material & Methods: Prospective clinical, functional and musculoskeletal ultrasound findings in 70 elderly patients with primary painful KOA diagnosed by ACR criteria were studied. The relationship between the Baker's cyst and the variables joint effusion, synovitis and functional parameters were analyzed. In all patients, ultrasound examination was performed with the HD 11 XE Ultrasound System Philips, with the linear sound of 12.5 MHz. We used the VAS scale for pain and the WOMAC index for functional status.

Results: Baker's cyst was found in 38 (54%) of knees or 32 (45%) of 70 patients. Only 9 of 38 cysts has been diagnosed clinically. 10 patients (14%) had a simple Baker cyst - an anechoic mass, sharply defined posterior wall, with posterior acoustic enhancement that communicates with the knee joint. A complex popliteal cyst - with internal echoes within the hypo echoic mass was found in 22 (31%) patients. Joint effusion and synovitis were detected in 54 (78%) and 44 (63%) of knees, respectively. We established a highly significant correlation between the presence of Baker's cyst with knee effusion and synovitis (p<0.001). There was also a significant correlation of the presence of Baker's cyst with WOMAC and VAS scales scores (p<0.01 and p<0.05).

Conclusion(s): Though it may be missed clinically, the Baker's cyst is common finding in elderly KOA patients. Therefore, ultrasound exam of knee is a very helpful imaging technique in the evaluation of a popliteal mass in the elderly patients and should be more widely employed by clinicians in the diagnosis of Baker's cyst. According to our results, the presence of Baker's cyst is an important determinant for the WOMAC function, pain and stiffness scores in elderly KOA patients.

P207
COMPLIANCE AND SATISFACTION WITH STRONTIUM RANELATE VS. BISPHOSPHONATE (ALENDRONATE) FOR THE TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS IN VENEZUELA: AN OPEN-LABEL, PROSPECTIVE, NON RANDOMIZED OBSERVATIONAL STUDY

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Objective(s): This study was a 1-year, longitudinal, observational, naturalistic, multicentric, open label study with 3 investigators, designed to evaluate compliance and satisfaction associated with strontium ranelate vs. bisphosphonate (alendronate) in postmenopausal women, older than 60, with postmenopausal osteoporosis for 12 months in Venezuela. Patients were divided in two groups for analysis: Group 1 was strontium ranelate: 2 g od. plus calcium citrate 1500 mg od vs. Group 2: alendronate: 70 mg weekly plus calcium citrate 1500 mg od. Statistical significance was set at $p \leq 0.05$.
Material & Methods: Results are expressed as mean±SD, unless otherwise stated. Strontium ranelate was prescribed for treatment of osteoporosis in 928 women and alendronate was prescribed for the same purpose in 436 women. Women who received strontium ranelate were younger than those who received alendronate (68.6±6.3 vs. 69.8±7.1 years old; strontium ranelate and alendronate, respectively; $p=0.007$, Student's t-test).
Results: After 12 months of treatment, 80% of patients who had initiated strontium ranelate and 65% of patients on alendronate were present at the last visit. Patient satisfaction, evaluated by a visual analog scale, from 1-100, was statistically different between groups after 12 months of treatment (82.9±14.5 vs. 68.8±17.4; strontium ranelate and alendronate, respectively; $p<0.001$, Student's t-test).
Conclusion(s): The compliance with strontium ranelate was higher to compliance with the bisphosphonate used in this study, and there was a better treatment satisfaction with strontium ranelate, after one year of treatment, in this observational study in Venezuela.

P208
WHY IS IMPORTANT TO EMPHASIZE THE RISK FACTORS FOR MALE OSTEOPOROSIS – OBSERVATIONAL STUDY

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Objective(s): In the last few years the problem of osteoporosis in men has been recognized as an important public health issue, particularly in light of estimates that the number of men above the age of 70 will double between 1993-2050. After age 50, 6% of all men will suffer a hip fracture as a result of osteoporosis. In older men, age-related bone loss is assumed to be the cause and several risk factors have been linked to osteoporosis in men. In our observational study we tried to evidence the importance of risk factors for development and evolution of osteoporosis in patients with disabling hip fractures.
Material & Methods: We studied 42 men aged between 62-78 years, with established hip fracture; 31 patients presented generalized osteoporosis (defined as T-score≤-2.5 SD); 11 men had local (total hip) osteoporosis. 29 patients were treated with antiresorptive drugs, 33 with calcium, vitamin D or both and 9 patients got no treatment. We followed the correlations between osteoporosis and different parameters: age, corticosteroids treatment, immobilization, rehabilitation program, smoking and other unhealthy lifestyle habits.
Results: We found a significant correlations between generalized and local osteoporosis and the following parameters: the age patient (R 0.735), the functional Steinbroker class (R 0.721) and immobilization or inadequate physical exercise (R 0.697); no important correlations were found between osteoporosis and unhealthy lifestyle habits (smoking, excessive alcohol use, low calcium intake); the values of correlation and predictivity were significant for the patients with corticosteroids therapy for chronic lung diseases.
Conclusion(s): BMD loss occurs early in the men with hip fracture, emphasizing that osteoporosis management should be considered early in the rehabilitation program. The individual patient with osteoporosis could be identified by either a case findings strategy based on risk factor assessment for osteoporosis or screening of all men.

P209
PREDICTION OF OSTEOPOROTIC FRACTURE RISK BASED ON DAILY ACTIVITY AND HEALTH STATUS OF THE ELDERLY IN HIROSHIMA COHORT

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Objective(s): To determine if activities of daily living (ADL) and health status of the elderly predict future osteoporotic fracture in a ten-year follow-up study using a population-based cohort.
Material & Methods: A population-based community cohort of 1278 women with mean age of 74.9±4.8 (65-87 years) were enrolled in a prospective and longitudinal cohort study in Hiroshima, Japan, that followed the subjects over a 10-year period. At health examinations conducted between 2000-2003, the subjects underwent measurements of spine and hip BMD using DXA (Hologic QDR-4500), and a questionnaire survey including information about ADL, self-reported heath status, and pain. The subjects were followed through biennial health examinations including chest x-ray and others until 2010. Incident thoracic vertebral fracture was assessed by lateral chest x-ray image at the time of these biennial health examinations. Incident osteoporotic fracture cases were collected on the basis of interviews by trained nurses and physicians during biennial health examinations. Association between osteoporotic fracture and the questionnaire responses was analyzed by Cox regression model.
Results: During the 10-year follow-up period, 23.6%, 2%, and 26.5% of women developed new thoracic vertebral fracture, hip, or "any osteoporotic fracture," respectively. Lower ADL, represented by such survey responses as "difficulty preparing meals" and "difficulty reaching an object just above your head," predicted hip fracture risk, and back and lumbar pain at rest or during exercise predicted osteoporotic fracture, after adjustment was made for age, sex, radiation dose, BMD, and prior vertebral fracture. Hazard ratios were 4.76 (95% CI, 1.38-16.38) for "difficulty preparing meals" and 2.10 (0.86-5.05) for "difficulty reaching an object just above your head." After excluding women who had prior spine fracture at baseline, pain at rest remained a significant predictor of osteoporotic fracture (HR=1.44, 1.13-1.84), but there was no longer association between back or lumbar pain during exercise and osteoporotic risk.
Conclusion(s): Elderly women with difficulty in ADL and those with back pain had high risk of hip and osteoporotic fracture.
Disclosures: This study was also supported by research funding for Longevity Sciences (23-22) from the National Center for Geriatrics and Gerontology (NCGG).

P210
COMPARISON OF CHANGE IN BONE RESORPTION AND BONE MINERAL DENSITY WITH ONCE-WEEKLY ALENDRONATE AND DAILY STRONTIUM RANELATE: A RANDOMISED, PLACEBO-CONTROLLED STUDY

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Objective(s): To compare the effects of alendronate 70 mg once weekly (OW) and strontium ranelate 2 g once day (OD) on biochemical markers of bone turnover and BMD in postmenopausal women with osteoporosis and type 2 diabetes.
Material & Methods: This was a 3-month, randomised, double-blind, placebo-controlled study with a double-blind extension to 18 months. The study enrolled 249 postmenopausal women (alendronate 99, strontium ranelate 150 who were ≥60 years of age at outpatient centres.
Main Outcome Measures: The primary endpoint was reduction in urine N-telopeptides of type 1 collagen (NTx) corrected for creatinine level at 6 months. Secondary parameters included change in BMD at the spine and hip at 6, 12 and 18 months, NTx at 1, 6, 12 and 18 months, and serum bone-specific alkaline phosphatase (BSAP) at 1, 6, 12 and 18 months. Adverse experiences (AEs) were recorded throughout the study for an assessment of treatment safety profiles and tolerability.
Results: Over 3 months, strontium ranelate produced a significantly greater mean reduction in urine NTx than did alendronate (-52% vs. -32%, $p<0.001$), which was maintained at 12 months. Strontium ranelate produced a significantly greater mean BMD increase than did alendronate at 6 months, and it was maintained at 12 months at the lumbar spine (4.8% vs. 2.8%, $p<0.001$) and total hip (2.7% vs. 0.9%, $p<0.001$), as well as at the trochanter and femoral neck. Significant reductions in BSAP with strontium ranelate compared to alendronate were maintained over the 12 months of treatment. Study size did not allow for meaningful assessment of differences in fracture rates. Tolerability was generally higher between strontium ranelate vs. alendronate, and the incidence of upper GI AEs causing discontinuation and oesophageal AEs was so much higher in the alendronate vs. strontium ranelate groups.
Conclusion(s): In this study, strontium ranelate 2 g OD produced a 50% greater reduction in bone resorption as measured by urine NTx and significantly greater increases in lumbar spine and hip BMD than did alendronate 70 mg OW.

P211
EFFECT OF LOCAL BMD REFERENCE DATA ON THE FRACTURE RISK ASSESSMENT USING FRAX ALGORITHM

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Objective(s): To determine the effect of local reference data on fracture risk assessment using FRAX algorithm based on T-scores

Material & Methods: A sample of 100 healthy young females (20-30 years) was recruited by a random number generation method from a defined mixed urban and rural geographical area representative of the Sri Lankan population. The femoral BMD was assessed to derive the reference T-scores for the local population. 225 postmenopausal women (34-85 years) referred for DXA evaluation for osteoporosis, were used for fracture risk categorization using FRAX algorithm. Medical records were reviewed to obtain clinical risk factors. Each patient was assessed for the fracture risk using the FRAX tool for the US Caucasians, US Asians and Singapore Indians based on T-scores of the NHANES and local reference data. Major osteoporotic fracture risk probabilities (MOFP) were compared statistically using paired t-test.

Results: Mean (SD) femoral neck T-scores using NHANES and local reference data were -2.24 (0.88) and -1.49 (1.47), ($p<0.001$), respectively. Mean (SD) MOFP calculated using US Caucasian FRAX model were 13.04 (7.23) when NHANES reference data were used and 11.34 (7.78) when the local reference data were used ($p<0.001$). In using US Caucasian model, 39 patients had MOFP>20 when assessed using NHANES reference data and 35 patients had MOFP> 20 when assessed by the local reference data (misclassification was only 3 out of 225 patients). The corresponding figures when US Asian model was used were 5 and 9. For Singapore model the corresponding values were 13 and 13.

Conclusion(s): Using local reference data instead of NHANES data to calculate T-scores of the femoral neck did not make a significant impact on the risk categorization using FRAX model.

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OSTEOGENESIS IMPERFECTA AND OSTEOPOROSIS: HOW AND WHEN TO TREAT? CASE REPORT

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Objective(s): Osteogenesis imperfecta (OI) is an autosomal dominant disease, caused by defect in the gene that produces type I collagen. The aim of our research is to show our treatment dilemmas in patient with OI and osteoporosis.

Material & Methods: Female patient, 41 years of age, 144 cm high, weight 62 kg, BMI 29.9 g/cm^2, regular periods, 2 childbirths, nonsmoker, with osteogenesis imperfecta type I diagnosed in the childhood when she had 17 fractures. She has typical signs of the disease - mild short stature, blue sclera, thin skin, hearing loss, scoliosis of the spine, right tibia deformities, low muscle tone, joint laxity and osteoarthritis of the right knee, which was the main reason she came to our clinic.

Results: She was first examined in 2008, when osteodensitometry was performed: T- score L2-L4 -3.0; Z-score -2.9; BMD 0.829 g/cm^2; T-score right femur total -1.2; Z-score -1.0; Ca^{++} 1.01; osteocalcin 20.4 ng/ml; crosslaps 268.1 pg/ml; ALP normal; treated with bisphosphonates during 1 year and with 1000 mg Ca and 800 ij vitamin D daily. Next time she came in 2011 because her orthopedist recommended surgical treatment of the right knee and tibia. Densitometry T-score L2-4 -3.2; Z-score -31; BMD 0.814 g/cm^2; T-score right femur -1.3; Z-score -1.1; Ca^{++} 0.99; osteocalcin 30.4 ng/ml; crosslaps 145 pg/ml. We decided to repeat the same treatment with bisphosphonates and supplementation with Ca and vitamin D.

Conclusion(s): Nearly all people with OI have osteoporosis, since they do not develop appropriate bone mass at any age. There are no recommendations or guidelines for treatment of osteoporosis in OI patients. Some authors recommend use of bisphosphonates in the childhood, and others in postmenopausal period. The treatment goal is to increase bone mass through exercise, maintaining a healthy body weight, proper calcium and vitamin D intake, restriction of caffeine, alcohol and smoking. Indications for usage of bisphosphonates, teriparatide and selective estrogen receptor modulators still remain controversial. Decision must be made individually, with long-term follow-up of changes in BMD, age and bone turnover markers.

P213

SAVE A WOMEN TODAY, BUILD A FUTURE TOMORROW

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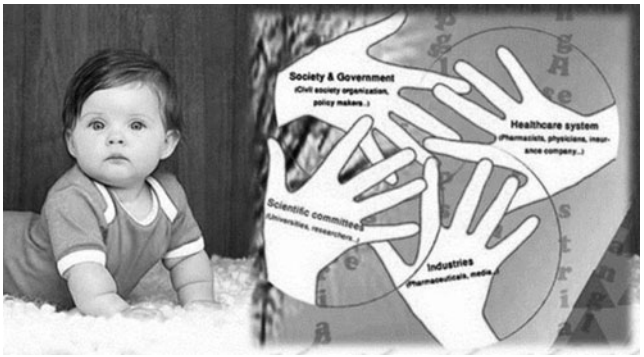
Objective(s): To highlight the utility of World Health Bank (WHB) initiative in the Osteoporosis settings.

Material & Methods: In depth literature review was carried out using the keywords; Osteoporosis, Electronic Medical Records (EMR), Patient-Centered healthcare.

Results: - Healthcare sector, across the globe, hardly struggles to adopt new capacities in the shape of mandatory reforms.

- Being osteoporotic patient reveals the social context of practicing medicine, in which; the treatment plan been built all around the patients' needs.
- Establishing a convenient tool for tackling the health status, starting directly upon confirmed being a fetus, play major role in osteoporosis-intervention process.



Conclusion(s): World Health Bank (WHB) provides the integrated tool for accurate and timely data mining, which aids in the decision making process, ensuring the best practices are developed and implemented when managing the silent disease's settings; Osteoporosis.

References: JW Hill, AW Langvardt (2010) *Business Horizons 53:87.* MW Leonard, A Frankel (2010) *Patient Education and Counseling 80:288.* R Thakur R, et al (2011) *J Bus Res* doi:10.1016/j.jbusres.2011.02.022

Disclosures: For the woman who gave me birth and from whom I learned expressing my deep gratitude to life's gift; the Women!

P214
THE CHAOS FALLS CLINIC IN PREVENTING FALLS AND INJURIES AMONG HOME-DWELLING OLDER ADULTS: A RANDOMISED CONTROLLED TRIAL

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Objective(s): The study assessed the effectiveness of the multifactorial Chaos Clinic Falls Prevention Programme on rate of falls and related injuries in home-dwelling older adults.
Material & Methods: A pragmatic, randomised controlled trial was conducted in home-dwelling people aged 70 years or more with high risk of falling and fall-induced injuries. Participants (n=1314) were randomised into intervention group (n=661) and control group (n=653). The intervention included a multifactorial, individualised 12-month falls prevention programme concentrating on general physical activity, strength and balance training, medical review and referrals, medication review, proper nutrition (protein, calcium, vitamin D), and home hazard assessment and modification. When necessary, mobility assistive devices were recommended. The control group received a general injury prevention brochure. Both groups were followed-up for one year. The negative binomial and the Cox proportional hazard regression models were used in analysing rate of falls, fallers, and fall-induced injuries (intention-to-treat basis).
Results: During the follow-up, the rate of falls was significantly lower in the intervention group (95 falls per 100 person-years [PY]) than in the controls (131 falls per 100 PY), the incidence rate ratio (IRR) being 0.72 (95% CI 0.61-0.86, P<0.001, NNT 3). The hazard ratio of fallers in the intervention group compared with the controls was 0.78 (95% CI 0.67-0.91, P=0.001, NNT 6). Respectively, the IRR of fall-induced injuries in the intervention group was 0.74 (95% CI 0.61-0.89, P=0.002, NNT 5). The IRR of fractures also favoured the intervention group (0.77, 95% CI 0.48-1.23, p=NS).
Conclusion(s): The multifactorial Chaos Clinic Falls Prevention Programme was effective in preventing falls of older adults. The programme reduced the rate of falls and related injuries by almost 30%.

P215
FEATURES OF CHANGES IN BONE REMODELING BY THE COMBINED USE OF IBANDRONATE AND ALFACALCIDOL AT THE PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS

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Objective(s): Extent suppression of the intensity bisphosphonate bone formation remains a debate subject. Appropriate to compare the intensity of decrease the bone resorption markers and bone formation using ibandronate in combination with alfacalcidol at the patients with postmenopausal osteoporosis
Material & Methods: During 12 months the 57 women's age from 56-86 years, with the duration of postmenopause >1 year, and low serum vitamin D3 level have been received once in 3 month ibandronate IV and daily 0.75-1.25 μg of alfacalcidol (the doses correction was depended from bloods calcium level) with 1500 mg of calcium carbonate per os daily. After 12 month from the beginning bone density measurements were done with using x-ray absorptiometry. Every 3 month blood calcium and urinary phosphor levels were analyzed and once in 6 month sCTX and osteocalcin, DPD of urine levels were analyzed too. The paired Student's criterion with 95% CI was used for the analysis of two measurements.
Results: After 12 month from the beginning of treatment was a significant increase of BMD in spine (L1-L4) at 4% from 0.820±0.041 to 0.854±0.042 (p=0.0001) and femoral neck at 2.7% from 0.719±0.036 to 0.739±0.034 (p=0.049). After 6 month the sCTX level significantly decreased from 0.59±0.08 to 0.2±0.12 ng/ml (p=0.019) and at 12 moth this

measurement resulted 0.18±0.08 ng/ml (p=0.00001). After 6 months from the beginning of therapy the value of DPD urine decreased from 7.0±0.68 to 5.7±0.76 nmol/l and did not significantly changed with the result 5.0±0.72 (p=0.002) nmol/l to 12 month. After 6 month the osteocalcin blood level didn't significantly changed and after 1 year decreased from 21.5±4.2 to 13.5±2.8 ng/ml (p=0.0001). The changes of bone metabolism markers were in reference range.

Conclusion(s): Accordingly decrease in the rate of resorption under the influence of ibandronate and alfacalcidol ahead decrease bone formation at 6 months, which provides marked increase in BMD.

P216

BONE ALKALINE PHOSPHATASE AND OSTEOCALCIN AS MARKERS OF OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN WITH BREAST CANCER AND BONE METASTASES

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Objective(s): Breast cancer (BC) is a heterogeneous tumor that occurs predominantly in elderly women. The overall estimated number of new BCs in the USA in 2011 was 232,000, accounting for about one-third of cases of cancer in women. It continues to be one of the most common causes of cancer death. BC frequently metastasizes to the skeleton, and it is estimated that 85% of individuals with advanced disease harbor bone metastases (BM). Bone alkaline phosphatase (BAP) and osteocalcin are widely used to check the response to therapy in patients with progressive bone disease. The aim of this study was to evaluate whether a correlation exists between bone remodeling serum markers BAP and osteocalcin, and BMD in women with BC and BMs.

Material & Methods: Data from a group of 18 postmenopausal women (median age 65 years, range 54-74 years) who have undergone surgery for invasive BC and successively developed BMs were retrospectively analyzed. Lumbar spine (L2-L4) BMD using DXA, and serum BAP and osteocalcin were measured in all patients. According to the WHO criteria, 13 patents (subgroup A) had mild or moderate osteoporosis (T-score -2.5 through -4 SD), while 5 (subgroup B) had severe osteoporosis (T-score of<-4 SD).

Results: Age (62.2±5.6 *vs*. 68.8±4.2 years, p=0.061), baseline BAP (27.8±7.3 *vs*. 34.8±7.4 U/L, p=0.088) and osteocalcin (22.8±7.4 *vs*. 31.4±8.7 ng/mL, p=0.081) did not differ significantly (subgroup A *vs*. B). There was no relationship between age, BMD, BAP and osteocalcin serum levels in subgroup B, while in the subgroup A, only a week correlation (R=0.72, p=0.018) between BAP and osteocalcin was observed, and no relationship (p=NS) between BMD, age, and serum markers was found.

Conclusion(s): In patients with BMs from advanced BC, the action of local osteolytic factors, such as PTHrP, together with direct bone resorption by lytic metastasis, may cause a severe bone disease. In postmenopausal women with BC and BMs the effects on bone of age and cancer together likely overlap, and the relationship between age, BMD, and bone remodeling serum markers is not maintained.

References: Lumachi F et al. Anticancer Res 2009;29:1551.

P217

OSTEOPROTEGERIN GENE POLYMORPHISM AND THE RISK OF LOW BONE MASS IN TYPE 1 DIABETIC PATIENTS

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Objective(s): Osteoporosis has a complex etiology and is considered to be a multifactorial polygenic disease. There are more than 100 genes which predispose to low bone mass and poor bone quality. Meanwhile osteoprotegerin plays a central role in the processes of bone formation and bone resorption. Our aim was to investigate the frequency of occurrence of OPG (-209 G/A) and OPG (-245 T/G) SNPs and its association with BMD in type 1 diabetics.

Material & Methods: 51 examined patients were divided into two groups: the first one includes 33 patients with normal BMD (Z-score more than -1.5: L1-4 0.03; femoral neck 0.03; total 0.38) and the second one includes 18 patients with low BMD (Z-score less than -1.5: L1-4 -1.37; T neck -1.75; total -1.48). BMD was measured by DXA. QIAamp DNA Blood Mini Kit (Qiagen, USA) was used to purify DNA from whole blood, gene polymorphisms were detected in sequence analysis. Patients with comorbidities and conditions associated with low BMD were excluded from the study.

Results: 29 (88%) patients with OPG (-209 G/A) GG genotype were detected in the group with normal BMD vs. 12 (67%) patients in the second group (p=0.001). Meanwhile there were 4 (12%) and 6 (33%) patients with OPG (-209 G/

A) GA genotype in the first and the second group correspondingly (p=0.001). OPG (-245 T/G) TT genotype were revealed 29 (88%) patients in the group with normal BMD and 12 (67%) patients in the group with low BMD) (p=0.001). OPG (-245 T/G) TG genotype was revealed in 4 (12%) patients with normal BMD and 6 (33%) patients in the second group (with low BMD) (p=0.001). Patients with OPG (-209 G/A) GA and OPG (-245 T/G) TG genotypes have significantly lower BMD in spine (p=0.021 and p=0.044, respectively) and femoral neck (p=0.035 and p=0.044, respectively), total hip (p=0.044 and p=0.044, respectively) regions than in patients with OPG (-209 G/A) GG genotype and OPG (-245 T/G) TT genotypes, respectively.

Conclusion(s): The results of the study reflect the high frequency of OPG (-209 G/A) and OPG (-245 T/G) SNPs in type I diabetic patients with low BMD. Our results potentially explain the possible mechanisms of bone loss in these patients.

P218
THE BONE HEALTH CLINIC: SUCCESSES OF AN EVIDENCE-BASED SERVICE IN PROVIDING SCREENING, PREVENTION AND TREATMENT OF OSTEOPOROSIS IN THE NORTHWEST REGION, IRELAND

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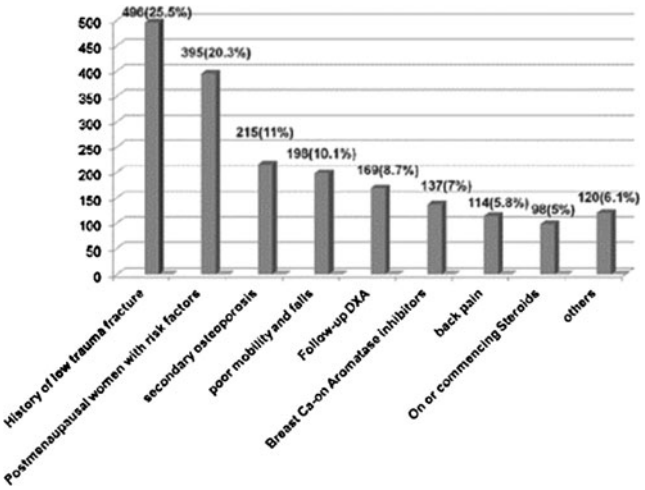
Objective(s): To audit the service provided by the bone health clinic at Sligo General Hospital (SGH) in providing the required care standard for screening, prevention and treatment of patients with or at high risk of osteoporosis.

Material & Methods: Data was collected from October 2007 - February 2011 on adult patients attending the Bone Health Service at SGH. Patient-related information and BMD results were recorded in the DXA dataset. Treatment recommendations were set depending on the risk profile and the densitometry result.

Results: A total of 2196 patients attended the Bone Health Service at SGH between October 2007 - February 2011, of whom 82.5% were female. The mean age was 67.4 years (±10.3).The indication for DXA assessment was documented in 88.5% of referrals (n=1942). A history of low trauma fracture was the commonest indication (25.5%) followed by screening of postmenopausal women for osteoporosis (20%).



Most of the requests (45%) for DXA scanning came from Internal Medicine Specialists (n=873). GP open access referrals accounted for 31.1% (n=605).Other sources included the Fracture clinic and the Fracture Liaison service (20.8%/n=407). One third of our cohort were diagnosed with osteoporosis (n=730) and of those 45.5% had severe osteoporosis.44.6% of our patients were osteopenic (n=981) with less than one quarter having normal BMD (n=484). Antiresorptive therapy was initiated in 19.9% of cases (n=389) with an additional 13.7% (n=267) advised to continue their current antiresorptive treatment. 300 patients (15.3%) were advised to commence calcium/vitamin D supplements and 287 patients (14.7%) were encouraged to optimize their dietary calcium and vitamin D intake.

Conclusion(s): Over a three year period, the bone health clinic at SGH provided a successful evidence based service for the early detection, prevention, treatment and follow-up of patients with or at high risk of osteoporosis.

P219
ASSOCIATION BETWEEN ABDOMINAL FAT MASS MEASURED BY CT AND BONE MINERAL DENSITY IN KOREAN MEN

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Objective(s): The protective effect of total fat mass on BMD has been challenged and the effect of central obesity on bone has been shown inconsistently. The aim of the present study was to investigate the association between abdominal fat mass and BMD.

Material & Methods: A total of 634 subjects who underwent abdominal CT during health check-ups were studied. BMD was measured at lumbar spine (L-spine) by using

DXA. Abdominal fat mass including visceral, subcutaneous and total fat was measured and calculated by CT. We examined the effect of central obesity on BMD by multiple regression after adjusting age, body weight, physical activity, smoking, alcohol intake and vitamin D level in serum.
Results: The median age was 50 years (interquartile range, 26-60 years). L-spine BMD showed a positive correlation with body weight, and a negative correlation with waist circumference by bivariate correlation analysis. Multiple regression analysis after adjusting age, body weight, physical activity, smoking, alcohol intake and vitamin D level in serum showed that body weight and waist circumference were significant determinants of the L-spine BMD (R^2=0.124, P< 0.001). Although when we performed bivariate correlation, central obesity such as visceral, subcutaneous and total fat had the positive correlation with L-spine BMD. However, multiple regression after adjusting age, body weight, physical activity, smoking, alcohol intake and vitamin D level in serum showed that total and subcutaneous fat had the negative correlation with L-spine BMD. In addition, there was no significant association visceral fat and L-spine BMI.
Conclusion(s): In this Korean male population, L-spine BMD showed a consistently positive correlation with weight and a negative correlation with waist circumference, especially total and subcutaneous fat.

P220
EFFICIENCY OF COLLAGEN INJECTIONS "GUNA MDs" IN PATIENTS WITH GONARTHROSIS, ASSESSED CLINICALLY AND BY ULTRASOUND

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Objective(s): This study is to investigate the effectiveness of collagen injections Guna-Knee+Guna-Matrix on pain and daily functioning in symptomatic knee osteoarthritis III-IV X-ray stages by Kellgren.
High frequency ultrasonography is an approved imaging technique for diagnosis of joint swelling and monitoring of therapy.
Material & Methods: We studied 25 patients aged between 62-79. All patients are clinically evaluated by joint assessment, as well as by standard X-ray and ultrasonography of the knee. Questionnaires completed by the patients before treatment, 60th and 90th day evaluation of pain at rest using a 10-point visual analog scale (VAS), pain assessment during movement of the knee in 10-point VAS, assessment of the Lequesne index on gonarthrosis/ algo-functional index/ and evaluation of the efficacy of the treatment according to the patient and the physician were performed. All patients had sonographic examination of both knees with Mindray M5(China) scanner with multifrequency linear transducer (8-12 MHz) at beginning and 30 days after completion of the treatment. We applied a combination of GUNA MD-Knee and GUNA MD-Matrix periarticularly, 10 ampoules in the following scheme: during the first 2 weeks - 2 applications per week and during the next 6 weeks - 1 application per week in a single course of treatment 8 weeks.
Results: Pain at rest and pain during movement are significantly reduced and the effect on pain remains after treatment. There is a statistically significant improvement in the index of Lequesne. Total of 68% of patients gave a very good and better assessment of efficacy, which coincides with the opinion of the physician. Of all patients 60% were without joint swelling 30 days after treatment, which is sonographically proved.
Conclusion(s): Periarticular administration of collagen injections GUNA-MDs in Gonarthrosis III-IV Rö stage significantly affects pain, swelling and functional activity of the knee, thereby increasing the quality of life of the patient. The effectiveness of GUNA-MDs continues after discontinuation of treatment. No side effects were registered throughout the whole course of treatment with GUNA-MDs.
Disclosures: Olivier Meyer: Président du comité de sécurité (safette committee) du ranelate de strontium, Membre du comité de surveillance DRESS du ranelate de strontium

P221
RECURRENT FRACTURES AFTER PERCUTANEOUS VERTEBROPLASTY OVER 1 YEAR: COMPARISON WITH MEDICATION

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Objective(s): To compare the long term outcomes of percutaneous vertebroplasty (PV) with medication for vertebral compression fractures (VCF).
Material & Methods: This retrospective study compared patients treated by PV for VCF (group A) with patients treated by medication only for the same condition (group B) over a year. Medication group received oral bisphosphonate and calcium citrate. We reviewed 44 patients with vertebral fractures who underwent PV between June 2006 - April 2010. We also reviewed 60 patients with vertebral fractures who underwent medical treatment without PV between June 2006 - April 2010. Pain reduction and newly diagnosed VCF were evaluated. Pain was measured using visual analogue scale (VAS). Additional VCF was evaluated by follow up radiograph.

Results:

General Characteristics of Patients

Variables	Group A (N=44)	Group B (N=60)
Sex (M : F)	6 : 38	9 : 51
Mean duration after VCF (months)	31.4±12.5 (13~60)	27.4±15.6 (13~81)
Age (years)	71.0±9.0	71.5±6.9
Height (cm)	154.1±8.8	156.7±6.9
Weight (kg)	54.7±10.6	54.7±10.6

44 patients (6 males, 38 females, 71±9 years) were in group A and 60 patients (9 male, 51 female, 71.5±6.9 years) were in group B. The mean duration after VCF was 31.4±12.5 months in group A and 27.4±15.6 months in group B. There was no significant difference in the sex, age and the duration after onset between two groups. In group A, 15 (34.1%) patients suffered newly developed VCF. In group B, 20 (33.3%) patients suffered newly developed VCF. There was no significant difference in the incidence of newly developed VCF between the two groups. Also incidence of new adjacent level fractures between two groups did not show significant difference. VAS reduction was more prominent within 1 week after PV ($P<0.05$).

Conclusion(s): Compared with medication, PV provided immediate pain reduction and did not increase the incidence of additional VCF.

P222
THE PREVALENCE OF COGNITIVE IMPAIRMENT IN ELDERLY HIP FRACTURE PATIENTS

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Objective(s): To examine the prevalence of cognitive impairment in elderly people with hip fracture.

Material & Methods: Experimental group were consisted with 21 hip fracture patients aged over 60 years. Control group were 21 age-matched inpatients without hip fracture. We measured cognitive impairment using the Mini Mental State Examination (MMSE). Subjects were interviewed using questionnaire including past history of neurologic disorder or dementia and location of fracture occurred.

Results: The mean age of enrolled both group were 77±4 years. The mean MMSE score in the control group was 26.2 and experimental group was 20.3. The MMSE score of the experimental group was significantly lower than the control group ($p<0.001$*). Eight patients(38%) of the experimental group had known dementia or old cerebral vascular accident (CVA) history and none of the control group had dementia or CVA history. Seven patients(33%) of the experimental group had first detected cognitive impairment during investigation. Overall, 15 patients (71%) of the experimental group had severe cognitive impairments. Most patients (71%) of the experimental group had history of fracture in their own house, and these patients had more severe cognitive impairment (mean MMSE score: 19) than patient with outside trauma history (mean MMSE score 23.5, $p<0.001$*).

General Characteristics of Patients

Character	Number of the Experimental group	Number of the Control
Total Number	21 (Male: 9, Female: 12)	21 (Male: 7, Female: 14)
Mean Age	77±4 years	72±4 years
Previous Cognition impairments	8	0
Fracture in house	15	0

Conclusion(s): Many elderly patients with hip fracture had more cognitive impairment than other peer group without hip fracture. And most hip fractures happen in one's own house. Detection of cognitive impairment and education is important to prevent hip fracture in old generation.

P223
PRINCIPLES OF DIAGNOSIS AND MANAGEMENT FOR ACUTE JUNCTION SYNDROME PATIENTS

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Objective(s): Acute junction syndrome (AJS) appears as a complex of clinical symptoms follow up several nosological issues.

Material & Methods: Patient's condition is characterized by intensive inflammation and/or pain syndromes, which requires his hospitalization. Acute junction syndrome term should be used as a medical diagnosis for prehospital period of medical care due to necessity of patient concentration in the specialized units and for providing medical diagnosis and successful medical care. Due to minimization of inpatient period pain relieve and verification of the clinical picture should be done simultaneously in specialized units of emergency multiple care hospitals.

Results: In according to this conception AJS patients are hospitalized and managed in Research Institute of Emergency Care n.a. I.I. Dzhanelidze. From the beginning of patient admission we use the special diagnostic algorithm with a complex of diagnostic procedures provided to decrease time of differential diagnosis and verification of concrete nosological form of disease. All 349 patients firstly divided to neurological, traumatological, infection diseases, oncological and rheumatological groups. Inside each group further verification is required.

Certain diagnostic approach used to divide AJS patients in rheumatology group. First, clinical, laboratory and instrumental investigation separates arthrosis and arthritis subgroups. After that we use X-ray examination and immunological investigation to verify the concrete nosological form of connective tissue diseases. During all diagnostic period from the beginning of hospitalization patients receive nonspecifically treatment including NSAIDs. After verification of diagnosis patients begin to receive DMARDs and other etiological treatment.

Conclusion(s): Earliest diagnosis verification in AJS patients allows accelerate the beginning of etiological treatment that improves the disease outcome.

P224

ASSOCIATION BETWEEN CALCIUM-REGULATING HORMONES PTH, 25(OH)D AND IGF-I, AND BMD IN ELDERLY WOMEN WHO WERE NOT ESTROGEN OR BISPHOSPHONATES USERS

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Objective(s): Secondary hyperparathyroidism is a frequent condition in elderly women, and represents a risk factor for increased bone resorption. Measurement of BMD is currently considered of diagnostic value to predict an individual long-term fracture risk, and BMD values correlate with several demographics and anthropometric parameters, and with markers of bone metabolism and calcium-regulating hormones. The aim of this study was to evaluate the relationship between BMD, BMI, PTH, vitamin D (25(OH)D), and IGF-I in elderly women.

Material & Methods: A group of 31 postmenopausal women over age 65 (median 68 years, range 65-74) who were not bisphosphonates, estrogen, calcium or vitamin D users, and had no history of fracture, were enclosed in the study. The following parameters have been recorded: age, age at menarche and menopause, weight, height, BMI (kg/m^2), systolic and diastolic blood pressure. Lumbar spine (L2-L4) BMD (g/cm^2) using DXA, serum albumin, calcium, PTH (ng/L), 25(OH)D (nmol/L), and IGF-I (μg/L) were measured in all patients.

Results: The main results are reported in the Table. There were no hypertensive patients, and both s-albumin and s-calcium were within the normal range (41-47 g/L, and 2.10-2.55 mmol/L, respectively). There was an inverse correlation between age and both 25(OH)D (R=-0.50, p=0.020) and IGF-I (R=-0.7, p<0.0001), and between BMD and PTH (R=-0.48, p=0.027). Moreover, a significant relationship between IGF-I and both BMD (R=0.64, p=0.0016) and PTH (R=0.48, p=0.026) was found, while IGF-I did not correlate with 25(OH)D (R=0.16, p=0.47) and BMI (R=-0.89, p=0.70). Age at menarche and menopause were independent parameters (p=NS).

	Age (years)	Age at menarche and menopause (years)	BMI (kg/m^2)	BMD (g/cm^2)	PTH (ng/L)	25(OH)D (nmol/L)	IGF-I (μg/L)
Mean	68.4	12.8/49.6	25.1	0.790	72.1	48.6	117.4
SD	2.2	1.6/4.2	2.1	0.058	12.5	19.2	63.1

Conclusion(s): In this group of elderly women there was a strong relationship of osteoporosis (expressed as BMD values) to calcium-regulating hormones, such as PTH and IGF-I, while BMI and 25(OH)D seem to be independent of bone mineralization status.

P225

RELATIONSHIP BETWEEN BONE REMODELING SERUM MARKERS AND BMD IN PREMENOPAUSAL WOMEN WITH ADVANCED BREAST CANCER

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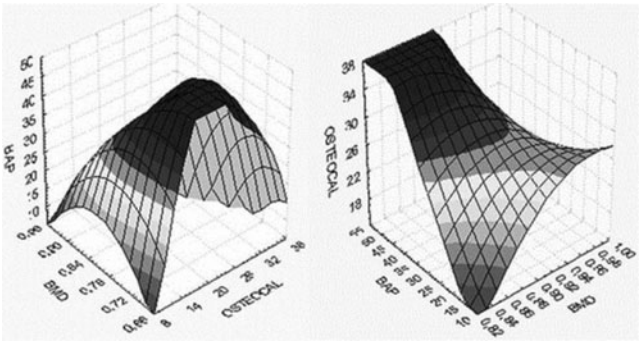
Objective(s): In cancer patients, metastatic bone disease is not uncommon, and the prevalence of bone metastasis (BM) is high especially among patients with prostate and breast cancer (BC). BMs may usually complicate with different skeletal morbidity, such as pain, spinal cord compression, pathologic fracture, and malignancy-related hypercalcemia. Early detection of BM is usually obtained by imaging study procedures, but bone turnover serum markers measurement may be useful. The aim of this study was to assess the relationship between bone formation markers bone alkaline phosphatase (BAP), osteocalcin, and amino-terminal propeptide of type I collagen (PINP), bone resorption marker carboxyterminal crosslinked telopeptide of type I collagen (CTx) and PTH, and BMD in premenopausal women with advanced BC and BMs.

Material & Methods: A group of 19 women (median age 45 years, range 34-51) with BC and BMs were enrolled in the study. All patents underwent lumbar spine (L2-L4) BMD measurement using DXA. BAP (U/L), osteocalcin (ng/mL), PINP (ng/mL), CTx ng/mL), and PTH (ng/L) serum levels were also assayed. According to BMD results, patients were considered as

having osteopenia (T-score>-2.5 SD, Group 1=11 patients) or osteoporosis (T-score<-2.5 but>-4 SD, Group 2=8 patients).
Results: No correlation was found (Group 1 *vs.* 2) between BMD and BAP (R=-0.50, p=0.13 vs. R=-0.48, p=0.21), osteocalcin (R=-0.23, p=0.51 *vs.* R=-0.41, p=0.19), PINP (R=-0.41, p=0.22 *vs*. R=-0.32, p=0.43), CTx (R=0.46, p=0.18 *vs*. R=0.15, p=0.51), and PTH (R=0.19, p=0.64 *vs*. R=0.20, p=0.56) in both Groups. The figure shows the relationship between BMD, osteocalcin and BAP in Group 1 (left) and 2 (right).



Conclusion(s): In premenopausal women with BC and BMs, lumbar spine BMD values are independent of bone turnover serum markers levels, both in patients with osteopenia and in those with osteoporosis. Bone resorption by lytic micrometastasis could be the cause of further bone impairment.

P226
USEFULNESS OF ICTP AND TRACP5b MEASUREMENTS IN WOMEN WITH BONE METASTASES FROM BREAST CARCINOMA AND SEVERE OSTEOPOROSIS: PRELIMINARY RESULTS

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Objective(s): Bone is the first site of distant metastases in patients with breast cancer (BC). Bone lysis induced by cancer cells invading the bone and promoting degradation of mineral matrix, together with the production of PTH-like peptides, represent the mechanisms of cancer-induced hypercalcemia. Bone metastases (BMs) are a frequent complications in BC. They are usually detected by whole body bone scintigraphy, which unfortunately presents low sensitivity and specificity, visualizing areas of increased osteoblastic activity. In patients with BMs a number of urinary and serum markers are altered. Tartrate-resistant acid phosphatase (TRACP5b), specifically derived from osteoclasts, is a promising marker of bone resorption. Moreover, increased concentrations of carboxyterminal telopeptide of type I collagen (ICTP), a crosslinked product of collagen I degradation, have been observed in patients with BMs. The aim of this preliminary study was to evaluate the usefulness of TRACP5b, ICTP and bone alkaline phosphatase (BAP) in patients with BMs from BC and severe osteoporosis.
Material & Methods: A group of 12 women (median age 66 years, range 56-72 years) with BC, severe osteoporosis, and radiologically confirmed isolated BMs (cases), and 15 age- and stage-matched women without BMs (controls), were retrospectively reviewed. All patients underwent serial measurement of TRACP5b, ICTP, and BAP. The cut-off values considered were 3.6 U/L, 4.2 U/mL, and 68 U/mL for TRACP5b, ICTP, and BAP, respectively. Odds ratios (OR) calculation with the 95% CI, Fisher exact probability test, and Student's t-test were used to compare variables.
Results: The mean levels of TRACP5b, ICTP, and BAP (cases *vs.* controls) were 6.2±2.8 *vs*. 3.2±1.2 (t=3.62, p=0.0014) U/L, 8.3±6.4 *vs*. 4.2±1.6 (t=2.32, p=0.029) U/mL, and 151.3±98.6 *vs*. 72.5±26.4 (t=2.87, p=0.0085) U/mL, respectively. The corresponding OR were 7.20 (95% CI 1.06-48.64, p=0.043), 6.41 (95% CI 1.09-37.73, p=0.041), and 1.60 (95% CI 0.32-7.84, p=0.42), respectively, while the OR for TRACP5b and ICTP together was 9.77 (95% CI 1.55-61.64, p=0.014).
Conclusion(s): Our preliminary study shows that in osteoporotic patients with BC the elevation of both TRACP5b and ICTP correspond to a 9.8-fold higher risk of having BMs.

P227
POLYMORPHISMS OF THE HUMAN IL-1 RECEPTOR ANTAGONIST GENE AND FOREARM BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN

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Objective(s): The objective of this case-control study was to investigate the association between the forearm BMD and the IL1RA gene polymorphisms.
Material & Methods: 400 postmenopausal Bulgarian women participated. BMD was measured at the forearm by X-ray absorptiometry on a DTX-100 device (Osteometer Meditech, USA). A PCR product was isolated. The alleles were scored according to their length: A1 – 410 bp – 4 repeats; A2 – 240 bp – 2 repeats; A3 – 500 bp – 5 repeats; A4 – 325 bp – 3 repeats; A5 – 595 bp – 6 repeats. All

analyses were evaluated for statistical significance (χ^2-test and T-test).

Results: Four alleles were observed – A1, A2, A3 and A4. The A1A1 genotype was more common in cases with low BMD than in controls with normal BMD (95% vs. 90%, χ^2 $p<0.01$). The A2A2 genotype was equally distributed among cases and controls (both 5%). The other two genotypes (A3A3 and A4A4) as well as A1A3 were present only in controls with normal BMD. The A2A2 genotype was associated with higher BMD and the A1A1 - with lower BMD at both forearm sites. The odds ratio for low BMD in the presence of the A1A1 genotype was 2.11. The etiological factor reflecting the association between the polymorphism and the disease was 0.50.

Conclusion(s): In our study sample the IL1RA genetic polymorphisms were associated with the forearm BMD. This genetic polymorphism may become a useful genetic marker for the study of osteoporosis.

P228
RELATIONSHIP BETWEEN CLINICAL SARCOPENIA AND POSTMENOPAUSAL OSTEOPOROSIS, FRACTURES AND FALLS

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Objective(s): The aim of the study was to examine the relationship between clinical sarcopenia and osteoporosis.

Material & Methods: Study sample: a population-based cohort of 591 Finnish postmenopausal women (mean age 67.9; range 65-72) from the Osteoporosis Fracture Prevention (OSTPRE-FPS) study. Outcome measures: BMD and total body scan were assessed by DXA. The study sample was divided into three categories according to WHO BMD criteria: normal (n=276), osteopenia (n=289) and osteoporosis (n=26). Furthermore, the study sample was divided into sarcopenic and nonsarcopenic groups according to quartiles of relative skeletal muscle mass index (RSMI) (appendicular muscle mass (kg)/height $(m)^2$), hand grip strength (kPa) and walking speed. Nonsarcopenic women were not in the lowest quartile in any measurement (RSMI, grip strength or walking speed) whereas sarcopenic women were in the lowest quartile of RSMI and either muscle strength or walking speed or in both.

Fractures were assessed based on self-reports according to postal inquiry and falls were registered by telephone interviews.

Results: Multinomial regression analysis revealed that in comparison to non-sarcopenic women, sarcopenic women had 12.9 times higher odds of having osteoporosis ($p\leq 0.001$, OR=12.9; 95% CI=3.1-53.5). In comparison to women within the highest grip strength quartile, women within the lowest quartile strength had 11.7 times higher odds of having osteoporosis ($p=0.001$, OR=11.7; 2.6-53.4). Sarcopenic women had 2.7 times higher odds of having fractures compared to nonsarcopenic women ($p=0.005$, OR=2.732; 1.4-5.5). Sarcopenic women had also 2.1 times higher odds of having falls during the last year compared to nonsarcopenic women ($p=0.021$, OR=2.1; 0.3-0.8). Finally, the adjustment with age, BMI, physical activity and hormone therapy (HT) did not significantly alter these results.

Conclusion(s): Clinical sarcopenia was significantly associated with osteoporosis. Grip strength was the most significant measurement to show association between sarcopenia and osteoporosis, falls and fractures.

Disclosures: The study was supported by Kuopio University Hospital EVO-grants and Ministry of Education and Culture.

P229
SOFT TISSUE BODY COMPOSITION AND FUNCTIONAL RECOVERY FOLLOWING A FRAGILITY FRACTURE OF THE HIP: AN OBSERVATIONAL STUDY OF 502 WOMEN

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Objective(s): To investigate the association between lean and fat components of soft tissue body composition and functional recovery in hip-fracture women.

Material & Methods: We investigated 502 of 560 women admitted consecutively to our rehabilitation hospital following a fragility fracture of the hip. Soft tissue body composition was assessed by DXA, 20.1±6.9 (mean±SD) days after fracture occurrence. Appendicular LM (aLM) was calculated as the sum of LM in arms and legs. Fat mass (FM) was calculated as the sum of FM in arms, legs, and trunk. Because metal implants (prostheses, plates, nails, and screws) affect the regional assessment of body composition, measures of soft tissue from unfractured legs were substituted for measures of soft tissue in fractured legs as previously described: corrected aLM=(LM in unfractured leg x 2)+LM in arms; corrected FM=(FM in unfractured leg x 2)+FM in arms+FM in trunk. To adjust both aLM and FM for body size we divided them by height squared. Functional recovery was assessed by using Barthel index scores both before and after inpatient rehabilitation.

Results: At bivariate correlation, aLM/ht2 was neither significantly correlated with Barthel index scores after

rehabilitation nor with their change during rehabilitation (ρ =0.01, p=0.79, and ρ=-0.06, p=0.20, respectively). A weak correlation was found between FM/ht2 and Barthel index scores after rehabilitation (ρ=0.129; p=0.004), but not between FM/ht2 and the change in the functional score (ρ=-0.01; p=0.84). The inclusion of both aLM/ht2 and FM/ht2 together with age in a linear multiple regression model did not show any significant associations between either lean or fat compartments and function. Finally, corrected aLM adjusted for height and FM (residuals) was not significantly associated with the functional scores.

Conclusion(s): Measures of neither aLM nor FM assessed by DXA after hip fracture were consistently associated with the short-term functional outcome in women. Data suggests that qualitative changes of the muscle tissue, which are not captured by DXA scans, may play a pivotal role in affecting recovery to function in activities of daily living following a fracture of the hip.

P230
PATHOPHYSIOLOGY OF DRUG INDUCED OSTEOPOROSIS: THE TRABECULAR, THE CORTICAL AND THE BROKEN

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Objective(s): To study the change of BMD, both axial (hip and spine) and peripheral (forearm), in drug induced osteoporosis and its impact on clinical practice. Also, to assess the association of BMD measurement and low trauma fractures.

Material & Methods: Data of 81 cancer prostate men (71.1±5.4 yr) treated with hormone antagonist therapy (HAT), as well as 74 breast cancer (64.7±6.1 yr) treated with HAT were compared to 165 subjects (85 men and 80 women) of matching sex and age. All patients had BMD measurement at the spine, hip and forearm at baseline and 1-year whereas at 2-years of therapy 56 male and 48 from the active groups had repeat DXA scan. Vertebral morphometry was also carried out.

Results: By the end of 2 years, in the active male group: BMD assessment revealed osteoporosis in: 59.3%, 9.8% and 6.1% at the distal forearm, hip and spine, respectively, in comparison, in 7.4%, 3.5% and 5.9% in the control group. In the active female group BMD assessment revealed osteoporosis in: 48.6%, 13.5% and 16.2% at the 3 sites, respectively, in comparison to 31.1%, 8.1% and 14.9% in the control female group. In both the men and women groups, the mean T-scores in the active groups at the distal forearm ($p<0.01$) and hip ($p<0.03$) were significantly less than the control groups. In the active groups: 19/155 (12.3%) sustained low trauma fractures, 31.6% had low trauma fracture at the forearm, 15.8% at the spine, 5.3% at the ankle, 15.8% at the hip or pelvis, and 31.6% at other sites.

Conclusion(s): Patients treated with HAT have a high prevalence of osteoporosis. The use of peripheral BMD measurement appears to identify more patients with bone loss earlier in the course of therapy and suggests its use in the evaluation of patients receiving HAT. The association of BMD loss with fracture was site specific. In view of the fact that the ratio between cortical and trabecular bones varies according to the site, the prevalence of osteoporosis and fractures among the patients assessed in this work raises the possibility that cortical bone loss might be key factor in drug induced osteoporosis.

P231
POSTMENOPAUSAL DISABILITY PENSION IMPAIRS BONE AND MUSCLE HEALTH

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Objective(s): The aim of the study was to investigate relationship between postmenopausal disability pension (DP) and BMD as well as muscle strength.

Material & Methods: Study population consisted of 3222 Finnish postmenopausal (mean age 53.4 years, range 48-59.6 years) women from the OSTPRE-study in Kuopio, Finland. Femoral neck (FN) BMD was measured with DXA in 5-year intervals from 1989. In all 2227 women accomplished the 15-year follow-up. Grip strength (GS) measurements were carried out parallel with DXA using hand-held dynamometer. GS was divided into quartiles. Disability pension (DP) records were gathered from the Finnish social insurance institution (KELA) registers from 1955-1995. Of the study population 1208 women were on disability pension before year 1995. Disability pension records were divided into eight major disability subgroups using International Classification of Diseases (ICD-9).

Results: Women on DP (BMD 0.92 g/cm^2 at baseline and 0.86 g/cm^2 at 15-year measurement) had significantly higher bone loss rate in comparison to women not on DP (BMD 0.93 g/cm^2 at baseline and 0.88 g/cm^2 at 15-year) with significance of linear trend (F-test) p=0.001. “Diseases of the respiratory system” and “Diseases of the nervous system and sense organs” – DP groups had the lowest BMD at 15-year measurement and the highest bone loss rate. Adjustment for age, calcium daily intake, BMI, alcohol intake, hormone therapy,

daily physical activity and smoking did not significantly alter the differences. Furthermore women were divided into quartiles of GS. At baseline 39.1% of the women on DP were in 1st quartile (weakest) and 14.0% in 4th quartile (strongest) whereas 17.6% of nonpensioners were in 1st quartile and 29.3% in 4th quartile (p=<0.001). At 15-year 33.4% of the women on DP were in 1st quartile and 18.9% in 4th quartile whereas 21.2% of nonpensioners were in 1st quartile and 27.8% in 4th quartile (p≤0.001).

Conclusion(s): Disability pension is associated with postmenopausal bone loss and decreased grip strength. Bone loss and muscle strength differ between different DP morbidity categories.

Disclosures: The study was supported by Kuopio University Hospital EVO-grants and Ministry of Education and Culture.

P232

OSTEOPOROSIS AWARENESS AND 10 YEAR PROBABILITY OF FRACTURE FROM FRAX® AMONG FEMALE BREAST CANCER SURVIVORS

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Objective(s): To report the osteoporosis awareness and predicted fracture risks among female breast cancer survivors who never receive osteoporosis treatments participating in a patient support group event.

Material & Methods: During the 2011 Taiwan Breast Cancer Alliance "Pink October" event, questionnaires about osteoporosis awareness and FRAX® tool were distributed. The answers on FRAX® questions were entered into the Taiwanese calculator onsite to generate the10-year probability of fractures. All participants were provided with the osteoporosis/fracture education booklets and free consultations by on-site physicians. Participants who had high risks defined as predicted major osteoporotic fracture ≥20% or hip fracture ≥3% in 10-year were asked to visit their primary care physicians for considering osteoporosis treatments. Among the 942 returned questionnaires, 842 female participants with complete information were included for data analysis. Comparisons were made between those below or above 50 years of age, a surrogate for menopausal status.

Results: Mean age was 55.1±9.0 years with 212 (25.2%) <50 years old. Only 29.9% knew that the mortality rate of osteoporosis was similar to that of stage 4 breast cancer and 2/3 (67.1%) knew that breast cancer treatment would accelerate bone loss. Over half (55.5%) knew that 41% of Taiwanese women older than 50 years of age had osteoporosis. Nearly 9/10 (92.4%) plan to visit a physician if they have high osteoporosis or fracture risks. Close 1/5 (18.8%, hip) and 5.6% (major osteoporotic) were considered high risks from FRAX®. Compared to younger survivors (<50 y/o), older participants (≥50 y/o) had better awareness for the above three osteoporosis knowledge questions. They were also shorter in height, having higher BMI, higher prevalence of previous fracture, parent hip fracture, and secondary osteoporosis. More older participants were considered high risk (24.4% vs. 1.9%, for hip fracture, 7.1% vs. 0.9% for major osteoporotic fracture, both p<0.001) than younger participants.

Conclusion(s): In general, breast cancer survivors who never receive osteoporosis treatment had inadequate awareness in osteoporosis. However, 1/5 of them and 1/4 of postmenopausal women had high risk of fracture predicted by FRAX®. Knowing the fracture risks would increase patient's willingness to visit a physician to consider appropriate treatments.

P233

THE EFFECTS OF HEALTH MANAGEMENT INTERVENTION ON POSTMENOPAUSAL OSTEOPOROSIS WOMEN TREATMENT

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Objective(s): To evaluate the effects of an intervention programme of health management, targeted to osteoporosis patients in clinical therapy.

Material & Methods: Randomized controlled trial with one-year follow-up, carried out in the study. A total of 120 postmenopausal osteoporosis women were enrolled. The 120 postmenopausal osteoporosis subjects were randomized to either the intervention group (A, n=60,) or the control group (B, n=60). Both groups were treated by Alendronate Sodium. Group A: Education program performed once a season for the intervention group, at baseline, the intervention group was given general information about lifestyle and osteoporosis risk. This was done either individually or in one group session (30 min to 1 h), and some printed material was delivered. The message included healthy and balanced diet, exposure to sunlight (30 m-2 h/d, and more than 8 h/w), and respect to physical fitness (30 m-1 h/d, and more than 3-5times/w), and supplement calcium 600 mg and VitD 125 IU daily. Group B: nonintervention controls. The first outcome was comparison of compliance in follow up. The second

outcomes were changes in BMD. During one year of intervention, BMD was measured by DXA on lumbar spine and hip at pre-intervention and 12 months after intervention.
Results: After one year, 51 subjects in group A and 38 subjects in group B completed the follow-up. Groups A had much better compliance than group B. BMD on lumbar spine and the hip were significantly increased in both groups, compared with themselves at pre-intervention. There was no significant difference between group A and group B. But the changes of BMD on lumbar (0.042±0.067/0.026±0.070, p= 0.029) and the changes of BMD on Words region (0.029± 0.129/0.023±0.143, p=0.041) have statistical significance.
Conclusion(s): For alendronate sodium treatment, health management ensures the effectiveness of therapy and also increase the compliance of patients. It's a very important assurance of curative effect for long-time treatment of osteoporosis.

P234
EFFICACY OF MONTHLY AND WEEKLY ORAL BISPHOSPHONATES IN THE TREATMENT OF POSTMENOPAUSAL OSTEOPORSIS

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Objective(s): To estimate the clinical effect and treatment adherence of ibandronate and alendronate in postmenopausal osteoporosis.
Material & Methods: This study enrolled 64 postmenopausal women aged 47~80 years with BMD at baseline lumbar spine or femoral neck or total hip T-score≤-2.5. The people were randomly assigned to two groups. 32 in each group: group I, oral ibandronate 150 mg per month; and group II, oral alendronate 70 mg per week. All patients received calcium 500 mg and vitamin D 200 IU daily for one year. All patients were examined by DXA (lumbar, hip) before and after treatment. At same time biochemical markers of bone turnover rate were determined.
Results: Substantial increases in lumbar spine BMD were seen in group I: 6.25% and 9.64% after half year and one year treatment, respectively, those in group II were 6.82% and 11.4%, respectively. There was significance difference in two groups comparison with pretreatment($P<0.05$). In both group, the BMD of hip locations also increased but without significance($P>0.05$). Serum CTX-1 levels decreased dramatically in both groups. In group I, there was 9.4% women discontinued treatment compared to 21.9% in the group II.
Conclusion(s): Once-monthly oral ibandronate is at least as effective alendronate for increasing BMD and for inhibiting osteoclastic activity in treatment postmenopausal osteoporosis. Once-monthly administration may be more convenient for patients and improve therapeutic adherence, thereby enhancing therapeutic outcomes.

References: 1. Cotte FE, Fardellone P, Mercier F, et al (2010) Osteoporos Int 21:145. 2. Rabenda V, Mertens R, Fabri V, et al (2008) Osteoporos Int 19:811. 3. Anthony IS. Ronald DE, Joseph DK, et al (2009) Bone 44:423. 4. McClung MR, Bolognese MA, Sedaratic F, et aI (2009) Bone 44:418.

P235
ROLE OF SERUM SCLEROSTIN ON BONE METABOLISM IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Objective(s): Type 2 diabetes mellitus (T2DM) is associated with an increased risk of fragility fractures. The pathophysiological mechanisms are complex. The role of the Wnt pathway and its endogenous antagonist sclerostin should be clarified. The aims of this study were to evaluate serum sclerostin in T2DM patients and to analyze its relationship with bone metabolism.
Material & Methods: This was a cross-sectional study. We compared serum sclerostin in T2DM group (n=76) and control group (n=54) and we evaluated its relationship with bone turnover markers, BMD and morphometric vertebral fractures.
Results: Sclerostin levels were significantly higher in T2DM patients than control subjects ($p<0.001$) and in T2DM males than in T2DM females ($p<0.001$). Serum sclerostin was positively correlated with age in males T2DM ($p=0.031$) and with serum creatinine in T2DM group ($p<0.001$). Sclerostin concentrations were positively associated with duration of T2DM ($p=0.064$) and HbA1c ($p=0.074$) independently of age in T2DM patients. Sclerostin was inversely related to bone turnover markers bone alkaline phosphatase, carboxy-terminal crosslinked telopeptide of type I collagen and tartrate-resistant acid phosphatase 5b ($p<0,05$) and positively related to lumbar spine, femoral neck and total hip BMD ($p<0.05$) in T2DM group. Sclerostin was significantly lower in osteoporotic than nonosteoporotic patients with T2DM ($p=0.041$). There was no relationship according to morphometric vertebral fractures. In linear regression analysis, gender, study group, age, serum creatinine and BMD were predictive of sclerostin levels ($p<0.05$).
Conclusion(s): Circulating sclerostin is increased in T2DM independently of gender, age, renal function and BMD. Also we found a relationship between serum sclerostin and duration of T2DM, HbA1c, bone turnover markers, BMD and osteoporosis in T2DM patients.

References: García-Martín A, Rozas-Moreno P, Reyes-García Ret al (2011) J Clin Endocrinol Metab [Epub ahead of print].

P236
SERUM C-REACTIVE PROTEIN AND BONE MINERAL DENSITY IN A GROUP OF POSTMENOPAUSAL WOMEN

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Objective(s): Increased circulating levels of high sensitivity c-reactive protein (hsCRP) have been proposed as independent predictor of cardiovascular events, more recently associated with decreased BMD and increased bone turnover. We aimed to investigate the relationship between serum hsCRP levels and BMD parameters at central skeletal sites in a group of postmenopausal women.

Material & Methods: The study included 450 postmenopausal women who underwent DXA testing on Hologic QDR 2000 device. BMD parameters: BMD (g/cm^2), T (SD) and Z(SD) score were measured. We took demographic, medical history, laboratory testing data, including hsCRP (nephelometry, r.v: <5 U/ml). Two subgroups were formed according to hsCRP levels, one with normal hsCRP (NCRP), another with elevated hsCRP levels (HCRP). We examined correlations of hsCRP levels and DXA parameters on both skeletal sites and compared two subgroups with regard to DXA parameters obtained. The variables were analysed by appropriate statistic tests.

Results: A total of 450 women were analysed, aged 59.4±6.2 years, menopause duration 11.1±5.93 years. Mean serum hs CRP value in group NCRP (n=251) was 1.9±1.28 U/ml, while in HCRP group (n=199) 16.6±12.21 U/ml, p=0.000. The subgroups were comparable in term of demographics, medical history of no serious concomitant disease, risk factors for osteoporosis and other laboratory findings, except hsCRP. Mean BMD (L1-L4) in NCRP was (0.968±0.1793), while in other (0.901±0.1682) g/cm^2, p=0.7, mean T-score (-0.94±1.412) vs. (-0.81±1.618), p=0.68. We found mean BMD on femoral neck in group with NCRP (0.73±0.134) vs. (0.74±0.138) SD in HCRP group, p=0.6. Mean neck T-score in NCRP group was (-2.14±1.024) vs. (-2.1±1.195) p=0.5. Among correlations observed, statistically significant were found between serum homocysteine, creatinine and hsCRP levels in HCRP subgroup (both, p=0.01).

Conclusion(s): Increased hsCRP levels are not associated with significant decrease of BMD in apparently healthy postmenopausal women. Elevated hsCRP is positively correlated with serum homocysteine and creatinine in subgroup of women with elevated hsCRP.

P237
INTRA-ARTICULAR ADMINISTRATION OF HYLASTAN SGL80 IN PATIENTS WITH SYMPTOMATIC KNEE OSTEOARTHRITIS: PRELIMINARY DATA OF A MULTICENTER COHORT STUDY

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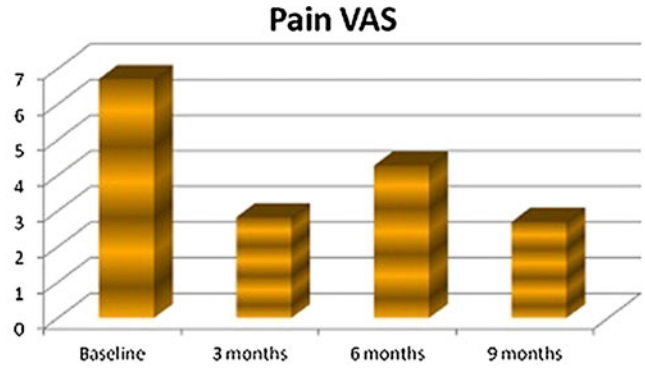
Objective(s): Hylastan SGL80 is a mixture of hylastan gel, sodium hyaluronate gel (HA) chemically cross-linked with divinilsulfone and a liquid-based HA in the gel-liquid ratio 80:20, contained in a 5 ml syringe preloaded with about 4 ml of soft-gel. The mechanical/viscoelastic properties of Hylastan SGL80 are similar to those of the synovial fluid and higher than those of unmodified hyaluronan-based solutions.

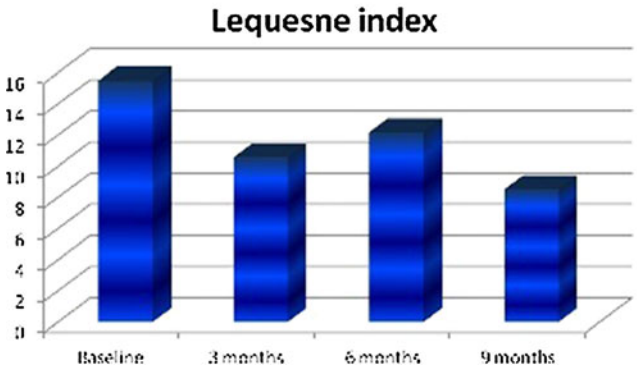
Material & Methods: We performed a multicenter cohort study with a follow-up of 12 months and obtained preliminary data on the effectiveness and safety of Hylastan SGL80 in knee OA. We enrolled adult patients with knee OA grade 1-4 Kellgren-Lawrence and treated them with a single intra-articular infiltration Hylastan SGL80 (4 ml). The follow-up visits were performed at baseline, 3, 6 and 9 months evaluating the infiltration index Lequesne and VAS pain. Safety was assessed by recording any adverse event.

Results: We enrolled 101 patients, 56 males and 45 females. Each patient underwent to a single intra-articular infiltration of Hylastan SGL80 for every knee affected by OA. Preliminary results showed a statistically significant improvement from baseline at 3 and 6 months in terms VAS pain (p<0.001), and at 3 months with a slight decrease at 6 months in terms of Lequense Index.

Efficacy profile of Hylastan SGL80 in knee OA

	Baseline	3 months	6 months	9 months
Pain VAS (mean±SD)	6.71±1.4	2.83±1.2	4.28±1.4	2.7±0.4
Lequesne Index (mean±SD)	15.51±3.3	10.58±4.04	12.19±4.5	8.54±1.6
Number of patients reaching followup visit	101	101	80	7





Infectious or other complications were not reported.
Conclusion(s): Our data suggest that a single intra-articular infiltration of Hylastan SGL80 in knee joint affected by OA is well tolerated and effective in reducing pain for up to 6 months and in improving the functionality to 3 months.

P238

ASSESSMENT OF THE BIOCHEMICAL MARKERS OF BONE TURNOVER IN GONADAL DISGENESIAS

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Objective(s): All defects formation of embryonic gonads were grouped under the gonadal disgenesias. The etiology of gonadal disgenesias role of sex chromosomes is well established as the default condition for the development of gonads and enzymatic battery providing specific hormone biosynthesis. Gonadogenesis alteration process (morphological disgenesia) has multiple implications: biosynthesis disrupt hormonal processes, altered responsiveness to hormones gonadal structures and disorder in clinical aspect sexualization process. Exclusion of sex hormones in the body economy, seriously affecting bone structure, the main cause of hypogonadal osteoporosis.
Material & Methods: The study was performed on 20 cases with gonadal disgenesias whose ages were between 12-28 years, including female phenotype with Turner syndrome (14 cases) and Klinefelter's syndrome (6 cases). Were assessed biochemical markers of bone turnover (serum osteocalcin and CrossLaps) and BMD was assessed by DXA.
Results: Osteoporosis was detected in 10 cases, osteopenia in 7 cases and the remaining patients BMD and biochemical markers were within normal limits.
Conclusion(s): 1) A study of biochemical markers of bone turnover and BMD is required for all cases with gonadal disgenesias. 2) Early diagnosis of osteoporosis/ osteopenia, hormone replacement requires specific clinical forms, which are first line therapeutic attitude to prevent fragility fractures. 3) Given that 85% of the cases we studied had osteopenia and osteoporosis, hormone replacement therapy is necessary association with specific means bone remineralization.

P239

INCIDENCE OF OSTEOPOROSIS STUDY IN PREMATURE OVARIAN FAILURE

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Objective(s): At patients with premature ovarian failure, follicular endowment is very low and therefore is deficient ovarian hormonogenesis. As the number of follicles is lower, the lifetime of the ovary is reduced, representing a clinical spectrum from total or partial absence of pubertal sexualisation by early onset climacteric. The disruption of ovarian hormones that control bone homeostasis, is disturbtraining report bone resorption with decreased bone mass and osteoporosis.
Material & Methods: The study was conducted on 48 patients whose age ranged between 20-38 years. Investigations were focused on the study hormonology FSH, LH, PRL, oestradiol, progesterone. Pelvic ultrasound

was also performed utero-ovarian. At all patients the BMD was assessed by DXA. As biochemical markers of bone turnover were studied and serum osteocalcin CrossLaps by ELISA.

Results: Hormonal dosages showed low levels of oestradiol and progesterone, but those of gonadotrophic hormones (LH, FSH) were between 210-385 mUI/ml (upper limit of normal: 0.110-190 mUI/ml). BMD measurement showed the presence of osteoporosis in 22 cases, representing 45.8% of all cases investigated. BMD is correlated with biochemical markers of bone turnover.

Conclusion(s): 1) A study of BMD and biochemical markers of bone turnover in premature ovarian failure, it must be conducted regularly to identify patients who rapidly lose bone mass and increased risk of osteoporosis. 2) The estrogen-progestive substitution represents the therapeutic attitude which is the first choice for premature ovarian failure to prevent osteoporosis, metabolic or visceral complications. 3) Patients with osteoporosis will be associated the antiresorbtion or proformation medication to prevent fragility fractures.

P240
STUDY OF BMD AND BIOCHEMICAL MARKERS OF BONE TURNOVER IN HYPOGONADISM HYPOGONADOTROP

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Objective(s): Bone, being a loyal following the sexualizing, sexualized body growth and reshuffling his general. The role of hormonal factors is very important for bone growth and consolidation. Physiological stages of the game is directly proportional to bone functionality gonads. Change of bone mass during osteogenesis recognizes three stages: growth, consolidation and reduction of its

Material & Methods: The study was performed on 13 cases with hypogonadism hypogonadotrop, of which sexual infantilism pituitary dwarfism 3 cases; adiposo-genital syndrome, 8 cases and 2 cases anterior pituitary tumor. Were evaluated biochemical markers of bone turnover osteocalcin and CrossLaps, and BMD was assessed by DXA

Results: Osteoporosis was evident in 5 cases with pituitary dwarfism and osteopenia in anterior pituitary tumor and 4 cases adiposo-genital syndrome

Conclusion(s): The paper suggests two major objectives in therapeutic strategy of osteoporosis/osteopenia cases with hypogonadism hypogonadotrop: a. Early diagnosis of gonadal failure in the adoption of measures for the prevention of bone changes already in the prepubertal, pubertal and post pubertal, to stabilize or increase bone mass and age appropriate sex; b. Solution of substitution associated estrogen-progestogen therapy/androgen medication with the antiresorption or proformation medication.

P241
ANTHROPOMETRIC CHARACTERIZATION AND BODY COMPOSITION IN SPANISH CLIMATERICAL WOMEN WITH OSTEOPENIA AND OSTEOPOROSIS. RELATION WITH THE ANSWER AND IMPLICATION IN THE PHARMACOLOGICAL TREATMENT

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Objective(s): Due to long periods of treatment once osteoporosis is manifested, it is necessary to provide new factors that optimize social and individual quality of life. Thus the objective of the study is to know if the somatic status and body composition of women have impact on the effectiveness of pharmacological treatment and their adherence to the same.

Material & Methods: Study carried out in Madrid, with 150 women aged between 40-80 years. Follow-up a longitudinal study was done according with two direct measures about anthropometry, body composition and densitometry with a temporary lapse of 12 months. The scheduled data followed the bioethical Helsinki Protocol. The somatic characterization was performed according to the International Biological Program (IBP), Tetrapolar Bioimpedance was used to determining body composition and DXA (lumbar spine (L2-L4) and neck of femur) for assessment of bone situation. Four groups of women according to the annual bone evolution have been established: increase in bone density in lumbar or neck of femur, decrease in lumbar spine or neck of femur

Results: At the global level the situation in BMD remains with a very discreet increase (after CL: 0.770±0.64, current: 0.775±0.68) 0.615 Prior CF±0.47, current 0.617±0.46) However if evidence has been found statistically significant that in groups consisting of women with similar treatments have achieved an increase in bone density are those which have most precocious age of menarche, later menopause. The study shows that among women with bone recovery have greater weight, higher BMI, perimeters and fatty

percentages significantly higher than those women without bone recovery (F=4.38 P>0.01 weight, F=3.85 p>0.05).
Conclusion(s): Menstrual history as well as body composition characteristics can be used as predictive of bone recovery or risk of fracture. The best tracking of treatment have been found among women treated with risedronate (100%) in women with favorable progression in CL and those that have not progressed in CF. The short sample with another therapy focus on the requirement of more studies with another alternative therapy as strontium derivates.

P242
RESEARCH BONE MINERAL DENSITY IN TURNER SYNDROME

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Objective(s): The study was performed on 10 cases with Turner syndrome with female phenotype. Cytogenetic investigation (sexual chromatin, karyotype, chromosomal heel) confirmed the diagnosis of Turner syndrome. Hormonological explorations were focused on the study: FSH, LH, estradiol, progesterone.
Material & Methods: BMD was measured by DXA. Scanning was done at the radius, hip and lumbar spine in anteroposterior incidence. It is estimated that measurement of bone mass in the spine and hip are better for predictability of fracture risk than those in the peripheral skeleton. The result is expressed as BMD in g/cm^2 and T- and Z-scores osteoporosis and osteopenia diagnosis was established according to criteria recommended by WHO, on the basis of age heterogeneity score T. Because patients with Turner syndrome, we evaluated Z-score for BMD assessment and got out of the age factor calculation. Hormonological investigations showed insignificant values feminizing hormone (estradiol, progesterone) and hypothalamic-pituitary debaclu (very high LH and FSH). It is widely accepted that in Turner syndrome, renal impairment by anovarie estroprogesteronic early puberty is evident from the absence of puberty sexualization when the body does not have definitive sexuality processing.
Results: By osteodensitometry, osteoporosis was confirmed in 7 cases, and osteopenia in 3 cases. Z-score values were between -1.73 and - 4.44 SD.
Conclusion(s): Therefore, we consider that the assessment of BMD and markers concomitant hormone in patients with Turner syndrome, we provide useful information on the process of bone remodeling. In conclusion, to prevent fragility fractures, hormone replacement therapy is necessary association with the proformation medication.

P243
THERAPEUTICAL ATTITUDE DIFFERENTIATED IN HYPOGONADAL OSTEOPOROSIS

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Objective(s): There are many treatment options in osteoporosis induced gonadal failure (ovarian or testicular), and choosing appropriate therapy should be based on the following principles: efficiency, confounding effects extrascheletice, cost-benefit.
Material & Methods: Casuistry included in our study is represented by 57 patients, of which the late puberty (26 cases) and premature ovarian failure (31 cases).
Results: For cases with delayed puberty - hypogonadism hypergonadotrop (gonadal disgenesias) and hypogonadism hypogonadotrop - the major objectives of hypogonadal prophylaxis were carrying insurance sexualisation process, bone stability during ontogenesis, control factors that induce osteoporosis and its consequences (osteoporotic fractures). For cases with premature ovarian failure have followed: evaluation of patients with increased risk of osteoporosis, secondary osteoporosis causes exclusion, selection of appropriate treatment. Treatment options include both patients with delayed puberty and premature ovarian failure for cases: nonpharmacological approach and intervet therapeutic pharmacological agents against pathogenic mechanism of osteoporosis hypogonadal.
Estrogen-progesterone replacement therapy is the attitude of the first line in premature ovarian failure, to prevent osteoporosis, metabolic and visceral complications. For cases with delayed puberty, associated therapeutic substitution solution estrogen-progesterone/androgen antiresorptive medications (bisphosphonates) or proformatores.
Conclusion(s): In our study, we observed a decrease in T-score 14-16% after 6 months of treatment with strontium ranelate in patients with premature ovarian failure. In other cases with Turner syndrome (4) and premature ovarian failure (7) we treated for 3 months at doses of 35 mg

risedronate/wk. It noticed a decrease in serum CrossLaps and osteocalcin by 38.5% to 41.3% compared to baseline. Regular assessment of biochemical markers of bone turnover (osteocalcin, CrossLaps) and BMD (DXA) provides useful information on the effectiveness of therapy.

P244
MODULATION IMMUNO-ENDOCRINE ON BONE METABOLISM

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Objective(s): One of the most evocative similarities between the endocrine and immune system, is the mechanism regulating Ag, respectively specific hormone receptor. The similarity between Ig and hormones can be extended to the functional structure: containing hormones as Ig-binding regions, and regions of printing function such as Fc fragment and Ig.
Material & Methods: Moreover, reasoned opinions have appeared that the effect of hormones on immune cells would be relatively proportional to receptor number local to them. It is estimated that the main physiological role of sex hormones on immune system activity is to help achieve an appropriate balance in the treatment of immune complexes. This balance is dynamic and antagonistic actions resulting from the balance between male and female sex hormones.
Results: The stimulation of estrogen production and conversion of IgM→IgG immunoglobulin by B cells increase "Self" and control of part of the phenotypic expression of IgM (by mediation chromosome X). Progesterone tends to "suppress" immune reactivity with anti-estrogenic effects. May decrease in vitro T cell proliferation, but increase the number of CD 8 cells without diminishing function nonresponder. Androgens have immunosuppressive effects (inverse to estrogen) because decreases immunoglobulin production by decreasing B cell stimulation and immune complexes. Cytokines influence bone cell metabolism by mediating interactions between physiological and pathological bone and immune system, the action of circulating hormones osteotropi. A fundamental characteristic of most cytokines is their immunomodulatory activity. IL-1, was the first cytokine "immune" identified as having the following bone metabolism: activates bone cell replication, stimulate bone resorption, coupled with osteoformatores resorption, stimulates collagen synthesis and increased synthesis of IL-6 with a role in resorption. How IL-1 stimulates IL-6 produce by osteoblastic cells and marrow stomata, it is possible that interactions of these cytokines to pathological bone resorption implication only, but also in normal bone remodeling.
Conclusion(s): Knowing the intimate mechanisms of immune-endocrine modeling of bone metabolism, open new perspectives in the management of osteoporosis.

P245
NEW MECHANISMS ACCOUNTING FOR A FINE TUNING REGULATION OF OSTEOBLAST AND OSTEOCLAST ACTIVITY

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Objective(s): To study if the interplay among c-Src, IL-6 and IGFBP5 is involved in maintaining osteoblasts in an immature status.
Material & Methods: Primary osteoblasts (OBs) were treated with the c-Src inhibitor PP1, recombinant human IL-6 and soluble IGFBP5 to study the impact on OB differentiation by RT-PCR and Western blot analysis. Osteoclast (OC) precursors and mature OCs were treated with soluble IGFBP5 to analyse their formation and activity. Mice were treated with the c-Src inhibitor CGP76030, to evaluate IL-6 expression in tibias by RT-PCR and bone parameters by histology/histomorphometry.
Results: WT, hIL-6 overexpressing transgenic (TG) and inflammatory agents-treated mice subjected to CGP76030 treatment showed reduced STAT3 activation and IL-6 mRNA in whole bones. Histomorphometric analysis demonstrated that treatment with CGP76030 significantly improved TG mice bone phenotype, demonstrating the anabolic and antiresorptive effects of the c-Src inhibitor. BALB/c-*nu/nu* mice intracardiacally injected with MDA-MB231 and treated with CGP76030 showed decreased incidence of bone metastases, with a reduction of both human (derived by MDA-MB231) and mouse IL-6 in sera and in the bone metastasis tissue. IL-6-treated OBs increased c-Src activation in long-term treatment, suggesting the involvement of mediators. Although IGF-1 could be instrumental to link IL-6 and c-Src pathways, IL-6-treated OBs showed no changes of IGF-1, while IGFBP5 mRNA was increased. IGFBP5-treated OBs showed increased c-Src activation, proving a role for IGFBP5 in IL-6/c-Src interplay. Since c-Src inhibition increased IGFBP5 mRNA, we analysed the IGFBP5 promoter, identifying a responsive element for Runx2, that was upregulated by c-Src inhibition. Consistently, Runx2 overexpression increased IGFBP5 mRNA in OBs. To test if this effect depended on OB maturation, IGFBP5 was administered to subconfluent (immature) and overconfluent

(mature) OBs. At variance with subconfluent cells, in overconfluent OBs c-Src was barely expressed and, hence, insensitive to IGFBP5-induced activation. To test if in this context other cells were targeted by IGFBP5, OC precursors and mature OCs were treated with IGFBP5, which induced an increase of both osteoclastogenesis and bone resorption

Conclusion(s): These results suggest a novel role for IGFBP5 in bone homeostasis that could provide new insights in the pathogenesis of inflammation-related and cancer-related bone pathologies.

P246
STRUCTURE AND PARTICULARITIES OF DOCTOR- (OSTEOPOROSIS) PATIENT INTERACTION IN 3 ROMANIAN OUTPATIENT CLINICS

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Objective(s): To assess structure and characteristics of communication during the consultations of supposed - osteoporosis patients.

Material & Methods: Descriptive study, using quantitative and qualitative analysis of doctor-patient interactions in 60 outpatient visits of 3 rheumatologists, in state clinics. We measured time-structure of visits (duration of: the initial patient-report, patient's- and doctor's questions, explanation of diagnosis, recommendation for treatment and lifestyle changes) as well as some qualitative patterns of doctor-patient interaction (status/authoritarian pattern, depth of interaction, eye contact, offering a sit while discussing, summarising important information at the end of the visit, etc.).

Results: Duration of patients report was on average less than 1 min, while average time spent with one patient 3.6 min, there was average 4 doctor-questions and less than one asked by the patient. Explanations of the doctor took less than 2 m, including diagnosis, treatment and recommendations for laboratory or radiology investigations, where necessary. There were no questions regarding risk factors and no recommendations regarding lifestyle changes. None of the 3 doctors asked patients if they have any further questions.

Conclusion(s): Results can be explained with the time pressure, due to the large number of patients waiting for the doctor. It is more difficult to explain the way, patients were pleased and satisfied with the visits. They were not active (no or few questions), showed no willingness to participate in decision making or to have a more in depth discussion with the doctor. Further investigations are needed to clear how these patterns differ when the same doctors work in their private clinic, how these parameters relate to social status of patients, and how they influence patient satisfaction, implication in decision making and health outcome.

P247
CLINICAL PRESENTATION OF PRIMARY HYPERPARATHYROIDISM IN THE CANARY ISLANDS IN THE LAST 20 YEARS

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Objective(s): Primary hyperparathyroidism (PHPT) has a variable clinical expression. In the developed countries, asymptomatic hypercalcemia is the most frequent clinical finding although some other manifestations as urolithiasis, depression, osteoporosis and fragility fractures are often described. The objective of this study is to compare the clinical presentation of PHPT in the last 20 years in Gran Canaria, Canary Islands.

Material & Methods: Group I was conformed by 105 patients who were diagnosed of a PHPT from 1989 to 1999 and Group II were 116 patients who were diagnosed from 2000-2009. A questionnaire was filled and a complete physical examination was performed to every patient. A standard biochemical profile was done to every patient, including 25-hidroxivitamin D, intact PTH, calcium, phosphate, creatinine, total proteins. Bone densitometry was also performed to every patient and X-rays of the hands and dorsal and lumbar spine were also performed.

Results: Results are shown in Tables 1 and 2.

Table 1. Basal characteristics of the population studied

	1989-1999	2000-2009	p-value
Number (Male/Female)	105 (6/99)	116 (8/108)	0.012
Age (years)	61.2±10.4	58.7±9.6	0.012
Height (cm)	156±6.7	158.3±6.2	0.008
Weight (kg)	70.5±12.7	74±12.8	0.042
BMI (kg/m^2)	28.9±5.4	29.2±4.8	0.662

Table 2. Clinical manifestations of PHPT listed by decade

Clinical Manifestation	1989-1999	2000-2009	p-value
Number	105	116	NA
Hypercalcemia	87.1	91	0.649
Increased serum PTH	100%	100%	NA
Chronic renal failure	4.1%	3.5%	0.916
Weakness/Fatigue	29.8%	42.5%	0.107
Urolithiasis	34%	28%	0.448
Arterial hypertension	46.1%	51%	0.574
Depression	65.6%	59.3%	0.470
Osteitis fibrosa	6.1%	3.7%	0.495
Gastrointestinal disturbances	26.9%	30.2%	0.759
Fragility fractures	12.4%	14.3%	0.841

The clinical pattern of PHPT has changed very little in the last 20 years. The clinical manifestations are very similar with the exception of age. Indeed, the patients have more weight and height.
Conclusion(s): The clinical pattern of PHPT has changed a little in the last 20 years. Patients are now diagnosed at an earlier age, and have greater height and weight than patients diagnosed a decade ago, but the clinical manifestations are similar in this decade compared to the previous one. Asymptomatic hypercalcemia is doubtless the most frequent clinical feature.

P248
PREVALENCE OF HYPOVITAMINOSIS D IN ELDERLY MEN WITH HIP FRACTURES

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Objective(s): Vitamin D deficiency is a well known clinical finding in women suffering from hip fractures, who leads to the development of a secondary hyperparathyroid. Less studies have been published on men. We compare the prevalence of hypovitaminosis D in men and females admitted in the hospital because of a hip fracture.
Material & Methods: Cross-sectional observational study, performed in patients suffering from hip fracture, who were attended at the Hospital University Insular, Gran Canaria, between May 2005 - June 2009. We performed a questionnaire to every patient, including risk factors for falls and for osteoporosis. A physical examination was also done. We also performed a lateral X-ray of the dorsal and lumbar spine, and a complete analytical study, including renal function, vitamin D and parathyroid hormone (intact PTH) by immunochemoluminiscence.
Results: Results are shown in Tables.

Basal characteristics of the population studied.

	Men	Women	p-value
Number	76	175	
Age (years)	79.5±10.3	76.4±12.6	0.04
Weight (kg)	72.3±10.2	68.4±9.2	0.01
Height (cm)	162.3±4.5	158.6±5.2	0.01
BMI (kg/m^2)	27.2±5.6	28.5±4.8	0.125

Comparison of 25-HCC and PTH values between men and women with hip fracture

	Men	Women	p-value
25-HCC (ng/mL)	15.3±10.5	20.5±11.6	0.001
PTH (ng/mL)	67.4±21.7	61.5±17.4	0.03
Serum calcium (mg/dL)	9.6±0.4	9.5±0.3	0.213
Serum phosphate (mg/dL)	3.7±0.7	3.6±0.5	0.412
Total proteins (g/L)	6.8±0.5	6.9±0.5	0.568
Creatinine (mg/dL)	0.9±0.2	0.8±0.2	0.162

Vitamin D values were lower, and serum PTH were higher, in men suffering from hip fractures compared to women with the same disease. 58.3% of the men and 51.1% of the women had vitamin D lower than 20 ng/mL.
Conclusion(s): Globally, men suffering from hip fracture have lower values of vitamin D than women with the same disease. Almost 60% of men suffering from hip fracture present 25-HCC levels lower than 20 ng/mL, compared to 51% of the women, they also present higher values of serum PTH which leads to the developing of a secondary hyperparathyroidism, who could produce more bone loss and increase the risk of suffering new fractures in the future.

P249
ATYPICAL SUBTROHANTERIAN FRACTURE: AN EASY TO FIND SITUATION IN A PARTICULAR PATIENT WITH COMPROMISED BONE STRUCTURE TREATED FOR OSTEOPOROSIS

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Objective(s): Underline the importance of the bone structure abnormalities in the etiology of atypical subtrochanteric fracture (ATF).
Material & Methods: A 38 yrs woman after 2 years of continuously antiresorbtive treatment.

Results: Medical history: at age of 20 yrs had bone and joint generalized pain treated for short term with NSAIDs and prednisone 15 mg daily (2 months). No clear etiology of the pain was revealed at that moment; at 28 yrs was admitted in the hospital for went limp, pelvic pain. Radiographic findings: bilateral consolidated symphysis fractures, wedge-shaped vertebral body T5. L2-L4 DXA Z-score=-2.14 SD. Bone scintigraphy - multiple areas of uptake in the ribs and vertebral bodies. Serum calcium and PTH ruled out the diagnosis of primary hyperparathyroidism (Ca=10 mg/dl, PTH=15 pg/ml). No other endocrine dysfunction was revealed by further investigations. Bilateral spontaneous osteonecrosis of the femoral neck was diagnosed and bilateral prosthesis was recommended (postponed by the patient). Oral bisphosphonate was started at age 29. In the next 5 years bilateral forearm fractures and 18 cm decreased in height occurred due to multiple vertebral fractures. At age 34, histopathology showed generalized fibrous cystic osteitis. Next 2 years treatment was stopped (pregnancy and nursing). 2009 first admitted in our department: reevaluation for endocrine diseases without abnormal results, no connective tissue or celiac disease. Serum vitamin D, calcium, phosphate, PTH and IGF1 were normal. Bone resorbtion markers near the upper normal limit. 2009-2010: 5 mg intravenous zoledronic acid per year associated with strontium ranelate, and parenteral vitamin D3: no change in BMD, no new vertebral fractures; the patient experienced a right forearm fracture in 2009 and a right ATF in February 2011.

Conclusion(s): In spite of not very typical features, all the data leads to the diagnosis of fibrous dysplasia. Intravenous 5 mg yearly zoledronic acid improved the clinical aspect and lowered significantly the fracture incidence. In our opinion, the background of the patient (progressive FD and osteonecrosis of the hips) claims a bigger impact on the ATF etiology comparing to a relative short period of continuous bisphosphonate (last 2 yrs) treatment.

P250
THE IMPORTANCE OF RISK FACTORS FOR OCCURRENCE OF THE OSTEOPOROTIC FRACTURES IN PATIENTS WITH LOW BONE DENSITY

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Objective(s): The osteoporotic bone is a bone with lower bone density and as such with predispositions for fracture occurrence. The aim of the study was to detect risk factors and establish their importance for the occurrence of osteoporotic fractures in patients with low bone density.

Material & Methods: The prospective clinical study included 1245 patients, treated during the period from January-July 2011 in Special Hospital for Rheumatic Diseases in Novi Sad. The tested group consisted of 96% women (1193/1245) and 4% men (52/1245), with average age of 63 years. All patients have undergone the osteodensitometric examination (DXA) at lumbar spine and at the hip; by means of which BMD was measured and expressed as the T-score. Exclusion factors in this study were premenopausal women and men under 50 years of age. Results are interpreted according to the valid definition of osteoporosis. All patients were surveyed regarding risk factors responsible for the occurrence of osteoporosis and/or osteoporotic fractures. For statistical analysis purpose the Bonlink data processing program was used.

Results: BMD on the osteoporosis level was present in 16% of patients, on the osteopenia level in 66%, and regular T-score was present in 18% of patients. The most common risk factor was early menopause 28.27%, previous fractures 23.29%, family history of fractures 13.73%, treatment by glucocorticoids 9.64%, smoking 14.06%, autoimmune diseases 7.63%, rheumatoid arthritis 5.70%, low BMI 3.53% and alcohol consumption 0.88%. Osteoporotic fractures occurred in 35.26% of patients, from which vertebral fractures were in 40% and nonvertebral in 60% of patients. The most frequent fractures were in patients with T-score at the osteopenia level 63%, then followed fractures at the osteoporosis level 26% and finally the least percent of fractures 11% in patients with regular T-score.

Conclusion(s): In order to star therapy in time and to prevent new fractures it is necessary to evaluate risk factors responsible for occurrence of osteoporotic fractures.

P251
EFFICACY OF STRONTIUM RANELATE ON BACK PAIN RELIEF COMPARE TO ALENDRONATE IN MANAGEMENT OF POSTMENOPAUSAL OSTEOPOROSIS

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Objective(s): Osteoporosis, is a skeletal disorder that adversely affects bone strength, is common among postmenopausal women primarily due to reduced ovarian estrogens. The pain and pathology fracture are most common problem that make patients search for help. The present study was taken up to evaluate the effect on pain improvement of strontium ranelate in the management of postmenopausal osteoporosis compare to alendronate.

Material & Methods: This retrospective study conduct on 40 postmenopausal women with lumbar spine BMD >2.5 SD below the young adult reference range, ten of them with vertebral fracture. 20 of the participants received strontium ranelate 2 g plus 800 IU Vit.D per day orally, (Group I) and 20 patients received alendronate 70 mg/5600 IU Vit.D per week, (Group II). The subjects were studied for one year. The patients were assessed on every three months for pain improvement with VAS and OPAQ-SV for back pain. The data was analyzed by descriptive statistics methods.
Results: The analgesic effect of strontium ranelate starts on 3 d month and on the sixth month is significantly greater than those of alendronate. This greater reduction in back pain is obvious and on 12th month. VAS and OPAQ-SV have comparable results for back pain and both can be used for studying the patients for pain relief.
Conclusion(s): Strontium ranelate has early effect on pain improvement in cases of postmenopausal osteoporosis and thus has a beneficial effect compare to those of alendronate. Strontium ranelate is a promising and good alternative to alendronate for the management of back pain in postmenopausal osteoporosis.
References: 1. Riggs BL, Parfitt M *J Bone Miner Res, 2005*;*20*:*177*. 2. Reginster JY, Seeman E, de Vernejoul MC, et al *J Clin Endocrinol Metab 2005*;*90*:*2816*. 3.Reginster JY, Felsenberg D, Boonen S, et al *Arthritis Rheum 2008*;*58*:*1687*.

P252
OSTEOPOROTIC FRACTURE IN RHEUMATOID ARTHRITIS (RA): A STUDY OF INCIDENCE, PREDICTIVE FACTORS AND ECONOMIC BURDEN FROM A 25 YEAR RA INCEPTION COHORT

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Objective(s): To examine incidence rates, economic burden of, and predictive markers for osteoporotic fracture in patients with RA in a well described 25 yr inception cohort.
Material & Methods: The Early RA Study (ERAS) recruited 1465 patients from 1986-1998 in 9 UK centres. Standard clinical, radiological and laboratory measures were performed yearly for a maximum 25 yrs (median 10 yrs). Yearly assessments recorded comorbidities and inpatient hospital episodes, including fracture sites, and orthopaedic interventions (OPCS codes). Clinical databases were supplemented and crossvalidated with national databases, the National Joint Registry (data available from 2003-2011), Hospital Episode Statistics (data 1997-2011), and the National Death Register (data 1986-2011). Only patients who moved abroad or were not registered with a general practitioner would be absent in the two latter databases. Treatment regimens followed guidelines of the era, mainly conventional DMARD therapies, ±steroids, and latterly biologics.
Results: 176 fractures occurred in 126 patients (8.6%): hip (59,4%), wrist (23,1.5%), vertebral (11,0.8%), others in 33 (2.2%) patients. 12 hip fractures required hip replacements and 47 dynamic hip screw surgery. There were no immediate postoperative deaths but hip and vertebral fractures were recorded as contributory causes of death in 11 and 2, respectively. Fracture incidence rates and direct costs will be displayed graphically indicating a moderately early complication of RA, e.g., hip fracture was median 10 yrs (IQR 5-15) from baseline. Average direct costs of hip fracture surgery were £4890 depending on inpatient stay (mean 15 days), posing a significant health economic burden. Fracture prediction included traditional risk factors (age, gender) and for hip fracture, risks also included disease severity measures in 1st year: steroids (OR 1.8, 95%CI 1.1-3.1), erosions (OR 1.9, 95%CI 1.2-3.3), high HAQ (OR 1.9, 95%CI 1.1-3.5) & ESR (OR 1.8, 95%CI 1.1-3.1), low haemoglobin (OR 2.09, 95%CI 1.2-3.4), the latter unexpected as not normally included in predictive models for RA outcomes.
Conclusion(s): Osteoporotic fracture complicated RA in 8.6% over 25 yrs. 4% had hip fractures, half by 10 yrs of RA and all requiring major orthopaedic interventions and health costs. Risk factors for hip fracture included disease severity measures, prompting more active therapies for RA & bone protection.

P253
VITAMIN D RECEPTOR GENE POLYMORPHISM IN RELATION TO VITAMIN D AND PARATHYROID HORMONE LEVELS IN POSTMENOPAUSAL WOMEN

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Objective(s): To assess the relationship between 25(OH) D and PTH in postmenopausal women. To study the vitamin D receptor (VDR) gene polymorphisms in postmenopausal women.
Material & Methods: 50 postmenopausal women were included after careful clinical history and physical examination. Serum PTH and serum vitamin D estimation was analysed by radioimmunoassay (RIA) methods using Dia-Sorin (USA) kits and baseline laboratory investigations were done by autoanalyser using standard methods. Genomic DNA was extracted from whole blood by phenol chloroform extraction method. The frequencies of Taq1

and Apa1 alleles were determined by using PCR and restriction fragment length polymorphisms technique (RFLP).
Results: The mean age of the subjects was 56.66±5.35. The base line laboratory investigations, i.e., S.Albumin, ALT, AST, ALP, urea, creatinine, calcium and phosphorus were 0.518±0.21, 22.04±9.25, 26.84±18.99, 139.72±77.68, 29.44±17.13, 1.094±1.22, 9.202±0.59 and 3.908±1.07, respectively. The mean serum 25(OH) D levels were 14.07±10.72.

Table. Clinical characteristics of the study population

Sl. No.	Parameters	Values (Mean±SD)
1	Age	56.6±5.35
2	25(OH)D	14.07±10.72
3	iPTH	80.8±68.2
4	S.calcium	9.20±0.59
5	Phosphorous	3.90±1.07
6	ALP	139.72±77.68
7	S.Creatinine	1.094±1.22
8	Urea	29.44±17.13
9	ALT	22.04±9.25
10	AST	26.84±18.99
11	T.Billurubin	0.51±0.21

The mean serum intact PTH (iPTH) was 80.85±68.22. 35 Subjects were identified as hypovitaminodosis, 10 were found to be insufficient and only 5 subjects were having optimum level of Vitamin D. Secondary hyperparathyroidism were observed in 29 subjects with strong inverse correlation among PTH/Vitamin D. All subjects had raised levels of serum alkaline phosphatase (ALP). Vitamin D deficiency was found in 58% of population. Result of VDR polymorphism reveals that the polymorphic allele, i.e., Aa (ApaI) was found to be prevalent. Genotype (aa) was identified only in three subjects. Similarly, another genotype tt (TaqI) was also predominant except in two subjects denote (Tt).
Conclusion(s): Our study reveals that VDR gene polymorphisms are associated with low vitamin D levels in Indian postmenopausal women and also seems to be a strong genetic determinant. We found the inverse correlation between PTH and vitamin D.

P254
ABDOMINAL WEIGHT IS INDEPENDENTLY AND INVERSELY ASSOCIATED WITH BONE MASS OF OVERWEIGHT LATINA WOMEN

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Objective(s): The link between central adiposity and osteopenia has not been shown in adult women. In particular, the association between abdominal weight and BMD and bone mineral content (BMC), independent of total weight, remains uncertain.
Material & Methods: Trunk weight, total body fat mass, lean mass, BMC and BMD of 33 premenopausal Latina women age 22-51 years from Los Angeles, California was measured using DXA. Waist circumference (WC) was measured without clothing at the smallest circumference of the torso.
Results: Partial correlations controlling for total body fat mass and lean mass revealed a significant inverse relationship between BMC and WC (r=-0.59, p<0.005) but not between BMD and WC (r=-0.24, p=0.20). Similarly, while controlling for total body fat and lean mass, BMC was inversely associated with trunk fat mass (r=-0.77, p<0.001), with trunk lean mass (r=-0.64, p<0.001) and with total trunk mass (r=-0.77, p<0.001); results were nonsignificant for BMD.
Conclusion(s): Although general obesity may prevent osteoporosis, these findings suggest that abdominal obesity (i.e., trunk weight) specifically and independently may adversely influence bone mass.

P255
CALCIUM INTAKE IN GREEK POPULATION

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Objective(s): Calcium and vitamin D are key nutrients for the prevention and treatment of osteoporosis, in adequate intake according to the recommendations. Various studies have shown that calcium balance in human body is optimal when the daily intake is about 1000-1200 mg. The purpose of this study is to assess the daily dietary calcium intake in a sample of Greek women from various parts of the country.
Material & Methods: The recruitment of the population was part of the events carried out by the Hellenic Society for the Support of Patients with Osteoporosis in rural and urban areas throughout Greece, with the goal of collecting data for the detection of risk factors associated with osteoporosis and informing the public about the disease. Demographic characteristics were collected and there was an estimation of the daily calcium intake using a food frequency questionnaire.
Results: 10,216 volunteers were interviewed with mean age 58.77 years (range 18-97), weight (kg) 71.06±12.51 (mean±SD), height (m) 1.61±0.07 and BMI (kg/m^2) 27.50±4.84. The calcium intake was categorized as follows: <400 mg in 21.8%, 400-800 mg in 28.1%, 800-1200 mg in 21.4% and >1200 mg to 28.7% of all volunteers. Further analysis by age group showed that lower intake of 400 mg

per day presented in 24.7% of those under 40 years and in 16.4% of those 80 years of age.

Conclusion(s): Approximately 50% of the volunteers had daily calcium intake below 800 mg with women less than 40 years of age having a higher percentage of intake less than 400 mg compared with women over 80 years of age. A large percentage of women do not receive the adequate amount of calcium from the diet, which is an essential nutrient for bone health, and such a fact makes essential the need for public awareness about the foods they could consume in order to meet the daily needs for calcium intake according to their age.

P256
REPRODUCIBILITY OF A VERTEBRAL DEFORMITY TOOL (VDT) USING AN ACTIVE SHAPE MODELLING WORKFLOW TOOL

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Objective(s): There is a need for enhanced radiographic measurement techniques for diagnosis and prevalence of vertebral deformities (VD). A novel 95 point annotation of vertebrae from radiographs has previously been described[1]. This study assess the inter- and intrareader reproducibility of this novel clinical workflow tool that uses model-based shape recognition technology for semi-automated annotation of the T4-L4 vertebrae using digitized plain-film radiography.

Material & Methods: Lateral spine radiographs of 163 subjects with suspected VD, obtained from the Canadian Multicenter Osteoporosis Study (CaMos) were independently assessed by two radiologists (R1 and R2) using a semi-automated protocol based on a previously described 95 point delineation[1]. This VD Tool (VDT) was applied using a read system developed by BioClinica and embedded software from Optasia. VD was independently assessed based on the Genant scoring system. Inter- and intra-reader variability was reported as the root mean square of successive differences (RMSSD) with 95% CIs.

Results: The mean reproducibility T4-L4 spine in mask displacement in mm (%) for R1 ranged between 0.53 (1.87%)-0.94(2.77%), and for R2 between 0.87(3.46%)-1.53(5.27%). The inter-reader variability ranged from 0.87-1.34 mm. The inter-reader variability ranged from 3.17-4.57%. Intra- and inter-reader reproducibility by mm displacement as mean (95% CI).

Intra- and inter-reader reproducibility by mm displacement as mean (95% CI

LEVEL	R1	R2	Inter-Reader
T4	0.64 (0.62-0.65)	0.87 (0.85-0.89)	1.06 (1.02-1.09)
T5	0.53 (0.52-0.54)	0.97 (0.95-1.01)	0.96 (0.95-1.02)
T6	0.54 (0.53-0.56)	0.99 (0.94-1.03)	0.81 (0.79-0.86)
T7	0.56 (0.55-0.59)	1.02 (0.98-1.06)	0.87 (0.85-0.90)
T8	0.61 (0.60-0.64)	1.13 (1.09-1.17)	1.06 (1.04-1.11)
T9	0.65 (0.63-0.69)	1.18 (1.13-1.22)	1.03 (1.01-1.08)
T10	0.58 (0.57-0.61)	1.25 (1.19-1.30)	1.08 (1.03-1.21)
T11	0.71 (0.68-0.75)	1.29 (1.23-1.33)	1.29 (1.25-1.35)
T12	0.90 (0.86-0.94)	1.34 (1.28-1.39)	0.97 (0.94-1.01)
L1	0.94 (0.89-0.98)	1.53 (1.44-1.65)	1.10 (1.06-1.16)
L2	0.65 (0.62-0.67)	1.36 (1.27-1.44)	1.13 (1.10-1.19)
L3	0.73 (0.70-0.75)	1.22 (1.16-1.27)	1.18 (1.15-1.24)
L4	0.82 (0.79-0.84)	1.49 (1.44-1.53)	1.34 (1.30-1.40)

Conclusion(s): We report good reproducibility of comprehensive 95 point annotation using this tool: the results are similar or superior to other studies employing standard 6 point markup to assess VD. This VDT may serve as a robust mark-up tool for clinical studies of vertebral fracture.

References: Brett A, Miller CG, Hayes CW, et al, Spine 2009;34:2437.

Disclosures: The authors would like to thank and acknowledge the use of the radiographs obtained by the CaMOS research study team.

P257
THE APPLICATION OF IBANDRONATE IN MULTIMODALITY THERAPY OF PERIODONTAL DISEASE

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Objective(s): Periodontal disease is being characterized by progressive destruction of bone tissue. To improve the efficiency of treatment received by patients affected with periodontal disease via remodeling of bone tissue metabolism and resorption process of alveolar bone. Over a period of 15 years in our clinic we administer bisphosphonates in the treatment of periodontitis, such as ibandronic acid is being used by us during 3 years

Material & Methods: Examination and treatment of 188 patients affected with periodontal disease (90 females - average age: 46±4.6; 98 males - average age: 45±4.2) was provided. The quantitative dissection of alveolar bone level was conducted on panoramic X-Ray. Blood analysis identified markers of bone metabolism- osteocalcin and deoxypyridinoline. The patients received initial periodontal treatment and once in 3 month supportive treatment. Ibandronic acid – 1 pill

per month per three-month course of treatment was additionally prescribed to the main group (48 females and 50 males). Prescription of ibandronic acid based on the high level of resorption of bone tissue of skeletal system. Third generation calcium baseline therapy was prescribed – 1 pill twice a day per six-month course of treatment.

Results: Among 100% of patients in the main group was not revealed any exacerbation of disease, among 16.6% (15 persons) ($p<0.005$) in the control group exacerbation of periodontitis was revealed. According to the data from radiostereometry index of decrease of alveolar bone level in the main group made up (4.12±1.23) mm. After treatment was provided it is observed that index of alveolar bone level increased by 14% (3.29±1.15 mm; $P<0.05$). Decrease of alveolar bone level in control group before treatment made up (4.09±1.14) mm, after 12 months – (4.36±1.23) mm. After 12 months resorption of alveolar bone was observed – deoxypyridinoline made up (4.71±0.42) in comparison with the index before treatment – (6.37±0.68) nmol ($P<0.05$). Processes of bone tissue formation have improved. Before treatment index of osteocalcin made up 20.12± 0.34 ng/ml – before treatment in comparison with 27.45±0.38 ng/ml ($P<0.05$) after treatment. In control group these indexes varied unreliably.

Conclusion(s): The application of ibandronic acid has normalized bone tissue metabolism of patients affected with periodontitis.

P258
VITAMIN D LEVELS IN OLDER THAN 50 YEARS OF AGE IN URUGUAY: RESPONSE TO SUPPLEMENTATION WITH VITAMIN D

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Objective(s): To estimate the distribution at base line of the levels of serum vitamin D (VD) in people aged older than 50 years and to evaluate the modification after supplementation of 2000 IU of vitamin D3.

Material & Methods: 25OH VD3(VD3) basal level was measured in 372 women and 72 men older than 50 years without medical conditions or under treatment with drugs-induce osteopenia and without receiving VD at a higher dose than 200 IU in the past six months. According to Hollis (1) it was considered VD3 sufficiency levels above 30 ng/ml, hypovitaminosis between 20-30 ng/ml, insufficiency 10-20 ng/ml and deficiency below 10 ng/ml. Results were analysed according to sex and age group (<65 and >66 years of age). 2000 IU of VD3 was prescribed to those with serum levels below 30 ng/ml during 5 months. A this time a second determination of VD3 level was performed.

Results: 78.16% of the population older than 50 y had VD3 serum levels below 30 ng/ml and almost 30% below 20 ng/ml. Mean concentration was 24.6 ng/ml. There was statistical difference between those <65 years who had 26 ng/ml and those >66 years who had 22.4 ng/ml ($p<0.001$). 80% of the women and 72% of the men had serum levels below sufficiency. Mean concentration of VD3 after supplementation increased from 24.6 to 36.9 ng/ml with no toxic levels found.

Conclusion(s): 78.16% of the population older than 50 years of age in Uruguay have VD3 levels below 30 ng/ml and a mean concentration of 24.6 ng/ml. Similar percentages were found in both sexes. There was a significant difference in the mean concentration of VD3 levels in the age groups considered. Supplementation with 2000 IU of VD3 is considered to be effective increasing the mean level of VD3 from 24.6 to 36.9 ng/ml. Nontoxic levels of VD3 were found in any subject.

References: 1. Hollis BW, et al. Am J Clin Nutr 2004;79:717.

P259
EFFECTS OF SODIUM INTAKE ON NON-VERTEBRAL FRACTURES IN POSTMENOPAUSAL WOMEN

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Objective(s): Increased Na intake is positively correlated with urinary Ca excretion, and related to negative Ca balance. Excessive Na intake has been reported to be associated with increases in bone resorption markers and decrease of BMD. However, it remains unknown whether excessive Na intake is related to the risk of fracture. We therefore examined the relationship between Na intake and the risk of fracture and investigated whether this relationship was influenced by BMD, bone metabolic markers, and intake of other nutrients.

Material & Methods: Subjects were 213 healthy postmenopausal women who had undergone osteoporosis screening. Levels of Ca, P, intact PTH, 25(OH)D, N-terminal propeptide of type I collagen (PINP) and C-terminal crosslinked telopeptide of type I collagen (CTX), were measured. The BMD of the lumbar spine (L2-4) and femoral neck (FN) was measured using DXA, the presence or absence of morphological vertebral fracture was determined, and the presence or absence of existing non-vertebral fracture was determined through physician interviews. Nutrient intakes (proteins, Ca, Mg, P, Na, vitamin D, vitamin K) were calculated using the Food Frequency Questionnaire (FFQ).

Results: Mean values of age and BMI were 63±8 years and 22.9±3.1 kg/m^2, respectively. Na intake was 5211±1697 mg, which was higher than the levels reported in the National Health and Nutrition Survey Japan 2009 (4055 mg). Levels of intact PTH, 25(OH)D, PINP, and CTX were 46±15 pg/ml, 16.3±4.4 ng/ml, 54.3±16.5 ng/ml, and 0.40±0.15 ng/ml, respectively, and levels of L2-4 and FN BMD were 0.84± 0.15 g/cm^2 (Z-score 0.3±1.1, T-score -1.5±1.3) and 0.62± 0.09 g/cm^2 (0.1±1.0, -1.5±0.8), respectively. Na intake was not correlated with BMD and bone metabolic markers. Logistic regression analysis of the effects of nutrient intake (divided into quartiles) on the risk of fracture revealed that highest Na intake group (mean value 7561±1035 mg) was a significant risk factor for nonvertebral fracture (odds ratio, 3.4 (95%CI: 1.3-9.1), $p<0.05$) even after adjustments for age, BMI, intact PTH, 25(OH)D, CTX, BMD, and intake of other nutrients.
Conclusion(s): These findings suggest that excessive Na intake is a risk factor independent of BMD and bone metabolic markers. It is important to consider excessive Na intake in diet therapy for osteoporosis.

P260
OSTEO METABOLIC ABNORMALITIES IN PATIENTS WITH BETA THALASSEMIA TREATED WITH BLOOD TRANSFUSION AND IRON CHELATION THERAPY

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Objective(s): Patients with β-thalassemia major and thalassemia intermedia, treated with blood transfusion and iron chelation therapy, can gradually develop osteopenia and osteoporosis. Genetic factors, endocrine disorders associated to beta-thalassemia, and the toxic effects of iron overload can interfere with bone remodeling inducing osteoclastic activity and/or inhibiting osteoblastic activity by RANKL/OPG pathway. Even though iron overload in the bone could lead to intervertebral disc calcifications, iron chelation therapies as well seem to increase bone loss and spinal deformities. The aim of our prospective cohort study was to evaluate osteoporosis and intervertebral disc calcifications in patients with thalassemia major and intermedia treated with blood transfusion and iron chelation therapy.
Material & Methods: We recruited 32 subjects (≥18 y.o.), referring to the Department of Orthopeadics and Rehabilitation Medicine, affected by β-thalassemia major or intermedia and in treatment with regular blood transfusions and iron chelation therapy. Thirty subjects (7 males and 23 females) had Cooley's disease (β-thalassemia major) and 2 (both females) had thalassemia intermedia. All patients underwent DXA examination for BMD measurements and X-rays of the dorsal and lumbar spine for the identification of intervertebral disc calcifications and spinal deformities.
Results: The mean age of our cohort was 30.5 (min 18; max 46). Nineteen subjects presented BMD values consistent with a diagnosis of osteoporosis and 13 with osteopenia. Fourteen subjects presented spinal deformities: 8 of them had only one deformity while the other 6 had multiple deformities. Twenty-one subjects presented intervertebral disc calcifications: 14 had dorsal calcifications, one lumbar calcifications, and 6 had both dorsal and lumbar calcifications. Eleven patients presented both spinal deformities and intervertebral disc calcifications: 10 of them were osteoporotic and one osteopenic.
Conclusion(s): Our results show that there is a decrease in BMD in all patients, the 59% had values consistent with a diagnosis of osteoporosis. The 44% presented at least one spinal deformity. The 66% presented intervertebral disc calcifications. One third of our population presented all the examined osteo metabolic abnormalities together (low BMD, spinal deformities and disc calcifications).

P261
EFFECTS OF EXERCISES ON BACK PAIN, DEPRESSION AND QUALITY OF LIFE TO OSTEOPOROTIC PATIENTS

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Objective(s): While antiosteoporotic drug therapy addresses to BMD, an exercises programme may have an important impact on back pain and disability to these patients.
In this randomized controlled clinical trial we want to determine the effects of exercises in reducing back pain, depression and improving physical function and quality of life to osteoporotic patients.
Material & Methods: The patients were randomly assigned to a control group (n=20) and an exercises group (n=20). In the control group the patients received only bisphosphonates (stable dose for at least 6 months). In the exercises group the patients followed the drug therapy and a standardized progressive exercises programme for improving posture, spine mobility, trunk control and strengthen spine extensors, abdominals and lower limb muscles (45 min, 3 times/week, 6 weeks). The assessment was made baseline and after 6 weeks using: a visual analogue scale (100 mm) for back pain, Beck Depression Inventory and Qualeffo-41 a questionnaire especially developed for measuring quality of life to patients with osteoporotic vertebral deformities.
Results: Back pain on VAS was reduced by 45.7% in the exercises group and only by 12.5% in the control group. The

intervention group showed significantly greater improvements in the Qualeffo-41 scores compared with the control group, especially on pain and social function subscales. There was a significant difference between groups in the Beck Depression Inventory: the exercises group showing an improvement (14.7 vs. 10.3) and the control group deteriorating (14.2 vs. 14.9).
Conclusion(s): The results support the benefits of exercises in the clinical management of osteoporosis. The exercises program was well accepted by subjects and no adverse events were reported.

P262
CALCIUM-SENSING RECEPTOR POLYMORPHISMS INFLUENCE ON BONE MINERAL DENSITY AND BONE METABOLISM MARKERS IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM

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Objective(s): Calcium-sensing receptor (CaSR) polymorphisms are associated with different calcium handling in healthy individuals but little is known about their role in pathological conditions of calcium metabolism. Thus our aim was to characterize the influence of CaSR polymorphisms on blood and urine calcium levels, BMD and markers of bone metabolism in primary hyperparathyroidism.
Material & Methods: Our study included 135 patients with PH (68 M/72 F, median age 59 [Q25 - 49 years; Q75 - 66 years], which underwent genetic testing for A986S, R990G and Q1011E polymorphisms of CaSR (extraction of leukocyte DNA, amplification of coding region of exon 7, direct sequencing of PCR ampliclons). We also evaluated Ca concentrations, PTH, osteocalcin (OK) and β-crosslaps (CTX), BMD (Prodigy, Lunar).
Results: We found no differences in Ca and PTH levels between wild genotype and studied polymorphisms in hyperparathyroid state. 986AS,S genotype was associated with lower levels of OK 33.1 vs. 55.90 ng/ml ($p=0.04$) and CTX 0.66 vs. 1.11 ng/ml ($p=0.02$), loss of Ca regulation of PTH levels ($r=0.11$, $p=0.56$ vs. $r=0.59$, $p=0.00000001$) and lower BMD at radius 33% 0.459 vs. 0.520 g/cm^3 ($p=0.03$). Patients with 990RG,G genotype had lower levels of CTX 0.8 vs.1.2 ($p=0.04$), higher BMD in premenopausal women and lower BMD in women in menopause. No differences were associated with 1011QE,E genotype.
Conclusion(s): A986S and R990G polymorphisms of CaSR seem to play pathological role in Ca and bone metabolism in primary hyperparathyroidism.
Disclosures: The work was supported by grant of President of Russian Federation MK-2852.2010.7.

P263
PREVALENCE OF VITAMIN D DEFICIENCY AND INSUFFICIENCY IN SERBIAN WOMEN POPULATION

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Objective(s): Vitamin D deficiency and insufficiency are quite prevalent among women in Serbia. The aims were to assess the level of vitamin D and prevalence of vitamin D deficiency and insufficiency and to improve supplementation which will improve vitamin D status in women. Vitamin D levels in peripheral blood have been assessed at 130 women, aged 29-79 years (median 56.7±1.2) in Railway Health Care Center in Belgrade.
Material & Methods: Patients have been split into 5 groups according to the age: 20- 39, 40-49, 50-59, 60-69 and 70-79 years old, all of them were women. Vitamin D levels were assessed with the 25-OH Vitamin D EIA Kit by means of the Immundiagnostic Enzyme-Immuno-Assay (EIA) for quantitative determination of 25-OH Vitamin D in human serum and plasma.
Results: Results in groups: 25-OH vitamin D level in group 29-39 yrs was 63.7±8.5 nmol/l; in 40-49 yrs -52.6±4.7 nmol/l; in 50-59 yrs-59.4±9.6 nmol/l; in 60-69 yrs-57.0±7.3 nmol/l; in 70-79 yrs-64.8±7.3 nmol/l. Average value throughout the assessed population was 57.5±5.3 nmol/l. Deficiency has been found in 0%, 11%, 11%, 3%, 0% of cases ("younger" to "older" group, respectively). Insufficiency; 40%, 68%, 62%, 72%, 69% of cases. Normal values of 25(OH) vitamin D have been determined in 60%, 21%, 27%, 25%, 31% (same group breakdown). In total diagnosis of vitamin D deficiency was established in 7% of the subjects, insufficiency in 66%; normal values in 27% of the population of question.
Conclusion(s): Vitamin D deficiency and insufficiency occurs with high frequency among women in Serbia. Lack of sun exposure and poor intake are suggested explanations for this phenomenon. Improving vitamin D status in the adult Serbian women population might be an effective strategy to reduce morbidity and mortality of osteoporosis.

P264
THE CORRELATION BETWEEN REDUCED SERUM 25(OH)D AND FREQUENCY OF FALLS AND FRACTURES IN PATIENTS WITH OSTEOPOROSIS RESULT BONLINK PROGRAM

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Objective(s): A reduced value of serum 25 (OH) D plays an important role in the development of osteoporosis and osteoporotic fractures as well in the functional capacity of skeletal muscle, which is reflected in the increased frequency of falls. The reduced value of serum 25 (OH) D is considered to be below the value of 30 ng/ml (75 nmol/l). The purpose of this study is to determine the correlation between decreased serum 25 (OH) D and the frequency of falls and fractures in patients with osteoporosis.
Material & Methods: The analysis included 229 patients with osteoporosis, 208 women (90.8%) and 21 men (9.2%), median age 65. The study was conducted during one year. The patients were measured by serum 25 (OH) D ECLIA method. In patients with reduced serum 25 (OH) D the frequency of falls and fractures was determined on the basis of anamnestic data and X-ray findings, through the analysis of data from the "BONLINK" database, which is used for entering patients' data with osteoporosis and data analysis.
Results: In 86 patients the measured value of serum vitamin D was above 30 ng/ ml, while in 142 the value was less than 30 ng/ml. The median total serum 25 (OH) D measured was 30.91 ng/ml. For women the median value measured was 29.18 ng/ml and men 47.95 ng/ml. More than three falls per year happened to 86 patients (60.6%) with a lower serum 25 (OH) D and low trauma fractures were found in 60 patients (42.3%). The relation of the frequent falls and fractures was 65.11%, in other words 56 patients with frequent falls had fractures. Vertebral fractures were found in 42.3%, while nonvertebral fractures were more frequent and were observed in 57.7% of patients. The most common localization of the fracture was in the area of the forearm, recorded in 38 patients (26.8%).

Conclusion(s): Our results suggest that a decreased serum 25 (OH) D is closely associated with the emergence and frequency of falls and fractures. It is therefore necessary to monitor it regularly and correct it through an adequate intake in order to prevent future falls and fractures.

P265
THE BONE MINERAL DENSITY IN MINSK-CITY HEALTHCARE PROFESSIONALS ACCORDING TO THE DUAL X-RAY ABSORPTIOMETRY

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Objective(s): To assess the BMD state in health care professionals in Minsk city.
Material & Methods: BMD was assessed by DXA of the axial skeleton in 137 (mean age 54 [48.6: 60.30] years, duration of menopause 7 [2:12] years) patients. The T-score was used for the quantitative evaluation of BMD in postmenopausal women, and the Z-score was used in the group of women up to 45 years. The surveys for the presence of risk factors for OP (including secondary forms of OP), evaluation of anthropometric data: height, weight, BMI was conducted.
Results: The cohort of surveyed people n=137 included 86 (63%) physicians and 56 (41%) nurses. The total distribution of the bone density: 55 (40%) - norm, 56 (41%) - osteopenia, 26 (19%) - osteoporosis. It should be noted that all the patients were informed about osteoporosis. In order to assess the impact of age-related changes in the status of the BMD the surveyed women were divided into 4 groups.

Clinical and anthropometric data of Minsk city health care professionals

Groups	Age, years	Height, cm	Weight, kg	Spine BMD, g/cm^2	Z-score or T-score	BMD femur neck, g/cm^2	Z-score or T-score
Women under 45 (n=23)	40.8[32:43.9]	166.09+4.8	65.7+8.8	1.191+ 0.15	-0.06+1.25	0.985+ 0.15	-0.08+1.17
Women 45-55 (n=47)	50.37+2.33	162.48+4.98	68.37+10.6	1.107+ 0.17	-0.71+1.39	0.912+ 0.13	-0.6+1.05
Women 55-65 (n=50)	59.15[56.6:61.5]	159.89+5.47	75.9+12.77	1.046+0.14	-0.4+1.13	0.871+ 0.10	-0.098+0.81
Women over 65 (n=17)	69.36+3.11	157.59+4.4	74.4+13.5	1.018+0.17	-1.4+1.38	0.819+0.09	-1.34+0.79

The significantly ($p<0.05$) lower values of femur neck BMD in comparison with the spinal BMD among the women studied were noted.

The prevalence of osteopenia and osteoporosis in different age groups of women surveyed

Women surveyed	Normal	Osteopenia	Osteoporosis
Women under 45 (n=23)	96% (22)	4% (1)	-
Women 45-55 (n=47)	40.5% (19)	40.5% (19)	19% (9)
Women 55-65 (n=50)	22.0% (12)	54% (27)	24% (11)
Women over 65 (n=17)	18% (3)	47% (8)	35% (6)

Conclusion(s): The increase of the rate of BMD loss with the age (from 4% in the age under 45 years up to 82% in the age over 65 years) was detected. The results of study reveal the high prevalence of osteopenia (41%) and osteoporosis (19%) in the healthcare professionals despite the awareness of risk factors and methods for early diagnosis of OP.

P266
FUNCTIONAL HYPOPARATHYROIDISM IS SEX-ASSOCIATED: AN OBSERVATIONAL STUDY OF 909 HIP FRACTURE INPATIENTS

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Objective(s): To investigate the association between sex and functional hypoparathyroidism, i.e., the condition of having inappropriate normal levels of PTH in the presence of severe vitamin D deficiency, following a fragility fracture of the hip.
Material & Methods: We investigated 909 of 981 inpatients admitted consecutively to our rehabilitation hospital following a fragility fracture of the hip. In each patient we assessed PTH (by two-site chemiluminescent enzyme-labelled immunometric assay), 25-hydroxyvitamin D (by immunoenzymatic assay), albumin-adjusted total calcium, phosphate, magnesium, and creatinine on a fasting blood sample 20.3±6.0 (mean±SD) days after fracture occurrence. Glomerular filtration rate (GFR) was estimated by the 4-variable Modification of Diet in Renal Disease Study equation. Functional level was assessed using the Barthel index. We excluded from the study the patients with hypercalcemia or with an estimated GFR<15 ml/min.
Results: Among the 909 patients, 571 (492 women and 79 men) had severe vitamin D deficiency (25-hydroxyvitamin D levels <12 ng/ml). On the whole, 235 of these 571 patients (41%) had secondary hyperparathyroidism, whereas the remaining 336 (59%) had functional hypoparathyroidism (normal PTH levels despite severe vitamin D deficiency). The prevalence of functional hypoparathyroidism was significantly different between sexes (p=0.003): it was found in 302 of the 492 women (61%) and 34 of the 79 men (43%). The significance of the between-sex difference was maintained after adjustment for age, estimated GFR, phosphate, albumin-adjusted total calcium, albumin, magnesium, Barthel index scores, and 25-hydroxyvitamin D. Women had an adjusted odds ratio for having functional hypoparathyroidism=1.78 (95%CI 1.05-3.02; p=0.034).
Conclusion(s): Functional hypoparathyroidism was significantly more prevalent in women than in men following a fragility fracture of the hip. Higher tendency to PTH excess may play a role in the known higher occurrence of unfavorable outcomes found in hip fracture men.

P267
VITAMIN D STATUS AMONG PATIENTS SCREENED FOR OSTEOPOROSIS

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Objective(s): Vitamin D deficiency is a common worldwide condition. The serum 25-hydroxy vitamin D measurement is the most accurate way to assess vitamin D deficiency. In this study the authors determined the serum 25-hydroxy vitamin D among Hungarian patients screened for osteoporosis.
Material & Methods: The vitamin D status has been measured among 1563 women and 169 men in a period from 1 December 2006 to 31 May 2008, in a subregion of Hungary (Fejer County). The relationships between serum 25OH-D3 levels and metabolic bone markers, bone mineral content have also been studied, as well as the possible effect of vitamin D supplementation to bone fracture rate. The serum 25OH-D3 concentration was determined using ECLIA method.
Results: Insufficient (0-60 nmol/l) serum 25OH-D3 level was found in 63% of the investigated population. 25OH-D3 levels did not differ between the two genders. Our data confirmed the well known seasonal variations in 25OH-D3 levels. Lower BMD was found among subjects suffered from vitamin D deficiency. Poor vitamin D status caused an increase in serum PTH levels, and an increase in fracture rate, despite vitamin D supplementation which was inadequately dosed.
Conclusion(s): Our results suggest that patients with high risk of osteoporosis frequently have vitamin D insufficiency as well. Evaluation of vitamin D status and the intervention with adequate dose of vitamin D supplementation is suggested

to have benefits in the effective antiporotic treatment as well as in the prevention of falls and fractures.

P268
EFFICACY OF STRONTIUM RANELATE IN COMPREHENSIVE TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS WITH EVALUATION OF VERTEBRAL BODIES DEFORMITIES BY DXA

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Objective(s): To evaluate the strontium ranelate efficacy in the treatment of postmenopausal osteoporosis with dynamic assessment of vertebral bodies (T4-L4) deformities by Genant's semiquantitative method based on DXA.
Material & Methods: We examined 35 Minsk city women (middle age 60.3 [57.4:64] years old, duration of menopause, 10 [7-16] years) with verified diagnosis of postmenopausal OP. The patients were surveyed for the presence of risk factors for OP including secondary forms of the disease. In 12 women before and after the treatment were assessed vertebral deformities using an LVA-application (lateral vertebral assessment), which is characterized by high sensitivity comparable with standard radiography. The deformities were assessed by Genant's semiquantitative method and the index of the vertebral body, equal to 76-79% is weak deformity, 61-75% moderate deformity and less than 61% expressed osteoporotic deformity of vertebral bodies. During the follow-up after 12 months the evaluation criteria were the presence of new deformities and / or increase of the degree of the vertebral deformity.
Results: Comparative analysis of BMD at lumbar spine (L1-L4) and femoral neck before and after 12 months treatment of OP with strontium ranelate and a combined preparation of calcium carbonate and cholecalciferol showed significantly (L1-L4 $p<0.00001$; SB $p=0.00078$) increased BMD in both areas. The maximum increase in BMD at the lumbar spine in the dynamics of 12% and 8% was observed among women who had borderline significance of the T-score - 2.5, indicating the maximum efficiency at an earlier stage of the disease. In 5 from12 women surveyed mild and moderate deformities of the vertebral bodies T11, T12, L1 and L2 were identified. During the follow-up new deformities were not noted, all patients noted reduction of pain.
Conclusion(s): The results of the prospective randomized clinical studies have confirmed the efficiency of strontium ranelate in combination with a combined preparation of calcium carbonate and cholecalciferol in the treatment of postmenopausal osteoporosis with increasing BMD rates in the lumbar spine and in the femoral neck with good tolerability and patients' adherence to treatment.

P269
SHORT TERM PHYSICAL ACTIVITY MAY INDUCE CHANGES IN BONE DENSITY AND GEOMETRY EVEN AFTER LATE ADOLESCENCE IN TALENTED FEMALE ATHLETES

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Objective(s): The aim of this study was to assess the changes in hip structural parameters and BMD in high level adolescent soccer players and swimmers at the period of late adolescence.
Material & Methods: 26 girl swimmers (SWIM, 15.9±2 years) and 32 soccer players (SOC, 16.2±0.7 years) were investigated before and after an 8-month training season. Fifteen non active age-matched adolescents were enrolled at baseline to serve as a reference group. Body composition and areal BMD were measured at the total body, lumbar spine and total hip by DXA. Indices of bone geometry were extracted from DXA scans using the hip structural analysis (HSA) method. Anatomical (cross sectional area-CSA, endocortical diameter-ED, periosteal diameter-WIDTH) and mechanical parameters (CSMI, Z, buckling ration-BR) were analyzed. A one way ANOVA with repeated measures was performed.
Results: After 8 months of training, SOC had increased their density at all the traditional bone sites whereas SWIM did not. The SOC's changes were associated with an increase of whole body lean mass. At the neck and total hip, SWIM kept their baseline normal Z-score values and SOC remained above the normal. The most important changes in HSA parameters were observed at the femoral shaft. When comparing the Z-score to the control group at this section, SWIM who were normal for ED and WIDTH did not change after the season. For the SOC group who started already above the average range, CSA and WIDTH still improved during this period. Z-score showed an improvement of CSMI and Z at FS section for SOC ($p<0.001$), without any change in the SWIM group. Remarkably SWIM

had improved the Z-score of BR ($p<0.005$) while SOC did not.

Conclusion(s): A training season of sport characterized by impacts (SOC) is associated with bone geometry improvement in late adolescent female despite expectations that this period of growth represents a plateau in bone maturation. Weight bearing physical activity can be an important contributor to bone strength at the end of adolescence, as observed during childhood.

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UNDERSTANDING AND USE OF THE 2010 OSTEOPOROSIS CANADA CLINICAL PRACTICE GUIDELINES (OC CPG) BY CANADIAN PRIMARY CARE PHYSICIANS (PCPs)

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Objective(s): In October 2010, OC published updated CPG for the diagnosis and management of osteoporosis in Canada, emphasizing a shift to absolute fracture risk (AFR) assessment. A survey of Canadian PCPs was conducted to assess current awareness, understanding and use of the 2010 OC CPG.

Material & Methods: These data represent results from the control group of an educational intervention program evaluating accredited CHE and practice assessment on understanding and use of the 2010 OC CPG. An online survey of Canadian PCPs previously consenting to participate in surveys was conducted in May 2011. Inclusion criteria: physicians treating >10 postmenopausal osteoporosis (PMO) patients/month. Level of understanding was gauged using three patient cases with different fracture risk.

Results: • 304/2100 PCPs were eligible and completed the survey
◦ 59% indicated they had started using the CPG
◦ 17% and 10% indicated they were using 2010 CAROC (Canadian Association of Radiologist and Osteoporosis Canada) or FRAX, respectively, as their primary approach to evaluating PMO patients
◦ Most (66%) relied on BMD and risk factors
• Over 59% indicated that they obtain the 10-year AFR assessment results from DXA reports. A follow-up question asking which risk factors are used to calculate the AFR yielded inconsistent results
• Only 22/304 (7%) correctly identified the appropriate risk category of all three patient cases according to the CPG
◦ Most (82%) did not accurately assess the moderate-risk patient
• Although most PCPs stated they use the OC CPG to guide treatment decisions, many indicated they considered etidronate (52%) or calcitonin (14%) as firstline therapies, contrary to CPG recommendations

Conclusion(s): Seven months after the launch of the 2010 OC CPG, a large proportion of Canadian PCPs indicate they are using the guidelines and risk assessment tools. However, PCPs may not apply the 10-year ARF accurately, particularly in the case of moderate-risk patients, and treatment recommendations may not be fully understood at this time. Further education and strategies to integrate AFR and CPG into clinical practice, including DXA reports, will likely improve their understanding and use by PCPs in the future.

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P271
A PROSPECTIVE 1-YEAR STUDY OF CARE PROCESS AND FUNCTIONAL RECOVERY FOLLOWING OSTEOPOROTIC HIP FRACTURES

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Objective(s): To identify current practices and care gaps for elderly patients admitted to a tertiary care trauma center following an osteoporotic hip fracture, and to characterize patients patterns of functional recovery over a 1-year period.

Material & Methods: 40 community-dwelling participants with an osteoporotic hip fracture (age 65 years and older, fall from standing height) were recruited and followed over 1-year. Patients were divided according to their pre-fracture mobility: low, medium, and high. Recovery was defined in 2-ways: traditional definition based on return to pre-fracture mobility; and acceptable based on ability to go up and down stairs. Statistical analysis: Single-subject design approach for analyzing small samples was used to identify sources of variability in recovery over time.

Results: Gaps in services received during hospitalization and at the time of discharge to the community were: (i) 63% had a surgical delay of more than 48-hours; (ii) >75% had inadequate osteoporosis management; (iii) only 35% had a home visit within one week of return home; and (iv) 40% did not receive instructions on fall prevention. Using the traditional definition for recovery: 80%, 52%, 33% recovered from the low, medium, and high baseline groups, respectively; 40%, 43%, 33% maintained this recovery up to 1-year. Using the definition for acceptable

recovery, 20%, 43%, 71% recovered, respectively, and 10%, 38%, 57% maintained the recovery. The low group returned to prefracture function around 6-weeks while the high group returned around 6-months post-fracture. However, patients generally lost functional improvement between 6-12 months, following waning of rehabilitation services. Patients with acceptable recovery had better health-related quality of life over the study period than those without ($p<0.01$).

Conclusion(s): Despite the plethora of evidence-based guidelines specifically for osteoporosis management following hip fracture, gaps exist in care practices across the continuum. The extent of recovery depended on the definition used; however we noted that, after initial improvement, the majority of patients deteriorated after 6 months. An extended booster rehabilitation program and planned contact with the health care system may be indicated 6 months following the fracture for community-dwelling survivors of hip fractures.

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EFFICACY OF GLUCOSAMINE SULFATE (GS) IN HAND OSTEOARTHRITIS

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Objective(s): Osteoarthritis (OA) frequently involves joints of the hand leads to pain, stiffness, deformity, gradual loss of function which decrease the ability to perform manual tasks and diminish the quality of life. In this randomized clinical study we want to compare the efficacy of two currently preferred medications for symptomatic treatment of OA: glucosamine sulfate and acetaminophen.

Material & Methods: 50 patients from Physical Medicine and Rehabilitation outpatient clinic, who met the American College of Rheumatology criteria for hand OA were included in the study, with mean age 61 years, 56% female. The treatment arms were: GS 1500 mg, oral, once daily (25 subjects) and acetaminophen, one 1000 mg tablet two times daily (25 subjects). The patients are assessed at baseline and after 6 weeks, at the completion of the study using the following parameters: hand joint pain (100 mm VAS), a hand function test with short administration time, the Moberg Picking-Up Test (MPUT) and the Short Form 36 Health Survey (SF- 36).

Results: The treatment groups were comparable in terms of baseline characteristics. After 6 weeks of treatment GS decreased the pain by 28% and acetaminophen by 24.2%. GS was significantly superior to acetaminophen in improving hand function (better times to 6 weeks MPUT, 12.8 s vs. 15.6 s). The Short Form 36 scores were significantly improved in the GS group for physical functioning, role physical, mental health and role emotional subscales. There were no significant differences between groups for general health, bodily pain, vitality and social functioning subscale.

Conclusion(s): GS was at least as effective as acetaminophen in improving hand OA symptoms and increased joint mobility and strength to HOA patients.

P274
THE EFFICACY AND TOLERABILITY OF PLASTER "NANOPLAST FORTE" IN KNEE OSTEOARTHRITIS TOPICAL THERAPY

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Objective(s): To evaluate the efficacy and tolerability of nanoplast forte (NF) plaster in knee osteoarthritis (KOA) topical treatment.

Material & Methods: In a multicentric double blind randomized placebo controlled 2 weeks trial with 2 paralleled groups, 120 pts (1:1 ratio), KOA were included. The primary criterion of efficacy-decrease of pain according part A of WOMAC index (≥50%). The secondary criteria-decrease:1) daily dosage or withdrawal of NSAIDs; 2) everyday intensity of pain(VAS, mm); 3) assessment of efficacy by pts and physician separately (VAS, mm). Side effects were assessed by rate and intensity. In both groups the plaster was applied to the frontal surface of target joint every 12 h. Plaster NF was made by very special technology (nanotechnology).

Results: Demographic and base-line clinical characteristics were similar in both groups. The rate of 50% decrease of pain (part A WOMAC index) in NF plaster group was 38.2%, in placebo group-16.7% ($p=0.013$; Fisher test). Only in NF plaster group pain during walking decreased statistically significant ($p=0.05$; ANOVA method) already at 4-th day and at final of treatment (Dannet test). Symptoms significantly improved of the WOMAC index (stiffness subscale, functional subscale and total WOMAC score) in NF group ($p=0.035$; $p=0.01$, $p=0.012$; ANOVA method). The improvement according to the opinion by pts and physicians was observed in 82% in NF group and 43% in placebo group ($p=0.01$). In NF group 23 pts could decrease or fully withdraw NSAIDs, in placebo group only 7 ($p=0.007$; Fisher test). Two local allergic reactions was noted only in placebo group.

Conclusion(s): Topical nanoplast forte therapy in KOA is well tolerated and provide expressed analgesic effect during decrease NSAIDs dosage.

P275
VITAMIN D DEFICIENCY IN CHILDREN WITH A CHRONIC ILLNESS: SEASONAL AND AGE-RELATED VARIATIONS IN VITAMIN D CONCENTRATIONS

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Objective(s): Although vitamin D deficiency is a worldwide epidemic with multiple health effects, vitamin D status is not routinely measured in children and adolescents with a chronic illness.
The aim of the study was to evaluate overall vitamin D status, and its association with age, gender, and season in a large cohort of chronically ill Finnish outpatients at Children's Hospital, University of Helsinki, Finland.
Material & Methods: A register-based cross-sectional study was carried out. Altogether 1351 children visiting paediatric outpatient clinics during 2007-2010 had their vitamin D status (S-25-OHD) determined. The subjects' ages varied between 0.2-18 years, and 51% of them were boys.
Results: Almost half of the S-25-OHD values were consistent with subnormal vitamin D status: 23% of subjects had S-25-OHD <37.5 nmol/L and 24% between 37.5-50.0 nmol/L. In contrast, only 12% had a concentration>80 nmol/L. Age and season, but not gender, were the most important determinants for S-25-OHD concentration. For further analysis children were divided into five age groups; 0-2, 2.1-6, 6.1-10, 10.1-15, and 15.1-18 years. Mean S-25-OHD concentration differed between age groups (Kruskal-Wallis; $p<0.001$): the highest concentrations were seen in the youngest and the lowest values in the oldest age groups. A significant seasonal variation in 25-OHD concentration was noted in children older than 10 years. In the whole cohort summer concentration was on average 12 nmol/L higher than in winter and prevalence of vitamin D deficiency (= S-25-OHD <37.5 nmol/L) varied from 29% to 11% between winter and summer.
Conclusion(s): The finding that almost half of the Finnish children with chronic illness had suboptimal vitamin D status is alarming. Seasonal variation and inferior vitamin D status was noted in adolescents compared with younger children suggesting that imbalance between intake and requirement emerges with age. Although vitamin D status is improved during summer, part of the pediatric outpatients remains vitamin D deficient. Clinicians should identify individuals at risk and actively recommend vitamin D supplementation.

P276
ONCE YEARLY ZOLEDRONIC ACID AFTER 18 MONTHS OF PARATHYROID HORMONE (1-84) FOR SEVERE OSTEOPOROSIS

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Objective(s): The use of full-length PTH1-84 as a treatment for severe osteoporosis is limited to 18-24 months, depending on different country rules. The therapeutic strategy after this treatment remain an important issue, and at present time evidences about antiresorptive therapies other than alendronate after PTH1-84 are lacking. For this reason we aimed to determine whether once yearly 5 mg of intravenous zoledronic acid (ZOL) can maintain or increase gains in BMD at hip site after 18 months of therapy with PTH1-84.
Material & Methods: 25 severe osteoporotic postmenopausal women were treated consecutively with PTH1-84 monotherapy (100 μg daily) for 18 months followed by 5 mg ZOL two months after having ended PTH1-84. BMD at femoral neck and total hip were assessed with the use of DXA at baseline, after 18 months of treatment and 1 year after ZOL infusion. Bone biochemical turnover markers (serum CTX, OC and B-ALP) were assessed at baseline, every 6 month during PTH treatment and 1 year after ZOL infusion. Tolerability was evaluated by adverse experience (AE) reporting.
Results: BMD increased at femoral neck by 5.8% (1.8% after PTH1-84 and 4% after ZOL, respectively) and an analogue improvement was observed at total hip. Bone biochemical markers percentage modifications from baseline are resumed in Table. Three patients (12%) experienced self limiting adverse events in the first month of PTH1-84 treatment, while 11 (44%) of patients experienced a self-limiting acute phase reaction after ZOL.

Bone Biochemical Markers Modifications

	6 month	12 month	18 months	1 year after ZOL
OC	+ 228%*	+ 201%*	+ 180%*	- 50%
CTX	+ 140%*	+ 232%*	+ 250%*	- 70%*
B-ALP	+ 128%*	+ 198%*	+ 186%*	- 28%

* $p<0.01$vs. baseline

Conclusion(s): Our data show that ZOL is a safe and effective option not only to maintain but also to increase BMD at the hip site after 18 months of PTH1-84.
References: Black DM, Bilezikian JP, Ensrud KE et al. N Engl J Med 2005;353:555.

P277
PROPHYLAXIS OF HETEROTOPIC OSSIFICATION VIA PREOPERATIVE IRRADIATION INDUCES LOCAL INFLAMMATION

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Objective(s): Preoperative irradiation of the hip is an established method to prevent heterotopic ossification. To explore the involvement of the immune system in heterotopic ossification, we analyzed hematomas which resulted from the transection of the femur in patients receiving a total hip arthroplasty (THA), either untreated preoperatively (THA-H, n=24) or having been irradiated preoperatively (THA-X-H, n=20) in the hip region (7 Gy).
Material & Methods: We quantified (i) immune cell populations by flow cytometry and (ii) cytokines and growth factors by multiplex suspension array.
Results: While there were no differences in the frequencies of granulocytes, lymphocytes or CD14+ monocytes/macrophages between the THA-H and THA-X-H groups, the number of CD3+ T cells was significantly increased in the THA-X-H when compared to THA-H ($p<0.01$) due to the increased frequency of CD3+CD8+ cytotoxic T cells ($p<0.001$). Moreover, we found significantly higher concentrations of the pro-inflammatory cytokines IL-6 ($p<0.001$), IL-8 ($p<0.001$) and IFNg ($p<0.001$) in the THA-X-H as compared to THA-H. In contrast, the concentration of the angiogenic VEGF was significantly suppressed ($p<0.01$).
Conclusion(s): Here we show that (i) the immune cell composition in THA-hematomas is altered by the preoperative irradiation of the hip, (ii) the secretion of pro-inflammatory cytokines is induced by the preoperative irradiation while (iii) the secretion of the angiogenic VEGF is suppressed. The increased numbers of cytotoxic T cells and the elevated concentrations of IL-6, IL-8 and IFNg are indicative for a local inflammatory process. Interestingly, high numbers of cytotoxic T cells in wound healing were shown to be associated with impaired regeneration and thus could also be suspected to mediate prevention of heterotopic ossification. The suppressed VEGF secretion after preoperative irradiation of the hip is considered a relevant aspect of the modified regenerative capacity that may be related to prevention of heterotopic ossification.

P278
FREQUENCY OF POLYMORPHISM OF VITAMIN D RECEPTOR GENE IN PATIENTS WITH LOW BMD

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Objective(s): The aim of the study is to provide the analysis of polymorphism frequency of VDR gene in the group of patients with low BMD.
Material & Methods: The BMD study was assessed with DXA by "Lunar Prodigy GE" in lumbar spine (LS) L1-L4 and femoral neck (FN). The criterion for the inclusion into the study was T-score less than -1,0 according to LS or FN. The molecular genetic analysis was performed by RFLP-PCR method (ApaI, BsmI and TaqI).
Results: 134 patients residing in Gomel area aged 64.2±9.8 were included into the study. Osteoporosis was revealed in 124 (92.5%) patients and osteopenia was indicated in remained 10 (7.5%) patients. Total in study group low-energy fractures of FN, vertebral and forearm were earlier marked in 46 (34.3%) patients in the age older than 50 years of old. As a result of the performed molecular genetic analysis there was revealed that in patients with low BMD values (T-score<-1.0) genotypes frequency made up by allele A/a, B/b and T/t. Under the analysis of various genotypes frequency in groups of patients by presence/absence of fractures in anamnesis and BMD there were not revealed statistically significant differences. In the group of patients where in anamnesis the relatives had low-energy fractures, genotype "tt" frequency was statistically higher than in patients without family history ($\chi^2=6.27$; $p=0.012$). There were marked statistically significant differences in "t" and "b" alleles frequency in the group of patients who indicated fractures at relatives. "t" allele frequency in the group of patients with family history was statistically higher ($\chi^2=6.04$; $p=0.014$) and made up 0.500 in comparison with the patients without family history where "t" allele frequency made up 0.314. "b" allele frequency in the same groups made up 0.542 correspondingly in comparison with 0.336 ($\chi^2=7.10$; $p=0.008$).
Conclusion(s): The provided analysis of polymorphism frequency of VDR gene in patients with low BMD showed the prevalence of “t” allele frequency ($\chi^2=6.04$; $p=0.014$) and “b” allele frequency ($\chi^2=7.10$; $p=0.008$) in the group of patients with low-energy fractures family history.

P279
THE PATIENTS KNOWLEDGE ABOUT OSTEOPOROSIS AND DOCTORS VIEW OF THE SITUATION IN YEKATERINBURG, RUSSIA

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Objective(s): To assess the awareness of patients with osteoporosis (OP) of their disease and compare this data with the doctors judgment.
Material & Methods: Cross-sectional written questioning of 128 OP patients (mean age 64 years, 95% CI 63-66, mostly women) and 22 their doctors by recruited independent interviewees.
Results: 84% and 88% of patients acc. knew about the essence of OP and the goals of its treatment. 96% of doctors indicated that inform their patients about it "always". 70% of patients could calculate the total expenses for treatment despite 37% of doctors 'never" or "rare" discussed these items. 38% of patients were aware of different approaches of medication including annually, 58% knew about the risk of irregular treatment, 37% knew the adverse effects. But 12%, 22% and 12% of doctors acc reported that "never or rare" touch on these subjects in consultations. More than 90% of patients were confident "Ca plus vitamin D intake is effective remedy for fractures prevention in OP", 57% wrote that OP pharmacotherapy allows refusing physical exercises. 100% and 77% of doctors acc. reported that consider these aspects "always" or "regularly". 80% of patients pointed "regular visits to doctor is an obligate part of treatment" and "I require a long-term management". But only 42% of doctors organize next visits. There were no associations between patients' age, sex, and duration of anti-OP treatment, probability of depression, anxiety and quantity of correct answers.
Conclusion(s): We obtained the lack of patients awareness of practical aspects of OP treatment that may influence on compliance indirectly. Information that doctors give in consultations is insufficient, weakly understandable or hard to remember. Patients need a long-term management.

P280
CLINICAL AND ECONOMIC CHARACTERISTICS OF HIP FRACTURE PATIENTS WITH AND WITHOUT MUSCLE ATROPHY/WEAKNESS IN THE UNITED STATES

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Objective(s): Patients recovering from hip fracture with muscle atrophy/weakness (MAW) may have increased medical needs than those without. This study assessed the prevalence of MAW among hip fracture patients and compared the demographics, comorbid medical conditions, and healthcare costs and utilization among hip fracture patients with and without MAW.
Material & Methods: Using large US administrative claims databases, individuals aged 50+ with commercial insurance (under age 65) or Medicare supplemental insurance (65+ years old) who were hospitalized for hip fracture between 1/1/2006-9/30/2009 were identified. The first hospitalization for hip fracture was defined as the index stay. Patients were categorized into three cohorts: individuals with medical claims associated with MAW over the 12 months pre-index stay (pre-MAW), patients whose first MAW claim occurred during or within the 12 months after the index stay (post-MAW), and patients without any MAW claim (no-MAW). Demographics, comorbid medical conditions measured via Charlson comorbidity index (CCI) over the 12-month pre-index stay, and medical costs associated with the index stay were assessed and compared between groups. Multivariate regressions were performed to estimate the medical costs incurred over the 12 months post-index stay controlling for cross-cohort differences.
Results: There were 26,122 Medicare (pre-MAW: 839; post-MAW: 2,761; no-MAW: 22,522) and 5,100 commercially-insured (pre-MAW: 132; post-MAW: 394; no-MAW: 4,574) patients included in this study. Patients in the pre-MAW cohort had higher CCI (Medicare: 7.3 vs. 5.6 vs. 5.0; commercial: 8.0 vs. 4.9 vs. 4.2), and were more likely to have any hospitalization (Medicare: 52.2% vs. 25.1% vs. 21.2%; commercial: 59.9% vs. 25.6% vs. 20.8%) during the 12 months pre-index stay than those in the post-MAW and no-MAW cohorts (all $p < 0.05$). The medical costs associated with the index hip fracture stay were also the highest for the post-MAW group in both insurance populations. Controlling for cross-cohort differences, both pre-MAW and post-MAW cohorts had significantly higher total healthcare costs (Medicare: $7,308 and $18,753; commercial: $18,679 and $25,495) than the no-MAW cohort (all $p<0.01$) during the 12-month post-index stay.
Conclusion(s): Among US patients with hip fractures, those with MAW had higher healthcare costs than patients without MAW.
Disclosures: This study was funded by Eli Lilly.

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ASSESSING TREATMENT EFFECT IN A KNEE OSTEOARTHRITIS DMOAD TRIAL USING MRI: CARTILAGE DEFECT SCORING VS. QUANTIFICATION OF CARTILAGE VOLUME LOSS

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Objective(s): To evaluate the impact of MRI sequences on cartilage lesion assessment in knee OA patients as well as

the sensitivity to change over time comparing cartilage defect (semiquantitative) with cartilage volume loss (quantitative) methods.

Material & Methods: Two fat suppressed MRI sequences were compared: a 3D gradient echo (GRE), a classic cartilage sequence, and an intermediate-weighted fast spin echo sequence (IW-FSE). Knee OA MRI were from two studies of 2 years duration each (cohort 1, n=55; cohort 2, n=143). Cohort 2 included patients from a previous trial examining the chondroprotective effect of licofelone vs. naproxen. For both cohorts, a GRE sequence was used, and patients of cohort 1 underwent an additional IW-FSE. Cartilage defects (for both cohorts) and cartilage volume (for cohort 2 only) were evaluated using the semi-quantitative and quantitative methods, respectively, on the same patient.

Results: The cartilage defect assessment provided consistent significantly higher scores in IW-FSE than in GRE sequences both at baseline and 2 years ($p<0.007$). However, the change at 2 years was not significantly different ($p\geq 0.134$) between the two sequences. The standardized response mean (SRM) of cartilage change was consistently higher for the quantitative method (4.3-6 fold) than the semi-quantitative method. Cartilage defecT-score change between the two treatment groups revealed a trend toward significance only in the medial tibial plateau ($p=0.054$), whereas the change in cartilage volume loss demonstrated a significant difference in the global knee ($p=0.009$), lateral compartment ($p=0.026$), femur ($p=0.015$), and lateral femur ($p=0.014$).

Conclusion(s): Both MRI sequences show similar sensitivity to change over time in evaluating cartilage defects. Interestingly, the quantitative cartilage volume assessment is more sensitive than the semi-quantitative scoring for the detection of treatment effect on OA cartilage changes.

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P282
FAVOURABLE ECONOMIC IMPACT OF HIGHER DAIRY INTAKE ON THE BURDEN OF OSTEOPOROSIS

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Objective(s): With the ageing of the population, health and economic burden of osteoporosis are dramatically growing. The economic impact of nutritional fracture prevention is still not established.

We estimated the impact of increasing dairy consumption on the burden of osteoporosis, in terms of public health outcomes and costs.

Material & Methods: We constructed a model to estimate hip fracture numbers which could be prevented by higher dairy foods intakes. Dairy calcium was used to model the effect on hip fractures. We calculated absolute hip fracture numbers which could be prevented by increasing dairy calcium intake, i.e. the Potential Impact Fraction (PIF). This allowed us to determine costs avoided, considering hip fracture healthcare reduction and higher dairy foods costs. Disability-Adjusted Life Years lost (DALYs) were estimated too. Separate analyses were done for France, The Netherlands and Sweden. We conducted sensitivity analyses on DALYs lost and total costs avoided to verify the validity of the assumptions applied.

Results: Hip fracture numbers which could be prevented each year by higher dairy intakes was highest in France (2023), followed by Sweden (455) and The Netherlands (132). DALYs lost per year were respectively 6263, 1246 and 374. In the first year after hip fracture, quality of life (QoL) average loss was evaluated at 0.22, and at 0.08 in the following years. Daily costs of an extra 600 mg calcium intake through additional dairy products were derived from the local market product prices and calculated at €0.44, €0.64, and €0.68, for the Netherlands, France, and Sweden, respectively.

Total costs that might be potentially avoided were largest in France (~€129 million), followed by Sweden (~€34 million) and The Netherlands (~€6 million).

Conclusion(s): The burden of hip fractures related to low calcium intake is significant. Increasing dairy consumption is likely to be effective in decreasing this public health burden and the associated health care expenditures. This model appears to be robust and a valid method to assess health, wellbeing and cost outcomes achieved by changes in food products consumption, building thereby connections between nutrition and health economics.

P283
BONE METABOLISM MARKER AS A DIAGNOSTIC TEST FOR ENDOGENOUS HYPERCORTICISM

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Objective(s): Bone metabolism markers are not recommended for the diagnostics of postmenopausal osteoporosis (PMO). However, the suppression of osteocalcin is almost

obvious sign of endogenous Cushing's syndrome (CS). This study evaluates osteocalcin as a diagnostic test for CS in obese and overweight patients referred to exclude CS and among patients with PMO and glucocorticoid induced osteoporosis (GIO) due to CS.

Material & Methods: Osteocalcin (OC) was measured in fasting blood sample by elecrochemiluminiscence immunoassay (ECLIA) on Cobas e601 in overweight and obese consecutive patients referred to exclude CS (n=106). Retrospectively, osteocalcin was evaluated in 67 patients with newly diagnosed PMO (presence of low traumatic fractures and/or ≥–2.5 T-score DXA) and in 22 patients with newly diagnosed CS older than 45 (presence of low traumatic fractures and/or ≥–2.0 T-score DXA). Patients from referred population provided late-night salivary cortisol test (ECLIA), 1 mg overnight dexamethasone suppression test, 24 h urinary free cortisol and other tests that required in dependence on etiology of CS. Eventually CS was confirmed by histology after surgery in all patients.

ROC-analysis was used to evaluate diagnostic performance of OC test. Cutoff point was chosen based on maximal sum of sensitivity and specificity.

Results: Among 106 patients of referred population (mean age 38±14 years; BMI 36±7 kg/m^2) CS was confirmed in 42 cases. Cutoff point for OC – 8.3 ng/ml revealed sensitivity 73.8% (95%CI 58.9-84.7%), specificity 96.9% (89.3-99.1%); positive likelihood ratio 23.6 (95%CI 5.9-93.5), negative likelihood ratio 0.27 (0.16-0.45), diagnostic odds ratio 87.4 (18.2-418.7). The total area under the ROC curve (AUC) was 0.859 (95%CI 0.773-0.945). In a retrospective part of the study OC level was significantly lower in patients with CS (mean age 54.2±7.7) vs. patients with PMO ($p<0.001$) and was even better as a diagnostic test for secondary osteoporosis due to CS (AUC - 0.959 (95%CI 0.887-1.00)). A cut-off value of 8.3 ng/ml achieved sensitivity 95.4% (95%CI 78.2-99.2%), specificity – 98.5% (95%CI 92.0-99.7%).

Conclusion(s): Osteocalcin can be used as a diagnostic test for endogenous hypercorticism in patients referred to exclude CS and to differentiate GIO due to CS among PMO.

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EFFECT OF DISCONTINUATION OF IV BISPHOSPHONATE ON LEVELS OF URINARY NTX

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Objective(s): To examine the effect of IV bisphosphonate (BP) treatment discontinuation in patients following long term treatment.

Material & Methods: Subjects on an IV BP for >5 years were reviewed at clinic. BMD and urinary N-telopeptide crosslink of type I collagen (uNTx) were measured at the review clinic and uNTx approximately 6 months after the clinic. Data on BP treatment history and fracture history were also collected. The uNTx levels in these subjects were compared with the manufacturer's premenopausal reference range (5-65 nM BCE/mM Cr).

Results: Data were collected on 42 subjects, 33 female and 9 male, aged 34-96 years (Mean=73.1) who had been treated with zoledronate (Zol) or pamidronate (Pam). 39 subjects had osteoporosis, 2 Paget's disease and 1 fibrous dysplasia. The median time since infusion was 4 months at the time of the clinic review and 1 year at follow-up. Subjects on Pam had been on IV treatment for significantly longer than those on Zol (8 years vs. 5 years; $p<0.01$). There were no significant differences in BMD levels or in time since infusion between Zol and Pam subjects. Zol subjects had significantly lower uNTx levels than Pam subjects at clinic (16.6 vs. 27.1; $p<0.05$) but not at follow-up (28.3 vs. 30.6; ns). In the Pam group there was a non-significant increase of 9% between the 2 uNTx samples compared with a 24.8% increase in the Zol subjects ($p<0.05$). The majority of subjects (36/42) had uNTx levels in the lowest half of the premenopausal reference range at clinic, of these 28 remained below the mean 1 year after the last infusion, only 1 patient with Paget's disease had increased above the premenopausal range. None of the subjects in the upper half of the premenopausal range at clinic increased above the upper limit at follow-up.

Conclusion(s): Discontinuation of BP treatment increased uNTx levels in the Zol subjects more than those on Pam, however, bone turnover remained suppressed. Further work needs to be done to determine if turnover rate remains higher in Zol subjects or the lower starting level means they have more scope to rise.

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RESULTS OF FRACTURE RISK EVALUATION USING FRAX-ALGORITHM STANDARDIZED FOR ITALIAN AND ROMANIAN IN ALBANIAN WOMEN

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Objective(s): The purpose of our work was to determinate 10-year fracture risk scores in postmenopausal women of the Tirana population, based on the FRAX® algorithm, standardised for the populations of Italy and Romania, countries close and very similar to Albania with common traditions (Italy) and socio-economic level (Romania).

Material & Methods: The study group included 205 postmenopausal females (52-80), divided into four age subgroups.

The patients compelled a questionnaire form, designed to analyze osteoporosis risk factors and were then submitted to femoral neck densitometry by a DXA scanner (GE-Lunar). The 10-year fracture risk was assessed by the FRAX® method, using a calculator standardized for the populations of Italy and Romania. FRAX® major (the risk of main osteoporotic fractures) and FRAX® hip (the risk of femoral neck fractures) were calculated, using obtained densitometry results (FMD, FHD) and BMI (FM, FH).

Results: In women, history of osteoporotic fracture was given by 52.4%, parental history of hip fracture by 9%, smoking by 2.6%, glucocorticoid therapy was present in 4.4%, history of rheumatoid arthritis in 3.3%, secondary osteoporosis in 14.2% and higher alcohol intake in 0.6%. The average 10-years risk of major osteoporotic fracture was 19.6% and 16.7%; the average 10-year risk of hip fracture was 7.8% and 5.7% (Italian and Romanian database, respectively). In each age subgroup, the highest T-scores of 10-year fracture risk (FRAX® major, FRAX® hip) were obtained, using the Italian-oriented calculator, while the lowest ones were found applying the Romanian version. The differences were not statistically significant.

Conclusion(s): 1. The outcome supports the need for a Balkanic version including Greece Albania, Bulgaria and Ex-Yugoslavian nations. 2. It is justifiable for the moment to use both Italian and Romanian version with no major differences.

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ASSESSMENT OF 10-YEAR PROBABILITY OF OSTEOPOROTIC FRACTURES IN THE POPULATION OF KAZAN (RUSSIA) BY USING FRAX PROGRAM

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Objective(s): To evaluate a 10-year probability of osteoporotic fractures by using FRAX program.

Material & Methods: The study included 70 patients (35 men and 35 women) aged 40-90 years who have been coming to the largest clinics of Kazan for various reasons during the period from January-June 2011. In each clinic 10 patients (5 men and 5 women) were randomly selected. All patients, included in the study, were invited to visit the City Centre of Rheumatology for risk assessment and calculation of the 10-year probability of osteoporotic fractures (femoral neck and total) using FRAX program which validated for these purposes. The epidemiological prevalence of risk factors in the Finnish population was used for the calculation. DXA was performed for the determination of BMD at the femoral neck. The 10-year probability of fracture was calculated (adjusted for BMD at the femoral neck). The 10-year probability of major fractures over 20% as well as the one of hip fracture more than 3% were considered as threshold of intervention (early antiosteoporotic therapy).

Results: The average age of study participants was 61.8± 21.3 years (women - 59.2±23.5 years, men - 63.5±18.1 years). The 10-year probability of major fractures more than 20% was observed in 15 (21.4%) people [11 (31.4%) women and 4 (11.4%) men]. The 10-year probability of hip fracture over 3% was observed in 13 (18.5%) people [10 (28.6%) women and 3 (8.6%) men]. After the X-ray densitometry the 10-year probability of major fractures more than 20% (adjusted for BMD at the femoral neck) was observed in 19 (27.1%) people [13 (37.1%) women and 6 (17.1%) men]. The 10-year probability of hip fracture over 3% (adjusted for BMD at the femoral neck) was observed in 20 (28.6%) people [13 (34.3%) women and 7 (20%) men].

Conclusion(s): FRAX program is available to evaluate the 10-year probability of osteoporotic fracture and determine the threshold for intervention in the individuals at risk. The advantage of this program is the ability to determine the likelihood of fracture in the absence of data on BMD at the femoral neck.

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SHORT-TERM EFFECTS ON BONE TURNOVER MARKERS OF A SINGLE HIGH-DOSE OF ORAL VITAMIN D3

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Objective(s): To investigate the short-term effects on bone turnover markers of a single bolus of vitamin D3.

Material & Methods: 12 elderly subjects (8 women, 4 men; mean age=76±3 years) were given a single oral bolus of 600,000 IU vitamin D3. Blood samples were taken at baseline and 1, 3, 7, 14, 30, 60 and 90 days after vitamin D3 administration. 24 subjects served as controls. Main Outcome Measures: Changes in serum levels of 25-hydroxyvitamin D (25OHD), 1,25-dihydroxyvitamin D [1,25(OH) 2D], PTH, C-terminal-telopeptides of type I collagen (sCTX), crosslinked N-telopeptide of type I collagen (sNTX), osteocalcin and bone-specific alkaline phosphatase (BAP).

Results: No relevant changes in 25OHD and bone turnover markers were observed in the controls. In treated subjects serum 25OHD attained a peak increment to 67.1±17.1 ng/ml ($p<0.001$) at day 3. Subsequently, it slowly decreased to 35.2±5.8 ng/ml ($p<0.01$ vs. a baseline value of 21.7±

5.6 ng/ml). Mean serum PTH concentration decreased by 25-50% and serum 1,25(OH)2D rose by 25-50%. Serum CTX and sNTX rose significantly at day 1 ($p<0.01$), they attained a peak increment >50% at day 3 and they subsequently decreased almost back to baseline values at day 90. Serum osteocalcin slightly rose within the first 3 days and then declined by day 60. No changes were observed in serum BAP.

Conclusion(s): Our results indicate that the use of large doses of vitamin D may be associated with acute increases in sCTX and sNTX which may explain the negative clinical results obtained by using intermittent high doses of vitamin D to treat or prevent vitamin D deficiency.

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11 YEAR TREND OF OSTEOPOROTIC HIP FRACTURES IN AN ASIAN POPULATION – GENDER DIFFERENCES, RISK FACTORS AND OUTCOMES WITH FOCUS ON ASIAN MALES

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Objective(s): Assess 11-year trend of osteoporotic hip fractures in an Asian population, and to compare gender differences, risk factors and outcomes with focus on Asian males.
Material & Methods: Retrospective review of ICD9 820 (Hip Fracture) admissions to a tertiary hospital aged ≥50 from 2000-2010. Fractures were classified into "Neck of femur" (NOF), and "Intertrochanteric/Subtrochanteric/Pertrochanteric/Basicervical " (non-NOF). Standardized telephone interviews were conducted in the male population to assess pre and post-fracture mobility status and mortality.
Results: 2698 patients were enrolled (1903 [70.5%] female, 795 [29.5%] male). Overall median age at fracture was 78 years (50-112). Median female and male age was 79 (50-112) and 75 years (50-99), respectively. There was no statistically significant change in gender or racial distribution of fractures per year in the 11 years ($p=0.962$, 0.671). Females were overall older at time of fracture ($p<0.0005$). There is an increasing trend in overall median age per year over the past decade of boundary statistical significance ($p=0.088$). Female median age at fracture displayed a statistically significant increasing trend ($r=0.826$, $p=0.002$). 1334 fractures (49.4%) were classified as NOF and 1364 (50.6%) were non-NOF. Analysis showed that Male gender, Older age, ischemic heart disease, Malay, Indian and Other races conferred higher risk of non-NOF fractures ($p<0.0005$). 110 patients (84 [76.4%] female, 26 [23.6%] male) experienced subsequent contralateral osteoporotic hip fracture. Median number of years between index fracture and contralateral fracture was 2.0 (0-8 years); 11 were on osteoporosis medication. 298 (37.5%) males responded to the questionnaire. 222 (74.5%) were prefracture ambulant without walking aid. Of these, 57 (25.7%) regained prefracture mobility, 124 (55.9%) required walking aids, 30 (13.5%) became wheelchair-bound and 8 (3.6%) became bedbound after treatment and rehabilitation. 1-year mortality in this group was 5%.
Conclusion(s): Osteoporosis remains a problem in ageing populations, with increasing trend in median age of fracture. The ratio of male hip fractures appears to be higher in the Asian population (1 in 3), with Asian males appearing to have different mobility and mortality outcomes, although further data collection is required to establish exact outcomes. Non-NOF fractures appear to have distinct risk factors.

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EFFECTS OF ZOLEDRONATE ACID AND TERIPARTIDE ON BONE MICROARCHITECTURE, REMODELING AND COLLAGEN CROSSLINKS: COMPARISON BETWEEN ILIAC CREST AND LUMBAR VERTEBRA IN EWES

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Objective(s): Iliac crest bone biopsies are used to assess the mechanism of action of drug treatments, yet there are little data comparing this site to sites prone to fracture. Thus, the purpose of this study performed in ewes was to compare the effect of short-term treatment with zoledronic acid or teriparatide on iliac crest and lumbar vertebrae microarchitecture, collagen crosslink composition and bone remodeling.
Material & Methods: Three groups of 8 aged ewes received either vehicle (CTRL) or a single injection of 10 mg of zoledronic acid (ZOL) or daily injections of 20 μg/d of teriparatide (TPTD). After double tetracycline labeling, a transiliac bone biopsy (IC) and L1 lumbar vertebrae (LV1) were collected after 3 months. 3D-microarchitecture was assessed by μCT and the content of both mature enzymatic crosslinks pyridynoline (PYD), deoxypyridinoline (DPD) and the nonenzymatic crosslink pentosidine (PEN) were analyzed. Static and dynamic parameters of bone remodeling were measured by 2D-histomorphometry.
Results: In CTRL, Ct.Th and BV/TV were significantly higher while osteoid parameters, MS/BS, Ac.f were significantly lower in LV1 than IC. In addition, the ratio PYD/DPD was 4 times higher in LV1 than IC. Regardless of the

site, ZOL markedly depressed the bone turnover: the diminution of MS/BS, BFR/BS and Ac.f varied from -94 to -98% vs. CTRL ($p<0.01$ to 0.001). A significant increase in 3D-BV/TV (20%, $p<0.04$), ConnD (30%, $p<0.03$) and TbN* (8.3%, $p<0.03$) vs. CTRL was noted only in IC. After ZOL treatment, the DPD content and the PYD/DPD ratio significantly decreased in IC cortices but remained higher than in LV1. TPTD treatment induced a significant increase in cortical porosity in LV1 with a thinning of the trabeculae at both sites ($p<0.05$). Static parameters of bone formation and resorption were significantly augmented in LV1 ($p<0.05$) with only a trend of increases in MS/BS and BFR/BS.
Conclusion(s): In conclusion, in adult ewes, ZOL's early effects include markedly reduced bone turnover at the iliac crest and lumbar vertebrae but improved bone microarchitecture only at the iliac crest. In contrast, the early effects of TPTD are observed only at the vertebrae. Distinguishing bone sites to study the early effects of osteoporosis therapies is meaningful.

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THE TALLER THEY ARE, THE MORE POROUS THE SKELETON TO FALL HARDER UPON

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Objective(s): During growth, appendicular bones with a larger total cross-sectional area (CSA) are constructed with a thinner cortex minimizing the amount of material needed to assemble the larger bone. Compressive strength and bone area are conserved as the thinner cortex is distributed around a larger perimeter. Resistance to bending is conserved as the cortex is further from the neutral axis. Yet taller individuals are at increased risk for fracture. The smaller cortical volume *relative* to external bone volume is the result of relatively greater resorption on the endocortical envelope than apposition on the periosteal envelope. If resorption is also relatively greater than formation upon the intracortical envelope then the thinner cortex may also be constructed with higher porosity.
Material & Methods: To test the hypothesis that taller women have thinner cortices with higher intracortical porosity we measured height, weight and distal tibial and radial cortical microarchitecture using HR-pQCT (Scanco Medical, Switzerland) in 185 pairs of female twins aged 40-61 years in a cross-sectional study in Melbourne, Australia 2008-2009.
Results: Each SD (6 cm) increase in height was associated with a 0.71 SD larger tibia total CSA, a 0.29 SD thinner cortex, a 0.22 SD higher porosity and 0.30 SD lower cortical vBMD after adjustment for age and BMI ($p<0.001$). Cortical CSA and mass did not differ by height so taller persons had a lower total and cortical vBMD. Similar results were observed for the distal radius but associations were weaker or not significant.
Conclusion(s): Taller women have thinner and more porous cortices. After menopause, remodeling increases and is higher in persons with higher intracortical porosity because there are more surfaces available to initiate remodeling (1). The higher remodeling may degrade the lower bone volume fraction more rapidly accounting for the observation that porosity reduces bone stiffness to the 7th power disproportionately increasing fracture risk (2).
References: 1. Bjørnerem Å et al. Bone. 2011;49:1125. 2. Schaffler MB et al. J Biomech 1988;21:13.

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TRABECULAR BONE SCORE IN NORMAL UKRAINIAN WOMEN OF DIFFERENT AGE

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Objective(s): The aim of this study is evaluating Trabecular Bone Score (TBS) in normal women of different age.
Material & Methods: We've examined 176 normal women aged 40-79 years (mean age – 53.4±0.6 yrs; mean height – 163.5±0.5 cm; mean weight – 80.4±1.1 kg). The patients were divided into the following age-dependent groups: 40-49 yrs (n=53), 50-59 yrs (n=89), 60-69 yrs (n=17), 70-79 yrs (n=17). TBS (L1-L4), total body, lumbar spine, femoral neck BMD, lean and fat masses were measured by DXA using a densitometer Prodigy, GE.
Results: We have determined the significant decrease of TBS (L1-L4) in women with age (40-49 yrs – 1.334±0.016 mm^{-1}; 50-59 yrs – 1.289±0.013 mm^{-1}; 60-69 yrs – 1.194±0.034 mm^{-1}; 70-79 yrs – 1.205±0.050 mm^{-1}; $F=6.56$; $p=0.0003$). BMD of spine is significantly increase with age (BMD of spine: 40-49 yrs – 1.126±0.015 g/cm^2; 50-59 yrs – 1.234±0.013 g/cm^2; 60-69 yrs – 1.343±0.053 g/cm^2; 70-79 yrs – 1.348±0.100 g/cm^2; $F=4.04$; $p=0.008$). BMD of femoral neck didn't show significant differences. The significant correlation was observed between TBS (L1-L4) and age, fat and lean masses:

- TBS=1.64-0.007*Age; r=-0.34; t=4.41; p=0.00002.
- TBS=1.47-0.000005*Total fat (g); r=-0.37; t=4.86; p=0.000003.
- TBS=1.90-0.00001*Lean mass (g); r=-0.59; t=8.98; p<0.000.

We did not find significant correlation between TBS and BMD of spine and femoral neck:

- TBS=1.36-0.05*BMD of spine; r=-0.05; t=0.66; p=0.5.
- TBS=1.53-0.22*BMD of femoral neck; r=-0.16; t=1.94; p=0.05.

Conclusion(s): The significant correlation between TBS and lean mass indicates that bone quality can be associated with muscular system. TBS was significantly decreased with age. TBS is independent parameter which has potential diagnostic value without BMD.

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HOW WE ARE TREATING OSTEOPOROTIC HIP FRACTURES (OHF)? A NATIONWIDE OBSERVATIONAL STUDY IN PORTUGAL

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Objective(s): Analyze changes in treatment of osteoporotic hip fractures (OHF) in Portugal, between 2000-2008.
Material & Methods: Discharges with diagnosis of hip fracture between 2000-2008 were collected from the national register of hospital discharges, mandatory for all Portuguese public hospitals. Chi-square test was used to access independence between sex, age groups, treatment and fatality. Linear regression was used to access temporal trends.
Results: A total of 77,083 OHF were recorded. Crude incidence rates (100,000 inhabitants) were 343.2 in females and 125.2 in males. Surgery was part of the treatment in 90.4% of patients and 9.6% were treated conservatively. Risk for conservative treatment was higher in men (OR=1.43; CI95%: 1.43-1.47%) and lower in patients between 70-85 years (OR=0.72; CI95%: 0.67-0.87) compared to 50 years old patients. Patients treated conservative reduced 45.2% (CI95%: 53.1-37.3) from 2000-2008.
Internal fixation was the most common (89.0% of the cases) treatment for trochanteric fractures, for neck fractures, total or partial hip arthroplasties (THA or PHA) was used 69.7% of the cases. Treatment with THA increased 21.1% (p=0.030) in patients with neck fracture younger than 75. Patients treated with THA had a mean age of 73.9 years (CI95%: 73.1-73.6) and were significantly younger the than the ones treated differently (p=0.039). The longer mean length of hospital stay (LOHS) was observed for conservative treatment and for THA; being 18.3 days (CI 95%: 17.4-18.7) and 16.1 days (IC95%: 15.9-16.5), respectively. Patients treated conservatively had the highest mean score in the Charlson-index, therefore they had more comorbidities than patients treated surgically. In-hospital crude fatality rate for OHF was 5.5% and decreased 16.8% (p<0.018) from 2000-2008. Fatality rate was 8.7% in men and 4.6% in women, OR=1.89; CI95%: 1.86-1.92. Fatality rate was 23.1% in patients treated conservatively and 3.6% in patients treated surgically, OR=6.33; CI95%: 6.18-6.48.
Conclusion(s): A significant decrease in fatality and in patients treated conservatively was observed from 2000-2008. An unexpected high number of patients treated conservatively were observed. No reasons for this fact were found. A spatial analysis of conservatively treated patients may help point reasons for this high prevalence.

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APPLICATION OF FRACTURE RISK ASSESSMENT TOOL (FRAX) TO PREDICT NEED FOR DXA SCANNING AND TREATMENT IN PATIENTS WITH RHEUMATOID ARTHRITIS AT RISK OF OSTEOPOROSIS

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Objective(s): To assess the accuracy of FRAX scores in RA patients without actual femoral neck BMD in identifying at risk needing BMD measurement and to establish the necessity to treat patients with RA and osteopenia (T-score femoral neck>-2.5).
Material & Methods: We calculated pre-BMD FRAX scores in 72 postmenopausal women with RA estimated to be at risk for having an osteoporosis and a high fracture risk. A DXA scan was performed to every patient and a FRAX score including the BMD was calculated.
Results: Calculation of pre-BMD FRAX scores reveals that 47 (65.28%) of the patients had a high 10-year fracture risk and in the rest 25 (34.7%) the risk was defined as low (p<0.05). After preforming a DXA scans only 19 (26.4%) of all patients were evaluated as having an osteoporosis (T-score femoral neck<-2.5). From the rest 53 after a calculation of FRAX score including the BMD a number of 28 (52.8%) patients with high 10-year fracture risk and need for treatment is found. The clinical FRAX score together with the FRAX score including the BMD demonstrate that from all patients with RA those with high 10-year fracture risk are 47 (65.28%).
Conclusion(s): In patients with RA perceived to be at risk of osteoporosis or osteopenia, the clinical FRAX score alone can predict accurately the risk of osteoporotic fracture. The usage of FRAX score alone have a high predictive value as far as it concern the necessity of osteoporosis treatment.

Calculating FRAX scores and/or its use with BMD improves identification of patients with RA and high fracture risk and implementation of adequate treatment.

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PREVALENCE OF SILENT VERTEBRAL FRACTURES DETECTED BY VFA IN YOUNG HYPERTHYROID MEN: PRELIMINARY RESULTS

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Objective(s): Vertebral fractures are among the most frequent osteoporotic fractures and are often silent. Only a third of them come to medical attention and up to 20% of patients with an incidental vertebral fracture experience a new fracture in the next year. Also, high morbidity and mortality are associated. Hyperthyroidism is a risk factor for reduced BMD as well as for osteoporotic fractures. Vertebral fracture assessment (VFA) by DXA is a radiological method of visualization of the spine, which confers more commodity for the patient and less radiation exposure than the conventional spine x-ray. The aim of this study was to evaluate the prevalence of vertebral fractures using VFA by DXA in patients with hyperthyroidism.
Material & Methods: A group of 48 men <50 years old were divided and paired in hyperthyroidism (n=24) and control (n=24) groups. The body lean and fat masses (kg) and the BMD (g/cm^2) at the lumbar spine (L_1-L_4), proximal femur, distal radius and whole body were evaluated by DXA (QDR Discovery, Hologic). VFA was used to detect fractures and those were classified according to type (wedge, biconcave, crush) and severity (% of deformity) by Genant's semiquantitative method. No patient was previously treated for hyperthyroidism and/or osteoporosis. In the controls, the BMD was qualified by Z-score, according to the ISCD recommendations. Appropriate tests were used and statistical significance was considered for $P<0.05$.
Results: The mean age, stature, weight and BMI were identical between the groups. The mean BMD at the total hip (*P= 0.028*) and at the whole body (*P= 0.025*) were reduced in the hyperthyroidism group.
There was a trend for a higher prevalence of reduced BMD and osteoporosis in the hyperthyroidism group, as well as the prevalence of osteoporotic fractures.
Conclusion(s): The results of this study using VFA technology, may suggest that the changes in the BMD in young hyperthyroid men may already lead to osteoporosis development and fractures. These data also support the interest of VFA in the routine of osteoporosis to detect precociously silent fractures and so, consider treatment as soon as possible.

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EARLY IDENTIFICATION OF PATIENTS WITH RAPID BONE LOSS FOLLOWING SPINAL CORD INJURY, USING PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY (PQCT)

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Objective(s): We are developing bone densitometry protocols to identify patients with significant bone loss early after spinal cord injury (SCI), to enable targeted treatment against osteoporosis in the future. Fragility fracture rates in the paralysed limbs are high [1] at the trabecular-rich sites that show the most rapid and extensive bone loss after SCI [2,3].
Material & Methods: Inpatients of the Queen Elizabeth National Spinal Injuries Unit (Glasgow, UK) with motor-complete SCI at neurological levels C4 and below are scanned using pQCT within 5 weeks of injury (baseline), and again at 4, 8 and 12 months post-SCI. Total BMD (BMDtot), trabecular BMD (BMDtrab) and bone mineral content (BMC) are calculated from unilateral scans at both epiphyses of the tibia, and at the distal epiphyses of the femur and radius.
Results: This is an ongoing study. Data are presented from 13 subjects: 8 paraplegia / 5 tetraplegia, all male, aged 17-72 years old. At baseline, mean (SD) BMDtot was 345.70 (24.42), 263.10 (33.21) and 293.10 (24.92) mg/cm^3 in the distal tibia, proximal tibia and distal femur, respectively. By 8 months post-injury, BMDtot had fallen to 293.59 (53.34), 202.36 (46.30) and 247.94 (39.72) mg/cm^3, respectively. Further regression analyses revealed some subjects with statistically significant decreases in BMD and BMC in the paralysed limbs ("FAST" bone losers), others with little/no bone loss ("SLOW" bone losers).
Conclusion(s): Repeat pQCT bone scans within the first year of SCI enable us to red-flag "FAST" bone losers, providing a window of opportunity to apply preventative treatments against further bone loss and fractures in vulnerable patients. These data will inform osteoporosis management in SCI and other patient groups.
References: [1] Vestergaard P. et al. (1998) Spinal Cord 36:790. [2] Morse L. et.al. (2009) Osteoporos Int 20:385. [3] Eser P. et al. (2005) Arch Phys Med Rehabil 86:498.

Disclosures: We wish to thank all the patients taking part in this study.

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BALLOON KYPHOPLASTY VS. RF-KYPHOPLASTY IN TREATING PATIENTS WITH OSTEOPOROTIC COMPRESSION FRACTURES

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Objective(s): Balloon kyphoplasty (BKP) has been proven as an effective method of treating patients with vertebral compression fractures (VCF). Due to the low viscosity of the PMMA cement uncontrollable cement leakage with corresponding risks is often the focus of discussions. The Radiofrequency Kyphoplasty (RFK) is an innovative procedure for which an ultra-high viscosity cement is used. For the statistical comparison of the two methods of augmentation clinical and radiological data of 2 patient groups were evaluated.
Material & Methods: As part of the treatment of patients with conservative therapy-resistant osteoporotic vertebral fractures a prospective study of RFK was performed. Measurement parameters for efficacy and safety were the course of pain intensity using a VAS scale and the ODI Score. The radiological images were evaluated. The extent of cement extrusion and the duration of operation time were compared. There were 2 groups of patients chosen with the same indication and average VAS prior to treatment. For the BKP-group the same parameters like in the first group were evaluated.
Results: For both groups 114 patients were selected. Prior to treatment 84 mm on the VAS were calculated in both groups. The decrease in VAS values was (RFK vs. BKP) immediately after surgery, 58.8 mm vs.54.7 mm and 73.0 vs. 58.9 mm after 6 months. In both groups improvements in the Oswestry scores were registered after 6 months without a statistically significant difference. In both groups, the middle part of the vertebral bodies was increased by an average of 3.1 mm. RF yielded a decrease in the average kyphosis angle of 4.4, the BKP resulted in about 3.8 degrees. Concerning cement leakage a key difference in favor of the radio frequency kyphoplasty was detected (6.1% vs. 27.8%). For RFK a shorter duration of operation time was calculated (28.2 vs. 49.6 min).
Conclusion(s): The RFK has proven to be a clinically very effective procedure that does somewhat better than BKP in long-lasting pain relief. No differences could be detected regarding improvement of functioning and the mean restoration of mid- and anterior vertebral height. The RFK offers the advantage of a lower proportion of cement extrusion.

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RADIOFREQUENCY (RF) KYPHOPLASTY IN THE TREATMENT OF OSTEOLYTIC VERTEBRAL FRACTURES DUE TO MULTIPLE MYELOMA

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Objective(s): Radiofrequency kyphoplasty (RFK) provides a new minimally invasive procedure to treat vertebral compression fractures (VCF). The purpose of this study was to investigate the functional outcomes, safety and radiographic outcomes after the treatment of painful osteolytic vertebral fractures treated with a novel minimally invasive procedure, RFK.
Material & Methods: 88 patients (50 females and 38 males) with 158 osteolytic vertebral fractures were treated with RFK using the StabiliT Vertebral Augmentation System (Dfine Inc, San Jose, CA). The StabiliT System provides a navigational osteotome to create a site and size specific cavity prior to delivering ultrahigh viscosity cement with an extended working time (done by applying radiofrequency energy to the cement immediately prior to entering the patient). 12 months follow up in 60 patients (36 females and 24 males) with 110 treated vertebrae are reported. Pre- and postoperative, 3, 6 and 12 months clinical parameters (Visual Analogue Scale, Oswestry Disability Index score), and radiological parameters (vertebral height and kyphotic angle) were measured.
Results: The median pain scores (VAS) ($p<0.001$) and the Oswestry Disability Score ($p<0.001$) improved significantly from pre- to post-treatment and maintained at 3, 6 and 12 months follow up. Postoperative, 3, 6 and 12 months follow-up RFK restored and stabilized the vertebral height and avoided further kyphotic deformity. No symptomatic cement leaks or serious adverse events were seen in the RFK group during 3-months of follow up. In 7 out of 158 vertebrae (4.4%) a cement leakage into the disc or lateral wall could be determined by radiograph postoperatively.
Conclusion(s): RFK is a very safe and effective minimally invasive procedure for the treatment of osteolytic vertebral fractures. RFK shows excellent clinical and radiological results in the 3 and 6 months follow up. Site specific cavity creation and delivery of ultra-high viscosity cement in RFK with extended working time resulted in the added benefits of height restoration and lower cement leakages intra-operatively.

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EFFICACY OF AN INTRA-ARTICULAR TREATMENT OF OSTEOARTHRITIS OF THE KNEE WITH HYALURONAN (GO-ON®)

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Objective(s): The aim of the study was to document the efficacy and safety of the intra-articular treatment of osteoarthritis related complaints of the knee with the hyaluronan product GO-ON® under real life conditions in an orthopedic practice.
Material & Methods: All patients seen at the orthopedic practice who were treated with the product during 2010 for complaints related to osteoarthritis of the knee were included in the study. The intra-articular treatment was realised with hyaluronan only, i.e., no adjuvant for example corticosteroids or other were added. The established pain treatment could be continued.
Results: Data of 115 patients (25% men, 75% women) could be evaluated. According to Kellgren-Lawrence 11 (9.6%) patients were graded II, 77 (66.9%) III, and 27 (23.5%) IV. 88% of patients got 5 injections per joint, the other were 3-4 injections. The injection was described as very painful by 1.7% of the patients, as slightly painful by 7.8%, and as not painful by 90.4%. After completion of the treatment 7.8% patients did not feel any change in pain, but 92.2% felt a clear improvement. No improvement of the mobility was observed in 18.3% patients, in contrast to 81.7% who reported a noticeable improvement. Safety: No patient reported an unpleasant effect due to the therapy, and 90.4% of the patients would repeat the therapy. There was no adverse event in any patient. No treatment withdrawal occurred.
Conclusion(s): The data documented in this survey confirm the safety and clinical efficacy of the intra-articular treatment of osteoarthritis related complaints with hyaluronan (GO-ON®). The patient's satisfaction of more than 90% shows a high effectiveness of this treatment option in cases of osteoarthrosis of the knee. Therefore this treatment can be considered as a safe and valuable method. Studies comparing hyaluronan directly with other conservative treatments of osteoarthritis symptoms should be performed.

P300
THE ASSOCIATION BETWEEN OBJECTIVELY MEASURED PHYSICAL ACTIVITY AND KNEE STRUCTURAL CHANGE USING MAGNETIC RESONANCE IMAGING: THE TASOAC STUDY

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Objective(s): There is conflicting evidence regarding the association between physical activity (PA) and knee osteoarthritis (OA). The aim of this study was to examine the longitudinal association between objectively assessed steps/day and knee structural change measured using MRI.
Material & Methods: A total of 405 community-dwelling older adults (49% male, mean age 63 years, range 51-79) were measured at baseline and approximately 3.0 years later. MRI of the right knee at baseline and follow-up was performed to measure bone marrow lesions (BMLs), cartilage volume, tibial bone area, cartilage defects, and meniscal pathology. PA was assessed at baseline as steps/day determined by pedometer. The association between steps/day and change in knee structures was determined using multiple linear and logistic regression models. Multivariable models were adjusted for age, sex, BMI, radiographic OA, history of knee injury or surgery, and baseline knee structural abnormalities. The interactions between steps/day and baseline knee structures on knee structural change was examined using product terms (e.g., steps/day*baseline BML presence) in the multivariable models. Models were examined for threshold effects.
Results: In a multivariable model, steps/day predicted cartilage defect increases in the whole population (odds ratio (OR) 1.3/SD, P=0.035). Doing ≥10,000 steps/day was associated with BML increases (β=50 mm^2, P<0.001) and meniscal pathology score increases (OR 2.3, P=0.035), especially in those with prevalent BMLs and meniscal pathology at baseline. Steps/day was protective against cartilage volume loss, but only in those in the highest tertile of cartilage volume at baseline (P=0.031). There was no association between steps/day and change in tibial bone area.
Conclusion(s): Steps/day was deleteriously associated with knee structural change, especially in those who were more active and have prevalent BMLs and meniscal pathology. This suggests patients with these abnormalities should avoid doing greater than 10,000 steps/day; thus, alternatives to weight bearing activity may be needed for patients in order to maintain PA levels required for other aspects of health.

P301
THE CHANGE OF CORTICAL THICKNESS AND BONE MINERAL DENSITY OF NECK IN OSTEOPOROTIC FRACTURE OF FEMORAL NECK

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Objective(s): To study the change of cortical thickness and BMD of neck in osteoporotic fracture of femoral neck.
Material & Methods: The proximal femur was examined with CT scan for 76 patients. There were 42 patients

with osteoporotic fracture of femoral neck in fracture group including 12 males and 30 females. The patients' age was 74.4±9.3 yrs. There were 34 patients including 12 males and 22 females in nonfracture group. The patients' age was 63.3±9.3 yrs. The parameters were defined from the CT films at T_{20} level (the neck at 20 mm higher than the apex of lesser trochanter) in the normal side hip. The cortex ratio of T_{20} long diameter and the cortex ratio of wide diameter of neck at T_{20} were calculated for the evaluation of the change of cortical thickness of femoral neck[1]. BMD of femoral neck was measured with DXA for evaluation of severity of osteoporosis.

Results: The cortex ratio of T_{20} long diameter was 17.57± 3.54% in the fracture group and was 21.64±3.75% in nonfracture group (P=0.000). The cortex ratio of wide diameter of neck at T_{20} was 25.98±5.74% in the fracture group and was 33.39±5.74% in nonfracture group (P=0.000). The BMD of femoral neck was 0.590±0.084 g/cm^2 in the fracture group and 0.698±0.138 g/cm^{2,} in the nonfracture group (P<0.000).

Conclusion(s): BMD is a strong predictor of fracture risk. The principal difficulty is that BMD alone has low sensitivity, so that the majority of patients who sustain fragile fractures have a T-score above -2.5. Our study confirmed that BMD was lower in the fracture group than in nonfracture group in the patients aged ≤65 yrs. But there was no significant change of BMD between fracture group and non-fracture group in the patients aged >65 yrs. The cortex ratio of T_{20} long diameter and of wide diameter of neck at T_{20} were significantly lower in fracture group than in nonfracture group in the patients aged >65 yrs. It suggest that the thinned cortex of neck is a main factor leading to osteoporotic fracture of femoral neck and may be effective for predicting fracture risk.

References: 1.Li YZ et al. Osteoporos Int 2011;22(suppl 1): s149.

P302
THE RELATIONSHIP BETWEEN OSTEOARTHRITIS AND VITAMIN D STATUS IN ELDERLY

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Objective(s): It has been suggested an inverse relationship between osteoarthritis and osteoporosis. On the other hand, the association between osteoarthritis and vitamin D status has not yet been clearly investigated. Low levels of vitamin D may have adverse effects on calcium metabolism, osteoblastic activity, matrix ossification, on bone density. It has been suggested that decreased levels of vitamin D may impair the ability of bone to respond optimally to processes in osteoarthritis and predispose to disease progression. The aim of this study was to investigate vitamin D status in patients with osteoarthritis.

Material & Methods: This study was carried out 31 (26 women and 5 men) consecutive patients with osteoarthritis according to clinical and radiologically findings and 25 (20 women, 5 men) age and sex matched healthy controls. The patients' ages ranged from 50-81 years, mean 65.5 years. A standardized examination was used to determine the clinical, laboratory and radiological findings. We measured the serum 25-hydroxyvitamin D (25(OH)D), PTH, alkaline phosphatase, calcium, and phosphate levels in osteoarthritis patients and compared those controls group. Serum 25(OH)D concentrations were measured using Elecsys 25(OH)D) reactive kit. According to current recommendations, serum 25 (OH)D levels <30 ng/ml, 20 ng/ml, and 9 ng/ml were defined as vitamin D insufficiency, deficiency and osteomalacia, respectively.

Results: The mean serum 25(OH)D concentration was significantly decreased in osteoarthritis patients compared to controls (mean:12.76 ng/ml, 22.60 ng/ml, p< 0.01). There were no significant differences in PTH, alkaline phosphatase, calcium and phosphate levels in between two groups (p>0.05). Approximately 16% of osteoarthritis patients (5 patients) had less than 30 ng/ml of serum 25(OH) D levels. Vitamin D levels of less than 20 ng/ml were found in 32% of patients (10 patients). 14 patients (45%) had less than 9 ng/ml of serum 25(OH)D concentrations. Only two patients had high than 30 ng/ml of serum 25(OH)D levels.

Conclusion(s): Our results have shown that serum 25(OH)D levels is decreased in patients with osteoarthritis. We suggest that it will be helpful to determine the vitamin D status in order to predict the osteoporosis and/or osteomalacia risk and progression of the disease in osteoarthritis patients.

P303
THE RELATIONSHIP BETWEEN OSTEOARTHRITIS AND VITAMIN D STATUS IN ELDERLY

Kazim Senel, Esra Sahin, Mahir Ugur, Tuba Baykal, Akin Erdal, Meltem Alkan Melikoglu

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Objective(s): Osteoarthritis is the most common form of arthritis. It has been suggested an inverse relationship

between osteoarthritis and osteoporosis. On the other hand, the association between osteoarthritis and vitamin D status has not yet been clearly investigated. Low levels of vitamin D may have adverse effects on calcium metabolism, osteoblastic activity, matrix ossification, on bone density. It has been suggested that decreased levels of vitamin D may impair the ability of bone to respond optimally to processes in osteoarthritis and predispose to disease progression. The aim of this study was to investigate vitamin D status in patients with osteoarthritis.

Material & Methods: This study was carried out 31 (26 women and 5 men) consecutive patients with osteoarthritis according to clinical and radiologically findings and 25 (20 women, 5 men) age and sex matched healthy controls. The patients' ages ranged from 50-81 years, mean 65.5 years. A standardized examination was used to determine the clinical, laboratory and radiological findings. We measured the serum 25-hydroxyvitamin D (25(OH)D), PTH, alkaline phosphatase, calcium, and phosphate levels in osteoarthritis patients and compared those controls group. Serum 25(OH)D concentrations were measured using Elecsys 25(OH)D) reactive kit. According to current recommendations, serum 25 (OH)D levels <30 ng/ml, 20 ng/ml, and 9 ng/ml were defined as vitamin D insufficiency, deficiency and osteomalacia, respectively.

Results: The mean serum 25(OH)D concentration was significantly decreased in osteoarthritis patients compared to controls (mean:12.76 ng/ml, 22.60 ng/ml, $p < 0.01$). There were no significant differences in PTH, alkaline phosphatase, calcium and phosphate levels in between two groups ($p > 0.05$). Approximately 16% of osteoarthritis patients (5 patients) had less than 30 ng/ml of serum 25(OH) D levels. Vitamin D levels of less than 20 ng/ml were found in 32% of patients (10 patients). 14 patients (45%) had less than 9 ng/ml of serum 25(OH)D concentrations. Only two patients had high than 30 ng/ml of serum 25(OH)D levels.

Conclusion(s): Our results have shown that serum 25(OH) D levels is decreased in patients with osteoarthritis. We suggest that it will be helpful to determine the vitamin D status in order to predict the osteoporosis and/or osteomalacia risk and progression of the disease in osteoarthritis patients.

P304

PREDICTING VERTEBRAL BONE STRENGTH WITH A QUANTITATIVE COMPUTED TOMOGRAPHY-BASED FINITE-ELEMENT METHOD: CREATION OF STRENGTH DATA ACCORDING TO AGE RANGE IN A NORMAL POPULATION AND ANALYSIS OF FACTORS AFFECTING STRENGTH

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Objective(s): Spinal aBMD only explains 50-80% of vertebral strength, and the application of aBMD measurements in isolation cannot accurately identify individuals who are likely to eventually experience bone fracture, due to the low sensitivity of the test. For appropriate treatment intervention, a more sensitive test of bone strength is needed. QCT based finite element methods (QCT/FEM) may allow structural analyses taking these factors into consideration to accurately predict bone strength (PBS). To date, however, basic data have not been reported regarding the prediction of bone strength by QCT/FEM with reference to age in a normal population. The purpose of this study was thus to create a database on PBS in a normal population as a preliminary trial. With these data, parameters that affect PBS were also analyzed.

Material & Methods: Participants in this study comprised individuals who participated in a health checkup program with CT and for whom scan data were available for subsequent FEM analyses. Participants included 602 men, 342 women. Exclusion criteria were provided. Scan data of L2 were isolated and taken from overall CT data for each participant with simultaneous scans of a calibration phantom. A 3-dimensional FE model was constructed from the isolated data using software. FE models were equipped with triangular shell elements for the outer surface of the cortical bone and tetrahedral solid elements with an edge size of 2 mm for the rest of the bone. A uniaxial compressive load with a uniform distribution and uniform load increment was applied.

Results: Mean PBS was lower in women than in men for all age ranges. PBS in men and women significantly decreased with age. Simple linear regression between age and PBS showed the annual rate of decline in PBS was 54 N/year in men and 134 N/year in women. Mean PBS in the 70-74 year age range was 73.3% of YAM in men and in women, was 48.9% of YAM.

Conclusion(s): PBS was strongly dependent on age, while physical status (height, weight, BMI) had less effect. These results do not contradict the findings of the previous study stating that "the risk of the vertebral body bone fracture is a woman, and aging".

P305
THE SAFETY OF BA058 IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: RESULTS OF A PHASE 2 CLINICAL TRIAL

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Objective(s): BA058 is a synthetic analog of PTHrP(1-34) designed to give a greater anabolic effect than hPTH. A phase 2 dose finding study was conducted to evaluate the safety and efficacy of daily SC BA058 (20, 40 and 80 μg), compared to placebo or teriparatide (20 μg).
Material & Methods: The study was conducted in 40 study centers in the USA, UK, Argentina and India. After IRB approval and informed consent, 222 postmenopausal women with osteoporosis were randomized (1:1:1:1) and 221 received at least one dose of study drug. After the initial 6 months of treatment, eligible patients were offered 6 additional months of their assigned treatment. All patients received calcium and vitamin D supplements. Safety was assessed by laboratory tests, radiology and the incidence and severity of adverse events from the time of entry, until 30 days after the last dose.
Results: 45 patients were randomized to receive placebo, 43 to 20 μg and 40 μg, and 45 each to 80 μg or teriparatide. The mean age of all patients was 65. Treatment emergent adverse events (TEAEs) were reported in 74% of patients. The incidence of TEAEs was similar across the treatment groups, ranging from 71% in the placebo group to 78% in the teriparatide group. The most commonly reported events were influenza (10.4%) and headache (10.4%), all other events occurred in <10% of all patients. Seven patients (3.1%) discontinued from the study due to an adverse event, and serious adverse events (SAEs) were reported in 1.4% patients. None of these were treatment related, and there were no deaths. Mean serum calcium levels were consistently higher in the teriparatide group compared to the BA058 groups, with mean values continuing to rise in the teriparatide group over time. The safety profile of BA058 was consistent through an additional 6 months of treatment and no new safety signals were observed.
Conclusion(s): Treatment with BA058 80 μg resulted in significant BMD gains at all measured sites. BA058 was well tolerated. Safety events were comparable with blinded placebo and consistent with medical events in a disease population of this age and gender.

P306
MULTICENTER REPRODUCIBILITY OF CORTICAL AND TRABECULAR BONE QUALITY MEASURES ASSESSED BY HR-PQCT

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Objective(s): To evaluate the feasibility of pooling data in large-scale, multicenter HR-pQCT imaging trials, single and multicenter reproducibility indices were determined for cortical and trabecular bone quality measures across nine imaging centers.
Material & Methods: Reproducibility imaging experiments were performed using structure and composition-realistic phantoms constructed from multiple 1-cm sections of cadaveric radii. Single-center precision was determined by repeat scanning over short (<72 h), intermediate (3-5 mo, spanning hardware repairs), and long-term intervals (28 mo). Multicenter reproducibility was determined by imaging the phantoms at nine different HR-pQCT centers. The root mean squared coefficient of variation (RMSCV) for each interval and across centers was calculated for standard density and structure, cortical porosity, and μFE parameters.
Results: Single-center short-term RMSCVs. were <1% for all parameters excepting Ct.Th (1.1%), Ct.Th.SD (2.6%), Tb.Sp. SD (1.8%), and porosity measures (6-8%). Except Tb.Ar,

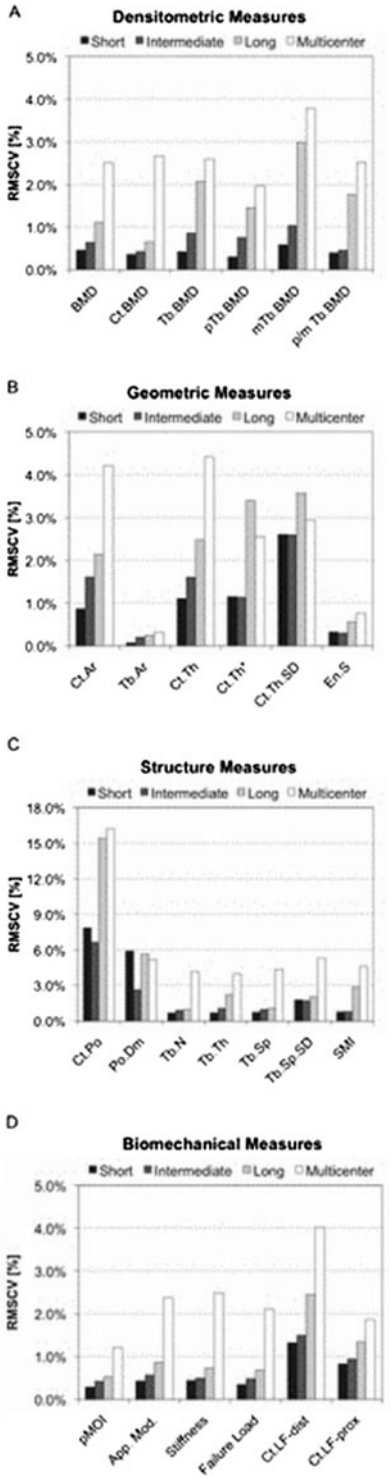

Figure 1 Reproducibility of select HR-pQCT measures expressed as RMSCV {%} over short- (<72 h), intermediate- (3–5 months), and long-term (28 months) (black, dark grey, light grey, respectively) compared to the muticenter reproducibility of nine different systems (white). **pTb.BMD**: peripheral Tb.BMD; mTb.BMD: medullary Tb. BMD: **p/mTb.BMD**: ratio of PTb.BMD to pTb.BMD: **Ct.Th***: direct 3D cortical thickness: **Ct.Th.SD**: standard deviation of Ct.Th or cortical heterogenesity: **En.S**: endocortical surface area: **Tb.Sp.SD**: standard of Inter-trabecular distances or trabecular heterogenesity; **Ct.LF**: cortical load fraction (at distal or proximal boudaries).

intermediate-term RMSCVs. were not statistically different from short-term values. Long-term variability was significantly greater for all density measures (0.7-2.0%; $p<0.05$ vs. short-term), Ct.Th (3.4%; $p<0.01$ vs. short-term), Ct.Po (15.4%; $p<0.01$ vs. short-term), and Tb.Th (2.2%; $p<0.01$ vs. short-term). Multicenter RMSCVs. were also significantly higher: 2-4% for density and μFE measures ($p<0.0001$ vs. short-term), 2.6-5.3% for morphometric measures ($p<0.001$ vs. short-term), while Ct.Po was 16.2% ($p<0.001$ vs. short-term).

Conclusion(s): In the absence of subject motion, multicenter precision errors for HR-pQCT parameters were generally less than 5%. While this translates to 2-5x worse than ideal short-term precision, phantom-based multicenter RMSCVs. for most structure and biomechanical measures were comparable to in vivo reproducibility data reported previously. The higher RMSCV for porosity metrics likely reflects the large biological range of these features and greater sensitivity to resolution differences. The reference data generated in this study will be used to evaluate, and ultimately recommend correction procedures that could broadly translate to multicenter study designs.

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P307
COMPARISON OF BMD VALUES AFTER TROCHANTERIC FRACTURES TREATED SURGICALLY VS. CONSERVATIVE TREATMENTAT 30 MONTHS FOLLOW-UP

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Objective(s): The purpose of this study was to evaluate the possible effect on bone mass from different treatment methods in patients with fractures of trochanteric region.

Material & Methods: This study is conducted in a single trauma service treating such fractures in the last three years. In this study were involved 64 patients with fractures of trochanteric region. Mean age 67.5 years (55-92). There were 30 males, 34 females. The first group of 35 patients was treated with internal fixation using DHS. The patients were mobilized 24 hours after surgery. Full weight bearing was achieved 10-12 weeks post-op. After 30 months follow-up six patients died and only 29 completed the survey. The second group of 29 patients was managed in conservative way. Patients age in this group from 59-92 years old (mean age 66.5 yrs). The treatment lasted for 10-12 weeks of absolute bed rest in skeletal traction. After 30 months follow-up nine patients died and only 20 completed the survey. All patients did the first BMD of the contralateral hip measurement with DXA (GE-Lunar) three months after fracture. The

second measurement was done 6 months after the first measurement. The next DXA were at intervals of 6 months until last follow-up of 30 months.

Results: In the first group of patients we obtained significant better results of BMD values. The first DXA measurement resulted with mean differences of 12% of BMD values in favor of ORIF group. During the following measurements the gap of BMD values varied from 10-18%. Even after 30 months the surgical group had statistically better BMD values. A new fracture appear at 5.8% of patients in the first group for 30 months of follow up, comparative with 17.2% in the second group.

Conclusion(s): Prolonged bed rest seems to accelerate bone loss not only due to disuse osteopenia but also from significant muscular atrophy in the conservative treated group. Aggressive rehabilitation earlier weight bearing better muscular activity are well known factors which minimize bone loss during healing period in trochanteric fractures.

P308
GLUCOSAMINE INDUCES INSULIN RESISTANCE IN OVARIECTOMIZED RATS

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Objective(s): Glucosamine (GlcN) is a popular nutritional supplement used to treat osteoarthritis in menopausal women. Menopausal women are at higher risk of type 2 diabetes mellitus and metabolic syndrome due to ovarian hormone deficiency. We used ovariectomized (OVX) rats as the model to investigate whether GlcN would induce IR in OVX rats and the underlying mechanisms.

Material & Methods: The rats were divided into four groups: (1) Sham-operated group (SHAM), (2) SHAM with GlcN treatment (SHAM+GlcN), (3) OVX group, (4) OVX with GlcN treatment (OVX+GlcN). GlcN were given intraperitoneally at 12 weeks after the surgical procedure for 2 weeks. The intraperitoneal glucose tolerance test (IPGTT) was performed to measure plasma glucose and insulin, and to calculate the clinical homeostasis model assessment-insulin resistance (HOMA-IR) and glucose-insulin index. Western blot analysis for detection of glucose transport protein subtype 4 (GLUT4) expression in skeletal muscle and histopathological examination for the changes in pancreatic islets were also performed.

Results: Fasting plasma glucose increased in the OVX with GlcN group, and the fasting plasma insulin and HOMA-IR were elevated more significantly in this group. In addition, the plasma glucose, plasma insulin, HOMA-IR and glucose-insulin index were significantly elevated only in the OVX with GlcN group after intraperitoneal glucose injection, implying that IR was induced by GlcN only in the female rats without the protection of ovarian hormone. Also, we found treatment with GlcN decreased the expression of GLUT-4 in skeletal muscle and induced pancreatic islet hypertrophy only in OVX rats.

Conclusion(s): The results demonstrate female rats do not develop IR upon GlcN treatment except after ovariectomy. Those who take GlcN after menopause or bilateral oophorectomy should watch their blood glucose level closely, especially after meals, but not the fasting glucose level.

P309
FUNCTIONAL STATE ASSESSMENT OF KNEE IN RELATION TO THE THERAPY

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Objective(s): To determine the efficiency of applied therapy and functional status of patients depending on the implemented therapy.

Material & Methods: The study included 60 patients with knee osteoarthrosis, whose established diagnosis was based on ACR criteria. The patients were divided into two groups. Group A: 30 of patients, in which we conducted outpatient physical therapy that included laser therapy, IFE, EF with Diclofen ampoules, ultrasound, MT, paraffin therapy with kinesis treatment. The treatment was combined and it was conducted over a period of 8 weeks. Group B: 30 of patients who received three applications of i.a. 1% Hyaluronic Acid injections over a period of 7 days, and then had a physical procedure of MT, laser therapy, paraffin therapy and kinesis therapy. The treatment also lasted for 8 weeks. All patients were analyzed by a single questionnaire. They were also clinically evaluated by the orthopedist and physiatrist. Average age was 68.4, 80% female representation. Radiological changes were assessed according to Kellgren-Lawrence classification, 70% had stage III, stage II 30%. Assessment of functional status before and after treatment was performed according to the Oxford knee score. The degree of pain was estimated with VAS before and after the treatment.

Results: In A group, the average value of pain according to VAS was 8 before the treatment, and it was 6 after the treatment. The average value of the functional score was 22 before the treatment, and 31 after the treatment. In B group the average value of pain according to VAS was 9 before the treatment, and 4 after the treatment. The average functional status was 22 and 38 after the treatment.

Conclusion(s): Patients who received i.a.1% hyaluronic acid injections and then performed physical therapy have a significant reduction in pain after the treatment as well as

improvement in functional status compared to patients who carried out only the combined physical therapy.

P310
ADHERENCE TO BISPHOSPHONATES: OUTCOMES AFTER SIX YEARS OF TREATMENT

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Objective(s): Bisphosphonates (BP) are the first choice treatment for osteoporosis. They effectively increase BMD, reduce markers of bone resorption, and lower the incidence of new fractures in patients with osteoporosis-related fracture. However, the efficacy observed in clinical trials may not be realized in a real life setting, partly due to poor adherence to therapy, with a significant worsening of clinical outcomes. The aim of this study conducted on an outpatient cohort is to quantify the adherence to the osteoporosis treatment in real practice setting and to identify the factors that may affect it.
Material & Methods: 236 women (mean age 66.4 y; SD 9.3; range 44-88) who started treatment for osteoporosis with BP after diagnosis of osteoporosis between January 2004 - December 2009 were examined. We assessed the association between adherence to oral BP and incidence of osteoporotic fractures. Adherence was quantified using the Medication Possession Ratio (MPR) per year and the MPR per visit for each patient. Adherence to treatment was defined as having MPR≥80%.
Results: Adherence rates decreased from 53% for treatment lasting 0-2 years to 43% for treatment lasting 2-4 years, returning to 49% for treatment lasting more than 4 years. In the whole sample mean MPR was 60.6% (41.4%). Among the motivations of therapy dropout comorbidities, self-made decision, GI intolerance and death were the most frequent. Nonadherent patients had higher risk of fracture (adjusted OR=3.4, 95% CI 1.1-10.5, p=0.032). Problems incompliance were reported in 181 visits (37.8%) on 51 patients (21.61%). The mean MPR per year adherence was associated with age <65 y (p=0.040), absence of comorbidities (p=0.023), positive history of fracture (p 0.044); having the same physician in follow-up (p 0.025).
Conclusion(s): Main determinants of low adherence described in clinical trials and relationship of adherence with fracture risk are confirmed in this real life study, and it emerges the importance of the relationship between physician and patient in improving the adherence. Adherence to BP in osteoporosis management is suboptimal in a real life setting. A significant positive association exists between poor adherence and increased risk of osteoporotic fractures which becomes augmented with longer treatment duration.

P311
VITAMIN 25OHD3 VALUES IN HOMOZYGOTE MUTATIONS VDR: CLINICAL VALUES

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Objective(s): The above listed workplaces have cooperated on a common project on genetic examining. Total number of patients reached 1008. This research provides evaluation of 945 patients where analyses have been completed in detail.
Material & Methods: In the complete work there are 4 basic polymorphisms in 3 genes (VDR, ESR1, and LRP5). DNA was isolated by kit MagAttract DNA Blood Mini M48 using automated isolator Biorobot M48 (Qiagen) from 200 μl noncoagulable blood samples provided by 945 patients. 4 polymorphisms in 3 genes were observed. In gene VDR (vitamin D receptor) BsmI polymorphism (A>G substitution, rs 1544410), in ESRl gene (receptor 1 of estrogen) polymorphism PvuII (T>C substitution, rs2234693) and in LR5 gene (lipoprotein receptor-related protein5) polymorphisms Val667Met and Ala1330Val(rs3736228). Concerning osteological parameters, entry parameters were observed during a primary examination, DXA on GE iDXA machine, laboratory parameters Ca, P, osteomarkers such as osteocalcin, CTx, ALP-bone isoenzyme, PTH, weight, height, BMI.
Results:

Total No. of probands=1008 *n*=945

VDR	n	%	age	Vit250HD3 nM/L
WT	351	34.3	55	58.5
HETERO	609	52.4	63.8	57.6
MUTATION	112	10.4	62.6	64.7 p<0.001
COMB.MUT.	15	1.4	64.6	62.7 p<0.01
DEFLECTION	5	0.54		

Monitoring group *n*=50

age - 58.7

Vit250HD3 nM/L - 58.3 nm/L

	age	Vit250HD3 nM/L
HETERO	62.8	56.2
COMB. HETERO	63.5	55.7
MUTATION ESR 1	60.8	53.8

We are presenting results from an observation of homozygote mutation of VDR gene. We have found considerably higher values of vitamin 25(OH)D3 at these patients in comparison with the rest of the probands. Consumption of vitamin D was not significantly different in statistics. Our work was focused on values of vitamin 25(OH)D3 in the

specified groups of probands. See the chart above for the characteristics.

Conclusion(s): In Bouillon et. al 2008 experiments prove that when VDR is inactivated in mice (null mice) different levels of metabolites of vitamin D are attained. Metabolite 1.25 vitamin D is increased, activity 1-alfa-hydroxylase is increased and metabolite 24.25.OH2D3 is lowered. A similar phenomenon has been observed with people. There can be two clinical meanings of 25(OH)D3 increase in VDR mutations: 1. Direct - in disturbing bone homeostasis; 2. Indirect - intervention into calcification processes in vessels.

P312
SEQUENTIAL THERAPY AFTER PTH 1-84 TREATMENT: COMPARISON AMONG BISPHOSPHONATES AND STRONTIUM RANELATE

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Objective(s): PTH1-84 is a bone anabolic drug that increases bone strength and reduces the risk of fractures. Evidence in literature shows how is useful to use antiresorptive drugs such as bisphosphonates, in severe osteoporosis severe after PTH (1-34 or 1-84) treatment.

Material & Methods: This study was divided into two parts, each of 18 months: the first one analyzed BMD changes by DXA-BMD at the lumbar and femoral and serum osteocalcin and β-CTX, monitoring their performance after 6,12 and 18 months in 61 women with severe postmenopausal osteoporosis (mean age 71.0±8.5), treated for 18 months with PTH 1-84. In the second phase of the study, 66.66% (40 of 61 treated patients) was divided into 5 groups (each with 8 patients), who received calcium (1 g/day) and vitamin D (5600 IU/week). Patients, respectively, taking alendronate, risedronate weekly, ibandronate monthly and strontium ranelate daily and in the last group only vitamin D and calcium. After 18 months was evaluated again BMD at the spine and femur.

Results: We observed a slight increase in femoral T-score from baseline (-2.3±0.8 at baseline and -2.1±0.7 at the end of treatment, (p=0,07, Wilcoxon test), more significant at the lumbar spine (baseline=-3.3±0.9 and -2.7±1.2 at the end of treatment ($p<0.001$, Wilcoxon test). Osteocalcin values were increased (ANOVA, $p<0.001$), 4.4 times from baseline at 6th month, 5.4 and 3.1, respectively, at 12th and 18th months (Bonferroni, $p<0.001$). β-CTX levels showed an increase of 2.5 times from baseline at month 6th, 2.6 and 1,8, respectively at 12th and 18th months ($p<0.001$). After 18 months of therapy with other bisphosphonates, strontium ranelate and calcium and vitamin D further significant increases were evidenced in t-scores after ibandronate (+0.9, 95% CI: +0.2, +1.5, $p<0.05$), ranelate (+0.8, 95% CI: +0.4, +1.3, $p<0.05$), risedronate (+1.6, 95% CI: +1.0, +2.3, $p<0.05$. Analysis of variance showed a significant difference ($p=0.008$) between risedronate and Vit D.

Conclusion(s): Our data show PTH 1-84 efficacy and suggest that in severe osteoporosis the treatment of choice would include a first cycle of 18 months with PTH1-84, followed by a subsequent cycle of therapy with antiresorptive drugs or ranelate strontium.

P313
VITAMIN D RECEPTOR GENE BSMI POLYMORPHISM AND BONE PHENOTYPE IN POPULATION OF CENTRAL MORAVIA REGION

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Objective(s): During the recent years bone phenotype relation to gene candidates for osteoporosis has been observed. Individual parameters of bone phenotype such as BMD, bone microarchitecture, bone turnover markers (BTM) and fractures can be determined by an interaction between these candidate genes and external factors. Nowadays one of the most followed candidate gene is a gene for vitamin D receptor (VDR). One of the most followed polymorphisms of this gene is polymorphism BsmI. We have been observing frequency of this polymorphism occurrence in relation to parameters of bone phenotype.

Material & Methods: DNA was isolated by kit MagAttract DNA Blood Mini M48 using an automated isolator Biorobot M48 (Qiagen) from 200ul non-coagulable blood samples. The principle of isolation is based on a separation by magnetic spheres. Polymorphism BsmI was observed (A/G substitution, rs 1544410) in a vitamin D receptor gene. Detection of polymorphism BsmI was carried out by real-time method PCR while using FRET sounds and by direct sequencing on a sequenator ABI 3130 (Applied Biosystem). Bone phenotypes (BMD, BTM, fractures) were then compared with frequency of genotype occurrence as wildtype with no mutation (bb), mutated heterozygote (Bb) or mutated homozygote (BB). BMD was measured in lumbar spinal column and total hip using densitometer Lunar iDXA (GE Healthcare).

Results: A cluster of 1051 patients from Central Moravia region was analysed. We followed a frequency of polymorphism BsmI occurrence and its relation to individual parameters of bone phenotype. BMD in femoral neck and lumbar spine area, BTM osteocalcin (OC) and β-crosslaps (CTx) and fractures were analysed. Demographic characteristics of individual genotype were with no significant difference. The

acquired results show significantly lower BMD of homozygote BB in femoral neck and lumbar spine area and a significantly lower occurrence of fractures with patients of genotype bb. Relation among BsmI polymorphism and BTM were not proved.

Conclusion(s): Our results show that it is possible to observe slight but statistically significant relation among observed vitamin D receptor gene BsmI polymorphism and some parameters of bone phenotype.

P314
GENERAL HEALTH RELATED QUALITY OF LIFE IN PATIENTS WITH OSTEOPOROSIS

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Objective(s): Osteoporosis is a systemic disorder characterized by decreased bone mass and microarchitectural deterioration of bone tissue. Aim of the study to determine influence the bone density decrease on the quality of life of these patients.

Material & Methods: A number of 709 women, outpatients, chosen by a method of random selection, was examined. Bone density was measured by osteodensitometry. Quality of life was estimated through a general questionnaire SF36.

Results: Decreased bone density had 59.80% women - osteopenia was found in 38.36% and osteoporosis in 21.43%. Insufficient level of physical activity was found in 45.1% patients and in the group of patients with osteoporosis in 72% of patients. An early menopause was found in 1/5 of patients. There were 24.5% patients who smoke and 16.2% of patients moderately consumed alcohol. 13.5% of patients was on a regular corticosteroid therapy. The quality of life, estimated through a global physical aspect, did not differ significantly between patients with normal and decreased bone density (normal bone density 39.76; osteopenia 39.68; osteoporosis 38.01). The difference in the psychological score was not significant between patients with normal and decreased bone density (normal bone density 42.54; osteopenia 41.47; osteoporosis 41.12). A statistically significant difference was found only when a role of physical functionality was evaluated ($p=0.05$) (normal bone density 59.60; osteoporosis 52.86).

Conclusion(s): In the patients we evaluated, the most frequent risk factor to influence the decrease of bone density was insufficient physical activity. The quality of life of patients with normal and decreased bone density was significantly different when the role of physical functionality was estimated.

References: 1. Boskovic K, et al. Balneoclimatologia YU ISSN 0350/5952, 2009;35(Suppl.3):7. 2. Zvekic Svorcan J, Boskovic K, Lazarevic D, et al. Balneoclimatologia 2011;35:205. 3. Madic D, Obradovic B, Maric D, et al. Vojnosanit Pregl 2010;67:386.

Disclosures: Physical activity has the most important impact on the quality of life of patients with osteoporosis.

P315
DOES POST-FRACTURE THERAPY WITH BONE CONSERVATION AGENTS PREVENT SECOND FRACTURE? PRELIMINARY RESULTS FROM A STUDY OF 10,608 MALES

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Objective(s): There are few studies of the effectiveness of bone conservation therapy in achieving secondary prevention of subsequent non-vertebral fragility fractures in men. Our objectives in this study are: 1) determine the clinical effectiveness of treatment with bone conservation agents in preventing subsequent fractures among men after index fragility fracture; 2) identify clinical characteristics associated with treatment; 3) estimate post-fracture risk of subsequent fracture among treated and untreated men.

Material & Methods: We used the claims of a large health insurance company with enrollees throughout the United States to identify 10,608 men 65 years and older who had a claim for a fragility fracture during the period 2000-2005. Patients' characteristics, diagnostic procedures, therapies, comorbidities, and provider characteristics were compared for fracture patients who initiated bone conservation agents with those who did not following the index fracture and used to estimate the occurrence of a subsequent fracture.

Results: A total of 492 (4.6%) patients initiated and 10,116 (95.4%) patients did not initiate post-fracture therapy. Treatment for all bone conservation agents peaked in 2002-2003. Mean age for initiators was 76.2 and 74.9 for noninitiators. Among initiators, 16.1% experienced a subsequent fracture compared with 10.7% of noninitiators ($p<0.001$). Initiators were more likely than non-initiators to have a previous diagnosis of osteoporosis ($p<0.001$) or COPD, or previous treatment with tertiary tricyclics ($p<0.001$), SSRI antidepressants ($p<0.001$), and benzodiazepines ($p<0.001$), The average time to subsequent fracture for initiators was 12.5 months and 13.4 months for noninitiators. The crude risk of experiencing a subsequent fracture among initiators relative to noninitiators was 1.6 (95% CI: 1.25-2.05) and 1.55 (95% CI: 1.21-2.00) adjusted for the aforementioned covariates.

Conclusion(s): These preliminary results suggest that: few men with a fragility fracture received post-fracture treatment

with a bone conservation agent, 2nd fractures for initiators tend to occur on average of 1 month sooner, and the relative risk for a 2nd fracture is increased among patients who receive treatment relative to those who do not receive treatment.
Disclosures: Claims data used in this study are contained in the i3 Invisions database, which is maintained by Optuminsight, a member of the United Health Group.

P316
LACTOSE INTOLERANCE AS A RISK FACTOR FOR OSTEOPOROSIS

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Objective(s): To recognise calcium intake with patients treated with osteoporosis and lactose intolerance.
Material & Methods: Patients currently treated with osteoporosis were asked about their lactose intolerance. Those who replied positively were further examined in gastroenterological clinic to prove their lactose intolerance. Genetic testing (LCT gene, C/T 13910 and G/A 22018) was done and then weekly questionnaire on dietary calcium intake was administered.
Results: There were 89 patients genetically examined. All of those with positive reaction to lactose intolerance were also genetically positive. From the whole group there were 72.5% homozygotes and 27.5% heterozygotes for both polymorphisms. 40 patients turned in the calcium intake questionnaire. 39 of those were women and 1 man, average age was 61 years. Average calcium intake in the whole group was 415 mg a day. Considerable individual differences were found, from 150-1150 mg/day. Average deficit of calcium intake in the whole group was 800 mg/day.
Conclusion(s): We have proved a low calcium intake (415 mg/day) with patients of lactose intolerance. Large individual differences in daily intake were found. We can consider this to be a risk factor of osteoporosis. Genetic examination of lactose intolerance is simple and precise. It is appropriate to calculate substitution calcium dose individually according to patient's dietary intake.

P317
COELIAC DISEASE SCREENING OF PATIENTS WITH OSTEOPENIA AND OSTEOPOROSIS IN CENTRAL AND NORTHERN MORAVIA, THE CZECH REPUBLIC

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Objective(s): To prove validity of coeliac disease screening for osteopenia and osteoporosis patients.
Material & Methods: Patients diagnosed with osteopenia and osteoporosis were examined according to DXA. Serological examination of tissue transglutamine - AtTGa was carried out. Patients with positive results were further examined.
Results: Total number of 2245 patients was examined, from which 2128 (95%) were women and 117 (5%) were men. Positive serology was found with 50 patients (2.2%), further examined by endoscopy were 45 (2.0%) patients. In a group of patients with osteoporosis there were 2.14% with positive serology, in osteopenia group 2.49% were positive. Average age in the total group with confirmed coeliac disease was 47 years, in osteoporosis group 54 years and in osteopenia group 40 years.
Conclusion(s): We have proved that prevalence of coeliac disease in this target group of Central and Northern Moravia population is 2.2-2.49% in comparison with general population of the whole Czech Republic. It is four times higher than expected in general population of the Czech Republic where anticipated prevalence is 0.4-0.5%. It can thus be deducted that screening in this target group is meaningful and should be introduced in the common praxes.

P318
LONG-TERM IMPACT OF ADHERENCE TO ORAL BISPHOSPHONATES ON OSTEOPOROTIC FRACTURE INCIDENCE

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Objective(s): Adherence to osteoporosis treatments is a critical parameter resulting in suboptimal effectiveness in real life practice. The long-term effect of adherence on fracture risk has not been assessed.
Material & Methods: Retrospective study using provincial health insurance claims databases to assess the association between adherence to oral bisphosphonates (OBP) and incidence of osteoporotic fractures in all Ontario patients with osteoporosis between April 1996 - December 2009. Multivariate logistic regression models were used to assess the association between OBP adherence and fracture risk. Treatment duration was classified into two-year intervals. Compliance was estimated with the medication possession ratio (MPR) and persistence was defined as the length of continuous therapy without a gap in refills >30 days.
Results: A total of 636,114 patients comprised the study cohort with a mean age of 72 years and 84% being female.

Overall, the mean compliance for the total cohort was 0.72 (0.30) with 53.5% of the patients having a compliance of >80% during the 14-year follow-up period. Among the patients with 0-2 years of follow-up only 49.9% were compliant. After this period, compliance declined steadily with time from 58.9% in patients with 2-4 years of follow-up to 49.9% in patients treated for 12-14 years. With regards to persistence, 24.6% of the total cohort was persistent during the 14-year period. Persistence decreased steadily from 41.0% in patients with 0-2 years of treatment to 3.3% in patients with 12-14 years of treatment. Significant associations between high compliance and persistence and reduced fracture risk over the entire 14-year period of the study were observed. The overall odds ratio for categorical compliance (MPR>80% or MPR≤80%), continuous compliance and persistence were 0.909 (95% CI: 0.893-0.925), 0.918 (95% CI: 0.893 and 0.944) and 0.804 (95% CI: 0.787-0.821), respectively.

Conclusion(s): In a real life setting, adherence to OBP in osteoporosis management is suboptimal. A significant positive association exists between poor adherence and increased risk of osteoporotic fractures which becomes augmented with longer treatment duration.

Disclosures: This study was supported by a grant-in-aid by Novartis Pharmaceuticals Canada Inc. and an in-kind support by JSS Medical Research Inc.

P319
MEDICATION BURDEN OF SAUDI ARABIAN WOMEN RECEIVING ANTIRESORPTIVE THERAPY

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Objective(s): Osteoporosis is common among Saudi Arabian population and successful treatment requires full compliance. Patients who require antiresorptive therapy (ART) such as oral bisphosphonates might suffer from other diseases which require medications and this increases the Medication Burden (MB) and end up in noncompliance of drugs making them vulnerable to osteoporosis related fractures (ORF). We decided to undertake this study to analyze the concomitant medications which osteoporotic patients are receiving at King Fahd University Hospital, AlKhobar.

Material & Methods: Osteoporotic patients receiving ART at King Fahd University Hospital, AlKhobar were identified through the database of the QuadruMed Patients Care system and was cross checked from the Radiology data base of DXA scan and pharmacy drug dispensing system between January 2009 - December 2009. Concomitant medication is defined as use of other drugs for ≥30 days with oral bisphosphonates, calcium and vitamin D. MB is defined as mild (≤1 concomitant medication), moderate burden (≥2 and ≤4 medications) and severe burden (≥5 medications). The demographic data such age, sex and diagnosis was collected from the medical records. The data was analyzed using SPSS (Statistical Package for the Social Sciences), version 14.0, Chicago, Illinois.

Results: During the study period 516 patients were diagnosed to have osteoporosis and were and 473 were on ART. Sixty-eight (14.4%) of the patients with the average age of 50.15±2.4 years were on 1 medication apart from ART, vitamin D and elemental calcium, 129 (27.3%) with average age of 51.6±9.7 years were taking 3.32 medications, and 276 (58.3%) with mean age of 62.1±10.7 years were on 8.02 concomitant medications. The most common concomitant medications in use were cardiac, endocrine and systemic anti-inflammatory and analgesics in that order.

Conclusion(s): This study suggests that majority of the Saudi women who are osteoporotic with oral bisphosphonate therapy have a concomitant medication burden of ≥5 other medications. To have a full compliance of the therapy patients' medication burden should be considered before choosing the route of treatment.

P320
MODALITIES OF PRESCRIPTION OF THE SYMPTOMATICS SLOW-ACTING DRUGS FOR OSTEOARTHRITIS (SYSADOA) IN THE MANAGEMENT OF HIP AND KNEE OSTEOARTHRITIS (OA)

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Objective(s): To describe when, how and why European rheumatologists use the SYSADOA in the management of OA of the lower limb.

Material & Methods: Cross-sectional prospective survey. 342 European rheumatologists (EU-RH) participating the 2009 EULAR congress were asked to fulfil a questionnaire regarding their habits of prescription of the SYSADOA.

Results: The rheumatologists were males 55%. 62% described their primary practice setting in hospital or clinic. The average age was 46 years old.

- The average number of patients seen for hip OA is 16 by week and 20 for knee OA.
- The data from the survey suggest that SYSADOA are mainly used a part from acute episode 86% vs. 65% during flare ups.
- The determinant for prescribing a SYSADOA is mainly based on the international recommendation (EULAR, OARSI) the medical literature and the congresses.

- Drugs prescribed during the flare-ups: analgesics level I 83%, analgesics level II 87%, NSAIDs 96%, SYSADOA 65%, topical corticoids 74% for knee OA, local corticoids injections 90%, hyaluronic acid 57%.
- Drugs prescribed a part from the flare-ups: analgesics level I 83%, NSAIDs 66%, SYSADOA 86%, topical corticoids 72% for knee OA, local corticoids injections 45%, hyaluronic acid 83%.
- Treatments aims of rheumatologists: symptomatic effect on pain 93%, functional improvement 96%, possible structural effect 90%, reduction of total dosage of NSAIDs 95%, reduction of duration of NSAIDs treatment 92%.
- More than 90% of the EU-RHs expect a benefit on pain, functional disability, possible structural effect and a reduction of NSAIDs intake.
- Criteria for prescribing a SYSADOA: EULAR recommendations 90%, OARSI recommendations 54%, medical literature 93%, internet 81%, congresses 94%, sales representatives 86%, advertising 59%.
- The criteria of choice are guided by the good tolerance of the product (99%), the ease of administration for 82% of rheumatologists, as well as by the status of medical prescription for 91%.

Conclusion(s): The result of the survey shows that EU-RHs mainly use SYSADOAs during chronic episodes of OA. The expected effects are mainly the symptomatic and functional improvements.

P321
SELF-REPORTED PREVALENCE AND CORRELATES OF OSTEOPOROSIS IN WOMEN AGED MORE THAN 50 YEARS: RESULTS FROM A REPRESENTATIVE STUDY

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Objective(s): The aim of the present study was to determine self-reported prevalence of osteoporosis and its correlates in a representative community-based cohort of women aged more than 50 years in Tunisia.
Material & Methods: The present study is a cross-sectional community-based study carried out thought home questionnaire. This study was supported by grants from Sanofi Aventis and the National Institute of Public Health. The study population consisted of 997 women aged 50 years and older. No response subjects (n=220). The diagnosis of osteoporosis was established by home interviews regarding self-reported osteoporosis, health-related information.
Results: Osteoporosis self-reported prevalence rate was 11.3%. The prevalence of osteoporosis was higher for the women aged more than 70 years (6.2% vs. 13.7%, $p<0.01$). Osteoporosis was fond to significantly more prevalent among women using steroids more than three months (OR=3.7; $IC_{95\%}$: 1.6-8.4). Hormone post menopauses replacement therapy, high educational level and obesity seems to protect against osteoporosis (OR, 0.40; 95% CI, 0.18-0.89), (OR, 0.64; 95% CI, 0.45-0.92), (OR, 0.65; 95% CI, 0.36-0.98), respectively. Osteoporosis was associated but not significantly with the presence of past fracture history and early menopause (before 45 year). Only 45.5% of women with osteoporosis receive treatment: calcium and vitamin D (n=28), bisphosphonate (n=12).
Conclusion(s): Despite limitation of this study (we did not perform bone densitometry, and therefore the prevalence may been underestimated). The findings of the present study on a representative sample of the women aged more than 50 years, showed that also when based on self-reported measures, osteoporosis is a significant public health problem. Policymakers should be aware of this finding and allocate resources accordingly.
References: Werner P, Archiv Gerontology Geriatrics 2003;37:277. Lígia Araujo Martini et al Rev Saúde Pública 2009;43(Supl. 2).
Disclosures: This study was supported by Sanofi Aventis, the National Institute of Public health and The Association of protection of elderly in Monastir.

P322
ALTERATIONS OF BONE MINERALIZATION CHARACTERISTICS INDUCED BY OSTEOARTHRITIS OVER TIME: LONGITUDINAL STUDY

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Objective(s): Bone mineralization on a microscopic scale is major determinants of mechanical quality of trabecular bone. However, longitudinal study to quantify alterations of bone mineralization characteristics is sparse, particularly in osteoarthritis (OA) over time. The current study is, therefore, aimed to quantify alteration patterns of bone mineralization characteristics induced by OA over time, using *in vivo* μCT.
Material & Methods: Fourteen 8 week-old female Sprague Dawley rats were randomly divided into control (n=7) and OA (n=7) groups. Mice in the OA group were administered monoiodoacetate into the knee joint cavity. The knee joint was scanned by *in vivo* μCT at 0, 4, and 8 weeks after

administration and the trabecular bone was analyzed to quantify alteration patterns of bone mineralization characteristics. The linear attenuation coefficient was measured and converted to bone mineralization. Bone mineralization was then divided into four areas (0-0.3 g/cm^3, 0.3-0.7 g/cm^3, 0.7-1.0 g/cm^3, >1.0 g/cm^3) to quantify bone mineralization alterations based on method suggested by Sato *et al.* (2000). Immunohistological tests were performed additionally to verify if OA was well corresponded to clinical conditions. All procedures for specimen preparation were approved by Yonsei University School of Animal Care and Ethics Committee.

Results: In terms of bone mineralization, no significant difference was observed at 0 or 4 weeks ($P>0.05$), but approximately 13-15% differences were occurred at 8 weeks ($P<0.05$) between control and OA groups. In terms of periodic changes of bone mineralization, both of control and OA groups were hypermineralized at 4 weeks ($P<0.05$), compared with a degree of bone mineralization at 0 weeks. At 8 weeks, control group was not significantly changed ($P>0.05$) compared with a degree of bone mineralization at 4 weeks, but OA group was hypomineralized ($P<0.05$). Local bone erosion, osteophytes, cartilage damage, synovitis, and pannus formation were evident in histological images at 8 weeks after administration.

Conclusion(s): These findings indicate that longitudinal track may be important for identifying alterations in bone microarchitectural characteristics. The results also indicate that longitudinal track may be important when contemplating the use of antiresorptive and anti-inflammatory agents for the treatment of OA.

P323
RELATIONSHIP BETWEEN BODY COMPOSITION AND PRIMARY OSTEOPOROSIS IN ELDERLY EGYPTIANS

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Objective(s): To detect the relationship between body composition and primary osteoporosis in elderly Egyptians.

Material & Methods: A case-control study included 50 elderly females with primary osteoporosis compared with 50 controls. Each female was subjected to clinical assessment, measuring of BMI and BMD by DXA using GE Lunar DPX machine. Body composition was assessed using the bioelectrical impedance analysis.

Results: Ther were significant difference between cases and controls as regard BMI, total fat mass (TFM), fat percentage (FP) and lean percentage(LP). No significant difference were found as regard to total lean mass (TLM) or basal metabolic rate (BMR). There was a significant correlation between BMI and BMD; BMD was significantly higher among subjects with BMI≥3.0

Conclusion(s): Significant difference between the cases and controls as regard to weight and BMI, being higher in the control group. TFM and FP were significantly lower in patients with primary osteoporosis.

P324
EFFECTS OF IBANDRONATE FOR THE MANAGEMENT OF POSTMENOPAUSAL OSTEOPOROSIS

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Objective(s): Osteoporosis is a metabolic bone disease caused by reduction of the BMD that increases fracture risk. The primary goals of osteoporosis therapy include prevention of fractures and improvement of quality of life. Bisphosphonates are recommended as first line of therapy. The efficacy of oral preparations may be limited, due to low bioavailability, adverse effects and low compliance of patients. Hence, the parenteral administration of bisphosphonates is a valuable alternative. The aim of this study was to assess the effect of ibandronate applied intravenously and orally.

Material & Methods: We examine 58 women who received ibandronate tablets monthly and 32 women who received ibandronate i.v. every 3 months, with calcium and vitamin D supplementation. In all subjects DXA (Hologic Explorer) was performed for diagnosis of osteoporosis at start after one year of treatment.

Results: In women who received monthly ibandronate, BMD at lumbar spine before treatment was 0.7±0.02 g/cm^2, T-score -3.21±0.14 SD. Hip BMD was 0.6±0.02 g/cm^2, T-score -2.61±0.18 SD. After a one year of treatment a significance increase DXA parameters (BMD, T-score) at the L1-L4 BMD 0.75±0.02 g/cm^2 ($r=0.997$, $p<0.001$), T-score -2.85±0.15 SD ($r=0999$, $p<0.001$) and hip BMD 0.62±0.02 g/cm^2 ($r=0.999$ $p<0.001$), T-score -2.41±0.18 SD ($r=0.998$,$p<0.001$) were noticed. In women who received i.v. ibandronate before treatment DXA parameter on lumbar

spine was BMD 0.69±0.02 g/cm^2, T-score -3.24±0.2 SD, while hip BMD was 0.62±0.03 g/cm^2, T-score -2.74±0.22 SD. After one year of treatment a significance increase in DXA parameters at the L1-L4: BMD was 0.73±0.02 g/cm^2 (r=0.999, p<0.001), T-score -3.02±0.23 SD (r=0.999, p<0.001). Hip BMD 0.64± 0.02 g/cm^2, (r=0.999 p<0.001), T-score -2.35±0.19 SD (r=0.999, p<0.001).

Conclusion(s): Both oral and parenteral application of ibandronate are equally effective in treatment of osteoporosis.

P325
CHARACTERISTICS AND TREATMENT INITIATION AMONG WOMEN DIAGNOSED WITH OSTEOPOROSIS IN A UNITED STATES MANAGED CARE POPULATION

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Objective(s): To describe characteristics and treatment initiation among women diagnosed with osteoporosis in a managed care population.

Material & Methods: A retrospective cohort study using the U.S. commercial managed care claims database records from January 1, 2001 - December 31, 2010 (study period) was conducted. Inclusion criteria were women, 50 years or older, with a diagnosis of osteoporosis based on ICD-9 CM codes during the study period and enrolled for at least one year before and after the index diagnosis date. Index date was defined as the first date of osteoporosis diagnosis in the study period. Women who had a claim for Paget's disease, or a prescription for an osteoporosis medication 12 months prior to index date were excluded in the analysis. Osteoporosis medications were identified based on NDC codes and included alendronate, etidronate, ibandronate, risedronate, estrogens, calcitonin, raloxifene, zoledronic acid, and teriparatide. Number and percent of individuals receiving pharmacological treatment were determined in this population.

Results: Among 123,074 patients meeting study criteria with a mean age of 62 years (sd: 9.75) and a Charlson comorbidity score of 0.57 (sd: 0.98), a majority, 67% of the patients did not receive any pharmacological treatments within the 1 year of their diagnosis. 26% of subjects initiated treatment with bisphosphonates and 6.5% initiated a form of treatment other than bisphosphonates. Approximately 5.7% of the patients had a history of fractures and about 29.8% women had a history if gastrointestinal problems during the baseline.

Conclusion(s): This analysis showed that a significantly large proportion of women with osteoporosis did not receive any pharmacological treatment after being diagnosed with osteoporosis which warrants a need for further understanding of the reasons for non-treatment despite diagnosis.

P326
CHARACTERISTICS AND TREATMENT INITIATION AMONG WOMEN DIAGNOSED WITH OSTEOPOROSIS IN FRANCE

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Objective(s): To describe characteristics and treatment initiation among women diagnosed with osteoporosis in France.

Material & Methods: A retrospective cohort study using the Mediplus electronic medical records database in France from January 1, 2001 - December 31, 2010 (study period) was conducted. The study included women, 50 years or older, with a diagnosis of osteoporosis based on ICD-9 CM codes during the study period and were enrolled for at least one year before and after the index date. Index date was defined as the first date of osteoporosis diagnosis during study period. Women who had a claim for Paget's disease, or a prescription for an osteoporosis medication 12 months prior to index date were excluded from the analysis. Osteoporosis medications were identified based on NDC codes. Number and percent of individuals receiving pharmacological treatment were determined in this population.

Results: Among 15,264 women meeting study criteria with a mean age of 68 years (SD: 9.91) and a mean Charlson comorbidity score of 0.24 (SD: 0.50), almost half, 46.2% the women did not initiate any pharmacological treatments for osteoporosis within 1 year of their diagnosis. 36% of women initiated treatment with bisphosphonates and 17.9% initiated a form of treatment other than bisphosphonates. Approximately 8.6% of the sample had a history of fracture and about 2201 (14.42%) women had a diagnosis for gastroinstestinal problem during the baseline

Conclusion(s): This analysis showed that nearly half of the women with osteoporosis did not initiate any pharmacological therapy for osteoporosis after being diagnosed with osteoporosis which warrants a need for further understanding of the reasons for nontreatment despite osteoporosis diagnosis.

P327
ASSOCIATION OF GASTROINTESTINAL PROBLEMS AND INITIATION OF OSTEOPOROSIS TREATMENT: ANALYSIS OF ADMINISTRATIVE CLAIMS OF A US MANAGED CARE POPULATION

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Objective(s): To examine the association of gastrointestinal (GI) problems with osteoporosis treatment initiation patterns among women after having a diagnosis of osteoporosis.
Material & Methods: A retrospective cohort study using a US managed care database from January 1, 2001 - December 31, 2010 was conducted. The index date was defined as the date of first diagnosis of osteoporosis between January 1, 2002 -December 31, 2009 (study period). Study included women, 50 years or older, with a diagnosis of osteoporosis based on ICD-9 codes and enrolled for at least one year before (baseline) and one year after the index diagnosis date (follow-up). Subjects were excluded if they had a diagnosis of Paget's disease, or a prescription for an osteoporosis medication at baseline. GI problems were assessed as having a GI symptom related ICD-9 diagnosis after osteoporosis diagnosis and before treatment initiation in the follow-up. The association of a GI problem on osteoporosis treatment initiation was analyzed using multivariate logistic regression model controlling for age, comorbidities, fracture history, steroid use and NSAID history at baseline.
Results: 123,074 patients met the criteria with a mean age of 62 years and a Charlson comorbidity score of 0.57. Almost 24% of the patients had a GI problem. Among patients with a GI problem post diagnosis and before treatment, only 10.5% of patients subsequently received bisphosphonates, 4.3% received non-bisphosphonates and a majority, 85.1% did not receive any pharmacological osteoporosis treatment. Among patients with GI problems at baseline, those who continued to have GI problems in the period after diagnosis were less likely to be initiated with a bisphosphonate vs. being on no treatment (OR: 0.22, CI: 0.21-0.24) and were more likely to be initiated with a non-bisphosphonate as compared to a bisphosphonate (OR: 1.6, CI: 1.45-1.76). Similar association was seen among subjects with no GI history at baseline and those who developed GI problems post diagnosis.
Conclusion(s): Almost 24% women experienced GI problems. Occurrence of a GI problem after osteoporosis diagnosis may be associated with the likelihood of not being treated and increased likelihood of being treated with a non-bisphosphonate as compared to bisphosphonates.

P328
RATE OF OSTEOPOROTIC FRACTURE OVER TIME AMONG WOMEN WITH AT LEAST ONE YEAR OF ADHERENCE TO OSTEOPOROSIS THERAPY

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Objective(s): To examine the incidence of osteoporosis-related fracture over 2 years of treatment among patients who were adherent to osteoporosis therapy for at least 1 year.
Material & Methods: A retrospective observational study using a US managed care database was conducted. Women 50 years or older who initiated treatment with oral bisphosphonates from 2001-2010 and were enrolled in the database for 3 consecutive years, including a baseline year before the index prescription, an adherence year (year 1), and a follow-up year (year 2). Patients were excluded if they had Paget's disease or a diagnosis of malignant neoplasm. Adherence to therapy was defined as medication possession ratio greater than equal to 60% during year 1 (MPR= total number of days' supply/365 days). Rate of osteoporotic fracture was computed as number of osteoporotic fractures per 1000 patient years among women compliant to osteoporosis treatment for at least one year.
Results: Of 62,446 women who met eligibility criteria, 35,737 (57%) were adherent to osteoporosis therapy during year 1 (mean [SD] age, 60.7 [8.4] years). During year 2, 24,342 (68%) remained adherent to therapy. Osteoporotic fractures were recorded during the baseline year (before initiating therapy) for 1507 (4.2%) patients; during year 1 (adherence year) for 1397 (3.9%) patients; and during year 2 for 1173 (3.3%) patients. In year 2, the fracture rate was 52/1000 patient-years. Fracture rates even after 2 years of compliance, i.e., compliance and study period were 3.2% (51/1000 person years) during study period. Hip and other nonvertebral fractures were most common, representing over two thirds of all fractures in each year. Patients with a history of fracture in the baseline period experienced a higher rate of fracture in the study period (18%) as compared to those without a history of fracture within the same period (2.2%).
Conclusion(s): Rate of osteoporotic fracture during a second year of follow-up was 3.3% despite having been previously compliant to treatment for one year. Results indicate an unmet need related to level of osteoporosis control and an opportunity for newer therapies to help address this need.

P329
INFLUENCE OF HIGH-IMPACT EXERCISE ON BONE IN OSTEOPENIC OVARIECTOMIZED RATS

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Objective(s): We investigated the effects of jump training on osteopenic bones post-ovariectomy.

Material & Methods: This research was characterized as a single-blind study. Forty 10-wk-old Wistar rats were divided into the following four groups (n=10): sham sedentary (S-S), ovariectomized sedentary (OVX-S), sham exercised (S-E), and ovariectomized exercised (OVX-E). A 12-wk exercise period was introduced in which the rats from the exercised groups (S-E and OVX-E) jumped 20 times/day, 5 days/wk, with height of 40 cm. This was followed by 2-mo after surgery. At the end of the exercise period, bone formation marker (serum osteocalcin), FSH dosage, DXA, bone histomorphometry and biomechanical tests were statistically analyzed (p-value<0.05).

Results: OVX groups showed higher values of FSH ($p<0.001$) and body mass ($p<0.05$). The jump training significantly increased the BMD of tibia, femur and L5 vertebra ($p<0.05$). Ultimate load ($p<0.05$) of tibia, femur and L5 vertebra in the exercised groups were greater than in the sedentary groups. Osteocalcin dosage also showed higher values in the trained groups. ($p<0.001$). BV/TV, Tb.Th, Tb.N, OV.BV, OS.BS, Ob.S/BS, O.Th, N.Ob/B.Pm parameters ($p<0.05$) also showed higher values in the trained groups. Furthermore, Tb.Sp, N.Oc/B.Pm, ES/BS, Oc.S/BS parameters were lower in these exercised groups.

Conclusion(s): These findings suggest that jump exercise increased bone strength. It also increased bone formation and decreased bone resorption, which were detected by both morphological and biochemical analyses, even under ovarian hormonal deficiency.

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LIMITATIONS OF AREA UNDER THE ROC CURVE

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Objective(s): Comparison of disease discriminants or event predictors is an important aspect of assessing clinical utility. The area under the receiver-operating-characteristic curve (AUC) is the probability that the prediction variable for a randomly chosen case will be a higher value than for a randomly chosen individual without the disease. AUC is often used to characterise the goodness of a predictor, but has a number of limitations that should be acknowledged. The aim of this study was to describe examples of these limitations.

Material & Methods: In the simplest case, when the dependent 0-1-variable is obtained instantly (without a follow-up period) a predictor could for example be better at finding the 10% with the highest (or lowest) risk of having the value 1 compared to a predictor with a higher AUC. Thus the quantity AUC does not comprise a complete description of the goodness.

Results: In the scenario when each individual has a follow-up period, death may affect the AUC so a good predictor gets a low AUC. By use of simulations we have constructed an example where the predictor has an AUC of 0.70 if death is not taken into consideration. When death is considered the AUC is 0.50, which would falsely indicate that the predictor is useless. Likewise, the AUC may be misleading in the extreme situation with AUC=0.50 that could be the case more generally when death is a competing event. The gradient of risk per 1 SD of a variable is another measure of the goodness of a predictor. The gradient is the hazard ratio when comparing individuals, who differ 1 SD with respect to the predictor. If the gradient of risk is constant over the follow-up period, then the AUC will not be constant over time but will increase with the follow-up period. For example, the AUC could increase from 0.70 to 0.85 when the follow-up period increases from 5 to 45 years.

Conclusion(s): The limitations of AUC should be considered and held in mind when used and interpreted. Often more quantities have to be calculated to give a more complete picture and sometimes AUC should be avoided.

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SERUM 25-HYDROXYVITAMIN D CONCENTRATION AND BONE MINERAL DENSITY IN LATE REPRODUCTIVE AGE WOMEN

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Objective(s): It is well known that vitamin D deficiency is a risk factor for osteoporosis and fracture development, however there are conflicting data about associations between serum 25-hydroxyvitamin D level and BMD. The objective of this study is to further investigate this potential association.

Material & Methods: The effect of serum vitamin D level on BMD was assessed in 270 healthy women of late reproductive age (37-50 years, mean 46.1±4.5). Serum 25(OH)D and PTH levels were determine by ELISA for all participants. DXA was performed to determine BMD and body composition.

Results: Our results showed that vitamin D level was between 19.4-134.0 nMol/L in total study population. Vitamin D insufficiency (lower than 75 nMol/L) and deficiency (lower than 50 nMol/L) were found in 86.8% of women regardless of the season when the examination were performed. Vitamin D level was negatively associated with fat

mass quantity (r=-0.35, p=0.06). The DXA results showed that every 5th woman had a decreased BMD.

Study population based on DXA results

Parameters	Normal BMD (n=132)	Decreased BMD (n=34)	p
Age, years	46.1±0.5	45.7±0.7	
Weight, kg	79.7±1.7	74.3±2.1	<0.05
BMI, kg/m^2	29.5±0.5	26.5±0.5	<0.05
25(OH)D, nMol/L	52.3±2.5	48.8±4.7	
PTH, pg/mL	43.8±2.6	46.3±7.6	
BMC L1-L4, g/cm^2	1.285±0.012	1.176±0.008	<0.05
BMC Neck, g/cm^2	1.054±0.009	0.896±0.007	<0.05
BMC Total, g/cm^2	1.136±0.009	0.936±0.014	<0.05

BMD was higher in overweight and obese women than in women with normal BMI (r=0.25, p=0.001). Correlation analysis revealed a significant direct relationship between serum vitamin D level and BMD (r=0.48, p=0.04) as well as between serum PTH level and BMD (r=-0.52, p=0.01) but only in women up to 40 years old, while in study subjects over 40 years old, this relationship could not be seen.

Conclusion(s): In conclusion our results showed that vitamin D insufficiency is highly prevalent in healthy women population and could be a potential risk factor for decreased BMD but only in young women. Additional studies are required for further assessment of vitamin D role in bone remodeling.

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THE RISK OF A SUBSEQUENT FRACTURE: THE EFFECT OF TIME SINCE AN INITIAL FRACTURE - THE TROMSØ STUDY

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Objective(s): To examine the risk of subsequent non-vertebral fracture at specific time intervals after different types of initial fracture.

Material & Methods: This study included data from the Tromsø Study in Norway. During 15 years follow-up from 1994-2009, all fractures were ascertained by computerized search in the radiological archives. The analyses included 2690 women and 1631 men (aged 25+ years) with at least one fracture during follow-up. Initial fractures were classified into hip, major (proximal humerus, pelvis, distal femur and proximal tibia), and minor (all other types except skull and vertebrae). Rate ratios (RR) with 95% CIs of subsequent fractures were calculated for intervals of 0-1, 1-2, 2-5, 5-10, and >10 years after an initial fracture.

Results: In total, 612 women and 230 men suffered subsequent fractures. Within 5 years after initial fracture, 76% of the subsequent fractures occurred after hip, 76% after major, and 65% after minor fracture in women. In men, this was 88% after hip, 73% after major, and 67% after minor fracture. In women, the RRs of subsequent fracture over the entire follow-up period were 5.1 (4.3-6.0) after hip, 3.8 (3.2-4.5) after major, and 2.4 (2.1-2.6) after minor fracture. In men, RRs were 5.4 (3.9-7.3), 4.1 (2.8-5.7), and 1.9 (1.6-2.2), respectively. In women, the RR at different time intervals [Table] was highest at short term after hip and major fractures and remained significantly higher until 10 years after initial fracture. In men, the RR remained significantly higher until 5 years after hip fracture and 10 years after major fracture. In both sexes, the RRs after minor fracture remained significantly increased throughout follow-up, particularly in women.

Rate ratios of subsequent fracture compared with initial fracture at different time intervals after specific initial fracture locations in women and men. The Tromsø Study.

Years after initial fracture	Initial hip fracture	Initial major fracture	Initial minor fracture
Women			
0-1	6.0 (4.3-8.1)	4.8 (3.3-6.8)	2.3 (1.8-2.9)
1-2	5.0 (3.3-7.3)	4.3 (2.8-6.4)	2.5 (1.9-3.1)
2-5	4.6 (3.3-6.2)	3.5 (2.5-4.8)	2.4 (2.0-2.9)
5-10	5.4 (3.7-7.5)	3.4 (2.2-5.0)	2.3 (1.9-2.8)
>10	3.0 (0.6-8.7)	1.6 (0.3-4.7)	2.1 (1.4-3.1)
Men			
0-1	7.7 (4.3-12.5)	6.2 (3.0-11.4)	2.7 (1.9-3.8)
1-2	8.2 (4.2-14.3)	5.5 (2.2-11.3)	1.9 (1.2-2.8)
2-5	3.7 (1.7-7.0)	2.5 (1.0-5.3)	1.9 (1.5-2.5)
5-10	2.6 (0.7-6.8)	3.8 (1.6-7.5)	1.4 (1.0-2.0)
>10	3.8 (0.1-21.1)	2.6 (0.1-14.7)	1.8 (1.1-3.0)

Conclusion(s): Subsequent fracture risk varies on time and is highest immediately after the initial fracture. The influence of time should be taken into account in the prediction of future fracture risk.

P333
RENAL EFFECTS OF TREATMENT WITH ZOLEDRONIC ACID: RESULTS FROM THE HORIZON-PFT EXTENSION STUDY

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Objective(s): To assess the impact on renal safety in the HORIZON-PFT study of long-term treatment of postmenopausal osteoporosis with once-yearly zoledronic acid.

Material & Methods: In the core HORIZON-Pivotal Fracture Trial (PFT), 7736 women with postmenopausal osteoporosis were randomized to receive zoledronic acid 5 mg (ZOL) once yearly (IV administration over 15 minutes) or placebo for 3 years (Z3 and P3, respectively). In the 3-year extension, 1233 postmenopausal women who received a once-yearly infusion of zoledronic acid for 3 years in the core study were randomized to 3 additional years of ZOL (Z6, n=616) or placebo (Z3P3, n=617). The results pertaining to the efficacy endpoints in the extension have been published elsewhere[1] this presentation will focus on the results with respect to renal function.

Results: In the core study, no long-term differences in renal function were observed between the Z3 and the P3 groups. Mean changes from baseline in serum creatinine and estimated creatinine clearance were almost identical in the two treatment groups over the 3 years of the study[2]. In the extension, there was a significantly larger number of patients with increases in serum creatinine >0.5 mg/dL from baseline in Z6 (n=18) vs. Z3P3 (n=4; p=0.002). The majority of these increases occurred between infusion and the 9-to-11-day post-infusion follow-up visit; all were transient and resolved with no overall impact on renal function[1]. The mean changes from baseline in calculated creatinine clearance were similar in the Z6 and Z3P3 groups.

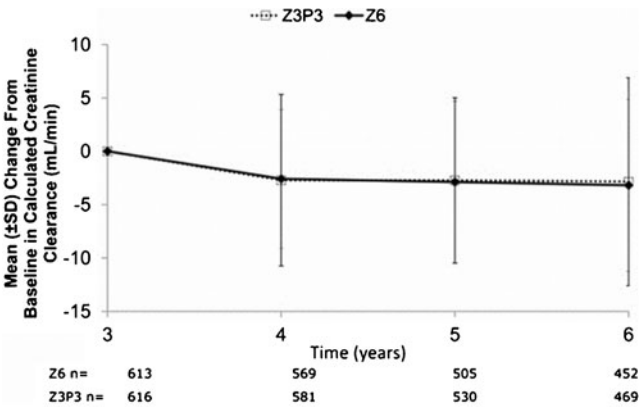

Figure 1: Mean changes in calculated creatinine clearance from extension baseline for Z6 vs. Z3P3 were comparable (safety population).

Conclusion(s): In the HORIZON-PFT study, treatment with ZOL had no long-term impact on renal function.

References: 1. Black et al. *J Bone Miner Res.* 2011;27:243. 2. Boonen et al. *Kidney Int.* 2008;74:641.

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PREVALENCE OF VTIMAMIN D INSUFFICIENCY IN A POPULATION WITH A HISTORY OF OSTEOPOROTIC FRACTURE IN PRIMARY CARE, IN CATALONIA (SPAIN)

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Objective(s): Vitamin D insufficiency is a hidden pandemia in the 21st century. The Spanish population, even when exposed to high levels of UV radiation, is not safe from it. Our aim was to evaluate the prevalence of vitamin D insufficiency in a cohort of noninstitutionalized patients with a prevalent osteoporotic fracture in primary care.

Material & Methods:

- Study design: Nested cross-sectional study within a multicenter cohort, carried out in 12 primary care practices located in urban areas around the region of Catalonia (the VERFOECAP cohort study).
- Participants: the VERFOECAP study includes a random sample of 194 patients with at least one prevalent osteoporotic fracture. Among these, serum levels of 24-hydroxy-D was measured in 166 subjects using the standard methods as used in primary care laboratories. These were categorized into: optimal (≥30 ng/mL), insufficient (<30 but ≥20 ng/mL), deficient (<20 but ≥10) and severely deficient (<10).
- Sample size: Accepting an alpha risk of 0.93, in a bilateral contrast and assuming a prevalence of 70% (based on previous publications), a random sample of 81 subjects would ensure a precision of 10% in our estimation. Our N doubles this number.
- Statistics: we used the binomial test to estimate point prevalence and 95% CI of vitamin D insufficiency.

Results: 64 out of 166 patients (39%) had optimal levels of vitamin D. Prevalence of vitamin D insufficiency was 61.4% [95%CI 53.6-68.9%]. Among these, 41 (24.7%) were insufficient, 47 (28.3%) were deficient, and 14 (8.4%) were severely deficient. 51 patients had a history of two fractures, 13 had had 3 and 4 at least 4 fractures.

Vitamin D levels were not associated with number of fractures.

Conclusion(s): Vitamin D insufficiency is highly prevalent in primary care patients with a history of osteoporotic fracture: more than 60% had suboptimal levels, and almost 30% were deficient. Preventive strategies should be studied to identify patients with vitamin D deficiency and supplement them accordingly in our region.

Disclosures: VERFOECAP Research Group

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CLINICAL AND BIOCHEMICAL VARIABLES DETERMINING BMD IN PRIMARY HYPERPARATHYROIDISM

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Objective(s): Primary hyperparathyroidism (PHPT) is a known cause of secondary osteoporosis. Decreased BMD is often present at the time of diagnosis especially at the hip and forearm. The purpose of this retrospective study was to analyze the association between different clinical and biochemical variables and BMD in a large series of PHPT patients.

Material & Methods: We identified all 1391 consecutive patients undergoing parathyroid surgery at Aarhus University Hospital, Denmark in a 15 year period from 01.01.96–31.12.2009. We excluded patients operated for hyperparathyroidism secondary to renal disease and parathyroid implantation after thyroid surgery. With the unique Danish personal identification number we retrieved preoperative biochemical data including plasma levels of PTH, ionized calcium (Ca^{2+}), creatinine and 25-hydroxyvitamin D (25OHD), height, weight and preoperative DXA measurements of the spine, hip and forearm. A complete set of biochemical data were available on 785 patients.

Results: Median age was 62 years (range 13-91) and 638 (81%) patients were women. PTH (mean±SD) was 17.4± 24.3 pmol/l and 25OHD was 56±30 nmol/l. Women had slightly lower Ca^{2+} (1.50±0.09 mmol/l) than men (1.53± 0.12 mmol/l, $P<0.001$) and also lower plasma creatinine compared with men ($P<0.001$). Insufficient plasma 25OHD levels (<50 nmol/l) were found in 365 (46%) patients.

Associations with BMD were calculated in a multiple regression model. As expected BMD of the spine, hip and forearm were negatively associated with age ($P<0.001$). PTH was inversely associated with BMD of the forearm ($P<0.001$), total hip ($P=0.001$) and spine BMD ($P=0.025$). BMD of the spine, hip and forearm were not associated with 25OHD levels (NS), however, 25OHD was negatively associated with PTH ($P<0.001$).

Conclusion(s): In PHPT patients, DXA of the forearm is recommended due to the negative association between PTH and BMD of the forearm and the higher prevalence of subnormal values. Plasma levels of 25OHD are inversely related to PTH. However, levels of 25OHD did not correlate to BMD of the spine, hip or forearm.

P336
THE IMPACT OF THE KNEE JOINT MECHANICAL AXIS ANGLE ON THE FOOT

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Objective(s): Pedobarography is a method of measurement used in diagnosis and treatment follow-up of foot disease. In this study, we aimed to investigate the impact of the knee joint mechanical axis angle on the foot. For foot assessment, we made static and dynamic pedobarographic measurements.

Material & Methods: Fifty patients who referred to physical medicine and rehabilitation clinic and diagnosed as osteoarthritis in both knees were included in the study. The femoral and tibial mechanical axis was drawn in full-length lower extremity radiographs and the angle between them was measured. Both total foot peak pressure, maximum force, contact area and contact time parameters were calculated from the average with static and dynamic pedobarographic measurements.

Results: All of our patients were females and the mean age was 58. The distribution of radiologic staging, 30% stage 2 and stage 3 was 56%. The mean angel was calculated as 177.2 on the right and 117.5 on the left. According to MA 76% in the right knee and 84% in the left knee varus deformity was detected. A low positive correlation was found between the right knee mechanical axis angle and right foot contact area of dynamic assessment ($r=0.320$, $p<0.02$). But this correlation could not be explained with the available data. A low positive correlation was found between the age of patients and both left and right foot contact time of the dynamic pedobarographic parameters ($r=0.342$, $p<0.015$; $r=0.300$, $p>0.03$). Moderate positive correlation was found between patients BMI with the right and left foot dynamic and right foot static maximum forces ($r=0.639$, $p<0.001$, $r=0.600$, $p<0.001$, $r=0.598$, $p<0.001$). Allow negative correlation was found between mechanical axis angle of right and left knees and stage of osteoarthritis ($r=-0.310$, $p<0.02$, $r=-0.344$, $p<0.01$)

Conclusion(s): As a result, age and BMI were found as effective factors for pedobarographic measurements.

P337
IS ANXIETY ASSOCIATED WITH FRACTURE RISK AND ADHERENCE TO TREATMENT? FINDINGS FROM THE MRC SCOOP TRIAL

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Objective(s): We examined the relationships between anxiety, fracture risk and adherence to treatment in the MRC Scoop Trial.

Material & Methods: The MRC SCOOP Trial is a multicentre, unblinded, pragmatic, RCT of a screening strategy using the FRAX risk assessment instrument, in a sample of 12,486 women aged 70-86 years, recruited from 7 centres within England. In those randomised to screening, a 10-year fracture risk was computed from baseline information followed by BMD by DXA in selected participants at higher risk. This strategy yielded three groups within the screening arm: low risk without DXA (LR), low risk after DXA (LRD) and high risk after DXA (HRD). Anxiety [State-trait Anxiety Inventory (STAI), range 20 (low anxiety) to 80 (high anxiety)] was assessed by postal questionnaire at baseline (before randomisation) and at 6 and 12 months post randomisation; adherence was assessed by asking whether participants had stopped taking osteoporosis medication if they had been prescribed it.

Results: The LR group contained 3170 participants (52.9% of the treatment group); the LRD and HRD groups contained 1926 (32.1%) and 898 (15%) participants, respectively. The median anxiety score assessed at all three time points was lower in those participants categorised as low risk without DXA than in those categorised as low risk after DXA or high risk after DXA. [median(IQR) STAI score at baseline: LR:30(20-40); LRD:33.3(23.3-43.3); HRD:33.3 (23.3-43.3), $p<0.001$]. Amongst all participants who had been prescribed osteoporosis medication, STAI score assessed at baseline was lower in participants who were adherent rather than non-adherent to osteoporosis medication at 12 months (baseline median(IQR) STAI=33.3(23.3-43.3) in adherent vs. 38.3(26.7-43.3) in nonadherent participants, $p=0.08$), with similar findings for STAI assessed at 6 months ($p=0.058$).

Conclusion(s): Anxiety score at all times was lowest in lowest fracture risk group. Baseline and 6 month anxiety score was greater in non-adherent than adherent patients at 12 months follow up. This suggests that greater levels of anxiety may be associated with higher fracture risk and poorer adherence to treatment, and that psychological factors might be profitably addressed in the assessment and treatment of osteoporosis.

P338
ASSOCIATION BETWEEN THE MEDITERRANEAN DIET ADHERENCE AND THE RISK OF HIP FRACTURE IN ELDERLY PEOPLE

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Objective(s): Hip fractures are relatively common in elderly people and lead to severe consequences, such as persistent pain and limited mobility. Nutrition may play a role in preventing hip fractures and the promotion of healthy diets could contribute to decreasing fracture risk in older persons. Besides, the so-called Mediterranean Diet (MeDi) has already been associated with lower risks of death, cardiovascular diseases, cancer and dementia. The objective was to investigate the association between adherence to a MeDi and the risk of occurrence of hip fractures in elderly community dwellers.

Material & Methods: The sample consisted of 1482 participants from Bordeaux, France (932 women, 550 men) aged 67 years and over included in the 3 C study, a prospective cohort study of vascular risk factors of dementia. The participants had a dietary survey in 2001-2002 and were followed-up every two years for 8 years. Occurrence of hip fracture was self-reported at each wave. Adherence to the MeDi (scored as 0-9) was computed from a food frequency questionnaire and 24-h recall. The MeDi score was divided into three classes corresponding to low (score 0-3), moderate (4-5) and high adherence (6-9) and used as explanatory variable in a Cox regression model adjusted for age, gender, education, marital status, BMI, total energy intake, supplementation with calcium and/or vitamin D, self-reported osteoporosis, osteoporosis treatment and falling.

Results: After 8 years of follow-up, 57 incident hip fractures were recorded. The MeDi score was not associated with occurrence of hip fractures ($p=0.50$), either for moderate (HR=1.34, $p=0.41$) or high adherence (HR=1.57, $p=0.24$) compared to the reference category (low adherence). Among MeDi components, high fruit consumption was associated with an increased risk of hip fracture (HR=1.93, $p=0.04$).

Conclusion(s): The *a priori* healthy MeDi score was not associated with a lower risk of occurrence of hip fractures. Such a pattern highly loaded in fruit and vegetables and inversely loaded in dairy products cannot be considered as a universal healthy dietary pattern when analyzing the association between food intake and various health statuses.

P339
QUANTITATIVE MORPHOMETRY ON SPINAL X-RAYS: LONG-TERM PRECISION OF A NEW WORKFLOW TOOL FOR MEASURING VERTEBRAL BODY HEIGHT IN NONFRACTURED VERTEBRAE

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Objective(s): Vertebral body height assessed by 6-point quantitative morphometry (QM) provides useful information for the diagnosis of vertebral fractures. Here we evaluated the long-term longitudinal precision of a new QM tool (SpineAnalyzer, Optasia Medical Ltd, Cheadle, UK) in a research setting for the measurement of vertebral body height in nonfractured vertebrae.
Material & Methods: Lateral lumbar and thoracic x-rays from 48 osteoporotic postmenopausal women (73.8±5.2 y, femoral neck T-score=-2.7±0.6) without prevalent or incident fractures were retrospectively evaluated at two visits 3 years apart. T4-L4 levels were analyzed. First the default automatic placement provided by SpineAnalyzer (SA) was compared with a standard manual 6-point placement used as a reference standard. Then, if necessary, automatic placements were corrected by an experienced QM reader. Standard QM was done by different operators whereas the SA analysis was done by the same operator. Anterior (HA), mid (HM) and posterior (HP) heights were calculated from the 6 points using standard algorithms. The root mean square coefficient of variation (rmsCV) between the two visits was calculated independently for the automatic SA, corrected SA and the standard QM analysis for each of the 3 heights and for each vertebral level.
Results: Long-term mean rmsCV±SD values (averaged over all vertebral levels) for standard QM were 4.4±0.8% (HA), 4.0±0.7% (HM) and 4.7±0.7% (HP) compared to 4.7±1.5% (HA), 4.1±1.3% (HM) and 4.0±1.0% (HP) for automatic SA. Manual SA corrections affected predominantly T4, L1 and L4. The corrections reduced rmsCV to 3.9±0.9% (HA), 3.4±0.7% (HM) and 3.5±1.0% (HP). rmsCV was significantly (paired T-tests) lower in automatic and corrected SA compared to standard QM for all three heights of T10 and T8, and in addition for HP of T9, T11 and T12 and for HM of T11.
Conclusion(s): Overall the longitudinal precision of SA analysis over a period of 3 years was slightly superior to QM in some but not in all thoracic vertebrae in particular for the posterior heights. Precision was comparable in the lumbar vertebrae. The results show that SpineAnalyzer works well in nonfractured vertebrae. However, the performance of the tool on fractured vertebrae has not been tested here.

P340
ART THERAPY AS A PART OF GLOBAL CARE OF OSTEOPOROSIS PATIENTS IN ZLÍN, THE CZECH REPUBLIC

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Objective(s): The aim of the research study is to prove the effectiveness of art-therapy in the treatment of the osteoporosis patients, particularly with respect to compliance and adherence.
Material & Methods: In our preparatory research study we asked whether art therapy has the potential which should be helpful for osteoporosis patients in terms of compliance and adherence.
24 women (average age 68 years) who attended the art therapeutic group from 2006-2011 were compared with a group of osteoporosis women patients who were never provided psychological care. Indicators of adherence, exercise, as well as smoking, alcohol abuse and nutritional quality were followed. As a possible indicator of bone density changes we use the degree of depression and neuroticism. We assumed that patients with osteoporosis who do not work in art therapeutic group would experience more negative emotions than the group of women who did participate in art therapy.
Results: The research found significant correlation between art therapy and better interaction and cooperation of patients in treatment with osteoporosis with medical staff.
Conclusion(s): The interest in art therapeutic methods reflects the modern human need of more natural complex therapies and harmonization, where the reason, sense, understanding and feeling, body and soul, male and female quality, ability of introspection and activities have the same role. In addition to active factors described in verbal psychotherapy, the use of art in art therapy brings a number of specific issues.

- Artistic creation requires some physical activity and develops sensomotoric integrity.
- Creative expression allows changes of style while reducing the feeling of helplessness.

- Art therapeutic work in most cases induces positive emotions, helps to overcome apathy and forms more active life approach.
- Art therapy is based on a mobilization of human creative potential and corresponds with the basic need of self-actualization.
- Art therapy helps to verbalize difficulties on the basis of artistic expression and so it is easier to get aware and to better deal with them in an internal dialogue just as in a cooperation with physicians.

P341
EFFICACY AND SAFETY OF COLLAGEN INJECTION GUNA MDS IN OSTEOARTHROSIS TREATMENT OF KNEE

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Objective(s): Collagen injection GUNA MDs will replace, strengthen and protect cartilage, tendons, ligaments, joint capsule and all anatomical structures containing collagen fibers. This leads to the relieving of localized pain or pain in movement. To evaluate change in degree of pain at rest and movement in Gonarthrosis before and after treatment with GUNA MD-KNEE+GUNA MD-MUSCLE
To evaluate change in Lequesne Index before and after treatment To evaluate efficacy of the GUNA MDs in Gonarthrosis by patient and by physician.
Material & Methods: 36 patients were monitored:

- Male – 13
- Women – 23
- Age 55-70 years
- Case history, rheumatologic examination and proving of gonarthrosis, X-ray stage 2 or 3, without swelling
- exclusion of inflammatory joint, systemic diseases, gout, malignancy
- intra-articular injection in knee for gonarthrosis with GUNA MD-KNEE (10 amp)+GUNA MD-MUSCLE (10 amp)

Complete a questionnaire by the patient and assessment by physician:

- before treatment
- on week 8th (at the end of treatment)
- on day 90th (30 days after treatment)

Results: More than 3 times decreasing of the average score of pain at rest at the end of treatment as good effect was kept 30 days after withdrawal of therapy (p=0.000). Approximately 2-fold decreased the average score for pain in movement compared to the initial, as the reduction continues within the month after stopping treatment (p=0.000). The average score for night pain decreased more than 2.5 times on the third visit, compared with the initial (p=0.001). The average score for pain on standing decreased 3.5 times on the third visit, compared with the initial (p=0.000). The average score for pain in walking decreased more than 1.5 times on the third visit, compared with the initial. The average score for the maximum walking distance decreased 1.5 times on the third visit, compared with the initial. The average score for completion of other activities decreased 1.4 times on the third visit, compared to the initial.
Conclusion(s): With application of collagen injection GUNA MDS in gonarthrosis treatment the assessment of treatment efficacy on day 60th and 90th by patient and by physician are identical as with the highest percentage are these having the highest assessment “very good”.

P342
MICRO- AND MACROARCHITECTURAL CHANGES AT THE TIBIA AFTER BOTULINUM TOXIN INJECTION IN THE GROWING RAT

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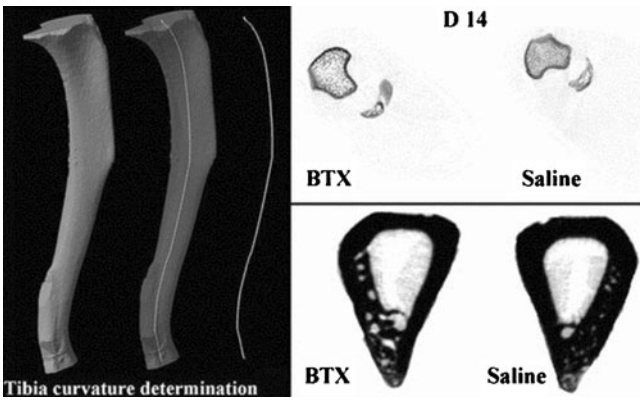
Objective(s): To analyze bone micro- and macroarchitecture of tibia in a disuse model in growing rats.
Material & Methods: 8-week-old Copenhagen rats were injected intramuscularly with 1.5 units BTX in the quadriceps muscle of the right hind limb. Saline injection was done at the left hind limb to serve as control. Five rats were killed at day 1 and represented the baseline group (D1), 5 rats were killed at day 14 (D14), 5 at day 21 (D21), 5 at day 28 (D28) and 5 at day 35 (35). For each group, muscle surface, parameters of bone microarchitecture and macroarchitecture (including length, width and curvature of the tibia) were measured using microtomography.
Results: Paralysis occurred as soon as day 2. At the left hind limb, muscle surface area, cortical thickness, cross sectional total area and growth in length significantly increased during the time study. At the right hind limb, muscle surface area, bone trabecular volume, and cortical thickness decreased as soon as day 14 associated with an increased cortical porosity. Growth in length did not differ from left side; cross sectional total area did not increase and the diaphyseal cross section acquired a more rounded shape.

There was no modification of the curvature between right and left hind limbs during the time study.



Conclusion(s): In this murine model of unilateral muscle paralysis in growing animals, we showed a rapid muscle loss leading to a decreased growth in width; however growth in length and curvature were unaltered.

P343
BONE MINERAL DENSITY AND LEVEL OF VITAMIN D IN POSTMENOPAUSAL WOMEN WITH AND WITHOUT HISTORY OF FRAGILITY FRACTURES

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Objective(s): The aim of our study was to evaluate the prevalence of low BMD and vitamin D deficiency in postmenopausal women with and without fragility fractures in anamnesis.

Material & Methods: 240 postmenopausal women at age 49-80 years (mean age 61.7±8.8 years) living in two different regions of Belarus (Minsk and Brest) were examined. BMD of lumbar spine and hips was examined by DXA (Lunar Prodigy, GE), serum levels of 25-hydroxyvitamin D were determined using the chemiluminescent assay (Roche Diagnostica) during the period of August-September 2011. The history of fragility fracture was revealed by questioning.

Results: 29.5% of examined women had fragility fractures at the age of 50 years and older. Among them 23% experienced 1 osteoporotic fracture, 5% had 2 fractures, and 2.5% had 3 and more osteoporotic fractures. Mean level of vitamin D consisted 15.90±5.68 ng/ml. 95% of women were characterized by low (<20 ng/ml) serum 25-hydroxyvitamin D and only 5% had normal meanings of 25-hydroxyvitamin D. According to the results of DXA 31% of the examined had osteoporosis, 28% had osteopenia and 41% normal showings of BMD. The comparative analysis of women with and without history of fragility fracture revealed statistically significant differences in age, weigh, height, decreasing of height during life and BMD data of lumbar spine and both femoral necks, but there were no revealed changes in the content of serum 25-hydroxyvitamin D. It is important to notice that despite high prevalence of vitamin D deficiency we revealed statistically significant regional differences in the content of 25-hydroxyvitamin D in examined women: it was higher in women living in the southern region of the country (Brest) (12.87±5.3 ng/ml) than in those living in the central part (Minsk) (9.47±1.18 ng/ml).

Conclusion(s): We revealed statistically significant differences in age, anthropometric data and showings of DXA in postmenopausal women with and without fragility fractures in anamnesis. 95% of the examined women were characterized by low serum 25-hydroxyvitamin D, but there were determined regional differences between the content of serum 25-hydroxyvitamin D.

P344
HEALTH RELATED QUALITY OF LIFE IN POSTMENOPAUSAL WOMEN REFERRED FOR BONE DENSITY ASSESSMENT

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Objective(s): The effect of osteoporotic fracture on health related quality of life (HRQoL) is acknowledged, but little attention has been paid to the effect of low bone mass. This cross-sectional study aimed to assess HRQoL in postmenopausal women referred to a specialist metabolic bone clinic for BMD assessment.

Material & Methods: We sampled 240 postmenopausal women (65±3 y) who had completed the SF36v2 before a BMD assessment. The SF36v2 comprises 36 questions, relating to 8 domains of health, function and well-being, which form a physical (PCS) and mental (MCS) summary score. Patients were initially divided into two groups; those who reported any postmenopausal fracture (n=86) and those with no history of postmenopausal fracture (n=154). Analyses were then conducted after stratifying these two groups according to femoral neck BMD T-score values (osteoporotic, osteopenic, and normal).

Results: Irrespective of BMD, physical function, role physical, social function domains, and the PCS scores were worse in the fracture group compared with the no fracture group ($p < 0.05$), whereas the MCS scores were similar ($p=0.460$). After controlling for age and BMI, in those patients with a fracture, PCS scores tended to be worse in the those with an osteoporotic BMD (31±16) compared with those with normal BMD

(41±12) (p=0.056). These patients also tended to have higher prevalence of vertebral and hip fractures (p=0.092). In patients without fracture, no differences in HRQoL were revealed between the groups stratified according to BMD.
Conclusion(s): In this preliminary study, patients with a history of postmenopausal fracture had worse HRQoL (in the physical domains) compared with those without fracture. More specifically, fractures in the presence of osteoporosis were associated with a worse PCS score than in those without osteoporosis, which might be explained by the higher presence of vertebral and hip fractures. Osteoporosis in the absence of fractures had less impact on HRQoL. These findings suggest that factors in addition to low BMD and fractures, such as co-morbidities and frailty, which may also impact upon HRQoL should be explored in these patients.

P345
EFFECTS OF AGE ON GENETIC INFLUENCE ON BMD AND BONE LOSS OVER 17 YEARS IN WOMEN: A LONGITUDINAL TWIN STUDY

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Objective(s): Rate of bone loss varies considerably between early postmenopausal and older women and different mechanisms may be involved in each of these periods. In this study we aimed to estimate the genetic component of bone loss (heritability) in hip and spine across different ages.
Material & Methods: Starting in 1992 and during 17 years of follow-up in TwinsUK and Healthy Ageing Twin Study (HATS), 15,491 hip and lumbar spine DXA scans were performed in 7056 twin volunteers. Out of these subjects, 2810 female twins aged >35 years with at least two DXA scans with an interval period of >4 years were included in this analysis. We utilised a mixed-effects random-coefficients regression model to predict hip and spine BMD values for the included twins in exact ages of 40, 45, 50, …, to 80 years based on the available data in the close age ranges and with further adjustment for baseline age, weight, height and years of hormone replacement therapy as fixed-effects covariates. We then estimated heritability of the changes in BMD measures between these age ranges (40 to 45, 45 to 50, …) using univariate variance component analysis.
Results: Consistent with previous studies, heritability estimates for BMD were high and ranged from 63% to 88% at the ages of 80 and 40 years, respectively. Heritability of change of BMD was lower, generally ranging from 30-50%; between 40 and 45 years of age genetic factors explained 47.0% (95% CI: 29-60%) of variance of BMD loss for total hip, 44.4% (25-57%) for femoral neck, and 68.1% (56-76%) for lumbar spine BMD loss. These estimates decreased with increasing age, and there appeared no heritability of changes after the age of 65 for total hip/femoral neck BMD and after age of 70 for lumbar BMD.
Conclusion(s): While genetic factors appear to have an important role in bone loss in early postmenopausal women, their effects weaken with age and completely disappear with advanced ageing. This is distinct from the behaviour of genetic component of bone mass in the elderly women and suggests involvement of different genetic mechanisms in the process of bone loss with ageing.

P346
SECULAR TRENDS IN INCIDENCE OF OSTEOPOROSIS-RELATED FRACTURES DIFFER DEPENDING ON FRACTURE TYPE

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Objective(s): During the recent decade the incidence of hip fracture has been reported to decrease in most parts of the world. However, if a similar decrease has occurred for other types of osteoporosis-related fractures is unknown.
Material & Methods: Through the Skane Health Care Register, a diagnosis-based register covering all in- and outpatient health care data of residents in the County of Skane, Sweden (1.2 million inhabitants), we registered typical osteoporosis-related fractures of the hip (n=26 952), os pubis (n=4 215), proximal humerus (n=12 445), wrist (n=23 068), proximal tibia (n=3 336) and ankle (n=9 459) sustained by individuals aged 50 years or older from year 1998 until 2009 (5.1 million person-years). We calculated gender-specific age-standardized incidence for each fracture type using one-year age- and sex-specific population figures from the population register, where the average population of the examined years was used as the standard population. Trends of incidence were evaluated by linear regression, and we present data as means with their 95% CI with two-tailed α-level set to 0.05.
Results: During the evaluated years, the age-standardized hip fracture incidence decreased significantly in both women (-12 per 100 000 and year [95% CI -15, -9]) and men (-3 per 100 000 [95% CI-5, -1]). In contrast, during the same period the annual incidence of proximal humeral fractures increased significantly in women (4 per 100 000 [95% CI 0, 7]) and nonsignificantly in men (1 per 100 000 [95% CI -0, 3]). Furthermore, the incidence of pubic fractures increased significantly in men (1 per 100 000 [95% CI 0, 2]) but not in women (0 per 100 000 [95% CI -2, 1]). The incidence of ankle fractures

was stable in both men and women as was the annual incidence of wrist fractures and proximal tibial fractures (data not shown).

Conclusion(s): In this study covering the recent decade, the different types of examined osteoporosis-related fractures showed different secular trends in incidence. Hence, the decrease in hip fracture incidence evident in this and other studies cannot be extrapolated to all types of osteoporosis-related fractures when estimating the future total burden of fragility fractures in society.

P347

VERTEBRAL MORPHOMETRY, ITS HETEROGENEITY AND ANTERIOR CORTICAL RADIUS OF CURVATURE PREDICT LUMBAR VERTEBRAL FRACTURE IN POSTMENOPAUSAL WOMEN: THE OFELY STUDY

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Objective(s): Vertebral morphometry is widely used to depict vertebral fracture, but its value to analyze vertebral morphology to predict vertebral fracture is poorly documented. The aim of our study was to analyze vertebral anterior cortical curvature (Ct.curv) and body height heterogeneity, in postmenopausal women before incident vertebral fracture.

Material & Methods: A case control study from the OFELY cohort was performed, including 29 postmenopausal women with incident lumbar vertebral fractures (mean age 71±9 years, mean time until fractures 9±4 years) age-matched with 57 controls without incident fracture. Body height was not significantly different between groups. Digital scans were performed on lateral X-rays of lumbar spine (T12-L4) at baseline with a spatial resolution of 0.26 mm/pixel. From these radiographs, the following parameters were measured from six digitized points: 1) the posterior, middle and anterior vertebral height, 2) the heterogeneity of heights evaluated by the coefficient of variation of these three values, 3) the anterior cortical radius of curvature. All measurements were done by two observers, intra and inter observers reproducibility were excellent with an ICC of 0.99, 0.97 and 0.61, respectively.

Results: Mean vertebral heights were significantly lower in the fracture group vs. the control one. The posterior heights did not differ between the two groups. Only the anterior and middle heights were significantly different between the two groups in L4 and L3 vertebrae. No significant differences were found in L1-L2 and T12. The mean heterogeneity of vertebral height was significantly greater in the fracture group. In addition, fractured patients presented with a significantly higher radius of curvature.

	Mean vertebral heights (mm)	Mean heterogeneity of heights (CV%)	L4 ant. height	L4 mid. Height	L4 post. Height	L4 radius of curv.	L3 ant. Height	L3 mid. Height	L3 post. Height	L3 Ct.curv
Fractures	33.43	6	35.89	33.56	34.17	88	36.21	32.71	35.89	82
Controls	34.53	5	36.75	34.68	34.93	77	37.11	34.07	36.43	58
p*	0.049	0.003	NS	0.02	NS	NS	0.02	0.03	NS	0.04

*Mann Whitney test.
No significant differences were found in L1-L2-T12.

Conclusion(s): In summary, our study confirms the association between vertebral height and occurrence of fracture in postmenopausal women. The heterogeneity of vertebral heights and a higher anterior cortical radius of curvature seem to be relevant variables associated with fracture.

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WE HAVE ALWAYS BEEN OSTEOPOROTIC: BONE MINERAL DENSITY IN A PORTUGUESE IDENTIFIED SKELETAL SAMPLE

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Objective(s): Commonly, osteoporosis has been perceived as a "modern disease". Recently, a vast array of paleopathological studies has shown that this disease was ubiquitous in past communities. The diachronic modification of etiological factors, like longevity, physical activity or diet, affected the prevalence of osteoporosis and the so-called osteoporotic fractures in the past. As such, it is important to understand the epidemiology of this disease in historical populations; with behaviors and customs that were unalike the modern westernized lifestyle. The fundamental objective of this study is to characterize the epidemiological patterns of osteoporosis in an identified Portuguese skeletal sample from the 19th century.

Material & Methods: The sample studied comprised 196 individuals with known sex and age-at-death, buried at the Cemitério da Conchada (Coimbra, Portugal). Individuals were mostly manual workers with low socioeconomic

status. BMD was evaluated in the proximal femur through DXA.

Results: BMD decreased significantly with age-at-death, both at the ROI "Total hip" (Pearson r=-0.591; p=0.000) and the ROI "Neck" (Pearson r=-0.675; p=0.000). At the "Total hip", peak bone mass (PBM) was achieved early (20-29 years age group) in both sexes (female: BMD=0.930; DP=0.11; 95% CI: 0.858-0.987 / male: BMD=1.045; DP=0.09; 95% CI: 0.992-1.097). In the study group as a whole, BMD was significantly greater in males ("Total hip": 0.882; DP=0.16; 95% CI: 0.849-0.915 / "Neck": 0.757; DP=0.16; 95% CI: 0.725-0.789) when compared to females ("Total hip": 0.780; DP=0.16; 95% CI: 0.747-0.813 / "Neck": 0.679; DP=0.16; 95% CI: 0.647-0.710). As expected, the prevalence of osteoporosis in the proximal femur is greater in women (29.6%; 95%CI 21.5-39.3{29/98} vs. 13.3%; 95%CI 7.9-21.1 {13/98}) and rises steeply with age. Comparisons with a modern Portuguese sample showed a comparable pattern of BMD reduction. Nonetheless, BMD is usually lower in the skeletal sample.

Conclusion(s): In spite of enormous lifestyle differences, the epidemiological patterns of bone mass decrease in a Portuguese skeletal sample from the 19th century are strikingly similar to the ones observed in modern populations. This study adds further data to the recent notion that osteoporosis is a disease with deep roots in the past.

Disclosures: Fundação para a Ciência e Tecnologia (Ref. SFRH/BPD/74015/2010).)

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VITAMIN D STATUS IN HEALTHY BELARUSSIAN CHILDREN

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Objective(s): To evaluate the status of vitamin D in healthy Belarusian children.

Material & Methods: 49 healthy Belarusian boys (31) and girls (18) aged 5-17 are included into the research (mean age: 11.2 [7.8:13.8] years). Blood sampling was done in the period of autumn-winter 2011/2012. All examined children haven't received any vitamin and mineral preparations containing vitamin D and artificial ultraviolet radiation and natural insolation outside of permanent place of residence during 3 months before the research. The level of 25-hydroxyvitamin D3 (ng/ml) is defined by the method of electrochemiluminescence immunoassay (analyzer – cobas e, reagents – Roche Diagnostics). Statistical data processing is carried out in the program Statistica 8, quantitative data is presented in the following format: Me [LQ:UQ].

Results: Mean content of vitamin D in blood serum of the examined children made up 13.26 [8.66:16.46] ng/ml. In 91% (45/49) of the examined the level of vitamin in blood was less than 20 ng/ml, including 16 children with the value less than 10 ng/ml and 3 children with the value less than 4 ng/ml (value below the detection limit). There is a consensus opinion that the minimal vitamin D (25-OH) level for bone health is between 20-32 ng/ml, which was registered in 9% (4/49) of the children examined by us. A more recent consensus of experts leads to the conclusion that for general health a desirable concentration of vitamin D (25-OH) is ≥30 ng/ml. The level of vitamin D exceeded this value only in one child examined by us.

Conclusion(s): According to the results of our research (which was one of the first studies of concentration of vitamin D in Belarusian children) we can state that the overwhelming majority of them (more than 90%) demonstrate in the autumn-winter period the level of vitamin D in blood that shows its insufficiency or deficiency. To study this phenomenon on the level of healthy children's population of Belarus a more large-scale epidemiological study is needed in the future.

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CORRECTION OF VITAMIN D DEFICIENCY IN PATIENTS AGED 80 YEARS AND MORE: EFFICIENCY OF ORAL SEQUENTIAL 100 000 IU VITAMIN D3 DOSES

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Objective(s): Vitamin D deficiency is very common among very old individuals (80 years and more).To date there is no validated procedure to correct vitamin D deficiency in this population. Procedure proposed by Souberbielle (1) has been shown to correct vitamin D deficiency in 80% of elderly individuals (mean age 64 years) (2). We tested this procedure on very old patients.

Material & Methods: This prospective observational study included all patients aged 80 years and more, hospitalised in geriatric acute or rehabilitation units of a teaching geriatric hospital in 2011, with a 25 OHD concentration <30 ng/ml. Patients with disease or treatment influencing bone metabolism were excluded. Patients were given cholecalciferol 100 000 IU PO every two weeks, according to the baseline 25 OHD concentration: total doses varied from 200 000 IU over 14 days to 400.000 IU over 42 days. Serum calcium,

phosphate, creatinine, albumin, 25 OHD and PTH were measured at admission (DA) and at day 7, 30 and 60 after completion of the correction procedure. All biological assays were performed by the same laboratory. Complete follow-up until D60 was dependent on duration of the correction procedure and needed a hospital stay between 74-102 days.

Results: We included 372 patients (264 women and 108 men). Mean age was 88.64±5.10 years. Mean BMI was 22.88±4.76 and mean eGFR (Cockroft) 46.15±18.85 ml/min. As follow-up ended with hospital discharge, we obtained data from 149 patients at D7, 83 at D30 and 38 at D 60.

Results of vitamin D deficiency correction procedure

	DA	D7	D30	D60
25OHD (ng/ml) (meanSD)	12.15 (7.71)	39.85 (10.80)∗	35.81 (8.53)∗	32.39 (9.28)∗
25OHD≥30 ng/ml (% of patients)	0	79.9	73.4	47.4
PTH (pg/ml) (meanSD)	52.51 (34.54)	36.35 (21.48)	37.34 (29.54)	32.42 (24.70)
PTH≥47 pg/ml (% of patients)	44	24.5	20.5	10.5

∗: $p<0.001$ vs. DA

D7 25 OHD level was not correlated to baseline 25OHD level, nor to BMI.

There was no hypercalcaemia.

Conclusion(s): Correction of vitamin D deficiency with 200 000 to 400 000 IU of cholecalciferol is effective in 80% of very old patients, well tolerated and decreases PTH secretion.

References: (1) Souberbielle JC et al Ann Endocrinol 2009;69:501. (2) Rouillon V et al Rev Rhum 2009;76:983 (abstract O.04).

P351
LONG-TERM, REAL LIFE EFFECTIVENESS OF ZOLENDRONIC ACID IN OSTEOPOROSIS

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Objective(s): Although the efficacy of zolendronic acid in bone metabolism has been demonstrated in several controlled clinical trials, data from longitudinal observational studies are scarce. Such studies are essential in order to assess the real-life effectiveness of therapeutic interventions and demonstrate true population-based benefits.

Material & Methods: This was a retrospective chart review database analysis with data obtained from four clinics on patients initiating treatment with zolendronic acid. Changes in BMD, ionized calcium (iCa), serum PTH, bone formation markers (osteocalcin, alkaline phosphatase) and the bone resorption marker type I collagen C-telopeptide were assessed using linear mixed models with repeated measures.

Results: A total of 291 patients were included with a mean (SD) age of 65.0 (10.2) years. Among these, 262 (90.0%) patients were female. At baseline, the mean (SD) T-score was -2.9 (1.0) and -2.3 (0.8) for the spine and femur, respectively, and the mean (SD) zolendronic acid dose was 4.3 (0.78) mg. After one year of treatment with zolendronic acid, patients experienced clinically and statistically significant improvements in spine (% change=2.09) and femur (% change=2.05) BMD, which were further augmented over 5 years (trend over time: $P_{spine}=0.003$, $P_{femur}<0.001$). Interestingly, significant differences in spine BMD were observed based on the type of previous osteoporosis treatment ($P=0.009$); patients having previously used only calcium and vitamin supplements experienced the maximal benefit followed by patients previously treated with osteoporosis hormone replacement therapy or selective estrogen receptor modulators, or oral bisphosphonates. Percent changes over time in iCa, PTH, and bone biochemical markers upon adjustment for baseline values were not statistically significant.

Conclusion(s): The results of this real life observational study demonstrate that long-term treatment with zolendronic acid over five years is effective in improving spine and femur BMD in patients with osteoporosis, regardless of previous osteoporosis treatment. However, patients previously primed with calcium and vitamin supplements experienced the maximal clinical benefit.

Disclosures: This study was supported by an in-kind support by JSS Medical Research Inc.

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IMPROVEMENT OF BALANCE AFTER HIP FRACTURE IN ELDERLY REGARDING MUSCULOSCELETAL COMORBIDITY

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Objective(s): It is estimated that 25-75% of elderly patients after osteoporotic hip fractures are not able to achieve pre-fracture level of functional independence, so they are in great risk for next falls and fractures. The aim of our study was to evaluate the influence of musculoskeletal comorbidity on

restoring of balance after rehabilitation program measured in patients above 65 with osteoporotic hip fracture.

Material & Methods: The prospective study included 192 patients over 65 years admitted in rehabilitation facility after the hip fracture for post-acute rehabilitation. They had individually planed rehabilitation program prescribed by rehabilitation team. Participants functional status was evaluated by the Berg Balance Scale test on 3 occasions regarding time of observation: at the admission, at discharge from the rehabilitation center and 3 months after discharge. Statistical analysis was performed by using One-way ANOVA test, post hoc Scheffe tests and students T-test.

Results: There is no significant difference between BBS values for the patients with muscular impairment regarding different degrees of severity graded by CIRS-G at the admission but significant fluctuations were noticed in the period after discharge and after 3 months of follow-up. Preformed Post-hoc Scheffe test pointed out that significant decline in BBS values for the patients with muscular impairment was noticed tree months after discharge between severity degrees 0/1 ($p<0.05$) as well between severity degrees 0/3 ($p<0.05$). Patients after hip fracture that were referred to rehabilitation facility with different degrees of muscular impairment significantly increased functional status measured by BBS particularly between admission to rehabilitation center and at discharge as well between admission and 3 months of follow-up. Study participants with lower CIRS-G severity degrees showed significant improvement even after discharge between the period from discharge and 3 months of follow-up, while those with severe degrees lacked such improvement after discharge.

Conclusion(s): Rehabilitation of elderly after hip fracture should be mandatory for functional recovery regardless the comorbidity and functional status. Influences of musculoskeletal comorbidity and its severity should be considered by physicians as important factor for restoring of balance.

P353
NUTRITIONAL CALCIUM HABITS

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Objective(s): Our patients are influenced by all medical information, and even rumours. The aim of this study is to analyse their habits and reactions concerning dairy products and calcium.

Material & Methods: 305 patients questioned: 90% of women, mean age 62 years, 97% from the île-de-France region. 33.6% took osteoporosis medication or a vitamin and calcium supplement. 66% underwent a bone densitometry test (17.4%: osteopenia, 13%: osteoporosis). 24% had a history of non-traumatic fracture and 13% had another osteoporosis risk factor. 32% practised a weight-bearing sport, 12.5% had lost more than 8 kg through diet.

Results: 80% of those questioned did not know the body's calcium or nutritional requirements, but believe they have a sufficient intake. Nutritional calcium intake is mainly via yoghurts (37%). 56.4% have a nutritional calcium intake of <900 mg/day. 25% think that soya milk has the same benefits as cow's milk, hence the replacement (50%). Those with a BMI of less than 19 have the lowest nutritional calcium intake (740 mg/day on average). 40-60-year-old patients are the most responsive to rumours and lectures on milk. They are the ones who change their nutritional habits with regard to dairy products. Before the age of 40 years, patients are less responsive to medical advice and are influenced by the cost of dairy products and advertising. Less than 10% have no dairy intake because of taste, fat content, high cholesterol concerns and intolerances. Calcium is not dangerous (63%) but can lead to disorders if taken in excess. The dairy products-calcium-osteoporosis relationship is well understood, yet the onset of a fracture does not change people's habits concerning calcium (71%). BMD results and medical advice have a strong impact (91%). 52% are ignorant of the role of vitamin D for the bones, but do relate it to calcium.

Conclusion(s): While campaigns for the consumption of dairy products have helped promote their relevance in bone health, they have not dispelled any concerns over gaining weight or worsening cholesterol levels. Calcium is widely approved <73%-89%> whatever the age to maintain bone quality (41%) and fight osteoporosis (28%). Osteoporosis and the risk of fracture are well-understood, hence the determination to fight both.

P354
RELATIONSHIP OF VITAMIN D AND PARATHYROID HORMONE WITH OBESITY IN COMMUNITY DWELLING WOMEN

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Objective(s): The aim of this study was to investigate the association of serum vitamin D and PTH levels with BMI, waist circumference and fat mass.

Material & Methods: This was a cross-sectional study on women aged 40 years and older who consecutively had visited

the National Osteoporosis Center (Vilnius, Lithuania). Measurements of weight, height and waist circumference were obtained, BMI was calculated. We divided all subjects to subgroups by BMI category (<25, 25 to <30, and ≥30 kg/m^2). Total body DXA was used to evaluate fat mass (iDXA, GE Lunar). Serum vitamin D (25(OH)D) and PTH were measured by automated immunoassay (Cobas e411, Roche Diagnostic). PTH and vitamin D values were divided into four percentile groups. The statistical analysis was performed with SPSS software for Windows (Version 18.0). All p-values less than 0.05 were considered as statistically significant.

Results: A total of 352 women aged 62.5±13.7 years were included in this study: 119 (33.8%) were lean, 121 (34.4%) were overweight and 112 (31.8%) were obese. The lowest level of vitamin D (15.6±7.9 ng/ml) was found in obese women comparing to overweight and lean women, although not statistically significantly. The statistically significant difference was found for PTH: in obese women the highest values (53.2±21.1 pg/ml) were found. We have found a weak negative correlation between vitamin D and BMI (r=-0.23, p=0.016) in obese subjects only. PTH did not correlate with BMI, waist circumference, and fat mass in all groups. The highest BMI (29.7±6.4), waist circumference (94.4±14.1 cm) and fat mass (31.5±9.8 kg) values were found in the fourth PTH percentile group, comparing to other percentile groups. There were no significant differences of BMI, waist circumference and fat mass in vitamin D percentile groups.

Conclusion(s): Our study supports the hypotheses that vitamin D deficiency and increased PTH are associated with obesity.

P355
BONE MINERAL DENSITY (BMD) AND MICROARCHITECTURE ASSESSMENT BY TRABECULAR BONE SCORE (TBS) AT THE SPINE IN PATIENTS WITH RHEUMATOID ARTHRITIS (RA) AND SYSTEMIC SCLEROSIS (SSC)

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Objective(s): RA is a frequent chronic inflammatory rheumatic disease, and a frequent cause of secondary osteoporosis, due to chronic inflammation and long-term glucocorticoid therapy (GC). In SSc, the risk of osteoporosis may be less important because of milder inflammation and fewer patients receiving GC. The aims of our study were to examine BMD and bone microarchitecture by TBS in female patients with RA and SSc, to assess their associations with GC use and prevalent fractures and to compare these parameters with a control population.

Material & Methods: Single center cross-sectional study of 138 RA, 65 SSc patients and 227 controls with mean age of 61±11, 62±11 and 61±8 years respectively, mean BMI of 24.8±4.9, 26.5±4.8, and 24.2±3.8 kg/m^2. All patients and controls were female. BMD and TBS were assessed at AP Spine (L1-L4). In RA and SSc patients, the prevalence of fractures was respectively 34.8% and 29.2% (p=0.53), mean BMD was 1.001±0.203 g/cm^2 and 1.007±0.179 g/cm^2 (p=0.76), and mean TBS was 1.247±0.136 vs. 1.207±0.145 (p=0.13). Total GC dose was higher in the RA population (35522±28599 mg vs. 8630±14044 mg, p<0.0001).

Results: TBS and BMD were significantly lower in patients with a history of fracture than in nonfractured patients and controls, in both RA and SSc (p<0.05). In the combined SSc and RA population (n=203), 22 out of 68 fractured patients had a T-score at the spine and/or hip between -1 and -2.5, and TBS was below 1.308 in 45.5% patients. In RA and SSc patients receiving more than 5 mg/day of GC, TBS and BMD were significantly lower than in controls (p<0.005). These associations remained significant after adjusting for BMI. Among SSc and RA patients receiving more than 5 mg/day GC, TBS tended to be lower in SSc patients (nonsignificant when adjusted for BMI).

Conclusion(s): Microarchitecture assessment by TBS helped to differentiate between patients with and without fractures and between patients with glucocorticoids and controls. TBS detected 45.5% of fractured patients in the osteopenia zone on BMD. TBS was lower in SSc than in RA suggesting that in SSc there may be additional risk factors for osteoporosis other than glucocorticoid therapy and systemic inflammation, such as vascular alterations and fibrosis.

P356
SCLEROSTIN NEUTRALIZING MONOCLONAL ANTIBODY DECREASES SIGNIFICANTLY THE NUMBER OF PELVIC FRACTURES AND IMPROVES MARKEDLY THE SIZE AND INTERCONNECTIVITY OF LUMBAR TRABECULAR BONE IN OIM/OIM MICE

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Objective(s): As trabecular bone strength depends on both BMD and microarchitecture, we measured the effects of sclerostin antibody (Scl-Ab) on the rate of fractures in axial

skeleton as well as on the BMD and microarchitecture of lumbar vertebral bodies in oim/oim (OI) mice.

Material & Methods: 5-7-week-old OI and wildtype (WT) mice were treated with either Scl-Ab (25 mg/kg; n=14) or vehicle control (PBS; n=19) twice a week for 10 weeks. Mammography X-ray detected fractures of the axial skeleton lumbar vertebral bodies (LVB) were scanned by pQCT to measure BMD, and by μCT (Skyscan 1172) to measure trabecular (Tb) bone volume (BV/TV), Tb thickness (Tb Th), Tb number (Tb N), structure model index (SMI; lower values=more platelike trabeculae) as well as two parameters of Tb network connectivity, Tb bone pattern factor (Tb Pf; lower values=more connections) and fractal dimension (F D; higher values=more connections). Statistical analysis included Kruskal-Wallis one-way analysis of variance (ANOVA).

Results: Scl-Ab significantly reduced the number of pelvic fractures in OI mice by 65% (mean±SD=0.4±0.5 per mouse vs. 1.1±0.8 in PBS; $p<0.02$). This decrease corresponded with significant improvements in LVB trabecular bone parameters after Scl-Ab treatment (Table 1) including: BMD (+55%), BV/TV (+111%), Tb Th (+40%), Tb N (+48%) and Tb Pf (-43%). In WT mice, Scl-Ab therapy was also associated with significant trabecular improvements in BV/TV (+160%), Tb Th (+33%), Tb N (+96%) and Tb Pf (-94%). Scl-Ab therapy significantly decreased SMI in WT mice, but not in OI mice.

Parameter	Site	OI mice Scl-Ab	OI mice PBS	WT mice Scl-Ab	WT mice PBS
Fractures /mouse	pelvis	0.4±0.5*	1.1±0.8	0	0
BMD	LVB	541±23*	350±41	789±59*	454±68
BV/TV%	LVB	20.9±2.5*	9.9±4.9	38.7±8.8*	14.9±3.6
Tb Th μm	LVB	0.07±0.003*	0.05±0.005	0.08±0.007*	0.06±0.002
Tb N / mm	LVB	3.1±0.3*	2.1±0.9	5.1±0.8*	2.6±0.6
SMI	LVB	1.6±0.12	1.8±0.26	0.5±0.5*	1.5±0.2
Tb Pf	LVB	12.6±2.2*	22.2±6.1	0.7±5.7*	12.8±3
F D	LVB	2.13±0.01*	2.08±0.05	2.22±0.03*	2.14±0.03

*$p<0.02$ vs. PBS control

Conclusion(s): By increasing bone mass and connectivity of trabecular LVB, Sc-Ab reduced the prevalence of fractures of the axial skeleton in OI mice. Therefore, Scl-Ab might be a promising therapy for human type III OI.

P357
THE IMPORTANCE AND THE DIFFERENCES OF BONE MORPHOGENETIC PROTEINS FOR OSTEOPOROTIC HIP FRACTURES

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Objective(s): Bone morphogenetic proteins (BMPs), which are the major players of tissue repair, has become one of the most exciting fields in rheumatologic and orthopedic research. Today, the most important topic is the quality of life after hip fractures. In our study we aimed to evaluate the relationship between the levels of BMPs and osteoporotic hip fractures in two different localizations in order to speculate on the prognosis of patients.

Material & Methods: The total of the study group were included 62 patients with osteoporotic hip fracture. 38 of those (Group 1; 23 female/15 male, mean age 77.52±6.74 years) had intertrochanteric fractures of hip and 24 of them (Group 2; 18 female/6 male, mean age 75.16±6.89 years) had collum femoris fractures. All fractures were due to low energy trauma, simple falls. None of the patients had neoplastic pathology of bone, long-term corticosteroid usage, bone metabolism disease or arthritis and any other metabolic disease. BMD measurements were done with Lunar DXA. The measurements were performed on the intact side of the hip. Human serum BMP-4 (pg/mL) values were determined by Cellsciences elisa kit, BMP-7 (pg/mL) measurements were done by RayBio elisa kit.

Results: Neck, trochanter, wards and total BMD values were in agreement for osteoporosis and no significant differences between the two groups for all BMD values. The mean and standard deviation values for BMP-4 and BMP-7 levels in Group 1 (114.63±80.50, 86.91±54.31, respectively) and in Group 2 (129.74±99.24, 77.77±52.80, respectively) were not different. However for both groups only BMP-7 values were statistically increased compared to healthy subjects.

Conclusion(s): BMPs have been shown to stimulate osteoblast proliferation and/or differentiation. During bone formation, they can be local stimulators. Their primary task is to shape and guide body morphology and to maintain its integrity. Wnt signal transduction pathway is another bone remodelling regulator which some of the cytokines and BMPs mediate their effects on bone formation and resorption. The increased levels of BMP-7 which is an osteogenic factor in vivo, is a bone stimulating agent and after trauma elevated levels are adaptive or protective may reduce the severity of the fracture.

P358
AREA- AND VOLUME-BASED QCT REFERENCE DATA FOR THE PROXIMAL FEMUR

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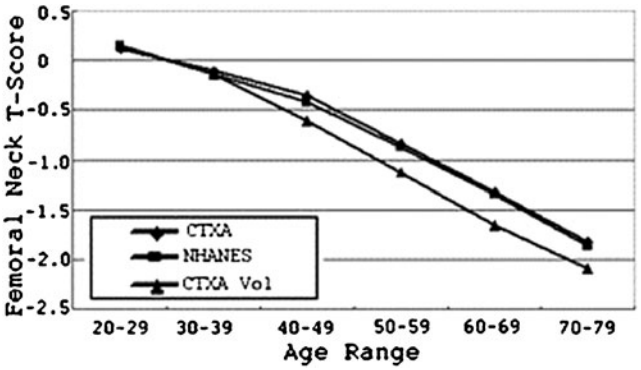
Objective(s): BMD estimates for the proximal femur using DXA are currently considered standard for diagnosing osteoporosis in patients using BMD alone. The WHO reference

standard for osteoporosis diagnosis is a T-score of -2.5 or less at the femoral neck. QCT produces DXA-equivalent "CTXA" areal BMD measurements at the proximal femur, but normal reference values are required to calculate a T-score. We have developed a normal reference BMD database for US Caucasian women for use with the QCT CTXA Hip software (Mindways Software, Inc., Austin, TX) and compared it to NHANES III DXA data.

Material & Methods: Our prospective cohort included 616 women aged 20-79 from 11 centers distributed across three U. S. regions: 3 Pacific, 4 Midwest, and 4 Northeast. CT images were analyzed with the CTXA Hip software. QCT data was analyzed in a DXA-like format using the standard femoral neck, trochanter, intertrochanter and total hip regions of interest. Both area-based and volume-based data are presented for these regions of interest. T-scores were calculated for CTXA Hip and NHANES III data sets based on age 20-39 reference.

Results: There were no statistically significant differences between measurements from different CT scanners. We found no significant variation across centers, regions or ages in BMI by ANOVA (α=0.05). The young reference means (±SD) from the pooled age 20-39 data were 0.922±0.116 g/cm^2 for Total Hip, 0.795±0.111 g/cm^2 Femoral Neck, 0.698±0.103 g/cm^2 Trochanter, and 1.096±0.137 g/cm^2 Intertrochanter. The figure shows T-scores for Femoral Neck regions calculated using CTXA Hip areal BMD, volumetric BMD data and NHANES III data.



Conclusion(s): Area-based T-scores based on the reference data presented here are virtually identical to those obtained from the published NHANES III data, indicating this method can be used with WHO DXA T-score guidelines to provide substantially the same clinical information at the femoral neck as DXA.

P359
ASSESSMENT OF ADEQUACY OF VITAMIN D SUPPLEMENTATION DURING PREGNANCY

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Objective(s): Deficiency of vitamin D in pregnancy leads to higher rates of preeclampsia, preterm birth, bacterial vaginosis, gestational diabetes and affects health of the child. According to Polish recommendations, published in 2009, vitamin D supplementation in pregnant women should be provided from 2nd trimester of pregnancy in daily dose of 800-1000 IU if skin synthesis is not effective.

The aim of the study was to (1) estimate how many pregnant women comply with those recommendations (2) to determine the 25(OH)D3 levels in pregnant women.

Material & Methods: The study included 88 pregnant women, aged 20-40, between 12-35 weeks of gestation. 25 (OH)D3 was measured by a direct electrochemiluminescence immunoassay (Elecsys, Roche).

Results: 35% of pregnant women did not use any supplementation. Mean level of 25OHD was 28.83±14.84 ng/ml (range 4-77.5 ng/dl). Severe deficiency of vitamin D [25(OH)D3 <10 ng/ml] was found in 4/88 (4.5%) of investigated women – none of these patients had taken any supplementation. Moderate deficiency [25(OH)D3 between 10-20 ng/ml] was present in 24/88 (27.3% subjects). Optimal level of 25(OH)D3 (over 30 ng/dl) was present in 33/88 (37.5% women). Hence, in 53.4% of women taking vitamin D supplements, the levels of 25(OH)D3 were still below 30 ng/dl.

Conclusion(s): Supplementation of vitamin D in investigated group was not adequate. Approximately 1/3 of pregnant women did not take any supplements, while half of the subjects who declared taking vitamin D failed to achieve optimal serum 25(OH)D3 concentration.

P360
TRABECULAR AND CORTICAL MICROARCHITECTURE IN POSTMENOPAUSAL HIV-INFECTED WOMEN

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Objective(s): To assess the effects of HIV infection and antiretroviral therapy (ART) on trabecular and cortical microarchitecture in postmenopausal minority women.

Material & Methods: A subgroup of 106 (46 HIV+, 60 HIV-) postmenopausal Hispanic and African American women from an established cohort had areal BMD (aBMD)

measured by DXA, and trabecular and cortical volumetric BMD (vBMD) and microarchitecture measured by high-resolution peripheral computed tomography of the radius and tibia.

Results: HIV+women were slightly but not significantly younger (58±1 vs. 61±1 yrs, p=0.08), and had lower BMI (28±1 vs. 31±1 kg/m^2, p<0.01). BMI-adjusted aBMD Z-scores were lower in HIV+women at the lumbar spine, total hip and ultradistal radius. Serum N-telopeptide and C-telopeptide levels were also higher in HIV+women. Trabecular and cortical vBMD were similar between groups at the radius but cortical area (105.5±2.4 vs. 120.6±2.0 mm^2, p<0.01) and thickness (956±33 vs. 1075±28 μm, p<0.01) were approximately 11-12% lower in HIV+women at the tibia. Differences remained significant after adjusting for age and BMI and stratifying by race/ethnicity. In contrast, cortical porosity was similar in both groups.

Conclusion(s): HIV+postmenopausal women had lower aBMD by DXA and higher levels of bone resorption markers. They also had lower cortical area and thickness at the tibia but similar cortical porosity than HIV-uninfected controls. Early cortical bone loss in HIV+women in their fifties, before cortical bone loss usually accelerates, raises concerns for future fracture risk in postmenopausal HIV+ women.

P361
DENOSUMAB – IDENTIFICATION OF APPROPRIATE PATIENTS

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Objective(s): Denosumab has been available for treatment of severe osteoporosis in Ireland for 15 months. We reviewed the selection criteria applied by our physicians to prescribe denosumab and any reported side effects.

Material & Methods: We retrospectively reviewed the first 82 patients who received denosumab in our Bone Health Clinic. Data was collected from an existing database where patients demographics, bone density and biochemistry results are recorded. Prior medication and early side effects are also recorded here.

Results: We identified 77 females and 5 males. Table 1 documents baseline demographic, biochemical and densitometric details of the 82 patients. The majority had severe osteoporosis with 35% having vertebral fractures. Several had suboptimal vitamin D levels with PTH levels at the upper end of the normal reference range. Bone turnover was within the normal reference range. The majority of patients had stage 3 chronic kidney disease (CKD).

Summary of key characteristics of patients receiving denosumab.

	Mean±SD
Age	75.9 yr±9.7
PTH	47.5 pg/ml±31 (15-65 pg/ml)
25(OH)Vit D	73.6 nmol/L±28 (optimal>75 nmol/L)
CTX	0.339 ng/ml±0.191 (0.016-1.008 ng/ml)
P1NP	51.1 ng/ml±46 (16-74 ng/ml)
Osteocalcin	29.0 ng/ml±38 (13-48 ng/ml)
T-score spine	-2.67±1.87
T-score total hip	-2.52±2.11
eGFR	55 ml/min±25

Of those who commenced denosumab, 40/82 had been recently treated with at least one year's course of bisphosphonates, 9 of whom were treated with iv zolendronic acid. Other treatments were evista (n=5), strontium ranelate (n=7) or rPTH 1-34 (n=14). Due to the presence of CKD 16 patients received denosumab as first line treatment. The main factors leading to commencement of denosumab were a lack of response to previous treatments, intolerance (specifically GI in 30%) of other treatments and noncompliance. Clinically reported side effects were minimal: arthralgia (n=1), mild flu-like illness (n=1) and rash (n=1).

Conclusion(s): Denosumab appears to be a very useful addition to the armamentarium of treatments for severe osteoporosis particularly in those with chronic kidney disease or GI conditions. Reported side effects have been rare and largely mild in nature making it a safe option in our elderly population.

P362
FRACTURE RISK EVALUATION IN PATIENTS WITH OSTEO-ARTICULAR INVOLVMENT DUE TO RHEUMATOLOGIC DISEASES AND OSTEOPOROSIS USING TWO MODELS OF FRAX

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Objective(s): To compare the results obtained using FRAX-Austria and FRAX-Romania in order to analyze the most efficient assessment tool in evaluation of osteoporotic fracture's probability in a territory with particular population's characteristics.

Material & Methods: Group I comprise 1200 patients (1040 females, mean age 60.53 with rheumatoid arthritis, under

specific treatment. Group II comprise 380 patients (290 females, mean age 58.44 with other inflammatory rheumatologic diseases. Group III comprise 570 patients (460 females, mean age 67.94 with arthrosis. Patients have been diagnosed with osteoporosis based on the DXA results, following specific treatment. We evaluated in this study the 10-year probability of osteoporotic fracture using FRAX. We have extended the group evaluated in a previous study using FRAX-Austria and compared the results with those obtained using FRAX-Romania.

Results:

The 10-year probability of a major osteoporotic fracture and hip fracture using two models of FRAX.

	10-year probability of a major osteoporotic fracture (mean range)		10-year probability of a hip fracture (mean range)	
	FRAX-Austria	FRAX-Romania	FRAX-Austria	FRAX-Romania
Group I	16% (5.3-60%)	9.75% (2.1-44%)	7.5% (0.8-51%)	4.4% (0.2-37%)
Group II	14.5% (2.6-51%)	7.9% (1.5-24%)	5.2% (0.2-31%)	2.75% (0.1-15%)
Group III	15% (4.5-47%)	6.4% (0.6-42%)	7.2% (2.2-33%)	2.7% (0.2-29%)
Total	15% (2.6-60%)	8.4% (1.5-44%)	7% (0.2-51%)	3.7% (0.1-37%)

The 10-year probability of a major osteoporotic fracture and of a hip fracture was significantly higher when using FRAX-Austria ($p<0.005$).

Conclusion(s): The 10-year probability of an osteoporotic fracture in patients with rheumatologic diseases is significantly lower when it was calculated with FRAX-Romania compared with FRAX-Austria. It is to be emphasized that we studied the population from western Romania, whose way of life, structure and pathology are similar with Austrian population. Romanian population is heterogeneous in terms of structure, way of life and associated pathology, and FRAX-Romania was developed taken in consideration only the population from southern Romania. Based on these facts, we consider that for the calculation of fracture risk in western Romanian population, FRAX-Austria suites the best. Patients with rheumatologic diseases with osteo-articular implications and associated osteoporosis have a risk of fracture. There were no significant differences between the risk of an osteoporotic fracture in patients with different rheumatologic conditions, regardless the model of FRAX used in evaluation.

P363
PROSPECTIVE, RANDOMIZED CONTROL STUDY OF USE OF ARTHROSCOPIC DEBRIDEMENT WITH OR WITHOUT VISCO SUPPLEMENTATION IN KNEE OSTEOARTHRITIS

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Objective(s): We investigated the effectiveness of arthroscopic debridement followed by visco supplementation in selected patients with knee osteoarthritis.

Material & Methods: The study included 82 patients (mean age 55±5 years; range 40-70 years) who had knee osteoarthritis according to the Kellgren Lawrence grade I, II & III. At three weeks from arthroscopic treatment (partial meniscectomy and debridement), the patients were randomly assigned to single intra articular injection of Hylan G-F 20 (n=41). Evaluations were made preoperatively, at three weeks and three weeks after injections using a patient satisfaction questionnaire, visual analog scale (VAS), and the WOMAC (Western Ontario and McMaster Universities) osteoarthritis index. The results in two groups, viscosupplementation and no viscosupplementation group were compared.

Results: All patients had significant improvement following both arthroscopic treatment and visco supplementation. Following visco supplementation, patient satisfaction, WOMAC and VAS scores were significantly improved in comparison with no visco supplementation group. Use of concomitant medication was significantly reduced in the visco supplementation group.

Conclusion(s): Our early results suggest that arthroscopic debridement combined with visco supplementation is an effective treatment option for selected patients with knee osteoarthritis. However the long term results of 24 month follow up are awaited.

References: 1. Kellgren J, Lawrence J. Ann Rheum Dis 1957;16:494. 2. American Academy of Orthopaedic Surgeons. Treatment of osteoarthritis of the knee (non-arthroplasty): Complete guide- line. Rosemont, IL: American Academy of Orthopaedic Surgeons, 2008. 3. Wobig M, Dickhut A, Maier R, Vetter G. Clin Ther 1998;20:410. 4. Waddell DD. Arthroscopy 2010;26:105.

P364
OSTEOPOROSIS AWARENESS AND 10-YEAR PROBABILITY OF FRACTURE FROM FRAX® AMONG COMMUNITY HEALTH PROMOTION EVENT PARTICIPANTS

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Objective(s): To report the osteoporosis awareness and predicted fracture risks among participants who never receive osteoporosis treatments from 16 community health promotion events.

Material & Methods: From Aug-Oct 2011, MSD, Taiwan in cooperation with 3 nongovernmental organizations held 16 community osteoporosis health promotion events. Questionnaires about osteoporosis awareness and FRAX® tool were distributed. The answers on FRAX® questions were entered into the Taiwanese calculator on-site to generate the10-year probability of fractures. All participants were provided with the osteoporosis/fracture education booklets and free consultations by onsite physicians. Participants who had high risks defined as predicted major osteoporotic fracture ≥20% or hip fracture ≥3% in 10 years were asked to visit their primary care physicians for considering osteoporosis treatments. Among the 1248 returned questionnaires, 1240 had complete information for data analysis. Comparisons were made between elderly (≥65 years old) and younger (<65 y/o) adults.

Results: Mean age was 57.8±13.7 years with 76.1% were women. Only 35.7% knew that 1/3 of Taiwanese women would have at least on osteoporotic fracture in their life time and 49.4%) knew that osteoporosis is second only to cardiovascular disease as a global healthcare problem. Nearly 9/10 (88.5%) plan to visit a physician if they have high osteoporosis or fracture risks. Close 1/3 (30.4%, hip) and 1/9 (11.5% major osteoporotic) were considered high risks from FRAX® calculator. Knowledge level did not vary by age. However, compared with younger adults (n=868, 70%), older participants (n=372, 30%) were thinner, shorter in height, having more previous fractures, more uses of glucocorticoid, higher percentage of rheumatoid arthritis, and secondary osteoporosis. Significantly more older participants were considered high risk (83.6% vs. 7.6%, for hip fracture, 35.5% vs. 1.2% for major osteoporotic fracture, both $p<0.001$) than younger participants.

Conclusion(s): In general, community adults who never receive osteoporosis treatment had inadequate osteoporosis awareness. However, 1/3 of adults and 6/7 of older adults had high risk of fracture predicted by FRAX®. Knowing the fracture risks would increase patient's willingness to visit a physician to consider appropriate treatments.

P365
ACTIVITY LIMITATIONS IN PERSONS WITH OSTEOARTHRITIS IN MEXICO

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Objective(s): To describe the activity limitations present in adult Mexicans with a recent diagnosis of osteoarthritis.

Material & Methods: We analyze data from a sample of Mexican adults participating in the Mexican National Health and Nutrition Survey (ENSANUT-2006), a probabilistic multistage survey conducted in 2006. Several questions were included in ENSANUT-2006 to assess for the presence of osteoarthritis and the presence of current activity limitations. In our analysis we included the following sociodemographic variables: Age, education, alcohol and cigarette consumption and several chronic comorbidities. Variables related to current activity limitation of any kind in persons with osteoarthritis were identified through a logistic regression model.

Results: Among the 45,240 interviewed adults, 267 (0.6%) reported osteoarthritis of recent diagnosis. Persons with osteoarthritis of recent diagnosis had an average age of 59.3 years (sd=16.4), 71.6% of them were women, 72.3% had lower education, 13.5% were current smokers and 24.3% reported alcohol consumption. High blood pressure was the most frequently reported comorbidity by these persons (29.2%). 23.7% reported a permanent activity limitation, with 49.6% of them reporting a limitation to walk, and 30.3% reporting daily life activity limitations. In the logistic regression model age, permanent limitation and pain were significantly associated to activity limitation of any kind.

Conclusion(s): Adult Mexicans with osteoarthritis of recent diagnosis are more frequently women, with roughly half of them having a limitation to walk. Persons with osteoarthritis of recent diagnosis and a current activity limitation of any kind are more likely to be of older age, to have pain and to have a permanent limitation.

P366
THE BENEFICIAL EFFECT OF ICARITIN ON OSTEOPOROTIC BONE IS DEPENDENT ON THE TREATMENT INITIATION TIMING IN ADULT OVARIECTOMIZED RATS

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Objective(s): Epimedium-derived flavonoids (EFs) have potential to treat established osteoporosis in postmenopausal

women. The beneficial effect of EFs on osteoporotic bone depends on intervention timing. Icaritin (ICT) was found to be the intestinal metabolite of EFs. Whether the beneficial effect of ICT on osteoporotic bone could be also dependent on the intervention timing remains unknown. Objective was to evaluate the effect of the treatment initiation timing of ICT on osteoporotic bone in adult ovariectomized rats.

Material & Methods: Eighty 9-month-old female rats (n=8/group) were sham-operated (Sham) or ovariectomized (OVX). The OVX rats were further assigned to early and late ICT treatment starting at month 1 (early treatment) and month 3 (late treatment) after ovariectomy, respectively. The vehicle-treated Sham and OVX rats starting at month 1 and month 3 after surgery served as the corresponding controls (Sham and OVX controls) for early and late ICT treatment. The treatment lasted for 2 months (40 mg/kg/day). To serve as pretreatment baseline controls, the Sham and OVX rats were immediately sacrificed before early and late ICT treatment. The bone turnover markers, trabecular architecture, bone remodeling and bone biomechanical properties were analyzed with biochemistry, μCT, histomorphometry and mechanical testing, respectively. The population of bone marrow stromal cells (BMSCs) and osteoblasts were evaluated with colony formation assays, respectively. The expression levels of osteoblast- / osteoclast-related genes in bone marrow were assessed by real-time PCR, respectively.

Results: At organ and tissue levels, early ICT treatment remarkably restored the trabecular bone mass, trabecular architecture and bone biomechanical properties toward pretreatment Sham levels, and significantly increased bone formation from pretreatment OVX level and markedly inhibited bone resorption toward pretreatment Sham level, whereas late ICT treatment failed. At cellular and molecular levels, early ICT treatment significantly increased the osteoblastic colonies and osteoblast-related gene expressions from pretreatment OVX levels and remarkably decreased osteoclast-related gene expressions toward pretreatment Sham levels, whereas late ICT treatment failed.

Conclusion(s): The beneficial effect of ICT treatment could be dependent on the intervention timing in established osteoporosis induced by estrogen depletion.

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URINARY KETONES' POSITIVE ASSOCIATION WITH BONE METABOLISM IN POSTMENOPAUSAL KOREAN WOMEN

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Objective(s): Our study aims to demonstrate the relationship of ketone with bone metabolism in Korean women. To do so, we measured urinary ketones, obesity indexes, BMD, anthropometry, and performed laboratory tests related to bone metabolism.

Material & Methods: We investigated the relationship between osteoporosis and its potentially related metabolic parameters in a cross-sectional analysis of 1198 Korean women (492 premenopausal women and 706 postmenopausal women). In our cross-sectional study, we examined BMI, waist circumstance, obesity related factors, urinary ketones, and BMD in Korean women after a fast lasting a minimum of 8 h (N=1198).

Results: The positive urinary ketone groups in pre and postmenopausal women showed better BMD than the negative urinary ketone group. In premenopausal women, BMI, waist circumstance, triglyceride, systolic blood pressure, insulin, HOMA-IR (Homeostasis of measurement assessment-insulin resistance), and alkaline phosphatase were negatively associated with ketonuria after adjusting for age, smoking, and alcohol use. The odds of having ketones decreased in the osteoporosis group, compared to the non-osteoporosis group (OR=0.312, P=0.028 in postmenopausal women)

Conclusion(s): The presence of ketonuria after a fast lasting at least 8 h may have metabolic benefits on BMD in postmenopausal women.

P368
CO-MORBID MEDICAL CONDITIONS ASSOCIATED WITH PREVELANT HYPOPARATHYROIDISM: A POPULATION-BASED STUDY

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Objective(s): Hypoparathyroidism (HypoPARA) is a rare condition with widespread consequences, ranging from asymptomatic presentation to fatal hypocalcemia. Population estimates of prevalence of HypoPARA across the full range of disease and associated patient characteristics are lacking.

Material & Methods: Using unique longitudinal, population-based Rochester Epidemiology Project (REP) medical records linkage resources, we 1) identified all persons residing in Olmsted County, MN, in 2009 with any diagnosis of HypoPARA assigned by a REP provider since 1945, 2) reviewed detailed medical records to confirm diagnosis of HypoPARA and assign etiology, 3) assigned 2 age- and sex-matched controls per confirmed case, and 4) obtained all medical diagnoses from 2006-2008 to compare cases with

controls for percent with any diagnosis in each chapter and subchapter of the International Classification of Diseases, Version 9, Clinical Modification (ICD-9-CM).

Results: There were 54 confirmed cases (prevalence=37/100,000; 71% female; mean age 58±20 years); etiology=78% postsurgical, 9% secondary, 7% familial, 6% idiopathic. Cases were more likely than controls ($p<0.05$) to have ≥1 diagnosis within 7 of 17 chapters and 15 subchapters. Details on specific chapter and subchapter differences are provided in the table.

Comorbidities Associated With Hypoparathyroidism

Chapter Level Yes; (Subchapter Level) Yes

Infectious/Parasitic Diseases (Mycoses)

Neoplasms (Malignancies of Genitourinary Organs; Other/Unspecified Malignancies; Benign Neoplasms)

Endocrine/Nutritional/Metabolic/Immunity Disorders (Disorders of Thyroid Gland; Disorders of Other Endocrine Glands; Nutritional Deficiencies; Other Metabolic/Immunity Disorders) (Disorders of Thyroid Gland; Disorders of Other Endocrine Glands; Nutritional Deficiencies; Other Metabolic/Immunity Disorders)

Genitourinary System Diseases (Other Diseases of the Urinary System)

Diseases of the Skin/Subcutaneous Tissue (Other Diseases of the Skin/Subcutaneous Tissue)

Chapter Level Yes; (Subchapter Level) No

Respiratory Diseases; Congenital Anomalies

Chapter Level No; (Subchapter Level) Yes

Nervous System Diseases (Peripheral Nervous System Diseases)

Digestive Diseases (Other Diseases of Intestine/Peritoneum)

Circulatory System Diseases (Ischemic Heart Disease; Other Heart Disease)

Musculoskeletal Diseases (Rheumatism Excluding the Back)

Chapter Level No; (Subchapter Level) No

Diseases of Blood/Blood Forming Organs; Mental Disorders; Pregnancy Complications; Perinatal Conditions; Symptoms/Signs; Injury/Poisoning

Table: Increased likelihood that persons with vs. those without confirmed diagnosis of HPT had any diagnosed medical condition within each ICD-9-CM chapter/subchapter.

Conclusion(s): These population-based data on confirmed HypoPARA prevalence and case characteristics reveal that, compared to unaffected peers, persons with HypoPARA exhibit a substantial burden of comorbid disease across multiple dimensions.

References: 1. Bilezikian JP, Khan A, Potts JT Jr, et al. J Bone Miner Res 2011;26:2317. 2. Melton LJ, III. Mayo Clin Proc 1996;71:266. 3. Shoback D. New Engl J Med 2008;359:391. 4. Marx SJ. New Engl J Med 2000;343:1863.

P369
OSTEOPOROSIS RISK FACTORS FOR POSTMENOPAUSAL WOMEN

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Objective(s): Osteoporotic fractures result in substantial indirect and hidden costs. We aimed to detect major fracture risk and hip fracture risk in a group of patients residing in rural areas.

Material & Methods: Total lot consisted of 162 postmenopausal women: 80 patients from rural areas formed group I and 82 from urban area formed group II. All filled out the IOF One-Minute Osteoporosis Risk Test - 2007, the questionnaire consisting of 19 questions that evaluate osteoporosis risk factors. The diagnosis of osteoporosis was established by DXA investigation.

Results: The mean age was years 61.13±15.2, ranging between 45 and 82 years. Mean risk factors was 2.1. The incidence of risk factors in the 2 groups is presented in Table 1.

Table 1. The distribution of risk factors in patients with osteoporosis

RISK FACTORS	LOT I (n=80)	LOT II (n=82)
Parents with osteoporosis	16.25%	37%
Early menopause	35%	67%
Kyphosis and height decrease	40%	44%
Smoking	5%	9.75%
Secondary osteoporosis	12.5%	24.4%
Underweight	10%	37.5%
Sedentarism	22.5%	62.5%
Less than 10 minutes sunlight exposure/day	20%	24.4%
Frequent falling tendency	40%	65.8%

Average duration of menopause until the investigation was 184±32.4 months in the first group and 212±62.5 months in the second group.

Conclusion(s): The analysis reveals that there are differences between risk factors for osteoporosis in postmenopausal women in rural and urban areas. Family history of osteoporosis, early menopause, secondary osteoporosis, sedentary lifestyle and falling tendency are more common in urban women. We strengthen the need to investigate risk factors, BMD and fracture risk in postmenopausal women for a proper treatment.

P370
EFFICACY OF PHYSICAL EXERCICE IN PATIENTS WITH OSTEOPOROSIS

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Objective(s): The aim of this study was to assess the efficacy of a 6 months ambulatory exercise program on functional status and quality of life in women with postmenopausal osteoporosis.
Material & Methods: The randomized controlled observational study included 81 patients with postmenopausal osteoporosis, mean age 68.7±7.3 years, randomly assigned to a control group (40 patients) and an exercise group (42 patients). All patients were diagnosed with osteoporosis based on DXA assessment and had a stable cardiovascular status. All patients continued to take their prescribed medication for osteoporosis. They followed exercise programs based on increasing spinal mobility, muscular strength and endurance, improving balance, coordination, respiratory exercises. The patients in the control group continued their daily living activities. The evaluation was made at the beginning of the study and after 6 months based on spinal mobility, muscular strength, pain assessment on a Visual Analogue Scale (VAS) and quality of life evaluation using SF-36 Questionnaire.
Results: The benefits of the kinetic programs were shown by a significant improvement on spinal mobility and muscular strength for spinal extensor and abdominal flexor muscles. Pain, evaluated on a Visual Analogue Scale, had a mean decrease of 3.56 points and the results were also strong statistic significant ($p<0.01$). For SF-36 Questionnaire, the best results were obtained for vitality (37.2% amelioration), mental health (20.8% amelioration) and body pain (53.5% amelioration) domains and were also statistic significant ($p<0.05$). For muscular strength, the values we obtained followed an ascendant curve for all the tested muscular groups. The results for the control group remained basically unchanged. The compliance of the study participants was very good; only three patients did not completed the 6 months training program.
Conclusion(s): The physical exercise program improves both functional status and quality of life in patients with postmenopausal osteoporosis by increasing spinal mobility and muscular strength and by reducing pain. Kinetic programs that combine aerobic exercise with exercises for increasing muscular strength and endurance, balance and coordination should be introduced in the rehabilitation programs of patients with osteoporosis without medical contraindications for moderate level exercise.

P371
REDUCED BONE MINERAL DENSITY (BMD) IN HEALTHY MALE WHITE-COLLAR WORKERS IN URBAN CHINA

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Objective(s): Although the status of BMD and the prevalence of risk factors for osteoporosis have been evaluated in mature men, the characteristics of osteoporosis in young men are unknown. The aim of this study was to investigate the status BMD in healthy, young and middle-aged male white-collar workers in Shanghai.
Material & Methods: The medical records from April 2007- August 2011, of physical health examinations at Huashan hospital in Shanghai were reviewed. The participants were 3991 healthy young white-collar males, aged 20-59 years old, without disorders known to affect bone or calcium metabolism. Their hip and spine BMD was measured by Hologic QDR Discovery-W DXA.
Results: The peak BMD occurred in the group aged 20-29 years (total hip 0.970±0.138 g/cm^2, neck 0.829±0.138 g/cm^2, troch 0.695±0.111 g/cm^2) ($P<0.05$). The prevalence of osteoporosis and low bone density in this study was calculated according to not only Hologic-supplied Caucasian cutoffs, but also Chinese cutoffs reported respectively from three recent studies in Shanghai[1], Changsha[2], and Hong Kong[3]. Even the lowest prevalence of low bone density among the four results as high as 40.74% (aged 20-29), 42.63% (aged 30-39), 42.78% (aged 40-49) and 47.70% (aged 50-59).
Conclusion(s): We conclude that low BMD is highly prevalent in young white-collar males in Shanghai, likely resulting from the unhealthy lifestyles of modern young Chinese males in urban areas.
References: 1. ZL Zhang, YJ Qin, QR Huang, et al. Asian J Androl 2006;8:419. 2. LJ Tan, SF Lei, XD Chen, et al. J Bone Miner Metab 2007;25:114. 3. HS Lynn, EMC Lau, B Au, PC Leung. Osteoporos Int 2005;16:1663.

P372
PREVENTION OF FALLS AMONG OLDER PATIENTS IN THE HOSPITAL ENVIRONMENT: A NURSE LED PREVENTION PROGRAMME

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Objective(s): Falls are the leading cause of injury in the older person (over 65 years). Research suggests that one third of people over the age of 65, and half over the age of 80 have had a fall in the last year. One tenth of these have

had multiple falls requiring hospitalisation. Falls are a leading cause of hospitalisation for the elderly and 7% of falls result in injuries, with another 3% of falls result in hip fractures [1-2].

Material & Methods: Since 2004, patients admitted to the Medicine for the Elderly department (MedEl) are assessed for falls risk. The "STRATIFY" tool identifies those deemed at a high risk of falling. These patients are identified with I. D. bracelet, bedside notification and are offered External Hip Protectors. Patients who have fallen are further assessed by the Clinical Nurse Specialist (CNS) who advises them and the staff of how to prevent future falls. The role of the CNS in falls prevention also includes an educational program that includes the development of on-going staff training in falls prevention and a regular in-patient audit program evaluating the effectiveness of our nursing practice.

Results: We looked at our fall rates in MedEL from 2004-2011 and found that there was a 24% decrease in falls. The current fall rates is 5.2 falls per 1000 bed days. Of the patients who fell in 2011, 3% sustained a fracture in comparison to 13% sustaining a fracture in 2010.

Conclusion(s): Our results suggest that a thorough and comprehensive assessment of patients reduced the number of falls and injuries within our service. The future challenge is a further reduction in fall rates and falls related injuries in our department.

References: 1. Guideline for the prevention of falls in older persons. American Geriatrics Society, British Geriatrics Society, and American Academy of Orthopaedic Surgeons Panel on Falls Prevention. J Am Geriatr Soc 2001;49:664. 2. Rubenstein LZ, Powers C. Clin Geriatr Med 2002;18:141.

P373
SEX SPECIFIC ASSOCIATIONS OF PHYSICAL ACTIVITY ON PROXIMAL FEMUR BMD IN 9-10 YEARS OLD CHILDREN

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Objective(s): The increase in femoral bone mass and strength in pre and pubertal children has been reported as a response to physical activity (PA) intervention programs, with the majority of studies showing that femoral neck sensitivity (as a surrogate of proximal femur sensitivity) to mechanical loading is higher in boys than in girls. Thus, the purpose of this work was to investigate sex specific associations between everyday PA and BMD of three regions of proximal femur in pre and early pubertal boys and girls aged 9-10 years.

Material & Methods: BMD at the femoral neck, trochanter and intertrochanter regions, and lean mass of the whole body were assessed using DXA in 161 girls (age: 9.7±0.3 yrs; body mass: 34.2±9.0 kg body height: 137.2±0.1 cm) and 164 boys (age: 9.7±0.3 yrs; body mass: 34.1±7.1 kg body height: 137.0±0.1 cm). PA was measured by accelerometry. Multiple linear regression analyses were used to explain the variance in BMD accounted for by PA at the three regions of the proximal femur. Adjustments were made for body height, total lean mass and pubertal status.

Results: Vigorous PA explained 3-5% of the variability in BMD at all three subregions in boys. In girls, vigorous PA explained 4% of the variability in intertrochanter BMD and 6% in trochanter BMD. PA did not contribute to the variance in FN differences in girls. An additional 10 minutes per day of vigorous physical activity (the best single predictor of BMD within physical activity variables) was associated with a ~2% higher trochanteric and intertrochanteric BMD in girls, while in boys it was related to a ~1% higher femoral neck, trochanter, and intertrochanteric BMD ($p<0.05$).

Conclusion(s): Proximal femur response to weight-bearing physical activity may differ between boys and girls aged 9-10 years old, particularly in the femoral neck. Boys showed a more homogeneous response among the three regions of proximal femur, while a significant greater bone density in the trochanteric and interthocanteric regions was observed in the more active girls, compared with less active girls.

Disclosures: Funded by Portuguese Science and Technology Foundation (SFRH/BD/38671/2007 and PTDC/DES/115607/2009).

P375
ATYPICAL FRACTURES IN PATIENTS ON LONG TERM IV BISPHOSPHONATE

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Objective(s): Atypical femoral fractures are reported in patients taking bisphosphonates (BP). The aim of this study was to identify patients with these fractures in patients using an IV BP Service.

Material & Methods: 799 patients were on IV BP. At review radiographs of the femora were taken in patients with thigh pain. Diagnosis was made if elevation or fracture of the lateral cortex were present. BMD was measured at IV treatment initiation and at the time of fracture. Duration and dose of BP treatment were noted.

Results: 21 patients (2 m/19f: 2.6%) were found to have femoral fractures. 15 had osteoporosis; 2 Osteogenesis Imperfecta and 4 had other diagnoses (cases of Paget's disease excluded). Treatment with BP had been for 10.8±5.9 yr

(range 2-23 years). 10 patients were on pamidronate and 11 on zoledronate at time of fracture, including 8 who had converted from other IV BPs. 17 patients had received pamidronate (Total dose 2619±1407 mg) and 11 zoledronate (10 mg (range 2-60 mg)) whilst 10 previously had oral BP. 2 patients were on corticosteroids and 12 on a proton pump inhibitor. Osteoporosis was present in 78.9% at treatment initiation in the LS and 32% at the FN and in 32% of subjects at LS and 21% at FN at fracture. LS BMD had increased significantly (0.766 to 0.901 g/cm^2; P<0.001) but not at the FN (0.640 vs. 0.638 g/cm^2). One patient had had radiographs of the pelvis for other reasons in 2005 (no fracture) and also in 2008 when an asymptomatic atypical fracture was present but not reported. In 2011 after 20 years of pamidronate she became symptomatic and required surgical intervention.

Conclusion(s): IV BP treatment increased BMD at the spine but not FN, in most subjects the latter site was not osteoporotic at commencement or at fracture. Nonosteoporotic BMD at the FN may be a risk factor for atypical fracture. Most patients had received IV BP for many years. The need for regular review is suggested by the patient in whom an asymptomatic atypical fracture was overlooked, but the frequency and method of review remains to be determined.

P376
ROLE OF INFLAMMATION IN CARTILAGE DAMAGE, FUNCTIONAL STATUS AND SYMPTOMS IN PATIENTS WITH KNEE OSTEOARTHRITIS: AN ULTRASONOGRAPHY STUDY

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Objective(s): To examine role of the inflammation on the thickness of the cartilage. To correlate clinical pain with cartilage thickness and presence of the synovitis. To find correlation between functional impairment and cartilage damage.

Material & Methods: 50 outpatients with painful knee OA (41 female, mean age 63), have been examined in order to establish influence of different factors on cartilage damage. We had two groups (41-59 and 60-81) in order to find out age differences in clinical parameters and cartilage thickness. A rheumatologist recorded the presence of knee joint pain, patient's assessment of knee pain using VAS scale, and Lequesne Index of severity for knee OA (LI). Other rheumatologist, blinded to the clinical data, performed the knee US examination, registering the presence effusion and thickness of the cartilage of femoral trochlea of both condyles.

Results: Difference of cartilage thickness for medial and lateral compartment, in female (1.7 mm and 1.8 mm), vs. male group (1.8 mm and 1.9 mm) were statistically nonsignificant. Female vs. male group (36 mm and 31 mm) had higher values of pain and LI of severity (6.8 and 7.8) statistically nonsignificant. Male group had more effusions than female group, statistically nonsignificant (28% and 24%). In older age group, cartilage thickness was 1.6 mm for medial and 1.7 mm for lateral condyle, significantly lower than in younger group (2.0 mm and 2.1 mm). Value of pain in older group vs. younger (32 mm and 36 mm). Mean LI in older group was 7.9 vs. younger group 6.9. We found effusion in 25% of knees. Cartilage thickness in knees with effusion was (medial 1.6 mm, lateral 1.8 mm), in group without effusion (1.8 mm and 1.9 mm) statistically nonsignificant. Pain and LI in group with effusion were (39 mm and 8.3), in group without (34 mm and 7.4). Negative correlations were demonstrated between the cartilage thickness and age. Significant correlations were found of pain and LI with age.

Conclusion(s): We didn't find correlation between knee joint effusion and cartilage damage. Most important parameter which correlated with cartilage damage, pain and Lequesne Index of severity of OA was age.

P377
LONG-TERM (3 YEARS) REPRODUCIBILITY FOR THE RADIOLOGICAL ASSESSMENT OF KNEE OSTEOARTHRITIS

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Objective(s): To confirm that the reproducibility remains stable over time for the radiological measurement of joint space narrowing (JSN) in knee osteoarthritic patients.

Material & Methods: 70 females from the OFELY[1] cohort with radiological osteoarthritis (Altman scoring >2) performed at baseline and 48 months later knee x-rays using a standardized fluoroscopically semi-flexed with positioning frame protocol. A single experienced reader, trained for a validated[2] semiautomated device, read twice 70 pairs of knee x-ray with knowledge of time sequence in April 2009, 2010 and 2011. Intra reader precision was assessed for JSN using an intraclass correlation coefficient (ICC), the mean difference and limits of agreement on a Bland Altman graph.

Reproducibility has been measured in 2009, 2010 and 2011 (Table I). 2009 was compared to 2010 and 2011. 2010 was also compared to 2011 (Table II).

Results: Cf Tables:

Table I: Reproducibility has been measured in 2009, 2010 and 2011

Intra reader reproducibility	ICC [95% CI]	Mean difference; mm±SD+ [95% CI]	Limits of agreement; mm Bland Altman
2009	0.799 [≥0.714]	-0.079±0.40 [-0.175;0.016]	[-0.864; 0.705]
2010	0.931 [≥0.899]	0.005±0.21 [-0.045; 0.056]	[-0.412; 0.423]
2011	0.905 [≥0.861]	-0.017±0.25 [-0.078; 0.043]	[-0.519; 0.485]

Table II: 2009 was compared to 2010, 2011 and 2010 compared to 2011

Intra reader reproducibility JSN	ICC [95% CI]	Mean difference; mm±SD+[95% CI]	Limits of agreement; mm Bland Altman
2009 vs. 2010	0.815 [≥0.737]	-0.055±0.37 [-0.145; 0.034]	[-0.792; 0.681]
2009 vs. 2011	0.791 [≥0.704]	-0.078±0.40 [-0.174; 0.018]	[-0.872; 0.715]
2010 vs. 2011	0.882 [≥0.829]	-0.022±0.28 [-0.089; 0.044]	[-0.575; 0.530]

Conclusion(s): This study shows that reproducibility of a single experienced reader, using a semiautomated reading device is good and stable over time. This is an essential condition to evaluate the cartilage loss in long term osteoarthritis studies.
References: 1. Delmas P. JBMR 1997;12:683. 2. Gensburger D et al. Arthritis Rheum 2009;61:336.

P378
THE CLINICAL RESULT OF SURGICALLY TREATED FEMUR FRACTURES AFTER LONG-TERM BISPHOSPHONATE THERAPY

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Objective(s): The purpose of this study is to analyze the result of surgically treated atypical femur fractures after long-term bisphosphonate therapy.
Material & Methods: Total 12 cases with using long-term bisphosphonate therapy were enrolled. All of the patients were female, and mean age was 67.3 years old. The examples of 11 cases represented subtrochanteric fractures, and the remaining 1 case showed distal shaft fracture in the femur. The internal fixation of fractures was decided based on the characteristics of types of fracture. The proximal femoral nailing was used in 7 cases, and dynamic hip screws and compression plate were used in 4 cases of subtrochanteric fractures. For the fracture in the shaft of femur, two plates were used and fixed with screws. Among the total of 12 cases, allogenic iliac bone graft was done in 7 cases. The bone density of the patients was measured. In addition, dates of use of bisphosphonate and of bony union after the surgery were numerically calculated.
Results: The mean T-score was found as -2.1 in the neck of femur and -2.0 in the lumbar spines. The mean dates of use of bisphosphonate were calculated as 4.9 years (in the range from 2-7 years). The proximal femoral nailing method showed 2 cases of nonunion and 1 case of metallic failure, leading to secondary surgical approach. The rest of PNA method groups showed bony union in 9 months of surgery. The patient underwent dynamic hip screws and compression plate showed bony union in 7 months of surgery. Irrelevantly to the types of internal fixation, the group of patients underwent AIBG made bony union in all cases, rather than 3 cases of 5 patients without AIBG showed nonunion or metallic failure.
Conclusion(s): Atypical fractures after long-term bisphosphonate therapy, especially the subtrochanteric fracture in the femur crucially requires internal fixation with AIBG since the cortical sclerosis of the bone is provided by decreased rate of bone turnover.

P379
PRIORITY RISK FACTORS OF OSTEOPOROSIS IN WOMEN OF BELARUS

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Objective(s): Problems of diagnostic of decreasing of BMD and revealing patients with high risk of low trauma fractures take an important place in modern healthcare due to the high economic and social expenditures for the treatment and rehabilitation of patients with low trauma fractures. The aim of our study was to evaluate the most prognostic important risk factors of low BMD in postmenopausal women by using the method of questioning.
Material & Methods: There were examined 507 postmenopausal women (mean age 56.8±8.3 years). Risk factors of osteoporosis were evaluated by the IOF questionnaire, BMD of lumbar spine and hips was measured by DXA (Lunar Prodigy, GE, USA). Statistical analysis was performed using the software Statistic 6.0
Results: The analysis of obtained data revealed the most prognostic important for low BMD questions: question No. 1 - Have either of your parents been diagnosed with osteoporosis or broken a bone after a minor fall (a fall from standing height or less)?; question No. 4 - Have you ever broken a bone after a minor fall, as an adult?; question No. 6 - After the age of 40, have you lost more than 3 cm in height? The answers to the rest questions were the same in different

groups (questions 9-10 and 12-18) or the amount of the affirmative answers were so small that these questions couldn't be included in statistical analysis (questions No. 3, 7, 8, 14, 15). The specificity of the model of prognosis of probability of decreased BMD consisted 97%, in other word, the probability not to administer bone densitometry to the patient with low BMD using this model is 3%.

Conclusion(s): The most prognostic important risk factors of low BMD in women are family history of low trauma fractures, fragility fractures in anamnesis and decreasing of height for 3 and more cm after age of 40. The method can be used widely in clinical practice to reveal individuals with the risk of low BMD for their further examination and treatment.

P380
ASSOCIATIONS BETWEEN VITAMIN D AND CONTENT OF AMINO ACIDS IN PATIENTS WITH COXARTHROSIS

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Objective(s): The aim of the present study was to establish associations between the serum level of vitamin D (25(OH) D) and PTH and the content of free amino acids (AAs) in blood plasma and bone tissue (BT) in patients with stage III coxarthrosis.

Material & Methods: Samples of compact and spongy tissue from femoral neck and those of blood serum were taken from 12 patients (6 women and 6 men aged 54.6±9.9 years) hospitalized for hip joint replacement due to coxarthrosis. The content of 32 free AAs was determined in both blood plasma and BT in their perchloric acid extracts using reversed-phase high performance liquid chromatography with pre-column derivatization on the Agilent-1200 chromatograph. Serum level 25(OH)D and PTH were determined with the enzyme immunoassay analyzer «Sunrise» («Tecan», Austria) using the reagents DRG (USA). Blood sampling was performed from September till March.

Results: The content of practically all AAs in particular that of ethanolamine, esparagine and isoleucine in spongy substance of BT in patients with stage III coxarthrosis was higher than in compact substance. We determined that accumulation of AAs (their level in bone tissue exceeding that in plasma) in spongy BT occurred in the following order: Cys>EA>Asn>Ile>Lys>Gln>Orn>Tau>α-AAA>Thr. In compact BT accumulation of AAs occurred in the following order: Cys>EA>Asn>Ile>Gln>Lys>α-AAA>Thr>Tau>Val. Met and Phe didn't accumulate in BT. All the examined patients had vitamin D deficiency in blood plasma. Serum level 25(OH)D was 20.53±6.4 nM/l, the level of PTH was 32.98±11.7 pg/ml. There were strong positive correlations between the serum level 25(OH)D and a number of plasma AAs: PAE (r=0.92), Asn (r=0.73), Gly (r=0.89), Ala (r=0.75), HPro (r=0.82). There was a strong negative correlation between the serum level 25(OH)D and the level of cysteic acid (r=-0.93) in spongy BT. We found no correlations between the level of PTH and content of AAs.

Conclusion(s): The level of vitamin D had strong positive correlations with a number of AAs in blood plasma and a negative correlation with the level of cysteic acid in spongy BT.

P381
OSTEOARTHRITIS OF THE HIP AND KNEE IN ASSOCIATION WITH OVERWEIGHT

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Objective(s): The aim was to examine the relation between overweight and osteoarthritis (OA) of the hip and knee in the population of Banjaluka region.

Material & Methods: Retrospective, population-based study included 865 patients (mean age 59.08) treated for symptomatic or radiographic OA from January 2005-September, 2010. We assessed the percentage of overweight patients (as defined by BMI of ≥30 kg/m^2) who had OA.

Results: From 865 participants, 295 (34.1%) had OA of hip (199 or 67.46% female and 96 or 32.24% male). OA of the knee was found in 570 (65.9%) participants (376 or 65.96% female and 194 or 34.04% male).BMI >30 was found in 95 (30.6%) patients with hip OA (68.42% female and 31.58% male) and in 221(69.94%) patients with OA of the knee (72.4% female and 27.6% male).

Conclusion(s): Overweight is significantly associated with OA of the knee. Obesity increases the risk of developing hip OA, though the correlation is not as strong as it is with knee OA.

References: 1/ Messier SP, Loeser RF, Miller GD, Morgan TM, et al. Arthritis Rheum 2004;50:1501. 2/ Executive summary of the clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults. Arch Intern Med 1998;158:1855. 3/ Tukker A, Visscher TLS, Picavet HSJ. Public Health Nutrition 2008;12:359.

P382
DENOSUMAB IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS – EARLY ADVERSE EVENTS RELATED TREATMENT

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Objective(s): Denosumab is a human monoclonal IgG2 antibody with a very high affinity and specificity to RANKL

blocking RANK and thereby inhibits the osteoclast activation, and increasing bone density. The unique effect of denosumab is very different from bisphosphonates. Denosumab is more efficient treatment in improving bone mechanical properties and reduced the risk of vertebral, hip, and other types of fracture. The postdose adverse events principally are not serious.

Material & Methods: We enrolled 31 women between the ages of 56-82 years who had a BMD T-score of less than -2.5 but not less than -4.0 at the lumbar spine or total hip. BMD was evaluated by DXA. Subjects received 60 mg denosumab subcutaneously, twice yearly. 17 women had taken before oral or intravenous bisphosphonates for <3 years. All women received 500-1000 mg of calcium and 400-800 IU of vitamin D. Patients had serum calcium level. 2.00-2.75 mmol/L and calculated creatinine clearance >30 ml/min. Lateral spine radiographs were taken annually for vertebral fractures. Patients were monitored for 3 months after denosumab application with telephone and clinic visits. Safety was assessed by the recording of all adverse events and serious adverse events (SAE) by: physical examination, monitoring hematological, blood- chemical, urinary values, fever and ECG.

Results: Denosumab treatment adverse events did not observe. In first-month therapy interval nonvertebral, hip and vertebral fractures did not establish. SAE, mild-to-moderate postdose symptoms after injection – pyrexia, myalgia, headache, arthralgia, local reaction, infection and cardiovascular events (including atrial fibrillation) did not report. No case of osteonecrosis of the jaw was occurred.

Conclusion(s): Denosumab had a favorable safety profile and is well tolerated. There were no adverse events and SAE in enrolled 31 postmenopausal women.

References: RB Hopkins at al. Musculo skelet disord 2011;9:209.

P383
DEFEROXAMINE INCREASE BONE MINERALIZATION DENSITY OF POSTMENOPAUSAL OVARIECTOMY MODEL AND PROMOTE BIOLOGICAL ACTIVITY OF OSTEOBLAST IN VITRO

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Objective(s): To investigate improvement of BMD by deferoxamine (DFO) intervention for osteoporotic model and its possible mechanism for osteoblast in vitro.

Material & Methods: 40 SD rats were divided into four groups, as ovariectomized model, ovariectomized model with DFO (100 mg/kg, twice a week) intervention, sham group and control group. After 12 weeks research, serum ferritin, serum iron and BMD were detect. Osteoblasts (hFOB1.19) were cultured with different concentrations of DFO (0, 5, 10, 20 μmol/L), respectively. MTT assay was used to detect osteoblast activity after 24 h. Alkaline phosphatase (ALP) activity was measured by ALP kit after 10 days. Von kossa staining was used to counted calcium nodules after 15 days. Type I collagen (COL1) mRNA and protein expression were detect by RT-PCR and western blot after 72 h.

Results: The sham group and control group showed no significant difference. Compared with control, BMD of model group was significantly lower, meanwhile serum iron and ferritin increased significantly ($P<0.05$). Compared with model group, BMD of DFO intervention group increased significantly, and with serum iron and ferritin significant decrease ($P<0.05$). In vitro, cell proliferation viability was stimulated at 5 μM, but depressed at 10 μM and 20 μmol/L ($P<0.05$). The ALP activity was promoted by DFO with concentration dependently ($P<0.05$). The number of mineralized nodules were increased significantly with DFO treatment at 5, 10 μmol/L and decreased at 20 μmol/L ($P<0.05$). The mRNA expression of COL1 was promoted significantly by DFO (5-20 μmol/L) ($P<0.05$). The protein expression of COL1 was promoted by DFO treatment at 5, 10 μmol/L and inhibited at 20 μmol/L ($P<0.05$).

Conclusion(s): The model of osteoporosis existed iron overload, which improved by DFO treatment. DFO had effects on cell culture in vitro, with low-dose stimulation and with high-dose inhibition on osteoblasts activity. DFO might be used as a new type of osteoporosis treatment, further research needs to be carried out.

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KNEE OSTEOARTHRITIS FEMALE PATIENTS' ADHERENCE TO PHYSICAL EXERCISES

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Objective(s): To establish the adherence to physical exercises of women with knee osteoarthritis (KOA).

Material & Methods: Physical exercises program for women with KOA and high SCORE cardiovascular risk was designed to reduce joint pain. Outpatients with KOA were offered to participate in the program. Willingness and adherence to the program were assessed.

Results: After the telephone contact with 69 female outpatients with KOA according to ARA clinical and radiographic criteria 54 (78.2%) came for baseline examination. Median

age was 61 (range: 49-75). After physical examination and SCORE risk assessment all patients were given the information on physical exercises program. Informed consent for the program was obtained from 20 patients (37% visitors). Among the reasons of refusal were unwillingness and lack of time. The program of 4 sessions (2 times a week) started in December 2011. All women were additionally reminded by phone of date, time and place of training. Only 8 women visited this physical training (11.6% of all women, 40% of confirmed women). 3 women visited all 4 sessions (4.3% of all women, 15% of confirmed women), 3 women visited 2 sessions (2.9% of all women, 10% of confirmed women), 2 women visited 3 sessions (4.3% of all women, 15% of confirmed women). After 4 sessions all patients were contacted to assess the reasons of their non-adherence. Among these reasons were: too far from home, unwillingness and a lot of work.
Conclusion(s): We established that women with knee osteoarthritis have low adherence to physical exercises.

P385
IMPROVING COMPLIANCE WITH STRONTIUM RANELATE THERAPY BY LOW INITIAL DOSE

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Objective(s): Strontium ranelate (SR), is being increasingly used for postmenopausal osteoporosis[1]. Though the incidence of serious adverse events is low, it can cause mild and transient side effects like nausea (6.6%) and diarrhoea (6.5%), and these may result in discontinuation of the drug[2]. The aim of the study was to see, whether initiating, the treatment at a lower dose, for limited period, before starting the full dose, will reduce the incidence of transient side effects and improve compliance.
Material & Methods: 60 consecutive patients, who were prescribed SR, were randomly divided into two groups. First group received full dose of SR, from the beginning and the second group received half the dose for first three weeks before increasing to full dose. All the other conditions, regarding taking the drug were complied by both groups (taking the drug at bedtime, at least 2 h after eating). Incidence of side effects and compliance was checked at three weeks and at three months.
Results: A significantly less number of patients complained of nausea and/or diarrhoea, at three weeks, in the half dose group 7 (23.3%), as compared to the full dose group, 15 (50%) ($p=0.0035$). As a result, at the end of three months, significantly more patients were compliant with the treatment with SR in the half dose group, 27 (90%), as compared to full dose group, 19 (63.3%) ($p=0.0024$). The upper GI side effects were the major reason for non-compliance in both the groups, 8 patients in the full dose group and 2 patients in the half dose group. Other side effects noted by both groups were headache 2, itching 1, and hair loss 1. No DVT was reported.
Conclusion(s): Compliance with strontium ranelate can be improved, and the incidence of transient gastro-intestinal side effects reduced by initiating the treatment with half the dose for the first three weeks, before establishing the full dose.
References: 1. Reginster JY & Neuprez A. Expert Op on Pharmacotherapy 2010;11;17:2915. 2. Meunier PJ, Roux C, Seeman E et al. N Eng J Med 2004;350:459.

P386
DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS (DISH) AND THE ASSOCIATION WITH HIGH SERUM CHOLESTEROL AND TRIGLYCERIDES

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Objective(s): The aim of the study is to assess the association between diffuse idiopathic skeletal hyperostosis (DISH), serum cholesterol and triglycerides.
Material & Methods: DISH were studied in 204 patients with back pain, knee or hip joint replacement due to DISH or osteoarthritis in Clinic of Rheumatology, UMHAT "Sveti Georgi" and rheumatologic practice in Plovdiv, Bulgaria. Participants had a standardized interview and examination. Radiographs of the joint as well as both knee and a blood sample were obtained. Serum cholesterol and triglycerides levels were divided into tertiles and hypercholesterolemia was defined as ≥6.0 mmol/l and hypertriglycerides was as ≥1.8 mmol/l. The control groups was 100 patterns with osteoarthritis (OA) and 60 patients with knee OA. Odds ratios and 95% Cls for the association of serum cholesterol and triglycerides with DISH patterns were calculated with logistic regression, adjusting for potential confounders.
Results: Hypercholesterolemia (OR 1.72; 95% CI 1.16-2.32) and high serum cholesterol levels (3rd vs. 1st tertile: OR 1.81; 95% CI 1.03-2.96) were independently associated with DISH. Hypertriglyceridemia (OR 1.69; 95% CI 1.2-2.14) were independently associated with DISH. No association was observed between hypercholesterolemia and hypertriglyceridemia and OA. Hypercholesterolemia (OR 1.61; 95% CI 1.06-2.47) and high serum triglycerides were independently associated with knee OA.
Conclusion(s): These data add to the evidence regarding the independent role of serum cholesterol and triglycerides as a systemic risk factor for DISH. The discrepant associations observed for different OA patterns are likely due to the relative weight of other risk factors.
References: 1. Fung MA, Frohlich JJ. *CMAJ* 2002;167:1261. 2. Grey A, Dalbeth N. Bone Rheumatic Disorders in Diabetes

2010:789. 3. Diederichs G, Engelken F, Marshall LM, et al. Osteoporos Int 2011;22:1789.

P387
FRACTURE RISK ASSESSMENT IN CZECH OSTEOPOROTIC PATIENTS BY DIFFERENT NATIONAL FRAX® DATABASES

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Objective(s): The introduction of the WHO FRAX algorithm has facilitated the assessment of fracture risk. Recently (*Osteoporos Int* 2010;21[Suppl1]:S271) we demonstrated that among Czech patients with osteoporosis by DXA, UK FRAX database identifies higher percentage of patients at high risk of fracture (20% risk of major nonvertebral fracture and/or 3% risk of hip fracture) compared to Austrian FRAX database (70.2% and 58.1%, respectively). Since 2011 Czech national FRAX database has been available. The aim of the study is to compare percentage of patients treated for DXA-diagnosed osteoporosis (GE Lunar, GE Healthcare, UK) fulfilling National Osteoporosis Foundation (NOF) criteria for osteoporosis therapy as assessed by different national FRAX databases.

Material & Methods: Retrospective database analysis of women with osteoporosis (lumbar spine and/or proximal femur BMD T-score≤-2.5 and/or osteoporotic fracture) treated on the outpatient basis (n=183). 10-year risk of both major osteoporotic fracture (hip, clinical spine, humerus or wrist) and hip fracture based on FRAX algorithm was calculated using Austrian, UK, German, Hungarian, Polish and Czech databases.

Results: Mean age (±SD) of patients was 68±9.2 years, weight 66.3±11.6 kg, height 160.8±8.3 cm, BMI 25.7±4.1. Mean femoral neck BMD was 0.751±0.093 g/cm^2 which corresponds to T-score of -2.1.

Numbers and percentages of patients fulfilling NOF criterion for treatment are given in Table 1.

Patients fulfilling NOF criterion for osteoporosis treatment

	≥20% risk of major nonvertebral fracture		≥3% risk of hip fracture	
FRAX National database	No. of patients	% of patients	No. of patients	% of patients
Austria	77	42	123	67
UK	55	30	108	59
Germany	37	20	105	57
Czech Republic	34	18	108	59
Hungary	31	17	108	59
Poland	14	8	75	40

Conclusion(s): If there's no national database available, it has been recommended to use database of a country with similar fracture incidence. Concerning Czech population, this could be Austria (historical and ethnic similarity) or Poland (ethnic relationship). Despite similar hip fracture incidence, these databases give highly discrepant results. Closest results are found by using German and Hungarian databases. In the Czech population of postmenopausal women with osteoporosis the risk of hip fractures dominates over risk of nonvertebral fractures. The use of other than national database may give misleading results.

P388
THE 5-YEAR RISK FOR CONTRALATERAL HIP FRACTURE AFTER THE FIRST ONE – A SIMPLE ALORITHM FOR RISK STRATIFICATION

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Objective(s): The known, increased risk of contralateral hip fracture after a first one may justify prophylactic stabilization. However, a case-finding strategy is required to exclude patients, which will not benefit from this additional surgical intervention. The goal of this project was to derive a simple algorithm assessing the 5-year risk for a contralateral hip fracture after the first one.

Material & Methods: The analysis was based on a nationwide population-based Danish cohort study of 84,360 patients experiencing a hip fracture in the age of 50-80 years being followed-up for 5 years. We a priori defined a set of 17 candidate parameters potentially associated with early contralateral hip fracture. We bootstrapped a stepwise augmentation procedure 10 times and selected five parameters that entered the model in all bootstrapping cycles. These were, female gender, alcohol abuse, living in a single household, the lack of bisphosphonate prescriptions and comorbidity as measured with the Charlson Score. Using this model, we computed the individual risk for a contralateral fracture within five years after the first incidence.

Results: 12,349 patients (14.6%) experienced a contralateral hip fracture within 5 years after the first one. The strength of association for the indicator variates were: female gender (Odds Ratio 1.58, 95%CI: 1.51-1.66), alcohol abuse 1.57 (1.46-1.69), living in a single household 1.10 (1.05-1.14) no prescription of bisphosphonates 1.64 (1.34-2.00), and comorbidity (Charlson Score values): 1-2; 2.20 (1.93-2.50) 3-4; 1.76 (1.54-2.01), 5 and more, 1.46 (1.26-1.70) against no comorbidity (Score=0). The probability of experiencing a second fracture ranged from 3.4% corresponding to a male with substantial comorbidity (>5) living in a relationship not

taking bisphosphonates and without an alcohol problem to 25.9% corresponding to a woman living in a single household without comorbidity but an alcohol problem not taking bisphosphonates.

Conclusion(s): Once this instrument is validated in other cohorts it provides a simple algorithm for case-finding for prophylactic hip augmentation to prevent a contralateral fracture.

Disclosures: The study was supported by the AO Clinical Priority Program Fracture Fixation in Osteoporotic Bone.

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EFFICACY OF A STRONTIUM RANELATE 2 G/VITAMIN D3 1000 UI COMBINATION ON THE CORRECTION OF VITAMIN D INSUFFICIENCY

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Objective(s): To assess the efficacy and safety of a daily oral administration of a fixed combination of strontium ranelate (SrRan) 2 g/vitamin D_3 1000 IU on the correction of vitamin D insufficiency in the treatment of osteoporotic postmenopausal women and men.

Material & Methods: International, double blind, randomised, 6-month parallel group study. Osteoporotic patients (postmenopausal women and men) with basal 25-hydroxyvitamin D (25OHD) levels >22.5 nmol/L were included: 80% between 22.5-50 nmol/L and 20% >50 nmol/L. Randomisation to treatment arms (SrRan 2 g/vitD_3 vs. SrRan 2 g) was unbalanced (4:1). Primary objective was the proportion of patients with 25OHD level≥50 nmol/L after 3 months in the Full Analysis Set. Secondary endpoints: PTH, falls, physical performance measured by Short Physical Performance Battery (SPPB) and safety.

Results: 518 patients were included and randomized: 413 to SrRan 2 g/vitD_3, 105 to SrRan 2 g. Baseline characteristics were similar in the two groups. Mean (±SD) age of 66.8± 8.3 yrs, L1-L4 BMD of 0.738±0.096 g/cm^2; and 25OHD of 44.1±14.6 nmol/L. The proportion of patients with 25OHD level ≥50 nmol/L at 3 months was significantly higher in SrRan 2 g/vitD_3 group than in SrRan group: 83.8% vs. 44.2% (95% CI [29.3; 49.8]). Adjusted odds ratio was estimated at 6.7 (95% CI [4.2; 10.9]). Mean 25OHD was 65.1 and 49.5 nmol/L in the SrRan 2 g/vit D_3 and SrRan groups, respectively after 3 months. These group differences were maintained over a 6-month period with 86% and 40% of patients ≥50 nmol/L and mean 25OHD levels of 66.9 and 45.4 nmol/L in the SrRan/vit D_3 and SrRan groups, respectively. PTH evolution over time was inversely correlated with 25OHD. SPPB showed a trend towards improvement in physical performance after 3 and 6 months in both groups. Falls occurred in 13.7% of patients in the SrRan 2 g/vitD_3 group and 17.3% in the SrRan group over 6 months. Safety was comparable between groups and considered good.

Conclusion(s): This study demonstrated the efficacy and safety of a fixed combination of SrRan 2 g and vitamin D_3 1000 IU over SrRan 2 g on the correction of vitamin D insufficiency in osteoporotic postmenopausal women and men.

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METABOLISM OF CHOLECALCIFEROL AND IT'S PLEOTROPIC EFFECT – "AN OPEN DOOR"

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Objective(s): The aim of this study is to assess the mechanism of Vit.D3 supplementation and its pleotropic effects associated with vit.D3 receptors (VDR) and activation of 1α-hydroxylase and 1,25-hydroxylasae enzymes. This reveal a new opportunities in the therapeutic approach of interfere autoimmune, antiviral and antitumor response in large number of diseases.

Material & Methods: We evaluated 310 women aged between 50-85 for a period of two years divided in two groups 180 with osteopenia,130 with osteoporosis. Thirty patients of both groups have systematic disease of connective tissue. All of them receive glucocorticoids and Vit.D3 in dosage of 800 IU/day and those with osteoporosis receive and bisphosphonates.

Results: Patients with osteopenia receiving Vit.D3 reduced the numbers of traumatic incidents and the vertebral and nonvertebral fracture which benefits to their quality of life. Women with osteopenia show high BMD with mean T-score (-0.4 SD) using DXA.

Conclusion(s): We recommend the use of Vit.D3 supplementation to reduce of traumatic incidents and the vertebral and non-vertebral fracture in women with postmenopausal osteoporosis.

References: 1. S Weiner, D Noff, M S Meyer, Y Weisman, S Edelste. Biochem J 1979;184:157. 2. DeLuca HF. Am J Clin Nutr 2004;80(6 Suppl):1689S. 3. Griffin MD, Xing N, Kumar R. Annu Rev Nutr 2003;23:117.

P391
DIAGNOSIS AND TREATMENT IN HAND INTERPHALANGEAL ARTHRITIS

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Objective(s): Hand osteoarthritis affects 38% of the female population and 24.5% of the male population aged >60. The clinical picture of hand osteoarthritis, according to ACR criteria, are: pain, limited movement and joint deformation.
Material & Methods: Radiological exam includes: standard X-ray, the presence of osteophytes, narrowing of joint space, bone scanning. Clinical forms of hand osteoarthritis may be either: a. generalized forms, involving 3 joints or a group of joints; b. erosive, with sudden onset, pain, swelling, erythema, joint erosion and aggravating tendency. Therapy in hand interphalangeal arthritis was determined according to 13 multicentre studies and consists of: symptomatic fast acting drugs, symptomatic slow acting drugs, and chondroprotective agents (GAG-PS).
Results: Treatment in hand osteoarthritis is similar with that of knee or hip osteoarthritis. A major role is held by the patient's compliance to treatment, elimination of mechanical risk factors, local physical therapy, analgesics, anti-inflammatories. Chondroprotective medicine may prevent, stabilize and even repair cartilage damage
Conclusion(s): Medical treatment requires individual treatment associated with physical therapy and, in most severe cases orthesis.

P392
BONE STRENGTH MIGHT BE INADEQUATELY ADAPTED TO THE EXCESS IN BODY WEIGHT IN MALE OBESE ADOLESCENTS

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Objective(s): Obesity, adolescence and male gender are known risk factors for upper limb fractures, although the mechanism by which obesity confers the increased fracture risk is unknown. Most studies investigating the influence of body fat mass on bone in adolescents used the DXA technique, which does not take into account the material and geometric bone properties. This study aims to determine the relationship between obesity and the true volumetric BMD and the bone geometry in obese adolescents.
Material & Methods: 51 obese adolescents (ObA) (BMI sds >2), aged 10-19 y, recruited at the entry of a residential weight loss program, together with 51 healthy controls matched for age, length and pubertal stage were included in this cross-sectional study. Trabecular (4%) and cortical (66%) vBMD and bone geometry, together with muscle and fat cross-sectional area (CSA) measurements were assessed at the nondominant forearm using pQCT.
Results: ObA had a higher trabecular density (215±33 vs. 199±34 mg/cm^3; p=0.02) at the distal 4% end, but comparable cortical density (997±54 vs. 995±60 mg/cm^3; p=0.89) at the proximal 66% site. Trabecular area (158±26 vs. 143±33 mm^2; p=0.02) as well as cortical area (72±21 vs. 66±16 mm^2; p=0.1) and periosteal circumference (46.8±4.7 vs. 44.5±4.8 mm; p=0.02) were slightly larger in ObA. ObA have apart from a higher fat CSA (2660±816 vs. 673±384 mm^2; p<0.001) also a higher muscle CSA (3105±840 vs. 2687±819 mm^2; p=0.012) at the proximal radius. However, the bone/muscle ratio was lower in the ObA group (5.6±0.79 vs. 5.9±0.84%; p=0.034)
Conclusion(s): Male obese adolescents have greater periosteal circumference, trabecular bone area and density at the radius, however the bone/muscle ratio is lower in the obese group. Hence, the higher forearm fracture risk in obese adolescents is not due to a low bone accumulation, but bone strength might be insufficiently adapted to the excess body weight.

P393
RISK FACTORS OF HIP FRACTURES IN RUSSIAN MEN

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Objective(s): The aim of this study was the comparison of the distribution of various risk factors in men of two age groups: 1 - from 40-69 years old and 2 - from 70 years and older.
Material & Methods: The material of the study included 184 men with hip fractures in Yaroslavl admitted to the emergency hospital. In the age group from 40-69 years old 93 patients were examined and in the age group from 70 years and older (91 patients). For the evaluation of osteoporosis risk factors a survey was carried out with regard to alcohol consumption and the content of 25(OH)vitaminD, testosterone, estradiol, prolactin, PTH, TSH in blood serum.
Results: Statistically reliable variations between the two groups were revealed according to the following risk factors: hip fracture in parents – 9 men (10.75%) in the group from 40-69 years and 3 men (3.29%) in the group from 70 years and older (ð=0.035); smoking - 77 (82.79%) and 57 (62.63%), respectively (ð=0.026); alcohol abuse and constant consumption of alcohol in 50 (53.76%) and 25 (27.47%), respectively (ð=0.003). However, in men at the age of 70 years and older 25(OH)vitaminD deficiency occurs more frequently. It has been proved statistically (in

31 men in group 2 (34.06%) and 14 men in group 1 (15.05%), respectively, (p=0.003)).

Conclusion(s): Among the risk factors of hip fractures in men at the age from 40-69 years old in comparison with the patients from 70 years and older it was revealed that hip fractures occurred more frequently in parents of the first group patients; as for the patients of this group themselves smoking, alcohol abuse were found to be more frequent, than in the patients of the second group; and they rarer had 25(OH)vitaminD deficiency.

P394
POOR BONE MICROACHITECTURE IN OLDER MEN WITH LOW MUSCLE MASS AND GRIP STRENGTH: THE STRAMBO STUDY

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Objective(s): Low relative appendicular muscle mass (RASM, kg/m^2) is associated with lower bone width in men *(Szulc, JBMR, 2005)*. In this study we assess the association of bone microarchitecture with RASM and grip strength in 810 men aged ≥60 yr.

Material & Methods: Bone microarchitecture was assessed at the distal radius and tibia by HR-pQCT (XtremeCT, Scanco). RASM was assessed by DXA. Statistical analyses were adjusted for age, height, fat mass, sex steroids, lifestyle factors and comorbidities.

Results: Men in the lowest RASM quartile (Q1) had lower cross-sectional area (CSA), trabecular area (Tb.Ar) and cortical thickness (Ct.Th) at the distal radius and tibia compared with men in the highest (Q4) quartile (6-11%, 0.33-0.64 SD, $p<0.01$-0.001, $p_{trend}<0.05$-0.001). At the distal tibia, they also had lower total volumetric BMD (Tt.vBMD), trabecular vBMD (Tb.vBMD) and trabecular number (TbN) (Q1 vs. Q4: 7-9%, 0.34-0.60SD, $p<0.05$-0.005, $p_{trend}<0.05$) and more heterogeneous trabecular distribution (TbSpSD) ($p<0.001$). Men in the lowest quartile of grip strength had lower CSA, Tt.vBMD, Tb.vBMD, TbN and Ct.Th at the distal radius than men in the highest quartile (4-10%, 0.29-0.45SD, $p<0.05$-0.001, $p_{trend}<0.05$-0.005). They also had 8% higher TbSpSD ($p_{trend}<0.005$). After adjustment on arm muscle mass, differences remained significant for Tt.vBMD, Tb.vBMD, TbN and TbSpSD. At the tibia, men in the lowest quartile of grip strength had lower Tt.vBMD, cortical vBMD (Ct.vBMD) and Ct.Th (3-8%, 0.33SD, $p<0.05$, $p_{trend}<0.05$). In multivariate models including both grip strength and arm muscle mass, CSA and Tb.Ar were associated with muscle mass (r^2=3-7%, $p<0.001$), not grip strength. Ct.vBMD correlated with grip strength (r^2=3%, $p<0.01$). Trabecular parameters correlated weakly with muscle mass (r^2=1-3%) and grip strength ($r^2\leq1\%$). Men having both low arm muscle mass and low grip strength (lowest tertiles) had 9% lower TbN (0.61SD, $p<0.005$) and 5% higher TbSpSD (0.49SD, $p<0.05$) than men in the highest tertiles of both variables.

Conclusion(s): In older men, low RASM and low grip strength are associated with poor cortical and trabecular microarchitecture. The associations remaining significant after adjustment for confounders including body size suggest direct association. Muscle mass and force are associated jointly and partly independently with bone microarchitecture, suggesting different mechanisms of linkage.

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WHAT GENERAL PRACTITIONERS EXPECT OF THEIR COLLABORATION WITH RHEUMATOLOGISTS

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Objective(s): To assess what general practitioners (GPs) expect from rheumatologists.

Material & Methods: A total of 132 GPs completed an anonymous questionnaire sent to them by 15 rheumatologists working in private practice or hospitals in *Aisne* and *Somme* (2 French *départements*).

Results: Of the 132 GPs questioned, 94 (75.8%) considered the wait for an appointment with a rheumatologist too long, and 83.1% thought the wait should not exceed 2 weeks. 97.7% of GPs always sent an accompanying letter when referring a patient to a rheumatologist. Before the change in conditions for reimbursement of patients' medical costs, half of GPs considered that 30% of their patients consulted a rheumatologist directly, without seeing them first. After introduction of the new reimbursement conditions, half of GPs reported that only 10% of their patients consulted a rheumatologist directly. Most GPs (90.4%) wanted to receive a report from rheumatologists contacted directly by patients. When referring a patient to a rheumatologist, GPs expected the rheumatologist to make a therapeutic suggestion

(100%), give a diagnostic opinion (98.5%), and perform a technical procedure when indicated (96.9%). GPs expect the rheumatologist to take over patient management completely (71.7% of cases) or just to act in a consultancy capacity (63.5% of cases), which shows that these two attitudes are not incompatible. Attitudes regarding prescriptions are less clear, since GPs expected the rheumatologist to prescribe medication (57.4%), physiotherapy (69.1%), or an orthopedic consultation (44.5%). GPs referred patients to a rheumatologist most frequently because of inflammatory disease (96.9%), nonarticular (88.4%) and vertebral (86.5%) disorders, osteoarthritis (51.7%), and osteoporosis (43.8%). The essential role of the rheumatologist in the follow-up of inflammatory disease was underscored by 83.8% of GPs, who acknowledge the importance of a quick appointment with the rheumatologist when inflammatory rheumatism is suspected (87.7%), but fewer GPs consider the rheumatologist has a role in initiating corticosteroid treatment (50.4%) and in its follow-up (35.6%).

Conclusion(s): GPs mostly refer patients to rheumatologists in cases of inflammatory, nonarticular, and vertebral disorders. They consider that the wait for an appointment is too long. GPs expect the rheumatologist to give diagnostic and therapeutic advice and to perform a technical procedure, if indicated.

P396
FRAX FOR ROMANIA: IDEAL TOOL FOR FRACTURE RISK CALCULATION

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Objective(s): FRAX® is a scientifically validated risk assessment tool, endorsed by the WHO. The web-based FRAX® calculator assesses the 10-year risk of osteoporosis fracture based on individual risk factors, with or without BMD values. Objective was the detection of fractures risk in the next 10 years for women diagnosed with osteoporosis.

Material & Methods: The study included a group of 328 patients with the diagnosis of osteoporosis, admitted to Baile Felix Rehabilitation Clinical Hospital between July 2010 - May 2011. The lot consisted exclusively of women with a mean age of 67.6±9.31 years, ranging between 34-79 years. Diagnosis of osteoporosis was established after DXA investigation in Diagnostic Center Maria, with Lunar Prodigy Advance device. Fracture risk has been calculated using FRAX calculator. FRAX version 3.3 is currently (August 2011) available in 34 country models and in 18 languages, including Romania.

Results: Mean T-score at lumbar spine in the study group was around -2.62 with -0.8 and -4.5 limits. Mean hip T-score was around-1, 65 with limits ranging from 0.1 to -4.2. The risk of major osteoporotic fracture for the next 10 years is 21.034±20.418, SD 2.25. Osteoporotic hip fracture risk had a mean value of 13.771, SD 20.558, SEM 2.270.

Conclusion(s): FRAX is helping health professionals to improve identification of patients at high risk of osteoporotic fracture. Obtained data will convince both policymakers and patients of the need of lifestyle changes and establishing adequate therapy.

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ADDRESSING THE CARE GAP IN SECONDARY FRACTURE PREVENTION IN A SOUTH EAST ASIAN HOSPITAL: EFFECTIVE INITIATION OF OSTEOPOROSIS DIAGNOSIS AND TREATMENT FOR PATIENTS WITH FRAGILITY FRACTURES THROUGH "OPTIMAL"

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Objective(s): An osteoporosis disease management program "OPTIMAL" (Osteoporosis Patient Targeted and Integrated Management for Active Living) aimed at preventing the occurrence of a second fragility fracture through case finding, medication subsidy, physiotherapy and case manager follow up was implemented in public hospitals in Singapore in 2008. We aim to describe characteristics including bone densitometry measurements, compliance to medications and exercise and the incidence of new fractures in the patients who were recruited into and completed 2-year follow up in the program at the largest hospital in Singapore

Material & Methods: Data collected during the process of screening, recruitment and follow up of patients in the program was analysed. Descriptive statistics was used to summarize the characteristics of patients. Comparison between baseline and follow up BMD measurements was done using paired T tests.

Results: 112 patients have completed the 2 yr follow-up as of December 2011. 64.3% of these patients had baseline AND 2 year follow up DXA performed. 58.9% of the patients were not on antiosteoporosis treatment at baseline. 65 out of the 66 treatment naïve patients were started on therapy following recruitment. 83.0% patients were compliant with therapy at 2 years as defined by a Medication Possession Ratio of >80%. Out of the 95 patients who agreed to embark on a weight bearing exercise program, 58.9% were compliant with exercise at the end of the 2 year follow up defined as continuing to do more than 30 minutes of such exercise, more than 2 times per week. There was a mean increase in BMD of 0.016 (p=0.000) at the total hip

and a mean increase in lumbar spine BMD of 0.045 (p= 0.045) at the end of the 2 years. 81.3% remained fracture free during the 2 years of the program.

Conclusion(s): In the 3 years following inception, the OPTIMAL program at our hospital has successfully identified and evaluated most patients with fractures. The ultimate success of the program will be measured by the subsequent fracture experience of these patients, but clear and effective steps in evaluating persons with fractures with BMD testing and offering treatment options have been initiated.

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THE RELATIONSHIP BETWEEN MORPHOMETRY AND CLINICAL INDICATORS OF OSTEOPOROSIS

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Objective(s): To assess defined anthropometric indicators (reduction of body weight, the presence of kyphosis, occiput-wall and rib-pelvis distance, number of teeth) and to correlate the outcomes with BMD and the presence and grade of vertebral fractures.

Material & Methods: Group of patients consisted of 103 postmenopausal women, in whom at least one defined anthropometric indicator was present. BMD was measured with a Hologic Discovery densitometer at standard sites. We used a lateral morphometric scan and a special software IVA to identify vertebral fractures. These fractures were evaluated with the use of the Genant scoring system.

Results: We found a statistically significant correlation between the values of BMD and body weight and rib-pelvis distance for both sites of measurement. The values of BMD at the site total hip significantly correlated also with the presence of thoracic kyphosis, occiput-wall distance and age. With the help of a lateral vertebral scan we identified 55 patients with a fracture, 24 of them had multiple fractures. The total number of identified fractures was 106. We found a positive correlation between the values of BMD and the severity of fractures for both sites of measurement. There was no significant correlation between anthropometric indicators and number or severity of fractures.

Conclusion(s): According to published information, low body weight seemed to be the best predictor of low bone density. The occiput wall distance more than 0 cm and rib-pelvis distance equal or less than 2 fingers seemed to suggest an occult vertebral fracture. The results of our study partly confirm these findings. We found a statistically significant positive correlation between low body weight and values of T-score at both sites of measurement. Values of BMD at the site of total hip correlated also with BMI, age, presence of kyphosis, occiput-wall distance and loss of body height. We assume that there could exist a relationship between these indicators and vertebral fractures as well. Proving this hypothesis could lead to better identification of patients at high fracture risk even for asymptomatic fractures.

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COMPARISON OF BONE MINERAL DENSITY AND ULTRASOUND PARAMETERS IN PATIENTS WITH POLYCYSTIC OVARIAN SYNDROME AND TYPE 2 DIABETIC WOMEN

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Objective(s): Skeletal health in patients with patients with polycystic ovarian syndrome (PCOS) and type 2 diabetes mellitus (T2DM) is an area of interest and controversy. QUS and DXA techniques are helpful in detecting bone deficits in patients. The aim of the study was to compare BMD measurements and quantitative ultrasound parameters between the patients with polycystic ovarian syndrome and the BMI matched type 2 diabetic women.

Material & Methods: Ten women with PCOS were weight-matched to 17 women with T2DM. Lumbar spine BMD, femoral neck BMD were measured by DXA. The QUS examination consisted of measuring the attenuation (BUA) and the speed of the ultrasound (SOS) transversing the calcanei. Differences between the groups were analyzed by Student's t-test. Correlation analysis was also performed between QUS and BMD measurements in both groups.

Results: Patients with T2DM had higher BMD in the lumbar spine (L2-L4) than patients with PCOS (1.09 g/cm^2 vs. 0.992 g/cm^2, p=0.04), but we found no statistically significant differences in the femoral neck density (0.984 g/cm^2 vs. 0.945 g/cm^2). QUS measurements showed similar values in both groups: BUA (70.3 dB/Mhz vs. 68.7 dB/Mhz, p=0.378), SOS (1531 m/s vs. 1532 m/s, p= 0.578). There was a moderate and significant positive relationship between SOS and BMD measurements in both groups.

Conclusion(s): In conclusion, the present study compared differences in bone mass measurement using two different methods, namely DXA and QUS. Our results indicate that QUS can provide useful information in the skeletal assessment of patients with PCOS and T2DM.

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NEW CONCEPT IN COMBATTING THE PAIN IN OSTEOPOROSIS AND ARTHROSIC DISEASE

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Objective(s): In order to produce the physical pain and perceive it, a series of steps are undergone, namely: a) peripheral tissue phase ('peripheral sensitization'); b) transmission through specialized structures phase; c) integration and organization of pain phase. The peripheral phase takes place after a well-known algorithm. Thus the pain of arthritis and osteoporosis diseases occurs as a consequence of the tissue injury through mechanical stimuli followed by the release of algogenic and hyperalgesic substances that leads to stimulation of the superficial or profound nociceptors, respectively. Purpose was to identify another type of pain-killer physical therapy. The new pain control model is based on different principles from those of conventional electrotherapy (gate theory supplemented by the release of the two opioid systems, endorphins and enkefalins).
Material & Methods: A novel delivery modality concept is disclosed based on chaotic oscillator type electric energy injection.
Results: The electric current injected in parallel to mimic the normal ion fluxes under the control of the central nervous system, offer a mean to intervene in the system function to reduce suffering. The physiological premise of the proposed new form of the energy delivery modality is appealing due to the known fact that physiological subsystem in normal healthy subjects preset a *natural variation of the chaotic type*.
Conclusion(s): • A novel electrotherapy delivery modality concept is introduced based on chaotic oscillator waveforms.

- The energy transfer among autonomous systems is mainly dependent on the system inherent synchronizing capacities.
- By similarity two chaotic oscillator models have been chosen to be used in a two case clinical trial. Future work plans: multiple model interaction, time regime experiments and energy delivery efficiency estimation.

P401
MANAGEMENT OF OSTEOPOROSIS BY GENERAL PRACTITIONERS

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Objective(s): To assess how general practitioners diagnose and manage osteoporosis.
Material & Methods: A group of rheumatologists sent 20 general practitioners (GPs) a questionnaire on osteoporosis management: detection, diagnostic workup, and treatment.
Results: The survey included 60 women: 24 (40%) aged 50-60 years, 18 (30%) aged 60-70, 17 (28%) aged 70-80, and 1 (2%) woman over 80. Osteoporosis was detected by GPs in 75% of cases. The main reasons for testing were risk factors (44% of cases), history of fracture (29%), postmenopausal patient (25%), and family history of osteoporosis (20%). GPs diagnosed osteoporosis on the basis of one (41%), 2 (32%), or 3 criteria (19%). When osteoporosis was suspected, further tests were done in 97% of cases. The techniques used were: laboratory tests (29%) and/or X-rays (20%), and in 100% of cases DXA, which was done by a radiologist (63% of cases) or rheumatologist (33%). The GPs considered that in 98% of cases the DXA data were useful in the treatment decision-making process, and revealed densitometric osteoporosis in 84% of cases. The GPs put more store by the densitometric values (83%) than by the clinical context (26%). When osteoporosis was diagnosed, a specific treatment (apart from vitamin D and calcium) was started in 82% of cases, mostly by the GPs (53%), or by a rheumatologist (17%). Depending on the GP, the principal criterion for treatment choice was antifracture efficacy (57%), followed by mode of action (20%), and dose regimen (14%). The treatment of 4 patients was stopped by the GP, the rheumatologist, or the patient herself. The main reasons for treatment discontinuation, in order, were onset of side effects and lack of efficacy. Osteoporosis was considered to be more serious than osteoarthritis by 78% of GPs, but less serious than diabetes (70%), Alzheimer's disease (65%), and inflammatory rheumatism (58%).
Conclusion(s): DXA was routinely performed following identification of an osteoporosis risk factor, which was the principal criterion used by GPs in making a treatment choice. However, screening for clinical risk factors for osteoporosis is often insufficient and additional effort is needed to inform women and GPs.

P402
REASON FOR DISCONTINUATION OF OSTEOPOROSIS TREATMENTS

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Objective(s): To analyze the reason for discontinuation of osteoporosis treatments prescribed by rheumatologists.
Material & Methods: During medical history taking with their osteoporotic patients, 8 rheumatologists in Finistère

(French *département*) recorded demographic data (age, sex), osteoporosis treatments (discontinued or ongoing), and reasons for treatment discontinuation.

Results: The survey included 75 patients (89.3% women of mean age 71 years; 10.7% men of mean age 73 years), 79.5% of whom had been treated for a mean 23 months. Osteoporosis treatments included bisphosphonates (61.6% of cases), strontium ranelate (24.4%), raloxifene (6.4%), teriparatide (6.4%), and hormone replacement therapy for the menopause (1.3%). The rheumatologists estimated in 74.4% of cases that the prescribed treatments were justified. Osteoporosis treatments were stopped particularly among the under-60s, by a general practitioner in 53.8% of cases, by a specialist (19.3%), or by the patients themselves (26.9%). In 54% of cases, the treatment was discontinued within one year of initiation: first month (13.2% of cases), 1-3 months (14.5%), 3-6 months (13.2%), 6-12 months (13.2%). Gastrointestinal intolerance was seen in 33% of cases, with no age effect. Allergy was seen in 3% of cases, solely in the over-70s. Fractures occurred during treatment in 17% of cases, and were more frequent in the over-70s. The rheumatologists prescribed another osteoporosis treatment in 60% of cases, the initial treatment being a bisphosphonate (47% of cases), strontium ranelate (40%), or teriparatide (6%). After a bisphosphonate, the rheumatologists prescribed another bisphosphonate (33% of cases), strontium ranelate (33%), teriparatide (17%), or raloxifene (17%). After strontium ranelate, they prescribed a bisphosphonate (79% of cases), teriparatide (14%), or hormone replacement therapy (7%). After teriparatide, a bisphosphonate was always prescribed.

Conclusion(s): These results suggest that discontinuation of osteoporosis treatments is mainly related to the onset of a side effect or to lack of efficacy leading to a fracture during treatment. A new treatment was then prescribed in over half of the cases. Whether treatment was discontinued by the rheumatologists or by the patients, the main reason was gastrointestinal intolerance, irrespective of the age of the patients.

P403

EFFECT OF AGE AND SEX OVER WOMAC SCORE IN NORMAL AND DISEASED INDIVIDUALS

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Objective(s): WOMAC questionnaire is one of the most accepted scoring systems for knee osteoarthritis. The WOMAC score thus obtained has a diagnostic and prognostic significance. It is also helpful in assessment of severity of knee osteoarthritis at any given point of time. However being a subjective questionnaire, there may be certain bias in the WOMAC score. Like pain perception and tolerance differ from person to person, hence it may give false low values for patient with poor pain tolerance and false high value for someone with greater endurance for pain. Also age and sex may affect WOMAC score to some extent. The bias due to pain tolerance may be reduced by proper clinical screening. The present study is about the effect of age and sex over WOMAC score. Aim of study is to calculate the WOMAC score from WOMAC questionnaire for normal as well as diseased males and females compare it with each other in reference to age and sex.

Material & Methods: A prospective case control study, conducted within a period of one year recruiting 100 cases and 50 controls. All cases and controls were asked to fill WOMAC questionnaire and advised to get a bilateral knee radiograph done for confirming severity of disease with Kellgren Lawrence grading scale. Both the cases and controls were compared within their group as well as with each other to obtain the trend of WOMAC score in reference to age and sex.

Results: Out of 100 cases and 50 controls there is an inversely proportional trend in most of the groups in reference to age. In mild, moderate and severe subgroups, similar inversely proportional trend exist in reference to age with exceptions in severe sub group. Normal males score slightly better than normal females, but diseased males have slightly poor WOMAC score over diseased females.

Conclusion(s): An inversely proportional relation between the WOMAC score and age is observed. This fact encourages about setting different inference criteria of obtained WOMAC score for severity of disease at different ages. On the other hand sex has no major impact over WOMAC score.

P404

STATE OF BONE MINERAL DENSITY AND THE PREVALENCE OF VERTEBRAL DEFORMITIES IN PATIENTS WITH PSORIATIC ARTHRITIS

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Objective(s): Psoriatic arthritis (PsA) is a chronic inflammatory arthritis associated with psoriasis that occurs in 0.3-1% of the population. PsA is usually seronegative for rheumatoid factor and is classified among the spondyloarthropathies. PsA develops in up to one-third of patients with psoriasis and is one of possible reasons of secondary osteoporosis. The aim of this study was to assess BMD, bone

quality and the prevalence of vertebral deformities in patients with psoriatic arthritis.

Material & Methods: BMD was measured by DXA at lumbar spine (anterior-posterior projection at L1-L4) and at femoral neck. Vertebras were assessable with lateral vertebral assessment at the thoracic and lumber spine. We used the Genant's classification to evaluate a grade of vertebral deformity. Spiral deformity index proposed as surrogate marker of bone quality, was calculated by summing the severity and the number of the vertebral fractures.

Results: 50 patients (26 men and 24 women; age 46.4± 5.2 years; duration of PsA 9.4±5.9 years) and in 30 healthy controls, were studied matched for sex, age, height, weight and BMI. BMD was statistically significantly lower in patients with psoriatic arthritis either at spine (BMD 0.850 [0.803:0.921] g/cm^2), than in control group (BMD 1.180 [1.054:1.323], $p<0.001$) and at femoral neck (BMD 0.797 (0.100) g/cm^2) in comparison with controls group (BMD 0.951 (0.107) g/cm^2, $p<0.001$).

46% of patients had vertebral deformities (n=23), that was statistically higher than in control group (5.0% n=1, p= 0.04). In 8 subjects (38%) multiple fractures were present. 11 subjects (42%) had from 1 to 5 deformities. Only 4 patients (20%) had deformities 1 thoracic or 1 lumbar vertebrae.

Conclusion(s): Decrease of BMD and increase in frequency of vertebral deformities is observed statistically more frequent in patients with PsA than in control group. In 38% out of the group of examined vertebral fractures were detected. The presence of PsA in patient is a significant risk of development of vertebral deformities and fractures.

P405
FIVE-YEAR INCIDENT FRACTURE RISK ASSESSED BY QUANTITATIVE MULTISITE ULTRASOUND: THE CANADIAN MULTICENTRE OSTEOPOROSIS STUDY

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Objective(s): To assess the ability of Beam-Med Multisite QUS to predict fracture risk over a 5-year follow-up.

Material & Methods: The participants included for these analyses were a subset of the Canadian Multicentre Osteoporosis Study. QUS estimated bone strength (speed of sound in m/s) at three anatomical sites: distal radius, tibia and phalanx. After QUS assessment, all participants were prospectively followed for five years during which incident fractures were recorded. Further, extensive questionnaires were employed at the time of QUS measurement. Two survival analyses were completed for each skeletal site - a univariate analysis and an adjusted multivariate analysis controlling for age, antiresorptive use, femoral neck BMD, number of diseases, previous fractures, BMI, sex (in combined model), parental history of hip fracture, current smoking, current alcoholic drinks >3 per day, current use of glucocorticoids, and diagnosis of rheumatoid arthritis. The unit of change for regression analyses was 150 m/s, approximately one standard deviation for all measurement sites. Separate analyses were completed for all clinical fractures, nonvertebral fractures and hip fractures for the whole group and by sex.

Results: There were 2633 (70.4%) women and 1108 (29.6%) men included and they experienced 204 incident fractures over five years of observation (5.5% fractured). When stratified by sex, incident fractures occurred in 177 women (4.8%) and in 27 men (0.7%). Hip fracture events occurred in 35 individuals (30 in women and 5 in men) and non-vertebral fracture events occurred in 160 individuals (139 in women and 21 in men). Univariate models revealed statistically significant predictive ability for all three measurement sites in the combined group and for women alone for all three fracture types, but not for the men's group. The adjusted model found that measures at the distal radius and tibia in the combined and women's groups could significantly predict all clinical fractures and nonvertebral fracture within the next five years.

Conclusion(s): The Beam-Med MultiSite QUS provides significant five-year fracture prediction, independent of BMD and other significant risk factors for fracture, when measured at the distal radius and tibia sites.

P406
MULTICENTER RANDOMIZED TRIAL OF INTERACTIVE EDUCATIONAL PROGRAM IN PATIENTS WITH OSTEOPOROSIS

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Objective(s): Lifestyle risk factors play an important role in development and progression of osteoporosis. The adherence to therapy in osteoporosis patients is usually low and leads to less effectiveness of the treatment. We studied the effectiveness of the new educational interactive 4-day program in adherence to treatment and life style modification in patients with osteoporosis.

Material & Methods: It was a multicenter clinical randomized open-label study in patients with osteoporosis which compared effectiveness of newly developed 4-day interactive structured educational program in small groups and brochure containing information on main aspects of osteoporosis. Six health care centers involved in management of patients with osteoporosis from different Russian cities participated. Patients were asked to keep a diary. Diet, physical activity, treatment pattern as well as fractures were assessed by questionnaire at 3, 6 and 12 months after the education. Patients were considered to be adherent if they took the antiosteoporotic drug not less than 80% of the time.

Results: Overall, 479 patients were randomized into two groups (241 in interactive program and 238 in control group). 435 subjects (90.8%) were available for contact at the end of the study. The majority of patients took calcium and vitamin D supplements 12 months after both types of education, and number of those adherent was equal (78.6% in interactive group and 80.1% in controls, p=0.69). Although, the number of patients who took antiosteoporotic treatment did not differ, the proportion of patients adherent to this therapy was greater in interactive program group (55.4% vs. 35.1%, p<0.0001). Patients of both groups changed their life style, but interactive program group did it more frequently: the proportion of those who increased the intake of dairy products was 58.6% in interactive program group and 45.2% in controls (p=0.0058), and proportion of those who increased their physical activity was 55.3% and 42.7% correspondingly (p=0.009).

Conclusion(s): The interactive structured educational program in small groups was more effective than a brochure in enhancing the adherence to the treatment and life style modification in patients with osteoporosis.

P407

IMPACT OF A THEORY-BASED OSTEOPOROSIS EDUCATION INTERVENTION ON CALCIUM AND VITAMIN D SUPPLEMENT INTAKE IN OLDER ADULTS: A RANDOMIZED CONTROLLED TRIAL

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Objective(s): This study determined whether DXA screening alone or combined with a theory-based education intervention, results in men and women's decision to start or increase calcium and vitamin D supplement intake to prevent or manage osteoporosis.

Material & Methods: This study utilized data from an ongoing randomized controlled trial conducted in Saskatchewan, Canada. Eligible participants were men and women 50 years of age and older, referred by their healthcare provider to undergo DXA screening for the first time in the local hospital. Participants (n=161, mean age=59.9 years) were randomly assigned to an intervention group (n=78) or control group (n=83). All participants underwent DXA screening and completed a series of measurements and questionnaires assessing health behaviours, health beliefs, and dietary intake. The intervention group also received osteoporosis education, using the Health Belief Model, a theory of health behaviour change, as a guiding framework. Six months after baseline, all participants completed a series of follow-up measurements and questionnaires.

Results: Daily calcium supplement intake increased in both the intervention and control groups. On average, the intervention group increased calcium intake from 369.9 mg to 792.9 mg ($t(77)=-7.89$, $p<0.01$), while the control group increased intake from 427.8 mg to 594.6 mg ($t(82)=-3.91$, $p<0.01$). Daily vitamin D supplement use significantly increased from 737.2 IU to 1186.1 IU ($t(77)=-6.40$, $p<0.01$) in the intervention group, and 686.9 IU to 1009.3 IU ($t(82)=-5.48$, $p<0.01$) in the control group. At follow-up, there was a significant difference between groups for supplemental calcium intake, but not vitamin D intake.

Conclusion(s): This study provided evidence that an education intervention based on the Health Belief Model is successful in increasing calcium supplement intake, particularly in men and women with no prior knowledge of their bone density. The Health Belief Model may be useful when planning and conducting osteoporosis education interventions; however more research in this area is needed.

Disclosures: This research is supported by a Canadian Institute of Health Research Doctoral Research Award and the Saskatchewan Health Research Foundation.

P408

ATYPICAL FEMORAL FRACTURES: RADIOGRAPHIC AND HISTOMORPHOMETRIC FEATURES IN 9 PATIENTS

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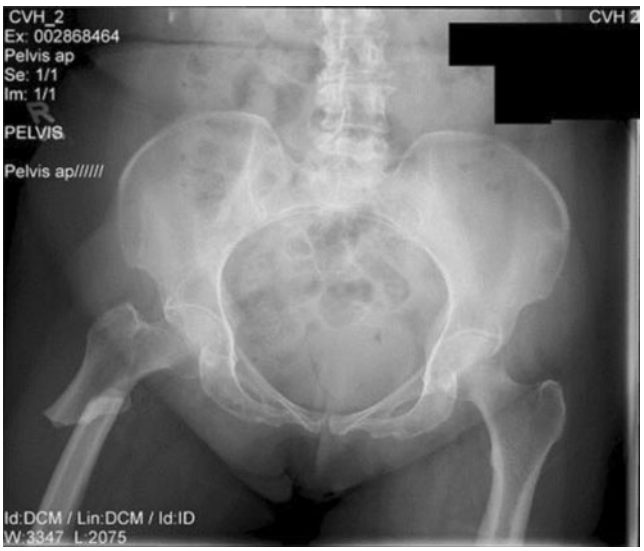
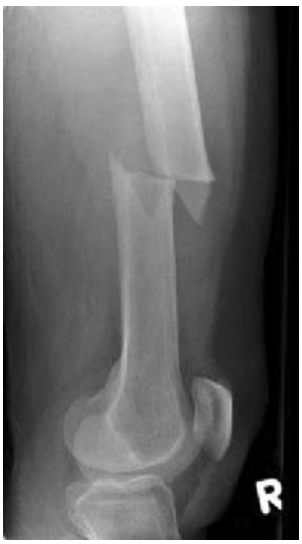
Objective(s): This study describes characteristics and histomorphometric and radiographic features of atypical femoral fractures (AFF) as seen in 9 cases referred for evaluation.

Material & Methods: All patients referred for evaluation of AFF were reviewed. Patients meeting the ASBMR criteria for AFF were further evaluated and tetracycline labelled bone biopsies were completed. Radiographs were reviewed by a musculoskeletal radiologist.

Results: All fracture lines were transverse or short oblique with thickened cortices. We report 9 cases of AFF in patients on long term bisphosphonate (BP) therapy. 6 of 7 fractures occurred without a fall or direct trauma to the femur with 1 case occurring after a fall from standing height. All patients were female; average age was 67 years (range 54-80 years). 2 of the 9 cases were of Chinese descent, 2 were East Indian with 3 being Caucasian. Average BP durations of us was 8.5 years (range 7-14 years). 5 of 9 patients were on alendronate alone, 2 patients were on risedronate. 1 patient had received 18 months of teriparatide, 3 years prior to AFF and had received a total of 10 years of BP use prior to teriparatide.





Conclusion(s): AFF in association with long term BP use are being seen in a disproportionately large number of Asian women. Further evaluation of all AFF with identification of predisposing key clinical risk factors is needed. Improved understanding of the pathophysiology may be gained with further histomorphometric data in larger numbers of patients.

P409
BODY COMPOSITION OF POSTMENOPAUSAL WOMEN WITH DIFFERENT CARDIOVASCULAR RISK (SCORE)

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Objective(s): Low weight body is a risk factor for osteoporosis and related with fractures. However, people with overweight are also subject to osteoporosis which is associated with increased cardiovascular risk.

Objectives: To study relationship between bone mineral content, lean and fat mass in postmenopausal women with low and increased risk of cardiovascular diseases.

Material & Methods: 100 postmenopausal women were underwent complete medical history, clinical examination, biochemical blood test (lipid profile) and examination of body composition. BMD, BMC, fat and lean mass were measured by DXA (Hologic Delphi W). Anthropometric measurements included BMI, calculated as weight (kg)/height (m^2). Patients were divided into subgroups according to their BMI: normal (BMI=18.5-24.9), overweight (BMI=25-29.9), obesity (BMI=30 and more). Assessment of cardiovascular risk was calculated by electronic version of the SCORE.

Results: Duration of menopause is directly correlated with severity of osteoporosis ($p<0.001$) and degree of cardiovascular risk ($p<0.001$). Significant skeletal alterations (osteoporosis and osteopenia) were found in 63% of patients, 49% among them had overweight and 27% (obesity). BMC(%) and lean mass(%) in the central and peripheral regions of the skeleton are negatively correlated with cardiovascular risk, while fat mass (%) is correlated positively. Heightened atherogenic coefficient is associated with osteoporosis ($p<0.05$) and increased degree of SCORE ($p<0.01$).

Conclusion(s): The results confirm that low bone mass is associated with increased cardiovascular risk. Obesity may not be considered as a protective factor against osteoporosis for postmenopausal women.

P410
THE IMPACT OF RISK FACTORS AND FRACTURES ON THE EFFICACY AND SAFETY OF IBANDRONATE IN PATIENTS WITH OSTEOPOROSIS

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Objective(s): To confirm the efficacy and safety of 1 year ibandronate in OP pts: 150 mg oral monthly or quarterly intravenously; to analyze the impact of risk factors and fractures on the efficacy of ibandronate treatment.
Material & Methods: 179 pts with primary OP, average 62.1 y, average menopause 16.8 y, treated 1 year with oral monthly or quarterly iv injection of ibandronate were included. BMD was measured by DXA Hologic at lumbar spine and proximal femur; OP is defined as the mean BMD expressed as a T-score <-2.5 and≥-5.0. The profile RTG of TH-LS spine was done before and after the therapy. Substitution of the optimal dose of vitamin D and calcium was applied
Results: Previous fracture (37.6%) and smoking (33.5%) were the most common risk factors;75.1% pts had OP and more than one risk factor. Total number of vertebral and non-vertebral fractures at baseline was 71; 25 vertebral, 46 non-vertebral. After therapy, the number of new fractures was 18; 8 vertebral, 10 nonvertebral. After 1 year of oral monthly ibandronate BMD was increased at the spine for 3.0%,hip 3.5%,after ibandronate injection spine BMD was increased for 4.6%, hip 3.6%. Spine and hip BMD increase was higher in pts with OP and multiple risk factors (spine, p=0.000, hip, p=0.01) than those with one risk factor (spine, p=0.04; hip, p=0.02). Pts with multiple fractures and OP had a greater increase in spine and hip BMD (spine, p=0.000; hip, p=0.001) compared to those with 1 or without fracture (spine, p=0.04; hip, p=0.05). Pts with OP and previous BF treatment had no sign. BMD increase at the spine (p=0.334), nor on the hip (p=0.2) opposed to those not previously treated, with statistically sign. BMD increasing (spine, p=0.000, hip, p=0.006). Adverse events were rare, did not lead to stopped the treatment:7.8%pts had a flu like sy,1.1% LS pain,1.1% SVPT, stopped after medical therapy
Conclusion(s): Ibandronate is effective, safe drug, orally applied monthly or quarterly iv. in OP pts, especially those with multiple risk factors and multiple fractures.

P411
BONE MINERAL DENSITY (BMD) ASSESSMENT IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM (PHPT) BEFORE AND ONE YEAR AFTER PARATHYROIDECTOMY (PTX)

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Objective(s): PHPT is a frequent cause of secondary osteoporosis. Increase in BMD following PTX has been reported in numerous studies. Subclinical PHPT is increasingly diagnosed in osteoporosis patients. It is unclear whether patients with a milder phenotype might benefit from PTX. This study was to investigate BMD changes in PHPT patients before and one year after PTX, and to compare BMD changes between patients with classic PHPT and a milder phenotype of PHPT.
Material & Methods: Single center longitudinal study of 55 PHPT patients aged 63±10.6 years with mean T-score at the spine, femoral neck and total hip of -2.51±1.29, -2.34±0.74 and -1.8±0.82, respectively. A history of fracture and osteoporosis were reported in 41.8% and 90.7% of cases. 23 patients had both an elevated pre-PTX serum total and ionized calcium level (group 1), while the remaining 32 had normal pre PTX total and/or ionized calcium (group 2). All patients were operated on with complete resolution of PHPT. BMD was evaluated using QDR 4500 (Hologic) before and one year after PTX.
Results: In the 55 PHPT patients, BMD increased significantly one year after PTX by 3.2±5.1% at the spine (p=0.0001), 3.0±5.6% at the femoral neck (p=0.0002) and 3.3±5.3% at the total hip (p=0.0001). In group 1 patients, BMD increased significantly by 4.8±4.5% at the spine (p=0.0001), 4.6±5.9% at the femoral neck (p=0.0019), and 2.9±4.5% at the total hip (p=0.0005). In group 2, BMD increased significantly by 1.8±5.1% at the femoral neck (p=0.031) and 2.7±6.1% at the total hip (p=0.048) but not at the spine (2.0±5.2% gain, p=0.098). The BMD gain was more important at the spine in group 1 than in group 2 (p=0.0076), but there was no difference in BMD gain between the 2 groups at the femoral neck and total hip (p=0.15 and P=0.16).
Conclusion(s): In these PHPT patients, BMD increased significantly after PTX at the spine and hip. Even in patients with normal pre PTX serum total and/or ionized calcium, a significant increase was observed at the hip. This highlights the need for biological exploration to exclude secondary causes of low bone mass.

P412
ALTERED BONE FATTY ACID METABOLISM IN OBESITY AND AFTER DIET-INDUCED WEIGHT LOSS

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Objective(s): Obesity has complex effects on bone tissue. Overweight results in increased bone mass but is associated with increased bone marrow adiposity with possible negative effects on bone metabolism. Free fatty acids (FFAs) serve as an energy source for several tissues. FFA tissue uptake is increased in obesity especially in myocardium, liver and adipose tissue but is reduced after weight loss. There is currently no information on FFA utilization in bone tissue of normal or obese subjects.
To understand the crosstalk between energy metabolism and bone, we analyzed bone FFA utilization using positron-emission tomography (PET) imaging and serum markers of bone turnover in controls and obese subjects before and after very low calorie diet (VLCD).
Material & Methods: Controls (n=9, BMI=25.1±3.3) were imaged at baseline and obese subjects (n=17, BMI=33.9±4.0) before and after a six-week VLCD using [18 F]-fluoro-6-thia-heptadecanoic acid ([18 F]-FTHA) for the assessment of FFA tissue uptake. This was measured in the bone marrow area at mid-femoral diaphysis and in the trabecular bone of L3 and T7 vertebral bodies.
Results: At baseline FFA uptake in the femoral diaphysis was significantly higher in obese subjects than in controls (0.37±0.16 vs. 0.15±0.07 μmol/(min*dl), $p<0.01$). In obese the FTHA uptake was lower in femurs than in vertebrae (0.37 vs. 1.41 μmol/(min*dl), $p<0.001$), but did not differ between thoracic and lumbar vertebrae. After VLCD obese subjects had lost weight in average 12 kg (101±12 kg to 89±11 kg, $p=0.008$). Subsequently, FFA uptake was reduced by 19% in femoral diaphysis ($p<0.03$). The reduction in FTHA uptake was greater in vertebrae (-27%, $p<0.01$) and more pronounced the higher the uptake was at baseline. Interestingly, VLCD resulted in increased levels of serum resorption marker CTX and formation marker PINP but the ratio of CTX/PINP remained unaltered.
Conclusion(s): Our results indicate that FFA uptake in bone marrow is increased in obese patients and that weight loss reduces FFA utilization in bone. Weight loss results in a balanced increase in bone turnover markers suggesting a link between bone marrow fat and bone turnover. Finally, the differing FFA metabolism between femur and vertebrae implies a functional difference in these tissue compartments.

P413
THERAPY WITH STRONTIUM RANELATE IMPROVES BONE MINERAL MASS, BONE MINERAL DENSITY AND GEOMETRICAL PARAMETERS OF BONE IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN: 2 YEARS RESULTS - A PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY (PQCT) OF THE TIBIA STUDY

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Objective(s): We assessed the effects of strontium ranelate on bone mineral mass, volumetric BMDs and geometrical properties of the bone in postmenopausal osteoporotic women using tibia pQCT.
Material & Methods: We studied 32 postmenopausal women who received 2 g strontium ranelate per os daily for 2 consecutive years. Inclusion criteria: 1) age >50 y, 2) postmenopausal status >2 y, 3) DXA measurement (spine/hip) with T-score<-2.5 SD 4) Tibia pQCT before, 1 y and 2 y after treatment. Exclusion criteria: 1) Secondary osteoporosis' conditions, 2) Other bone metabolic diseases, 3) Previous use of bone anabolic agents, 4) malignancies. pQCT of the tibia was performed in all patients (XCT 2000, Stratec Medizintechnik, Pforzheim, Germany) and three slices were obtained at the 4% (trabecular), 14% (subcortical and cortical) and 38% (cortical bone) of tibia length sites. We studied 15 variables per slice, mainly total bone content (TOT_CNT), total density (TOT_DEN), trabecular content (TRB_CNT), trabecular density (TRB_DEN), cortical content (CRT_CNT), cortical density (CRT_DEN), subcortical content (CRTSUB_CNT), subcortical density (CRTSUB_DEN), cortical area (CRT_A), subcortical area (CRTSUB_A) and mean cortical thickness (CRT_THK). Results were corrected for strontium ranelate atomic weight. We performed statistical analysis (t-test, ANCOVA) - data expressed as mean±SD
Results: Patients' mean age was 64.3±12.6 y and mean tibia length 352.14±65.03 mm. After 2 years of treatment, we report increases at the 14% site in TOT_CNT (181.04±21.51 vs. 183.05±21.34, $p=0.006$), SUBCRT_CNT (168.64±19.58 vs. 170.48±19.11, $p=0.005$), and CRT_CNT (62.91±18.58 vs. 66.63±20.63, $p=0.021$).At the 38% site we report increases in TOT_CNT (276.46±36.24 vs. 278.94±35.71, $p=0.09$), SUBCRT_CNT (205.86±25.60 vs. 208.59±25.47, $p<0.000$), CRT_CNT (160.09±31.19 vs. 168.84±32.62, $p<0.000$) and CRT_DEN (1192.46±14.50 vs. 1203.15±17.05, $p<0.000$). We also report increases in CRT_A (134.18±25.73 vs140.13±26.57, $p<0.000$) and mean CRT_THK (2.18±0.44 vs. 2.28±0.46, $p=0.001$).

Conclusion(s): Our results indicate that 2 years therapy with strontium ranelate increase significantly bone mass, volumetric cortical densities, cortical area and mean cortical thickness in postmenopausal osteoporotic women.

P414
INCORPORATING PATIENT REPORTED OUTCOME MEASURES IN CLINICAL PRACTICE: DEVELOPMENT AND VALIDATION OF A MULTIDIMENSIONAL QUESTIONNAIRE FOR OSTEOPOROSIS

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Objective(s): Osteoporosis is embarking on a fundamental redesign of the patients' care. It became mandatory not only to recognize BMD, fracture or falls risks, but also the impact of the disease and the subsequent fractures on the patient life. Measurement of patient reported outcomes have become critical in both standard clinical practice and long term observational studies. Objective was to assess validity; reliability and responsiveness to change of a patient self-reported questionnaire which can assess construct outcome measures of patients with osteoporosis and correlated low trauma fractures.
Material & Methods: 354 postmenopausal women were included in this work. The questionnaire was developed by integrating information obtained from the patients based on the Rasch model for ordered response options. The questionnaire includes assessment for functional disability, quality of life, VAS for pain (whether it is secondary to vertebral or nonvertebral fracture), as well as global status. All patients attended 2 visits: at baseline and at 6 months. The psychometric properties of the questionnaire were evaluated in terms of comprehensibility, validity and internal consistency in baseline, and in terms of test-retest reliability and responsiveness to change in visit at month and visit at 6 months.
Results: The questionnaire was reliable as demonstrated by a high-standardized alpha (0.891-0.932). The questionnaire items correlated significantly ($p<0.01$) with the occurrence of low trauma fracture, high FRAX and falls risk scores. Changes in functional disability, quality of life as well as pain score showed significant variation ($p<0.01$) with the management of the fracture. Moderate to high correlations were found between the Functional disability and quality of life scores with ECOS-16 score (0.64-0.82). The Minimal Clinically Important Difference suggested a change of 0.2 points representing the least improvement in general health status due to their osteoporosis. The PROMs questionnaire showed also a high degree of comprehensibility (9.4).
Conclusion(s): Integrating patient reported outcome measures into standard clinical practice is feasible and applicable. This version of multidimensional PROMs questionnaire was found to be valid and reliable. It provides informative quantitative measure for the patient's condition at the time of assessment and facilitate monitoring of the patient's response to therapy.

P415
A DOUBLE-BLIND, RANDOMIZED, DOSE-FINDING, PHASE 2 STUDY OF ODANACATIB, A POTENT CATHEPSIN-K INHIBITOR, IN JAPANESE PATIENTS WITH OSTEOPOROSIS

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Objective(s): The objectives of this study were to evaluate the efficacy and safety of oral treatment with placebo or 10, 25, or 50 mg of odanacatib once-weekly for 52 weeks in a double-blind, randomized, multicenter study in Japanese female and male (4%) patients with osteoporosis.
Material & Methods: The primary efficacy endpoint was the percent change from baseline at 52 weeks in lumbar spine (L1~L4) BMD. Secondary efficacy endpoints included the percent change in BMD at total hip, femoral neck, trochanter, and bone biomarker changes after treatment for 52 weeks.
Results: In this study, 287 patients were randomized to placebo (N=73) or odanacatib 10 mg (N=74), 25 mg (N=71), or 50 mg (N=69). The least-squares means (LS mean) percent changes from baseline at 52 weeks in lumbar spine (L1~L4) BMD were 0.5%, 4.1%, 5.7% and 5.9% in the groups receiving placebo, 10 mg, 25 mg and 50 mg of odanacatib, respectively. The LS mean percent changes from baseline at 52 weeks in total hip BMD were -0.4%, 1.3%, 1.8% and 2.7% in the placebo, 10 mg, 25 mg and 50 mg of odanacatib, respectively. The changes in femoral neck and trochanter BMD were similar to those at the total hip. Odanacatib reduced bone markers of resorption in a dose-dependent manner. However, the reductions of bone formation markers were of a smaller magnitude than the reductions of bone resorption markers. After 52 weeks, for patients once weekly receiving ODN 50 mg, geometric mean percent changes from baseline (SE) were -58.6 (3.3) for urine NTX/creatinine (N=51), but only -25.9 (3.2) for serum BSAP (N=54). The tolerability and safety profiles

were similar among all treatment groups with no dose-related trends in any adverse events.

Conclusion(s): Once weekly treatment with odanacatib for 52 weeks increased lumbar spine and all hip site BMD in a dose-dependent manner and was well-tolerated in Japanese patients with osteoporosis. In addition, the data from this study were similar to the results of the phase 2 dose-finding study (Protocol 004) of mostly Caucasian, postmenopausal women with low BMD.

P416
RELIABILITY OF PQCT-DERIVED MUSCLE AREA AND DENSITY MEASURES ON WATERSHED VS. THRESHOLD-BASED SEGMENTATION METHODS

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Objective(s): To compare reliability of calf muscle measures obtained using pQCT and analyzed with threshold-based vs. watershed algorithms across a cohort with varying muscle area.

Material & Methods: Young adults (<30 years old), older adults (>60 years old) and individuals with spinal cord injury (SCI) were scanned twice on pQCT at the same visit with repositioning between acquisitions. A 2.3±0.5 mm thick slice was obtained from the 66% calf at 500 μm resolution. Images were randomized and blinded to the reader. Threshold-based and manual watershed segmentation of muscle from bone (threshold: 280, contour 1, peel 2) and subcutaneous fat (threshold: 40, contour 3, peel 1) was performed using Stratec V6.0 (Orthometrix) and sliceOmatic V4.3 (Tomovision), respectively. Tissue boundary identification was guided by the watershed tool and manually traced by a single reader. Muscle volumetric density (vMD) and cross-sectional area (MCSA) were computed in each analysis. Root mean square coefficients of variation (RMSCV) and standard deviations (RMSSD), and Bland-Altman limits of agreement (LOA) were determined for vMD and MCSA for both methods. A general linear model determined difference in vMD and MCSA between segmentation methods adjusting for participant subgroup.

Results: Most RMSCV and RMSSD values for threshold segmentation were larger than manual watershed segmentation (Table I) The LOA for vMD obtained using the watershed algorithm were -3.68 to 3.09 (N=85); vs. on threshold-based segmentation, -4.75 to 4.75 (N=81). The LOA for MCSA was -132.80 to 137.50 (N=93) and -353.19 to 369.28 (N=81) for watershed vs. threshold segmentation, respectively. Manual segmentation (70.2±9.2 mg/cc) provided larger ($p<0.001$) densities compared to threshold segmentation (67.4±10.3 mg/cc).

Table I. Comparing reliability of pQCT muscle measures obtained by water-shed versus threshold-based segmentation separated by participant subgroups. Young adult (age: 25.6±3.3, BMI:23.9±4.8), older adult (age:74.0±9.2, BMI:25.7±4.0), SCI (age:44.1±9.4,BMI:23.9±3.3). vMD=muscle volumetric density, MCSA=muscle cross-sectional area.

Reliability Data	RMSSD (units)			RMSCV (% error)		
Variable & Method	Young	Older	SCI	Young	Older	SCI
Water-Shed vMD (mg/cc)	0.89	1.43	0.85	1.18	2.01	1.42
Threshold-based vMD (mg/cc)	1.73	1.22	2.43	2.36	1.77	4.06
Water-Shed MCSA (mm^2)	34.96	53.97	52.34	0.49	0.93	1.38
Threshold-Based MCSA (mm^2)	154.35	105.37	142.10	2.57	1.77	2.94

Conclusion(s): Watershed-guided segmentation of muscle from pQCT images showed greater reproducibility and tighter retesting limits. Although manual tracing may be less efficient, its higher reliability is favourable to longitudinal studies demanding greater analytical sensitivity.

P417
CORRELATIONS BETWEEN 25(OH)D AND BMD CHANGE IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN: SECONDARY ANALYSES OF A 1-YEAR TRIAL OF WEEKLY ALENDRONATE (ALN) PLUS VITAMIN D_3 5600 IU VS. STANDARD CARE

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Objective(s): Vitamin D supplements are recommended as adjunctive therapy with antiosteoporotic drugs. In this international, randomized trial, women receiving single tablet alendronate/vitamin D_3 5600 IU (ALN/D) for 1 year had higher 25(OH)D, higher BMD, and lower bone turnover markers than women receiving Standard Care (prescribed by patients' personal physicians who were not investigators in the trial), even though a majority of Standard Care

participants took a bisphosphonate (most often ALN) plus varying doses of vitamin D. Subgroup analyses and determination of correlations between serum 25(OH)D and BMD change in patients treated with alendronate were performed.
Material & Methods: Participants were postmenopausal women ≥65 years, BMD T-scores at spine or hip of ≤-2.5 (or ≤-1.5 with prior fragility fracture), 25(OH)D 20-50 nmol/mL, and increased risk of falls. The primary study endpoint was proportion of participants with 25(OH)D<50 nmol/mL.
Results: Participants (n=515) were of mean age=73 years, 72% Caucasian, with mean baseline 25(OH)D=37 nmol/L. After 1 year, fewer women taking ALN/D than Standard Care had 25(OH)D<50 nmol/mL among all trial participants and in the following: baseline 25(OH)D≤or >37.5 nmol/mL, age≤or >75 years, and European or non-European residence. Among Standard Care women receiving ALN, end-of-study 25(OH)D levels correlated positively with percent increase from baseline in lumbar spine and femoral neck BMD (Table, Pearson correlation coefficients (95% CI)=0.23 (0.02,0.41) and 0.24 (0.03,0.41), respectively). Baseline 25(OH)D levels correlated with increases in only lumbar spine BMD (Table, Pearson correlation coefficient (95% CI)=0.22 (0.01,0.40)).

Correlations Between Tertiles of 25(OH)D and % Change From Baseline in BMD in Referred Care Patients Receiving ALN

	Increasing Tertiles of Baseline 25(OH)D			Increasing Tertiles of 1-year 25(OH)D		
	1	2	3	1	2	3
Mean 1-year % change in LUMBAR SPINE BMD (SE)	3.7 (0.8)	5.2 (0.7)	5.9 (0.8)	3.9 (0.7)	4.9 (0.8)	5.8 (0.8)
[Range of 25(OH)D (nmol/L)]	[13-28]	[28-40]	[40-95]	[15-55]	[55-73]	[73-118]
Mean 1-year % change in FEMORAL NECK BMD (SE)	2.1 (0.7)	1.9 (0.6)	2.3 (0.8)	1.3 (0.6)	2.4 (0.7)	2.9 (0.8)
[Range of 25(OH)D (nmol/L)]	[13-30]	[30-40]	[40-95]	[15-55]	[55-73]	[73-118]

Conclusion(s): In osteoporotic postmenopausal women with low 25(OH)D the increase in lumbar spine and femoral neck BMD during treatment with alendronate was positively correlated with serum 25(OH)D. This parameter could be a determinant to optimize the BMD response to alendronate.

P418
SLOVAK REGISTER OF PATIENT WITH SEVERE OSTEOPOROSIS ON OSTEOANABOLIC TREATMENT

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Objective(s): Human PTH (1-84 PTH) or teriparatide (TPTD), a recombinant aminoterminal fragment (1-34) of the PTH have a predominantly stimulating effect on bone formation. Osteoanabolic treatment in Slovakia can be indicated only in centers (5 in our country) for patient with severe postmenopausal osteoporosis, for treatment of osteoporosis in men and glucorticoid-induced osteoporosis (GIOP). The primary outcome is to define the basic characteristics of patients on osteoanabolic treatment.
Material & Methods: We started a register of patient in the Slovakia, treated with PTH or teriparatide. In all enrolled patients we measured BMD, X-ray of skeleton, vitamin D, calcium, osteocalcin, C-telopeptide of collagen CTx P1NP. According the medical data we analyzed menopausal status, duration of previous antiosteoporotic treatment, the use of corticosteroids. The BMD of lumbar spine (L1-4), femoral neck and total hip was measured before treatment (base line) and at 12 and 18 months using DXA (Hologic). Statistical analyses were performed according to the intention-to-treat principle. T-test was used to determine the changes in percentage of BMD and levels of serum markers in 6, 12 and 18 months compared to baseline.
Results: We present the characteristics of 534 patient on osteoanabolic treatment, 242 on PTH and 292 on TPTD. From the group on PTH treatment were 13.4% (n=39) men. In the group on TPTD treatment were 100% of women. 115 patients on TPTD treatment were indicated for GIOP. At baseline the mean T-score of total hip was -2.73 (95% CI -

2.69 to -2.77), and of lumbar spine -3.10 (95%CI -3.05 to -3.15). Calcium levels were 2.37 mmol/l (95%CI 2.18-2.57), PTH 6.69 pmol/l (95%CI 2.21-15.56), osteocalcin 24.76 ng/ml (95%CI 8.12-60.77), 25-OH-vitamin D3 25.09 ng/ml (95%CI 4.00-62.10), sCTX 0.43 ng/ml (95%CI 0.08-0.09), P1NP 46.80 ng/ml (95%CI 9.59-100.30).

Conclusion(s): Osteoanabolic treatment is indicated for treatment of severe osteoporosis in women and also in men. More frequent indication was a new treatment of severe osteoporosis according the indication criteria.

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POPULATION BASED STUDY FOR BONE MINERAL DENSITY AND PEAK BONE MASS IN KOREAN MEN & WOMEN

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Objective(s): The cross-sectional study was performed to get the reference ranges of BMD to investigate the prevalence of osteoporosis in the Koran population based on the fourth Korea National Health and Nutrition Examination Survey (KNHANES IV) in 2008-2009.

Material & Methods: We measured BMD at lumbar spine, femoral neck, trochanter, and total hip by DXA machine (Hologic discovery, Hologic, USA). The subjects were 4652 men and 5664 women aged older than 10 years, who didn't have disease affect bone metabolism.

Results: At the lumbar spine, BMD peaked at aged 30-34 in men and at aged 35-39 in women. At the femoral neck, peak BMD was attained at aged 20-24 in men and at aged 15-18 in women. At the total hip, BMD peaked at aged 20-24 in men and at aged 40-44 in women. The age related changes of BMD in Korean men & women were different from that of other ethnic group. As compared with US participants, the BMD at every skeletal site in Koran males and females was significantly lower than that of white Americans. As compared with Japanese women, the lumbar spine and femur BMD in Korean females 20-49 ages was lower than in Japanese participants also.

Conclusion(s): This KNHANES survey is the first study to investigate the prevalence of osteoporosis, age at peak bone mass, and age related changes of BMD and will provide the Korean reference data of BMD.

P420

INCIDENCE OF OSTEOPOROTIC VERTEBRAL FRACTURES WITH ELDERLY POSTMENOPAUSAL WOMEN: OUR EXPERIENCE

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Objective(s): Vertebral fractures are linked with the increased mortality and morbidity as well as the higher risk against new fractures. Timely diagnostic is very important for the further treatment. Studies on its prevalence are rare in the country. Pilot examination of patients treated in the Institute Niška Banja on the incidence of vertebral fractures.

Material & Methods: 77 postmenopausal women older than 65, having osteoporosis, have been analysed. Upon the made densitometric examination of lumbosacral part of the spine (LS) L1-L4 and the hip, which helped to identify osteoporosis, X-ray test of the T4-L5 portion of the spine was made in all the patients, aimed at detecting vertebral fractures, AP and profile, which have been analysed by semi-quantitative method (Genant,1993); the analysis was made by a radiologist.

Results: Average age of the patients ranged between 70.4± 6.8 years, BMI 25.4±5.9 kg/m^2, height 155.8±4.5 cm, menopause started 18.9±5.4 years ago. Vertebral fractures were found out in 21 patients (27.27%). Symptomatic fractures were reported by 4 (19.04%) patients whereas 17 (80.95%) patients had the asymptomatic ones. One fracture was registered with 11 (53%) patients, 2 fractures with 6 (29%), and 3 and more with 4 (19%) patients. 1st degree fractures, according to Genant, were found out in 12 (57%), 2nd degree fractures were registered with 8 (38%) patients and 3 rd degree fractures with 1(5%) patient.

Conclusion(s): The results obtained from pilot research indicate a high percentage of asymptomatic vertebral fractures in the examined group of elderly postmenopausal women having osteoporosis. They also emphasise the need of making early diagnosis of vertebral fractures.

P421

AFTER 3 YEARS OF ANNUAL ZOLEDRONIC ACID, WHO SHOULD REMAIN ON TREATMENT? RESULTS FROM THE HORIZON-PFT EXTENSION STUDY

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Objective(s): There is limited evidence that bisphosphonates reduce fracture risk after 3-5 years. Our objective

was to determine who might be able to discontinue treatment after 3 years.

Material & Methods: In the HORIZON Extension (E1), we randomized 1233 women who had received 3 annual zoledronic acid (ZOL) infusions in the HORIZON-Core trial to 3 additional ZOL infusions (Z6, n=616) or 3 placebo infusions (Z3P3, n=617)(1). In this analysis, we analyzed fracture predictors during the extension in Z3P3. Potential predictors at E1 baseline included age, hip BMD, weight, prevalent vertebral fracture, P1NP, and predictors during the Core study included incident vertebral or nonvertebral fracture, hip BMD change and weight change. Treatment effects were then assessed in subgroups defined by the significant predictors (Z6 vs. Z3P3 groups).

Results: New morphometric fracture predictors were: FN T-score≤-2.5 [odds ratio (95%CI)=3.3 (1.4,8.0), p=0.008]; TH T-score≤-2.5 [OR=4.0(1.8,9.0), p=0.0007]; and incident morphometric vertebral fracture during Core [OR=4.8 (1.3,16.8), p<0.015]. For new nonvertebral fracture, significant predictors were incident nonvertebral fracture during Core [HR=2.5(1.2,5.3), p=0.014] and prevalent vertebral fracture [HR=3.0(1.4, 6.3), p=0.005]. TH BMD T-score≤-2.5 was marginally significant [HR=1.7, p=0.11]. For vertebral fractures, there were no significant treatment subgroup interactions; however, absolute fracture risk reductions were greatest and numbers needed-to-treat to prevent a fracture lowest in the high-risk subgroups, especially those with FN or TH T-Score≤-2.5 [Table]. For nonvertebral fractures, there were no significant treatment effects in high-risk subgroups.

Incident Morphometric Vertebral Fracture in Z3P3 and Z6 by Risk Subgroup

Risk Subgroup	Z3P3	Z6	OR (CI)	Rx Effect P	NNT/3 Yrs
FN≤-2.5	23/250 (9.2%)	9/257 (3.5%)	0.36 (0.15, 0.77)	0.011	18
FN>-2.5	7/235 (3%)	5/210 (2.4%)	0.79 (0.23, 2.53)	0.698	167
Yes Core Vert	4/16 (25%)	0/11	0	0.12	4
No Core Vert	26/467 (5.6%)	12/454 (2.6%)	0.46 (0.22, 0.9)	0.029	34

Conclusion(s): In women with hip BMD≥-2.5, no incident fracture during the initial treatment period and no prevalent vertebral fractures, risk for subsequent fracture is low and treatment discontinuation for up to 3 years can be considered. In other women, particularly those with hip BMD T-score<-2.5, continued ZOL for 3 years is likely to confer benefit at least against future vertebral fracture.

References: Black et al. JBMR. 2012;27:243.

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P422
VITAMIN D LEVELS OF GREATER THAN 85 NMOL/L IN THE PRESENCE OF ADEQUATE DIETARY CA MINIMISE BONE TURNOVER AND IMPROVE BONE STRENGTH

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Objective(s): We have reported femoral osteopenia in short term-vitamin D restricted rats without deterioration in tibial cortical bone volume (CBV), geometry or strength.[1] The present study aimed to establish the effect of extended vitamin D deficiency in aged rat tibial volume and strength.

Material & Methods: Female Sprague Dawley rats (9 m, n=6/gp) were fed a diet containing varying vitamin D_3 (D) levels (0, 2, 12 and 20 IU/d) with either low (0.1%, LCa) or high (1%, HCa) dietary calcium for 6 m. At 15 m blood was taken for 25-hydroxyvitamin D (25D) 1,25-dihydroxyvitamin D (1,25D), PTH and Ca analyses and tibiae and femora retrieved for bone analyses. 3D μCT scans (Skyscan 1174) were used to determine CBV, midshaft sagittal cortical thickness (Cth.sag) and metaphyseal BV/TV. Tibial peak load was determined by 3-point bending (Test Resources 800LE4). 25D and 1,25D were determined by RIA (IDS) and PTH by IRMA (Immutopics).

Results: Group serum 25D levels ranged from 22(±2.9) nmol/L to 161(±38.8) nmol/L and serum calcium levels from 2.5(±0.05) mmol/L to 3.2(±0.2) mmol/L. Circulating 25D was a determinant of BV/TV (R^2=0.23, p<0.001) and CBV (R^2=0.22, p<0.01). In multiple linear regression neither serum Ca, PTH nor 1,25D were determinants of bone volume when 25D was accounted for. Dynamic histomorphometry indicated that high dietary Ca reduced bone turnover only in animals with circulating 25D levels above 85 nmol/L with the greatest reduction achieved in the 20 IU/d group (20D) (BFR [$um^3/um^2/d$]: LCa20D 33.9(3.4) vs. HCa20D 21.8(2.3), p<0.05; Oc/BPm [$No.x10^{-3}/mm$]: LCa20D 2.0 (0.2) vs. HCa20D 1.1(0.1), p<0.05). Tibial peak load was related to Cth.sag (R^2=0.39, p<0.01).

Conclusion(s): Thus, optimisation of bone volume and strength requires the combination of high dietary Ca intake

and circulating 25D above 85 nmol/L. However, our previous demonstration that high dietary Ca is required to maximise circulating 25D levels[2,3] in combination with the present findings suggest that the mechanism for vitamin D-optimisation of bone is not mediated via a calcaemic effect.

References: 1. Lee AMC et al. JSBMB 2010;121:284. 2. Anderson PH et al. JBMR 2008;23:1789. 3. Anderson PH et al. JSBMB 2010;121:288.

P423

RELATION OF VITAMIN D LEVELS WITH BONE MINERAL DENSITY AND PARATHYROID HORMONE IN ADULTS WITH LOW BONE DENSITY

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Objective(s): To investigate the relationships among serum 25-hydroxyvitamin D [25(OH)D] levels, intact PTH (iPTH) levels, and BMD.

Material & Methods: Adults with or without prevalent fragility fractures and with low BMD at the total hip, or lumbar spine underwent assessment. Multivariate regression models were used to investigate the relationships among serum 25(OH)D, iPTH, and BMD.

Results: Total of 102 patients (male:female=38:64) with mean age of 62.5±6.4 years were inducted into the study. 44 patients had osteopenia and osteoporosis was present in 58 patients. The mean values for serum 25(OH)D and IPTH levels were 21.3±0.5 ng/ml and 53.1±22.3 pg/ml, respectively. In 84.3% of patients, serum 25(OH)D levels were below 30 ng/mL. There was no association between 25(OH)D levels and BMD at the total hip, or lumbar spine (P=0.473, and 0.353, respectively). Serum iPTH levels were negatively associated with BMD at the total hip (P=0.019) and the lumbar spine (P=0.02). Both at the total hip and lumbar spine, iPTH levels, male sex, BMI, and age were found to be significant predictors of BMD. Patients with higher BMI had significantly lower BMD and T-score. At levels <30 ng/mL, 25(OH)D was negatively associated with iPTH (P=0.041).

Conclusion(s): Among our cohort of patients with low BMD, no direct relationship between serum 25(OH)D levels and BMD at total hip and lumbar spine was observed. A negative correlation existed between iPTH and 25(OH)D at serum 25(OH)D concentrations <30 ng/mL, and serum iPTH levels showed a significant negative association with BMD at the total hip and lumbar spine. These significant negative associations between iPTH levels and BMD at the total hip and lumbar spine underscore the critical role of this hormone in bone metabolism and health. Advancing age, male sex, BMI are other significant predictors for BMD both at total hip and lumbar spine.

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P424

IS FEMORAL ACETABULAR IMPINGEMENT A PREDICTOR OF RADIOLOGICAL HIP OSTEOARTHRITIS IN OSTEOPOROTIC HIP FRACTURE PATIENTS?

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Objective(s): Traditionally the condition of femoral acetabular impingement (FAI) has always been diagnosed radiologically. FAI has been postulated to be the cause of hip osteoarthritis (OA). This study, comprising of osteoporotic hip fracture patients, aims to examine the incidence of hip OA with radiological FAI.

Material & Methods: Anteroposterior pelvic radiographs of 300 patients admitted to the Singapore General Hospital between January 2008 - June 2010 for osteoporotic hip fracture were collected. The good hip was assessed for the presence of CAM and pincer FAI. Measurements pertaining to CAM FAI were measured, namely: Sharp's, Neck-shaft and the centre-edge (CE) angle. Presence of the cross-over sign was used for the diagnosis of pincer FAI. The Kellgren-Lawrence scale (KL-scale) was used to assess for the presence and severity of hip OA. Severity of hip OA (KL-scale 0-4) was analysed against the angles measured for CAM FAI.

Results: The median age of our study group was 81 years (range: 60-104, SD 9.0). There were 237 females (79%) and 63 males (21%). 56 patients were diagnosed with FAI, of which 52 (17.3%) were CAM FAI and 4 (1.33%) were Pincer FAI. 36 out of 52 CAM patients had hip OA. Only 1 out of the 4 Pincer FAI patients had hip OA. There are significantly more cases of OA in CAM patients (p=0.02) than non-CAM patients. Older age was also associated with hip OA (OR=1.04, 95% CI: 1.0, 1.07) as was gender. Males were found to be 3 times more at risk of OA than females (OR=2.9, 95% CI 1.5, 5.6). There was no correlation between the severity of hip OA (KL-scale 0-4) and the angles of measurements for CAM.

Conclusion(s): In osteoporotic hip fractures, the presence of CAM was found to be an independent risk

factor for radiologic hip OA. There was no correlation between the severity of hip OA and angles of measurement for CAM. Other factors that would contribute to hip OA include old age and the male gender. Early identification of CAM FAI would aid in the delay and possibly the prevention of hip OA.

P425
HIGHER LEVELS OF SERUM PENTOSIDINE ARE ASSOCIATED WITH ELEVATED RISK OF VERTEBRAL FRACTURES IN A 10-YEAR FOLLOW-UP OF JAPANESE FEMALE POPULATION: THE JAPANESE POPULATION-BASED OSTEOPOROSIS (JPOS) COHORT STUDY

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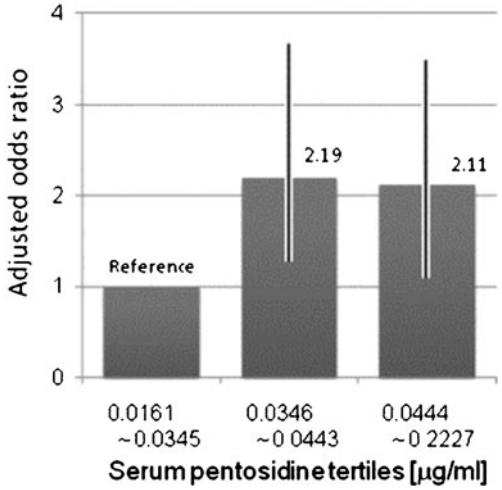
Objective(s): To evaluate associations between serum levels of pentosidine (PEN) and subsequent vertebral fracture (VFx) risk for 10 years

Material & Methods: Among 900 women aged 50-79 years selected randomly from 3 municipalities in Japan, 852 completed the baseline study and were invited for follow-up surveys conducted 3 times in 10 years including VFx assessment on digital images from spine absorptiometry and spine BMD measurement. Serum PEN levels were determined by ELISA at baseline. Prevalent vertebral deformity (VDf) was determined according to McCloskey-Kanis criteria. Incident VFx was identified when one of the three vertebral heights decreased by 20% or more compared to the baseline heights and the vertebra satisfied McCloskey-Kanis or Genant's grade 2 or 3 fracture criteria.

Results: 616 women participated in one or more follow-up surveys with mean follow-up of 9.1 years and had no missing data. Their mean age, BMI, spine BMD and PEN levels were 63.4±8.0 years, 24.3±3.5 kg/m^2, 0.819±0.144 g/cm^2 and 0.0398 μg/ml (mean±SD: 0.0286 and 0.0553), respectively.

We identified 71 VDf in 52 women at baseline and 148 VFx in 94 women during the follow-up where overall incidence rate of VFx was 16.8/1000 person-years. The multiple logistic analyses indicated that PEN levels significantly associated with the risk of VFx (odds ratio (OR) per 1 SD increase: 1.26 (95% CI: 1.01-1.57)) adjusted for age, BMI, prevalent VDf and BMD. The adjusted ORs of VFx in the tertile groups of PEN levels were illustrated in Figure 1.



These results did not alter when the participants with diseases liable to affect bone metabolism or those under drug therapy for osteoporosis were excluded.

Conclusion(s): Higher levels of serum PEN are associated with elevated risk of VFx independently of age, BMI, prevalent VDf and BMD in Japanese women.

P426
PREVALENCE OF VITAMIN D DEFICIENCY IN PRE- AND POSTMENOPAUSAL SAUDI WOMEN: A CROSS-SECTIONAL STUDY

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Objective(s): Vitamin D deficiency is a global health problem, with a range of chronic conditions being associated with low circulating levels of 25(OH)D. The aim of this study was to determine vitamin D status in a sample of randomly selected pre- and postmenopausal Saudi women.

Material & Methods: This cross-sectional study was conducted in the Center of Excellence for Osteoporosis Research (CEOR) during the year 2011. A total of 449 healthy women were randomly recruited from the city of Jeddah through Primary Health Care Centers. Data are presented on 226 premenopausal [20-39 years]; and 223 postmenopausal women [>51 years]. Menopausal grouping was confirmed by hormonal status. Fasting blood samples were collected for assessment of 25(OH)D status.

Results: A total of 20% of women had severe vitamin D deficiency with a serum level <12.5 nmol/L (29% pre, 11%

post), 35% of women had moderate deficiency with levels between 12.5- <25 nmol/L (42% pre, 28% post), 30.5% of women had mild deficiency with levels between 25-<50 nmol/L(23% pre, 38% post), and 10.7% had vitamin D insufficiency with levels between 50-<75 nmol/L (3.5% pre, 18% post). Only 3.8% had sufficient vitamin D levels >75 nmol/L (2.5% pre and 5% post).

Conclusion(s): Vitamin D deficiency is rather highly prevalent among both pre-and postmenopausal otherwise healthy Saudi women. Proper measures for the management and prevention of vitamin D deficiency are highly indicated to avoid the ill consequences of this deficiency.

P427

THE ECONOMIC COST OF CHRONIC LOW BACK PAIN

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Objective(s): Chronic low back pain (LBP) is a common and important health problem, which is a common cause of lost work days and disability. The economic burden of LBP is very high and its burden in Turkey is not known. The objective of this study is to determine the total cost of LBP.

Material & Methods: We included 211 adult patients with chronic LBP between September 2009 - November 2009 who consult to our outpatient clinic of Istanbul Medeniyet University Göztepe Research and Education Hospital in Istanbul. Patients socio-demographics, healthcare resource use, inability to work, quality of life and psychological health at the time of the study were collected by using questionnaires. We calculate all direct and indirect costs. Direct costs include medical visits, investigations, medications, hospitalizations, orthopedic aids, physical therapy and home payments during the last 6 months. Indirect costs include lost work days, productivity lost, early retirement for the last 3 months.

Results: The total annual direct costs for chronic LBP per patient were estimated at 346.14€, or 443.39 USD. The indirect costs were estimated at 2311.34€, or 2960.71 USD per patient, in 2011 prices. All costs were positively correlated with disease severity, disease duration, and female gender. The mean Roland & Morris score was 15.67 (SD 5.23). 59.7% of patients got severe and moderate depression and anxiety points.

Conclusion(s): The indirect costs for chronic LBP seems to be higher than the direct costs. The productivity losses due to sick leave could be reduced with effective treatments and could help cost savings.

P428

EFFECT OF HYPOVITAMINOSIS D ON MUSCLE FUNCTION AND PHYSICAL PERFORMANCE IN SAUDI WOMEN

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Objective(s): Vitamin D deficiency is associated with reduced muscle strength. Data on the effect of poor vitamin D status on physical performance in Saudi women are lacking. The aim of this study was to investigate the correlation between vitamin D level and measures of physical performance.

Material & Methods: This cross-sectional study was conducted in the Center of Excellence for Osteoporosis Research (CEOR). A total of 449 healthy women were randomly recruited from the city of Jeddah through Primary Health Care Centers. Data are presented on 226 premenopausal [20-39 years]; and 223 postmenopausal women [>51 years]. Fasting blood samples were collected for assessment of 25(OH)D status. Muscle function was assessed by the time taken to perform the following tests: get up and go (GUG); 8 feet walk (8FW); five-times sit to stand (5-STS). SPSS (version 16) was used for data analysis.

Results: A total of 55% of women were <25 nmol/L (71% pre, 39% post), 86% <50 nmol/L (94% pre, 77% post), and 96%< 75 nmol/L (97% pre, 95% post). Linear regression analysis was used to examine the association between vitamin D level and measures of physical performance adjusting for potential confounders. Vitamin D level was not among the predictors of physical performance measures in this study group.

Conclusion(s): These data suggest that low vitamin D status is not associated with poor physical performance and may be a reflection of muscle adaptation to prolonged, lifecycle of hypovitaminosis D.

P429

ULTRASOUND METHOD FOR OSTEOPOROSIS DIAGNOSTICS AT PRIMARY HEALTHCARE

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Objective(s): Osteoporosis is diagnosed using the axial DXA. Unfortunately, DXA is not an optimal technique for

use at primary healthcare due to high costs, size and use of ionizing radiation. It is estimated that over 75% of osteoporotic patients are not diagnosed nor receive treatment for their pathological condition [1]. This is mostly accounted for the lack of effective screening or diagnostic devices at primary healthcare. In this study, a prototype pulse-echo (PE) ultrasound device (Bone Index Finland Ltd., Kuopio, Finland) for multi-site ultrasound measurements is proposed for osteoporosis diagnostics.

Material & Methods: Elderly woman (n=131, mean age± SD=72.9±6.6 years) were examined using ultrasound measurements of cortical bone thickness in proximal and distal tibia, and distal radius with PE ultrasound (2.25 MHz). Ultrasound results were combined with subject characteristics to provide a diagnostic parameter, density index, DI [2] (patent pending)). Further, BMD in the femoral neck (BMDneck) and total hip (BMDtotal) was determined by axial DXA. Based on DXA, osteoporosis was diagnosed in individuals with T-Score lower than -2.5 in total hip or in femoral neck.

Results: A total of 30 subjects were diagnosed with osteoporosis. DI provided a significant estimate of BMDneck and BMDtotal (r=0.71-0.72, p=0.001, n=131). Thresholds for DI were determined to reach 90% sensitivity and specificity in diagnostics of osteoporosis [3,4]. By using these thresholds, 19.8% of the subjects were found to require additional DXA measurement to verify the diagnosis.

Conclusion(s): After present ultrasound measurements, due to the significant correlation between DI and BMD measured with axial DXA, only a limited number of subjects would need additional DXA measurement. The strength of DI-BMD association is similar to that between the lumbar spine and femoral neck BMD. The results are encouraging and suggest that the small-size portable ultrasound instrument may provide an easily accessible method for diagnostics of osteoporosis at primary healthcare. However, more subjects should be examined to validate the thresholds with 90% sensitivity and specificity for DI [3].

References: [1] Med J Aust 180:18;2004,[2] Osteoporos Int, In Press, 2011 [3] J Clin Densitom 11:188;2008., [4] Osteoporos Int 16:2149; 2005.

P430
SIX-YEAR FOLLOW UP IN PATIENTS WITH PREVIOUS OSTEOPOROTIC FRACTURE OF PROXIMAL FEMUR

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Objective(s): The authors observed 231 patients with low-trauma osteoporotic fractures, 87 in the area of proximal femur, 84 vertebral fractures and 60 fractures of distal forearm and proximal humerus. After the surgical treatment, densitometric measurement was performed and according to the results antiosteoporotic pharmacotherapy was started.

Material & Methods: In patients with spine injury was found significantly lower vertebral BMD, T- score -2.14 in area of L1-L4 and -1.6 in hip. The situation was opposite in patients with hip fractures: T-score -1.6 in L1-L4 and -2.02 in hip. In patients with fracture of proximal humerus and forearm was found less significant standard deviation from the norm T-score -1.3 in both areas. Average age of patients with fracture of distal forearm was 62, for vertebral fractures 67 and hip fractures 70. Relatively lower average age of patients with hip fractures was driven by the fact that those patients were able to come to densitometric measurement and all of them underwent surgical treatment of fracture. Patients were treated despite the high fracture risk mostly by calcium and vitamin D. Only patients with lower BMD than -2.5 T-score with low-trauma hip or vertebral fracture received an antiresorptive therapy at the specialized center. Although all patients were educated about the risk of another fracture, only 5% of them agreed to take the antiresorptive therapy. 15% of treatment refusing patients suffered from another hip fracture contralaterally within one year period and 35% within 3-year period after the first fracture.

Results: After six years follow up of patients with the hip fracture (set of 87 patients), more than 43.7% of patients experienced contralateral fracture or other type of fracture. Number of contralateral hip fractures increased from 16% to 36% and 45% after 1, 3 and 6 years after initial hip fracture. Other osteoporotic fx increased from 29%, 49% and 69%. Mortality Increased from 6%, 10% and 22%.

Conclusion(s): The authors also performed the monitoring of the same parameters in set of patients with vertebral fractures and distal forearm fractures and from the original densitometric measurements calculated FRAX index and they compared the risk of fracture with the actual incidence of fractures.

P431
EXTENT OF OBESITY IN SAUDI WOMEN AND THE ASSOCIATION BETWEEN VITAMIN D STATUS AND DIFFERENT MEASURES OF ADIPOSITY

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Objective(s): Obesity is associated with vitamin D deficiency. The aims of this study were to: 1) determine the extent of

obesity in Saudi pre- and postmenopausal women; 2) and to assess the association between different measures of adiposity and 25(OH)D in both groups.

Material & Methods: This cross-sectional study was conducted in the Center of Excellence for Osteoporosis Research (CEOR) during the year 2011. A total of 449 healthy women were recruited from Primary Health Care Centers. Data are presented on 226 premenopausal [20-39 years]; and 223 postmenopausal women [>51 years]. Menopausal grouping was confirmed by hormonal status. Fasting blood samples were collected for assessment of 25(OH)D status. Weight, height, waist circumference (WC), hip circumference (HC) and total body fat (TBF) DXA were measured. Waist-to-hip ratio (WHR) and BMI were calculated.

Results: A total of 30.7% of the women were overweight with BMI 25-<30 kg/m^2 (28.3% pre, 33.2% post), and 38.5% were obese with BMI ≥30 kg/m^2 (21.2% pre, 56.1% post). After adjusting for age, there was no significant correlation between 25(OH) D and any of the obesity measurements in the premenopausal women. A significant negative correlation between BMI (r=-0.203, P<0.01), TBF (r=-0.340, P<0.01) and WC (r=0.140, P<0.05) was found in the postmenopausal women.

Conclusion(s): Obesity was more prevalent among the postmenopausal women. Obesity-associated vitamin D insufficiency is likely due to the decreased bioavailability of vitamin D_3 because of its deposition in body fat compartments. Measures to reduce weight in this group may improve vitamin D status.

P432
STRONTIUM RANELATE TREATMENT IMPROVES BONE MATERIAL QUALITY IN HUMAN BONE BIOPSY SPECIMENS COMPARED WITH ALENDRONATE

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Objective(s): A preclinical study has shown that microarchitecture and material level properties contribute independently and significantly to the increase in bone strength induced by strontium ranelate treatments as evaluated by μCT-based FEA and by direct bone strength measurement. The aim of the present study was to evaluate whether similar effects on bone tissue quality could be detected in human.

Material & Methods: In a multicenter, international, double-blind, controlled study, 268 postmenopausal women with osteoporosis underwent transiliac bone biopsies at baseline and after 6 or 12 months of treatment with strontium ranelate 2 g/day or alendronate 70 mg/week. Among them, 40 patients with paired biopsies (at baseline and after 6 or 12 months of treatment with strontium ranelate or alendronate) were randomly selected. Material level properties were blindly analyzed by nanoindentation, for the determination of Elastic Modulus, Hardness and Working Energy. These values were obtained in the middle of the cortex and of trabecular nodes under humid conditions.

Results: Significance of differences was evaluated by ANOVA; * p<0.05 M12 vs. M0 and § p<0.05 strontium ranelate vs. alendronate. Cortical values (mean±SEM) are presented in the table:

	Strontium Ranelate M0 N=12	Strontium Ranelate M12 N=12	Alendronate M0 N=9	Alendronate M12 N=9
Elastic Modulus (MPa)	12.00±0.27	14.09± 0.29*§	11.42±0.28	12.68±0.30
Hardness (GPa)	385.37±8.46	450.40± 11.25*§	356.95± 11.59	373.01± 9.26
Working Energy (mN. nm)	3020.81± 49.11	3371.01± 73.59*§	2899.32± 59.65	3047.30± 80.10

Similar significant differences were obtained in trabecular bone. A significant improvement of intrinsic bone quality was only observed in strontium ranelate treated patients and the values were significantly different from the alendronate group. After 6 months of treatment, the differences were less pronounced. These results in human bone tissue confirm previous preclinical data and support a potential role of material level properties changes in strontium ranelate antifracture efficacy.

Conclusion(s): Overall, these results in human bone tissue suggest that changes of intrinsic bone quality by strontium ranelate treatment could contribute to an improvement of bone mechanical properties and to fracture risk reduction.

P433
EFFECT OF HIND III POLYMORPHISM IN THE OSTEOCALCIN GENE IN RELATION TO HUMAN OSTEOPOROSIS-RELATED TRAITS IN SLOVAK POSTMENOPAUSAL WOMEN

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Objective(s): The osteocalcin gene has been introduced as a candidate gene for osteoporosis because osteocalcin (also known as BGP, for bone Gla protein) is the most abundant noncollagenous protein in bone and is involved in many processes ongoing in bone tissue such as calcification, resorption or remodelling. The aim of the present study was to

examine possible associations of Hind III polymorphism in the osteocalcin gene with a variability of femoral (F-BMD), spinal BMD (S-BMD), as well as circulating alkaline phosphatase (ALP), osteocalcin (OC; formation markers), β-CrossLaps (CTx; resorption marker) and fracture incidence in 326 Slovak postmenopausal women.

Material & Methods: Postmenopausal women (62.20± 0.48 years) were selected according to strict inclusion criteria. Genetic polymorphism was detected by PCR-RFLP method. Genotype frequencies and frequencies of fractures were tested using the chi-square test. The differences of quantitative variables between the genotypes were analyzed by covariance analysis (GLM procedure) after correction of the measurements for age and BMI.

Results: The distribution of genotype frequencies for Hind III polymorphism was CC (6%), CT (35%) and TT (59%). No significant effects of Hind III polymorphism were recorded on femoral and spinal BMD, as well as fracture incidence and biochemical markers of bone turnover in the tested population. However, differences in BMD between genotypes was not far from the significance level (P=0.075). Individuals with TT genotype disposed insignificantly lower F-BMD and S-BMD values in compared with TC and CC genotypes. Similarly, we found that TT genotype had the highest concentrations of all analyzed bone turnover markers (ALP, OC, CTx), which could indicate a trend of increased remodelling rate in this group.

Conclusion(s): We did not identify a significant effect of the BGP/Hind III polymorphism on osteoporosis-related traits in analyzed population of Slovak postmenopausal women. However, genetic analysis of Slovak population can contribute to creating a more comprehensive view of genetic conditionality of osteoporosis. All procedures were approved by the Ethical Committee of the Specialized Hospital of St. Svorad in Nitra (Slovakia).

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P434

BONE MINERAL DENSITY IN SPANISH WOMEN WITH PRIMARY OVARIAN INSUFFICIENCY (POI)

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Objective(s): Primary ovarian insufficiency (POI) is a state of hypergonadotropic hypogonadism, characterized by premature estrogen deficiency and its associated with an increased risk of osteoporosis, among other alterations. The aim of the present study is to assess the prevalence of osteoporosis and osteopenia in a sample of POI patients and to report the evolution of their BMD within the years comparing women who had undergone HRT with women who has not.

Material & Methods: This descriptive retrospective study included 49 patients with POI consulting at the Gynecological Endocrinology Unit of Hospital de la Santa Creu i Sant Pau, Barcelona.

Results: The median age of POI patients at the time of diagnosis was 35 years. Forty (81.6%) POI women had taken HRT. Nine (18.4%) POI women did not take HRT. As the hypoestrogenic status has a greater impact on trabecular bone we used the results of the BMD and T-score obtained from lumbar spine measures. The results of the first densitometry in the group of patients without HRT were: 33.3% of normal BMD; 44% of osteopenia and 22.2% of osteoporosis. In the second densitometric control the results were: 33.3% of normal BMD; 33.3% of osteopenia and 33.3% of osteoporosis. The results of the first densitometry in the group of patients who were undergoing HRT were: 45% of normal BMD; 40% of osteopenia and a 15% of osteoporosis. In the second densitometric control the results were: 40% of normal BMD; 42.5% of osteopenia and 17.5% of osteoporosis.

Conclusion(s): The results of the present study show that there is a significantly higher loss of BMD in women who does not undergo HRT. These data indicate that HRT should be prescribed to affected patients, as soon as they are diagnosed. Young women at risk for POI need early education and medical supervision regarding strategies to maintain bone mass.

P435

ASSESSMENT OF JOINT SPACE NARROWING IN KNEE OSTEOARTHRITIS HAS GOOD LONG-TERM INTERCENTRE REPRODUCIBILITY WHEN READ IN PAIRS WITH A SEMI-AUTOMATED DEVICE

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Objective(s): To evaluate the inter-centre reproducibility of knee X-rays reading by pairs with known time sequence using a semi-automated software, in the assessment of Joint Space Width (JSW) and Joint Space Narrowing (JSN), among knee osteoarthritic patients.

Material & Methods: 70 females with knee osteoarthritis from the OFELY[1] cohort had knee radiographs at baseline and 48 months later. Two independent readers, each located in France and Belgium, were involved. They had the same training and read the images following the same reading method. Each knee X-ray was read twice by each reader, knowing the time sequence and using a validated semi-automated device[2] in year 2009, 2010 and 2011 (three

times). The long-term agreement between the two centers was assessed for JSW and JSN between baseline and M048, using an intra-class correlation coefficient (ICC) and the Bland and Altman method.

Results: The inter-reader reproducibility was good (ICC close to 0.8 or above each time). For the Bland and Altman method, the mean difference was close to 0 and the limits of agreement confirmed good correlation between readers.

CF:

Inter-centre Reproducibility	JSW (ICC/ 95% CI) Baseline	JSW (ICC/ 95% CI) M048	JSN (ICC/ 95% CI)	JSN (Mean difference; mm±SD, limits of agreement) Bland Altman
2009	0.956 [0.93; 0.972]	0.97 [0.948; 0.982]	0.806 [0.706; 0.875]	0.0463± 0.38 [-0.6921; 0.7848]
2010	0.954 [0.868; 0.979]	0.943 [0.903; 0.966]	0.84 [0.754; 0.897]	-0.0307± 0.34 [-0.6959; 0.6344]
2011	0.911 [0.482; 0.969]	0.933 [0.735; 0.973]	0.778 [0.665; 0.856]	-0.0406± 0.41 [-0.8387; 0.7575]

Conclusion(s): We found a good long-term agreement (over a 3 years period) between the two independent observers, reading the knee X-rays with the same method. Therefore reading X-rays by pairs with knowledge of time sequence, using a validated semi-automated device, is a reproducible method to follow the progression of knee OA in large clinical trials.

References: 1. Delmas. JBMR 1997. 2. Gensburger D. Arthritis Care Res 2010.

P436
NOVEL ULTRASOUND DEVICE PREDICTS OVERALL SKELETAL STATUS

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Objective(s): In osteoporosis the overall bone mass is decreased. The axial DXA measurement at the hip or spine provides the standard diagnostics of osteoporosis. In addition, DXA can be used to assess the BMD of the total body. The whole skeleton consists mainly cortical bone (80%). In this study, the association between the total body BMD and a multisite measurement of cortical thickness with a pocket size pulse-echo (PE) ultrasound device was studied.

Material & Methods: 51 Caucasian woman (age=20-80 years) were examined using the axial DXA (Lunar Prodigy, GE Healthcare) and an ultrasound device operating at 2.5 MHz (Bindex®, Bone Index Finland Ltd.) Total body areal BMD was analyzed with DXA. In addition, cortical bone thickness in proximal and distal tibia and distal radius were measured with Bindex®.

Results: The cortical bone thickness in proximal and distal tibia and distal radius were significant predictors of total body BMD (r=0.70, 0.70 and 0.69, respectively). The sum of cortical bone thickness values measured with ultrasound was the best predictor of the total body BMD (r=0.83, p=0.0001, n=51).

Conclusion(s): Total body BMD is the measure of overall skeletal status and may be more sensitive for e.g. nutritional status than the traditional hip or spine BMD [2]. Significant correlation between the cortical bone thickness in tibia and radius and the total body BMD suggests that multisite cortical bone measurements could provide an estimate for skeletal status. Therefore, the ultrasound technique may be useful in osteoporosis diagnostics in healthcare practices with limited access to axial DXA.

References: [1] Nguyen et al. Med J Aust 180:18;2004, [2] Kärkkäinen et al. Osteoporos Int 21 (12):2047;2010.

P437
DENOSUMAB INCREASES TOTAL HIP BONE MINERAL DENSITY IN OLDER WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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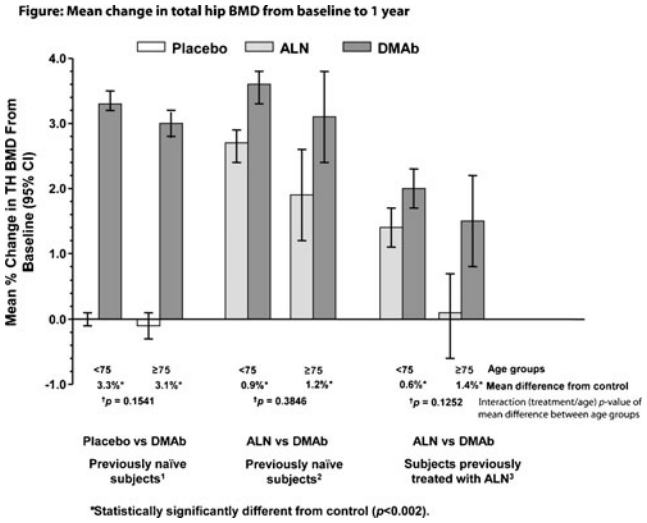
Objective(s): To assess the effects of denosumab on total hip (TH) BMD in subjects aged ≥75 and <75 years.

Material & Methods: This analysis was based on 3 randomized controlled studies in which postmenopausal women with low BMD who were either naïve to treatment for postmenopausal osteoporosis (PMO)[1,2] or previously received alendronate[3] were randomized to denosumab 60 mg every 6 months or either placebo or alendronate 70 mg weekly. Percentage change from baseline to 12 months in TH BMD was analysed by age group (<75 and ≥75 years).

Results: A total of 6779 and 2722 subjects aged <75 and ≥75, respectively, were randomized in all 3 studies. Percentage change in BMD and comparison between age groups are shown in the figure.



For both age groups across all 3 studies, denosumab treatment resulted in a statistically significant increase in TH BMD from baseline to month 12 relative to either placebo or alendronate (interaction between treatment and age, $p>0.05$), consistent with the overall results from each individual study. Among subjects ≥75 years of age previously treated with alendronate, switching to denosumab treatment resulted in a significant improvement from baseline in TH BMD at month 12 (1.5%, 95%CI: 0.8%, 2.2%) while continuation of alendronate had no further impact on BMD (0.1%, 95%CI: -0.6%, 0.7%).

Conclusion(s): Denosumab is associated with significant increases in TH BMD regardless of age (<75 or ≥75 years) and independent of prior alendronate treatment. While older subjects previously treated with alendronate showed significant improvement in TH BMD when switched to denosumab treatment, those who continued with alendronate treatment for 12 months did not show additional improvement in TH BMD.

References: 1. Cummings, NEJM 2009;361:756. 2. Brown, JBMR 2009;24:153. 3. Kendler, JBMR 2010;25:72.

Disclosures: This study was supported by Amgen Inc. and abstract writing by Amgen and GSK.

P438
MYOSTATIN SERUM CONCENTRATIONS IN MEN – AGE-RELATED CHANGES AND CORRELATES: THE STRAMBO STUDY

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Objective(s): Serum myostatin levels in men and its potential determinants have not been defined.

Material & Methods: We measured serum myostatin in 1153 men aged 20-87 years using an ELISA detecting the dimeric full-length peptide and its C-terminal active protein (Immundiagnostik AG, Bensheim, Germany). We assessed abdominal aortic calcification (AAC) score at the lumbar aorta on the Vertebral Fracture Assessment scans using the Hologic Discovery device.

Results: Before the age of 60, serum myostatin increased by 28% (n=353, r=0.16, p<0.005). In this group, serum myostatin showed seasonal variation with higher values during the summer (p<0.01). After 60 years, serum myostatin decreased (n=800, r=-0.12, p<0.001). In 780 men aged ≥60, who did not take vitamin D or calcium supplements, serum levels of myostatin and 25OHD correlated positively (r=0.20, p<0.001). After adjustment for age, month, current smoking, alcohol intake, and calcium intake, serum myostatin increased by 0.21 SD per 10 ng/ml of 25OHD. Serum myostatin showed seasonal variation with 0.64 SD higher values during the summer (p<0.001). The circannual variability of myostatin levels remained significant after adjustment for confounders including 25OHD (p<0.001).

Men in the highest myostatin quartile (>39.5 mg/L) had lower average AAC score compared with the three lower quartiles combined (p<0.005 adjusted for confounders). In multivariate models, AAC prevalence decreased with increasing myostatin levels (OR=0.76 per 1SD decrease, 95%CI: 0.64-0.91, p<0.001). AAC prevalence was lower (OR=0.48, 95%CI: 0.33-0.68, p<0.001) in the highest quartile *vs.* three lower quartiles combined. Furthermore, low calcium intake (<590 mg/day, lowest quartile) was associated with lower (11%, 0.37 SD, p<0.01) serum myostatin *vs.* the three higher quartiles combined. Serum myostatin levels were 5% lower (0.43 SD, p<0.05) in 45 current mild smokers (median: 8 cigarettes/day) compared with non-smokers. Men who drank >110 g alcohol/week (median) had 12% lower myostatin levels (0.41 SD, p<0.001) compared with men who drank less.

Conclusion(s): In men, serum myostatin concentrations increased until the age of 60, then decreased. In older men, presence of AAC, lower 25OHD level, winter season, low calcium intake, current smoking, and higher alcohol intake were all independently associated with lower myostatin levels.

P439
EVALUATION OF A NOVEL APPROACH FOR AUTOMATIC DELINEATION OF VERTEBRAL CONTOURS IN RADIOGRAPHS

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Objective(s): Accurate measurement of vertebral shape is important in the development of novel procedures for quantitative vertebral fracture assessment. The purpose of this work was to investigate the feasibility of a novel, computational, fully automatic approach for measurement of vertebral shape in lateral radiographs.

Material & Methods: We evaluated the technique on a data set of 157 manually annotated radiographs of the lumbar spine. The acquired radiographs were a subset of the Prospective Epidemiological Risk Factor (PERF) study cohort, containing a combination of baseline and follow-up images of postmenopausal women. Manual annotations of both full contour delineations and six-point placements were performed by trained radiologists for the L1-L4 vertebrae. The evaluated technique detects the vertebral outlines in a hierarchical manner, moving from a coarse estimate of the spine alignment to a detailed description of the individual vertebral shapes. The technique was based on a statistical model of the vertebral shape and appearance and centered around a sampling-based segmentation scheme. The technique was evaluated in terms of the average point-to-contour errors and the average error in estimating the posterior, medial, and anterior vertebral heights, with respect to the manual annotations of the radiologists.

Results: Our experiments showed an average point-to-contour error of 0.81 mm (±0.053, SEM), which compares favourably to the current state-of-the-art. Moreover, we were able to estimate the vertebral heights with an average error of 1.36 mm (±0.076, SEM) and a coefficient of variation from the ground truth annotations of 5.1%.

Conclusion(s): Our experiments showed that the accuracy of the evaluated technique compares favorably to the current state-of-the-art in automatic vertebra segmentation. The automatic procedure was able to estimate the vertebral heights with considerable accuracy. We believe that our technique could be relevant in vertebral fracture detection and in the development of novel, automatic osteoporosis biomarkers based on vertebral morphometry.

P440
A NOVEL IONIZABLE CATIONIC LIPID NANOPARTICLE-BASED DELIVERY SYSTEM FOR POTENTIAL RNAI THERAPY IN AGE-RELATED CARTILAGE DEGRADATION

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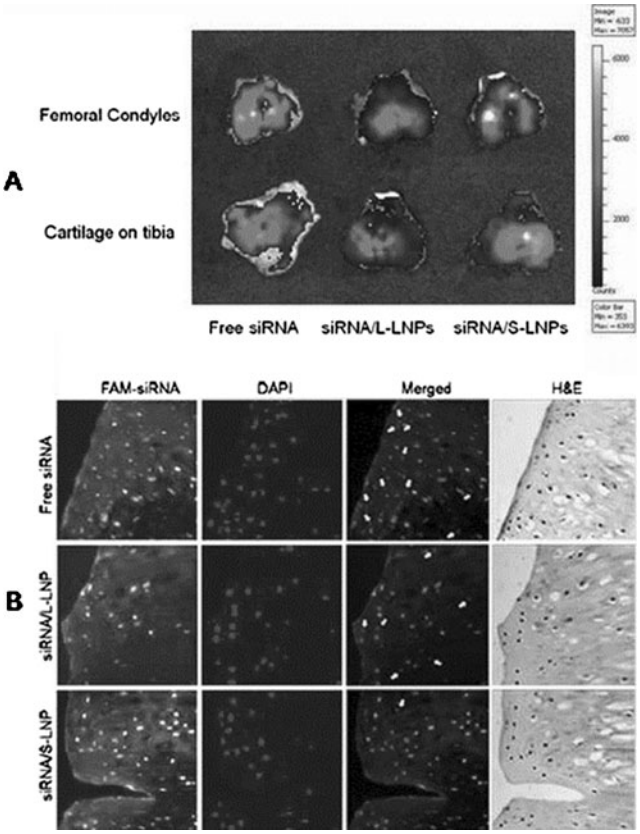
Objective(s): To prepare LNPs delivery systems with different particle sizes encapsulating siRNA and evaluate the distribution of siRNA after intraarticular injection in aged rabbits with cartilage degradation

Material & Methods: The lipids in ethanol were injected with different velocity under strong vortex to FAM labeled siRNA solution to prepare LNPs with small particle size (S-LNPs) and large particle size (L-LNPs). Then, the dialysis was performed to remove ethanol. The hydrodynamic diameters were measured and the morphology of LNPs was visualized by cryo-electron microscope. The aged rabbits (24 months) were divided into three groups and intraarticularly injected free FAM-labeled siRNA, FAM-labeled siRNA encapsulated in L-LNPs and S-LNPs, respectively, in knee joint. After 24 h, the joints were dissected for imaging and the cartilage was separated for histology analysis.

Results: The hydrodynamic diameters of L-LNPs and S-LNPs were 67±4.3 nm and 192±8.4 nm, respectively. After intraarticular injection, siRNA was predominantly found in femoral condyles and cartilage on tibia of all groups. The fluorescence intensity of free siRNA group was comparable with that of siRNA/S-LNPs group, while the signal of L-LNPs group was relatively weak (Fig. 1A). After colocalization of FAM-labeled siRNA and chondrocyte, we found numerous instances of separated nucleic existed without overlapping with siRNA after free siRNA administration, whereas, most of siRNA encapsulated in LNPs were shown to co-localize with chondrocyte once permeating into cartilage. The white arrows point at the nucleics without overlapping with siRNA. In L-LNPs group, there were decreased signals of siRNA in cartilage, which suggested the

nanoparticles with relatively large size are difficult to diffuse through the cartilage matrix (Figure 1B).



Conclusion(s): The ionizable cationic lipid nanoparticle with small size (S-LNPs) could facilitate not only the distribution of siRNA in cartilage but also the cellular uptake. It demonstrated the promising potentials for therapeutic RNAi in cartilage degradation.

P441
PATIENTS WITH OSTEOPOROTIC FRACTURES - UNDERTREATED, PATIENTS WITH ATYPICAL FRACTURES UNDERDIAGNOSED: INSIGHTS FROM FRACTURES PREVENTION PROGRAM

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Objective(s): To assess effectiveness of hospital based Fractures Prevention Program (FPP) in the fracture prevention treatment in patients with previous fragility fractures and prevalence of atypical fractures.

Material & Methods: We evaluated all fragility fractures patients who were hospitalized in the Departments of Orthopedic Surgery of Rambam Health Care Campus during years 2009-2010.

Results: 900 patients, aged 46-107 (75.18±11.7), 247 (27.4%) men, 653 (72.6%) women were hospitalized with fractures since March 2009: 593 (66%) for hip fractures, 60 (7%) for vertebral fractures, 247 (27%) for other fractures. 155 (17%) had previous fragility fractures. 65 (42%) of them received no fracture prevention treatment after the first fracture. Prior to hospitalization 152 (23.2%) women and 4 (1.6%) men received fracture prevention treatment. Women - 134 (88.2%) oral bisphosphonates (114 alendronate, 20 risedronate), 10 (6.5%) raloxifene, 5 (3.3%) teriparatide; men - alendronate. Of all hip fracture patients 96 (16.2%) received fracture prevention treatment. At admission one woman was diagnosed with atypical hip fracture due to prodromal pain in the hip, contralateral to the hip with prior fracture and characteristic radiographic findings. Subsequently all X-ray films were reviewed by a bone -radiologist for signs of atypical fractures. Four additional hip fractures met criteria for atypical fractures: 0.84% of all hip fractures, 0.55% of all fractures, and 3.2% of fractures in patients treated with bisphosphonates. All five women were treated with alendronate for 2-5 years.

Conclusion(s): Majority of patients with high fracture risk were untreated, even after previous fragility fractures. Men and hip fractures patients were more likely to be untreated. Most of hip fractures in bisphosphonate treated and in bisphosphonate naïve patients were "typical" osteoporotic fractures. Atypical fractures in bisphosphonates treated patients were rare and were mostly undiagnosed at hospitalization.

P442
EXTERNAL VALIDATION OF THE GARVAN NOMOGRAMS FOR PREDICTING ABSOLUTE FRACTURE RISK: THE TROMSØ STUDY

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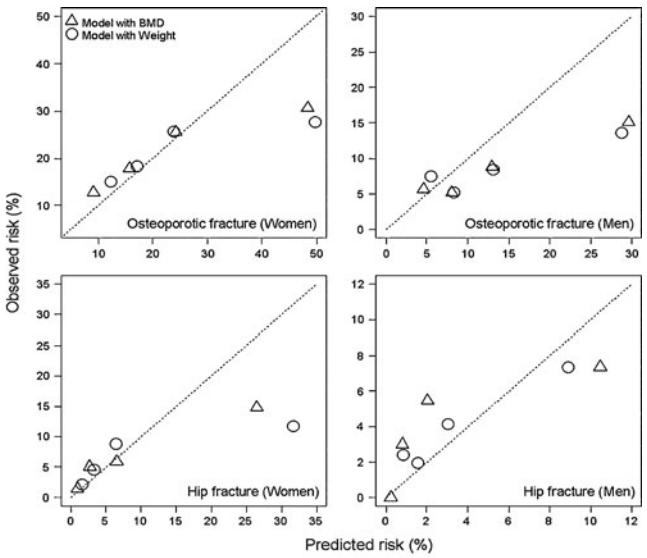
Objective(s): Absolute risk or individualized prognosis is considered a preferred approach for assessing fracture risk and making treatment decision. This study was designed to validate and evaluate the performance of the Garvan nomograms for predicting 10-year risk of fragility fracture in a Norwegian cohort.
Material & Methods: This prospective cohort study in Tromsø, Norway, included 1614 women and 1314 men (aged 60 years plus). During 8 years follow-up from 2001-2009, fragility fractures were ascertained by computerized search in the radiological archives. Nonhip nonvertebral (NHNV) fractures occurred in 350 women and 114 men and 92 women and 49 men suffered a hip fracture. Predicted 10-year probabilities of NHNV and hip fractures were determined using Garvan's models with and without BMD. The concordance between observed and predicted fracture incidence was used as a measure of fit.
Results: The overall incidence (per 1000 person-years) of NHNV and hip fracture during the follow-up was 34.6 and 9.1 in women, respectively; and 12.3 and 5.4 in men, respectively. In both sexes, the predicted 10-year fractures probability in the fracture group was consistently higher than the nonfracture group for all models. For hip fracture, the predicted fracture probabilities in the fracture group was 2.8 (women) to 3.1 times (men) higher than in the nonfracture group. Overall, there was a close agreement between predicted and actual risk of fracture. However, among those in the highest quartile of risk, the model overestimated the risk of fracture (Figure). Models with BMD performed better than models with body weight in terms of correct classification of fracture and nonfracture cases in their risk.



Concordance between of the predicted and observed risk of non-hip non-vertebral (NHNV) fracture (upper panel) and hip fracture (lower panel) in the Tromso Study cohort, according to the Garvan nomogram.
Quartile cutoffs for the predicted 10-year risk (%) of NHNV fracture in women were: 12.8, 19.3 and 30.6 for model with BMD (M1); and 14.7, 20.0 and 29.8 for model with weight (M2). Corresponding features in men were 6.2, 101 and 16.9 for M1; and 6.8, 10.2, 16.5 for M2. Quartile cutoffs for the predicted 10-year risk of hip fracture in women were: 1.8, 4.0 and 10.3 for M1 and 2.4, 4.4 and 10.3 for M2; In men, 0.5, 1.3 and 3.2 for M1; and 1.2, 2.1and 4.3 for M2.

Conclusion(s): The Garvan nomograms are valid and reasonably accurate in identifying individuals at high risk of fracture. Although the nomograms overpredicted the risk in high risk individuals, its predictive ability at the individual level can potentially be useful in clinical practice.

P443
RELATIONSHIP BETWEEN BONE MINERAL DENSITY, LEPTIN AND INSULIN RESISTANCE IN OBESE FEMALES

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Objective(s): The aim of our study was to assess the influence of serum leptin concentration and insulin resistance on BMD in patients with obesity.
Material & Methods: 63 females from age 28-68 with BMI 31-44 kg/m^2 (obese) were enrolled in the study. We measured BMI, fasting ionized Ca, phosphate, serum leptin, insulin, type I collagen C- telopeptide (CTX), lumbar spine (LS), proximal femur (PF) BMD and fat mass distribution by DXA (Lunar Prodigy Primo, GE Healthcare). Females were classified as insulin resistant (IR) and as insulin sensitive (IS) according to the HOMA insulin sensitivity index (ISI).
Results: 60.3% of patients (38 patients) had reduced levels of BMD (<-2.0 SD at LS and -1.5 SD at PF). BMD was lower in postmenopausal women. 63.1% (24 patients) of patients were classified as IR, 78% - (30 patients) revealed increased levels of serum leptin (42.3±0.2 ng/ml). Mean plasma leptin level was significantly higher in the IR group compared with the IS group ($P<0.01$). Serum CTX was significantly higher in the IR group compared with the IS group. HOMA-IR and insulin levels were inversely correlated with BMD ($r=-0.36$ and $r=-0.32$, $p<0.05$). Patients with high levels of leptin revealed positive correlation of leptin with BMI ($r=0.28$, $p<0.05$), IR ($r=0.3$, $p<0.05$), and fat mass distribution ($r=0.34$, $p<0.05$). The correlation between Leptin and BMD was weak, but significant ($r=0.12$, $p<0.05$), correlation between fat mass distribution and BMD was not revealed.
Conclusion(s): High leptin level is not related to high BMD in obese females.
Obese postmenopausal women should be considered at risk for decrease in BMD and osteoporosis.

P444
IMPROVED REAL-LIFE ADHERENCE OF 6-MONTHLY DENOSUMAB INJECTIONS DUE TO POSITIVE FEEDBACK BASED ON RAPID 6-MONTHS BMD INCREASE AND GOOD SAFETY PROFILE

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Objective(s): In an investigator initiated prospective observational study we investigated whether a careful explanation of treatment results 6 month after first denosumab injection focussing on no or only mild and probably not drug related AEs and on significant BMD increases has effects on adherence with further denosumab injections.
Material & Methods: We invited patients starting with a first injection of 60 mg to show up after 6 months to control and discuss tolerability and efficacy. 142 patients, 69 with postmenopausal, 42 with male and 32 with glucocorticoid-induced OP participated. 120 (85%) had been switched to denosumab after different previous OP medications, 22 were drug naïve. Inclusion criteria were BMD values at lumbar spine (LS) below -2.5 T-score and total hip (TH) below -2.0 T-score, with at least one prevalent vertebral or nonvertebral fracture. All received 1200 mg Ca and 800 IU vitamin D.
Results: 96% of patients reported no AEs at all, only 6 (4.2%) mild to moderate obviously not drug related AEs. Patients were very much impressed by demonstrating them the DXA-protocols showing clear and often even dramatic increases in LS and TH BMD after this short time. Gains at the LS ranged from +2.1 to +11.5% (mean 6 month increase +4.7%), at the TH from +0.9 to +7.2% (mean 6 month increase +2.1%). From the 105 patients with back pain at onset 92 (88%) reported a significant amelioration. There were no vertebral fractures and only 2 nonvertebral fractures in 71 patient years. The scarcity of AEs and the positive feedback of a significant BMD-increase at both sites resulted for 141 patients (99%) in a willingness to accept a second injection.
Conclusion(s): In this observational study we found that reporting the rarity of real life AEs as a positive reinforcement together with the rapid and highly significant increases in BMD already after 6 months denosumab therapy had a high impact on adherence to continue with the 6-monthly injections.

P445
DENOSUMAB IMPROVES VOLUMETRIC TRABECULAR AND CORTICAL BONE DENSITIES AS WELL AS 3D-BONE STRUCTURES, PARTICULARELY CORTICAL THICKNESS: DATA OF A PROSPECTIVE STUDY IN OUR CLINICAL PRACTICE MEASURED WITH HRPQCT (XTREMECT)

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Objective(s): Data of the FREEDOM-Study demonstrated that areal bone densities measured with DXA showed a significant increase at the lumbar spine and – less pronounced – at the hip. With the (XtremeCT® we can measure not only volumetric bone densities but moreover 3D bone structures. In 2010 we started a prospective study to demonstrate the effects of denosumab on volumetric bone densities and microarchitectural parameters ("bone quality") in postmenopausal osteoporotic women.
Material & Methods: After a baseline measurement at least one control measurement was done. Altogether till now we examined 26 postmenopausal osteoporotic women in this trial. The time interval between the first and the last measurement was 9,8 month in average. The mean age was 72 years, 21 of them had previous fractures. Menopausal age was 47,9 years in average. Additionally all patients receive individually dosage of calcium and vitamin D.
Results: After the control measurements we found a significant increase in volumetric trabecular bone densities of 2.5% per year in the radius and 3.5% in the weight bearing tibia and an increase in cortical bone densities of 1.2% per year in the radius and 1.5% in the tibia. The highest increase we found in the inner trabecular bone densities which was 9% per year in the radius and 17.1% in the tibia. Microarchitectural parameters showed the greatest increase in cortical thickness which was 3.8% per year in the radius and even 6.8% in the tibia! The changes of bone densities as well as for structural parameters were more pronounced in the weight bearing bone. Of all 26 patients 25 showed an increase in cortical thickness and only one of them a little decrease of 1%.
Conclusion(s): Denosumab increases trabecular and cortical bone densities as well as "bone quality" represented by a number of microarchitectural parameters, most convincingly in cortical thickness. This could be important because cortical bone more and more shifts in the focus of interest.

P446
GENETIC ANALYSES OF HIGH BONE MASS CASES FROM THE BARCOS COHORT OF SPANISH POSTMENOPAUSAL WOMEN

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Objective(s): To establish the prevalence of the high bone mass phenotype in the BARCOS cohort; to determine whether any of the HMB cases carry LRP5 mutations that explain the phenotype; and to characterize the expression

pattern of osteoblast-specific and Wnt pathway genes in primary osteoblast RNA samples from two HBM cases.

Material & Methods: HBM individuals within the BARCOS cohort were identified according to the criterion of a sum Z-score>4 (totalLS-Zscore+TotalHip-Zscore). Relevant exons of LRP5 (2, 3, 4, 9, 10, 11, and 12) were PCR-amplified and sequenced. Cosegregation analysis of markers in the LRP5 gene region was performed in one family. Primary osteoblasts from two HBM and two control individuals were cultured and RNA was extracted. A Roche RealTime ready Custom Panel was used to analyse the expression of 91 osteoblast-specific and/or Wnt pathway genes

Results: In the BARCOS cohort of postmenopausal women, 0.6% of individuals display BMD values in the HBM range (10 probands). No mutations in the analysed exons of the LRP5 gene were found in these patients. Additionally, in one familiar case in which the mother and one of the two sibs had BMD values in the range of HBM, cosegregation analysis ruled out LRP5 involvement. Further cosegregation studies in this family allowed the exclusion of the following genes: DKK2, IL6R, RANK, BMP2, and KRM1.The only gene cosegregating was RANKL, but it was sequenced in the proband and no mutations were found. Regarding the expression analysis, five genes were found to be overexpressed in the two HBM samples: BMP4, COL10A1, RUNX2, FZD3 and SOX6, while four were underexpressed: DLX3, TWIST1, IL6R, and PPARG.

Conclusion(s): LRP5 is not the cause of the HBM phenotype in these cases from BARCOS cohort. The results of the expression study raise new hypotheses that should be further investigated.

P447
ESTABLISHING REFERENCE INTERVALS FOR BONE TURNOVER MARKERS IN HEALTHY POSTMENOPAUSAL WOMEN

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Objective(s): There are several reference intervals for bone turnover markers (BTMs) in healthy younger women. There are fewer for older women, because they often suffer from diseases or take medications that affect bone turnover. We aimed to a) establish a healthy postmenopausal reference interval, b) compare this to a healthy premenopausal reference interval and c) determine if the exclusion criteria are valid.

Material & Methods: We studied postmenopausal women ages 55-80 years (n=2422), from the OPUS study, a 5-European centre population-based study. We excluded women who: were osteoporotic (spine or hip T-score<-2.5), were vitamin D deficient (25 (OH) D<50 nmol/L), had low eGFR (<30 mL/min/1.73 m^2), had high serum calcium (>2.60 mmol/L) or suffered from any disease known to affect bone turnover. Women aged 30-40 years (n=205) were also recruited, and the same exclusions applied. We measured CTX, intact PINP and bone ALP using the IDS-iSYS automated immunoassays on non-fasting serum samples.

Results: The reference intervals (table) were significantly higher in postmenopausal compared to premenopausal women ($p<0.001$). Multiple linear regression analyses in all postmenopausal women showed that the 3 BTMs were all significantly higher if subjects were vitamin D deficient (n=1208) or osteoporotic at spine or hip (n=127 and 339, respectively) ($p\leq0.01$). CTX was higher if eGFR was low (n=22). BTMs were not higher if calcium levels were high (n=181).

Geometric mean and 95% reference intervals for bone turnover markers for healthy postmenopausal and premenopausal women

Bone turnover markers	Postmenopausal Women (n=343)	Premenopausal Women (n=108)
Intact PINP ng/ml	40.5(16.0-102.0)	30.1(8.5-106)*
Bone ALP ug/L	14.1(7.3-27.2)	9.8(5.2-18.6)*
CTX ng/ml	0.31(0.10-0.98)	0.19(0.05-0.63)*

*P<0.001 Independent sample T-test

Conclusion(s): Older women have higher BTMs than younger women. Many factors can affect BTMs, particularly osteoporosis, vitamin D deficiency and chronic kidney disease.

P448
EARLY REVISIONS OF RESURFACING ENDOPROSTHESIS IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS AND HIP ARTHROSIS

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Objective(s): Resurfacing endoprosthesis is a new method, definitely superior to the endoprosthesis techniques currently used, due to its immediate post-operator recovery, at distance, being followed by a full recovery of the pelvic member function, also having a low rate of post-operator issues. The performances of this prosthesis are obvious in the well selected cases (patients with intense physical activity), once the surgery advice is correctly formulated.

Material & Methods: There were treated 36 patients with postmenopausal osteoporosis and primary or secondary arthrosis at the Orthopedic-Traumatology Clinic of the University Emergency Hospital Bucharest between 2005-2011. The diagnosis of osteoarthritis was established with Rx and RMN examinations. Surgical intervention with resurfacing total hip replacement was performed in 21 cases of postmenopausal women aged from 52-64 years diagnosed with osteoporosis according to WHO criteria using DXA for BMD measurements. All of this patients have low hip T-score (osteopenia/osteoporosis) and also incipient hip arthrosis. The approach was performed on a postero-side way, by maintaining the articular capsule in order to keep the femoral neck vascularisation.

Results: The recovery was very fast, within a short period of time patients being able to make complex movements of a normal amplitude, totally forbidden in the case of total prosthesis with small head. All the patients were medically re-examined at 4, 6 weeks, 3, 6, 12 months and afterwards annually. 3 revisions cases has been recoded after resurfacing arthroplasty independently of design and bearing surface: two femoral neck fractures and one case of malfunction recording a patient with a trochanteric osteotomy in antecedents. The surgical procedures were easier than the classic hip arthroplasty revisions. Most of the cases replacing only the femoral component was enough, keeping metal-on-metal couple with all its advantages.

Conclusion(s): The importance of this type of arthroplasty comes from the fact that addresses to the active patients who keep bone capital, maintains the femoral neck vascularisation, being able to get back to intense physical effort, to get back the full movement of the hips articulation, also the lack of a major issue in the hip arthroplasty represented by luxation.

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PREDICTION OF FOREARM FAILURE LOAD IN WOMEN: THE OFELY STUDY

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Objective(s): There is a growing interest for in vivo assessment of bone strength. However, the necessary technique for this evaluation - μFEA - is highly demanding in computational resources. So, we sought to predict one of the outcomes of μFEA by variables easily obtained by HR-pQCT imaging of the distal radius.

Material & Methods: Our cross-sectional analysis involved 831 women from the OFELY cohort who had a valid HR-pQCT radius scan. There were 228 pre- and 603 postmenopausal women, aged 40±7 and 67±9 years old. respectively. Distal radius HR-pQCT scans were used to measure volumetric BMD (vBMD), bone geometry and microarchitecture parameters, after segmentation of cortical (Ct) and trabecular (Tb) bone with advanced algorithm [1]. Estimated failure load for a fall on the outstretched hand was assessed on those segmented bone volumes by μFEA. Areal BMD was measured at the ultradistal radius (UDR) by DXA at the same visit

Results: In premenopausal women, most parameters did not vary with age, thus they were used as reference data to calculate standardized T-scores for the variables included in the prediction model.

First, univariate regression models showed that the failure load was best predicted by UDR aBMD (R^2=0.79, $p<0.001$). Among HR-pQCT parameters, Ct area (Ct.Ar) was the best predictor of the failure load (R^2=0.68, $p<0.001$), followed by total, Ct and Tb vBMD, and Ct thickness, with R^2 ranging from 0.49 to 0.61 ($p<0.001$). Age and other microarchitectural or geometrical parameters were poor predictors of bone strength (all $R^2<0.31$, $p<0.001$). In ascending multivariable regressions using only HR-pQCT parameters, the best surrogate variables to predict failure load included only Ct.Ar and Tb.vBMD, with R^2=0.85 ($p<0.001$). The addition of other microarchitectural parameters, age or UDR aBMD did not improve significantly the R^2 coefficient (up to R^2=0.89).

Conclusion(s): Ct.Ar combined with Tb.vBMD may be a surrogate variable of μFE estimated failure load. Without running μFEA, this method could help to estimate indirectly and more quickly bone strength based only on HR-pQCT measurement in large datasets. Further validation will be needed regarding its use in fracture risk assessment.

References: 1. Burghardt, Buie et al. Bone 2010;47:519.

P450

PTH (1-84) REPLACEMENT THERAPY IN HYPOPARATHYROIDISM: EFFECTS ON BONE METABOLISM AND STRUCTURE

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Objective(s): Conventional treatment of hypoparathyroidism (hypoPT) with calcium supplements and active vitamin D analogues causes reduced bone turnover and high BMD.

Material & Methods: We studied 62 patients with hypoPT randomized into treatment with either PTH(1-84) 100 μg/d s.c. or placebo, as an add-on therapy. We investigated changes in bone structure and density using μCT in 44 iliac crest bone biopsies (23 on PTH) obtained after 24-wks of treatment.

Results: Trabecular tunnelling was evident in 11 (48%) biopsies from the PTH-group, whereas no tunnelling was detected in the placebo group. Patients showing tunnelling had significantly higher levels of biochemical markers of bone resorption (NTX and CTX) and formation (osteocalcin, BSAP, PINP). Compared with placebo, PTH-treatment resulted in lower trabecular thickness (Tb.Th*) ($p < 0.01$), and trabecular bone tissue density ($p<0.01$), whereas connectivity density (CD) was higher ($p<0.05$) and structural modelling index tended to be lower indicating a change in trabecular architecture from a rod-like to a more platelike structure. Cortical porosity tended to be higher in PTH-treated patients, especially in those with tunnelling. Occurrence of tunnelling was not associated with etiology, length of disease, concentration of PTH or Ca^{2+}. QCT at the spine and hip were performed at baseline and at week 24 in 31 patients. At the lumbar spine (L1+L2), the increase in trabecular vBMD over the study period was significantly ($p=0.02$) higher in the PTH group (+12.2%) than in the placebo group (-0.7%). On the contrary, total vBMD decreased more in the PTH than in the placebo group at the total hip (-1.83% vs. 0.43%, $p<0.05$), at the trochanteric region vBMD (-3.28% vs. 0.46%, $p<0.03$), and at the femoral neck (-3.3% vs. -0.84%, $p=0.12$). At all three sites, there was a tendency towards an increased trabecular and a decreased cortical vBMD in the PTH treated patients.

Conclusion(s): The effect of PTH (1-84) treatment in hypoPT is increased bone turnover with a decreased vBMD at cortical sites, and an increased vBMD at trabecular sites, which is related to morphological changes in the bone microstructure with intratrabecular tunnelling and increased cortical porosity.

P451
BONE MINERAL DENSITY IN PATIENTS WITH RHEUMATOID ARTHRITIS BEFORE AND AFTER ONE YEAR OF TREATMENT WITH TNF BIOLOGICAL THERAPY

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Objective(s): To determine the effect of one-year of treatment with TNF biological therapy on BMD in patients with rheumatoid arthritis (RA) treated with methotrexate (MTX).

Material & Methods: The 120 patients (100 female, 20 male) with RA (ARA criteria) were analyzed. Patients were previously received MTX therapy (a minimum of 5 years) and corticosteroid therapy (a minimum of 3 months, doses greater than 5 mg daily). Patients were divided into two groups: group A (70 pts) who received etanercept apart from MTX therapy and B (50 pts) who received monotherapy MTX continuously. The demographic data were following and were comparable according to age, sex, BMI and duration of RA. BMD (g/cm^2) was measured at the lumbar region of the spine. DXA scan was done in two terms in both groups of pts. at the time of initiation of anti-TNF therapy and one year after. Patients were not taking osteoporosis therapy. They have no comorbidities which significantly affect bone metabolism either. All female patients were in the generative period. The SPSS, Student's and Mann-Whitney rank test were used in processing data.

Results: Analyzed BMD values in group A at baseline and after one year (1.153 ± 0.14 g/cm^2 vs.1.146 ± 0.15 g/cm^2) were decreased, but the difference was not statistically significant ($p=0.112$). In group B of pts. the BMD values were a statistically significant reduced ($p=0.001$) between the initial and repeat DXA scan (1.112 ± 0.11 g/cm^2 vs. 1.091 ± 0.11 g/cm^2). There was a statistically significant difference in the reduction of BMD values between A and B groups of patients (Mann-Whitney test, $p=0.012$).

Conclusion(s): Our study has shown no statistically significant reduction of BMD values between groups of RA patients who were treated with MTX and anti-TNF therapy in contrast to patients treated with MTX during one year following period. But, patients who received anti-TNF therapy had a significantly lower reduction of BMD compared to patients treated with MTX only.

P452
QUANTITATIVE HEEL ULTRASONOGRAPHY VS. DUAL X-RAY ABSORPTIOMETRY IN ROMANIAN WOMEN

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Objective(s): In comparison to DXA, QUS applied at the calcaneus, tibia, radius or phalanx is easy, portable and less expensive. The present study aimed to evaluate the diagnostic agreement between heel QUS and DXA in an random population of Romanian women aged 24-80 years, as well as to offer cutoff levels for QUS to distinct between women with or without osteoporosis identified by DXA.

Material & Methods: Fracture risk evaluation by calcaneus QUS (c-QUS) was carried out on 165 consecutive women

aged 55.1 years (range 29-74 years) submitted to the Osteoporosis and Menopause Center at the Endocrinology Clinic Cluj-Napoca. All patients were simultaneously investigated by both QUS on the water-based system Achilles Express (GE, Madison, USA) and DXA of the lumbar spine (L_1-L_4) and hip using the DPX-NT (GE, Madison, USA) device.

Results: In women measured by both DXA and calcaneus QUS (c-QUS), BMD moderately correlated with stiffness index (SI) (L_1-L_4: $r=+0.51$, $p<0.001$; femoral neck: $r=+0.53$, $p<0.001$; hip: $r=+0.57$, $p<0.001$). At a T-score cutoff level of -2.5SD, the high specificity but low sensitivity suggests a low false positive rate of c-QUS as a diagnostic test; still, several patients with the disease may not be correctly diagnosed. Diagnostic agreement between DXA and QUS was poor, with k-scores ranging from 0.33-0.39. Lowering c-QUS T-score cutoff for lumbar spine osteoporosis screening to -1.5 SD improved sensitivity and had a minor effect on diagnostic agreement.

Conclusion(s): Although c-QUS is useful to predict fracture risk, it should be mentioned that it does not represent an adequate predictor of BMD in Romanian women. Changing the diagnostic T-score threshold from -2.5SD to -1.5SD in subjects examined by c-QUS results in improved sensitivity of the method and enhances diagnostic agreement in the identification of patients with vertebral osteoporosis.

P453

THE PATTERN OF OSTEOPOROTIC FRACTURES IN THE POPULATION OF THE TOWN OF PERVOURALSK, URALS, RUSSIA

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Objective(s): Previous studies have shown that the distal forearm and hip fractures in women are significantly more often compared to men. Other localizations of fractures had not been investigated in Russia. The aim of this study was to assess the pattern of osteoporotic fractures by age and sex in Pervouralsk inhabitants, approximately 160,000 population in total.

Material & Methods: The analysis of records at the Central Pervouralsk hospital trauma department register as the place where patients with osteoporotic fractures have been routinely admitted to, data collecting from outpatient trauma stations were carried out from January,1 2008 - December, 31 2009. Types of fractures were included: hip, distal forearm, proximal humerus, ribs, tibia and fibula.

Results: 1371 osteoporotic fractures were revealed (383 fractures in men and 988 in women).

The proportion of all osteoporotic fractures according to fracture site is shown in the table.

Proportion (%) of osteoporotic fractures at different sites in men and women by age

Fracture type	Age range (years)						
	50-54	55-59	60-64	65-69	70-74	75-79	80+
Men							
Hip	4.9	10.3	11.3	18.4	14.6	24.3	40.0
Forearm	22.5	17.2	17.0	5.3	22.0	24.3	16.0
Proximal humerus	10.8	8.0	5.7	21.1	14.6	13.5	16.0
Ribs	39.2	39.1	50.9	39.5	41.5	37.8	24.0
Tibia and fibula	22.5	25.3	15.1	15.8	7.3	0.0	4.0
Women							
Hip	4.7	3.0	6.5	9.5	12.8	20.7	49.4
Forearm	59.4	68.9	61.1	52.6	54.7	42.2	26.9
Proximal humerus	10.2	13.2	10.2	14.6	13.4	20.7	16.9
Ribs	2.3	4.2	6.5	8.8	4.1	8.6	3.1
Tibia and fibula	23.4	10.8	15.7	14.6	15.1	7.8	3.8

There was a marked variation in the pattern of fractures with age in both men and women. The greatest percentage of fractures in men and women all ages were fractures of ribs (39.9%) and distal forearm (52.1%), respectively. Hip fractures accounted for a minority of fractures at age 50 years (4.9% and 4.7%, respectively, in men and women), but was the most common fracture after the age of 80 years. The part of hip fractures in men after the age of 80 was 40%, in women 49.4%. Fractures of distal forearm accounted for about half of all fractures in women (from 26.9 to 68.9%). The part of ribs fractures varied from 24.0-50.9% of total fractures in men and from 2.3-8.8% in women.

Conclusion(s): The resulting data can complement the knowledge of the epidemiology of osteoporotic fractures in Russia.

P454

IV ZOLEDRONIC ACID: INDICATIONS FOR ITS ADMINISTRATION AND ITS TOLERABILITY FOLLOWING FIRST DOSE

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Objective(s): To identify the side effects experienced by osteoporotic patients receiving their first dose of iv zoledronic acid. Objective was to identify the indications for osteoporotic patients receiving iv zoledronic acid.

Material & Methods: A retrospective study of patients who have received first dose of alendronic acid over 18 months was carried out. Prior to infusion, calcium and vitamin D levels

were corrected and patients were advised to keep well hydrated 24 h prior to and post infusion. Regular paracetamol was also advised. The indications for iv zoledronic acid and possible side effects including reduction in calcium levels were highlighted.
Results: Of 292 patients who received iv zoledronic acid, 63 (21%) experienced side effects. The most common being flu like symptoms (32), lethargy (12) and headache (4). Side effects experienced were transient lasting 24-48 h. 55 (19%) patients experienced a drop in serum calcium below normal.

Indications for iv zoledronic acid

Indications	Number/Percentage
Gastric symptoms (including oesophagitis, reflux, Barrets)	60(20%)
Intolerant of PO bisphosphonates	45(14%)
Post PTH therapy	50 (17%)
Noncompliant /Responder to previous therapy	130 (44%)
Cancer	5 (2%)
Unsuitable/Adverse reaction to PTH	10 (3%)

Conclusion(s): Zoledronic acid is generally safe and well tolerated and has the potential to improve compliance with osteoporosis therapy and consequently to reduce the risk of fractures in clinical practice. Discomfort experienced from side effects were reduces by patient education and symptom relief.

P455
EFFECTS OF BISPHOSPHONATE TREATMENT ON THE QUALITY OF LIFE OF PATIENTS WITH RHEUMATIOD ARTHRITIS

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Objective(s): To assess the quality of life of patients with rheumatoid arthritis on the background of bisphosphonate treatment.
Material & Methods: 117 patients receiving regular follow-up at the Department of Rheumatology for Rheumatoid Arthritis agreed to participate in the study. All of them fulfilled inclusion criteria: rheumatoid arthritis diagnosed according to 1987 ACR criteria, duration of postmenopausal period longer than one year, glucocorticosteroid treatment in the dose ≤7.5 mg, DMARD treatment with Metotrexate only, absence of concomitant diseases that might affect BMD or health assessment questionnaire (HAQ). In order to reduce speed of bone loss and risk of fracture to all the patients alendronate 70 mg weekly was prescribed. Taking into consideration that antiosteoporotic treatment in the Republic of Moldova is not covered by insurance some patients could not cover the costs and refused the treatment. They were selected for control group (48 patients). All the patients were followed up for one year. HAQ was applied at the beginning and at the end of supervision period for all the patients.
Results: At the beginning of follow-up in both groups results of testing by HAQ were similar. In the group that was supposed to receive alendronate mean HAQ index was 1.06±0.05 and in control group HAQ index was1.04±0.04, $p>0.05$. Among tested patients at the beginning of the study 63% had mild to moderate difficulty, 29% had moderate disability and only 8% showed severe disability. After one year of supervision in alendronate treated group mean value of HAQ index was 0.78±0.07 and in control group it was 1.16±0.03.There was found statistically proven difference between HAQ index values in alendronate treated group and control group, $p<0.05$, showing improvement of the quality of life in patients treated with bisphosphonates. Most of patients from control group either worsened HAQ index level (58%) or did not show any changes (42%).
Conclusion(s): Bisphosphonate treatment in patients with rheumatoid arthritis having mild or moderate disability has positive influence on their quality of life.

P456
THE EFFECT OF ANTI-TNF THERAPY TO BONE MINERAL DENSITY IN PATIENTS WITH SPONDYLOARTHROPATHIES

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Objective(s): The aim of this research was to investigate the effect of anti-TNF therapy to BMD in patients with spondyloarthropathies.
Material & Methods: The research included 78 male patients with ankylosing spondylitis and psoriatic spondyloarthropathies. The respondents were divided into two groups: group A (48 patients) received treatment with anti-TNF medicines (etanercept 50 mg/week; adalimumab 40 mg/2 weeks) and the group B- control group (30 patients) was not given the anti-TNF therapy. In both groups there were few patients who were treated with DMARD (disease modifying anti rheumatic) drugs, but none of them received glucocorticoids. For measuring of BMD we used DXA method with Lunar Advance Prodigy. Measuring was performed on hip at the beginning of the research and repeated after 18 months. Responders didn't receive therapy for osteoporosis. In processing the obtained data: SPSS and Student's *t* test and Mann-Whitney rank test.
Results: The groups were comparable by age (group A: 40±11.0 years, group B: 43.2±10.8 years), duration of illness

(group A: 9.3±6.1, group B: 10.5±5.7 years) and number of patients who received DMARD therapy (group A: 12.5%, group B: 11.4%). The average value BMD (g/cm^2) was not significantly different between groups at the beginning of the research (group A: 0.938, group B: 0.927, p=0.775). After 18 months, we recorded significant increase of BMD in the group A (1.017 g/cm^2, p<0.001) and significant decrease in the group B (0.846 g/cm^2, p<0.05). At the end of this research we detected statistically significant increase in the group treated by anti-TNF medicines in comparison to the control group (p<0.05).

Conclusion(s): 18 months long treatment with anti-TNFα therapy at our patients with spondyloarthropathy caused significant improvement of BMD.

P457
EFFECTS OF ALENDRONATE TREATMENT ON BONE MINERAL DENSITY OF PATIENTS WITH RHEUMATIOD ARTHRITIS

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Objective(s): To assess BMD of patients with rheumatoid arthritis on the background of alendronate treatment.

Material & Methods: 117 patients receiving follow-up for rheumatoid arthritis participated in the study. All of them fulfilled inclusion criteria: rheumatoid arthritis diagnosed according to 1987 ACR criteria, duration of postmenopausal period longer than one year, glucocorticosteroid treatment in dose ≤7.5 mg, DMARD treatment with Metotrexate, absence of concomitant diseases that might affect BMD. For all the patients alendronate 70 mg weekly was prescribed. Taking into consideration that antiosteoporotic treatment in the Republic of Moldova is not covered by insurance some patients refused the treatment. They were selected for control group (48 patients). All the patients were followed up for one year. BMD at lumbar spine and femoral neck was measured. BMD was measured using a Hologic Discovery Unit. WHO criteria were used for the diagnosis of osteoporosis (T-score≤−2.5 SD).

Results: At the beginning of follow-up both groups were identical. DXA showed that in average in both groups 19% patients had normal BMD both in the lumbar spine and the femoral neck. 43% patients had osteoporosis in at least one of the evaluated sites. 85% patients had T-score≤-1 and 38% patients Z score≤-1. After one year, in group of patients with regular Alendronate treatment mean lumbar BMD was 0.86 g/cm^2, mean lumbar T-score was -1.75, and mean lumbar Z score was -0.21 (95%CI -0.37 to -0.05; p<0.05). At the femoral neck, mean BMD was 0.645 g/cm^2, mean T-score -1.69, and mean Z-score -0.60 (95%CI -0.72 to -0.34; p <0.05). In control group mean lumbar BMD was 0.80 g/cm^2, mean lumbar T-score was -2.1, and mean lumbar Z-score was -0.3 (95%CI -0.38 to -0.04; p< 0.05). At the femoral neck, mean BMD was 0.59 g/cm^2, mean T-score -1.89, and mean Z score -0.72 (95%CI -0.73 to -0.35; p<0.05).

Conclusion(s): After one year of supervision there was found a tendency to worsening of BMD in patients who did not receive bisphosphonate treatment and femoral neck BMD showed statistically proven difference.

P458
VERTEBRAL DEFORMITY ASSESSMENT: WORKFLOW TIMING USING A STANDARD VS. A DEDICATED FILM VIEWER

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Objective(s): Vertebral fractures are more predictive of future osteoporotic fragility fractures than low bone density and should be treated. More vertebral fractures occur in patients not considered osteoporotic by bone density than in those who are and yet 69% of those who have fractures are unaware of them. The purpose of this study was to measure the effort required for itemized vertebral deformity assessment using a specialized viewing and reporting tool (SpineAnalyzer, Optasia Medical) compared to a traditional general use film viewing tool (eFilm, Merge Healthcare).

Material & Methods: Lateral thoracic and lumbar spine x-rays of 20 subjects were Genant semiquantitatively (SQ) scored from T4-L4 by a trained operator (NS) using both tools. In the traditional workflow the operator SQ-scored radiographs in eFilm, performing manual quantitative morphometry (QM) only on vertebrae which were thought to be deformed. QM was performed using the eFilm ruler tool and a spreadsheet (Microsoft Excel) to calculate and record vertebral deformity percentages. In SpineAnalyzer, prior to SQ-scoring each subject, the operator used the semi-automatic vertebral contour annotation facility to annotate and calculate deformity percentages for all vertebrae, regardless of whether they appeared deformed. Results were recorded within SpineAnalyzer. The operator timed the duration of the different analysis steps.

Results: Table 1 shows the timing results, per subject, all times in seconds. On average, the operator performed QM on 5.8 vertebrae per subject using eFilm. For the 3 cases where no manual QM measurements were performed, total eFilm review time was reduced to 201.1±45.1 s,

compared to 207.0±26.8 s for the same cases reviewed with SpineAnalyzer.

Vertebral Deformity Assessment Workflow Timing Results

	eFilm	SpineAnalyzer
Open images	15.3±0.7	9.8±0.2
View, arrange, pan and zoom, adjust brightness and contrast	33.2±2.9	17.6±2.1
Assess and record vertebral deformities	223.9±12.3	169.5±11.8
Assess and record Genant SQ scores	121.5±18.6	12.5±3.6
Total Review Time	393.9±29.0	209.9±12.7

Conclusion(s): Our results demonstrate that a dedicated workflow tool can provide a more comprehensive quantitative assessment of vertebral deformity in less time than general purpose viewing software. Even in cases where no manual QM was performed, using SpineAnalyzer did not result in a significant time penalty.

P459
EFFICACY AND SAFETY OF STRONTIUM RANELATE IN THE TREATMENT OF MALE OSTEOPOROSIS

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Objective(s): Efficacy and safety of strontium ranelate (SrRan) have been established for treatment of postmenopausal osteoporotic women. The Male Osteoporosis Study assessed the efficacy and safety of SrRan in men with primary osteoporosis.
Material & Methods: The study was an international 2-year randomised double-blind placebo-controlled trial (SrRan 2 g/day/placebo 2:1) including 261 patients. Primary endpoint was relative changes from baseline of lumbar BMD. Secondary endpoints were hip BMD, bone biomarkers, quality of life and fractures.
Results: The ITT population consisted of 243 men. Baseline characteristics (mean±SD) were similar in both groups: mean age was 72.7±5.7 years; lumbar and femoral neck BMD T-Score were -2.7±1.0 and -2.3±0.7, respectively; 29% of patients had prevalent vertebral fractures. BMD increased significantly in the SrRan group compared to placebo from baseline to Month-24 at each site: lumbar (L2-L4) by 9.8%±1.1 ($p<0.001$); femoral neck by 3.3%±0.9 ($p<0.001$) and total hip by 3.7%±0.8 ($p<0.001$). Observed from month-3, there was a significant decrease in bone resorption with a preservation of bone formation. At month 24, estimate of adjusted means difference (SrRan-placebo) for s-CTX was -29.7%±9.7, $p<0.001$ and for bALP 3.5%±4.8, NS. A significant improvement (i.e. score decrease) in the Quality of life was observed (-0.34±0.7 in the SrRan group vs. -0.07±0.5 in the placebo group, $p=0.009$). Although, no reliable conclusion can be drawn considering the low number of fractures, after 2 years, vertebral fracture incidence (central X-ray reading, semiquantitative method) was lower in the SrRan than in the placebo group (5.8% vs. 7.8%). The same was observed for clinical non-vertebral fractures recorded as adverse events (3.5% vs. 4.6%). The serum strontium levels and increase of lumbar spine BMD over 2 years in this study in men were similar to those previously observed in the pivotal trials in postmenopausal women. Overall SrRan was well tolerated (88.4% of patients experienced an adverse event in the SrRan vs. 96.6% in the placebo group).
Conclusion(s): In a male population at risk of fractures, a marked increase in the mean lumbar L2-L4, femoral neck and total hip BMD was observed with strontium ranelate. A trend towards a lower incidence of fracture with SrRan was observed.

P460
OUR EXPERIENCE IN IMPLANTING THE DISTAL LOCKING REVISON HIP PROSTHESIS IN OSTEOPOROTIC PATIENTS

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Objective(s): To use in the hip arthroplasty of the revision uncemented stems with distal locking capabilities, that offer a good primary stability in order to allow early patient's mobilization with full weight loading vs. cemented long stems.
Material & Methods: At the Orthopedics and Traumatology Clinic of the University Emergency Hospital of Bucharest, between 2007-2011, 42 hip revision surgeries have been performed at patients with osteoporosis, using cemented and uncemented stems. In 24 cases we used femoral components uncemented, with distal locking capabilities. The patients were aged 62-83 years. The sex ratio M/F=7/17. The diagnosis of osteoporosis was established using Rx. Exam and DXA. There were used a variety of designs, with cemented

or uncemented cups, with long uncemented stems, distal locked with 1 or 2 screws. All of them had the option of the reaming the femoral canal up to the expected diameter, and also had the option of using an external distal locking guide. Straight stems were used, as well as anatomically curved stems.

Results: This type of revision prosthesis offer a good primary stability of the femoral stem, allowing an early patient's mobilization, after 48 h postoperatively, with full weight loading from the first moment. The distal locking device has also antirotational purpose, allowing the use of femoral stems with smaller diameters than the femur's. This means an easier implantation procedure. Also, due to their length, they allow the replacement of the large bone defects at the proximal femur caused either by the osteotomies necessary during the old stem ablation. The patients had a fast rehabilitation that increased considerably the quality of life. There were not immediately or distance complications such as periprothetic fractures, in spite of the osteoporotic status of the patients.

Conclusion(s): We recommend the uses of the stems with distal locking options in the hip revision surgery, followed by an early rehabilitation.

P461
INADEQUATE PAIN RELIEF IN KNEE OSTEOARTHRITIS: AN EARLY LOOK AT THE SURVEY OF OSTEOARTHRITIS REAL WORLD THERAPIES (SORT)

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Objective(s): Osteoarthritis (OA) has an extremely high disease and economic burden. Despite treatments for OA pain management, data are limited on the adequacy of pain relief in OA patients. SORT will determine the adequacy of pain relief in patients with knee OA and compare patterns of clinical care and outcomes

Material & Methods: SORT, a 12-month prospective, observational six-country study will enrol 1400 participants using oral or topical analgesics for knee OA symptoms. Participants visiting a PCP must be ≥50 years old with knee OA. Clinical history, medications, quality of life, resource use are collected at baseline and months 1, 3, 6, 9, & 12. Inadequate pain relief (IPR) was defined as Brief Pain Inventory "moderate or greater pain" score >4.

Results: This analysis represents 171 participants who provided baseline data: 69% women, median (range) age 68 years (50-90), 5.8 years post OA diagnosis, 61% taking pain medication-oral only. IPR was reported by 60%. IPR and non-IPR participants were similar in clinical characteristics: BMI 30 kg/m^2 (20-55), coexisting OA of the hip (23%) & spine (35%). Hypertension (54%) was the most common comorbidity. IPR participants scored worse across domains other than pain: WOMAC Stiffness (135 vs. 75, $p<0.01$), Physical Function (986 vs. 527, $p<0.01$); SF-12 General Health (fair/poor 44% vs. 28%, $p=0.05$) & satisfaction with treatment side effects (very satisfied 17% vs. 40%, $p<0.01$).

Conclusion(s): With 60%of participants reporting IPR, the SORT study will provide valuable insight regarding the impact of IPR on individuals with knee OA.

Disclosures: This study was funded by Merck Sharp & Dohme Corp., Whitehouse Station, NJ USA.

P462
COMPARISON OF PRESCRIBING AND ADHERENCE PATTERNS OF ANTIOSTEOPOROTIC MEDICATIONS POST ADMISSION FOR FRAGILITY TYPE FRACTURE TO AN URBAN TEACHING HOSPITAL AND A RURAL TEACHING HOSPITAL BETWEEN 2005-2008

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Objective(s): To compare prescribing and adherence patterns of anti-osteoporotic medications in patients admitted to an urban teaching hospital in Ireland with a fragility type fracture to patients admitted to a rural hospital in the North Western region.

Material & Methods: We identified all patients ≥55 yrs admitted to Sligo General Hospital in the NW of Ireland between 2005-2008 with a fragility fracture (N=744) using the Hospital Inpatient Enquiry system (HIPE). The medical card number of those patients eligible for the Primary Care Reimbursement Services scheme (PCRS), facilitated the linkage of the HSE-PCRS database to the HIPE database enabling a longitudinal study to include patients' medical management for 12 months

before and 24 months after their admission. The data was analysed to identify persistence rates of patients prescribed osteoporosis therapy after discharge. Results were compared to the findings of a similar study carried out in an urban teaching hospital in Dublin - St. James's Hospital[1].

Results: Pre fracture treatment increased in SGH from 15.15% in 2005 to 16.54% by 2008 while postfracture prescribing increased from 31.31% in 2005 to 43.31% in 2008. In comparison prefracture treatment in St. James's Hospital increased from 2.6% in 2005 to 10.6% by 2008 while postfracture prescribing increased from 11% in 2005 to 47% in 2008. The persistence with medications postfracture in those prescribed therapy was 64.9% at 6 months and 24.7% at 12 months in the urban group and 64.8% at 6 months and 50% at 12 months in the rural group. In the urban group 28.6% of hip fracture patients were persistent at 12 months in contrast to the rural group where 50% continued to be persistent at 12 months.

Conclusion(s): The proportion of patients discharged on anti-osteoporotic medications post fragility fracture increased between 2005-2008 in both patient groups. There is a marked variation between the two groups in persistence rates at 12 months. The reasons for this will require further investigation.

References: 1.B McGowan, K Bennett, J Marry, JB Walsh, MC Casey. Eur J Clin Pharmacol 2011;67:301.

P463

BONE DECADE ACTIONS: ARE PRACTICAL RESULTS MEASURABLE YET? AGE SPECIFIC INCIDENCE RATES OF OSTEOPOROTIC HIP FRACTURES IN PORTUGAL

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Objective(s): The aim of this work is report temporal trend in hip fracture incidence, in Portugal.

Material & Methods: Osteoporotic hip fractures (820.x ICD 9-CM, caused by low impact, aged 49+) from 2000-2008 were collected from National Hospital Discharge Database, mandatory for all Portuguese public hospitals, containing information such as: sex, age, causes of admission and diagnosis. Cases of bone cancer, readmissions or complications after-care were excluded. Portuguese population, 2001 census, was the standard to calculate direct age standardized incidence rates (ASIR) (100,000 inhabitants). Linear regression was used to evaluate temporal trends of age specific rates (AR), by gender and Joinpoint regression to determine points of inflection in trends.

Results: During the period 77,083 hip fractures were identified (22.6% of male). Mean age at admission was 78.3 (SD 10.1) and 81.05 (SD 8.5) years old, men and women, respectively. A decreasing temporal linear trend was identified in ASIR in women (p-value 0.026), the relative estimated variation -10.63%. The AR in male patients showed fluctuating for all ages groups, with positive and negative absolute variation, none of the trends were statistical significant. However, in female patients all age groups presented a negative absolute variation, except the oldest (85+); in the age groups of 65-70, 70-75 and 75-80 the decreasing temporal trend was statistical significant (p-value 0.08, 0.02 and 0.02, respectively) and the relative estimated variation in the period was -23%, -29% and -15%, respectively. The year 2003 was identified as a turning point in temporal trend for hip incidence rate in women aged 65-70.

Conclusion(s): Statistically significant decreasing trends were identified only in female patients at intermediate age groups, this fact seems compatible with hormonal pharmacological intervention actions (beginning before the 2003 turning point). Among younger women (50-59 years old) no significant reduction was observed and one possible explanation is the fact that osteoporotic fractures tend to have severe medical reasons in younger groups and therefore the actions for osteoporosis prevention have lower impact. On the other hand, among the oldest group the effective intervention should be fall prevention, which is almost inexistent in Portugal.

P464

A COMPARISON OF BONE DENSITY AND BONE MORPHOLOGY IN THOSE PRESENTING WITH EITHER HIP FRACTURES, SPINAL FRACTURES OR A COMBINATION OF THE TWO

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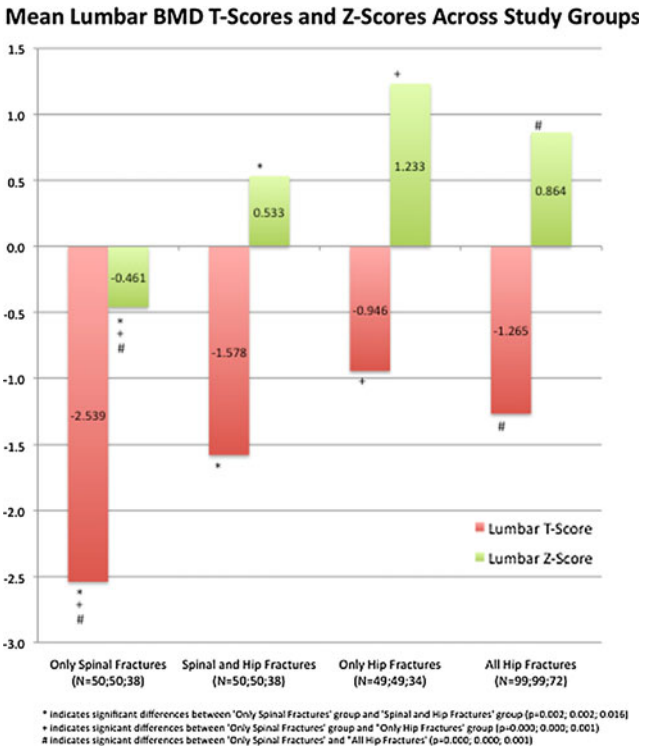
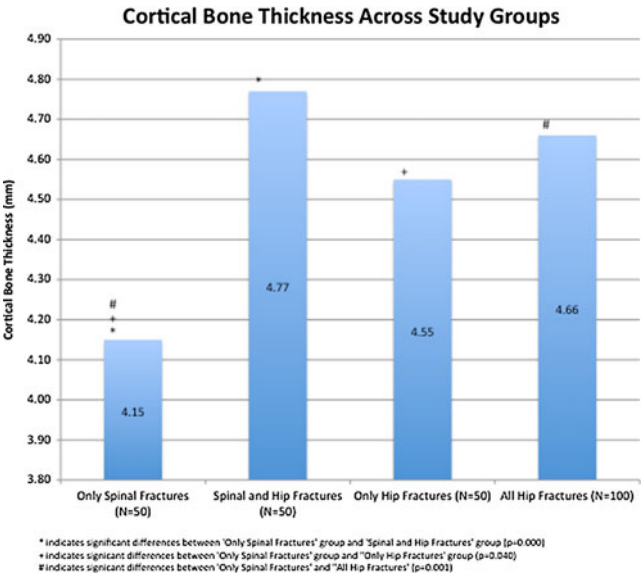
Objective(s): In hip fractures the relative contribution of trauma and osteoporosis is hard to determine. Who to treat

for osteoporosis after a hip fracture remains unclear; no guidelines currently exist.

Material & Methods: We compared spinal and hip bone density and morphometry across three fracture groups: those with spinal fractures only (N=50; age=76.6±9.3 years), those with hip and spinal fractures (N=50; age=79.5±6.4 years), and those with hip fractures only (N=50; age=81.0±5.9 years). Bone density by DXA included spinal density and hip density at 4 standard sites. Spinal fractures were assessed using the Genant method. Hip measurements included hip axis length, femoral neck length and width and femoral cortical bone thickness.

Results: Findings show a clear trend where for measurements that strongly reflect trabecular bone status (lumbar spine, intertrochanteric and trochanteric sites) those with only spinal fractures have the worst measurements, those with only hip fractures have the best measurements and those with spinal and hip fractures have measurements between the two. For measurements that strongly represent cortical bone status (femoral neck and cortical bone thickness) those with only spinal fractures remain lower than both hip fracture groups while the two hip fracture groups are not statistically different.





Conclusion(s): People presenting with spinal fractures have the worst bones, those presenting with hip fractures alone have bones normal for their age while those presenting with hip and spinal fractures are in between, these may represent the hip fracture patients who respond best to treatment with antiresorptive therapy.

P465

EXPERIENCE OF WORK OF MINSK CITY CENTER OF OSTEOPOROSIS, REPUBLIC OF BELARUS

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Objective(s): Belarusian Public Association "Fight osteoporosis together" was established in 2005. Now it consists of more than 600 members. The association promotes knowledge on osteoporosis among health professionals and general population. It regularly conducts scientific conferences on the issue, supervises research work, provides treatment and consultation work for osteoporotic patients, organizes schools on osteoporosis for general population and health care workers. Our association widely covers the problem of osteoporosis in media (regular sessions on TV, radio, regional and republican printed media).

Material & Methods: The city center of osteoporosis (CCO) was opened in the 1st clinic of the capital city Minsk in 2006 according to the initiative of the Association and Minsk City Healthcare Committee. The CCO occupies the territory of 450 m^2 and consists of 3 medical office receptions, treatment and DXA rooms, classroom and a

conference hall for 45 places. In 2011 the CCO was equipped with a modern immunoassay analyzer, which allows to determine not only bone markers, 25(OH)D but also total vitamin D in blood plasma. All the maintenance costs of the CCO are covered by the government. Each day 60-70 patients visit the centre with 35-40 densitometry examinations carried out each shift, followed by the consultation of the doctors of the CCO and specialists of the chairs of the Belarusian Medical Academy of Postgraduate Training. Patients with high risk of fractures are under supervision of the specialists of the centre. Schools for patients with osteoporosis are conducted weekly.

Results: In 2009 activists of Belarusian Public Association "Fight osteoporosis together" held the international conference on the problems of osteoporosis which was attended by 500 doctors, and in 2010 the IOF Osteoporosis Diagnosis Course was held with 300 participants. There were conducted 28 scientific republican and regional conferences on different aspects of osteoporosis in 2011.

Conclusion(s): The specialists of CCO carry out regular clinical and research work within the confines of scientific projects, funded by the government. In this time we carry out projects of hypovitaminosis of vitamin D, pathogenesis of diabetic arthropathy, development of the national computer program for evaluation of fracture risk "Osteoprognosis" and others.

P466
BENEFITS TO BONE HEALTH RESULTING FROM EARLY EXPOSURE TO SOY ISOFLAVONES ARE TRANSFERRED TO SECOND-GENERATION FEMALE MICE

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Objective(s): Infants consuming soy protein formula have higher levels of serum isoflavones, with potential estrogen-like activity, than other infants. Using a mouse model, we previously showed that early life exposure to isoflavones have long lasting benefits to bone health including greater BMD and improved bone structure, resulting in more resilient bones. While these benefits may be due to epigenetic modulations and thus transferred to subsequent generations, adverse effects on reproductive health - high rates of infertility and abnormal histology of reproductive organs - are observed in first (F1) but not second generation (F2) female mice. The objective is to determine if higher BMD and greater bone strength observed in F1 females exposed to isoflavones during early life transferred to F2 female offspring.

Material & Methods: Female CD-1 mice (F1, n=8-13/group) were randomized to isoflavones (7 mg/kg body weight/day) or corn oil from birth through the first 10 days of life, weaned at age 21 days and fed a control diet (AIN93G) until 2 months of age. F1 females were bred to control males to obtain F2 females (n=14-22/group) that were fed control diet until necropsy at 4 months of age. BMD and strength of femurs and lumbar vertebra (LV) were measured by DXA and a materials testing system, respectively. Body weight was measured once weekly.

Results: F2 females whose mothers were exposed to isoflavones had greater ($p<0.05$) femur and LV BMD accompanied by greater resistance to fracture ($p<0.05$) at the femur neck and midpoint, and LV. These changes were accompanied by higher ($p<0.05$) final body weight (12% higher).

Conclusion(s): Unlike adverse effects to reproductive health that are not transferred to F2, previously observed benefits to bone development in F1 are transferred to F2 females. Skeletal sites rich in trabecular (lumbar spine) or cortical (femur midpoint) bone respond similarly in that both sites withstand greater forces before fracture. Moreover, higher body weight persists into F2. These data provide a rational for long-term studies of infants exposed to isoflavones or other environmental estrogens during early life.

Disclosures: This work was supported by the Canadian Institutes of Health Research (funding number 89941).

P467
IMPLEMENTATION OF A FRACTURE LIAISON SERVICE MODEL OF POST-FRACTURE OSTEOPOROSIS CARE IN THE U.S. MEDICARE BENEFICIARY POPULATION

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Objective(s): As part of the U.S. National Bone Health Alliance (NBHA) 20/20 vision promulgated by its 33 member organizations and 3 government participants to reduce the incidence of hip and other fractures 20% by the year 2020, this project will implement a fracture liaison service (FLS) demonstration program in the U.S. Medicare beneficiary system at 70-100 sites nationwide. This FLS program will not only reduce the incidence of secondary fractures and costs, but also increase osteoporosis screening and treatment rates.

Material & Methods: The NBHA has requested funding from the U.S. Centers for Medicare & Medicaid Services to support a 3-year, 70-100 site FLS in the Medicare beneficiary population in which nurse practitioners will be responsible for ensuring post-fracture patients receive appropriate

diagnosis, treatment and follow-up. This Medicare FLS will incorporate best practices and lessons learned from existing U.S. and international FLS programs (modified for the Medicare setting), while using the tools developed by the American Orthopaedic Association Own the Bone program and other partners to enable rapid implementation.

Results: This Medicare FLS will track both process and outcome measures and is leveraging the experience of other FLS programs who have all shown (both in the U.S. and abroad) an ability to greatly reduce the rates of costly and serious secondary fractures by identifying and treating patients who present with a new fracture, recognizing that this group of patients represent those at highest risk of additional fractures. There is overwhelming support from a national and international network of FLS champions and care managers willing to assist in the success of the Medicare Innovation FLS project. The NBHA anticipates CMS award notification by early April 2012.

Conclusion(s): Given the high prevalence and costs of osteoporosis to the U.S. Medicare beneficiary population and the fact that disease management approaches have not yet been widely utilized in the U.S. around post-fracture risk reduction, the time to act is now to decrease health care expenditures and increase patient quality of care.

References: http://innovations.cms.gov/initiatives/innovation-challenge/index.html

P468

HEALTH RELATED QUALITY OF LIFE AFTER HIP FRACTURE: DIFFERENCES BETWEEN EQ-5D AND TIME TRADE OFF INSTRUMENTS

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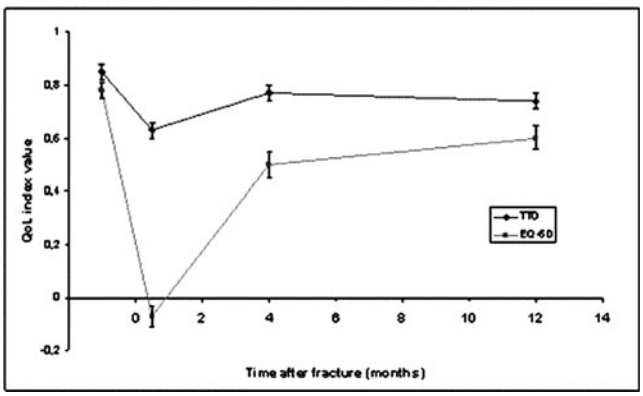
Objective(s): The objective of this study was to compare health utility elicited with the EQ-5D and the Time-trade-off (TTO) instruments directly, 4 months and 12 months after hip fracture.

Material & Methods: The International Costs and Utilities Related to Osteoporotic fractures Study (ICUROS) is a prospective multinational study with the aim of estimating costs and health related quality of life (HRQoL) related to osteoporotic fractures. In the study, two instruments were used to elicit estimates of patients' health utility before hip fracture (recollection), and 2 weeks, 4 months and 12 months after fracture: the individual preference based TTO instrument and the EQ-5D instrument based on societal preferences.

Results: In the 297 patients included in the interim analysis, health utility estimates varied significantly between the two elicitation instruments. Compared to TTO, the EQ-5D consistently provided lower estimates of health utility. Differences were largest 4 weeks after fracture, with average health utility estimates of 0.63 and -0.07 for TTO and EQ-5D, respectively. Differences decreased at 1 year post fracture (Fig. 1). The correlation coefficient for the health utility loss over 12 months, using Spearman's correlation, for the two instruments was 0.42 ($p<0.05$).

Figure 1. HRQoL index after fracture. Error bars indicate 95% CI.



Conclusion(s): Osteoporotic hip fractures give rise to significant loss of health utility, irrespective of instrument used. However, there are substantial differences in the extent of average health utility decrease between the instruments. This can mainly be explained by the difference in the underlying preferences between the two instruments. The direct TTO reflects the patients' own perceptions of the utility in the current health state whereas the EQ-5D reflects a healthy population's preferences of impaired health.

Disclosures: ICUROS is co-sponsored by IOF Invest in Your Bones (IYB), Amgen, Eli Lilly, Medtronic, Novartis, Sanofi-Aventis, Servier, and Pfizer.

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WATER CONTENT, CALCIUM AND PHOSPHORUS IN THE REGENERATE OF BONE FORMED IN DEFECTS AREA AGAINST A BACKGROUND OF STREPTOZOCIN DIABETES

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Objective(s): To study the chemical composition of the regenerate of bone tissue that formed at the site of the defect on the background of Streptozocin diabetes in mature age rats.

Material & Methods: The experiment was performed on 105 white rats (males) with an initial mass of 136.00±2.64 g for the initiation of diabetes (diabetic) rats, we injected Streptozocin (2-deoxymethyl-nitrosocarbamide-glucopyranose).

Results: Applying of perforated defect on the tibia on the background of Streptozocin diabetes compared with rats without diabetes at 7-day observation was accompanied by a decrease in water content of 8.64% in regenerate. From 15-90 days and water content increased and was greater than the rates of the control group according to 10.13%, 15.46%, 18.63% and 15.17%. Proportion organic matter in the period from 15-90 days was less than control values (group of defect without diabetes), respectively 9.89%, 11.52%, 7.76% and 3.33%, while the share of mineral component - in the period from 30-90 days of observation - by 2.77%, 6.64% and 6.41%. After application of a defect on the proximal tibia metaphysis macroelement composition of regenerate characterized by the following features: 7-day calcium and phosphorus was smaller than the rates of animals of the control group to 25.04% and 31.39%. Since the phosphorus content decreased more, this led to an increase in calcium-phosphorus ratio of 8.98%.

Conclusion(s): Applying of perforated defect on the background of Streptozocin diabetes accompanied by growth water content and decreasing the share of organic and mineral substances in regenerate. Calcium content was less than the benchmarks on the 15-60 days of experiment, and vice versa phosphorus was greater than the benchmarks from the 7-60 days. As a result, the ratio of calcium / phosphorus was less than control at the same time at 8.20%, 8.25%, 11.09% and 10.75%. This may be evidence of increased bone mineral regenerate amorphous. Applying a defect on the background of Streptozocin diabetes in mature age rats accompanied by an imbalance of macroelement composition of regenerate, indicating that inhibition of its formation processes.

P470
THE U.S. NATIONAL BONE HEALTH ALLIANCE: BONE TURNOVER MARKER STANDARDIZATION AND HARMONIZATION PROJECT

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Objective(s): There has been a call for advancing the field of bone turnover markers from a number of national and international groups, including the International Osteoporosis Foundation (IOF), International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) and the U.S. National Osteoporosis Foundation (NOF). The scientific triad of standardization, harmonization and reference population databases are recognized as vital steps towards wider clinical utilization of bone turnover markers for the management of osteoporosis.

Material & Methods: This project will standardize U.S. bone marker sample collection procedures, establish a U.S. reference range for one bone formation (serum procollagen type I N propeptide, s-PINP) and one bone resorption (serum C-terminal telopeptide of type I collagen, s-CTX) marker and standardize bone turnover marker assays used in clinical laboratories. This effort will allow U.S. clinicians to have confidence in their use of bone turnover markers to help monitor osteoporosis treatment and assess future fracture risk. This project builds on the recommendations of the IOF/IFCC Bone Marker Standards Working Group by developing U.S. reference standards for PINP and CTX, the markers identified as most promising for use as reference markers (see reference). This project is being coordinated by the U.S. National Bone Health Alliance (NBHA), a public-private partnership that includes 33 members representing industry, academia and non-profits (in addition to 3 government agencies).

Results: This project is anticipated to be completed in 2012; a position paper elucidating the goals and activities of this project will be published in early 2012 in *Osteoporosis International* (with companion and follow-on papers to be published in *Clinical Chemistry* and *Osteoporosis International*, respectively).

Conclusion(s): Successful completion of this project in 2012 will help assure U.S. health professionals of the clinical utility of bone turnover markers and ties in with the parallel effort of the IOF/IFCC to develop worldwide bone turnover reference ranges.

References: Vasikaran S, Eastell R, Bruyere O, et.al. Markers of bone turnover for the prediction of fracture risk and monitoring of osteoporosis treatment: a need for international reference standards. Osteoporos Int 2011

Disclosures: This effort was supported in part by Roche Diagnostics, Eli Lilly & Co., Inc., and the organizational members of the National Bone Health Alliance.

P471
BENEFICIAL EFFECTS OF STRONTIUM RANELATE COMPARED TO ALENDRONATE ON TRABECULAR BONE SCORE IN POST MENOPAUSAL OSTEOPOROTIC WOMEN: A 2-YEAR STUDY

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Objective(s): Trabecular Bone Score (TBS, Med-Imaps, France) is an index of bone architecture independent of BMD calculated by quantifying local variations in grey level from anteroposterior spine DXA scan and reported to be associated with fracture in prior case-control and prospective studies[1]. We compared the effects of strontium ranelate (SrRan) and alendronate (ALN) on spine architecture patterns as assessed by TBS in women with postmenopausal osteoporosis.
Material & Methods: A post hoc analysis was performed on DXAs (Hologic and GE Lunar Devices) from 79 women out of 189 included in a double blind, double dummy study and randomized to SrRan 2 g/day or ALN 70 mg/week during 2 years[2]. Spine TBS parameters were assessed by TBS iNsight (v1.9) at the spine after 12 and 24 months of treatment. We applied ISCD rules for individual vertebrae exclusion independently for BMD and TBS, respectively. Since duplicate measurements were performed at baseline, precision were calculated as CV%.
Results: Baseline characteristics (mean±SD) were similar between groups in term of age, 69.2±4.4 years; BMI, 23.8±4.4 kg/m^2; L1-L4 T-score, -2.9±0.9 and TBS 1.230±0.09. As expected, the correlation between Spine BMD and TBS was very low with r^2=0.12. Precision errors were 1.1% and 1.6% for spine BMD and TBS, respectively. Over 1 and 2 years, L1-L4 BMD increased significantly by 5.6% and 9% in SrRan group and by 5.2% and 7.6%, respectively in ALN group. Similarly, spine TBS increased by 2.3% ($p<0.001$) and 3.1% ($p<0.001$) in SrRan group and by 0.5% (ns) and 1.0% (ns) respectively in ALN group with a significant between-group difference in favor of SrRan ($p=0.04$ and $p=0.03$). There were no correlation between delta BMD and TBS at 1 year or at 2 years. The two treatments were well tolerated.
Conclusion(s): SrRan has greater effects on bone architecture index at the spine compared to alendronate in women with postmenopausal osteoporosis after 2-year treatment. These results consolidate previous studies supporting a benefit of SrRan on bone architecture.
References: 1. Hans D. et al. J Bone Miner Res 2011;26:2762. 2. Felsenberg D. et al. Osteoporos Int 2011;22(suppl. 1):S102.

P472
SURGICAL TREATMENT FOR DISTAL TIBIAL SHAFT FRACTURES IN OSTEOPOROTIC PATIENTS

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Objective(s): Comparison of immediate postoperative and follow-up results after surgical treatment of fractures of the distal tibial shaft by intramedullary nail osteosynthesis vs. plate and screws in osteoporotic patients.
Material & Methods: In the Orthopedics-Traumatology Clinic of the Bucharest Emergency University Hospital, between 2008-2011 were performed 23 surgeries for distal tibia and fibula fractures according patients with osteoporosis. Patients were aged between 57-78 years. Sex ratio M/F=10/13. The diagnosis of osteoporosis was established using DXA for BMD measurements. In 14 cases closed reduction was performed (±reaming) and locked intramedullary nail osteosynthesis and in 9 cases we performed open reduction and moulded plate osteosynthesis. After the orthopedic intervention, BMD was measured at lumbar spine and proximal femur using DXA with results suggestive for low bone mass. All these patients were included into a program aiming to prevent further bone loss using different therapeutic strategies (hormonal replacement therapy or bisphosphonate therapy associated with calcium and vitamin D supplements) They all made periodical medical checks and radiological evaluation at 6 weeks, 3, 6, 12 and 18 months postoperator. DXA scan was performed in all patients 1 year after initial evaluation.
Results: For intramedullary nail osteosynthesis with minimally invasive approach though it achieved an imperfect reduction of fracture, in terms of consolidation and evolution the functional outcome was superior. If a large approach was used and fracture reduction was perfect, complications were recorded: delay in the consolidation or pseudarthrosis.
Conclusion(s): If the fracture type allow distal nail locking, we recommend intramedullary nail osteosynthesis for distal tibial shaft fractures.

P473
MORPHOMETRIC PARAMETERS OF THE TIBIA IN WHITE RATS FOLLOWING INHALATION EFFECTS OF TOLUENE

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Objective(s): To study the growth characteristics of the tibia white rats after a 60-day inhalation poisoning with toluene.

Material & Methods: An experimental study was carried out on 180 white mongrel adult male rats in the SI "Lugansk State Medical University" and kept in accordance with the requirements and provisions established the "European Convention for the Protection of Vertebrate Animals used for experimental and scientific purposes." Tibias were removed at 1, 7, 15, 30, 60 days after the completion of a 2-month exposure of toluene and measured by the method of W. Duerst.

Results: It was reported slowdown in the longitudinal and apposition of bone growth in all subjects, which was the highest since the 1st to the 15th day after the cessation of inhalation cycle and subsequently slightly smoothed. Thus, the maximum length of the tibia were smaller than those in the control animals in all observation periods, respectively set at 4.15%, 4.47%, 2.67%, 3.35% and 3.41%. The transverse dimensions of the tibia were also lower than in intact rats, all the times of the experiment: the width of the proximal epiphysis of 3.69%, 4.14%, 5.77%, 4.49% and 2.84% ($p>0.05$), respectively, of the distal epiphysis - at 11.94%, 7.78%, 10.75%, 10.00% and 6.86% ($p>0.05$). As with the previous parameters, width and anteroposterior size of the mid-diaphysis decreased by 6.82%, 6.72%, 7.01%, 5.82% and 6.05% and 12.31%, 10.14%, 9.80%, 8.65% and 7.11%, respectively. Study the rate of apposition growth showed that the width and anteroposterior size of the midtibial shaft of old animals were lower than in intact animals, all the times of the experiment, respectively, at 4.92%, 5.08%, 4.06%, 4.37% and 4.98%, and 6.37%, 5.08%, 5.88%, 3.85% and 3.32%. The width of the distal epiphysis of tibiae was less than control values from 1-30 days of the experiment, respectively, at 11.37%, 5.00%, 5.91% and 4.74%.

Conclusion(s): Inhaled toluene poisoning leads to a slowdown in both longitudinal and apposition of bone growth. The identified changes are seen at 1, 7 and 15 days after poisoning with toluene inhalation with a tendency to a levelling of 30 and 60 days.

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NERIDRONATE TREATMENT IN CHILDREN WITH OSTEOGENESIS IMPERFECTA (OI): THE EFFECTS ON BONE MINERAL DENSITY (BMD) AND VERTEBRAL DEFORMITIES

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Objective(s): To evaluate the effects of neridronate treatment on bone mass and vertebral deformities in children with OI.

Material & Methods: In 66 children (34 F, 32 M; age 1-12 aa), with OI (types I,III e IV) in therapy with neridronate (2 mg/kg i.v. every 3 months), were evaluated lumbar bone mass (BMD e BMAD) and vertebral deformities by radiographs and DXA using QDR4500A (Hologic, Inc., Bedford, MA, USA),. Vertebral deformities were evaluated by semiquantitative assessment (SQ) of radiographs and by morphometric X-ray absorptiometry (MXA) calculating wedging index [(1-ah/ph)x100%] and concavity index [(1-mh/ph)x100%]

Results: A significant increase of BMD was observed after 24 months of therapy, from 0.08 ± 0.01 to 0.09 ± 0.01 (+17.1%; $p<0.01$); the indexes of vertebral deformity were both significantly ($p<0.01$) reduced (wedging :-8.64%; biconcavity: -10.2%) and inversely correlated to the BMD ($r=-0.372$) and to the BMAD ($r=-0.376$). Vertebral deformities were 196 by SQ and 139 by MXA at baseline; after 24 months of therapy vertebral fractures decreased at 162 by SQ and 104 by MXA.

Conclusion(s): Our data demonstrates the effectiveness of the therapy with neridronate increasing the bone density and improving the indexes of vertebral deformity. So we suggest the use of MXA (low-dose method), in the follow-up for the children with OI for the evaluation of vertebral deformities.

P475

ASSOCIATION BETWEEN HANDGRIP STRENGTH AND BODY COMPOSITION IN MEN

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Objective(s): The aim of the study was to investigate the association of handgrip strength with body composition in underweight, normal and obese men.

Material & Methods: Men (n=268) aged 40 years and older were included in this cross-sectional study. Exclusion criteria were metabolic or endocrine disorders known to affect musculoskeletal system and restriction of movement in the upper extremities. The subjects performed three maximum attempts for dominant handgrip strength measurements with handle dynamometer and the mean value of these trials was recorded in kilogram (kg). DXA was used to measure fat mass, body fat percentage (%BF), total BMD and lean mass (iDXA, GE Lunar). All subjects were divided into three groups according to BMI: <22 kg/m^2 – underweight, BMI range 22-29.9 kg/m^2 – normal, and BMI$\geq$30 kg/m^2 – obese. The significance of

difference between handgrip strength and body composition among BMI groups was tested by one-way analysis of variance (ANOVA). Differences between groups at the 5% significance level ($p<0.05$) were assessed by LSD post hoc probability test for multiple comparisons. Pearson's correlation coefficient was calculated.

Results: Of all men investigated, 18 subjects (6.7%) were underweight, 184 (68.7%) – normal and 66 (24.6%) were obese. Using one-way ANOVA test statistically significant differences of handgrip strength, fat mass, %BF, total BMD and lean mass were found between BMI groups. In obese men handgrip strength (41.3±13.9 kg), fat mass (34.7±7.9 kg), %BF (35.6±5.3%), lean mass (61.8±6.3 kg), and total BMD (1.264±0.137 g/cm^2) were statistically significantly higher comparing with underweight and normal men. Handgrip strength was statistically significantly related to lean mass in all BMI groups, and the strongest correlation was found in underweight men ($r=0.63$, $p=0.017$). There was a weak correlation of handgrip strength with total BMD ($r=0.34$, $p=0.001$) and negative correlation with %BF ($r=-0.28$, $p=0.02$) in normal BMI group. No relationships were found in underweight and obese subjects.

Conclusion(s): Although the lean mass was greater in obese subjects, the most significant correlation between handgrip strength and lean mass was found in underweight men.

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EARLY DETECTION OF BONE METASTASES FROM NONSMALL CELL LUNG CANCER USING SERUM CARBOXYTERMINAL TELOPEPTIDE (CTX) AND AMINOTERMINAL (PINP) OF TYPE I COLLAGEN MEASUREMENT: PRELIMINARY RESULTS

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Objective(s): Nonsmall cell lung carcinoma (NSCLC) is the most common lung cancer, which represents the major cause of cancer death worldwide. The early diagnosis of NSCLC is difficult, and the sensitivity of common serum tumor markers, such as carcinoembryonic antigen (CEA) and fragments of cytokeratin 19 (CYFRA 21-1), is low. Unfortunately, bone metastases (BMs) are common in patients with NSCLC, and their early detection and treatment may improve both disease-free interval and survival. Several serum biomarkers have been proposed for the detection of BMs, such as carboxyterminal telopeptide of type I collagen (CTX), tartrate-resistant acid phosphatase isoform type 5b (TRAP5b), and amino-terminal propeptide of type I collagen (PINP), which are markers of bone resorption. The aim of this preliminary study was to evaluate the usefulness of a panel of serum biomarkers in patients with NSCLC and BMs.

Material & Methods: Sixteen patients (11 males, 5 females, median age 64 years, range 54-68) with NSCLC and BMs (cases), and 18 age- and gender-matched patients without BMs (controls) underwent serum CTX, TRAP5b, PINP, CEA, and CYFRA 21-1 measurements. CTX was measured by automated immunometric assay, TRAP5b and CEA by two-site ELISA, PINP by radioimmunoassay, and CYFRA 21-1 by immunochemiluminescent assay. The cut-off values were 400 pg/mL (CTX), 5 U/L (TRAP5b), 3.5 ng/mL (CEA), 65 μg/L (PINP), and 45 pg/mL (CYFRA 21-1), respectively.

Results: CTX (443.7±945.1 *vs.* 402.7±28.4 pg/mL, $p=0.003$), and PINP (75.9±11.4 *vs.* 64.1±7.5 μg/L, $p=0.001$), were significantly higher in patients with BMs, while the other markers did not differ (p=NS) between cases and controls. The sensitivity, specificity and accuracy were 73.7%, 86.7%, and 79.4% (OR=18.2, 95% CI 2.99-110.7, $p<0.0001$) for CTX; 30.4%, 76.2%, and 67.6% (OR=6.22, 95% CI 1.06-36.5, $p=0.038$) for TRAP5b; 72.2%, 81.2%, and 76.5% (OR=11.26, 95% CI 2.21-57.20, $p=0.002$) for PINP; 55.5%, 62.5%, and 58.8% (OR=2.08, 95% CI 0.53-8.23, $p=0.29$) for CEA; 65.0%, 78.61%, and 70.6% (OR=6.81, 95% CI 1.41-32.8, $p=0.012$) for CYFRA 21-1, respectively.

Conclusion(s): In patients with NSCLC, both CTX and PINP measurements can be useful in the detection of BMs.

References: Horiguchi T, *et al.* Jpn J Clin Oncol 30:174;2000.

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ASSOCIATION BETWEEN BONE TURNOVER MARKERS AND LIPID PROFILE IN MEN AND WOMEN

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Objective(s): The aim of this study was to evaluate the relationship between bone turnover markers and serum lipids: total cholesterol, HDL, LDL and triglycerides.

Material & Methods: This was the cross-sectional study of subjects aged 60 years who had visited the National Osteoporosis Center (Vilnius, Lithuania). The exclusion criteria were: fracture within previous 12 months, known cancer and

diseases affecting bone turnover except untreated osteoporosis, treatment with medications acting on bone turnover or on lipid profile. Blood samples were obtained between 9-11 a.m. after 12 h fasting. Serum bone resorbtion marker C-telopeptide of type I collagen crosslinks (s-CTX-I), type I procollagen amino-terminal propeptide (PINP) and PTH were measured by automated immunoassay (Cobas e411, Roche Diagnostic) and serum lipids were analyzed by ADVIA 1800 (Siemens Medical Solution). Mann-Whitney U test and Spearman's correlation methods were used for statistical analysis.

Results: Participants included 134 men and 160 women. There were no significant differences in age and BMI between genders. Total cholesterol, HDL and LDL were statistically significantly lower in men than in women. Triglycerides negatively associated with s-CTX-I and PINP only in women when all data were analyzed. Subjects of both genders were divided into three age groups: 60-69 years (56 men and 60 women), 70-79 years (46 men and 62 women) and over 80 years (32 men and 38 women). The analysis of the associations between lipids and bone turnover markers in different age groups indicated negative moderate correlation of triglycerides with s-CTX-I ($r=-0.45$, $p<0.01$) and PINP ($r=-0.38$, $p=0.05$) in men aged 60-69 years. No significant correlations were found in other age groups. In women the most significant correlations were found in two age groups: triglycerides associated with s-CTX-I in group 70-79 years ($r=-0.33$, $p<0.01$), and with PINP in 60-69 years group ($r=-0.39$, $p<0.01$).

Conclusion(s): Triglycerides negatively correlated with bone turnover markers s-CTX-I and PINP in women over 60 years and in men at the age of 60-69 years.

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USING QUS FOR FRACTURE PREDICTION – AFTER FRAX, OR TOGETHER?

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Objective(s): Major bone properties determining bone fragility are bone mass and size, microstructure and quality of bone. Treatment decisions were based on decreased bone mass until the very last time. Recently FRAX method has become widely accepted as intervention threshold. FRAX calculation covers the main clinical risk factors which are dependent or independent of bone density. Alas, microstructure or bone quality have not been involved into the decision-making process – neither in the past nor in the FRAX-era. However, QUS of bone varies not only by decreased bone density but also by changes in trabecular structure and by decreased elasticity. The aim of this study was to compare the contribution of QUS and BMD to the fracture probability calculation by FRAX.

Material & Methods: 209 untreated postmenopausal women were involved, 77 with and 132 without fracture. Spine and hip BMD was measured by DXA (Prodigy, GE Lunar). Heel ultrasound for BUA, SOS and Stiffness was made by Achilles InSight (GE Lunar). FRAX calculation based on Hungarian data was also done. SPSS was used for correlation analysis, linear and logistic regression evaluations.

Results: According to BMD, 71 normal, 104 osteopenic and 34 osteoporotic women were studied. Hip BMD correlated to fracture probability for major fractures ($r=-0.277$, $p<0.001$) and for hip fractures (-0.250, <0.001). A very similar correlation was found between Stiffness and fracture probability (-0.245, <0.001 and -0.245, <0.001). Both the hip BMD and Stiffness had an independent contribution to the FRAX values for both types of calculation. Fracture probability increase for 1 SD was found as follows (95% CI): hip BMD 0.86-1.77, stiffness 0.48-0.89, FRAX major OP fx 1.17-1.35, FRAX hip fx 1.22-1.56.

Conclusion(s): The correlation of QUS to fractures seems to be equal to that of BMD to fractures, however, heel Stiffness predicts fractures independently of hip density. The power of QUS to predict fractures lies on a comparable level to the predicting power of FRAX. Taking into consideration the different source of fragility information provided by ultrasound, our results suggest that implication of QUS into the FRAX calculation system promises a more sensitive tool for treatment decisions.

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THE EFFICACY AND SAFETY OF IBANDRONIC ACID FOR INTRAVENOUS ADMINISTRATION FOR TREATMENT OF SEVERE SYSTEMIC OSTEOPOROSIS IN PATIENTS WITH JUVENILE ARTHRITIS

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Objective(s): To evaluate the efficacy and safety of ibandronic acid for intravenous administration for treatment of severe systemic osteoporosis in patients with juvenile arthritis.

Material & Methods: The study included 25 patients with juvenile arthritis at the age of 7-17 years (10 girls, 15 boys), including 20 patients with systemic arthritis, 3 with polyarthritis, 2 with ankylosing spondylitis. The mean age was 12.5 (10.5, 14.0) years. Was allocated to 2 groups: 17 children treated with glucocorticoids (GC) and 8 not receiving GC. Children of the first group had 12 vertebral fractures and patients of the 2-d group - 1. Ibandronic acid was administered intravenously at a dose of 3 mg every 12 weeks. Evaluation of treatment efficacy was conducted by a combined index of BMD of tissue Z-score, assessing the patient / parent to the severity of pain on a visual analog scale, serum markers of bone resorption C-terminal telopeptide.
Results: The treatment of ibandronic acid in children of both groups was marked increase in BMD. In patients treated with GC, a statistically significant increase was registered in 76 weeks of therapy ($p<0.01$), while the second group of children - through 46 and 76 weeks ($p<0.05$). Within 6 months of treatment in both groups of ibandronic acid was a statistically significant reduction in pain index ($p<0.05$), after a year of treatment with this trend persisted ($p<0.001$). In both groups, reducing the concentration of C-terminal telopeptide in serum were detected through 52 weeks of treatment ($p<0.05$). After 76 weeks of treatment new vertebral fractures and fractures of the peripheral skeleton are not fixed. Tolerability of therapy ibandronic acid in patients was satisfactory.
Conclusion(s): In the course of the study has identified high efficacy and an acceptable tolerability ibandronic acid for treatment of severe systemic osteoporosis in patients with juvenile arthritis

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MORPHOMETRIC PARAMETERS OF THE HIP BONE IN WHITE RATS FOLLOWING INHALATION EFFECTS OF TOLUENE

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Objective(s): To study the growth characteristics of the hip bone of white rats after a 60-day inhalation poisoning with toluene.
Material & Methods: An experimental study was carried out on 180 white mongrel adult male rats in the SI "Lugansk State Medical University" and kept in accordance with the requirements and provisions established the "European Convention for the Protection of Vertebrate Animals used for experimental and scientific purposes." Tibias were removed at 1, 7, 15, 30, 60 days after the completion of a 2-month exposure of toluene and measured by the method of W. Duerst.
Results: The slowdown in the longitudinal and apposition of bone growth in all subjects, which was the highest since the 1st to the 15th day after the cessation of inhalation cycle was observed after a 60-day inhalation of toluene vapors. However, 60 days after ending the cycle of inhaled toluene credible deviations still remained. The maximum width of the hip bone was lower than in intact animals and in all the times of the experiment, respectively, at 6.06%, 6.19%, 6.89%, 4.87% and 5.53% ($p>0.05$). However, after a 60-day inhalation of toluene vapor the maximum thickness of the hip bone was less than control values of group 1 to the 1, 30 and 60 days of the experiment at 5.02%, 4.78% and 10.45%. The maximum width of the hip bones of animals of group 5 was less than control values to the 1 and 7 day experiment at 4.38% and 4.09% and a maximum thickness - to 30 day at 4.44%. In these conditions the maximum width of the hip bone was lower than in intact animals, to the 1 and 7 day experiment, respectively 4.04% and 4.09%, while its maximum thickness - to 15 day at 4.03%.
Conclusion(s): Revealed changes in the hip bone appear at 1, 7 and 15 days after poisoning with toluene inhalation with a tendency to a levelling of 30 and 60 days.

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THE U.S. NATIONAL BONE HEALTH ALLIANCE: A MULTISECTOR PUBLIC-PRIVATE PARTNERSHIP WORKING TOGETHER TO IMPROVE AMERICA'S BONE HEALTH

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Objective(s): The U.S. National Bone Health Alliance (NBHA) is a public-private partnership launched in late 2010 that includes 33 members representing industry, academia and the nonprofit sectors, in addition to three U.S. government agencies: the Centers for Disease Control and Prevention, Food and Drug Administration and National Institutes of Health. NBHA develops projects in bone health awareness, prevention, research, diagnosis and treatment and advocacy.
Material & Methods: Among the major initiatives of the NBHA is the implementation of a fracture liaison service (FLS) model of secondary osteoporosis care to reduce the incidence of secondary fractures and increase osteoporosis screening and treatment rates while also reducing costs. NBHA has requested funding from the U.S. Centers for Medicare & Medicaid Services to implement an FLS program at 70 to 100 sites nationwide. In addition, NBHA will launch an awareness campaign in mid-2012 to highlight the connection between osteoporosis and fracture, especially with patients who have suffered a fracture. A third project

under development is an effort, building on the recommendations of the International Osteoporosis Foundation (IOF)/ International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) Bone Marker Standards Working Group, to standardize U.S. bone marker sample collection procedures, establish a U.S. reference range for one bone formation (PINP) and one bone resorption (CTX) marker and standardize bone turnover marker assays used in clinical laboratories. NBHA also serves as an advocate on topics important to bone health, most notably vitamin D, calcium, DXA reimbursement and utilization and the long-term use of bisphosphonates and other therapies.

Results: The NBHA brings together the expertise and resources of partners from the nonprofit, public and for-profit sectors to work together on efforts that no one sector or organization can address on their own.

Conclusion(s): The NBHA is a platform that allows all voices in the bone health community to harmonize to deliver clear, concise messages about bone health by facilitating ongoing dialogue among interested individuals and organizations engaged in bone health activities and identifying shared priorities and projects that can become reality through pooled funding.

Disclosures: The organizational members of the NBHA.

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STRONTIUM RANELATE REDUCES PAIN AND IMPROVES PATIENTS' ABILITY TO COPE WITH DAILY LIFE REQUIREMENTS IN POSTMENOPAUSAL OSTEOPOROSIS UNDER REAL LIFE CONDITIONS: RESULTS OF THE NON-INTERVENTIONAL PERSPECTIVES STUDY

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Objective(s): The prospective, noninterventional PERSPECTIVES-Study (ProtElos® foR poStmenoPausal ostEoporotiC paTIents with preVious thErapieS) examines the effectiveness of strontium ranelate (SR) in postmenopausal women with osteoporosis in relation to pain reduction and improvement of daily life abilities, frequency of falls and fracture-related treatments under practice conditions.

Material & Methods: 1147 osteoporotic patients were included and treated with 2 g SR daily. Pain, analgesics use, coping with daily life requirements, compliance and tolerability, falls and fracture treatments were analysed descriptively in 1135 patients.

Results: After 3 months of treatment with SR, the overall pain perception improved by 17%. The pain frequency was reduced as well, whereas the use of moderate and strong analgesics declined by 20 and 30%, respectively.

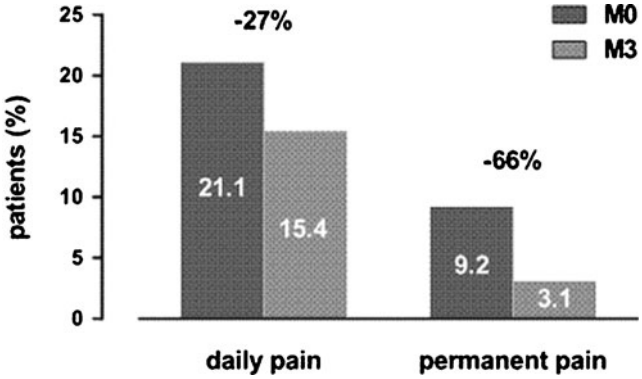

Figure: pain at study entry (M0) und after 3 months of SR therapy (M3) - percentage of patients with daily or permanent pain (n=1059)

The score reflecting on abilities to cope with daily life requirements improved by 14%. The incidence of serious falls, and inpatient/outpatient fracture treatments, decreased by 57% each. The physicians rated the tolerability in 92.1% of the patients as very good or good.

Conclusion(s): Under the daily routine practice conditions in a population including 81.6% of pretreated patients, SR shows a rapid decrease of pain, reduced use of analgesics, improvement of daily life activities and reduction of fall incidence and fracture treatment frequency, as compared to previous therapy.

Disclosures: The study was sponsored by Servier Deutschland GmbH.

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THE CORRELATION BETWEEN VITAMIN D STATUS AND FREQUENCY OF VERTEBRAL OSTEOPOROTIC FRACTURES IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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Objective(s): The purpose of this research was to determine the status of vitamin D in women that have been recently given the diagnosis of postmenopausal osteoporosis and to correlate the status of vitamin D with previous vertebral fractures

Material & Methods: The research included 88 women who have recently been given the diagnosis of postmenopausal osteoporosis and who haven't taken vitamin D as prevention of osteoporosis. All the examinees were determined with the level of 25(OH)D as well as the level of calcium, phosphorus and alkaline phosphatase in serum and also level of calcium and phosphorous in 24 h old urine. The level of 25(OH)D were determined by ELISA method. All of the examinees were defined with their BMD on the

lumbar spine, measured with DXA on the Hologic Discovery machine. Obtained results were further analyzed by Pearson and Spearman's correlation test and student T-test
Results: Average age of the examinees was 62.46±7.35, average duration of menopause was 14.24±8.35 years and average value of 25(OH)D was 48.65±12.45 nmol/L. With all examinees the level of Ca, P and ALP in serum and level of Ca and P in 24 h old urine were in reference limits. With previous fractures there were 21 examinees (23.86%), without fractures there were 67 examinees (76.14%). A statistically significant difference of the level of 25(OH)D was determined in the examinees with previous fractures (n=21) in comparison to those with no fractures (n=67) (36.45±13.18 vs. 49.22±15.26 nmol/L; $p<0.01$). In the group of 8 examinees with vitamin D insufficiency there were 2 examinees with previous fractures (25%); in the group of 68 examinees with vitamin D deficiency there were 14 (20.58%); and in the group of 12 examinees with normal status of vitamin D there were 1 examinees with previous fracture (8.33%). Difference between these frequencies were statistically significant ($p<0.01$).
Conclusion(s): Our results show that the deficiency and insufficiency of vitamin D in women with postmenopausal osteoporosis is a significant risk factor for bone fractures

P484
CLINICAL UTILITY OF THE FRAX® TO PREDICT NEED FOR RADIOGRAPHIC VERTEBRAL ASSESSMENT IN POSTMENOPAUSAL WOMEN

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Objective(s): The aim of this study was to assess the relationship between the WHO fracture risk assessment (FRAX®) scores and the presence of vertebral fracture in radiographic assessment among postmenopausal women, and to predict the utility of FRAX® in clinical practice.
Material & Methods: A total of 4314 women who referred to the "Osteoporosis Diagnosis & Treatment Unit" during 2001-2011 years were retrospectively evaluated, and 807 eligible postmenopausal women aged 50-85 years were included in this research. Only the patients who had a DXA measurement on the same densitometer (Lunar DPX-NT) at baseline were included in the study. The patients who had a history of medication for osteoporosis, and the patients without vertebral radiographic assessments were excluded from the study. The 10-year probability of a major osteoporotic fracture and a hip fracture were estimated the FRAX® designed for Turkey.
Results: The mean age of the patients was 64.7±8.0 (50-83) years, and the mean of BMI was 28.1±4.7 kg/m^2. 13.8% (n=108) of the patients had at least one osteoporotic fracture in the dorsal or lumbar spine radiographic assessment according to the visual semi-quantitative method, and 86.6% (n=699) of the patients had not any vertebral fractures in the x-ray assessment. There was no significant difference between the patients who had radiographic fracture and those without it with regard to age ($p=0.442$) and BMI ($p=0.786$). The 10-year probability of major osteoporotic fracture was 9.0% for the patients with vertebral fracture and 7.2% for those without it, and the risk of major osteoporotic fracture in the patients with vertebral fracture was significantly higher than those without it ($p<0.001$). Moreover, the 10-year probability of a hip fracture was significantly ($p=0.002$) higher for the patients with vertebral fracture (3.5%) than those without it (2.4%).
Conclusion(s): The 10-year probability of a major osteoporotic fracture and hip fracture estimated by the FRAX® can be used to predict the presence of vertebral osteoporotic fracture, and may be effective in reducing the need for the radiographic assessments in clinical practice.

P485
STRONTIUM RANELATE MAY IMPROVE MILD FORMS OF OSTEOARTHRITIS IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Objective(s): Osteoporosis and osteoarthritis are frequently presents in the same patient making therapeutic approach more difficult and challenging in controlling clinical symptoms and prevent severe outcomes. Previous studies showed that strontium ranelate inhibits subchondral bone resorption and stimulates cartilage matrix formation in vitro. The purpose of our study was to determine whether a 2-year treatment with strontium ranelate could delay the progression of spinal osteoarthritis (OA) in postmenopausal women with osteoporosis.
Material & Methods: Our analysis included the 25 postmenopausal women (age over 68 years old) with osteoporosis and concomitant mild or severe degree of radiological spine osteoarthritis, randomized to strontium ranelate for a 24-month period. The presence and severity of osteophytes and sclerosis in the lumbar intervertebral spaces was graded according to a validated method and an overall OA score was calculated for each intervertebral space. Back pain and health-related quality of life were assessed at baseline and after 2 years. Lumbar x-rays were available at baseline and over the 2-year treatment period. Cartilage degradation was evaluated using a validated urinary marker adjusted for creatinine (CTX-II/cr).
Results: At baseline CTX-II was significantly elevated in subjects with a history of osteoarthritis. Strontium ranelate

caused a significant decrease from baseline in CTX-II over a 24-month period whatever the osteoarthritis status and back pain was significant ameliorated in patients with mild forms of OA while patients with more severe forms of OA showed a less clinical improvement.
Conclusion(s): The CTX-II profile of changes over 2 years may reflect efficacy of strontium ranelate against cartilage degradation suggesting that besides its beneficial effects in osteoporosis strontium may attenuate the progression and clinical symptoms of osteoarthritis.

P486
OSTEOPOROSIS AND OSTEOPENIA IN WOMEN WITH BRONCHIAL ASTHMA

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Objective(s): Bronchial asthma (BA) is the most common chronic pulmonary disorder. Treatment may be conveniently considered as management of the acute attack and day-to-day therapy. The aim of the study was to evaluate the influence of treatment on BMD in female patients with BA.
Material & Methods: The study included 67 female patient aged 37-59 years who had no diseases or states that can induce BMD, except BA. The patients were divided in two groups: I group (n=39) those who were untreated with GC and II group (n=28) those who permanently took oral (5-10 mg prednisone daily) and inhaled GC (duration of the therapy 5 years). Patients in both group were monitored for BMD and were given adequate therapy to prevent bone loss (for 3 years). The patients underwent questionnaire. BMD measurements were accomplished by quantitative ultrasound technique Sunlight Omnisense 7000S. Results were interpreted in accordance with criteria adopted by the WHO by T-score.
Results: In the I group of women with BA mean BMD was decreased in 59.3% reflecting osteopenia from moderate to severe. T-score: distal 1/3 radius -1.6±0.05; midshaft tibia -1.4 ±0.1; proximal phalanx of the third finger – 1.7±0.1; II group of women treated with GC mean BMD was more significant and reflected osteoporosis in 57,6%. T-score: -3.2±0.07; -2.9±0.1; -3.4±0.05, respectively. After 3 year treatment for osteoporosis in both groups of women BMD was increased: I group T-score: -1.3±0.06; 1.1±0.1; -1.5±0.08; II group T-score: -2.6±0.05; -2.4 ±0.1; -2.8±0.05, respectively.
Conclusion(s): Women with asthma tend to be at increased risk for bon loss. In the I group of women with BA there was a high incidence of osteopenia that increased with the severity of BA. The long-term use of GC in women in the II group with BA caused a marked reduction in BMD and led to development of osteoporotic fractures. Prevention GC treatment induced effects on BMD requires suspicion, assessment of bone density, supplemental calcium and vitamin D, and, if indicated bisphosphonates and other medicines for osteoporosis to prevent bone fractures that could compromise the patient's quality of life.

P487
SERUM CONCENTRATION OF 25-OH-VITAMIN D IN WOMEN WITH RHEUMATOID ARTHRITIS DEPENDING ON DISEASE ACTIVITY AND SUNLIGHT EXPOSURE

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Objective(s): Rheumatoid arthritis (RA) is a chronic inflammatory disease affecting musculoskeletal system. As long-standing high concentration of pro-inflammatory cytokines in RA patients has been observed, RA belongs to risk factors of osteoporosis. Vit. D influence bone metabolism and can modulate the activity of immunological system by its influence on tolerance and anti-inflammatory processes. The aim of the study was the assessment of serum vit. D metabolite concentration in women with RA. We also looked for the correlation between serum vit. D metabolite concentration, disease activity and sunlight exposure.
Material & Methods: 22 females with established diagnosis of RA aged 30-72 years entered the study. 25-OH-vit. D serum concentration was measured using commercial ELISA test. The measurements were performed twice: before the introduction of methotrexate (MTX; dose range: 15-20 mg weekly) and 6 months after the first dose of MTX. We assumed that months between November and April are winter months, and months between May-October are with high sunlight exposure (summer months). RA activity was measured with ESR-DAS28. High disease activity was defined according to EULAR guidance as DAS28 >5.1.
Results: There was no significant difference in serum 25-OH-vit. D concentration between months with low and high sunlight exposure. However, in 16 patients there was an increase of serum 25-OH-vit. D concentration in summer months (11/16 reached the statistical significance). Most of the measurements revealed low serum 25-OH-vit. D concentrations: only 2 (9.09%) measurements in summer and winter months revealed concentrations above the borderline of normal range (>75 nmol/L), low levels (30-75 nmol/L) were revealed in 15 (68.18%) measurements in summer months and 14 (63.63%) in winter months, very low levels (<35 nmol/L) in 6 (27.27%) measurements in winter months

and 5 (22.73%) in summer months. After six months of MTX treatment there was no significant change of serum concentration of 25-OH-vit. D. In patients with active RA (DAS28>5.1) 25-OH-vit. D serum concentration was lower than in patients with lower disease activity (42.27±24.95 nmol/L vs. 54.45±26.92 nmol/L).

Conclusion(s): There was low 25-OH-vit. D serum concentration independent of sunlight exposure in patients with RA. The vit. D supplementation should be considered in RA patients.

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EVALUATION OF QCT CORTICAL HIP PARAMETERS IN A CLINICAL TRIAL WITH ROSIGLITAZONE: POTENTIAL FOR A NEW STUDY ENDPOINT

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Objective(s): QCT is used extensively to ascertain bone quality and density. QCT provides 3D information and can segment trabecular from cortical bone. This is important to evaluate new therapeutic agents that affect bone metabolism and to understand the role that each bone compartment plays in the pathogenesis and prognosis to fracture. Precise assessments of the cortical bone remain elusive. This study explores the effect of edge definition at different thresholds at the femoral neck (FN) in vBMD.

Material & Methods: This was a double-blind, randomized study in postmenopausal women with type 2 diabetes mellitus; BMD T-score>-2.5 at FN, lumbar spine (LS), and total hip (TH). Subjects were randomized to RSG or metformin (MET) for 52 Weeks (Wk) followed by 24Wk of open-label MET. At baseline, DXA T-scores were: FN=-0.96±0.91; TH=-0.02±0.97; LS=-0.55±1.25. Using spiral multidetector scanners with standard acquisition technique, a subset of 79 subjects underwent QCT scans of the hip at baseline, after 52Wk of double blind treatment and after 24Wk of open-label MET. All scans were evaluated centrally and analyzed using Mindways Software Inc. The% change in cortical vBMD and cortical thickness (mm) in FN quadrants (FNQ's) is presented at 3 different thresholds: 350 mg/cm^3, 375 mg/cm^3, 400 mg/cm^3.

Results: The results using different thresholds yielded changes in similar direction in cortical vBMD and cortical thickness at the superior-posterior quadrant. Cortical vBMD at the FN can be precisely segmented from trabecular bone and used to demonstrate therapeutic effect on this bone compartment.

Change in Hip Cortical vBMD Via QCT at 3 Different Thresholds

A.% Change in Hip Cortical vBMD Via QCT at 3 Different Thresholds

Superior-Posterior FN Quadrant Cortical vBMD (mg/cm3)	350 mg/cm^3		375 mg/cm^3		400 mg/cm^3	
	Adjusted*% Change Mean(SE)		Adjusted*% Change Mean(SE)		Adjusted*% Change Mean(SE)	
	RSG	MET	RSG	MET	RSG	MET
BL to Wk52	-1.29(1.18)	0.10(1.34)	-1.11(0.77)	-0.21 (0.87)	-0.95 (0.74)	-0.13 (0.83)
BL to Wk76	-0.33(1.14)	-0.32 (1.40)	-0.28 (0.70)	-0.81 (0.85)	-0.44 (0.68)	-0.82 (0.83)
Wk52 to Wk76 Open-Label MET	0.94(0.98)	-0.01 (1.20)	0.73 (0.75)	-0.58 (0.91)	0.41 (0.73)	-0.64 (0.88)

B. Change in Hip Cortical Thickness Via QCT at 3 Different Thresholds

Superior-Posterior FN Quadrant Cortical Thickness (mm)	350 mg/cm^3		375 mg/cm^3		400 mg/cm^3	
	Adjusted* Change Mean(SE)		Adjusted* Change Mean(SE)		Adjusted* Change Mean(SE)	
	RSG	MET	RSG	MET	RSG	MET
BL to Wk52	-0.09 (0.07)	0.05 (0.08)	-0.10(0.04)	0.06(0.05)[1]	-0.10 (0.04)	0.04 (0.05)[3]
BL to Wk76	-0.06 (0.07)	0.02 (0.08)	-0.07(0.04)	-0.03(0.05)	-0.05 (0.04)	-0.03 (0.05)
Wk52 to Wk76 Open-Label MET	0.03(0.06)	-0.02 (0.07)	0.03(0.05)	-0.11(0.06)[2]	0.04 (0.05)	-0.09 (0.05)[4]

*Adjusted for baseline value, region and prior therapy

1. P =0.0071 for treatment comparison (RSG –MET)
2. P=0.0423 for treatment comparison (RSG –MET)
3. P=0.0137 for treatment comparison (RSG –MET)
4. P=0.0459 for treatment comparison (RSG –MET)

Conclusion(s): FNQ may provide utility as an endpoint in clinical trials for the elucidation of the therapeutic effect of new entities.

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INFLUENCE OF HLA CLASS II ANTIGEN (DR; DQ) ON THE PRODUCTION OF RHEUMATOID FACTOR IN A TUNISIAN POPULATION

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Objective(s): The most important genetic risk factor for rheumatoid arthritis (RA) is the HLA-class II alleles. In particular, the HLA-DRB1 alleles. The aim of this study is to focus on the association between seropositive RA and HLA class II gene (DRB1 and DQB1).
Material & Methods: This prospective study was performed on a total of 81 Tunisian patients with rheumatoid arthritis including 67 women and 14 men (sex ratio 4.78). All patients fulfilled the American College of Rheumatology (ACR 1987) criteria for RA. RA associated with other autoimmune pathologies have been excluded from the study. For each patient we assessed DNA and serum samples. The DNA was extracted from lymphocytes using a commercial kit (Qiagen). The HLA class II (DQB1 and DRB1) was performed by PCR technique specifying-sequence primers (PCR-SSP). The specific products of PCR were analyzed by 2.5% agarose gel electrophoresis. All tests include positive and negative controls appropriate for each blood sample. The phenotypes of patients were obtained through the Software One Lambda DNA / Software (SSP2L-generic DRB / DQB).
Results: Demographic traits of the patients were: mean age 49.17±11.21 years (age 24-78). The disease average duration was 7.44±2.12 years (4 months-29 years), 82.71% were women and 17.29% men. Seropositive RA were 80.24%, and 71% of RA have anti CCP positive antibody.
Of the 64 seropositives rheumatoid patients, 35 (54.5%) were positive for DRB1*0401 antigen, as compared with four seronegatives subjects (DRB1*0401), a highly significant difference ($p<0.0001$). Similarly, a high significant association with DRB1*1501 antigen ($p<0.0001$) was found, followed by DRB1*0301, *1301 and *1101. We noted that, the RA with HLA-DRB1*0401 alleles are associated with more radiologic erosions and more aggressive RA. HLADQ*0201, *0301, *0501 and *0601 were associated with seropositive RA. HLADQB1*0401 and *0302 were also associated with seropositive RA, but with less significance. Four DRB1*0401 were homozygotes and all of them were seropositive RA.
Conclusion(s): Our results indicate that, in addition to HLA-BRB1 alleles, HLA-DQB1 alleles also augments the genetic susceptibility to seropositive RA.

P490

COMORBID CONDITIONS IN OSTEOPOROSIS

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Objective(s): It is known that comorbidities often adversely affect the management of osteoporosis. The objective of this study was to examined the prevalence of comorbid conditions, establish the morbidity count, severity index and the presence of specific diseases associated with osteoporosis.
Material & Methods: We have performed an observational study on a lot of 84 patients, with osteoporosis, treated in the Medical Rehabilitation Clinical Hospital Baile-Felix, Romania. Affected persons were evaluated by DXA technique. They ranged in age from 47-76 years with a mean age of 63.85±8.85 years. Information about comorbidity was gathered using the Cumulative Illness Rating Scale (CIRS).
Results: The mean number of diseases/patient was 3. Severity index was 2.25. All patients had at least one associated disease (CIRS≥1). 81.05% patients had at least one moderate or severe associated disease (CIRS≥2). The most common category was represented by musculoskeletal diseases, which represented 50% of the total number of comorbidities, cardiac diseases (19.35%%), endocrine and metabolic disorders represented 11.2%, followed by vascular diseases (4.8%), gastrointestinal (4.8%), neurologic (3.22%), urinary tract (3.22%), respiratory (1.66%) and renal diseases (1.66%). Obesity was diagnosed in 7.77% of the cases and diabetes mellitus in 13.1% of them.
Conclusion(s): In clinical practice it must be taken into account the presence of comorbidities, which will influence the therapeutic decisions, the outcomes and the risk for fractures. Results are important for the patients with osteoporosis, as it is expected that with the aging of the population an increasing number of elderly people will need rehabilitation.

P491

THE EFFICACY OF STRONTIUM RANELATE ON BACK PAIN AND BONE MINERAL DENSITY IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS WITH AND WITHOUT GLUCOCORTICOID TREATMENT

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Objective(s): To assess the effect of strontium ranelate (SR) within one year on the back pain and BMD in patients with

postmenopausal osteoporosis(PMO) with and without glucocorticoid (GC) treatment.

Material & Methods: The study group consisted of 113 women; 42 women of mean age of 59.7±7.9 with PMO, receiving at least ≥5 mg/day of GCs for one year and over, and 71 women of mean age of 63.9±9.0 with PMO without GC treatment. The clinical characteristics of the enrolled patients (pts) included back pain and PMO. Lumbar spine BMD was measured by DXA, and thoracic and lumbar X-rays were evaluated at baseline and after one year. Back pain was assessed at baseline, 3rd and 12th month by a 4-point scale ranging from "no pain" (score 0) to "severe pain" (score 3). The pts were treated with SR 2 g daily dose, calcium – 600 mg/d, and vitamin D – 400 IU/d for one year. Statistical analysis was performed by Kolmogorov-Smirnov test, paired samples test, Wilcoxon Signed Ranks test, chi-square test, using SPSS 13,0 for Windows.

Results: At the end of the study period we were able to achieve a significant increase in the mean BMD from baseline in both groups; in the group with PMO with GC treatment (-2.906±0.547 vs. -2.401±0.705; $p<0.0001$); in the group with PMO without GC (-3.094±0.543 vs.–2.720± 0.819; $p<0.0001$). However, no statistically significant differences were observed between both groups.

The reduction in back pain from baseline to the 3rd and the 12th month follow-up was statistically significant ($p< 0.0001$) for both groups.

Conclusion(s): We conclude that one year of treatment with SR combined with calcium and vitamin D improves BMD and reduces back pain in patients with PMO under GC treatment, as well in those without GC treatment.

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INFLUENCE OF HLA CLASS II ANTIGEN (DR; DQ) ON THE PRODUCTION OF ANTI-CYCLIC CITRULLINATED PEPTIDE ANTIBODIES IN A TUNISIAN POPULATION

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Objective(s): Rheumatoid arthritis (RA) is the most common chronic inflammatory rheumatism. It's a complex autoimmune disorder. The aim of this study is to focus on the relationship between HLA-DRB1 genes and RA specific antibodies against cyclic citrullinated peptides (anti-CCP antibodies).

Material & Methods: This prospective study was performed on a total of 81 Tunisian patients with rheumatoid arthritis. All patients fulfilled the American College of Rheumatology (ACR 1987) criteria for RA. For each patient we assessed DNA and serum samples. The DNA was extracted from lymphocytes using a commercial kit (Qiagen). The HLA class II (DQB1 and DRB1) was performed by PCR technique specifying-sequence primers (PCR-SSP). The specific products of PCR were analyzed by 2.5% agarose gel electrophoresis. All tests include positive and negative controls appropriate for each blood sample. The phenotypes of patients were obtained through the Software One Lambda DNA/Software (SSP2L-generic DRB/DQB).

Results: The mean age of our population was 49.17±11.21 years (age 24-78). The disease average duration was 7.44±2.12 years (4 months - 29 years), 82.71% of RA were women and 17.29% were men. Seropositive RA were 80.24%, and 71% of RA have anti-CCP positive antibody. Univariate analysis of the presence of anti-CCP antibodies in conjunction with HLA DRB1 and DQB1 was performed. Carriership of HLA DR*0301, 0401 and 1501 were significantly associated with the presence of anti-CCP antibodies ($p<0.0001$). Four DRB1 0401 carriers were homozygotes with three out of them having anti-CCP antibodies. Carriership of HLA DQB1*0201, 0301, 0302,0501 and 0601 was associated with the presence of anti-CCP antibodies and so was HLA-DQB1*0401, but with a less significant association.

Conclusion(s): Although no formal conclusions on causality can be drawn from this association study, these findings suggest that anti-CCP antibodies are associated with different phenotypes; which suggest that various pathogenetic mechanisms underlie the positivity for anti-CCP in RA.

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HLA CLASS II ANTIGEN (DRB1 AND DQB1) AND OSTEOPOROSIS IN A TUNISIAN POPULATION

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Habib Thameur Hospital, Internal Medecine, Tunis, Tunisia

Objective(s): The most important genetic risk factor for rheumatoid arthritis (RA) is the HLA-class II alleles. In particular, the HLA-DRB1 alleles. The aim of this study is to focus on the association between RA, HLA class II gene (DRB1 and DQB1) and osteoporosis

Material & Methods: This prospective study was performed on a total of 81 Tunisian patients with rheumatoid arthritis including 67 women and 14 men (sex ratio 4.78). All patients fulfilled the American College of Rheumatology (ACR 1987) criteria for RA. RA associated with other auto-immune pathologies have been excluded from the study. For each patient BMD was measured in lumbar spine, femoral neck, trochanter, and Ward's triangle. The DNA was extracted from lymphocytes using a commercial kit (Qiagen). The HLA class II (DQB1 and DRB1) was performed by PCR technique specifying-sequence primers (PCR-SSP). The specific products of PCR were analyzed by 2.5%

agarose gel electrophoresis. All tests include positive and negative controls appropriate for each blood sample. The phenotypes of patients were obtained through the Software One Lambda DNA/Software (SSP2L-generic DRB/DQB).
Results: Demographic traits of the patients were: mean age 49.17±11.21 years (age 24-78). The disease average duration was 7.44±2.12 years (4 months - 29 years), 82.71% were women and 17.29% men. Seropositive RA were 80.24%, and 71% of RA have anti CCP positive antibody. HLADQ*0201, *0301, *0501 and *0601 were associated with seropositive RA. HLADQB1*0401 and *0302 were also associated with seropositive RA, but with less significance. Four DRB1*0401 were homozygotes and all of them were seropositive RA. The occurrence of osteoporosis is not correlated with the presence of shared epitope ($p=0.6$). However, the number of patients carrying the shared epitope and with osteoporosis is much lower than in patients without (41 patients against 9). The shared epitope in single dose appears to be a protective factor against osteoporosis ($p< 0.001$)
Conclusion(s): Our results indicate that, in addition to HLA-BRB1 alleles, HLA-DQB1 alleles also augments the genetic susceptibility to seropositive RA.

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SOCIOECONOMIC IMPACT OF OSTEOARTHRITIS IN REPUBLIC OF MOLDOVA

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Objective(s): To determine the direct and indirect cost of osteoarthritis according to function of joint, independence and to estimate the total its costs in Republic of Moldova.
Material & Methods: This study is cross-sectional, non-randomized with subjects stratified according to functional limitation by scale Function in Daily Living (ADL), Knee injury and Osteoarthritis Outcome Score KOOS and Katz Index of Independence in Activities of Daily Living. The total costs were calculated as direct and indirect costs. Subjects were recruited from primary care and rheumatology. In score KOOS-ADL the last week was taken into consideration, a normalized score (100 indicating no symptoms and 0-extreme symptoms) was calculated for this scale. The Score Katz 6 (high)-patient was independent, score 0 (low)-dependent. A questionnaire gathered information over the previous 12 months.
Results: There were 100 patients, from them 85 were eligible, with complete X-ray data 60 (70.6%) female and 25 (29.4%) male, mean age 63.8±0.17 (range 48-76) years old, mean disease duration 5.6±0.2 (range 0.4-12.0) yrs, mean BMI 29.6 kg/m^2, SD 5.2 kg/m^2. Low education and socio-economic class were associated with more severe disease and high level of KOOS score-ADL. Excluding joint replacement, in RM the direct costs ranged from dollar was $541-$9882 per person per year and indirect costs $55-$211. The direct costs are poor comparable to those reported in Western countries; however, the ratio of direct to indirect costs is much higher than 10, in contrast to the greater indirect vs. direct costs reported in whites. The total cost of OA treatment in pts with low incomes are about 32%, and in pts with high income under 19%.
Conclusion(s): The direct and indirect cost of osteoarthritis patients are high comparable with incomes. The socioeconomic impact of OA in the RM population is significant, but the economic burden is not placed on the government, patients having relatively high/moderate out-of-pocket expenditures.

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THE EFFECTS OF BAZEDOXIFENE AND RALOXIFENE ON VERTEBRAL, NONVERTEBRAL, AND ALL CLINICAL FRACTURES AS A FUNCTION OF BASELINE FRACTURE RISK ASSESSED BY FRAX®

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Objective(s): This post hoc analysis of data from a 3-year pivotal phase 3 treatment study of bazedoxifene examined the risk of morphometric vertebral, clinical, and nonvertebral fractures as a function of baseline fracture probability using the FRAX®.
Material & Methods: Hazard ratios (HRs) were calculated using a Cox regression model for the effects of bazedoxifene 20 and 40 mg, bazedoxifene 20/40 mg combined, and raloxifene 60 mg vs. placebo on the incidence of morphometric vertebral, clinical, and nonvertebral fractures. Cox regression analyses were performed in subgroups based on 10-year probability of a major osteoporotic fracture thresholds (determined by FRAX®; ≥2.5%, ≥5.0%, ≥7.5%, ≥10.0%, ≥12.5%, ≥15.0%, ≥17.5%, ≥20.0%).
Results: HRs for the risk of vertebral, nonvertebral, and all clinical fractures decreased with increasing 10-year fracture probability for bazedoxifene vs. placebo, while those for raloxifene vs. placebo remained stable with increasing fracture probability. In 10-year fracture probability threshold subgroups, bazedoxifene was associated with a significant reduction in the risk of vertebral fractures in most subgroups

compared with placebo (Table). The risk of nonvertebral and all clinical fractures was also significantly reduced for bazedoxifene compared with placebo at ≥20% fracture probability (55% and 60% reduction, respectively, for bazedoxifene 20/40 mg combined). Risk reductions for raloxifene 60 mg compared with placebo were significant for vertebral fractures in subgroups with fracture probabilities of ≥2.5% to ≥10%; reductions in nonvertebral or all clinical fracture risks were not significant for any subgroups. The risk of vertebral, nonvertebral, and all clinical fractures decreased with increasing fracture probability for bazedoxifene vs. placebo, but remained generally constant for raloxifene vs. placebo (Table).

Table. Hazard Ratio Vs. Placebo (95% CI) for Vertebral, Nonvertebral, and All Clinical Fractures for Subgroups Based on Fracture Probability (FRAX®)

	Bazedoxifene 20 mg	Bazedoxifene 40 mg	Bazedoxifene 20/40 mg	Raloxifene 60 mg
Probability threshold: ≥2.5%				
Vertebral fractures	0.575 (0.372-0.887)[a]	0.657 (0.431-1.002)	0.615 (0.431-0.877)[a]	0.587 (0.380-0.906)[a]
Nonvertebral fractures	0.870 (0.647-1.168)	0.894 (0.665-1.203)	0.881 (0.684-1.135)	0.966 (0.723-1.290)
All clinical fractures	0.856 (0.646-1.134)	0.861 (0.649-1.144)	0.858 (0.674-1.092)	0.993 (0.757-1.303)
Probability threshold: ≥5%				
Vertebral fractures	0.487 (0.302-0.786)[a]	0.561 (0.354-0.889)[a]	0.524 (0.357-0.769)[a]	0.570 (0.361-0.899)[a]
Nonvertebral fractures	0.747 (0.537-1.039)	0.796 (0.574-1.104)	0.771 (0.584-1.018)	0.945 (0.692-1.289)
All clinical fractures	0.744 (0.546-1.015)	0.768 (0.563-1.048)	0.756 (0.582-0.983)[a]	0.963 (0.720-1.288)
Probability threshold ≥10%				
Vertebral fractures	0.444 (0.246-0.802)[a]	0.472 (0.264-0.843)[a]	0.459 (0.285-0.738)[a]	0.581 (0.338-0.999)[a]
Nonvertebral fractures	0.697 (0.448-1.083)	0.745 (0.483-1.151)	0.722 (0.499-1.044)	1.075 (0.723-1.598)
All clinical fractures	0.708 (0.473-1.059)	0.714 (0.477-1.069)	0.711 (0.506-0.999)[a]	1.063 (0.738-1.530)
Probability threshold: ≥20%				
Vertebral fractures	0.268 (0.087-0.823)[a]	0.217 (0.062-0.761)[a]	0.244 (0.097-0.611)[a]	0.458 (0.183-1.149)
Nonvertebral fractures	0.449 (0.216-0.932)[a]	0.438 (0.206-0.930)[a]	0.447 (0.244-0.819)[a]	0.700 (0.369-1.326)
All clinical fractures	0.379 (0.186-0.771)[a]	0.408 (0.201-0.829)[a]	0.395 (0.223-0.701)[a]	0.697 (0.387-1.255)

[a]P <0.05 vs. placebo.

Conclusion(s): The treatment effects of bazedoxifene on vertebral, nonvertebral, and all clinical fractures increased with increasing probability. This trend was not observed with raloxifene.

P496
VERTEBRAL FRACTURES AND QUALITY OF LIFE IN OSTEOPOROTIC PATIENTS

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Objective(s): The aims of this study were to examine prevalence of vertebral fractures, patients' characteristics, and quality of life (QOL).

Material & Methods: The study included 53 postmenopausal women (mean age 71.60 years, SD=9.14) with primary osteoporosis and vertebral fractures. The study was performed in Institute of Rheumatology - Medical Faculty University of Belgrade Serbia, during the one year period. Primary osteoporosis was established according to WHO criteria. BMD was diagnosed by DXA measurement on lumbar spine (L1-L4) and/or hip using GE Lunar Prodigy. Vertebral deformities were established according to Genant's classification. Observed patients' characteristics were: age, age of menopause onset, duration of menopause, employment status, education level and marital status. Quality of life was assessed using two questionnaires: QUALEFFO-41 and EQ-5D.

Results: The prevalence of at least one vertebral fracture in the study group was 51.46%, while number of fractures ranged 1-8. The patients' characteristics predicting more than one fracture were: education (higher than secondary, OR=1.48, CI=1.22-1.82, $p<0.05$) and marital status (married status, OR=1.08, CI=0.30-3.91, $p<0.05$). The mean value of QUALEFFO-41 total score was 51.65 (SD=18.94), and the EQ-5D health state value (HSV) and Visual Analogue Scale (VAS) were 0.47 (SD=0.28) and 50.78 (SD=21.02) respectively. Number of vertebral fractures was not in a significant correlation with QUALEFFO-41 domains, HSV or EQ-5D VAS score ($p>0.05$).

Conclusion(s): The prevalence and number of fractures in the study group was high. Among the observed patients' characteristics only education level and marital status could significantly predict occurrence of two and more vertebral fractures. The study showed that vertebral fractures had influence on QOL (the total questionnaires' scores were around the half on a scale from 0 to 100/1), but their correlation was not significant.

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RELATIONSHIP BETWEEN REGIONAL DISTRIBUTION OF BODY FAT MASS (BFM) AND SERUM LEPTIN, TNFα, TESTOSTERONE FREE, β-CROSSLAPS IN MEN WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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Objective(s): The role of fat-bone interactions in the pathogenesis of osteoporosis in COPD is poorly understood. Our aim was to evaluate the relations between BFM distribution and inflammatory mediator TNFα, hormones, markers of bone metabolism in men at the age 40-70 years.

Material & Methods: Data were obtained from 98 participants who underwent DXA (analyze of body composition, the regional distribution of BFM). We examined 3 groups of patients (aged 40-70 years) and control group (15 healthy men with mean age 56 years, mean BMI 26 kg/m^2). The COPD pts were subdivided into groups according to COPD severity: the 1st was made of 20 men; GOLD I stage; mean age 55 years; FEV1 78%; BMI 27 kg/m^2, smokers 68%, packs/yrs 20; the 2nd included 43 patients; GOLD II stage; mean age 57; FEV1 55%; BMI 28 kg/m^2, smokers 80%, packs/yrs 21; the 3 d -20 patients; GOLD III stage; mean age 60; FEV1 41%; BMI 25 kg/m$_2$, smokers 84%, packs/yrs 28.

Results: Fat mass in android region was directly related to serum TNFα (r=0.33, p=0.02). Total, trunk, arms fat mass were directly related to serum leptin (r=0.21, r=0.36 and r=0.35, p<0.05, respectively). Serum leptin exert negative influence on BMD in lumbar spine (r=-0.43, p=0.001), but not at femoral necks. We founded positive correlations between beta-crosslaps and total fat mass (r=0.33, p=0.02) and fat mass in android region (r=0.32, p=0.02). Total, arms, legs, trunk fat mass and fat mass in android and gynoid regions increase in COPD pts with lower level of serum testosterone free (p<0.05 for all relationships). The male patients at the age 40-70 years with COPD had osteopenia and osteoporosis in the presence of increased BMI (29.4 kg/m^2 and 24.7 kg/m^2, respectively) and serum leptin (2.8 ng/ml and 2.9 ng/ml, respectively, vs. 1.9 ng/ml in patients without osteopenia and osteoporosis, p<0.05).

Conclusion(s): The regional distribution of body fat mass play important role in the pathogenesis of osteoporosis in men with COPD.

P498

THE EFFICACY OF BAZEDOXIFENE IN POSTMENOPAUSAL WOMEN IS INDEPENDENT FROM KIDNEY FUNCTION

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Objective(s): We investigated whether kidney function, evaluated based on glomerular filtration rate (GFR) and which generally worsens with age, affects the efficacy of bazedoxifene (BZA) using data from 2 global phase 3 studies of postmenopausal women (2-year prevention [N=1583] and 3-year treatment [N=7492]).

Material & Methods: BMD and bone turnover marker (osteocalcin and C-telopeptide [CTx]) data for the BZA 20 and 40 mg and placebo groups from both studies were integrated. Incidence of all fractures (morphometric vertebral and clinical) was assessed in the treatment study for BZA 20 and 40 mg combined. Women were categorized based on GFR estimated by the Modification of Diet in Renal Disease Study equation, in mL/min per 1.73 m^2: normal function (GFR≥90; n=1467), mild impairment (60≤GFR<90; n=4568), or moderate/severe impairment (GFR<60; n=546).

Results: Improvements in the mean percent change from baseline in lumbar spine BMD at Month 24 was greater for BZA 20 mg (1.4-1.8%) and BZA 40 mg (1.6-2.1%) vs. placebo (0-0.1%; P<0.001) in the normal and mild renal impairment subgroups; a similar trend was observed for moderate/severe renal impairment, but the increases with BZA vs. placebo were not statistically significant. Changes from baseline in total hip BMD at Month 24 were greater for BZA 20 mg (0.8-1.1%) and BZA 40 mg (0.9-1.1%) vs. placebo (-0.3%; P<0.001) in the normal and mild renal impairment subgroups, and for BZA 40 mg (1.1%) vs. placebo (-0.3%; P<0.001) in the moderate/severe renal impairment subgroup. BZA 20 and 40 mg reduced the median percent change from baseline in osteocalcin (-34.7% to -41.5%) and CTx (-42.8% to -49.6%) across all renal subgroups at Month 12 vs. placebo (-18.7% to -20.4%; P< 0.001 and -23.4% to -24.9%; P<0.001, respectively). The efficacy of BZA on all fractures did not appear to be affected by baseline kidney function, as evidenced by overall consistent trends across GFR categories (hazard ratios<1) and no treatment by GFR interaction (P=0.766).

Conclusion(s): The efficacy of BZA on BMD, bone turnover, and fractures in postmenopausal women was not influenced by baseline kidney function.

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POSTMENOPAUSAL OSTEOPOROSIS PATIENTS MONITORING

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Objective(s): To develop a method of integrated assessment of antiosteoporotic therapy efficiency.
Material & Methods: 114 women with new-onset postmenopausal osteoporosis (PMO) were included in research. Mean age of women is 58.6±3.8 years. Mean age of menopause is 50.0±3.1 years, menopause duration is 9±3 years. Control group without osteoporosis (OP) (n=34) is comparable in age-related and social parameters to the basic group. Two subgroups were sorted out in the basic group: A (n=71 / alendronate 70 mg/week) and B (n=43 / strontium ranelate 2 g/day). Assessment instrument: questionnaires SF-36 and QUALEFFO-41, the ternary numeral assessment scale (NAS), "OP patients' compliance test". Quality of life (QL) indicators estimation was carried out prior to the therapy beginning, in 3, 6, and 12 months. X-ray densitometry was made before and after 12-month therapy.
Results: After 3 months of both medicines administration neither authentic changes of QL indicators, nor vertebral pain intensity was revealed (according to SF-36, QUALEFFO-41, NAS), $p>0.01$. After 6 months of alendronate therapy SF-36 demonstrated a significant improvement of QL indicators (seven scales out of eight), and less improvement after strontium ranelate therapy (two scales out of eight), $p<0.001$, CI. QUALEFFO-41 showed a significant QL dynamics after alendronate (six domains out of seven) and strontium ranelate (two domains out of seven), $p<0.001$, CI. After 6 months of alendronate NAS discovered an authentic decrease of pain and no significant dynamics after strontium ranelate ($p<0.001$, CI). After 12 months of alendronate and strontium ranelate therapy SF-36 revealed a significant improvement of QL indicators (seven scales out of eight and six scales out of eight respectively), $p<0.001$, CI. After 12 months of alendronate and strontium ranelate therapy QUALEFFO-41 showed a significant QL dynamics (seven domains out of seven and five scales out of seven respectively), $p<0.001$, CI. After 12 months of both medicines administration NAS discovered an authentic decrease of vertebral pain ($p<0.001$, CI). Patients' high PMO compliance during the year authentically favors lumbar spine MBD increase both during alendronate (+5.85 [+3.15; +10.68]%), and strontium ranelate (+6.53 [+2.72; +12.55]%) administration.
Conclusion(s): SF-36, QUALEFFO-41, NAS, and "OP patients' compliance test" can be used as additional assessment criteria of antiosteoporotic therapy efficiency.

P500
MULTIDAY ANALGESIA WITH ETORICOXIB FOLLOWING THIRD-MOLAR EXTRACTION SURGERY USING A FLEXIBLE DOSING PARADIGM

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Objective(s): We evaluated a multiday flexible dosing paradigm with etoricoxib following oral surgery.
Material & Methods: This double-blind, randomized controlled study compared etoricoxib 90 mg and 120 mg with placebo, ibuprofen 600 mg qid, or acetaminophen 600 mg / codeine 60 mg (A/C; qid) in patients with ≥2 third-molar extractions (≥1 impacted). Patients dosed as needed (flexible dosing on Days 2 and 3 with study (SM) and rescue medication (RM; acetaminophen 325 mg). Outcomes included average and worst recall pain (0-10 scale), RM, total SM doses used (days 1-3), and adverse experiences (AE).
Results: Differences from placebo for Average and Worst Recall Pain are shown (Table). RM usage was 57% (placebo) and 18-23% across active treatments on Day 2, and 22% (placebo) and 14-20% across active treatments on Day 3. The mean numbers of SM doses were 2.02, 1.52, 1.74, 2.32, and 1.59 on Day 2 and 0.80, 1.08, 1.07, 1.65, and 1.25 on Day 3 for placebo, etoricoxib 120 mg, etoricoxib 90 mg, ibuprofen, and A/C, respectively. A/C had more AEs and less dosing. On day 2, placebo and ibuprofen patients took more SM and RM than etoricoxib and had worse pain. Nausea and vomiting were common AEs with higher frequency with A/C.

Differences from placebo in Average and Worst Recall Pain Scores

	Etoricoxib 120 mg qd	Etoricoxib 90 mg qd	Ibuprofen 600 mg qid	Acetaminophen 600 mg/ codeine 60 mg qid
Average Recall Pain (Day 2)	-1.40	-1.29	-1.11	-0.97
Average Recall Pain (Day 3)	-0.68	-0.78	-0.28	-0.45
Worst Recall Pain (Day 2)	-1.42	-0.97	-0.79	-0.48
Worst Recall Pain (Day 3)	-0.37	-0.78	-0.21	-0.62

Conclusion(s): Etoricoxib provided better treatment responses compared with ibuprofen and A/C and resulted in less dosing vs. ibuprofen on Days 2 and 3.

P501
PARENTAL POSITIVE HISTORY, UNDENIABLE OSTEOPOROSIS RISK FACTOR

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Objective(s): Several factors can increase the likelihood of developing osteoporosis. Some of these are unchangeable risk factors, such as genetic predisposition. The study aims to assess the prevalence of risk factors in patients with osteoporosis, emphasizing the importance of positive family history.
Material & Methods: It included a group of 328 patients admitted to Baile Felix Rehabilitation Clinical Hospital, Romania, between July 2009-May 2011, investigated by DXA osteodensitometry to detect osteoporosis. The study lot consisted exclusively of women with mean age 61.6± 9.31 years, ranging between 44-81 years. To assess the osteoporosis risk factors all subjects completed the one-minute osteoporosis risk test-IOF 2007.
Results: Mean number of risk factors was 2.52±0.8, ranging between 1 and 6. 14.6% of patients had at least one risk factor, 24.3% had 2, 21.3% had three and 36.5% had four or more risk factors. More than half (51.8%) had a parent with osteoporosis, 60.3% had early menopause, 53.6% kyphosis and height decrease, 13.75% smoked and 22.8% had secondary osteoporosis. Stage statistical analyses revealed that increased number of cases did not significantly modify data obtained on smaller samples.
Conclusion(s): It is important that individuals are aware of their genetic predisposition. Fortunately, osteoporosis can be prevented by adopting a healthy lifestyle. Early diagnosis maintains the disease under control. Bone mass cannot be recovered once osteoporosis is installed, therefore, the earlier the diagnosis, the greater the likelihood of fracture prevention. Knowledge of risk factors enables prevention of osteoporosis and monitoring the disorder for early detection, before fractures occur.

P502
SERUM CONCENTRATION OF BONE METABOLISM MODULATORS IN WOMEN WITH RHEUMATOID ARTHRITIS (RA)

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Objective(s): (RA) is a chronic inflammatory disease affecting musculoskeletal system. As longstanding high concentration of proinflammatory cytokines in RA patients has been observed, RA belongs to risk factors of osteoporosis. The mechanisms that guarantee the dynamic of bone turnover depend on interrelations between three bone matrix cell types and their function. Modulators of bone metabolism allow the communication between those cells. The aim of the study was the assessment of serum concentration of OPG, RANKL, DKK1 and sclerostin in women with RA, and comparing it to healthy individuals. We also looked for correlation between concentration of analyzed bone metabolism modulators and the disease activity.
Material & Methods: 22 females with established diagnosis of RA aged 30-72 years and 12 healthy (aged and sex matched) volunteers entered the study. OPG, RANKL, DKK1 and sclerostin serum concentration were measured using commercial ELISA tests. The measurements were performed once in control group and twice in RA group: before the introduction of methotrexate (MTX; dose range: 15-20 mg weekly) and 6 months after the first dose of MTX. RA activity was measured with ESR-DAS28. High disease activity was defined according to EULAR guidance as DAS28>5.1.
Results: In RA group comparing to control group there was statistically significant lower serum concentration of DDK1 (70.80 pg/ml vs. 548.52 pg/ml) and OPG (81.16 pg/ml vs. 557.377 pg/ml). Serum RANKL concentration was significantly higher in RA group (777.79 pmol/L vs. 255.19 pmol/L). There was no significant difference in sclerostin serum concentration between both groups. In patients with good response to MTX treatment we observed significant reduction of serum concentration of DDK1 (80.96 pg/ml vs. 70.36 pg/ml; t-Student test, $t=2.16$, $p=0.05$), OPG (79.86 pg/ml vs. 69.69 pg/ml; nonparametric signs test; $Z=2.07$, $p=0.04$) and RANKL (781.16 pmol/L vs. 529.76 pmol/L; t-Student test, $t=2.16$, $p=0.05$). The concentration of sclerostin remained unchanged. There was no significant difference in serum concentrations of bone metabolism modulators between patients with active and non-active RA.
Conclusion(s): The results support the hypothesis the RA changes the bone metabolism. Successful treatment influence the serum concentration of bone metabolism modulators. Sclerostin seems to have no value in monitoring bone metabolism in RA patients.

P503
DISTRIBUTION OF LEAN SOFT TISSUE IN TYPE 2 DIABETES MELLITUS MEN AND WOMEN

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Objective(s): Body composition may be altered by the disease process in type 2 diabetes mellitus (DM). Fat distribution has important evident associations with DM and risk of cardiovascular diseases. There are also unanswered questions about amount and distribution of lean soft tissue in relation to disease status and whether fat or lean mass may have independent associations with type 2 DM. The aim of the study

was to identify differences in amount and distribution of lean soft tissue in subjects with and without type 2 DM and to determine any gender differences.

Material & Methods: 232 patients with type 2 DM (178 women, 54 men) (mean age: 60.36±7.55 yrs, duration of DM: 10.61±6.78 yrs, BMI: 31.81±5.33) and 81 (63 women, 18 men) controls matched for age, sex and BMI were examined. The research involved clinic examination, glycated hemoglobin test, DXA body composition program. Lean mass distribution analysis was based on arms, legs, trunk, android, gynoid, total body parameters.

Results: Lean mass distribution parameters in type 2 DM patients and controls were: total body: 47.7 kg [33.7-69.7] vs. 45.1 kg [35.7-64.3] (p=0.20); android: 3.8 kg [2.4-5.9] vs. 3.2 kg [2.4-5.4] g (p=0.025); gynoid: 6.9 kg [4.9-10.0] vs. 6.5 kg [4.9-9.4] (p=0.26); trunk: 25.1 kg [17.6-38.0] vs. 22.3 kg [16.8-36.9] (p=0.007); arms: 4.9 kg [3.4-8.7] vs. 4.8 kg [3.8-7.8] (p=0.99); legs: 14.5 kg [9.9-22.3] vs. 14.8 kg [11.5-21.2] (p=0.33). Body composition lean android and lean trunk mass were statistically higher in type 2 diabetic patients both men and women in comparison with control group (android: men 4.6 kg [2.6-6.9] vs. 4.2 kg [3.3-6.8], (p=0.04); women 3.7 kg [3.1-4.2] vs. 3.1 kg [2.7-3.9], (p=0.025); trunk: men 28.9 kg [26.8-32.6] vs. 24.3 kg [16.8-35.9] (p=0.01); women 24.6 kg [21.6-27.5] vs. 20.8 kg [19.5-24.6], (p=0.009)).

Conclusion(s): The results indicate the prevalence of centrally distributed lean mass, with larger deposits in the trunk region and smaller deposits in the leg region. The distribution of lean tissue in type 2 diabetes, both men and women, compared to controls followed a similar pattern to that of fat: more in the trunk region, less in the leg.

P505
CORRELATIONS OF INDICES OF BODY COMPOSITION (IBC) WITH INFLAMMATORY MEDIATOR TNFα, HORMONES, MARKERS OF BONE METABOLISM AND OXYGEN SATURATION IN MEN WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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Objective(s): Weight loss is a poor prognostic factor for survival and may involve all tissue compartments in COPD patients. The aim was to analyze IBC and relationship between their levels and TNFα, hormones, markers of bone metabolism, oxygen saturation.

Material & Methods: Bone mineral content (BMC), Fat mass (FM) and Lean mass (FFM, excluding BMC) were detected by DXA. FM, FFM and BMC were expressed as ratio to height squared to obtain indices FMI, FFMI and BMCI, respectively. We examined 3 groups of patients (aged 40-70 years) and control group (15 healthy men with mean age 56 years, mean BMI 26 kg/m^2). The COPD pts were subdivided into groups according to COPD severity: the 1st was made of 20 men; GOLD I stage; mean age 55 years; FEV1 78%; BMI 27 kg/m^2, smokers 68%, packs/yrs 20; the 2nd included 43 patients; GOLD II stage; mean age 57; FEV1 55%; BMI 28 kg/m^2, smokers 80%, packs/yrs 21; the 3 d -20 patients; GOLD III stage; mean age 60; FEV1 41%; BMI 25 kg/m^2, smokers 84%, packs/yrs 28.

Results: FFMI significantly differed in patients of 1-2-3 groups. The median value of FFMI decreased during COPD progression: 20.5 kg/m^2, 20.2 kg/m^2, 17.7 kg/m^2, respectively. We revealed correlation between COPD severity and FFMI (r=-0.54 p=0.001). We founded positive correlations between FMI and serum leptin, beta-crosslaps and negative one with testosterone free (r=0.31, r=0.31, r=-0.38, respectively). Serum TNFα was inversely related to FFMI (r=-0.30, p=0.03). BMCI significantly positive correlated with oxygen saturation (r=0.40), PTH (r=0.54). FMI, FFMI and BMCI depended on pack/years smoking index (r=-0.37 p=0.004 for FMI, FFMI and r=-0.3 p=0.04 for BMCI). Patients of 3 d group had lower FMI than those in patients with early stage (median: 4.68 vs. 8.28 in 1st stage p=0.001, and 9.72 in 2nd stage). The median value BMCI in 1st and control groups coincided and was significantly higher than in 2nd and 3 d groups: 1.06 kg/m^2 in 1st and control, and 1.00 kg/m^2, 0.89 kg/m^2, respectively.

Conclusion(s): The dynamics of IBC in COPD patients can reflect the progression of disease.

P506
THE CORRELATION BETWEEN OSTEOPOROSIS AND DIABETUS MELLITUS TYPE 2

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Objective(s): To assess the correlation between diabetes mellitus type 2 and osteoporosis in a group of postmenopausal women.

Material & Methods: We studied a group of 164 postmenopausal women from Bihor county, Romania. We divided the group in two subgroups - first subgroup consisted in 83 patients with diabetes mellitus type 2, and second - the control subgroup consisted in 81 patients without diabetes

mellitus; mean age was 61.7±11.3. All of the subjects were assessed by DXA and underwent clinical assessment. BMI> 30 was noticed in 47 women with diabetes mellitus and in 39 women from the control group. 36 women from the first group and 42 women from the control group had a BMI< 30. We compared the prevalence of osteopenia and osteoporosis in the two subgroups.

Results: The prevalence of osteoporosis was 63.37% in the subgroup of women with diabetes mellitus tip 2 and of 61.49% in the control subgroup. We didn't notice significant statistical differences between the two subgroups. However we found a higher prevalence of osteoporosis in nonobese patients.

Conclusion(s): Our study showed that there were no significant differences in prevalence of osteoporosis between the studied groups. Nevertheless osteoporosis was significant more frequently in nonobese patients.

P507

COMPARISON HISTOLOGICAL DATA OF ACTIVE EXPIRATION RESPIRATORY MUSCLE (RM) AND ECHODENSITOMETRIC PARAMETERS IN MEN WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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Objective(s): For the present moment changes occurring in RM, during COPD progressing, have been studied insufficiently. The aim was to investigate the RM status and compare them with histological data of bioptic muscular material.

Material & Methods: The peak histogram of the internal oblique abdominal muscle (intOAM) was detected by ultrasonic scanner. We obtained the following indices: homogeneity (H), structural density (SD), echogenicity (E) and dispersion (D). Histological research of bioptic muscular material of intOAM has been carried out. The histological method of hematoxylin - eosin staining and the one by van Gieson were used. Microscopical and echo densitometry research was made in 13 pts: 1st group: 8 at the 1st COPD stage; mean age 56 yrs; FEV1 78%; BMI 24 kg/m^2, smokers 68%, packs/yrs 13; 2nd group: 5 at the 2nd COPD stage, mean age 59 yrs; FEV1 63%; BMI 24 kg/m^2, smokers 80%, packs/yrs 29. Control group was formed of 10 healthy subjects compared according to age, sex and BMI.

Results: Contractions of myofibrils (particularly, on peripheries of muscular fibrils), small sites of a fragmentation, stratification of myofibrils and proliferation of fibroblasts were observed at the 1st and 2nd COPD stage. We revealed (in staining by van Gieson) scleroses of single muscular fibril and foci of sclerosis in intramuscular regions. The atrophy and crimp of muscular fibrils with the phenomena of contractions of myofibrils was observed at the 2nd stage of COPD. The median value of index H in patients of the 1st and 2nd groups was 21 and 18 units, respectively. Increasing severity of COPD was associated with enhancing of contractions and stratification of myofibrils. Thus, we detected the significant correlations between COPD severity and contractions (r=0.72) and with stratification of myofibrils (r=0.66). Indices H and SD were lower in patients with more scleroses manifestations (r=-0.42 and r=-0.59, respectively). Whereas index E and D were higher in these patients (r=0.59 and r=0.46). The pack/years index significantly correlated with intensity of proliferation of fibroblasts (r=0.56).

Conclusion(s): Echodensitometric parameters (indices H, E, SD, D) reflect the pathological processes occurring in RM in COPD patients.

P508

THE UTILITY OF FRAX TOOL IN OSTEOPOROTIC FRACTURES PREDICTION IN A GROUP OF PATIENTS FROM ORADEA, ROMANIA

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Objective(s): To assess the prediction of osteoporotic fractures in the next 10 years in a group of postmenopausal women from Oradea, Romania, to enhance the value of risk factors in osteoporosis.

Material & Methods: We studied a group of 87 women with osteoporosis, mean age 69.7±12.3 years. All of the subjects were investigated by DXA and vertebral radiographs. We assessed the risk for vertebral and hip fractures using FRAX algorithm for the patient's 10-year fracture risk. The patients measurement contained also: height, body weight and BMD.

Results: The mean value for the risk factors 2.74±1.32, a mean of 27.28±3.48 kg/m^2 for the BMI, mean T-score for the hip -2.25, and mean T-score for lumbar vertebra -2.81. The mean spine (SD) BMD was 0.807±0.102 g/cm^2. The mean total hip (SD) BMD was 0.734±0.132. Correlating these values we estimated a mean probability of having a vertebral fracture of 21.23±23.1 in the next 10 years, and a risk of having a hip osteoporotic fracture of 14.26±20.42. Pain and loss of function due to these fractures have a negative impact on quality of life and increase the burden of healthcare costs.

Conclusion(s): Presence of more than one risk factor increased fracture probability. It is proved once more that FRAX tool is a very useful algorithm for assessing the 10 years prediction of osteoporotic fracture and the hip fracture risk in the next 10 years.

P509
THE FEASIBILITY OF AN ACTIVE REHABILITATION PROGRAM WITH THE USE OF WEIGHT-VEST FOR OSTEOPENIC WOMEN AND A FORMER WRIST FRACTURE: THE OSTEOACTIVE PROGRAM

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Objective(s): Active rehabilitation has shown to be one of the most important factors for the prevention of osteoporotic fractures, and studies have indicated that active rehabilitation mainly concentrating on muscular strength, and dynamic and static balance, has a positive effect on the risk of falls. The purpose was to describe the development, and the feasibility of a rehabilitation program (OsteoACTIVE) for postmenopausal osteopenic women with a former wrist fracture.
Material & Methods: 31 postmenopausal osteopenic women (65.5±7.1 years) with a former wrist fracture and low BMD (T-score<-1.5) attended OsteoACTIVE for 6 months (3x60 min/week). The exercises consisted of strength, balance, coordination, core stability and the use of weight-vests during exercises. OsteoACTIVE also consisted of a patient education part (OsteoINFO), and was offered twice during the 6 months period. Pre- and post-testing included quadriceps muscle strength (Biodex 6000), anthropometric data and BMD measured with DXA, dynamic balance (Four Square Step Test (FSST), Six-Minute Walk Test, physical activity (mPASE), and quality of life (SF-36). ANOVA was used for statistical analysis, and Standard Response Mean (SRM) was used to consider low (0.2), moderate (0.5) or large change (0.8) from pre- to post-test.
Results: There were a statistical significant increase in quadriceps muscle strength from 89.2±24.3 N-m to 99.7± 25.9 N-m at 60º/s (p=0.02), and for the dynamic balance (FSST) (p=0.03). No significant improvements in the other measurements were obtained. However, there were no significant improvements in all sub-domains except for the General Health. No changes were found in BMD in lumbar spine and hip. SRM was moderate to high for quadriceps muscle strength (0.70), and moderate for dynamic balance (0.50). For the other outcomes, SRM was low. No adverse events were reported and compliance was 87%.
Conclusion(s): OsteoACTIVE demonstrated beneficial effect on muscle strength and dynamic balance for postmenopausal osteopenic women with a former wrist fracture. OsteoACTIVE is a safe program and is well tolerated by the participants. In addition, it had a very good compliance.
Disclosures: The Muskuloskeletal and Sport Medicine Clinic, Hjelp24 NIMI (www.hjelp24.no), for NAR (http://active-rehab.no) with rehabilitation facilities and research staff. Grant from the South-Eastern Norway Regional Health Authority.

P510
INFLUENCE OF DIFFERENT ASSAY METHODS ON THE DETERMINATION OF 25-HYDROXYVITAMIN D

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Objective(s): Vitamin D deficiency is an important cause of bone diseases. The availability of automated methods provides the possibility to analyze large sample sizes. However, method standardization is still a problem. In 2011 Roche Diagnostics (Mannheim, Germany) changed the method for 25OHD with the Elecsys analyzer. We compared the two Roche methods and an ELISA reference method.
Material & Methods: 25OHD was determined in serum samples of 80 ambulant consecutive patients (54 female, 26 male; mean age 65.8±13.0 years). Some of these patients were supplemented with vitamin D. 25OHD was determined with three assays: Elecsys Vitamin D3 (Roche old), Elecsys Vitamin D total (Roche new; both from Roche Diagnostics; Mannheim, Germany) and 25OHD direct ELISA Kit (Immundiagnostik, Bensheim, Germany). All methods are competitive, both Roche methods are automated. The pretreated serum samples were incubated with a polyclonal antibody (Roche old), vitamin D-binding protein (Roche new) or a monoclonal antibody (25OHD direct ELISA Kit).
Results: Mean 25-OH-D values for patients:

> Roche (old): 40±27 nM; Roche (new): 80±33 nM; ELISA 97±36 nM
> Correlation coefficient Roche(old) vs. Roche (new): 0.69
> Correlation coefficient Roche(old) vs. ELISA: 0.41
> Correlation coefficient Roche(new) vs. ELISA: 0.73
> Percentage of Vitamin D-deficiency (25-OH-D<50 nM): Roche (old): 73%; Roche (new): 16%; ELISA 6%

The Bland-Altmann-Plot shows concordance between Roche(new) und ELISA(Immundiagn.).
Conclusion(s): The old Elecsys Vitamin D3 assay measured significantly lower levels of 25OHD compared to the new Elecsys Vitamin D total assay and to the reference manual ELISA method. The percentage of vitamin D deficient

patients is significantly higher with the old method. The 25OHD levels determined with the Elecsys Vitamin D total method (new) correlate very well with the 25OHD direct ELISA (Immundiagnostik Bensheim). Therefore, the new Roche method shows high plausibility. The method of 25OHD assay has important influence on clinical interpretation. The influence of assay methodology on the serum 25-hydroxyvitamin D concentrations has to be considered in clinical studies and for the definition of "normal Vitamin D status".

P511
PHYSICAL FUNCTION AND QUALITY OF LIFE IN POSTMENOPAUSAL OSTEOPENIC WOMEN WITH A FORMER WRIST FRACTURE

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Objective(s): Little is known whether postmenopausal osteopenic women with a former wrist fracture have reduced physical function and quality of life compared to a healthy control group without previous fracture. The purpose was to evaluate physical function and quality of life in postmenopausal osteopenic women and a former wrist fracture compared to a control group without fracture.
Material & Methods: Eighteen postmenopausal osteopenic women (57.7±3.5 years) with a former wrist fracture (patients) were matched to 18 control subjects on gender, age (58.5±4.2 years), height, weight and BMI. The exclusion criteria for the controls were previous fractures, diagnosed with osteoporosis, physical active (moderate/hard intensity) >4 h/week, and didn't understand Norwegian written and spoken. The patients had to have proven low BMD (T-score<-1.5), wrist fracture >2 years old, and domicile in the Oslo region. The exclusion criteria were previous hip or vertebral fractures, or >3 osteoporotic fractures, physical active (moderate/hard intensity) >4 h/week, and didn't understand Norwegian written and spoken. We tested them for quadriceps muscle strength (Biodex 6000), dynamic balance (Four Square Step Test (FSST), walking distance (Six-Minute Walk Test (6MWT), and how exhausting they experienced the 6MWT on Borg's Scale (BS), physical activity (mPASE), and quality of life (SF-36).
Results: The patients had 17% reduced quadriceps muscle strength at 60°/s ($p=0.014$) and 18% at 180°/s ($p=0.012$) compared to the control group. In addition, we fond impaired performance for the patients with 79 m on 6MWT, 1.8 points on BS, and 2 s on FSST. Furthermore, the patients scored lower on SF-36 on the physical role (16.3 points), bodily pain (14.1 points), and vitality (20.9 points).
Conclusion(s): The patients scored significantly lower on physical function and quality of life compared to the controls. This indicate that health care professionals should include quadriceps muscle strength and balance exercises when developing exercise programs for patients with osteopenia and a former wrist fracture with the aim to increase physical function and quality of life.
Disclosures: The Muskuloskeletal and Sport Medicine Clinic, Hjelp24 NIMI (www.hjelp24.no), for NAR (http://active-rehab.no) with rehabilitation facilities and research staff. Grant from the South-Eastern Norway Regional Health Authority.

P512
ASSOCIATION BETWEEN BONE MINERAL DENSITY AND SERUM LIPID PROFILE IN POSTMENOPAUSAL WOMEN

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Objective(s): The magnitude of the public health problem related to cardiovascular disease (CVD) and osteoporosis has been widely documented in the medical literature in the last decades. Dyslipidemia in women increases significantly after menopause. On the other hand, bone mass decreases with age regardless of sex. Furthermore, relationship between serum lipid profile and BMD in postmenopausal osteoporosis has not yet been clearly established. The purpose of this study was to investigate the effects of dyslipidemia on the bone metabolism in a group of postmenopausal Romanian women.
Material & Methods: The subjects studied were 122 postmenopausal women at the mean age of 61 years (age range: 47-75 year): 65 osteoporotic women according to OP diagnostic criteria of WHO and 57 nonosteoporotic postmenopausal controls. The controls were clinically healthy, no medications known to affect bone metabolism and lipid profile, and had any systemic and inflammatory diseases. Patients with secondary osteoporosis and systemic disorders were excluded from the study. The height, body weight and BMI were measured as physical parameters. Previous disease, menstrual status, menarche and menopausal age were determined using a questionnaire form. All blood samples were collected in the morning after an overnight fast. We measured serum total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), and triglyceride (TG) levels. BMD values were measured by DXA at lumbar spine, total hip and femoral neck.

Results: There was differences in TC, LDL-C, HDL-C, TG levels between two groups but this differences were not significant ($p>0.05$). In our study, there was no significant difference in BMD values between two groups. We found no significant relationship between lipid profiles and BMD in two groups ($p>0.05$).

Conclusion(s): In conclusion, in our study, there wasn't any association between lipid profile and BMD values in postmenopausal women. Further research is needed to determine whether there was any association between lipid profile and BMD values in postmenopausal osteoporosis patients. Despite the fact that the results obtained by the studies carried out to date are not definitive, future studies should establish the magnitude of this relationship, especially at the level of tissue.

P513

THE PREVALENCE OF VERTEBRAL FRACTURES AND THEIR RELATIONSHIP WITH BONE MINERAL DENSITY IN MILD ANKYLOSING SPONDYLITIS MEN PATIENTS

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Objective(s): Osteoporosis (OP) is a frequent complication of ankylosing spondylitis (AS). DXA for assessing BMD has limitations in patients with AS because of unreliability of spinal measurements, particularly in advanced disease with new bone formation. The objective is to determine BMD in men patients with mild ankylosing spondylitis (AS), to establish the prevalence of vertebral fractures and fracture risk in these patients, and to determine the relationship between BMD and vertebral fractures.

Material & Methods: 34 men aged 40-60 years with mild AS were studied. BMD of the lumbar spine and femoral neck was measured by DXA and radiographs of the thoracic and lumbar spine were obtained in all subjects. From the radiographs, vertebral fractures were characterized by a morphometric technique using established criteria. 39 healthy male subjects aged 50-60 years, recruited from primary care registers, had spinal radiographs performed and served as controls for vertebral fractures.

Results: In patients with AS, BMD was reduced in both the lumbar spine 0.97 (0.1) g/cm^2 [T-score −1.10 (1.3), 95% -0.50, +0.14] and femoral neck 0.82 (0.1) g/cm^2 [T-score -1.40 (1.2), 95% CI -0.51, +0.09]. 6 patients of 34 (17.6%) patients with AS had a vertebral fracture, compared with 1 of 39 (2.6%) controls; odds ratio 5.92 (95% CI 1.4, 23.8). AS patients with fractures were not significantly older (mean age 41.4 vs. 37.8 yr, $P=0.17$), but had significantly longer disease duration (12.4 vs. 9.3 yr, $P<0.05$) than patients without fractures. No significant correlation was observed between BMD of the lumbar spine or femoral neck and vertebral fractures in patients with AS. In addition, there was no significant difference in the lumbar spine or femoral neck BMD in AS patients with fractures compared with those without.

Conclusion(s): Spinal and hip osteopenia and vertebral fractures are a feature of mild AS. However, there was no correlation between BMD and vertebral fractures in these patients. AS patients with mild disease had a higher risk of fractures compared with the normal population and this increased with the duration of disease.

P514

LASER DOPPLER ALLOWS TO ASSESS BONE PERFUSION IN MOUSE TIBIA: EFFECTS OF INTERMITTENT PTH 1-84 IN TWO STRAINS OF OVARIECTOMISED MICE

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Objective(s): Vessels provide bone perfusion which could be involved in changes in bone remodeling. Furthermore, PTH, a treatment for osteoporosis, may exert effects through vascular mechanisms. However, the role of perfusion in bone metabolism is unknown especially because of the lack of convenient methods for its assessment in mice, the most used animal model in bone biology. To this aim, we designed a Laser Doppler (LD) based perfusion measurement in mouse tibia.

Material & Methods: We used a 780 nm diode laser (Periflux, Perimed). First, we tested measurement accuracy ex vivo on a mouse femur canulated with a 0.38 mm diameter tube in which heparinized blood circulated at various outputs (1-4 ml/h) via a peristaltic pump. Concentration of moving blood cells (CMBC), mean blood cell velocity (VEL) and perfusion (PERF, Arbitrary Units) were measured. Increasing blood output linearly correlated with PERF ($r=0.99$). Second, we designed in vivo measurements in mice under gaseous anaesthesia while monitoring heart rate (HR, Bpm), tail blood pressure (BP, mmHg) and body temperature. The bone surface of the tibia anteromedial side was carefully exposed after skin incision; we measured bone PERF in three areas from the proximal metaphysis to the upper part of the diaphysis. Finally, two groups of 60 four month-old C57/Bl6J and Cd1/129 female mice were either ovariectomised (OVX) or sham operated (CT) and then daily administered with either saline (Sal) or PTH 1-84 (90 μg/kg/d, Nycomed) subcutaneously (8 groups, $n=15$/group). After 14 days, bone perfusion was measured.

Results:

Table 1

	CT+Sal .	OVX+Sal	CT+PTH	OVX+PTH
C57/BL6J				
VEL	93.7±6.8	92.6±6.8 c#	65.6±4.3 a'	93.1±5.7 c'
CMBC	64.7±4.9	51.2±3.1 c'	117.5±8.1 a'	75.2±10.3 b#,c'
PERF	53.2±3.4	37.4±1.9 a',c'	63.8±3.2 a#	52.1±3.4 b',c#
HR	69.3±3.4	69.7±3.6	63.3±5.1	73.4±3.4
BP	442±15	499±10 a	558±12 a'	502±16 a',c'
BVR	1.36±0.10	1.90±0.13 a	1.03±0.11	1.55±0.14 b#,c'
Cd1/129				
VEL	74.8±3	90.1±4.7	117.3±8.1 a',b'	117.4±6.4 a',b'
CMBC	49.4±4.7	47.8±3.7	46.8±2.3	46.2±3.1
PERF	32.6±2.5	36.6±2.5	48.1±3.9 a',b	50.1±4.8 a',b'
HR	70.7±2.6	66.3±2.6	61.9±2.2 a#	60.8±2.3 a
BP	473±16	476±11	500±16	488±20
BVR	2.34±0.20	1.91±0.20	1.41±0.15 a'	1.42±0.16 a

a: vs. CT+Sal, b: vs. OVX+Sal. c: vs. CT+PTH, # $p<0.05$, ': $p<0.01$

OVX-induced systemic cardiovascular effects differed between strains. PTH increased significantly bone perfusion in all groups with similar amplitude (40%) in OVX groups in both strains.

Conclusion(s): LD provides a reliable tool for bone perfusion assessment in mice. Intermittent 1-84 PTH increases tibia perfusion regardless of genetic background, despite the differences in bone perfusion observed between strains in unchallenged mice.

P515
EFFECTS OF OPIOIDS ON POSTURAL BALANCE

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Objective(s): Opioids are frequently used and users of opioids are known to have increased risk of fractures. The objective was to examine the effects of opioids on postural balance.

Material & Methods: In a cross-sectional study we measured postural balance in 194 patients recruited from a department of internal medicine and an outpatient clinic for endocrinology of whom 29 patients (15%) were using opioids. Patients who were users of opioids were under stable treatment for more than one month. Postural stability was measured in using a stadiometer (Good Balance™, Meitur Ltd, Finland) in four simple positions: normal standing with eyes open, normal standing with eyes closed, semitandem, and tandem.

Results: Included patients had a mean age of 57 (range 18-91) years and 158 (81%) were women. Users of opioids had a significantly reduced postural stability during normal standing with eyes closed (X-speed 3.9 vs. 3.1 mm/s, $p=0.03$ and velocity moment 12.0 vs. 8.2 mm^2/s, $p=0.007$) compared with patients who were not on opioid treatment. Differences between the two groups were not statistically significant during normal standing eyes open, semi-tandem and tandem (NS). In the opioid group seven patients were also users of benzodiazepines, however, postural balance in these patients were not different from the rest of the group and there were no users of benzodiazepines in the group without opioids. In a multiple regression model, age was negatively associated with postural balance in normal standing with eyes open and closed ($p<0.05$). Height and weight did not significantly affect postural balance.

Conclusion(s): Opioids affect the central nervous system and some of these effects are detrimental. In the present study, patients under opioid treatment had decreased postural stability. With open eyes the difference was not significant, however, withdrawing the sense of vision revealed an impaired balance in the opioid group. This result may have implication for other patients. Moreover, these patients were under stable treatment and short term or high dose treatment may have even worse affection of stability.

P516
ULTRASOUND-GUIDED INTRAARTICULAR APPLICATION OF SODIUM HYALURONATE IN PATIENTS WITH OSTEOARTHRITIS OF THE HIP JOINT

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Objective(s): The study examines the effect of hyaluronic acid administered intraarticular (Ostenil Plus - OP, 2 ml, 40 mg, 2% sodium hyaluronate in combination with mannitol) on the painful symptoms in patients with osteoarthritis of the hip joints (OH).

Material & Methods: 46 patients with OH (ACR, 1991) were examined. OP was administered weekly, for three consecutive weeks, locally (front-access sagittal) in 84 hip joints (in 38 patients OP was administered bilaterally) under ultrasound control (7 MHz, linear transducer, with internal rotation in the hip joints at 15-20°). The follow up period was 6 months.

Results: Throughout the observation period no side effects of the local treatment were established. Statistically significant ($p<0.001$) improvement in the condition (AFI -

algofunctional indices for hip, M. Lequesne, 1997) and pain reduction (in 72.62% of the hip joints injected with OP) (VAS) were reported on the third and sixth month. Improvement of quality of life (HAQ) was presented in 60.87% (28 patients) of the studied patients.

Conclusion(s): Local application of hyaluronic acid has a significant place in the general programme for treatment of osteoarthritis of the hip joints. Ultrasound guidance ensures strict intraarticular getting the drug and fewer complications of therapy.

P517

COULD DXA PROVIDE ADDITIONAL INSIGHT INTO SARCOPENIA IN OLDER ADULTS? EXPLORATION OF LEG LEAN MASS/FAT MASS RATIO

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Objective(s): Sarcopenia is a risk factor for falls and fracture. How to best evaluate and incorporate the contribution of fat to functional impairment (so called sarcopenic obesity) remains to be defined. DXA can measure regional fat mass, but currently not intramuscular (IM) fat. Including fat measurement in sarcopenia evaluation might improve clinical assessment as greater adipose tissue may contribute to muscle impairment and increase disability risk. This study explores whether the ratio of leg fat/lean mass obtained from total body DXA differs between young and old adults. Additionally, we correlated this ratio with classic muscle function tests, jumping mechanography (JM) and appendicular lean mass (ALM)/height^2.

Material & Methods: 60 collegiate athletes and 97 older adults were studied. Body composition was determined in all using a GE Lunar iDXA. The older adults performed muscle function tests including the short physical performance battery (SPPB), grip strength and JM. JM measures jump height and power. Leg fat/lean mass ratio was compared between the age groups and genders using T-tests. Leg fat/lean ratio and the ALM/height^2 ratio were correlated with muscle function tests using linear regression analysis.

Results: Age (mean; range) of the athletes and older adults was 20.3; 18-23 and 80.6; 70-95 years respectively. Leg fat/lean mass ratio was lower ($p<0.0001$) in athletes than in older adults. In young and old cohorts fat/lean ratio was lower in men ($p<0.0001$). Fat/lean mass ratio was negatively associated with grip strength, jump power/height (all $p<0.0001$) with trends ($p=0.06$-0.07) for chair rise test and SPPB score. The ALM/height^2 ratio was positively associated with grip strength, jump power/height (all $p<0.01$), but not the other measures.

Conclusion(s): The leg fat/lean mass ratio differs between young athletes and older individuals and also between genders. It correlates with muscle function in older individuals and could potentially be complementary to the ALM/height^2 ratio. Further studies are needed to evaluate whether the fat/lean mass ratio correlates with outcomes, e.g., falls and fracture, and whether it, or other DXA approaches to leg fat measurement, can serve as a measure of IM fat and/or sarcopenic obesity.

P518

EFFECTS OF EXEMESTANE AND TAMOXIFEN TREATMENTS ON BONE QUANTITY AND QUALITY IN PATIENT WITH BREAST CANCER

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Objective(s): We performed an analysis of a substudy of the randomized Tamoxifene Exemestane Adjuvant Multinational (TEAM) trial to determine the effects of exemestane (EXE) and tamoxifene (TAM) on bone quantity and quality.

Material & Methods: Patients recruited in this study were postmenopausal women with hormone sensitive primary breast cancer. Patients received randomly EXE or TAM (1:1) as adjuvant therapy for hormone receptor-positive breast cancer. BMD was assessed at baseline and after 6, 12 and 24 months of treatment on a GE-Lunar Prodigy densitometer. Bone quality, as expressed as bone microarchitecture status, was evaluated by Lausanne University Hospital without knowing the clinical status/treatments of the patients, using TBS at lumbar spine L1-L4. TBS (TBS iNsight®, Med-Imap, France) is a grey-level texture measurement, which correlates with 3D bone microarchitecture parameters, regardless of BMD. TBS and BMD were evaluated on the same region of interests.

Results: Study groups were composed of 17 and 17 women taken TAM and EXE, respectively. Patients receiving TAM showed a mean increase from baseline in lumbar spine BMD of 0.7, 2.9 and 4.0% and in TBS of 2.8, 3.2 and 3.5% at 6, 12 and 24 months treatment, respectively. Conversely, patients receiving EXE showed a mean decrease from baseline in BMD of 2.7, 3.7 and 4.7% and in TBS of 1.3, 1.9 and 3.1% at 6, 12 and 24 months treatment, respectively. No significant correlations were obtained between TBS and BMD at spine or at total hip at baseline and during the follow-up. There were significant differences in the changes in lumbar spine BMD and at total hip between treatment groups ($P<0.005$ at any time points). Changes in TBS from baseline at spine were also significantly different between EXE and TAM: $p=0.015$, 0.008 and 0.002 at 6, 12 and 24 months, respectively.

Conclusion(s): EXE resulted in decreases in bone quantity and quality whereas TAM induced and increase in bone

quantity and quality and independently from each other. The rapid influence of TAM on TBS should be further investigated and might be related to temporally bone quality status of the patient related to the chemotherapy.

P519
PLACENTAL SIZE AT 19 WEEKS IS POSITIVELY ASSOCIATED WITH NEONATAL BONE MASS: FINDINGS FROM THE SOUTHAMPTON WOMEN'S SURVEY

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Objective(s): Poor early growth is associated with reduced adult bone mineral content and increased risk of hip fracture. In mother-offspring studies, maternal smoking, nutrition and physical activity during pregnancy appeared to influence offspring bone mineral accrual. It is likely that these relationships are mediated via an effect on the placenta, but it is unclear whether the important determinant is placental size or function. In this study we investigate the relationship between placental size and offspring bone mass using the Southampton Women's Survey (SWS).
Material & Methods: The SWS is a unique prospective cohort of 12,583 nonpregnant women aged 20-34 years, of which 3156 subsequent singleton pregnancies were followed. Detailed placental measurements were obtained by fetal ultrasound scanning at 19 weeks. In a subset of births, DXA was performed on the neonate within the first two weeks. Pearson correlation and linear regression were used to relate placental measurements to neonatal body composition and bone mass.
Results: We identified 757 mother-neonate pairs with complete ultrasound and DXA data. The statistically significant, positive predictors of offspring bone area (BA), bone mineral content (BMC) and BMD ($P<0.05$) included placental circumference, length of attachment to the uterine wall, cross-sectional area and volume. Placental volume at 19 weeks was positively associated with neonatal total lean mass, and percent and total fat mass ($p<0.0001$), however was negatively associated with percent lean ($p<0.0001$). This indicates that as placental volume increased, total neonatal size increased but with an increase in percentage fat and a reduction in percentage lean within the overall size envelope. All associations remained after adjusting for maternal factors known to affect offspring bone mass.
Conclusion(s): Placental size is positively associated with intrauterine bone mineral accrual. These associations appear independent of maternal factors known to influence neonatal bone mass, suggesting that these factors might act through modulation of placental function rather than placental size. Low placental volume early in pregnancy may be a marker of a smaller postnatal skeletal envelope and potentially increased risk of fracture in older age.

P520
PREMENOPAUSAL WOMEN WITH DISTAL RADIUS FRACTURES HAVE DETERIORATED TRABECULAR BONE ARCHITECTURE COMPARED TO NON-FRACTURE CONTROLS

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Objective(s): To gain insight into early origins of skeletal fragility, we compared BMD and bone microarchitecture, assessed by hr-pQCT at the distal radius and distal tibia, in premenopausal women with and without recent fractures of the distal radius.
Material & Methods: We enrolled premenopausal women under age 45, including 28 fracture cases and 82 nonfracture controls. Women were eligible as fracture cases if they had a fracture of the distal radius within the prior 3 months. Control subjects had no history of fractures in adulthood. Trabecular and cortical bone density and microarchitecture at the (non-fractured) distal radius and tibia were assessed using high resolution peripheral quantitative computed tomography (XtremeCT, Scanco Medical AG). Areal BMD of the hip, spine and forearm was measured by DXA. BMD and trabecular and cortical bone microarchitecture were compared between pre-menopausal women with and without fractures using two-tailed student's t-test, with $P<0.05$ considered statistically significant.
Results: Subjects did not differ with regard to age, race or BMI. Among FX, 19 injuries were sustained from a fall from a standing height and 9 resulted from high energy sports. Cortical and trabecular microarchitecture differed between groups both at the distal radius and distal tibia. At the distal radius total density (-8%, $p=0.03$), trabecular density (-10%, $p=0.02$), and trabecular thickness (-8%, $p=0.01$) were lower in FX than CONT ($p=0.03$). FX also tended to have lower cortical thickness, cortical area and periosteal perimeter although values did not reach statistical significance. At the distal tibia, total density (-12%, $p<0.01$), trabecular density (-14%, $p<0.001$) and cortical density (-9%, $p=0.01$) were lower in FX than CONT. FX also had lower cortical (-11%, $p=0.01$), and trabecular thickness

(-13%, p<0.001) than CONT. BMD was similar between groups at all sites.

Conclusion(s): We found that premenopausal women with forearm fractures have similar BMD but altered microarchitecture when compared to controls with no history of fracture. Identifying patients at risk of osteoporosis before menopause may provide opportunities to initiate early treatment and prevention efforts.

Disclosures: We acknowledge funding from Sanofi/Aventis (now Warner Chilcott) and the Ruth Jackson Orthopedic Society.

P521
DENOSUMAB REDUCES INTRACORTICAL POROSITY MORE THAN ALENDRONATE IN THE COMPACT-APPEARING CORTEX AND OUTER TRANSITIONAL ZONE

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Objective(s): Denosumab reduces remodeling and cortical porosity and increases cortical vBMD more greatly than alendronate. Remodeling is surface dependent. Denosumab can inhibit osteoclasts throughout the skeleton without binding to bone matrix. Alendronate's affinity for bone mineral may limit its distribution in deeper skeletal compartments distant from bone surfaces, so that intracortical remodeling may be less inhibited. We therefore hypothesized that denosumab's effect will be greater than that of alendronate in compact cortical bone but not necessarily in trabecular bone.

Material & Methods: Postmenopausal women aged 61±5 years were randomized double-blind to denosumab 60 mg Q6M (N=83), alendronate 70 mg QW (N=82), or placebo (N=82). All received calcium and vitamin D. Trabecular bone volume fraction (BV/TV) and porosity in the compact-appearing and trabecularized cortex (transitional zone) were measured at baseline, 6 and 12 months from distal radius HR-pQCT images using software (Strax1.0) which quantifies porosity.

Results: At 12 months, both treatments reduced porosity and increased BV/TV from baseline (Table).

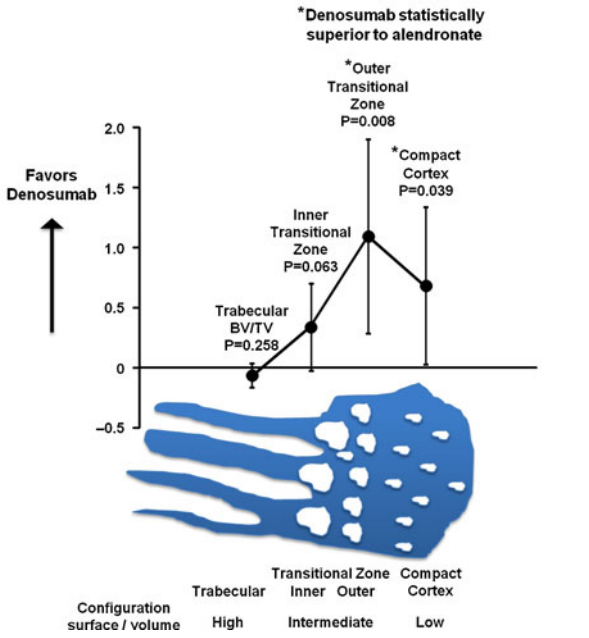
Table: Changes (Percentage Points Difference) From Baseline at 12 Months

	Trabecular BV/TV	Porosity		
		Inner Transitional Zone	Outer Transitional Zone	Compact Cortex
Alendronate	+0.19*	-0.81*	-0.86†	-0.54^
Denosumab	+0.24*	-1.15*	-1.95*	-1.22*

P value relative to baseline, *<0.001, †<0.005, ^<0.03

Denosumab did so twice as much compared with alendronate in the compact cortex (P=0.039) and outer transitional zone (P=0.008). In the inner transitional zone, a similar trend was observed (P=0.063). There was no treatment difference in trabecular bone (Figure).

Figure: Differences Between Denosumab and Alendronate According to Compartment



Conclusion(s): Superiority of denosumab in cortical bone (80% of the skeleton) could be partly due to its accessibility to all surfaces throughout the skeleton. Improvements in the outer cortical bone may be associated with improved resistance to bending and compressive strength.

P522
ASSOCIATION BETWEEN BONE MINERAL DENSITY AT FEMORAL NECK AND PHYSICAL ACTIVITY ASSESSED WITH A TRIAXIAL ACCELEROMETER IN POSTMENOPAUSAL JAPANESE WOMEN

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Objective(s): Previous studies [1-3] have reported the positive effects of daily walking steps and physical activity (PA) by accelerometer on quantitative ultrasound parameters of the calcaneus. However, it remains uncertain whether these

motion sensors-determined PA has positive effects on regional BMD except calcaneus. This cross-sectional study investigated the associations between BMD at femoral neck (FN-BMD) and PA using a triaxial accelerometer in postmenopausal Japanese women.

Material & Methods: This study is part of the Japanese Population-based Osteoporosis (JPOS) study. The subjects were 90 women with 10 years since menopause (YSM) or more (69.2±6.3 years of age). None of the subjects showed any abnormality in bone metabolism. FN-BMD was measured by DXA (QDR4500A, Hologic, USA). A triaxial accelerometer (EW-NK50, Panasonic Electric Works Co., Japan) was given to each subject. This instrument measured the number of steps per taken and converted acceleration into metabolic equivalents (METs). PA at 3 METs or more was recorded. The output of PA was expressed in METs·hours. The subjects were instructed to wear the accelerometer during waking hours for 7 consecutive days.

Results: FN-BMD showed significant negative correlation with age ($r=-0.38$, $p<0.01$) and YSM ($r=-0.34$, $p<0.01$). FN-BMD showed no correlation with BMI. While there was no correlation between walking steps and FN-BMD, PA (METs·hours) was positively associated with FN-BMD ($r=0.26$, $p<0.01$). This positive effect of PA on FN-BMD remained significant after adjustment for age or YSM.

Conclusion(s): Walking steps do not provide information on the intensity of the activities in daily living. On the other hand, the output of PA (METs·hours) reflects intensity of the activities. It is suggested that the intensity of PA assessed with a triaxial accelerometer is a significant determinant of FN-BMD in postmenopausal Japanese women.

References: 1) Kitagawa J et al., Osteoporos Int 14:219;2003. 2) Kitagawa J et al., J Physiol Anthropol, 27:295;2008. 3) Park H et al., Osteoporos Int 18:285;2007.

P523
A SYSTEMATIC REVIEW OF ADHERENCE TO OSTEOPOROSIS MEDICATIONS IN MEN

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Objective(s): Male osteoporosis is a growing but undermanaged problem. We determined to investigate the cumulative knowledge on adherence to therapy in men to better understand real life effectiveness of osteoporosis treatment and how this may be improved.

Material & Methods: We conducted a systematic review to identify information on adherence to osteoporotic medication in men. MEDLINE and Embase databases were searched from 1998-2010 using keywords and MeSH terms. Recent conference proceedings (2008-2010) were also screened. Studies were included if they were in English and reported osteoporosis related adherence data in real-life clinical practice settings for male populations.

Results: Thirteen studies were identified which reported male-specific information; four studies were exclusively in male populations, the others were in mixed populations. Six studies had a male population size of <200. Disparate methods of measurement and reporting prevented comparison of results. Adherence to bisphosphonates, measured in terms of Medication Possession Ratios (MPRs), ranged from 70% to 41%. Adherence to bisphosphonates using persistence, compliance, consumption rate, and self-reported measures ranged from 60% to 54%. The highest percentage of patients adhering to treatment was reported in two studies: one with annually dosed zolendronic acid (persistence with therapy after 12 months was 100%), and one with off-label treatment with teriparatide (81% of men were still on therapy after 12 months of treatment). Results for gender differences in medication adherence were conflicting; two studies showed no difference in adherence between men and women, one study showed better adherence in men, and one showed better adherence in women. One study which assessed outcomes related to treatment adherence indicated that there was an inverse relationship between treatment adherence and risk of fracture.

Conclusion(s): Studies which report osteoporosis treatment adherence estimates for males varied widely, nevertheless, the available data indicate that a substantial number of men with osteoporosis do not optimally use currently prescribed osteoporotic medications.

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P524
A SYSTEMATIC REVIEW OF COST OF FRACTURE AND RESOURCE UTILIZATION IN MEN WITH OSTEOPOROSIS

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Objective(s): Male osteoporosis is an increasingly important public health concern. The purpose of this study was to assess the cumulative data published to date on the cost burden of osteoporosis in men.

Material & Methods: We conducted a systematic review to identify information on the cost burden of osteoporosis in men. MEDLINE and Embase databases were searched from 1998-2010 using keywords and MeSH terms. Recent conference proceedings (2008-2010) were also screened. Studies were included if they were in English and reported osteoporosis-related cost or resource utilization data in men.

Results: 24 studies were identified which reported a male subpopulation within the study; only one study was carried out exclusively in men. Men accounted for 11-30% of costs related to fractures. Total 1-year costs related to fracture reported at the national level were substantial, ranging from EUR 100 million (USD 119 million) in Sweden to EUR 3.5 billion (USD 4.1 billion) in the US. In both Europe and the US, costs associated with osteoporosis-related fractures in men are expected to outpace those of women over the next few decades. In general, the mean cost for fracture was highest for men ≥75 years of age. Hip fractures are the most expensive type of fractures to treat, costing up to EUR 36,366 (USD 42,866) in the first year post fracture, and resulting in hospitalization costs ranging from EUR 1709 (USD 1590) in China (in 2000) to EUR 28,644 (USD 32,195) in the US (in 2003). Mean length of hospital stay for hip fractures ranged from approximately 6 days to 34 days.

Conclusion(s): Although the prevalence of osteoporosis in men is significantly lower than in women, the cumulative evidence indicates that the cost of fracture and resource utilization due to fracture in men is substantial, and is expected to increase with an increasing aging population.

P525
A DRUG DELIVERY SYSTEM FOR 'MUSCULOSKELETON STRENGTHENING HERBS' FOR APPROACHING BONE FORMATION SURFACES

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Objective(s): 'Musculoskeleton strengthening herbals' can't exert obvious beneficial effects on muscle and bone in skeletal disorder therapy mainly due to short retention time in blood and insufficient concentration in bone to execute its bone anabolic effect, so our present study aim to develop nanoparticles entrapping 'musculoskeleton strengthening herbs' approaching bone formation surfaces to enhance the interaction of herbs with osteogenic cells.

Material & Methods: $(AspSerSer)_6$ as targeting moiety for approaching bone formation surfaces was conjugated to the surface of nanoparticles composed of poly(ethyleneglycol)-poly(D,L-lactic-co-glycolic acid) (PEG-PLGA). The Fructus Psoraleae extract and the mixture of Epimedium and Bacopin extract, which are commercially available injection solution, were used as model drugs, respectively. The physical properties were characterized and *in vitro* drug release was also investigated. The proliferation and osteogenic differentiation of Fructus Psoraleae extract and the mixture of Epimedium and Bacopin extract entrapped in $(AspSerSer)_6$-PEG-PLGA nanoparticles were determined. In *in vivo* study, $(AspSerSer)_6$-PEG-PLGA nanoparticles carrying DiR as tracer were employed to examine distribution at organ, tissue and cell levels in rats, respectively.

Results: The average particle size of $(AspSerSer)_6$-PEG-PLGA nanoparticles entrapping the herbal extracts was about 118±5 nm. It had slow release ability and significantly promoted osteoblast differentiation and osteogenesis *in vitro* compared to Fructus Psoraleae extract and the mixture of Epimedium and Bacopin extract without delivery systems, respectively. In in vivo study, the signals in femora from rats injected with $(AspSerSer)_6$-PEG-PLGA nanoparticles showed more intensive than that injected with PEG-PLGA nanoparticles without $(AspSerSer)_6$ group at 4 h after administration. Moreover, fluorescence signals remained intense in femora after administration of $(AspSerSer)_6$-PEG-PLGA nanoparticles at 24 h. We found that bone formation surfaces labeled with calcein green were largely colocalized with rhodamine labeled $(AspSerSer)_6$-PEG-PLGA and also found numerous instances of co-localization of DiR with ALP- or RUNX2- positive cells when $(AspSerSer)_6$-PEG-PLGA nanoparticles as delivery system, whereas there were few instances of such overlapping staining when PEG-PLGA nanoparticles as carriers.

Conclusion(s): $(AspSerSer)_6$-PEG-PLGA nanoparticles not only maintained drugs slow release, enhanced bioactivities, but also facilitated 'Musculoskeleton strengthening herbals' approaching bone formation surfaces to exerting anabolic effects.

P526
LONGITUDINAL TRACK OF ALTERATIONS BONE MINERALIZATION CHARACTERISTICS IN SECONDARY OSTEOARTHRITIS INDUCED BY TRAUMA

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Objective(s): Bone mineralization on a microscopic scale is major determinants of mechanical quality of trabecular bone. However, longitudinal study to quantify alterations of bone mineralization characteristics is sparse, particularly in secondary osteoarthritis induced by trauma (T-OA) over time. The current study is, therefore, aimed to quantify

alteration patterns of bone mineralization characteristics induced by T-OA over time, using *in vivo* μCT.

Material & Methods: Fourteen 8-week-old female Sprague Dawley rats were randomly divided into control (n=7) and T-OA (n=7) groups. Anterior cruciate ligament transaction was performed for T-OA group. The knee joint was scanned by *in vivo* μCT at 0, 4, and 8 weeks after administration and the trabecular bone was analyzed to quantify alteration patterns of bone mineralization characteristics. The linear attenuation coefficient was measured and converted to bone mineralization. Bone mineralization was then divided into four areas (0-0.3 g/cm^3, 0.3-0.7 g/cm^3, 0.7-1.0 g/cm^3, >1.0 g/cm^3) to quantify bone mineralization alterations based on method suggested by Sato *et al*. (2000). Immunohistological tests were performed additionally to verify if T-OA was well corresponded to clinical conditions. All procedures for specimen preparation were approved by Yonsei University School of Animal Care and Ethics Committee.

Results: In terms of bone mineralization, no significant difference was observed at 0 (P>0.05), but 7-12% differences were occurred at 4 and 8 weeks (P<0.05) between control and T-OA groups. In terms of periodic changes of bone mineralization, a degree of bone mineralization in control and T-OA groups was not significantly changed at 0 and 4 weeks (P>0.05). At 8 weeks, a degree of bone mineralization in control group was not also significantly changed (P<0.05), but that of T-OA group was slowly moved to high mineralization area over time at 8 weeks (P>0.05). Local bone erosion, synovitis, and mild inflammation were evident in histological images at 8 weeks after administration.

Conclusion(s): These findings indicate that longitudinal track may be important for identifying alterations in bone microarchitectural characteristics. The results also indicate that longitudinal track may be important when contemplating the use of antiresorptive and anti-inflammatory agents for the treatment of T-OA.

P527
CHANGES OF BONE MINERALIZATION CHARACTERISTICS IN RHEUMATOID ARTHRITIS OVER TIME: LONGITUDINAL STUDY

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Objective(s): Bone mineralization on a microscopic scale is major determinants of mechanical quality of trabecular bone. However, longitudinal study to quantify alterations of bone mineralization characteristics is sparse, particularly in rheumatoid arthritis (RA) over time. The current study is, therefore, aimed to quantify alteration patterns of bone mineralization characteristics induced by RA over time, using *in vivo* μCT.

Material & Methods: Fourteen 8-week-old female Sprague Dawley rats were randomly divided into control (n=7) and RA (n=7) groups. Bovine type-II collagen was injected intradermally at the tail of RA group. The knee joint was scanned by *in vivo* μCT at 0, 4, and 8 weeks after administration and the trabecular bone was analyzed to quantify alteration patterns of bone mineralization characteristics. The linear attenuation coefficient was measured and converted to bone mineralization. Bone mineralization was then divided into four areas (0-0.3 g/cm^3, 0.3-0.7 g/cm^3, 0.7-1.0 g/cm^3, >1.0 g/cm^3) to quantify bone mineralization alterations based on method suggested by Sato *et al*. (2000). All procedures for specimen preparation were approved by Yonsei University School of Animal Care and Ethics Committee.

Results: In terms of bone mineralization, no significant difference was observed at 0 (P>0.05), but 16-33% differences were occurred at 4 and 8 weeks (P<0.05) between control and RA groups. In terms of periodic changes of bone mineralization, a degree of bone mineralization in control and RA groups was not significantly changed at 0 and 4 weeks (P>0.05). At 8 weeks, a degree of bone mineralization in control group was not also significantly changed (P<0.05), but that of RA group was moved to low mineralization area and showed high turnover over time at 8 weeks (P>0.05). There were the evidences of chronic inflammation status showing fibrosis and synovial hypertrophy in histological images after administration.

Conclusion(s): These findings are expected to be able to useful analyzing efficacy of rheumatoid arthritis treatment drugs such as antirheumatic and antiresorptive agents in bone mineralization point of view. To our knowledge, this study may prove valuable as the first approach in tracking longitudinally alteration patterns of bone mineralization characteristics in RA.

P528
ASSOCIATION OF OSTEOPOROSIS AND PSYCHOEMOTIONAL CHANGES IN POSTMENOPAUSAL WOMEN

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Objective(s): Depression has been implicated as a possible risk factor for osteoporosis, however, the results to date have not been consistent. And there are a very few studies

reported an association between anxiety disorders and low BMD. Some investigations have indicated that those relationships may differ depending on sex and age. The aim of this study was to examine associations between osteoporosis and psychoemotional disorders (anxiety and depression) in postmenopausal women.

Material & Methods: Study comprised 508 postmenopausal women aged over 45 years (median 63(57;70) years) who had normal BMD (n=68), osteopenia (n=78) or osteoporosis (n=362) according to DXA testing. Spinal X-rays were performed for vertebral deformities assessment in patients with osteopenia and osteoporosis. Test battery included C. D. Spielberger-Y.L. Khanin self-assessment scale for evaluation of reactive and personal anxiety and the depression scale developed in the St. Petersburg Psychoneurological Research Institute named of V.M. Bekhterev (adapted by Balashova T.I., 1978).

Results: A significant correlation was found between reactive anxiety level ($r=0.09$, $p<0.05$) and number of vertebral deformities, and there were not found associations of reactive anxiety level with age or BMD. No significant correlations were found between personal anxiety level and age or number of vertebral deformities, unlike with femoral neck BMD ($r=-0.11$, $p<0.05$). Depression level correlated significantly with duration of menopause ($r=0.12$, $p<0.01$) and BMD in lumbar spine ($r=-0.10$, $p<0.05$) and in total hip ($r=-0.11$, $p<0.05$). Reactive anxiety and depression levels were much higher ($p<0.01$) in osteoporosis patient than in women with normal BMD or osteopenia. The spinal T-score was significantly lower ($p<0.05$) in women with major depression compared to non-depressed women or women with subsyndromal situational depression.

Conclusion(s): Vertebral deformities increase reactive anxiety level in postmenopausal women. High level of personal anxiety and major depression are associated with low BMD in postmenopausal period.

P529
A SINGLE DOSE OF ZOLEDRONIC ACID PREVENTS PERIPROSTHETIC BONE LOSS IN FEMALE PATIENTS WITH CEMENTLESS TOTAL HIP ARTHROPLASTY

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Objective(s): Periprosthetic bone loss is common during the first year after total hip arthroplasty (THA). Factors that lead to periprosthetic bone loss are not clearly understood but are thought to be associated with an increase in osteoclastic activity. The primary objective of this trial was to demonstrate that zoledronic acid, given as a single intravenous infusion after THA, reduces periprosthetic bone loss measured by DXA.

Material & Methods: This randomized double-blind placebo-controlled trial included postmenopausal female patients with hip osteoarthritis. Excluding criteria included evidence of secondary osteoporosis, an ongoing bisphosphonate or corticosteroid therapy. Of the 49 eligible patients, 14 (29%) had normal preoperative systemic BMD, 24 (49%) osteopenia and 11 (22%) osteoporosis. All patients received a cementless total hip prosthesis with stem marks for RSA (radiostereometric analysis). Postoperatively, the patients received a single intravenous dose (5 mg) of zoledronic acid or placebo. All patients received calcium and D-vitamin supplementation. The response to zoledronic acid therapy was monitored by measurements of serum markers (CTX, TRAP, and PINP). Periprosthetic BMD was measured by DXA at 0, 3, 6, and 12 months. RSA imaging of stem migration was performed at 0, 3, 6, and 12 months. Functional recovery was evaluated by means of gait analysis, Balance master®, and patient reported outcome measures (RAND-36, WOMAC, HSS).

Results: At the baseline, the patients of zoledronic acid (n=25) and placebo (n=24) groups showed minor imbalances in the mean age (65 vs. 71 years), 25(OH)D-vitamin levels (65 vs. 52) and HSS scores (55 vs. 43). Periprosthetic total hip BMD did not change with time in patients with zoledronic acid treatment, while placebo-treated patients showed loss of periprosthetic bone. The intergroup difference was 6.3% at 3 months ($p=0.0071$), 6.0% at 6 months ($p=0.0105$) and 6.8% at 12 months, $p=0.0039$, RMANCOVA). In RSA imaging, translation and rotation vectors of stem migration showed no significant intergroup differences. Functional evaluation and patient reported outcome measures showed no significant differences between the two groups.

Conclusion(s): Zoledronic acid was efficient in prevention of early periprosthetic bone loss in female THA patients. Based on RSA, the treatment had no adverse effects on implant osseointegration.

P530
CIRCULATING SCLEROSTIN IN POSTMENOPAUSAL WOMEN WITH TYPE-2 DIABETES MELLITUS: A CROSS-SECTIONAL STUDY

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Objective(s): Sclerostin a glycoprotein produced by osteocytes, is a potent inhibitor of Wnt signaling and bone formation. Diabetes mellitus (DM) is a risk factor for osteofragility. However, there is limited information on circulating sclerostin levels in patients with type 2 DM (T2DM). The main objectives of the present study are to examine study the relationships between circulating sclerostin in T2DM patients in relation to glycemic control among postmenopausal women as compared with healthy age- and sex-matched controls.

Material & Methods: A total of 630 T2DM patients and 630 healthy controls [postmenopausal women; age range 50-79 yrs] were studied. Each woman completed a questionnaire and provided blood and urine samples. Anthropometric parameters, together with serum sclerostin (determined by ELISA), glycated hemoglobin (HbA_{1c}) and plasma glucose were measured. BMD of lumbar spine (L_1-L_4) and neck femur were determined by DXA.

Results: Sclerostin levels were significantly higher in T2DM patients than controls (74.1±16.5 vs. 51.09±21.3 pmol/L; P<0.001), respectively. In age-adjusted analysis, serum sclerostin levels were positively correlated with HbA1c in T2DM patients (r=0.256; P<0.001). In T2DM patients, sclerostin levels were significantly lower in patients with osteoporosis (50.6±18.6 vs. 60.6±23.5 pmol/L, P<0.002). There were no differences according to presence or absence of morphometric vertebral fractures.

Conclusion(s): Patients with T2DM showed higher serum sclerostin than age- and sex-matched healthy controls with sclerostin levels positively related to HbA1c values. Also, circulating sclerostin levels were lower in T2DM patients with osteoporosis.

P531

STUDY OF OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN IN CENTER OF FAMILY MEDICINE, PRISHTINA

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Objective(s): To assess the figures and prevalence of osteopenia and osteoporosis in women who presented in Rheumatology Cabinet with clinical signs of osteoporosis.

Material & Methods: Bone density measurements of radius and ulna, lumbar vertebrae 1-4 and hip, by Hologic DXA device, were done in 223 females of age 46-86 years, during the period of May 2010-April 2011. The criteria for investigation were the presence of clinical signs, post menopause and positive biochemistry data for osteoporosis. The data were analyzed based on DXA results (BMD), using retrospective epidemiological method. Patients were divided into 3 groups: with normal bone density (T-score≥-1.0), osteopenia (T-score from -1.0 till -2.5) and osteoporosis (T-score≤-2.5).

Results: Results showed that from 223 postmenopausal women included in the study, aged between 46-86 years (average 63.18 yr.), having the last menstruation between 25-57 years (average 48.4 yr.), who showed positive clinical signs and biochemistry data for osteoporosis, 65.48% had mineral bone density changes on their DXA measurements. The osteopenia (T-score from -1.0 till -2.5) was noted in 86 cases (38.57%), and osteoporosis (T-score from -2.5 till -9.0) in 60 cases (26.91%).

Table 1 Radio Ulnar DXA osteodensitometry

	Normal / No. of patients 77 (34.53%)	Osteopenia / No. of patients 86 (38.57%)	Osteoporosis / No. of patients 60 (26.91%)
Age (average)	46 to 73 (59.8) years	47 to 76 (63.1) years	53 to 86 (66.9) years
T-score	T-score	T-score	T-score
Mean	-0.20	-1.72	-3.38
Standard Deviation	0.64	0.42	0.98
Minimal Value	-1.0	-2.4	-9.0
Maximal Value	+2.1	-1.1	-2.5
BMD Min/ Max (average)	0.504-1.005 (0.563)	0.440-0.849 (0.484)	0.308-0.624 (0.405)

Conclusion(s): As only 65.48% of patients with clinical signs and positive biochemistry for osteoporosis showed mineral bone density changes consistent of osteopenia and osteoporosis on DXA bone density measurements, we can conclude that bone density measurement is an important diagnostic method which determinates the patients who require treatment. Early diagnosis and therefore treatment of postmenopausal women with osteoporosis minimizes fractures, invalidity and early death.

P532

DOES OSTEOPOROSIS RELATED VERTEBRAL FRACTURES PRECEDE HIP FRACTURES? A RETROSPECTIVE ANALYSIS

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Objective(s): Osteoporosis related fractures in men and women carry high morbidity and mortality. It was reported that vertebral fractures precede a second fracture. We conducted a retrospective analysis of patients with osteoporosis related hip fractures whether they suffered a spinal fracture.
Material & Methods: 154 patients with osteoporosis related hip fractures and no history of a previous fracture were analyzed for the presence of a vertebral fracture. Radiographs were retrieved from the IPAC imaging retrieval system and was reviewed independently by two authors AHG, and MSA and later reviewed jointly. The site of the fractures and type were classified as mild, moderate or severe as per the semi-quantitative technique. Patients with the diagnosis of malignancy or connective tissue disorder and those on steroids were excluded from the analysis.
Results: Out of 154 patients with hip fractures, 111 (72.1%) of patients and radiographs could be analyzed. The average age was 70.6±13.7 years. 76 (75.2%) had no fractures of the spine with the average age 67.28±12.2 and 47 were men and 29 women. 35 (24.8%) patients had 46 vertebral fractures with average age of 76.9±14.5. 21 were women and 14 were men. Patients with vertebral fractures were significantly older than those without fractures $p<0.001$.
Conclusion(s): This analysis finds that patients with osteoporosis related hip fractures, a previous spine fracture is not the rule. Women sustained more spinal fractures than men and age was the significant factor. A vertebral fracture does not increase the risk of a subsequent extremity fracture.

P533
TERIPARATIDE IN PATIENTS WITH OSTEOPOROSIS – OUR EXPERIENCE

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Objective(s): PTH and its analogue, teriparatide (recombinant human PTH 1-34), are the only bone anabolic therapies approved for the treatment of osteoporosis. Our aim was to investigate the effect of teriparatide in postmenopausal osteoporosis.
Material & Methods: 88 patients (pts) with postmenopausal osteoporosis treated at the Institute of Rheumatology were included in the research. They were selected in the period between April 2008 - April 2011. The treatment lasted for 18 months. In Serbia the costs of treatment with teriparatide are covered by health insurance for 18 months with postmenopausal women meeting one of the following criteria: 1. T-score≤-4 SD, aged ≥65 years; 2. T-score≤-3.5 SD, aged ≥65 years with ≥2 fragility fractures; 3. T-score≤-4 SD, aged 55-64 years with ≥2 fragility fractures; 4. Patients with fragility fracture, aged ≥55 years, who have failed with antiresorptive therapies, as indicated by declining BMD or new fragility fracture on therapy. BMD, visually analogous pain scales (VAS) and therapy side effects were observed at the beginning and end of treatment. All the patients were trained to apply the therapy independently using subcutaneous injections of teriparatide 20 μg/80mcl (Inject Pen) once a day.
Results: Out of 88 patients, 75% were in group of 61-80 year-olds. 16 pts were included according to the 1. criterion, 15 (2.criterion), 10 (3.criterion) and 29 (4.criterion). 13 pts met two of these criteria and for 5 pts criteria were unknown. Only 5 pts did not have fragile fractures, and others had mostly multiple fractures, localized mostly on the vertebra. 23 pts did not previously receive any antiosteoporotic therapy, other patients were receiving bisphosphonates. 50 pts finished 18 months of treatment with good effect: a significant increase in BMD (0.733-0.804 g/cm^2 on lumbar spine and 0.633-0.680 g/cm ^{2} on hip) and significant reduction of back pain (VAS 69.98-17.70 mm). 18 pts stopped the treatment. 20 patients are still being treated. Side effects were mild and transient.
Conclusion(s): Bone anabolic therapy with teriparatide, can greatly increase bone density, reduce pain in lumbar spine and improve general condition of patients with osteoporosis.

P534
IS THE *BSMI* POLYMORPHISM OF VITAMIN D RECEPTOR (VDR) GENE AN INDICATOR OF BONE MASS AND FRACTURES IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN IN WIELKOPOLSKA AND MAZOWSZE REGIONS?

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Objective(s): Bone mass and fragility is determined by genetic and environmental factors. Vitamin D receptor (VDR) gene is one of candidate genes in osteoporosis. The aim of the study was to assess the association of *BsmI* VDR gene polymorphism with BMD and prevalence of vertebral/nonvertebral fractures in postmenopausal women with osteoporosis.
Material & Methods: The study group consisted of 500 postmenopausal women with osteoporosis aged between

47-88 years (mean 66.8 years) from Wielkopolska and Mazowsze regions. Osteoporosis was diagnosed either by WHO densitometric criteria or history of low-energy fracture. History and clinical examination allowed to exclude patients with comorbidities being cause of secondary osteoporosis. DXA of lumbar spine (L1-L4) and hip was performed by means of Lunar. DNA was isolated from peripheral blood lymphocytes. *BsmI* VDR polymorphisms were performed by polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP) method.

Results: Patients were divided into two subgroups – with fracture history (n=285, incl. 168 vertebral, 117 nonvertebral) and no fracture history (215). In women with any previous fracture, hip BMD was shown to be significantly lower when compared to females without fracture (0.684 g/cm^2 vs. 0.717 g/cm^2) ($p<0,05$). In case of L1-L4 BMD the difference in fracture incidence was insignificant.

In vertebral fracture group, the distribution of *BsmI* polymorphism genotypes was: BB - 27, Bb - 80, bb - 60, whereas in women with no history of vertebral fracture - 55,145 and 133, respectively. In nonvertebral fracture group the distribution of *BsmI* was: BB - 13, Bb - 51, bb - 53, whereas in females with no nonvertebral fracture present: 69, 174, 140, respectively. There was no statistically significant difference between the *BsmI* VDR polymorphism distribution and history of any fracture. Univariate tests of significance for hip T-score showed significant differences in carriers of different *BsmI* polymorphisms ($p<0,05$), however, post hoc tests did not confirm statistical significance.

Conclusion(s): 1. Analysis of the association of *BsmI* VDR polymorphisms did not allow to identify them as predictors of fracture – any, vertebral or non-vertebral. 2. In studied population there was no significant association between *BsmI* VDR polymorphisms and hip/L1-L4 BMD.

P535
THE TENDON INDEX OF THE SHOULDER JOINT – INSTRUMENT OF EVALUATION OF SHOULDER PERIARTICULAR TISSUES IN PATIENTS WITH OSTEOARTHRITIS

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Objective(s): To determine the feasibility of using the tendon index of the shoulder joint to assess the destruction of periarticular tissues of the shoulder joint in patients with osteoarthritis.

Material & Methods: The study involved 20 patients with osteoarthritis complained of pain in the shoulder joint. To assess pain were used VAS in quiescent state, in motion, and palpation. Assessment of the shoulder joint was carried out on the ConstanT-score. To evaluate the objective status used the tendon index of the shoulder joint, which included assessment of pain on a scale (0-3) during movements, causing the tension of the rotator cuff tendons (rotator cuff) and the long head biceps (long head of the biceps tendon). Statistical data was carried out using Spearman's test.

Results: There was a marked correlation between the tendon index of the shoulder joint and VAS after palpation ($r=0.4$), between the tendon index of the shoulder joint and VAS after joint motion ($r=0.3$) as well as between the tendon index of the shoulder joint and the ConstanT-score ($r=-0.6$).

Conclusion(s): The tendon index of the shoulder joint can be used to assess the pathology of periarticular tissues of the shoulder joint in patients with osteoarthritis.

P536
MALE HYPOGONADISM IMPACT IN BONE QUALITY ASSESSED BY TRABECULAR BONE SCORE (TBS)

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Objective(s): Increased recognition of the morbidity and mortality attributable to osteoporosis of the nontraumatic fractures in men are main issues of the public health problem of osteoporosis. Ageing and the propensity to fall are the main risk factors for low bone mass in males, but hypogonadism in men is an important secondary cause of low BMD but very little is known about the microarchitecture of the bone. The TBS ("trabecular bone score", Medimaps, Bordeaux, France) is a quantitative index that characterizes the state of bone microarchitecture independently of the bone density as previously demonstrated. The objective of the study is to study the impact of the male hypogonadism on the bone quality as assessed by TBS.

Material & Methods: BMD at the lumbar spine, at the proximal femur, at the distal radius, the total body lean and fat masses were measured by DXA in 96 hygogonadal (hypogonadism group) and in 96 normal (control group) men. The TBS technique was applied to the lumbar spine scans. Fast blood was collected for LH, FSH, PRL, E_2 and

total testosterone measurements. The weight, height and BMI were also determined. Appropriate statistics were used with the significance level at P<0.05.

Results: The mean age, weight and total body fat mass were identical, but in the hypogonadism group the mean spine TBS (*P=0.0000*), BMC (*P=0.0000*) and BMD (*P=0.0013*) at the lumbar spine and total body lean mass (*P=0.0000*) were significantly lower, as compared with the control group.

Significant negative correlation was found between the TBS and the age in the control group. The correlation between BMD and site matched TBS is overall non-significant (r^2<5%) confirming that it is measuring different bone properties than BMD.

Conclusion(s): Data of this study show a significant reduction in both BMD and bone quality evaluated by TBS, thus suggesting an important negative impact in the bone strength of hypogonadal men, which may be associated to an increased osteoporotic fracture risk.

Disclosures: Medimaps (Medimaps, Bordeaux, France) and Radilan (Lisboa, Portugal) for the kind free access and use of the TBS iNsight software for this study

P537
CELIAC DISEASE AND METABOLIC OSTEOPATHY: A UNIVERSITY HOSPITAL EXPERIENCE

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Objective(s): To report on metabolic osteopathy in celiac disease (CD) patients in Saudi Arabia where vitamin D deficiency is common.

Material & Methods: A retrospective analysis of the registry on histopathology of celiac disease starting from 1996 as well as a survey of the serological testing done since its introduction in 2003, conducted in a major teaching hospital. The criteria of the diagnosis of CD patients were as follows:

a) Patients with duodenal biopsies reported by the histopathologist to be diagnostic of CD and complied with Marsh-Oberhuber system type III (a,b,c), or b) Positive IgA – Antiendomysial antibodies (EMA). Both positive tests had to be supported by strong clinical suspicion of the disease and the final diagnosis given by the treating physician was CD with no alternative diagnosis attached to them on follow-up. Biochemical parameters and imaging tests were recorded.

Results: The total numbers of patients were 114, 65 of whom were children (aged 15 years or younger). The male to female ratio was 1:1.9. A total of 88 patients (94%) were diagnosed by histopathology while 92 (85%) had positive serology. There were 82 patients who had both tests performed and 61 (74%) had both tests positive. The 25-dihydroxyvitamin D_3 [$25(OH)_2D_3$] was low in 100% of adults and in 70% of children who did the test, while all the groups who had a PTH value measured (11 patients) had high level (100%). DXA was performed only in 19 patients with osteopenia/osteoporosis reported in 79% of them. A bone scan was performed in only 14 patients and an abnormal finding compatible with metabolic bone disease reported in 64% of them.

Conclusion(s): Metabolic osteopathy and vitamin D deficiency are higher in Saudi CD patients than reported elsewhere. The physicians' awareness of importance of bone disease is seriously low.

P538
OUR EXPERIENCE WITH TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS WOMEN WITH ZOLEDRONATE

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Objective(s): Zoledronate is an intravenous bisphosphonate, widely used in the treatment of postmenopausal osteoporosis. It increases BMD and reduces fracture risk. Its use can be associated with postinfusion flu-like symptoms. Its advantage is the lack of important gastrointestinal side effects, common in peroral bisphosphonates.

Material & Methods: We retrospectively studied 12 women with postmenopausal osteoporosis, treated with zoledronate 5 mg, for their baseline BMD (in g/cm^2: average for L1-L4 vertebra and for femoral neck) before and BMD one year after Aclasta 5 mg intravenous infusion. Their average age was 68, SD 6. We noted the incidence of postinfusion flu-like symptoms and the reason for initiating intravenous therapy. We calculated averages and standard deviations and compared averages of two means with paired-Student t-test. Values of p<0.05 were considered statistically significant.

Results: Baseline BMD was 0.66 g/cm^2 for L1-L4 and 0.56 for femoral neck, 1 year after zoledronate BMD was 0.67 g/cm^2 for L1-L4 and 0.59 for femoral neck. T-test showed no significant change (neither increase nor decrease) for any of the sites (p>0.05). We prescribed zoledronate for the following reasons: side effects of peroral therapy in six patients (50%), noncompliance in four patients (33%) and lack of peroral therapy efficacy in two patients (16%). Four (33%) patients experienced flu-like symptoms following application.

Conclusion(s): Based on BMD preservation, we find the therapy with zoledronate is effective for the treatment of postmenopausal osteoporosis after 1 year and is occasionally associated with flu-like symptoms.

P539
DECREASED SERUM LEVELS OF CATHEPSIN-K AND BONE TURNOVER IN PATIENTS WITH TYPE-2 DIABETES MELLITUS: A CASE-CONTROL STUDY

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Objective(s): Limited information is available on the changes in bone turnover markers (BTMs) and cathepsin K in patients with diabetes mellitus (DM). The present study describes the relationships between serum cathepsin K, bone turnover markers (BTMs), PTH, and 25-hydroxyvitamin-D [25(OH)D] and BMD among patients with type 2 diabetes mellitus (T2DM).
Material & Methods: Case-control study including 630 patients with T2DM [postmenopausal women (n=350); men (n=275); age range 50-79 yrs] were studied and compared with age- and sex-matched controls (n=630). Each subject completed a questionnaire and provided fasting blood and second-void urine samples. Anthropometric parameters, socioeconomic status, together with the measurements of serum cathepsin K, BTMs [namely: serum osteocalcin (s-OC), bone-specific alkaline phosphatase (s-bone-ALP), type 1 collagen C-telopeptide (s-CTx), procollagen type 1 N-terminal propeptide (s-PINP) and urinary N-terminal crosslinked telopeptide of type-1 collagen (u-NTX)], serum PTH, serum 25 (OH)D, glycated hemoglobin (HbA_{1c}) and plasma glucose. BMD values (neck femur, lumbar spine and total hip) were measured by DXA.
Results: Serum cathepsin K levels were significantly lower in T2DM patients (4.22±2.16 pmol/L) as compared with corresponding controls (6.81±3.64 pmol/L) (P<0.001), respectively. Bone resorption markers levels (s-CTX, u-NTx) were lower in T2DM compared with controls (P<0.001) with no significant differences in bone formation markers (s-OC, s-PINP, and s-bone-ALP). Serum PTH levels were lower in T2DM (3.41±1.86 pmol/L) vs. controls (5.22±2.36 pmol/L) (P<0.001), respectively. Also serum 25(OH)D levels were significantly lower in T2DM (36.51±18.4 nmol/L) vs. controls (41.72±15.84 nmol/L) (P<0.05). Bone resorption markers showed negative correlations with BMD values at all sites studied (P<0.001).
Conclusion(s): Serum cathepsin K, bone resorption markers and PTH levels were markedly lower in T2DM patients as compared with age- and sex-matched healthy controls.

P540
SERIAL MEASUREMENTS OF BONE TURNOVER MARKERS IN POSTMENOPAUSAL WOMEN WITH DIFFERENT RATES OF BONE LOSS AND OSTEOPOROSIS RISK: THE CEOR STUDY

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Objective(s): Low BMD is an important risk factor for osteofragility with about half of the fractures occurring in women with BMD below the diagnostic threshold for osteoporosis (i.e., T-score≤-2.5 SD). Combining BMD with other risk factors can potentially improve identification of women with and/or at high risk of osteoporosis. The present study describes whether assessment of bone turnover markers (BTMs) at multiple time intervals can identify women at high risk for bone loss.
Material & Methods: We examined 707 postmenopausal women in a population-based study with a mean follow-up period of 5.2±1.3 years. Four BTMs [namely: serum osteocalcin (s-OC), bone-specific alkaline phosphatase (s-bone-ALP), type 1 collagen C-telopeptide (s-CTX), procollagen type 1 N-terminal propeptide (s-PINP) and urinary N-terminal cross-linked telopeptide of type-1 collagen (u-NTX)] were studied at baseline and at 1, 2, 3 and 5 years. The 5-year change in BMD values [total hip, neck femur, and lumbar spine (L_1-L_4)] were also determined.
Results: At baseline, BTMs correlated weakly to changes in BMD values at all sites studied. The associations were stronger when mean of baseline and 1-year values was used (regression coefficients -0.14 to -0.29, P<0.001). Addition of 3- and 5-year values further strengthened the correlation (regression coefficients -0.26 to -0.35, P<0.001). Women with high turnover lost greater BMD values than those with intermediate or low turnover (P<0.001).
Conclusion(s): Serial measurements of BTMs improve the identification of postmenopausal women with higher rate of bone loss and at greater risk of osteoporosis.

P541
LYCOPENE SUPPLEMENTATION IMPROVED BONE RESORPTION, BONE MINERAL DENSITY, OXIDATIVE STRESS MARKERS AND MARKERS OF ENDOTHELIAL FUNCTION IN POSTMENOPAUSAL WOMEN: THE CEOR STUDY

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Objective(s): We studied the effects of lycopene supplementation on biochemical bone turnover (BTMs), BMD, oxidative stress markers together with endothelial-cell function and oxidative-DNA damage in postmenopausal women in a randomized controlled intervention study.
Material & Methods: A total of 90 healthy women agreed to participate in the study and gave their informed consent. Inclusion criteria were: age of ≥50-65 years, postmenopausal state, independent mobility, and a femoral neck and/or lumbar spine (L_1-L_4) T-score values of ≥1.0. Women with cancer or chronic diseases or treatment for metabolic bone disorders or with diseases known to be associated with increased oxidative stress were excluded. Women were randomized into 3 equal groups to follow a daily lycopene (Lyc-O-mato) supplementation protocol: (1) 30 mg/day (n=30); (2) 45 mg/day (n=30); and (3) placebo capsules containing 0 mg/day lycopene (n=30). Following a 4-week washout period with no lycopene-containing foods being consumed, and at 2, 4 and 6 months of lycopene supplementation, fasting blood and second-void early morning urine samples were collected. Lycopene, total antioxidant status (TAS), total oxidant status (TOS), oxidative stress index (OSI), antioxidant enzymes, protein thiols, lipid peroxidation and BTMs (s-OC, s-PINP, s-bone ALP, s-CTX, u-NTX and s-TRACP-5b), endothelial function markers (s-VCAM-1, s-ICAM-1) and oxidative-DNA damage (indicated by alkaline comet assay) were determined at various time intervals. BMD values were measured by X-ray absorptiometry at baseline and 6 months following supplementation.
Results: Lycopene supplementation for 6 months significantly increased serum lycopene compared to placebo (P<0.001) and decreased bone resorption (P<0.001) with increases in bone formation markers (P<0.02). The comet assay showed significant decreases in comet tail lengths (P<0.05), comet tail DNA (P<0.001) and comet tail moment (P<0.01), in women with lycopene supplementation as compared with placebo controls. Lycopene supplementation significantly increased TAS (P<0.001) and decreased TOS (P<0.001); OSI (P<0.001); lipid peroxidation (P<0.001) and protein oxidation (P<0.001) variables and s-ICAM (P<0.002) and s-VCAM-1 (P<0.02) as compared with placebo control, respectively.
Conclusion(s): Our findings demonstrate positive effects of 6-months lycopene supplementation on decreasing bone resorption markers, oxidative stress variables and markers of endothelial function in postmenopausal women.

P542
WHAT SHOULD BE THE INTERVENTION THRESHOLDS OF TRABECULAR BONE SCORE (TBS) WHEN USED AS A MAJOR CLINICAL RISK FACTOR (CRF) OF OSTEOPOROTIC FRACTURES (OPs)? A META-LIKE ANALYSIS

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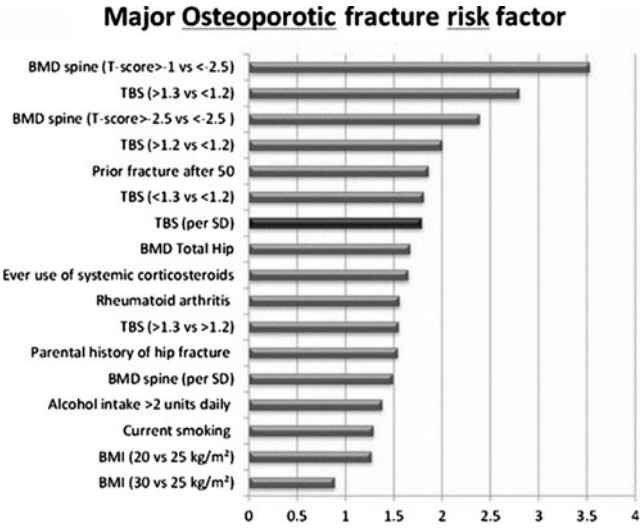
Objective(s): To have an added value over BMD, a CRF of osteoporotic fracture must be predictable of OPs, independent of BMD, reversible and quantifiable. There are many recognized major CRF related to general risk, basic disease or to drugs. Out of these factors, many of them are indirect descriptor of bone quality. TBS predicts fracture independently of BMD as demonstrated from previous studies. The aim of the study is to verify if TBS can be considered as a major CRF of OPs and to determine its intervention thresholds.
Material & Methods: Existing validated datasets of Caucasian women were re-analyzed in this meta-like analysis. These datasets were weighted differently according to their design. This study involves more than 33,000 women (>50 years) with 2200 osteoporotic fractures from three prospective studies (OFELY, MANITOBA, SEMOF) and 12 cross-sectional studies including the OsteoLaus and Osteo-Mobile studies. Weighted relative risk (RR) for TBS was expressed for each decrease of one standard deviation and compared with those obtained for the major CRF included in FRAX®. TBS intervention thresholds were evaluated using a tertile approach.
Results: TBS thresholds obtained were 1.195 and 1.301 for the lowest and the highest tertiles respectively. Overall TBS RR after adjustment for age was 1.81 [95%CI 1.35-2.47]. For all women combined, RR for fracture for the highest compared with the middle TBS tertile was 1.8 and for the highest compared with the lowest TBS tertile was 2.8. Besides, the TBS lowest tertile was reached at 75 years as the BMD WHO cutoff point of -2.5 T-score.



Conclusion(s): TBS is comparable to most of the major CRF (Fig 1) and thus could be used as one of them. Defined thresholds seem to be consistent amongst the different studies and could be a starting point for clinical use. Further studies using sensitivity and specificity are needed to confirm these first findings.

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VITAMIN D LEVELS IN SUBJECTS WITH OSTEOARTHRITIS

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Objective(s): 25-hydroxyvitamin D effects the mineralization of bone matrix, and decreased level of 25-hydroxyvitamin D may leads to insufficient mineralized bone (1). Insufficient mineralization may change the forces across the joint and it may result as joint degeneration (2). Also low level of 25-hydroxyvitamin D plays a role in the metabolism of chondrocytes that causing degeneration on bones (3).The purpose of this article is to assess the serum 25-hydroxyvitamin D levels in the patients with osteoarthritis and healthy controls.
Material & Methods: 45 patients with osteoarthritis and 25 healthy controls were consecutively included in the study. Serum 25-hydroxyvitamin D, Ca, P and ALP levels were analyzed in both groups.
Results: The demographic variables like age and sex were similar between osteoarthritis patients and controls ($p>0.05$). Serum 25-hydroxyvitamin D levels were in patients with OA was found to be significantly lower than controls ($p<0.001$) and ALP levels were significantly higher in patients with osteoarthritis according to control cases ($p<0.01$). Serum Ca and P levels were not statistically significant in patients with osteoarthritis than control subjects ($p>0.05$).
Conclusion(s): Our results suggest that serum 25-hydroxyvitamin D levels may be lower and ALP levels may be higher in patients with osteoarthritis according to control cases. Further long-term studies on the subject are needed to explore relation to between serum 25-hydroxyvitamin D levels and development and progression of osteoarthritis.
References: 1- Lane NE, Gore LR, Cummings SR, et al, Arthritis Rheum 1999;42:854. 2- Chaganti RK, Parimi N, Cawthon P, et al, Arthritis Rheum 2010;62:511. 3- Ding C, Cicuttini F, Parameswaran V, et al, Arthritis Rheum 2009;60:1381.

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SERUM 25-HYDROXYVITAMIN D LEVELS IN PATIENTS WITH LEUKEMIA

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Objective(s): This study was carried out to investigate the serum 25-hydroxyvitamin D levels of patients with leukemia.
Material & Methods: 25 patients (15 male, 10 female) with Leukemia and 29 matched healthy controls were enrolled in this study. In laboratory analysis, serum 25-hydroxyvitamin D levels were measured in both groups.
Results: There were no statistically significant differences between the two groups with respect to demographic data ($p>0.05$). In patients with leukemia, 25-hydroxyvitamin D values were lower significantly more than those of the healthy controls ($p<0.05$). Serum 25-hydroxyvitamin D levels of patients and controls were 13.6±6.98 and 18.4±8.76 ng/ml, respectively.
Conclusion(s): Our results showed that serum 25-hydroxyvitamin D levels may decrease in patients with leukemia according to control cases. Further studies need to define the relationship between vitamin D status and leukemia.

P545

PITFALLS IN THE VALIDATION OF FRACTURE RISK ASSESSMENT TOOLS

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Objective(s): FRAX is an extensively validated assessment tool for the prediction of fracture in men and women. A number of recent studies have addressed the validation and/or comparison of FRAX and other fracture risk assessment tools. The aim of this study was to review and critique the methods used in these evaluations of FRAX and other instruments.
Material & Methods: We reviewed studies undertaken in external cohorts that investigated the calibration of FRAX or assessed its performance characteristics.
Results: Most studies used inappropriate methodologies to compare the performance characteristics of FRAX with other models. These included discordant parameters of risk (comparing incidence with probabilities), comparison with internally derived predictors, lack of consideration of representativeness of the study cohort and inappropriate use and interpretation of receiver operating characteristic curves. There is a predictable and widening discordance between incidence and probability at older ages, as probability incorporates the competing risk of death. An internal model will almost invariably provide higher gradients of risk (or fracture discrimination) than models that are derived externally, since the internal model is constructed to best fit the data within the index cohort. The difference between the fracture and

mortality rates in the studied cohort and the rates used to build the country specific FRAX model should be studied to detect if the studied cohort is representative for the country. Even if deemed to be locally representative, hip fracture rates for example may vary more than 2-fold within a country.

Conclusion(s): Cohort studies that evaluate FRAX and other assessment tools are to be welcomed but should seek to avoid deficient analyses that markedly impair interpretation of these studies. Where impossible to avoid, the conclusions should be interpreted with caution and preferably re-evaluated.

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SCLEROSTIN AND DKK-1 LEVELS AND THE RISK OF OCCURENCE OF OSTEOPOROSIS-RELATED FRACTURES AMONG POSTMENOPAUSAL WOMEN: THE CEOR STUDY

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Objective(s): Both sclerostin and dickkopf-1 (DKK-1) regulate bone formation through the inhibition of the Wnt signaling pathway. We therefore hypothesized that postmenopausal women with increased circulating sclerostin and possibly DKK-1 levels have a greater risk for osteoporosis-related fractures (ORFs).

Material & Methods: We examined the association between circulating sclerostin and DKK-1 [both were measured by ELISA methods, (Biomedica, Austria)] levels and the risk of ORFs in 707 postmenopausal women, 50 years of age or older in a population-based study with a mean follow-up period of 5.2±1.3 years. Multivariate Cox proportional-hazards regression models were used for analysis of the risk of fracture with adjustment for age, body-mass index and other potential risk factors that may be associated with the risk of fractures or with higher circulating sclerostin and/or DKK-1 levels.

Results: High serum sclerostin levels were associated with an increased risk of ORFs.

Table 1: Increased levels of serum sclerostin and serum DKK-1 and the risk of ORFs in postmenopausal women.

	RR (95% CI) for 1 SD increase		RR (95% CI) for levels < highest quartile	
	Unadjusted	Adjusted	Unadjusted	Adjusted
Serum sclerostin (pmol/L)	3.10 (1.17-8.24)	7.74 (2.57-23.18)	6.01 (2.26-15.98)	14.96 (4.97-45.56)
Serum DKK-1 (pmol/L)	1.86 (0.87-3.79)	1.96 (1.09-4.12)	3.36 (1.61-7.05)	3.38 (1.49-7.89)

All relative risk values were adjusted for age, BMI, PA-score, dietary calcium intake, hand grip strength and BMD total hip. The quartiles for serum sclerostin (pmol/L) were: Q≤41.6; Q2=41.6-52.3; Q3=52.31-68.9 and Q4≥68.9, respectively. The quartiles for serum DKK-1 (pmol/L) were: Q1≤81.9; Q2=81.9-105.2; Q3=105.3-133.2 and Q4≥133.2, respectively. Following adjustment for age and other confounders, the relative risk (RR) of ORFs for each increment of 1 SD in sclerostin level was greater than 7-fold among postmenopausal women. Similar, but to a lesser extent, the RR values were obtained for high serum DKK-1 levels [RR=1.98 (95% CI: 1.09-4.20)].Further, women in the highest quartile of sclerostin or DKK-1 levels had an increase in the risk of ORFs so that the risks were 15-fold for sclerostin and 3.4-fold for DKK-1, respectively. The risks of ORFs that were attributable to sclerostin or DKK-1 levels (in the highest quartile) were estimated at 56.6% and 31.7%, respectively.

Conclusion(s): Higher sclerostin levels are associated with a greater risk of ORFs among postmenopausal women. Similar findings were obtained for DKK-1 levels and its association with the risk of ORFs, albeit to a lesser degree than sclerostin.

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EPIDEMIOLOGY OF OSTEOPOROSIS, FRACTURES AND VITAMIN D DEFICIENCY IN BULGARIAN WOMEN AGED 50 YEARS AND OLDER

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Objective(s): 1. To determine the prevalence of the major risk factors for osteoporosis and the densitometric prevalence of osteoporosis in a national representative sample of Bulgarian women aged 50 and older (Osteoporosis National Epidemiology Study). 2. To determine the prevalence of vitamin D deficiency and insufficiency in a large group of postmenopausal women (vitamin D Epidemiology Study).

Material & Methods: 1. The Bulgarian Osteoporosis Epidemiology Study was part of the National Program against Osteoporosis in Bulgaria 2005-2010. The National Statistical Institute selected a national representative epidemiological sample, a questionnaire was implemented searching for major risk factors for osteoporosis and allowing fracture risk calculation according to FRAX. Ten osteoporosis centers throughout the country participated. BMD was measured

at the proximal femoral neck by DXA. 2. The vitamin D Epidemiology Study included 1400 postmenopausal women throughout the country. The blood samples were taken during winter and serum 25-OH-vitamin D was measured by HPLC. The statistical analysis was performed on SPSS 13.0 for Windows.

Results: 1. 1331 women were included (mean age 63.8±8.3 yrs), divided into decades. 16.8% of them had osteoporosis and 46.5% had low femoral neck BMD. Their mean 10-year absolute fracture risk for major fractures was 13.4±9.2%, and for hip fractures 2.8±5.2% respectively. 2. The prevalence of vitamin D deficiency was around 30%, additional 1/3 of the postmenopausal women had some levels of insufficiency. A small percentage only had optimal vitamin D levels.

Conclusion(s): This study is the largest epidemiological osteoporosis trial in Bulgaria and allows assumptions about the prevalence of osteoporosis and vitamin D deficiency among women aged 50 and older in our country on which the secondary fracture prevention could be based.

Disclosures: N. Temelkova, S. Jeleva, Z. Velkova, N. Velkov, M. Velkova, S. Tsvetkova, R. Nestorova, B. Terziiski, I. Alexandrova, M. Gavrailova (co-workers in The Osteoporosis Study Group in Bulgaria)

P548
EFFECT OF STRONTIUM RANELATE ON A MURINE MODEL OF MULTIPLE MYELOMA

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Objective(s): The aim of the study was to evaluate the effects of strontium ranelate in a murine model of Multiple Myeloma. The study focused on the effect on tumor growth, animal survival, bone resorption and formation, cortical and trabecular bone loss.

Material & Methods: Two groups of 13 mice were injected intravenously with 1.5 106 5THL cells. The first group served as control; the second (SrRan) received strontium ranelate by oral gavage (1800 mg/kg/day) from 2 weeks (2w) before 5THL injection until a maximum period of 12w. Tumor growth was controlled by measurement of the paraprotein every 2w, from 6w until sacrifice; osteolysis was assessed on tibia and femur by X-ray and μCT. 3D-histomorphometric analysis was performed on trabecular bone. Cortical thickness was measured on 2D sections. Effect on bone resorption was assessed by a serum dosage of TRAcP and by histomorphometry; effect on bone formation was evaluated by a serum dosage of P1NP.

Results: No significant differences were observed in the paraprotein level between the two groups. In contrast, SrRan tended to delay the time of sacrifice compared to controls as illustrated by the trend curve. 3D-histomorphometric parameters showed a significant difference for Structure Model Index and Trabecular Bone Pattern factor, which were improved in the SrRan group. Cortical thickness from the methaphyseal region was significantly higher in the SrRan group (+7.4%, $P<0.05$). Significant decrease of PINP level was observed in SrRan group (-33%, $P<0.01$) whereas no significant decrease of TRAcP was observed. Osteoclast number from both femur and tibia cortices was significantly decreased in the SrRan group (resp. -21.8% and -28.2%, $P<0.01$).

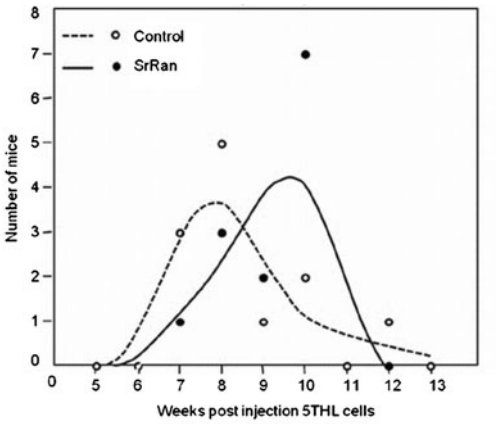

Figure. Trend curves of the time of sacrifice for control and SrRan group.

Conclusion(s): Strontium ranelate did not have an effect on tumor growth but would tend to improve survival time. Optimal effects of strontium ranelate were obtained on cortical bone by improving cortical thickness and reducing cortical resorption.

P549
SERUM 25-HYDROXYVITAMIN D LEVELS IN PATIENTS WITH LYMPHOMA

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Objective(s): This study investigated the serum 25-hydroxyvitamin D levels of patients with lymphoma.

Material & Methods: 25 patients with lymphoma and 30 matched healthy controls were enrolled in this study. Serum 25-hydroxyvitamin D were measured in both groups.

Results: There were no significant differences between the two groups regarding demographic data. The serum 25-hydroxyvitamin D levels of patients and controls were 12.67±7.37 and 16.54±8.32 ng/ml, respectively. In patients with lymphoma, 25-hydroxyvitamin D values were significantly lower than those of the healthy controls ($p<0.05$).

Conclusion(s): Our results suggest that serum 25-hydroxyvitamin D levels are decreased in patients with lymphoma.

P550

FRAX® WITHOUT BMD

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Objective(s): The use of FRAX in the absence of BMD continues to the subject of some debate and requires a review of the evidence for its clinical application.
Material & Methods: The prediction of fractures with the use of clinical risk factors alone in FRAX is comparable to the use of BMD alone and is suitable, therefore, in the many countries where DXA facilities are sparse. In countries where access to BMD is greater, substantial analyses demonstrate that FRAX can be used without BMD in the majority of cases with BMD tests reserved for those close to a probability based intervention threshold.
Results: The clinical risk factors used in FRAX have high validity as judged from an evidence based assessment and identify a risk that is responsive to pharmaceutical intervention. In addition, the selection of high risk individuals with FRAX, without knowledge of BMD, preferentially selects for low BMD. Indeed, recent studies suggest that the majority of women selected for intervention by BMD and/or fracture criteria would also be identified by FRAX clinical risk factors alone. Regardless, the effects of treatment, with the possible exception of alendronate, are largely independent of baseline BMD.
Conclusion(s): Thus, whereas the efficacy for agents to reduce fracture risk has not been tested prospectively in randomised controlled trials in patients selected on the basis of FRAX probabilities, there is compelling evidence that FRAX with or without the use of BMD

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VERTEBRAL KYPHOPLASTY: IS IT USEFUL?

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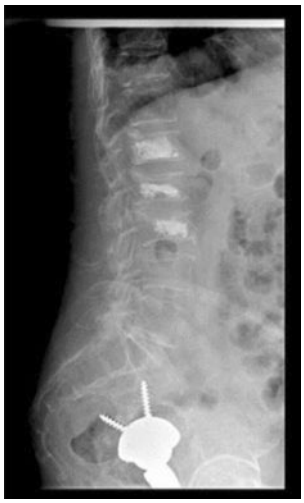
Objective(s): We describe the use of percutaneous cementing vertebral osteoporotic fractures as definitive treatment of pain and symptom relief, restoring the activity and patient autonomy.
Material & Methods: 77 year old female with a history of hypertension, atrial fibrillation, ischemic stroke and mitral regurgitation, was referred to Orthopedics for filing week history of low back pain without traumatic antecedent. Exploration: pain in dorsolumbar hinge and low back without radiation to lower limbs with preserved strength and sensitivity. In the radiology showed vertebral collapse in L1, L2 and L3, starting conservative treatment and analgesia rigid brace and completing study dorsolumbar MRI confirmed the existence of mild anterior wedging of the vertebrae D6 and D11, without edema and fracture acute collapse of the upper plates of the vertebrae L1, L2 and L3, osteoporotic appearance. Given the persistence of pain, surgical treatment is decided by cementation with kyphoplasty, also performing a biopsy.



Results: After surgery, the patient improved pain clinic. The biopsy performed with analytical studies was assessed by discarding hematology tumor process.
Conclusion(s): Osteoporotic vertebrae fail to compressive forces, usually in bending, causing fractures with involvement of the anterior wall without causing neurological disorders and symptoms is pain, which decreases the activity and patient autonomy. The goals of surgical treatment are to relieve pain and restore, where possible, height and sagittal balance. Kyphoplasty involves inserting an inflatable balloon within the vertebral body, be pressurized to create a cavity and fill it by a high viscosity acrylic cement. Its design has fewer complications than vertebroplasty in the acute phase, although as vertebroplasty in subacute or chronic phase, the correction of height is lower.

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AN ECONOMIC EVALUATION OF STRONTIUM RANELATE FOR THE TREATMENT OF MALE OSTEOPOROSIS

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Objective(s): Strontium ranelate demonstrated to be effective for the treatment of male osteoporosis in the MALEO Trial. In addition to the therapeutic value of a new drug, it becomes increasingly important to evaluate whether it represents good value for money. The present study aims therefore to estimate the cost-effectiveness of strontium ranelate in the treatment of osteoporotic men from a Belgian healthcare payer perspective.
Material & Methods: An updated version of a previously validated Markov microsimulation model was used to estimate the cost (€2010) per quality-adjusted life-year (QALY) gained of strontium ranelate compared with no treatment. Based on the bridging Maleo study which showed same lumbar and femoral neck BMD increase over 1 year in men as in women, same antifracture efficacy has been considered in men as in women in the base case analysis. The model was populated with cost and epidemiological data for Belgium and the population from the MALEO Trial (i.e., mean age of 73 years, femoral neck BMD T-score of -2.2 and 28.1% had prevalent vertebral fracture at baseline). Parameter uncertainty was investigated using one-way and probabilistic sensitivity analyses. In particular, additional analyses were performed in populations (over 60 years) with femoral neck BMD T-score≤−2.5 or prevalent vertebral fracture.
Results: Strontium ranelate compared with no treatment was estimated in the base case at €22,717/QALY gained. This value decreased to €15,465 and to €8,050 when assuming a BMD T-score equal to -2.5 or that all men had prevalent vertebral fractures at baseline, respectively. Results were robust over a wide range of sensitivity analyses. Results fall below €33,000 per QALY gained for men with a BMD T-score≤-2.5 or with prevalent vertebral fracture, over the entire age range examined (60-80 years). In probabilistic sensitivity analyses strontium ranelate remains below the willingness to pay threshold of €45,000/QALY in 89% of cases
Conclusion(s): The results of this study demonstrated that strontium ranelate is a cost-effective strategy compared with no treatment for the treatment of osteoporotic men in Belgian setting, including in patients over 60 years with a BMD T-score≤-2.5 or with prevalent vertebral fracture.

P553
COMPARING OUTPUTS OF THE FRAX AND GARVAN FRACTURE RISK ASSESSMENT TOOLS

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Objective(s): Simple approaches to comparisons of fracture risk assessment tools frequently overlook differences in output metrics. For example, both FRAX® and the Garvan Fracture Risk Calculator use clinical risk factors (CRF) and BMD to assess fracture risk. In contrast to the Garvan tool, the output of FRAX is fracture probability, derived by integrating risk factors on both fracture risk and competing death risk. The aim of the present study was to illustrate the impact in output of the two fracture risk assessment tools.
Material & Methods: The impact of age on hip fracture outputs was assessed with both the Garvan tool and FRAX. The T-scores were set differently in the two models so that the output estimates were approximately equal at the age of 60 years. For FRAX the probability of hip fracture was assessed for a woman with a T-score of -4.0 SD, a BMI of 23.9 kg/m^2 and no other CRF. For the Garvan tool the hip fracture risk was assessed for a woman with a T-score of -3.3 SD and no other CRF. Data were computed from the respective web sites.
Results: Whereas the output between FRAX and Garvan tool were similar for the lower ages, differences became apparent with advancing age. With the Garvan tool, hip fracture risk increased exponentially with age. By contrast, the probabilities calculated with FRAX reached a plateau and thereafter decreased from18% at the age of 80 years to 12% at the age of 90 years, due to the competing risk of death. No such effect was seen in the Garvan tool, where the corresponding figures were 17.8% and 27.3%.

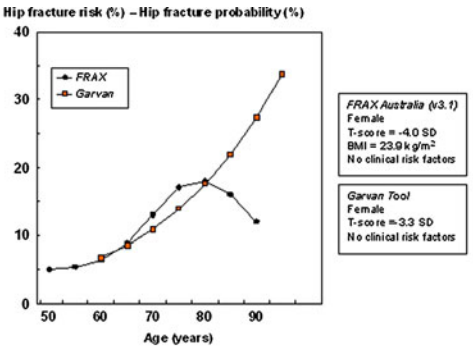

Figure The risk of hip fracture with age in a model that considers 10-year fracture risk alone (the Garvan tool) and FRAX which computes the probability of hip fracture from the fracture and death hazards (FRAX). The T-scores are set differently in the two models so that the risks are approximately equal at the age of 60 years. Data are computed from the respective web sites.

Conclusion(s): The present study shows that the calculation of fracture probability which incorporates the death hazard is not synonymous with the calculation of fracture risk. Direct comparison of the tools is erroneous, particularly in aged individuals.

P554
HIGH SERUM ADIPONECTIN PREDICTS INCIDENT FRACTURES IN ELDERLY MEN: MR OS SWEDEN

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Objective(s): Adiponectin, a protein exclusively secreted from adipose tissue, may exert influences on bone health as adipocytes and osteoblasts share a common progenitor. The aim of the present study was to determine if serum adiponectin was associated with fracture risk in elderly men
Material & Methods: We studied the relationship between serum adiponectin and the risk of fracture in 999 elderly men recruited to the MrOS study from the general population in Gothenburg, Sweden. Baseline data included general health questionnaires, lifestyle questionnaires, BMI, total hip BMD, serum adiponectin, osteocalcin and leptin. Incident fractures were captured during an average of 5.2 years follow up (maximum 7.4 years). Poisson regression was used to investigate the relationship between serum adiponectin, other risk variables and the time-to-event hazard function of fracture.
Results: Median levels of serum adiponectin at baseline were 10.4 μg/ml (interquartile range 7.7-14.3). During follow up, 150 men sustained one or more fractures. The risk of fracture increased in parallel with increasing serum adiponectin (hazard ratio per SD, 1.46 (95% CI: 1.23-1.72) and persisted after multivariate-adjusted analysis (HR/ SD, 1.30 (95% CI: 1.09-1.55).
Conclusion(s): Higher serum adiponectin levels are associated with a significant excess risk of fracture in elderly men which was independent of several other risk factors for fracture. The mechanism(s) remains to be clarified but its measurement may hold promise as a risk factor for fracture in men.

P555
THE EFFECT OF INTRAVENOUS ZOLEDRONIC ACID ON BONE MINERAL DENSITY IN AN ELDERLY POPULATION

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Objective(s): To investigate the effect of intravenous zoledronic acid, on BMD at the hip and spine in 12-18 months, in older adults attending a geriatric day hospital.
Material & Methods: A retrospective analysis of a cohort of 192 patients with known osteoporosis (T-score less than -2.5) attending a geriatric day hospital setting was done. Subjects who were treated with IV zoledronic acid (dose range 1-5 mg) and had normal renal function were included in the study. All subjects also had DXA scans performed between 12-18 months to assess for change in BMD at the hip and spine. 43 subjects met the given criteria. Drug side effects were recorded. The mean difference in the BMD pre and post infusion was analyzed using a paired t-test.
Results: The mean age of the patients in the study was 75.2±9.3 years (SEM 1.42) with 93% being female. The mean BMD at baseline was 0.82 g/cm^2 (SEM 0.026) at the spine and 0.71 g/cm^2 (SEM 0.017) at the hip. The median dose of zoledronic acid administered was 4 mg. The median time to follow up DXA to review response was 13 months. A significant improvement was seen in BMD at the hip (mean difference +0.012 g/cm^2, p=0.019, SEM 0.005) and at the spine (mean difference +0.045 g/cm^2 P=0.000, SEM 0.007) post infusion. Only 5% of the subjects reported minor side effects such as body aches and flu like symptoms.
Conclusion(s): The study shows that intravenous zoledronic acid is effective at improving BMD in osteoporotic subjects in a period between 12-18 months. The response in the spine was found to be greater than in the hip, a finding that is consistent with other studies. In addition, treatment was very well tolerated by the subjects. This strongly supports the use of IV zoledronic acid in osteoporotic older adults.

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INCIDENT VERTEBRAL FRACTURES DETERIORATE HEALTH-RELATED QUALITY OF LIFE DURING 10 YEARS OF FOLLOW-UP OF JAPANESE FEMALE POPULATION: THE JAPANESE POPULATION-BASED OSTEOPOROSIS (JPOS) COHORT STUDY

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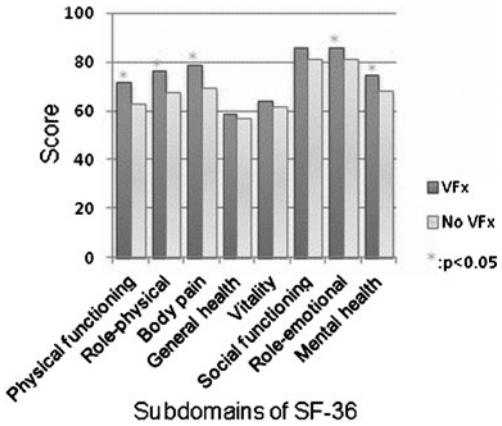
Objective(s): To assess whether low BMD and vertebral deformity (VDf) at baseline and incident vertebral fractures

(VFx) during 10-year follow-up affect health-related quality of life (QOL) at the end of follow-up.

Material & Methods: Among 900 women aged 50-79 years selected randomly from 3 municipalities in Japan, 852 completed the baseline study and were invited for follow-up surveys conducted 3 times in 10 years including VFx assessment on digital images from spine absorptiometry and spine BMD measurement. Prevalent vertebral deformity (VDf) was determined according to McCloskey-Kanis criteria. Incident VFx was identified when one of the three vertebral heights decreased by 20% or more compared to the baseline heights and the vertebra satisfied McCloskey-Kanis or Genant's grade 2 or 3 fracture criteria. Health-related QOL was assessed by SF-36 questionnaire at the end of follow-up.

Results: 493 women complete the 10-year follow-up and had no missing data. Their mean age, BMI, and spine BMD were 62.0±7.5 years, 24.2±3.4 kg/m^2 and 0.825±0.146 g/cm^2, respectively. We identified 51 VDf in 38 women at baseline and 119 VFx in 75 women during the follow-up where overall incidence rate of VFx was 15.2/1000 person-years. The multiple linear regression analyses indicated that prevalent VDf and BMD at baseline did not affect any score of SF36 subdomains but incident VFx significantly deteriorate the scores of physical functioning, role-physical. body pain, role-emotional and mental health domains. Comparisons of mean scores of subdomains between participants with and without incident VFx were illustrated in Figure 1.



Conclusion(s): Incident VFx deteriorated several domains of SF36 independently of age and prevalent VDf at baseline in Japanese women.

P557
A SYSTEMATIC REVIEW OF HIP FRACTURE INCIDENCE AND PROBABILITY OF FRACTURE WORLDWIDE

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Objective(s): The present study aimed to update the information base available on the heterogeneity in the risk of hip fracture on a worldwide basis. An additional aim was to document variations in fracture probability as determined from the available FRAX models.

Material & Methods: Studies on hip fracture risk were identified from 1950 to November 2011 by a Medline OVID search. Evaluable studies in each country were reviewed for quality and representativeness and a study (studies) chosen to represent that country. Age-specific incidence rates were age-standardised to the world population in 2010 in men, women and both sexes combined. The 10-year probability of a major osteoporotic fracture for a specific clinical scenario was computed in those countries for which a FRAX model was available.

Results: Following quality evaluation, age standardised rates of hip fracture were available for 63 countries and 45 FRAX models available in 40 countries to determine fracture probability. Countries categorised by hip fracture risk are shown in the figure. Worldwide, there were marked variations in hip fracture rates and in the 10 year probability of osteoporotic fractures, with a greater than 10-fold variation between countries. The variation is sufficiently large that these cannot be explained by the often multiple sources of error in the ascertainment of cases or the catchment population.

Fig. Estimated age and sex standardised hip fracture rates for men and women combined in different countries of the world categorised by risk. Red (annual incidence > 250/100,000) orange (150-250/100,000), green (<150/100,000) or grey (data not available).

Conclusion(s): Understanding the reasons for this heterogeneity may lead to global strategies for the prevention of fractures.

P558
MUSCLE FUNCTION AND STRENGTH IN RELATION TO VITAMIN D STATUS AMONG HEALTHY SAUDI WOMEN AGED ≥60 YEARS

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Objective(s): Vitamin D deficiency is common among Saudi elderly, and leads to secondary hyperparathyroidism, bone loss, muscle weakness with high risk of/or with osteoporotic fractures. The present study describes the relationship between vitamin-D status, muscle function and strength among postmenopausal women aged ≥60 years.
Material & Methods: A total of 530 women were included in the study. Anthropometric parameters, socioeconomic status, together with the completion of a questionnaire on lifestyle habits and other variables were collected. Overnight fasting blood and second-void urine samples were collected for the determinations of serum, 25 hydroxyvitamin D 25 (OH)D, intact PTH (iPTH), bone turnover markers (BTMs) [namely: serum osteocalcin (s-OC), bone-specific alkaline phosphatase (s-bone-ALP), cross-linked C-terminal telopeptide of type 1 collagen (s-CTX), procollagen type 1 N-terminal propeptide (s-PINP), and urinary N-terminal cross-linked telopeptide of type-1 collagen (u-NTX)] and minerals (serum calcium, phosphate and magnesium). Muscle function was assessed by means of walking-speed test, standing balance, and sit-to-stand tests. Lower extremity muscle strength was determined using a manual dynamometer.
Results: Serum 25(OH)D levels ≥50 nmol/L were found to be associated with improved lower extremity muscle function and strength. Only 18.0% of women had 25(OH)D levels ≥50 nmol/L. Women with 25(OH)D levels ≥50 nmol/L showed higher muscle function tests ($P<0.001$), stronger knee extensor ($P<0.001$) and hip abductor ($P<0.001$) muscles. Negative correlation was observed between iPTH and muscle function ($r=-0.512$; $P<0.001$).
Conclusion(s): Serum 25(OH)D levels ≥50 nmol/L are needed for an acceptable muscle function and strength. Assessment of vitamin D nutritional status in women aged ≥60 years is suggested to ensure correcting hypovitaminosis D and improve muscle function and strength tests among Saudi postmenopausal women.

P559
EVIDENCE BASED EVALUATION OF CLINICAL RISK FACTORS USED IN THE ASSESSMENT OF FRACTURE RISK

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Objective(s): There are well established methods for evaluating the quality of evidence of the effectiveness of interventions. The evaluation of risk factors for case-finding can be judged on similar principles.
Material & Methods: Ease of use of risk factors is of importance, particularly in the setting of primary care. For a globally applicable tool, they should also be valid in an international setting and their predictive value stable over time. Ideally, the predictive value of such tests should be subject to meta-analyses to demonstrate a high degree of consistency in populations similar to those in whom the test would be applied (level I). The inclusion of an internal control is appropriate for the highest level of evidence. Showing a dose-dependent effect may also be helpful in assigning high validity. Lower levels of evidence (level II and III) are provided by studies with any of the following deficits: a narrow population or a sample frame that does not capture the population in whom the test would be applied, the lack of a reference standard, case-control studies or the use of a poor internal control. The lowest level of evidence is provided by expert committees or clinical experience (level IV).
Results: A further consideration is the reversibility of risk, i.e., is there evidence that the risk identified by a risk factor is amenable to therapeutic intervention. This can also be graded. At the highest level of evidence it would be necessary to recruit patients selected on the basis of the risk factor to a randomised controlled trial (Level A). In the absence of such data, an alternative approach is to demonstrate that the presence (or absence) of a risk factor does not adversely influence therapeutic efficacy against fracture (Level B).

Figure. FRAX risk factors and their applicability to case finding

Risk factor	Ease of use	Predictive value	Reversibility of risk
BMD	2	I	A
BMI	1	I	B
Age	1	I	A
Sex	1	I	A
Prior fracture	1	I	A
Parental history	1	I	B
Current smoking	1	I	B
Glucocorticoid use	1	I	A
Rheumatoid arthritis	1	I	B
Secondary osteoporosis	1	I	B
Alcohol use	1	I	B

Conclusion(s): The clinical risk factors used in WHO FRAX® algorithms are based on the highest level of evidence.

P560
EFFECT OF PTH 1-84 ON THE REMODELING, MICROSTRUCTURE AND BONE MASS IN MALE ORCHIDECTOMIZED RATS

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Objective(s): Androgenic depletion affects bone metabolism, causing osteopenia. There is limited evidence on the effect of PTH 1-84 in male osteoporosis. The aim of this work was to study the effect of PTH 1-84 in an experimental model of orchidectomized male rats, measuring the changes in BMD, remodeling markers and bone microstructure.
Material & Methods: Four groups of 10 six-month-old male Wistar rats. SHAM: n=10, simulated intervention; OQX: n=10, orchidectomized; OVX+PTH1: n=10, orchidectomized and treated with PTH 10 μg/kg; OVX+PTH2: n=10 orchidectomized and treated with PTH 50 μg/kg. The treatment was started 3 months after orchidectomy, and was maintained for 3 months. After sacrifice, BGP, FATR 5b and β-CTX bone remodeling markers, BMD of the lumbar spine and femur, and a femoral microstructure analysis by μCT scan were measured.
Results: A statistically significant reduction in vertebral and femoral BMD was evidenced in the OQX group vs. the SHAM group, which partially reverted with the low dose of PTH, and completely reverted with the high dose. A significant increase of the CTX/FATR ratio was seen in the OQX group vs. the SHAM group, which was maintained in the treated groups. The level of BGP did not show any changes in the OQX group, although a significant dose/response increase was seen in the treated groups. A relative reduction of BV/TV was seen in the OQX group, a decrease in the number of trabeculae and an increase in their separation. PTH treatment (both doses) restored baseline values of BV/TV, partially reducing separation and increasing trabecular number with the low dose, completely restoring both parameters with the high dose. Trabecular pattern factor increased in OQX, it was restored with the low PTH dose, and it became lower than in the SHAM group with the high dose. The structure model index (SMI) experienced a significant reduction in the high-dose group, compared to the OQX rats.
Conclusion(s): In an animal model of osteoporosis, treatment with PTH 1-84 has shown to have a bone-forming effect, reflected by an increase in bone formation markers, and increased lumbar and femoral BMD and a partial or total recovery of microstructural parameters.

P561
EFFECT OF VITAMIN D ON BONE MINERAL DENSITY VALUES

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Objective(s): This study was carried out to investigate the effect of serum vitamin D levels on BMD.
Material & Methods: Two hundred people were included in the study. These people divided into 2 groups according to the levels of vitamin D. The volunteers with the lower of the vitamin D hormone (20 ↓ ng/dl) were included in the first group. The others (20 ↑ ng/dl) were included in the second group. BMD (L1-L4 and femoral neck), serum vitamin D, Ca and P levels were measured in the both groups.
Results: Vitamin D, Ca, P levels were not significantly different in the between the two groups. BMD values was similar in the between two groups ($p>0.05$)
Conclusion(s): The lower limit or upper limit of normal values of vitamin D hormone may not affect the BMD values.

P562
THE RELATIONSHIP BETWEEN OSTEOPROTEGERIN, RANKL AND BONE TURNOVER MARKERS AMONG POSTMENOPAUSAL WOMEN WITH AND WITHOUT OSTEOPOROSIS: A CROSS-SECTIONAL STUDY

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Objective(s): Both OPG and RANKL play an important role in the regulation of bone turnover, but the contribution of these two cytokines to the pathogenesis of osteoporosis remains controversial. The present study assess the relationship between the plasma levels of OPG, RANKL, bone turnover markers (BTMs) and BMD among postmenopausal women with and without osteoporosis.
Material & Methods: A total of 340 postmenopausal women diagnosed with osteoporosis and compared with age-

matched healthy controls (n=340) with normal BMD. Each women completed a questionnaire and provided fasting blood and second-void urine samples. Plasma OPG and RANKL were measured by using two-site sandwich ELISA – (Biomedical Gruppe Kits, Austria). Other analyses including PTH, FSH, LH, E_2, 25(OH)D, bone turnover markers [serum osteocalcin (s-OC), serum procollagen type 1 N-terminal propeptide (s-PINP), urinary N-terminal cross-linked telopeptide of type 1 collagen (u-NTX) and cross-linked C-terminal telopeptide of type-1 collagen (s-CTX)] and IL-6 were measured by commercially available kits and reagents on autoanalyzers.
Results: Plasma OPG was significantly higher in women with osteoporosis (19.26±8.44 pmol/L) than in age-matched controls (11.15±4.66 pmol/L) (P<0.0001). Similarly, plasma RANKL levels were significantly higher in women with osteoporosis (0.71±0.48 pmol/L) than in age-matched controls (0.34±0.29 pmol/L) (P<0.0001), respectively. The OPG/RANKL ratio was higher in women with osteoporosis vs. age-matched controls (P<0.001). Women with osteoporosis showed higher levels of BTMs, IL-6 and PTH but lower serum 25(OH)D and E_2 than corresponding controls. Multiple regression analysis showed that BMD values for lumbar spine (L_1-L_4) and neck femur were predicted by OPG (by 17.6%) and RANKL (by 12.3%), respectively.
Conclusion(s): Both circulating OPG and RANKL levels inversely related to BMD among postmenopausal women through increased bone resorption.

P563

THE EFFECT OF THYROID STIMULATING HORMONE ON BONE MINERAL DENSITY

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Objective(s): This study was conducted to investigate the effect of thyroid stimulating hormone (TSH) levels on BMD.
Material & Methods: 240 volunteers were included in this study with TSH hormone levels within the normal range. The volunteers did not have thyroid disease. These volunteers were divided into 2 groups. The volunteers with the lower limit of the THS hormone (2 ↓ ng/dl) were included in the first group. The others (2 ↑ ng/dl) were included in the second group. BMD of L1-L4 and femoral neck were measured in the both groups.
Results: BMD values were not significantly different in the between the two groups (p>0.05)
Conclusion(s): The lower limit or upper limit of normal values of TSH hormone may not affect the BMD values.

P564

HIGH BODY MASS INDEX, ADJUSTED FOR BMD, IS A RISK FACTOR FOR FRACTURE IN WOMEN

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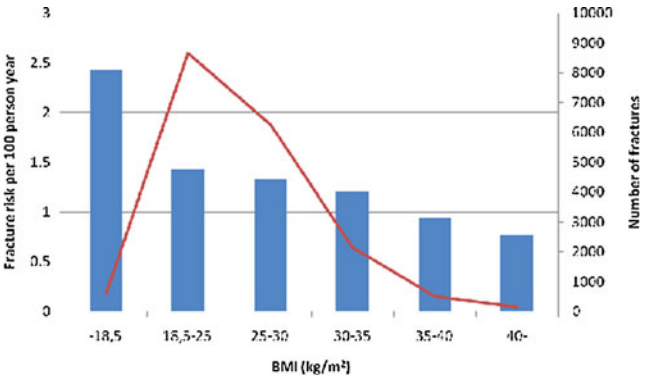
Objective(s): Several studies have suggested that obesity may be a risk factor for fracture. The aim of this study was to investigate the risk of fracture and number of fractures that arise in overweight and obese women.

Material & Methods: We studied 27 prospective population-based cohorts from more than 25 countries. At baseline BMI was calculated as kg/m^2. BMD was measured at the femoral neck by DXA. Fractures during follow up were collected by self-report and, in some cohorts, confirmed by radiography. An extension of Poisson regression was used to examine the relationship between BMI and fracture risk adjusted for age, BMD and time since baseline.

Results: Baseline data on BMI were available in 296 736 women aged 20-105 years (average 62.7). Femoral neck BMD was measured in 74 394 women aged 67.0 years. The prevalence of obesity (BMI≥30 kg/m^2) was 18%. During overall follow-up of 1.4 million person-years, 18,336 osteoporotic fractures (4,509 hip fractures) occurred. A majority of fractures (85%) arose in non-obese women. The risk of osteoporotic and hip fracture decreased progressively with increasing BMI. Compared to a BMI of 26 kg/m^2, the hazard ratios (HR, 95%CI) for osteoporotic fracture at a BMI of 35 or 40 kg/m^2 were 0.89 (0.84-0.93) and 0.83 (0.77-0.90), respectively. When adjusted for BMD, the corresponding HRs were 1.14 (1.06-1.23) and 1.23 (1.10-1.39), respectively. The HR for hip fracture was also reduced at higher BMIs (0.75 [0.67-0.85] and 0.64 [0.53-0.78] at 35 and 40 vs. 26 kg/m^2). When adjusted for BMD, the corresponding HRs were 1.09 (0.91-1.30) and 1.14 (0.86-1.50), respectively.



Conclusion(s): Our results demonstrate that at a population level, obesity is protective for fracture in women and this protection is mediated by effects on BMD. However, at a given BMD, obesity appears to be a weak risk factor for fracture.

P565
EFFECT OF PARATHYROID HORMONE ON BONE MINERAL DENSITY VALUES

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Objective(s): This study made to examine the effect of PTH on BMD values.

Material & Methods: 101 volunteers were enrolled in this study. These volunteers were divided into 2 groups. The volunteers with the lower limit of the PTH (20 ↓ ng/dl) were included in the first group. The others (20 ↑ ng/dl) were included in the second group. BMD of L1-L4 and femoral neck, and serum Ca, P levels were measured in the both groups.

Results: BMD values of L1-L4 and femoral neck were not significantly different in the between the two groups ($p>0.05$). Also, serum Ca and P levels were similar in the between two groups ($p>0.05$).

Conclusion(s): The lower limit or upper limit of normal values of PTH may not affect the BMD values.

P566
COST-EFFECTIVENESS OF BAZEDOXIFENE COMPARED WITH RALOXIFENE IN THE TREATMENT OF POSTMENOPAUSAL OSTEOPOROTIC WOMEN

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Objective(s): This study aims to evaluate the cost-effectiveness of bazedoxifene compared with raloxifene in the treatment of postmenopausal osteoporotic women.

Material & Methods: The cost-effectiveness of treatment for 3-years with bazedoxifene was compared with raloxifene using an updated version of a previously validated Markov microsimulation model (1). The model was populated from a Belgium healthcare payer perspective and analyses were conducted in populations (over 60 years) where osteoporosis medications are currently reimbursed in many European countries, i.e., BMD T-score is ≤-2.5 or presence of prevalent vertebral fracture. The effects of bazedoxifene and raloxifene on fracture risk were derived, in the base-case analysis, from the post hoc analysis (including women at high risk of fractures) of the 3-year results of a randomized, double-blind, placebo- and active-controlled study, including postmenopausal women with osteoporosis (2).

Results: Bazedoxifene was dominant (lower cost for higher effectiveness) in most of the simulations when compared with raloxifene. The cost-effectiveness acceptability curves

demonstrate that, regardless of the threshold value, the probability that bazedoxifene was cost-effective compared with raloxifene was around 90%. Sensitivity analyses confirm the robustness of the results, which were largely independent of starting age of treatment, fracture risk, costs and disutility. Moreover, even when the cost of raloxifene was reduced by 50%, bazedoxifene remains cost-effective, at a threshold of €35,000 per QALY gained, in 85% of the simulations. Results were however sensitive to the effect of treatments on fracture risk. When using the treatment effects from the whole population of the randomized controlled population, both treatments are equally cost-effective.

Conclusion(s): Under the assumption of improved anti-fracture efficacy of bazedoxifene over raloxifene in women with high risk of fractures, this study suggests that bazedoxifene can be considered cost-effective or even dominant when compared with raloxifene in the treatment of postmenopausal osteoporotic women.

References: (1) Value Health 2009:12:687. (2) J Bone Miner Res 2008;23:1923.

P567

BONE METABOLISM IN GHD IN THE AGE OF TRANSITION: EFFECT OF RHGH TREATMENT

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Objective(s): It is largely recognised that GH has benefits on cardiovascular function, quality of life and completion of linear growth, after achievement of final height in adolescent GH-deficient. GH/IGF1 axis has been demonstrated to be mostly involved in reaching peak bone mass, the most important predictor of osteoporotic fractures, in the late adolescence, during the transition from paediatric to adult age. That period is considered an important time to define by appropriate testing the persistence of GH deficiency (GHD) in patients with childhood-onset GHD (COGHD) and to establish the need to continue GH therapy with rhGH (recombinant human Growth Hormone). Our study analyse consequences of GH replacement on bone mineralization in patients with COGHD, reassessed at retesting in the age of transition.

Material & Methods: A total of 23 adolescents (16 boys; 7 girl; mean age18.87±0.3 yrs) affected by COGHD and treated with rhGH in the childhood were restudied and divided into two groups, according to the result of arginine test: 12 patients confirmed GHD (group1) (peak<10 ng/ml), while 11 patients resulted healthy (group2) (peak>10 ng/ml). In both groups BMD of the lumbar spine and femoral neck were established by DXA and bone markers (osteocalcin, bone specific alkaline phosphates, β-crosslaps) were measured at baseline and, in group1, after 1, 6 and 12 months of treatment with rhGH (25 μg/kg/die).

Results: At baseline, DXA showed that 44.4% of group 1 were affected by osteopenia while none of group 2 presented bone loss. β-crosslaps were lower in group 2 than in group 1 and difference between the two groups was statistically significant ($p<0.05$). GH replacement increased significantly BMD of the lumbar spine and femoral neck and osteocalcin and bone specific alkaline phosphates in group 1.

Conclusion(s): Although number of patients was small, results indicate GHD which continue rhGH treatment reach a significant increase of BMD after one more year of therapy. As GH replacement can produce benefits on bone density even if linear growth had just been completed, rhGH should be continued up to the achievement of peak bone mass in patients with GHD.

P568

FALL-RISK ESTIMATION TESTS IN PATIENTS WITH SENILE OSTEOPOROSIS

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Objective(s): Using tests for muscle strength and balance estimation we estimated risk for falls at patients with senile osteoporosis and previous fracture.

Material & Methods: Prospective investigation has been performed at the Institute Niska Banja from July 2010 – Dec 2011. In this investigation patients with fracture and senile osteoporosis (confirmed by osteodensitometry apparatus DXA -Hologic) have been involved. Total number of patients is 73. According to sex distribution : 65 female and 8 male. Average age 69.5 years of age. Localisation of previous fractures: lower leg fractures – 25 patients, thigh bone fractures – 32 patients, elbow fractures 6 patients, vertebral fractures 20 patients. For investigation fall-risk estimation tests have been used: Tandem-Standing test for balance estimation, Timed-up & go test – walk and muscle function estimation, usual walk speed test, Chair-rising test muscle strength test.

Results: Tandem-Standing tests for balance estimation – all patients were in a tandem position less than 10 sec-pathological results (100%). 26 (35%) patients were able to make light 8 and more tandem steps – regular result. 47 (65%) were not able – pathological result. Timed-Up & Go test – Pace estimation and muscle function: 12 (16%) patients have performed the test in more than 12 s. Pathological result usual walk speed test: 34 (46%) patient had walk speed faster than 1 m/s -pathological

result. Chair Rising test – muscle strength test: 2 (2%) patient performed the test in less than 10 s -regular result. 71 (98%) patients performed the in test longer than 10 s -pathological result.

Conclusion(s): Because of the strong connection between falls & fractures in monitoring patients with senile osteoporosis it is very important to include estimation of risk factors for falls and prevention falls program. Strength improvement of muscles by moving & exercises program, so bones receive stimulus to form again and muscle synchronisation repair and better keeping of balance in order to reduce fall & fractures risks.

P569

IDENTIFICATION AND FUNCTIONAL CHARACTERIZATION OF THE MECOM GENE AS A NOVEL PREDISPOSING FACTOR FOR OSTEOPOROTIC FRACTURE

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Objective(s): Osteoporotic fracture (OF), the clinical endpoint, is a major complication of osteoporosis. Although several OF genes and loci have been identified through genomewide association studies (GWAS), the functional implications of these GWAS signals are incompletely understood in most cases.

Material & Methods: To investigate OF susceptibility genes, we performed a GWAS and carried out follow-up replication studies in individuals of East Asian descent.

Results: In a combined meta-analysis of OF from a discovery cohort (n=1427) and two de novo replication sets in Korea (n=1626) and Japan (n=929), we identified rs784288 in the MECOM gene as reaching genome-wide significance ($p=4.83\times10^{-8}$; odds ratio=1.38) with pleiotropic associations. A functional analysis using RNA interference showed that MECOM knockdown with small interfering RNA suppressed osteoclastogenesis.

Conclusion(s): Together, our results provide new insights into the genetic architecture of OF.

P570

EFFECT OF PHYSICAL ACTIVITY AND SUN EXPOSURE ON VITAMIN D STATUS OF SAUDI CHILDREN AND ADOLESCENTS

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Objective(s): Accumulating evidence suggests increased prevalence of vitamin D deficiency in the Middle East. In this context, we aimed to determine whether the prevalence of vitamin D deficiency is related to degree of physical activity and sun exposure among apparently healthy Saudi children and adolescents, in a lesser studied population.

Material & Methods: A total of 331 Saudi children were included in this cross sectional study. Levels of physical activity and sun exposure were determined using a standard questionnaire. Anthropometry, serum calcium and 25-(OH) vitamin D were analyzed.

Results: All subjects were vitamin D deficient, majority of whom were moderately deficient (71.6%). Age-adjusted comparisons revealed that vitamin D status was highest among the most physically active group and most frequently sun exposed, though levels in this group remain deficient. BMI was also lowest in the most physically active group ($p<0.05$).

Conclusion(s): Promotion of an active outdoor lifestyle among Saudi children in both homes and schools may counteract the vitamin D deficiency epidemic in this vulnerable population. Vitamin D Supplementation is also suggested.

Disclosures: Many thanks to Prince Metab Chair for Osteoporosis for the funding of this study.

P571

X-RAY ABSORPTIOMETRY INDEXES FOR WOMEN IN POSTMENOPAUSAL PERIOD WITH OSTEOPOROTICAL FRACTURES

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Objective(s): To estimate structural and functional condition of bone in women in postmenopausal period with osteoporotic fractures, compare the results to referent data for Ukrainian population and to compare the results of X-ray absorptiometry to the fracture risk rate, assessed by FRAX

for women in postmenopausal period with osteoporotic fractures.

Material & Methods: 39 women in postmenopausal period aged 50-89 years with forearm (18) and proximal hip (21) fractures, who were on treatment the Traumatology Department #1 of Lviv City Clinical Hospital of Ambulance. They were divided into 4 categories by age (50-59[13]; 60-69[12]; 70-79[9]; 80-89[5]). Nordin Index was measured with the "Osteolog" workstation, developed in the Institute of Gerontology AMS Ukraine under the direction of professor Povoroznyuk V.V. Fracture risks were estimated using FRAX.

Results: We found lower cortical indexes for women in postmenopausal period with osteoporotic fractures for 50-59 (Common IN=0.41), 60-69 (Common IN=0.40), 70-79 (Common IN=0.36), 80-89 (Common IN=0.33) age groups in comparison to referent data for Ukrainian population. Also we found lower cortical indexes for women in postmenopausal period with higher risk of osteoporotic fracture, assessed by FRAX, independent of age.

Conclusion(s): Thus, low cortical indexes, measured with the "Osteolog" workstation are reliable predictors of high fracture risk. There is a significant correlation between low cortical indexes and high fracture risk, assessed by FRAX.

P572

MUSCLE SIZE, STRENGTH AND PHYSICAL PERFORMANCE AS PREDICTORS OF FALLS AND FRACTURES IN THE HERTFORDSHIRE COHORT STUDY

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Objective(s): Sarcopenia is common in later life and associated with subsequent disability. However, the definition of sarcopenia is often problematic; hence recently the European Working Group on Sarcopenia in Older People proposed a practical clinical definition for age-related sarcopenia requiring both low muscle mass and function (strength or performance). However, the extent to which these different components correlate with falls risk, and ultimately fracture, remains uncertain. We address this issue in a prospective population cohort, the Hertfordshire Cohort Study.

Material & Methods: 1579 men and 1418 women underwent baseline assessment of health (questionnaire) and detailed anthropometric measurements. Grip strength was measured using a Jamar hand-held dynamometer and gait speed was assessed by 3 m walk test. A subset of 313 men and 318 women, underwent pQCT examination of the calf and forearm using a Stratec 2000XL pQCT to assess muscle cross-sectional area (mCSA) (66% slice). Subsequently, 2299 participants completed a postal questionnaire, detailing fall and fracture history, a mean of 5.5 years after baseline (range 2.9-8.8 yrs).

Results: The mean age (SD) at baseline was 66.2 (2.8) years. At follow-up weaker grip strength and, in men reduced gait speed, predicted a higher risk of falls reported since the age of 45 years and in the previous year. A similar but much weaker trend with gait speed was seen in men. Incident fractures were more common in those with lower grip strength (men OR 1.075 [95% CI 1.028, 1.125] p= 0.002; women OR 1.039 [95% CI 1.002, 1.077] p=0.04, for every 1 kg reduction in grip strength) after adjustment for age, height, weight-adjusted-for-height, social class, smoking status, alcohol consumption, activity score, dietary calcium (and oestrogen replacement use and years since menopause in women). However, no associations were detected between mCSA and incident falls or fractures.

Conclusion(s): Both grip strength and gait speed but not mCSA were associated with falls risk; additionally grip strength also predicted incident fractures. Assessments of muscle function therefore may be better predictors of these clinical outcomes than muscle size.

P573

VITAMIN D DEFICIENCY AND CALCIUM INTAKE IN REFERENCE TO OBESITY IN CHILDREN AND ADOLESCENTS

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Objective(s): Vitamin D deficiency has been linked to several chronic diseases in adults, and nearly all cardiometabolic risk factors are associated with vitamin D deficiency. Studies focusing on children and adolescents, however, are limited. In this randomized cross sectional study we aimed to determine the prevalence of vitamin D deficiency and its association with childhood obesity and dietary calcium intake among a population of healthy urban Saudi adolescents.

Material & Methods: 331 randomly selected Saudi children (53.8% females and 46.2% males) aged 6-17 years were included. Demographic, medical and dietary information were collected from each subject. Anthropometrics were measured. Blood levels of fasting glucose, lipid profile, 25(OH) D and corrected calcium were analyzed.
Results: Vitamin D deficiency was noted in all subjects, with girls having significantly lower vitamin D levels than boys. Serum vitamin D levels were significantly and inversely associated with BMI, fat mass percentage, body fat mass, TG, waist circumference and hip circumference ($p<0.05$). Serum calcium was significantly lower in girls compared to boys and was positively correlated with vitamin D and negatively correlated with BMI, fat mass and waist to hip ratio. Approximately 30% of the subjects with <250 mg of calcium daily were obese, while only 14% of the subjects with >800 mg of calcium intake were obese.
Conclusion(s): Results from this study correlated serum vitamin D with obesity in children and adolescents implying important functional role for vitamin D deficiency in obesity associated chronic diseases.
Disclosures: Many thanks to Prince Mutaib Chair for Osteoporosis (PMCO) for the funding of this study

P574
THE EFFECT OF TIBOLONE ON BONE DENSITY IN WOMEN WITH EARLY MENOPAUSE RESULTING FROM CANCER TREATMENT

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Objective(s): To evaluate the effect of tibolone on bone density in women with early menopause (<45 years old) resulting from treatment of cervical cancer.
Material & Methods: Through retrospective chart review, 46 women with early menopause resulting from bilateral oophorectomy or pelvic radiation therapy were compared with age-matched healthy women. All the women had taken tibolone continuously. Two normal women were matched per one woman with early menopause, so 92 of healthy women with regular menstruation were selected. Initial bone density data of lumbar spine, femur neck, and total hip were compared with those of 2 years later.
Results: For 2 years, there were no significant changes in bone density of women treated with tibolone for early menopause. In normal control, bone density of total hip was significantly decreased after 2 years. ($p=0.02$) In inter-group analysis, there were no significant differences in changes of bone density between two groups.
Conclusion(s): Women treated with tibolone for early menopause kept normal age-related change in bone density. Tibolone may be effective for prevention of bone loss in women with early menopause after bilateral oophorectomy or pelvic radiation therapy.

P575
DEVELOPMENTAL HIP DISORDER AS A CAUSE OF COXARTHROSIS

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Objective(s): To highlight the significance of DHD among the causes of coxarthrosis and consequential implantation of hip endoprosthesis in generative and the most active life period, and to indicate the absence and necessity of continuous observation and treatment of the patients with DHD before the complications occur.
Material & Methods: The retrospective study conducted in the time period between January 1, 2004 - March 3, 2010, involved two groups of patients; one group consisted of 136 patients, to 55 years old, treated for coxarthrosis; the second group consisted of 213 patients, of the same age, after the implantation of hip endoprosthesis. The data were obtained from the case histories. The groups were formed according to the cause of the disease. Afterwards, we separated patients with DHD being a primary etiology and classified them according to their gender, DHD treatment method in the childhood and age. We compared our results with the data from the literature
Results: In both groups of patients, DHD was a cause of the complications with high percentage, for coxarthrosis 28.67%, for implantation of endoprosthesis 36.44%, which corresponds with the data from the literature that DHD is among the most common primary diseases causing coxarthrosis.
In both separated groups of patients with complications due to DHD, women were much more often affected. The percentage of development of complications in adult patients was higher in those operated in childhood. Most patients with complications were 30 to 50 years old. We could not compare our data with data from the literature because there were no any. We have noticed that the children are referred to the balneophysical treatment after the surgical treatment of DHD, and adolescents and adults only when complications occur.
Conclusion(s): DHD has proven to be a significant cause of coxarthrosis and implantation of hip endoprosthesis both

being significant and cost ineffective for the society for they affect reproductive and active population. Therefore, we highlight present absence of continuous observation and balneo-physical treatment of patients with DHD in adolescents and adults and necessity for its implementation to postpone and prevent the development of the most severe complications.

P576
ASSOCIATION BETWEEN BONE MINERAL DENSITY AND BODY COMPOSITION PARAMETERS IN BRITISH AFRICANS LIVING IN LONDON

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Objective(s): Studies have suggested age specific association between different body compartments and that lean mass is the main predictor of BMD. The purpose of this study was to explore the association between BMD with fat mass (FM), lean mass (LM), skeletal muscle mass (SMM) and total body weight (TBW) in British African men, women and children living in London, UK.

Material & Methods: Whole body scans were conducted using DXA (Norland XR800). Scanned images were analysed for total body FM, LM and BMD. Total SMM (kg) was determined by adding appendicular LM of arm and leg regions and multiplying by 1.33 (assuming this represents 75% of total SMM). Pearson correlation coefficients were used to evaluate univariate relationships between BMD, SMM, LM and FM. In order to evaluate the relative contribution of FM, LM and SMM to BMD, multivariate linear regression models were developed with BMD as the dependent variable and LM, SMM, FM and total body weight (TBW)as independent variables using a stepwise process. Men and women were modelled separately.

Results: Altogether 23 men, 26 women and 41 children were measured. Mean ages were 34.7 y (SD 15.1) 30.5 y (SD 10.8) and 10.0 y (SD 3.6), respectively. BMD (g/cm^2) ranged from 0.832-1.385; 0.816-1.166; and 0.558-1.75, respectively. Univariate correlation between BMD and LM was significant in men ($r=0.77$, $P<0.001$), women ($r=0.66$, $P<0.001$) and children $r=0.49$, $P=0.001$). No significant relation was found between FM and BMD in all age groups. Using the regression model, LM was the best predictor of BMD for women, accounting for 44% of the variance ($r^2=0.438$, $P<0.001$) and an even better predictor of BMD for men, accounting for 59% of the variance ($r^2=0.589$, $P<0.001$). In children, LM accounted for 24% of the variance in BMD ($r^2=0.243$, $P=0.001$). TBW was the best predictor of BMD for children, 35% ($r^2=0.347$, $P<0.001$)

Conclusion(s): LM is the best predictor of BMD in Black adults, better in men than women. TBW is the best predictor of BMD in Black children.

P577
MANDIBULAR RADIOGRAPHIC MEASUREMENTS AS INDICATORS OF OSTEOPOROSIS IN SAUDI POSTMENOPAUSAL WOMEN: A CROSS-SECTIONAL STUDY

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Objective(s): Mandibular indices, measured on panoramic radiographs, and morphology of the mandibular inferior cortex may be useful screening indicators for low BMD. The present study examines whether the mandibular cortical width (MCW), panoramic mandibular index (PMI) and alveolar crest resorption degree (M/M ratio) can be used to identify postmenopausal women with low BMD.

Material & Methods: A total of 1020 postmenopausal women (≥50 years) were randomly selected and screened according to an inclusion criteria over 2 years at the Center of Excellence for Osteoporosis Research (CEOR). Women were excluded if they had chronic diseases including osteoarthritis, or with evident endocrine disorders, or on any form of drug therapy with possible effects on bone metabolism, or on oral contraceptives or are smokers or with any cancer. Accordingly, 431 women were included in the final analysis. Age and anthropometric data were recorded. Dental digital panoramic radiography was performed and BMD at lumbar spine (L_1-L_4) and neck femur was determined by DXA.

Results: Women were grouped according to BMD values as normal (n=232), osteopenic (n=124) and osteoporotic (n=75). Panoramic indices as a function of various of groups are presented in Table 1.

Table 1: Panoramic indices as a function of various postmenopausal groups.

	All (n=431)	Normal BMD (n=232)	Osteopenia (n=124)	Osteoporosis (n=75)	P-value (for trending)
Age (yrs)	57.78±6.24	57.02±6.54	57.74±5.40	60.21±6.05	P<0.0001
MCW (mm)	4.68±1.29	4.55±1.31	4.76±1.29	4.98±1.18	P<0.008
PMI (mm)	0.442±0.093	0.433±0.095	0.448±0.092	0.457±0.087	P<0.065
M/M ratio	2.24±0.28	2.24±0.25	2.25±0.28	2.23±0.26	0.992

MCW=mandibular cortical width; PMI=panoramic mandibular index and M/M ratio=alveolar crest resorption degree.

Mean MCW values were significantly greater in women with osteoporosis (P<0.01) as compared with the normal group. Optimal cutoff values for the MCW to detect women with T-score<-1 (being 4.6 mm) and those T-score≤-2.5 (being 4.1 mm) at either lumbar spine (L_1-L_4) or total hip showed low sensitivity (58.4-60.2%) and specificity (68.4-69.4%) values.

Conclusion(s): MCW performed better than PMI and M/M ratio in its power to differentiate postmenopausal women with osteopenia or osteoporosis from healthy controls. The present MCW measurements have limited power in their ability to identify women with low BMD at the axial skeleton.

P578

THE EFFECT OF MECHANICAL LOADING ON THE REGULATION OF 1α-HYDROXYLASE IN PRIMARY HUMAN BONE CELLS

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Objective(s): 1,25-dihydroxyvitamin D ($1,25(OH)_2D$) was shown to influence the response of mouse bone cells in vitro to mechanical stimuli, which could have important consequences for the maintenance of bone mass by mechanical loading. Bone cells express the 1α-hydroxylase gene CYP27B1, therefore they should be able to convert 25-hydroxyvitamin D (25(OH)D) into its' active metabolite $1,25(OH)_2D$. However the regulation of 1α-hydroxylase in bone cells is largely unknown. The aim of this study was to investigate whether 25(OH)D affects the response of primary human bone cells to mechanical loading, similar to $1,25(OH)_2D$. Furthermore, we examined whether mechanical loading affects the conversion of 25(OH)D to $1,25(OH)_2D$ by primary human bone cells.

Material & Methods: Primary human bone cells were incubated with 25(OH)D (0 or 400 nM) or $1,25(OH)_2D$ (0 or 100 nM) for 24 h. Thereafter the cells were subjected to pulsating fluid flow (PFF; 0.7±0.3 Pa, 5 Hz) or kept under static conditions for 1 h, and postincubated (0 or 3 h) without PFF. The response to PFF was quantified by measuring nitric oxide (NO) using Griess reagent and ATP production using the bioluminescence assay (Roche). mRNA expression of RANKL, OPG, osteocalcin and osteopontin as well as CYP27B1, VDR and CYP24 expression was quantified using RT-qPCR.

Results: The stimulation of NO and ATP release by PFF was not influenced by preincubation with 25(OH)D and $1,25(OH)_2D$ in human bone cells. CYP27B1 mRNA was increased 3 h after PFF, and VDR mRNA was decreased 3 h after PFF. mRNA expression of osteocalcin and CYP24 was not affected by PFF, but was increased after addition of 25(OH)D and $1,25(OH)_2D$.

Conclusion(s): These data show that the response of bone cells to mechanical loading is unaffected by preincubation with both $1,25(OH)_2D$ and 25(OH)D. Interestingly, PFF increased mRNA expression of CYP27B1, suggesting that physical activity may enhance the local availability of $1,25(OH)_2D$ to bone cells, thereby contributing to bone mass regulation.

P579

COFFEE CONSUMPTION IS ASSOCIATED WITH VITAMIN D AND CALCIUM LEVELS IN SAUDI ADOLESCENTS

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Objective(s): Coffee consumption was hypothesized to interact with variants of vitamin D-receptor polymorphisms, but limited evidence exists. Here we determine for the first time whether increased coffee and tea consumption affects circulating levels of 25-hydroxyvitamin D in a cohort of Saudi adolescents.

Material & Methods: A total of 330 randomly selected Saudi adolescents were included. Anthropometrics were recorded and fasting blood samples were analyzed for routine analysis of fasting glucose, lipid levels, calcium, albumin and phosphorous. Frequency of coffee and tea intake was noted. 25-hydroxyvitamin D levels were measured using enzyme-linked immunosorbent assays.

Results: Improved lipid profiles were observed in both boys and girls, as demonstrated by increased levels of HDL-cholesterol, even after controlling for age and BMI, among those consuming 9-12 cups of coffee/week. No significant differences were observed in vitamin D levels although an increasing trend was observed with increasing coffee consumption. Age and BMI-adjusted vitamin D levels were significantly highest among those consuming 9-12 cups of

tea/week in both males and females (p-values 0.003 and 0031, respectively).
Conclusion(s): This study suggests a link between coffee and tea consumption and vitamin D levels in a cohort of Saudi adolescents, independent of age and BMI. This should be confirmed prospectively.

P580

COMBINATION OF DIGITAL X-RAY RADIOGRAMMETRY AND FRAX® IN EVALUATION OF STRUCTURAL-FUNCTIONAL STATE OF BONE IN POSTMENOPAUSAL WOMEN

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Objective(s): The aim of the study was to estimate the informative value of digital X-ray radiogrammetry and its combination with FRAX® in evaluation of structural-functional state of bone in Ukrainian postmenopausal women.
Material & Methods: 247 postmenopausal women aged 45-87 years were examined, average age 65±0.6 years, duration of postmenopausal period 16±1.6 years. BMD was measured by DXA "Prodigy" and digital X-ray radiogrammetry (DXR) of the II-IV metacarpal bones. The 10-year probability of hip fracture calculated with FRAX® tool.
Results: There is difference in distribution of bone indexes in depending of used methods. Among women which had osteoporosis of femoral neck by DXA, 73% had osteoporosis, 24% osteopenia, 3% normal data by DXR. Sensitivity of DXR indexes ranging was from moderate to high, but specificity was low (with femoral neck 73% and 38%, total hip 78% and 22%, lumbar spine 56% and 18%, total body 68% and 24%, accordingly). Such sensitivity and specificity increased when combining DXR with the ten years probability of hip fracture without BMD (FRAX) (with femoral neck 86% and 63%, total hip 89% and 54%, lumbar spine 84% and 50%, total body 89% and 53%, accordingly). Sensitivity was higher in patients with fractures in comparison with women without fractures, (with femoral neck 82% and 64%, total hip 80% and 75%, lumbar spine 82% and 56%, total body 82% and 50%, accordingly), but specificity was low in both groups. Moderate positive correlation was between BMD of total body and DXR ($r=0.58$, $p=0.0000$). Correlation between indexes of DXR and BMD of femoral neck, total hip and lumbar spine were significant, but lower.
Conclusion(s): DXR of is informative method in evaluation of structural-functional state of bone in postmenopausal women. Sensitivity and specificity increased when combining DXR with FRAX® from 56% and 18% up to 89% and 63% accordingly. Sensitivity was higher in patients with fractures.

P581

COMBINED THERAPEUTIC EFFECT OF BALNEO-PHYSICAL AND MEDICAMENTOUS TREATMENT IN PATIENTS WITH REDUCED BONE DENSITY

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Objective(s): To indicate advantages of combined application of medicamentous treatment and balneo-physical procedures in increasing bone mass and reducing fractures, namely, improving quality of life in patients with decreased bone mass.
Material & Methods: The study was conducted in the Specialized Rehabilitation Hospital, Banja Koviljaca, in the time period between November 2005 - February 2008, with 269 patients having T-score<-1.7 SD. The bone density was determined at the distal forearm with DTX 4000, at least twice in aforementioned period, and at least 1 year after the treatment had started. Information on fractures and quality of life was obtained in survey. The therapy group consisted of 117 patients, mean age 66.32, 101 women and 16 men. They had at least two balneo-physical 10 days' (or more) treatments and all being treated with medicines. The control group consisted of 152 patients, mean age 63.48, 141 women and 11 men who did not have either physical or medicamentous treatment. Balneo-physical treatment implied kinesi therapy, peloid, thermo mineral water and Horizontal therapy or low frequency magnetic field. The results were processed statistically by Mann-Whitney, Yates, Cramer tests.
Results: The statistically highly significant improvement of all observed parameters was noticed in the work group: - bone mass increase with a mean alteration of BMD between the first and final measurement being -0.59 SD; - only one new fracture; - quality of life improvement. There were 7 new fractures in the control group. The process of losing bone mass with the mean alteration of BMD between the first and final measurement being -4.44 SD. 86% of respondents has pain intensity increased, and 38% of respondents said that had limitations in daily life activities.
Conclusion(s): The subjects with decreased bone mass who in addition to prescribed medicamentous treatment had balneo-physical treatment have had pronounced bone density increase, less fractures and better quality of life, noticeable positive, complementary therapeutic effect and improvement of all observed parameters.

P582

LACK OF INCREASED PTH LEVELS IN SAUDI HEALTHY INDIVIDUALS WITH REDUCED 25(OH) VITAMIN D LEVELS

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Objective(s): Recent advances on vitamin D research in the Middle East have shed light on the increased incidence of vitamin D deficiency across this region of year-round sunlight. There is scarcity of information, however, as to the levels of 1, 25-dihydroxyvitamin (OH)2D, the active form of vitamin D, and its associations to cardiometabolic parameters in the Arab cohort and this study aims to fill this gap.
Material & Methods: In this cross-sectional study, 33 male and 43 female [22 children and 54 adults, total 76] Saudis with low levels of 25-(OH)D (<25 ng/ml) were otherwise randomly recruited. Anthropometrics were obtained and fasting blood samples were taken for a routine measurement of glucose, lipid profile, calcium and albumin. Serum 25-hydroxyvitamin D, 1,25-(OH)2D and intact PTH were quantified using ELISA.
Results: 25-hydroxyvitamin D deficiency was noted in 100% of the subjects. Serum calcium, intact PTH and 1, 25(OH)2D were all within the normal range. Serum 1,25-dihydroxyvitamin D was not associated with intact PTH and inversely correlated with systolic blood pressure ($p=0.01$).
Conclusion(s): Vitamin D deficient Saudi children and adults with normal levels of 1,25-(OH)2D, had normal circulating calcium and PTH. The study proposes to establish local cut-offs that will be of clinical significance in the identification of those at true risk for harder end-points, such as secondary hyperparathyroidism and bone-related diseases.
Disclosures: Many thanks to Prince Mutaib for funding the study.

P583
BONE MASS AND MICROARCHITECTURE CHANGES IN SUBCHONDRAL BONE DURING OSTEOARTHRITIS: INFLUENCE OF PRIOR MECHANICAL LOADING?

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Objective(s): Although osteoarthritis (OA) is considered as a primary disorder of articular cartilage, the architecture and properties of the periarticular cortical and trabecular bone are also modified during the course of the disease. In an experimental model of OA, we have previously shown by DXA a bone loss in the epiphyseal area adjacent to the knee, and a protective effect of exercise on this parameter. The current study aimed to investigate changes in bone mass and trabecular microarchitecture in both lateral and medial parts of rat knee joints in an OA model.
Material & Methods: Male Wistar rats (n=48) were divided in exercise (Ex) or non exercise (NEx). Ex rats were subjected to treadmill training 1 h/day, 5 d/wk for 10 wks. At the end of the training period, OA was induced by intraarticular injection of 1 mg monoiodoacetate (MIA) in each half group (Ex-MIA and NEx-MIA). Other rats were injected with saline as controls (Ex-C and NEx-C). Safranin-O-fast green stainings were performed on tibia sections to determine the severity of OA cartilage lesions. The lateral and medial parts of the proximal tibia was imaged by μCT.
Results: Our data indicated that the lateral part of the knee joint exhibited significantly lower BV/TV and Tb.Th than the medial part. Ex and OA did not alter the microarchitecture in the medial part. A lower BV/TV was found in the lateral part from rats injected with MIA (NEx-MIA vs. Ex-C: 34.19±5.91 vs. 42.21±3.34; $p<0.01$; Ex-MIA vs. Ex-C: 32.81±6.31 vs. 42.21±3.34; $p<0.01$). Lateral Tb.N was also reduced in both MIA groups (NEx-MIA vs. Ex-C: 3.09±0.44 vs. 3.61±0.25; $p<0.01$; Ex-MIA vs. Ex-C: 3.04±0.38 vs. 3.61±0.25; $p<0.01$), and lateral Tb.Th was significantly lower in the MIA groups compared to controls (NEx-MIA vs. Ex-C: 0.11±0.01 vs. 0.12±0.01; $p<0.05$; Ex-MIA vs. Ex-C: 0.11±0.01 vs. 0.12±0.01; $p<0.05$).
Conclusion(s): These data suggest that MIA-induced OA is associated with bone loss and changes in the trabecular subchondral bone from the load-bearing area of the knee joint. This chemical effect of the MIA seems finally differentially translated in the lateral vs. medial part of subchondral OA bone, suggesting an interaction with mechanical properties of the rat knee.

P584
COMPARATIVE ANALYSIS OF BONE DENSITOMETRY FINDING ON THE LUMBAR SPINE AND HIP

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Objective(s): To analyze the values of the mineral bone density gained by measurements on the lumbar spine and

femur neck and their correlation with the most significant risk factors for osteoporosis.

Material & Methods: The study comprised 1594 respondents, of both genders, who had bone densitometry of lumbar spine and hip done by Lunar DPX device. All subjects filled in the questionnaire with the basic demographic data, risk factors for losing the bone mass and data on fractures. The data were processed statistically by: Spearman's test for correlation, Wilcoxon test, univariable analysis test and ANOVA test.

Results: The mean age of subjects was 66.67, predominating by women 1515 (95%). DXA finding on the lumbar spine was at the level of osteoporosis in 61% of subjects, 33% had osteopenia, and 6% had normal result. The bone densitometry on the hip registered osteoporosis in 44% of subjects, 47% had osteopenia, and 9% had the expected level of the bone density. The mean value of the BMD of the lumbar spine in all subjects was 0.892 g/cm^2, and of the hip was 1.020 g/cm^2. Overall, 22 vertebral and 23 hip fractures were registered. The analysis of obtained data yielded statistically high significance ($p<0.01$) of correlation between DXA finding of the lumbar spine with early menopause, female gender and low index of the body weight, and statistically significant correlation ($p<0.05$) with the higher age. DXA finding of the hip was highly correlated ($p<0.01$) with early menopause, age, low BMI and previous fractures, and there was statistical significance ($p<0.05$) for the female. The method of univariable analysis showed that the parameters of the largest variability in BMD of the lumbar spine BMI (Eta^{2}0.117) and gender (Eta^{2}0.028), and for the BMD of the hip BMI (Eta^{2}0.214) and age (Eta^{2}0.089).

Conclusion(s): The effect of negative predictors of osteoporosis on the decrease of BMD has been reliably registered both on the lumbar spine and hip. It is recommended to measure both sites in order to have an adequate estimation of the bone strength and to prevent fractures with elimination of the risk factors.

P585

SEVERE VITAMIN D DEFICIENCY IS ASSOCIATED WITH LOWERED CIRCULATING ENDOTHELIAL PROGENITOR CELLS AND ENDOTHELIAL DYSFUNCTION AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Objective(s): The present study describes the relationship between vitamin-D deficiency and brachial flow-mediated dilatation (FMD) together with circulating endothelial progenitor cell (EPC) numbers among Saudi patients with type 2 diabetes mellitus (T2DM).

Material & Methods: A total of 410 patients (42% were Women, patient age range 46-76 years) with T2DM attending Diabetic Clinics at King Abdulaziz University (KAU) Hospital and other hospitals in the Jeddah area were recruited. Each patient was asked to visit a special clinic at the Center of Excellence for Osteoporosis Research (CEOR) at KAU to be enrolled in the study. Diabetic patients were compared with age- and sex-matched healthy controls (n=820). Each patient was medically examined and data were collected on life style, smoking habits, level of physical activity, dietary habits, use of medications and vitamins using a validated questionnaire. Age and anthropometric data were collected. Each patient provided fasting blood with second-void morning urine samples for the measurements of serum 25(OH)D, various bone turnover markers (BTMs); hormones, haemoglobin A1c (HbA1c); lipids, glucose, and creatinine. Circulating CD34$^+$/kinase insert domain-containing receptor (KDR)$^+$ and CD133$^+$/KDR$^+$ ECPs were determined by Flow cytometry. BMD was determined by DXA and brachial artery FMD was determined by vascular ultrasonography. Healthy control subjects were studied as that of diabetic patients.

Results: 79% and 32.4% of T2DM patients were with vitamin D deficiency [25(OH)D <50 nmol/L] and severe deficiency [25(OH)D <12.5 nmol/L], (vs. 74.1% and 13.6% among healthy age- and sex-matched controls), respectively. Serum 25(OH)D levels showed significant negative correlations with HbA1c values ($r=-0.246$, $P<0.001$). Patients with severe vitamin-D deficiency exhibited significantly lower brachial FMD values (3.09±1.56; $P<0.001$) and CD133$^+$/KDR$^+$ ECP counts (0.216±0.162%; $P<0.001$) as compared with those with vitamin-D sufficiency or healthy controls following adjustment for age, sex and others confounding factors including HbA1c values.

Conclusion(s): Severe vitamin-D deficiency was significantly associated with lowered brachial artery FMD and circulating CD133$^+$/KDR$^+$ EPCs. Such observations suggest that severe vitamin D deficiency might contribute to lowered circulating EPCs and endothelial dysfunction among patients with T2DM.

P586

STUDYING OSTEOPOROSIS IN NON MENOPAUSAL WOMEN (OPNMW)

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Objective(s): Fragility bone fractures are a serious problem regarding public health, generally associated to age and sex (post-menopausal osteoporosis already almost well defined). As Osteoporosis can occur at any age, data from US centers recognize 5 cases each 100,000 women in ages between 20 to 44 years old and also diagnosing it, is a clinical challenge. Because of that, we decide to conduct a follow-up study of OPNMW attending our Rheumatology-Osteology Unit during 4 years, all diagnosed fractures based (vertebral or peripheral) or without fractures but diagnosed as osteoporosis by a densitometric finding specially in pts under glucocorticoid treatment, or anti-aromatase drugs, or because of hormonal disorders leading to bone fragility (by X-rays, with vertebral demineralization) or because familial history of osteoporosis. In OPNMW we cannot apply OMS classification as in menopause women (T-score:<2.5) , because it is not associated to the same fracture rate risk as in menopause.
Material & Methods: We study phosphocalcic metabolism, PTH and 25OH D3, full history and physical examination, personal and familial antecedents, sport fractures that predispose to a later ones, alimentary behavior, previous and actual treatments, predisposing diseases, contraception (e.g., taking progestins). Time of training and type of sport practicing, and also if they suffered from menses disorders, and if they were using some products for better performance.
Results: in 49% cases we don't find predisposing disease in women presenting low bone mass, we identified causal disease in 15% (connective tissue disease, thyroid disease or hipoparathyroidism) and in 35% we remark toxic antecedents: drinking alcoholic beverages (33%), smoking, alimentary salt excess and diet deprived from calcium). In 39% of pts, the 250HD3 plasma levels were in insufficiency range (low than 30 ng/mg). 19% of pts were in sport overtraining. 59% have a bad alimentation, 10% suffer from celiac disease, 12% have liver disorders, 0.5% hemochromatosis, prolonged immovilisation in 12%of cases, Marfan's syndrome in 1%, osteopathies related to cancer in 2%, osteomalacia in 0.2%; primary hypertiroidism in 2%,hemopathies: 4%; HIV in2%, fractures during childhood 6%.
Conclusion(s): We remark the importance of a population that are not in current cheking for most of osteoporotic causes.

P587
ATYPICAL PARATHYROID ADENOMA AND OSTEOPOROSIS – CASE REPORT

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Objective(s): The aim is to shown an atypical case of parathyroid adenoma and osteoporosis with normal level of ionized Ca, total Ca and vit.D.

Material & Methods: Female patient age of 65 years, height 170 cm, weight 73 kg with pains in the spine, hips, knees, low energetic fracture on the patellae, normal calcium and vitamin D dietary intake and insufficient exposure to sunlight. After first densitometry the patient was treated for one year with bisphosphonate, 1000 mg calcium and 800 IU vitamin D. The control DXA scan results showed decreasing of BMD (L1-L4 and dual femur) compare with previous densitometry. Due to a suspect of secondary osteoporosis and following blood tests were performed: iPTH, ionized Ca, total Ca, ALP, P, Vit.D, 24 h Ca urine test. Because of high level of iPTH was done neck ultrasound and scan with Tc99 on parathyroid gland and the diagnosis of parathyroid adenoma was set.
Results: First densitometry results: L1-L4 with T-score -2.3SD; Right femur with T-score -2.6SD; Left femur with T-score -2.5SD. Blood test were: ionized Ca 1.15 mmol/l, total Ca 2.3 mmol/l, Vit.D 80,5 pg/ml. After one year following results were got: L1-L4 with T-score -2.7 SD; Right femur with T-score -2.5 SD; Left femur with T-score -2.5 SD. Blood test results were: iPTH 235 pg/ml, ion. Ca 1.39 mmol/L, total Ca 2.89 mmol/l, ALP 136.08 U/L, P 1.53 mmol/L, Vit.D 15.7 pg/ml, 24 h Ca urine test 11.6 μmol/d. After 6 months of the surgery the blood test results are: : iPTH 63 pg/ml, ionized Ca 1.27 mmol/L, total Ca 2.35 mmol/l, ALP 92 U/L, P 1.38 mmol/L, Vit.D 28.5 pg/ml. Control DXA is following.
Conclusion(s): If the level of Ca and Vit D in the blood are in the normal range but the control densitometry show decreasing of BMD like in our case it is obviously that the level of PTH was determinate for the diagnosis. Parathyroid adenoma is the most common cause of hyperparathyroidism and the surgery is the most common treatment. Due to this it is very important to detect on time the real reason for decreasing of BMD to diagnose that curable disease.

P588
THE ASSESSMENT OF MEDICAL CARE QUALITY OF PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS IN MOSCOW REGION

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Objective(s): The purpose of this study was to evaluate the quality of diagnostics and treatment of postmenopausal osteoporosis (PMO) in Moscow Region.
Material & Methods: The study was performed in form of a cross-sectional questionnaire survey of 362 postmenopausal

woman aged 55 and older (median 65 (59;70) years) with previously verified diagnosis of PMO from 17 towns in Moscow Region. The study questionnaire consisted of the list for medical treatment quality assessment consisting of 19 items, the list of attitudes towards osteoporosis therapy consisting of 13 questions and the attitude scale towards factors influence quality of medical care of osteoporosis patients consisting of 11 items.

Results: The questionnaire survey results showed, that in 57.4% of respondents the first doctor they visit because of osteoporosis was an endocrinologists, in 19.7% - a traumatologist, in 13.1% - a rheumatologist and in 4.9% each-physician or neurologist. To confirm the diagnosis of PMO 38% of patients had to visit 2 doctors, 30% of patients - 3 doctors and 28% of patients - only 1 doctor, but the period of time from the first visit to doctor until verification of PMO in 39% cases took from 1 month till 1 year. 79% of all referrals to BMD testing and 70% of all diagnosis of PMO in Moscow Region are made by endocrinologists. 77.8% of PMO patients in Moscow Region do not receive effective medical therapy being treated only with calcium and (or) vitamin D. Generally women with PMO did not received effective therapy due to lack of adequate recommendations of the doctors not insisting on mandatory treatment (50%) or not giving clear treatment recommendations (43.8%) or not detailed instructions on drag usage (25.0%). The main factors that hinder the PMO patients from receiving qualified medical care are high cost of anti-osteoporotic drugs, non-availability of DXA and osteoporosis specialists in local medical departments, insufficient qualification of doctors in field of osteoporosis diagnostics and treatment and impossibility to evaluate biochemical parameters of calcium metabolism in local laboratories.

Conclusion(s): The medical care of patients with PMO in Moscow Region is not adequate and need to improve.

P589

BONE METABOLISM AND FRAX SCORE IN MEN OVER 50 YEARS OF AGE WITH TYPE 2 DIABETES MELLITUS

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Objective(s): To characterize bone metabolism and fracture risk assessment (FRAX) in men over 50 years of age with type 2 diabetes mellitus (T2DM).

Material & Methods: We determined levels of 25-hydroxyvitamin D (25-OH-D), PTH, osteocalcin (OC), C-terminal telopeptides of type-I collagen (CTX-I), procollagen type 1 amino-terminal propeptide (PINP), BMD at L1-L4 (LS) and femur neck (FN), daily dietary calcium intake and the 10-year probability of hip fracture and a major osteoporotic fracture using the country specific FRAX algorithm in 68 T2DM patients. The same data was available from 68 age- and sex-matched population based controls.

Results: The mean (range) age of the T2DM groups was 61.4 (51-78) years. The prevalence of hypovitaminosis D (25-OH-D <75 nmol/L) was 59%. The prevalence of low BMD (T-score<-1.0) at the FN and LS was 21% and 14%, respectively. The mean (range) FRAX hip fracture and FRAX major osteoporotic fracture was 0.8 (0-3.1)% and 4.5 (2.2-10)%, respectively. Upon univariate analyses, BMD at the FN (0.974 g/cm^2 vs. 0.915 g/cm^2; p=0.005) and lumbar spine (1.221 g/cm^2 vs. 1.068 g/cm^2; p<0.001) was significantly higher in the T2DM cohort as compared to the healthy age matched males. Compared to the healthy controls, 25-OH-vitamin D (79.8 nmol/L vs. 67.7 nmol/L; p =0.032), CTx (0.242 μg/L vs. 0.191 μg/L; p=0.001), P1NP (41.7 μg/L vs. 33.7 μg/L; p=0.012), PTH (4.4 pmol/L vs. 3.9 pmol/L; p=0.019) were significantly lower in the T2DM group. FRAX (major osteoporotic fracture) (4.5% vs. 3.7%; p=0.001) was significantly higher in the T2DM group., Following adjustment for all variables showing a significant difference between the two groups, FN and LS BMD, and FRAX major osteoporotic fracture probability remained significantly higher in T2DM patients as compared to the control group. Furthermore, T2DM patients treated with insulin had a higher FRAX score than those not treated with insulin.

Conclusion(s): Males over 50 with T2DM have increased bone density at the femur neck and lumbar spine, but concurrently have increased 10-year probability of a major osteoporotic fracture using the country specific FRAX algorithm.

P590

DEVELOPMENT OF A BIOACTIVE PTH (1-84) SPECIFIC ASSAY ON THE IDS-iSYS SYSTEM

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Objective(s): Measurement of PTH is essential for the management of hyperparathyroidism and metabolic bone disease associated with chronic kidney disease (CKD-MBD). Currently available assays recognise either full-length PTH plus non-PTH (7-84) fragments (Intact PTH) or are specific for only the full-length 84 amino acid molecule (Bioactive PTH). The degree of cross-reactivity to non-PTH (7-84) fragments recognised by Intact PTH assays can vary considerably. There is much discussion

regarding which PTH assay represents the most reliable and sensitive method for PTH monitoring. In particular, whether Intact PTH can be used given the undefined biological activity of non-PTH (7-84) fragments, opposed with the opinion that Intact PTH is still a robust indicator of overall PTH levels. The Bioactive PTH (1-84) assay will allow specific measurement of full-length PTH on the IDS-iSYS system and in combination with the panel of available bone tests will allow clinical profiling of patients at risk of bone dysfunction.

Material & Methods: The measurement of bioactive PTH (1-84) is a two-site chemiluminescent immunoassay. PTH (1-84) is bound by Biotinylated C-terminal and Acridinium-conjugated N-terminal-specific antibodies. These complexes are captured by streptavidin-coated magnetic particles. Bound PTH (1-84) is measured in a high sensitivity luminometer, where signal generated by the acridinium conjugate is directly proportional to the concentration of PTH (1-84) in the sample.

Results: The bioactive PTH (1-84) assay has a range of 4-1800 pg/ml. Time to first result is 33 minutes. Analytical sensitivity is 1.8 pg/mL. Correlation with the IDS-iSYS Intact PTH assay gives a relationship of bioactive PTH= 0.6x Intact PTH values in EDTA plasma (n=59). Cross-reactivity with non-PTH (1-84) fragments is clinically insignificant. Recovery was measured at 95%. Linearity of 101% was measured across the full range of the assay.

Conclusion(s): The IDS-iSYS Bioactive PTH (1-84) assay is an accurate and precise method which is specific for the biologically active full-length PTH (1-84).

P591
FIGHT OSTEOPOROSIS – MOVE, EAT, LEARN

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Objective(s): The main goal of the activities was to make all generations aware of the importance of exercise, knowledge and nutrition in preventing and curing osteoporosis. The peak of the activities was Celebration of World Osteoporosis Day in Ljubljana. The event, held on the very day of the World Osteoporosis Day was sponsored by the City of Ljubljana and held on the main square in city centre. Mrs. Barbara Miklic Türk, first lady and a regular sponsor of all our activities, also attended the event. Dr. Toma Kocjan presented the importance of prevention of falls in everyday life. We arranged bone density measurements on the spot for all participants. The main presenter was famous performer Peter Poles, who also made a short survey among younger public, that was presented on the event and will be shown to participants in Bordeaux as well. Cooking Photo Challenge: As a part of the activities marking the 2011 World Osteoporosis Day we organised a cooking contest, focused on recipes that are rich in calcium and vitamin D. Special exhibition of photos was held on the banks of river Ljubljanica from October 20-30. Members of our societies sent us recipes and photographs to participate. We will present the winning recipes at the conference. Osteothlon: The event is composed to promote: exercise, knowledge and nutrition. We were very satisfied with the response of the public. At the end of activities related to World Osteoporosis Day we could say that the whole year, and especially October 2011 were dedicated to the awareness about the osteoporosis epidemic. The activities and events we organised were directed to all generations, to make them start thinking of their bones as soon as possible, and prevent the start of bone decay. We stressed the importance of active lifestyle, calcium rich food and vitamin D.

Material & Methods: Public event, survey, media, rubberband, bulletin.

Results: Increased awareness of general public on the importance of healthy way of life in preventing and fighting osteoporosis.

Conclusion(s): We found that it is important to communicate different publics with tools they understand and are familiar with, e.g., events, Twitter, Facebook, and internet.

P592
CIITA POLYMORPHISMS AFFECTING EXPRESSION OF MHCII ARE ASSOCIATED TO BMD, BONE LOSS AND FRACTURE

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Objective(s): Inflammatory factors such as cytokines, surface molecules and T lymphocytes affect osteoclast activity and the balance between bone formation and resorption. After menopause, levels of the pro-inflammatory cytokine interferon-gamma (IFNg) increase. IFNg promotes T lymphocyte survival and activity by inducing expression of MHCII molecules on antigen-presenting cells, a process mediated by the MHC class II transactivator gene (*CIITA)*. Our aim was to address the genetic impact of polymorphisms in genes with possible effects on osteoimmunological interactions and capture age-related differences on BMD, bone loss and incident fracture risk.

Material & Methods: We investigated the effect of polymorphisms in *CIITA* associated with reduced expression of MHCII (rs3087456(G) and rs4774(C)) on BMD, bone loss and fracture in young and elderly Swedish women (PEAK-25 n=999; OPRA n=1003). In addition, 3 SNPs each in *CLEC-16A* and *IFNG* were analyzed. Phenotypes included BMD, bone resorption markers, bone loss and fracture.

Results: *CIITA* was only associated with BMD in the elderly women (75 yrs: spine, femoral neck, hip, p=0.01-0.04 and 80 yrs: p=0.02-0.04). BMD was 1.8-3.4% higher in rs3087456(G)-carriers (p=0.009-0.02), suggesting an increasing effect on BMD by reduced MHCII expression. *CIITA* was also associated with increased rate of bone loss (femoral neck p=0.01, total hip p=0.03, total body p=4E-5), but not bone resorption markers. Despite increased bone loss, rs3087456(G) was protective against fracture (Any fracture: carriers (28%) Vs. non-carriers (39%); osteoporotic fracture 23% vs. 31%, p=0.02). *IFNG* polymorphisms were weakly associated with lower hip (p=0.04) and spine BMD (p=0.03) at 75 yrs, but not bone loss or fracture. *CLEC16A* was associated with lower BMD (75 yrs: spine p=0.04; 80 yrs: total body, total hip, and femoral neck, all p=0.04) and fractures occurring between age 75-80 (rs725613(G) carriers 31% Vs. non-carriers 39%, p=0.02).

Conclusion(s): Expression-related polymorphisms in the inflammatory genes *CIITA* and *CLEC16A* are associated with BMD, and fracture in elderly women. These findings illustrate the importance of inflammation in general and MHCII expression levels and T lymphocyte activation in particular in the pathogenesis of reduced bone strength in the elderly.

P593
BONE TURNOVER MARKERS: ARE THEY USEFUL FOR THE INITIAL DIAGNOSIS OF OSTEOPOROSIS?

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Objective(s): Evaluate the utility of bone turnover markers comparing with BMD for the initial diagnosis of osteopenia or osteoporosis.

Material & Methods: 42 patients who came for the first time to our clinic were selected. DXA was used to assess BMD of the lumbar spine, total hip and femoral neck. Osteocalcin (OC), procollagen type I N-terminal propeptide (P1NP), bone alkaline phosphatase (ALP) and PTH were measured in serum, and calcium, phosphorus and Deoxypyridinoline in urine. Statistical analysis was performed with SPSS-15 (U of Mann-Whitney Test). Receiving Operating Curves (ROCs) were constructed carrying out a comparison between groups. Spearman Rho coefficient was used to make a correlation analysis between the T-Score values of total hip and femoral neck with bone markers.

Results: BMD: 12% normal, 26% osteopenic and 62% osteoporotic. ROC showed significant results in PTH, vitamin D and osteocalcin between normal and osteopenic/osteoporotic group.

TABLE 1

	PTH	VIT D	OC
AUC Normal-Osteopenia	0.88*	0.88*	0.71*
AUC Normal-Osteoporosis	0.82*	0.83*	0.59

*p<0.05

TABLE 2

	PTH	VIT D	OC
AUC Normal-Osteopenia	S=80% E=80% CP=60.8 pg/ml	S=80% E=80% CP=19 ng/ml	S=60% E=80% CP=8.5 ng/ml
AUC Normal-Osteoporosis	S=80% E=80% CP=59 pg/ml	S=77% E=80% CP=20.5 ng/ml	No significant

Cutoff points (CP), sensitivity (S) and specificity (E)

We did not find significant differences in the rest of bone markers.

Conclusion(s): Biochemical bone markers provide poor value in the initial diagnosis of osteoporosis. PTH, vitamin D and OC show significant differences between groups; however the definitive diagnosis must be performed with the BMD measurement.

P594
THE INFLUENCE OF HORMONAL CHANGES IN BODY COMPOSITION AND MUSCLE BONE UNIT AT PERIPUBERTAL GIRLS

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Objective(s): Puberty is a key period for influencing the quality of bone. The aim of our study was to determine relationships between factors affecting the growing skeleton in healthy adolescent girls.

Material & Methods: In 100 healthy girls aged 9-15 years, we have examined the biochemical and hormonal parameters related to bone growth and puberty. Bone mineral content (BMC), areal density of the lumbar spine (aBMD L1-4), muscle and fat mass were assessed using DXA GE Lunar Prodigy with paediatric software Encore. We measured muscle strength by dynamometer.

Results: Statistical processing of data using multiple regression showed highly significant relationship aBMD (L_1-L_4) with menarche, stage of puberty according to Tanner, height, muscle strength and lean body mass (LBM)

($p<0.01$). Timing of menarche strongly influences the level of leptin ($p<0.001$). Z-score strongly correlated with the proportion of fat mass ($p<0.01$). Significantly positive relationship is between serum bone ALP, menarche and puberty stage ($p<0.01$). BMC correlates strongly with height, muscle strength and LBM ($p<0.01$). Muscle and bone strength correlates with 25(OH) D. 92% of children had inadequate vitamin D levels <30 ng /ml (75 nmol/l).

Conclusion(s): Strong predictor of maximum PBM is the age onset of menarche-regulated levels of leptin. Parameters bone quality and strength strongly correlated with body composition in relation to the proportion of muscle and fat mass. Vitamin D may directly influence muscle strength during the pubertal growth, providing an alternative pathway by which vitamin D may strengthen bone.

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P595
TOTAL HIP REPLACEMENT IN COXARTHROSIS, COMBINED WITH OSTEOPOROSIS IN YOUNG PATIENTS WITH JUVENILE RHEUMATOID ARTHRITIS

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Objective(s): To implement the functional recovery and quality of life of adolescents with severe coxarthrosis against JRA, in combination with osteoporosis.

Material & Methods: The study is based on an analysis of 42 patients with lesions of the hip against the JRA, in conjunction with osteoporosis, operated in trauma and orthopedic department of scientific center of children health, from 2008-2012. Patient age was 13-18 years (17 male and 25 female). Patients were cure appointing a conservative treatment by bisphosphonates (ibandronate), regulators of calcium-phosphorus metabolism, calcium supplementation. During arthroplasty were used in excess of the small types of leg prosthesis adapted to the size of the femoral canal of teenagers.

Results: Postoperatively, patients were active rehabilitation measures. After completion of the rehabilitation of patients significantly increased range of motion in the hip joints. Analysis of X-ray images during follow-up, demonstrated good positioning of the implant components. Against the backdrop of conservative therapy bisphosphonates positive dynamics index Z-score in densitometry.

Conclusion(s): Total hip arthroplasty and adequate conservative treatment for severe coxarthrosis, is an effective method of comprehensive treatment, which allows to carry out rehabilitation of patients with JRA and to restore their quality of life. The application of modern conservative therapy for osteoporosis allows THA in young patients without risk of premature loosening of the prosthesis and other complications.

References: In patients with severe systemic JRA option is almost always assigned to oral corticosteroids and intravenous injections, which usually contributes to the development of severe metabolic system of osteoporosis. The most effective operative treatment of coxarthrosis is now a total hip replacement that allows surgeons to quickly restore the length of the reference and the function of the affected limb.

P596
SKELETAL DISORDERS ASSOCIATED WITH OSTEOPOROSIS

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Objective(s): Osteoporosis is a systemic skeletal disease characterized by reduced BMD, disrupted bone microarchitecture and alterations in the amount and variety of proteins in bones. The same patient may associate intervertebral disk hernia or different degenerative skeletal system or joint damages such as, degenerative disk disorder (spondylosis), knee osteoarthritis, hip osteoarthritis, scapulohumeral periarthritis with osteoporosis. The aim of the present study was to evaluate the presence of associated skeletal degenerative disorders in cases with osteoporosis and the efficiency of the complex physical- kinetic treatment in these patients.

Material & Methods: We evaluated 84 patients admitted in the Medical Rehabilitation Clinical Hospital Baile Felix, between January 2011 - June 2011, diagnosed with osteoporosis. Their age ranged between 47-76 years. Affected persons were evaluated by DXA technique and radiographs. They followed a complex medical rehabilitation program for 14 days. Treatment objectives and methods aimed rehabilitation of both musculoskeletal associated diseases and osteoporosis. All cases have completed the Qualeffo 48 questionnaire.

Results: 36.90% had associated musculoskeletal diseases. Out of these, 51.63% of the cases had associated degenerative changes in the spine or spinal *disc herniation*, 16.12% had hip osteoarthritis, 12.90% knee osteoarthritis and 19.35% scapulohumeral periarthritis. The mean value for Qualeffo score in cases with associated degenerative pathology was 64.32±16.23 compared to 49.75±9.61, the mean score for patients that had only osteoporosis. Comparing the obtained values, a very significant statistical difference ($p=0.0001$) was noticed.

Conclusion(s): Diagnosing bony *spondylotic changes* of the vertebrae, especially in lumbar spine is extremely important because diagnostic errors can occur by changes of T-score determined by the production of bone (osteophytes) on an osteoporotic bone. Treatment must be complex, targeting both associated degenerative diseases and changes in bone turnover from osteoporosis. Response to therapy is altered because of associated pathology.

P597
RELATIONSHIP BETWEEN TRABECULAR BONE SCORE (TBS), BONE MASS AND MICROARCHITECTURE IN HUMAN VERTEBRAE: AN EX VIVO STUDY

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Objective(s): Although bone mass strongly impacts fracture risk in elderly people, the influence of trabecular bone microarchitecture measured in vivo on the lumbar spine is not completely addressed. The trabecular bone score (TBS) is a grey-level measure of texture using a modified version of experimental variogramm and can be extracted from DXA images. The aim of the current study was to compare the TBS with microarchitectural parameters measured using μCT with a 35 μm isotropic resolution.
Material & Methods: Lumbar vertebrae (L3) were harvested fresh from 16 human donors (7 men, 9 women, age: 82±8 yrs for men and 72±11 yrs for women). The BMD (g/cm^2) of the vertebral body was measured using anteroposterior (AP) and lateral DXA (Delphi W, Hologic) and then the TBS was extracted from AP view. The tridimensional trabecular microarchitecture, bone volume (BV/TV), trabecular thickness (Tb.Th), degree of anisotropy (DA), and structure model index (SMI) which reflects the rodlike vs. platelike nature of the structure were measured using μCT with a 35 μm isotropic voxel size (Skyscan1076).
Results: The TBS was significantly correlated to the BV/TV and SMI (r=0.518 and -0.597; p=0.040 and 0.015; respectively).

Table 1: Spearman correlation between TBS and microarchitecture

	AP BMC (g)	AP BMD (g/cm^2)	Lateral BMC (g)	Lateral BMD (g/cm^2)	BV/TV (%)	Tb.Th (μm)	DA (#)	SMI (#)
r	*0.226*	*0.453*	*0.068*	*0.210*	**0.518**	*0.132*	*-0.184*	**-0.597**
p	*0.399*	*0.078*	*0.803*	*0.434*	**0.040**	*0.626*	*0.496*	**0.015**

Level of Significance; p < 0.05

Conclusion(s): In conclusion, the TBS was significantly correlated to the most relevant microarchitectural parameters used to predict fracture risk (i.e., BV/TV and SMI). The TBS might improve bone assessment in association with BMD using standard DXA and could enhance assessment of fracture risk without requiring μCT acquisitions in elderly patients.

P598
BONE MINERAL DENSITY (BMD) COMBINED WITH MICRO-ARCHITECTURE PARAMETERS (TBS) SIGNIFICANTLY IMPROVES THE INDENTIFICATION OF WOMEN AT HIGH RISK OF FRACTURE: THE SEMOF COHORT STUDY

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Objective(s): The aim of this analysis was to investigate whether combining quantitative (BMD) and qualitative (trabecular bone score, TBS) information obtained from DXA scans performed on a single device contributed to better identification of women at high fracture risk.
Material & Methods: In the prospective SEMOF study, women between 70-80 years old were randomly selected from official state registries between January 1998 - April 2000. Only women who attended their visit at the SEMOF site of the Osteoporosis Policlinic of the University Hospital of Bern, Switzerland, were included in the present analysis. Lumbar spine and hip BMD assessed by DXA (Hologic, USA) and MA evaluation by TBS (Medimaps, France) were recorded. After checking for normal distribution, results of all parameters were expressed as means and SD. The hazard of the first clinical fracture was calculated by using the age and BMI adjusted proportional hazards model of Cox.
Results: The necessary information was available for 557 out of 701 women (79%) with the following baseline characteristics (mean±SD): age 76.1±3.0 years, BMI 25.6±3.9 kg/m^2, lumbar spine and hip BMD, 0.863±0.174 and 0.771±0.121 g/cm^2, respectively, and TBS 1.195±0.115. As expected, correlation between BMD and site matched TBS was low (r^2=0.25). After 2.72±0.77 years of follow-up, the incidence of fragility fracture was 9.4%. Age- and BMI-adjusted ORs (per SD decrease) were 1.6 (1.1-2.1) (AUC=0.68), 1.8 (1.4-2.3) (AUC=0.66), 1.7 (1.2-2.3) (AUC=0.61) for spine, total hip, and femoral neck BMD, respectively, and 1.9 (1.4-2.5) (AUC=0.73) for TBS. TBS remained significant after adjustment of any of the BMD values. When using a triage approach, 57% of fragility fractures had a BMD T-score below -2.5 and 75% of fractures had a TBS<1.200. Combining

BMD≤-2.5 SD at any site or TBS<1.200 identified 85% of all women with an osteoporotic fracture.

Conclusion(s): These preliminary results confirm the partial independence between BMD and TBS. More importantly, combining TBS and BMD values improved the identification of women with osteoporotic fractures. Thus TBS added to BMD information may become an important parameter for further refining individual fracture risk.

P599
BENEFICIAL EFFECTS OF ZOLEDRONATE COMPARED TO PLACEBO ON SPINE BONE MINERAL DENSITY (BMD) AND MICROARCHITECTURE (TBS) PARAMETERS IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: A 3-YEAR STUDY

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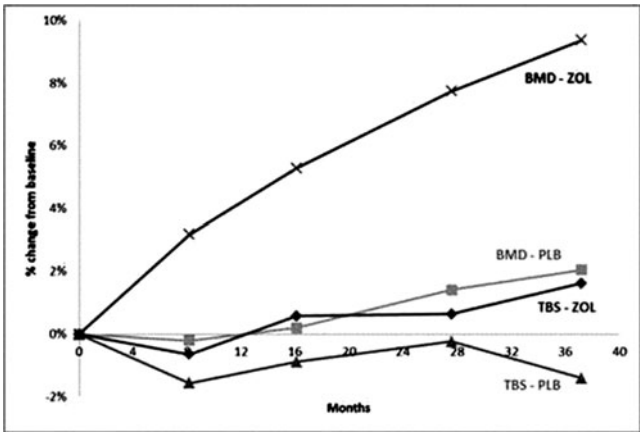
Objective(s): Trabecular Bone Score (TBS, Med-Imaps, France) is an index of bone microarchitecture independent of BMD calculated from anteroposterior spine DXA scans. TBS showed a positive maintenance of TBS in patients treated with alendronate while treatment-naïve controls were significantly losing bone microarchitecture. The aim of this study was to compare the effects of yearly intravenous zoledronate (ZOL) and placebo (PLB) on spine BMD and microarchitecture as assessed by TBS in postmenopausal women with osteoporosis.

Material & Methods: In a subset of 98 patients included in the HORIZON trial, a retrospective analysis was performed. The HORIZON trial was a randomized (1:1), double-blind, placebo-controlled study comparing the effects of once-yearly intravenous ZOL and PLB during 3 years in postmenopausal women with osteoporosis. All subjects received adequate calcium and vitamin D3 supplements. Spine BMD and TBS were assessed by TBS iNsight® at baseline, 9, 12, 24, and 36 months after treatment initiation. An ITT analysis was applied.

Results: Baseline characteristics (mean±SD) were similar between groups in term of age, 76.5±5.1 years; BMI, 24.4±4.1 kg/m^2; L1-L4 T-score, -2.55±1.44, and TBS 1.200±0.12. ZOL induced an early and sustained significant increase in spine BMD compared to placebo (% delta spine ZOL vs. % delta spine PLB at 9 and 36 months, p value<0.01). TBS was significantly greater with ZOL than with PBO at month 36 (p value p<0.05). Spine BMD and TBS were weakly correlated (r^2=0.11). There were no correlations between changes in BMD and TBS from baseline at any visit. This suggests and confirms that TBS reflects bone properties other than BMD.



Conclusion(s): In postmenopausal women with osteoporosis, once-yearly intravenous ZOL therapy significantly increased lumbar spine BMD during three years compared to PLB and prevented bone microarchitecture decay assessed by TBS.

P600
AN AUDIT OF ANDROGEN DEPRIVATION THERAPY AND BONE PROTECTION IN SECONDARY CARE

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Objective(s): Prostate cancer is the most common cancer in men, with an incidence of 37,000 in 2008 in the UK. Androgen deprivation therapy plays an important role in prostate cancer treatment for many patients. However, hormone treatment is known to reduce bone density, even with short term use. This may lead to morbidity from pathological fractures and has a negative correlation with survival. Bisphosphonates and denosumab can be used to ameliorate these changes in bone mineralisation and thus reduce the incidence of fractures during use of anti-androgens. Currently there are no national guidelines regarding bone protection during and following use of androgen deprivation therapy.

Material & Methods: We audited the management of bone protection in prostate cancer patients starting androgen deprivation therapy over a nineteen month period at Russells Hall Hospital, Dudley, West Midlands. Consideration for risk factors of osteoporosis by clinician use of risk stratification tools (FRAX®), DXA scans and appropriate prescription of preventative treatment with calcium/vitamin D, bisphosphonates and denosumab were reviewed.

Results: A total of 177 cases were analysed. During and following treatment FRAX® score had not been documented for any patient, even in cases of known osteoporosis, and only 2.8% had undergone a DXA scan. Only 2.3% were prescribed calcium/vitamin D and 6.8% received bisphosphonates. Denosumab had not been prescribed throughout this period.
Conclusion(s): Although osteoporosis is a risk with androgen deprivation therapy, here patients at risk of fracture had not been identified by lack of use of risk stratification tools and baseline DXA scans. Yet delays in preventative treatment may have detrimental effects on skeletal health. Agreed national guidelines and educating those managing prostate cancer care are required to make screening for at risk patients standard practice. Re-auditing following guidance is necessary.

P601
DEGENERATIVE CHANGES AT THE LUMBAR SPINE – IMPLICATIONS FOR BONE MINERAL DENSITY MEASUREMENT IN ELDERLY WOMEN

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Objective(s): In the elderly, degenerative manifestations in the lumbar spine may result in falsely elevated BMD values, consequently missing a large proportion of those with osteoporosis. Our aim was to determine the impact of degenerative changes on lumbar spine DXA measurements over time and the implications for the clinical diagnosis of osteoporosis.
Material & Methods: The study participants were 1044 Swedish women from the population based Osteoporosis Prospective Risk Assessment study (OPRA) cohort. All were 75 yrs at invitation and followed up after 5-years (n=698) and 10-years (n=380). BMD was assessed using the Lunar DPX-L DXA. Degenerative changes (disc space narrowing, osteophytes, asymmetric subchondral sclerosis or facet joint sclerosis) were evaluated visually on the DXA image for each vertebra L1-L4 (intra observer precision kappa values 0.66-0.7). Evaluation of spinal X-rays was also made for comparison.
Results: At baseline, degenerative changes were more frequent in the distal part of the lumbar spine: 5% (L1), 15% (L2), 26% (L3), 36% (L4) and increased over time. At 10-year follow-up incidence was: 20% (L1), 39% (L2), 59% (L3), 72% (L4), manifesting as a significant increase in overall BMD. Reanalysis following exclusion of all cases with degenerative changes resulted in BMD remaining stable between 75-85 yrs rather than the expected bone loss. Using the criteria (L2-L4 BMD <2.5SD), at baseline, 33% of women had osteoporosis. Excluding individuals with degenerative changes, this proportion increased to 42%. Using L1-L2, which are less prone to degenerative changes, as the diagnostic site, 46% of women were classified as osteoporotic. Use of bisphosphonates, calcium, D-vitamin or HRT did not significantly alter the results.
Conclusion(s): Our results confirm that degenerative changes are common in elderly women, accelerate disproportionately over time, are more frequent in vertebrae further distally, with a gradient from L1-L4 and have significant impact on DXA measurements. Interestingly, even in the absence of degenerative changes, BMD is maintained rather than lost over time in elderly women. We conclude that the DXA image offers sufficient precision to detect degenerative changes and used in conjunction with BMD measurements improves interpretation of osteoporosis status. Clinically, diagnosis of osteoporosis and evaluation of therapy would be improved by routinely assessing vertebrae L1-L2.

P602
VITAMIN D SUPPLEMENTATION IN HYPERTHYROIDISM IMPROVES BONE DENSITY

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Objective(s): We have previous reported that patients with hyperthyroidism have vitamin D deficiency which exacerbates bone loss. Therefore this study was done to examine the effect of vitamin D supplementation on bone density in patients with hyperthyroidism.
Material & Methods: Seventy consecutive patients with hyperthyroidism attending endocrine clinic of Lok Nayak Hospital, New Delhi, recruited during two years. Similar number of age and sex matched controls were also included as controls. Serum analysed for T4, TSH, 24 (OH) D and PTH levels. BMD was measured using Hologic DR 4500A densitometer at hip and lumbar spine. Half of the patients were randomized to receive either vitamin D 60,000 IU per month and 1 g calcium. Parameters of bone homeostasis were reanalyzed after one year of vitamin D supplementation. Data was analyzed using SPSS 12.0 computer software. Student t test was used to establish whether differences existed within study groups. Chi-square test was used to assess differences in the frequency of different indices between vitamin D deficient and sufficient group. Pearson correlation test was used to assess relationship among study variables.
Results: The mean age of the subjects was 39 (10.0) years. Serum calcium, phosphorous, alkaline phosphates and PTH levels were comparable in patient and control groups. Mean

(SD) vitamin D levels were significantly lower in patients group compared to controls [19.24(10.15) vs. 28.38(14.56)] ng/ml. BMD at hip and lumbar spine was significantly lower in patient group. There was a correlation between vitamin D and bone density. Group randomized to vitamin D and calcium supplementation had significantly higher vitamin D levels and bone density at end of one year.

Conclusion(s): Patients with hyperthyroidism are vitamin D deficient compared to controls. Vitamin D and calcium supplementation improves bone density at end of one year.

References: 1. Dhanwal DK, Kochupillai N, Gupta N, Cooper C, Dennison EM. J Clin Densitom 2010;13:462. 2. Dhanwal DK, Gupta N. J Assoc Physicians India 2011;59:562.

P603
FUNCTIONAL ACTIVITY AND QUALITY OF LIFE IN PATIENTS WITH VERTEBRAL FRACTURES

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Objective(s): The purpose of the study was to examine the functional activity and quality of life in patients with vertebral fractures.

Material & Methods: We examined 153 women aged 60-89 years old in postmenopausal period (mean age 69.67 ±0.54 years). Patients were divided into two groups: the first (control group) – without osteoporotic fractures, and the second – with vertebral fractures. Methods of research - questionnaires (to assess life style, Euro-Qul-5D, Roland-Morris, ECOS-16), functional tests (dynamometry, static balancing, 15-m test), Thomayer's, Schober's, Ott's tests, orthopedic examination (range of movement assessment in the thoracic/lumbar spine, determination of the chest excursion and breath holding spell), DXA.

Results: BMD of lumbar spine and femoral neck in patients with vertebral fractures was significantly lower than appropriate data in control group. Indexes of quality of life and daily activity in patients of the second group were considerably lower compared to the control group. It was found significant differences in Schober's test ($p=0.04$) and parameters of movement of the thoracic and lumbar spine ($p=0.04$). Others functional tests were without significant difference. In patients without vertebral fractures it was found the significant positive correlation between BMD of the femoral neck and lumber spine and data of functional tests indexes such as dynamometry, Thomayer's, Schober's tests, maximum and average chest excursion. In contrast, patients with vertebral fractures didn't have significant correlation between BMD data and indexes of functional tests and orthopedic examination data. In patients with vertebral fractures was determined significant correlation between ECOS-16 indexes and Schober's tests ($p=0.006$) and breath holding spell ($p=0.03$) in contrast to patients without vertebral fractures.

Conclusion(s): Our study found significant correlations between BMD and some functional tests in patients without vertebral fractures. Vertebral fractures leads to reducing of functional ability and decreasing of quality of life.

P604
TRAP5B AND SCLEROSTIN IN MGUS AND MULTIPLE MYELOMA RELATIONSHIPS WITH HISTOMORPHOMETRY

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Objective(s): Multiple Myeloma (MM) is characterized by an increase in bone resorption and a depression of osteoblast function. Wnt pathway is involved in the pathophysiology of MM as DKK1 is produced by plasma cells to decrease bone formation. Little is known on the implication of sclerostin, another inhibitor of the Wnt pathway. The aim of the study was to evaluate serum level of sclerostin in MM and MGUS patients and to see if relationships exist with histomorphometric parameters of bone formation. Similar analysis was conducted with TRAP5b.

Material & Methods: 108 patients (47 male / 61 female, mean age 63±10 years) were included in the study: 58 with MGUS and 50 with MM. Dosage of TRAP5b (Quidel) and sclerostin (TECOmedical) was performed by ELISA. Dosages were also performed on 12 healthy controls. Among the 108 patients, 89 patients had a transiliac bone biopsy (39 MGUS, 50 MM). Dynamic bone formation parameters (MS/BS and Aj.Ar) and osteoclastic parameters (ES/BS and N. Oc/B.Ar) were compared with TRAP-5b and/or sclerostin level.

Results: Sclerostin level was significantly higher in MGUS patients compared to controls; no significant differences were found in MM patients. TRAP5b level was significantly higher in both MM and MGUS patients compared to healthy controls; TRAP5b value in MM patients was significantly higher compared to MGUS (3.56±0.27 vs. 2.87±0.17, $P<0.05$). Aj.Ar and MS/BS were not different between MM and MGUS. In contrast, N.Oc/B.Ar and ES/BS were significantly increased in MM patients compared to MGUS (resp. +58.1%, $P<0.01$; +20.3%, $P<0.01$). We found no correlation between sclerostin level and bone formation

parameters. In contrast, a significant correlation was found between TRAP5b level and N.Oc/B.Ar (r=0.56, P<0.01).

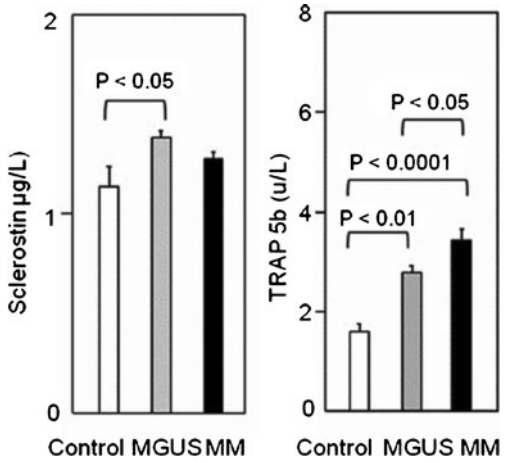

Figure. Serum results from dosage on 39 MGUS and 50 MM patients

Conclusion(s): Sclerostin could not be used as a predicting factor of depressed bone formation in MM. In contrast TRAP5b reflected the bone resorption level in MGUS and MM patients.

P605

OSTEOPOROSIS IN WOMEN WITH EARLY SURGICAL MENOPAUSE

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Objective(s): To determine total body and regional BMD in a cohort of women with early surgical menopause due to gynecological causes.

Material & Methods: 37 women with early surgical menopause, mean age 35.72±11.5 years were evaluated regarding lumbar spine and total hip BMD by DXA. Total body measurements were done with the same device and the results were compared with 37 age-matched controls.

Results: In women with early surgical menopause, BMD was reduced in both lumbar spine (T-score -1.15±1.52) and total hip (T-score -0.71±0.95) as compared with controls (T-score 0.13±1.12, respectively 1.33±0.41, all p<0.05). Total body BMD was also significantly lower in the studied lot patients (p<0.05) and it was correlated with spine BMD (r= 0.70; p=0.00523) but not with total hip BMD. Lumbar spine BMD was also correlated with menopause duration and with the age at menopause onset.

Conclusion(s): We found spine osteopenia or osteoporosis in 51.43% patients, while 32% had hip osteopenia and none had hip osteoporosis. Early menopause age is associated with generalized bone loss that occurs early after its onset.

P606

FALL RISK ASSESSMENT PREVENTS OSTEOPOROTIC FRACTURES

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Objective(s): It is estimated that 30% of those over 65 years fall annually and half are repeated fallers. This percent is increased in osteoporotic patients, 50% of them, aged 65 or more, fall, suffering fractures. Elder individuals without risk factors or with only one, will have a risk of about 27% of falling each year. This increases to 78% for cases with 4 or more risk factors. Fall frequency is estimated to 2-3 every year. Fear of falls leads to the imposition of restrictions regarding physical activity and social contacts. Our hypothesis was that physical training can prevent falls.

Material & Methods: We conducted a clinical epidemiological randomized, observational study on a number of 87 patients aged over 65 years, diagnosed with type I or II osteoporosis, admitted in the Medical Rehabilitation Clinical Hospital Baile-Felix, Romania, between June-December 2011. Fall risk assessment was performed by means of simple tests that can reveal diminishing of legs functionality and are considered as good independent predictors for falls: chair rise test, Tinetti gait test, tandem standing test, Get Up and Go test. Risk assessment tools are designed to help target those at high risk of falling and to establish prevention strategies to individual risk profiles. Rehabilitation program objectives were maintaining functional capacity, maintaining musculoskeletal integrity. Physical therapy is extremely important. Duration of exercise, frequency, rate and effort intensity were dosed. The type of exercise took into account each patient's functional capacity. Walking was the basic exercise dosed by distance and rate.

Results: Mean values are calculated. Tandem standing test was 9.51±2.17, Get Up and Go test 12.61 s; Chair Rise test 17.16, Tinetti gait test 16.21. Next monitoring will be done over six months.

Conclusion(s): Preventing falls prevents osteoporotic fractures. Physical therapy may improve therapeutic results.

P607

DYNAMICS OF GROWTH RATE OF 3 LUMBAR VERTEBRAE OF WHITE RATS AFTER INHALATION OF TOLUENE AND ITS CORRECTION BY THIOTRIAZOLIN

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Objective(s): To study the growth characteristics of 3 lumbar vertebrae of white rats after a 60-day toluene inhalation, well as the rationale the possible ways of correcting by thiotriazolin.
Material & Methods: An experimental study was carried out on 180 white mongrel adult male rats in SI "Lugansk State Medical University" and kept in accordance with the requirements and provisions established "European Convention for the Protection of Vertebrate Animals used for Experimental and Scientific Purposes" (Strasbourg, 1986). Rats were taken out of the experiment at 1, 7, 15, 30, 60 days after the completion of a 2-month exposure of toluene by decapitation under ether anesthesia.
Results: We found that body height of third lumbar vertebra was less than the values of the control group, respectively, at 5.12%, 6.27%, 6.69%, 3.28% and 4.80%. This indicates about the oppression of bone growth by vapor of toluene. Maximum body width at of third lumbar vertebra was also lower, but significantly different from control values only to the 7 day - at 7.51%. Simon index of the third lumbar vertebra was greater than control values, but this difference did not reach limits of the confidence interval. Intraperitoneal injection of 2.5% thiotriazolin solution in a dose 117.4 mg/kg body weight of rat was accompanied by a slight acceleration in both longitudinal and transverse growth of the studied bones. Body height of third lumbar vertebra has exceeded the value of the experimental group from 15 to 60 day experiment, respectively, at 5.01%, 5.19% and 4.27%.
Conclusion(s): Inhalation of toluene leads to the slowing of longitudinal and appositional growth of third lumbar vertebra. The use of thiotriazolin simultaneously with inhalation of toluene reduces the negative effect of the experimental conditions.

P608
ACCURACY OF APPLICATION OF WHO FRACTURE RISK ASSESSMENT (FRAX™) FOR PREDICTION HIO FRACTURE IN KHON KAEN HOSPITAL THAILAND

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Objective(s): The aim to determine the FRAX® tool (10-year probability of hip fracture) in Thai peoples ages over 50 years who have fragile fracture around hip as a diagnosis test.
Material & Methods: The retrospective study was conducted during 2008-2010 by chart review and interview. 366 patients over the age of 50 with fragile fracture around hip were recruited compare with aged match control group, 380 patients. 10-year probability of hip fracture was evaluated by using the FRAX® WHO Tool (available at http://www.shef.ac.uk/FRAX/index.htm). We used age, sex BMI and 7 clinical risk factors without BMD due to limited healthcare resources. The output was based on China model. The probability of hip fracture more than 3% should be assumed as patients fracture and needed to intervention.
Results: The populations in both groups were similar in age and gender ratio. At the cut point, probability of hip fracture was more than 3%, in these groups showed 190 in 366 patients and 117 in 380 control groups. The sensitivity was 0.62.The specificity was 0.60. Positive predictive value (PV+) was 0.52. The Negative predictive value (PV-) was 0.69. And Likelihood ratio LR (+ve) was 1.54, LR (-ve) was 0.64
Conclusion(s): WHO fracture risk assessment tool used 10-year probability of hip fracture at cut point 3% was ineffective and had limitation to predict fracture in Thai peoples. Because of low sensitivity and specificity, this tool may not suitable for the screening method for population with risk for fragility fracture. Further cohort study, vary in cut point decision and country-specific calculation tools especially in Thai model were needed to confirm this study.

P609
BENEFICIAL EFFECTS OF PTH ON SPINE BONE MINERAL DENSITY (BMD) AND MICROARCHITECTURE (TBS) PARAMETERS IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: A 2-YEAR STUDY

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Objective(s): Trabecular Bone Score (TBS, Med-Imaps, France) is an index of bone microarchitecture independent of BMD calculated from anteroposterior spine DXA scans. TBS was associated with fracture in prior case-control and prospective studies. In addition, an earlier study showed a positive maintenance of TBS in patients treated with alendronate while treatment-naïve controls were significantly losing bone microarchitecture. The aim of this study was to assess the effects of teriparatide, recombinant 1-34 PTH on spine BMD and spine microarchitecture assessed by TBS in postmenopausal women with osteoporosis.
Material & Methods: In this open label multicenter study (Bern and Lausanne, Centers of Bone Diseases), 82 women were treated with teriparatide during 2 years. At the lumbar spine, BMD was assessed by DXA (Hologic Discovery) and TBS parameters were assessed by TBS iNsight (v1.9) at baseline and after 24 months of treatment. ISCD-like rules for individual vertebrae

exclusion were applied independently for BMD and TBS. The analysis was by ITT.

Results: Baseline characteristics (mean±SD) were similar between groups in term of age, 69.2±10.3 years; BMI, 23.9±4.3 kg/m^2; L1-L4 BMD, 0.785±0.15 and TBS 1.213±0.11. The correlation between BMD and TBS at the lumbar spine was very low (r^2=0.13). Over 2 years, L1-L4 BMD increased significantly by +7.6% ($p<0.001$) and Spine TBS increased by +4.3% ($p<0.001$). At 2 years, there was no correlation between the changes in BMD and TBS from baseline.

Conclusion(s): In postmenopausal women with osteoporosis, a 2-year treatment with teriparatide lead to an independent increase in BMD and TBS at the lumbar spine, suggesting that teriparatide has independent positive effects on spine bone mass and microarchitecture.

P610

VITAMIN D STATUS IN HUNGARIAN CHILDREN: HEALTHY VOLUNTEERS, OBESE CHILDREN AND PATIENTS WITH TYPE-I DIABETES MELLITUS

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Objective(s): Vitamin D deficiency is one of the most frequent medical deficits in the developed countries. The lack of vitamin D has a negative impact on the musculoskeletal system, moreover, it can promote development of numerous malignant, autoimmune and metabolic diseases. Serum concentration of 25(OH)D3 has been accepted as a validated indicator for vitamin D supply. The aim of this study was to survey the level of vitamin D supply in a healthy young population as well as in children with obesity or with type-I diabetes mellitus.

Material & Methods: 462 healthy children (223 boys and 239 girls, aged 4-19 ys) with normal BMI (according to the Hungarian National Standards) participated in the survey. 73 children with obesity and 36 with type-I diabetes mellitus were also studied. Serum 25(OH)D3 level was measured by chemiluminescent immunoassay (Diasorin test, Liaison automat) in fasting blood sample of all cases. The results were evaluated according to age, sex, Tanner's stage and the season. Differences among the groups and relationships to the seasons were analyzed by SPSS.

Results: Severe vitamin D deficiency (less than 20 ng/ml) was found in 21% of healthy children. Another 34% showed insufficient vitamin D supply as their 25(OH)D3 levels were found between 20 and 30 ng/ml. A continuous decrease of the level has been observed from summer to spring with the deepest values in February. Gender had no impact, while the vitamin D deficiency was found being more expressed in the pubertal than in prepubertal children. The 25(OH)D3 levels in obese children were slightly lower than in healthy volunteers. No differences were found between healthy and type-I diabetic children.

Conclusion(s): This is the first pediatric survey of vitamin D status done by modern methods in Hungary. Our observations suggest that the majority of Hungarian children develops under pressure of vitamin D insufficiency. This incidence is especially expressed in puberty, a period of exclusive importance for skeletal, immune and metabolic maturation. The growing frequency of pediatric obesity provides a further aggravation in vitamin D deficiency while type-I diabetes mellitus has no more impact.

P611

PREDICTION OF FRAGILITY FRACTURE WITH THE FRAX TOOL IN POSTMENOPAUSAL WOMAN IN THAILAND

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Objective(s): The purpose of this study was to determine the output of FRAX® tool in postmenopausal woman in Thai people at the age over 50 years old.

Material & Methods: The retrospective data of 715 people (average age of 72 year old) from 2008-2010 were reviewed by interviewing and medical record. The patient group, 374 cases at the age over 50 years who were diagnosed with a major osteoporotic fracture (spine, forearm, hip or shoulder), were recruit. The control group was age-related people. The FRAX® tool (age, sex, BMI, and 7 clinical risk factors) was used to assess 10-year probability of major osteoporotic fracture. The T-score for BMD was not included due to incomplete data correction. The data was calculated by using WHO fracture risk assessment tool based on Hong Kong country with the reason of higher sensitivity and specificity than other Asians countries. Over 20% of major osteoporotic fracture probability (the cut point) was decided to be treated and assumed as risky fracture patients and assumption as diagnosis test.

Results: Age and gender ratio from both groups were similar. At the cut point, probability of major osteoporotic fracture was more than twenty percent; 261 out of 355 in

the fracture group and 133 out of 460 in the control group. Sensitivity and Specificity were 0.73 and 0.63, respectively. Positive predictive value (PV+) was 0.66. The Negative predictive value (PV-) was 0.71. And Likelihood ratio LR (+ve) was 1.99, LR (-ve) was 0.42

Conclusion(s): Using the FRAX® tool with the cut point of 20% to predict fracture for postmenopausal woman in Thai population was accurate. It may appropriate for screening people who have risk of fragility fracture due to moderate sensitivity and specificity. Thai specific data reference, prospective cohort study and vary in cut point are needed to improve evaluation of the probability of fracture.

P612

HIGH SERUM CYSTATIN C PREDICTS INCIDENT HIP FRACTURE IN ELDERLY MEN: MROS SWEDEN

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Objective(s): Serum Cystatin C is widely used as a serum marker for renal function. High values are related to poorer kidney function. Earlier studies of postmenopausal women have indicated a higher risk of hip fracture in women with high serum Cystatin C. However in elderly men there are few data showing that increased risk of hip fracture is related to high Cystatin C. The aim of this study was to examine the association of high Cystatin C and incident hip fractures in men.

Material & Methods: We used the MrOS, Sweden cohort (n=3014) of men aged 69-80 years who were recruited from a national population register. BMD was measured with Lunar and Hologic DXA and standardized BMD was estimated. All incident fractures were collected from national X-ray registers during the 7 years following baseline. A total number of 388 men sustained one or more fractures, including 90 hip fractures. Cystatin C was measured by immunoturbidimetry with polyclonal antibodies against human Cystatin C.

Results: Serum Cystatin C increased with age ($p<0.001$). The mean value was 1.138 mg/l (0.30). Estimated GFR was below 45 ml in 7.9% and in 27.1% below 60 ml. High Cystatin C was associated with BMD of the lumbar spine ($r=0.06$, $p=0.001$) but not with hip BMD ($r=-0.04$, $p=0.052$). There was a linear association with serum Cystatin C and all types of fractures (GR 1.14(CI 1.1-1.2)) adjusting for BMI, hip BMD, age, previous fracture and general health. Cystatin C (per SD increase predicted hip fracture [HR 1.26(CI 1.03-1.54)]. The HR for hip fracture was 1.90 (CI 1.24-2.93), adjusting for age and center, when comparing quartile IV vs. quartile I-III. A multivariate model including hip BMD, BMI, age and center showed increased hip fracture risk [HR 1.71 (CI 1.10-2.65)] when comparing quartile IV against quartile I-III of Cystatin C. The multivariate hip fracture risk adjusted for age, hip BMD, BMI and center for men with GFR below 45 ml was HR 2.6 (CI 1.5-4.4) and below 60 ml HR 1.8 (CI1.1-2.7).

Conclusion(s): We conclude that high Cystatin C is related to increased risk of hip fractures in elderly men.

P613

VITAMIN D SUPPLEMENTATION AS AN ADJUVANT THERAPY FOR SAUDI PATIENTS WITH T2DM: AN 18-MONTH INTERVENTIONAL STUDY

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Objective(s): Vitamin D deficiency has been shown to impair human insulin action, suggesting a role in the pathogenesis of type 2 diabetes mellitus (T2DM). Despite the level of sunshine in Saudi the population has significant vitamin D deficiency based on our previous studies. In this prospective interventional study we investigated the effect of vitamin D (Vit D) supplementation in the metabolic and glycemic profiles of the Saudi T2DM subjects pre and post supplementation to improve known Vit D deficiency compounded in metabolic states such as T2DM.

Material & Methods: T2DM Saudi subjects (men: age: 56.6±8.7 yr, BMI, n=34; 29.1±3.3 kg/m^2; females: age: 51.2±10.6 yr, BMI 34.3±4.9 kg/m^2; n=58) were recruited and given 2000 IU vitamin D3 daily for 18 months.

Anthropometrics and biochemical data was collected (0, 6, 12, 18 months) to monitor serum 25 hydroxyvitamin D [25 (OH) D (nmol/L)] using a commercial ELISA, as well as glycemic and lipid profiles.

Results: In all T2DM subjects there was a significant increase in mean circulating 25(OH)D levels from baseline (32.2±1.5 nmol/L) to 18 months (54.7±1.5 nmol/L; $p<0.001$) as well as with serum calcium [baseline=2.3 ±0.23 mmol/L vs. 18 months=2.6±0.1 mmol/L; $p=0.003$). A significant increase in HDL-cholesterol was noted only in females ($p<0.001$), as well as a significant decrease in LDL-calcium [baseline=4.4±0.8 mmol/L vs. 18 months=3.6±0.8 mmol/L] and total cholesterol calcium [baseline=5.4±0.2 mmol/L vs. 18 months=4.9±0.3 mmol/L] ($p<0.001$ and $p<0.001$, respectively). Glycemic parameters (glucose, insulin, HOMA-IR), blood pressure and BMI were comparable.

Conclusion(s): In summary, the results highlight that despite oral vitamin D supplementation (2000 IU/day) in Saudi subjects with T2DM; circulating 25(OH)D levels still remain deficient by 22% below normal 18 months post treatment. However, supplementation appeared to significantly improve lipid profile with a change in HDL/LDL ratio which was more pronounced in T2DM females, offering other benefits for health. This study suggests that T2DM Saudi subjects require a higher Vitamin D supplementation (3000 IU/day) as a clinical recommendation to achieve normal vitamin D status.

Disclosures: Many thanks to King Abdulaziz City for Science and Technology for funding this study.

P614
QUALITY OF BONE MINERAL DENSITY REPORTING IN POST-FRACTURE CARE IN ONTARIO, CANADA

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Objective(s): To determine whether or not Canadian Association of Radiologist (CAR) or WHO diagnostic categorizations for osteoporosis were prevalent in reports in 2008; 2) 2008 fracture risk assessments incorporated risk factors such as history of fragility fracture, as mandated by CAR in 2005; and 3) the overall format of 2008 reports, on average, conformed to CAR's 2005 published standards.

Material & Methods: The reports examined were collected as part of a cluster randomized trial focusing on the treatment of individuals with a recent fragility fracture. Diagnoses and assessments produced by the research team were then compared to those produced by the reading specialist. To determine if risk assessments in 2008 conformed to CAR's 2005 recommendations, the research team first extracted the following information from the gathered reports: age, sex, and the lowest T-score from the lumbar spine (L2-L4), femoral neck, and total hip. The lowest T-score, in combination with each patient's age and sex were then used by the research team to calculate baseline 10-year absolute fracture risk as per guidelines.

Results: A total of 53 follow-up BMD reports were gathered from those who had a DXA. Of these reports, 2 were excluded from the present analysis because they predated the participants' fracture; 1 was excluded because it was produced by a clinic outside of Ontario. An additional 2 were excluded because they were incomplete when received. This resulted in BMD reports for 48 patients in the pool of those eligible for analysis. In accordance with CAR guidelines, 33.3% of BMD reports that should have provided a fracture risk assessment of "moderate" were reported as "low". Similarly, 14.8% of reports that provided a fracture risk assessment of "moderate" should have provided a fracture risk assessment of "high".

Conclusion(s): This study has highlighted the overall poor quality of Ontario's BMD reports produced in non-urban centres as of 2008, in terms of missing clinical risk factors that modify fracture risk. The lack of this information has implications in terms of fracture risk categorization and subsequent follow-up care and treatment recommendations.

P615
THE PHYSICAL AND PSYCHOLOGICAL CONSEQUENCES ON QUALITY OF LIFE IN PATIENTS WITH UPPER LIMBS OSTEOARTHRITIS

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Objective(s): To assess the impact on quality of life of a group of patients with upper limb osteoarthritis.

Material & Methods: We studied a group of 97 patients with upper limbs osteoarthritis, divided in two subgroups, first subgroup of 49 patients underwent a physical rehabilitation program three times per week for 12 months and the second subgroup of 48 sedentary patients. All the patients were assessed with Short Form 36 and Beck Depression Inventory(BDI) at baseline, at 6 months and at 12 months. The Short Form 36 is a complex questionnaire that measures eight domains of health which include physical functioning, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems and mental health. The BDI is widely used screening instruments for measuring the severity of depression in adults. The inventory is composed of items relating to depressive

symptoms such as: hopelessness and irritability, cognitions (such as guilt or feelings of being punished), physical symptoms (such as fatigue, weight loss, and lack of interest in sex).

Results: In the subgroup of patients who underwent rehabilitation program both Physical Component Summary (PCS) and Mental Component Summary (MCS) improved at 6 months and the improvement in quality of life was greater at 12 months than in the second subgroup of sedentary patients which showed no improvement in quality of life.

Conclusion(s): An active life and a regular physical exercise programme play an important role in wellbeing and in enhancing one's quality of life.

P616

SPINE TRABECULAR BONE SCORE (TBS) SUBSEQUENT TO BMD IMPROVES VERTEBRAL AND OP FRACTURE DISCRIMINATION IN WOMEN

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Objective(s): Assessing trabecular architecture in routine in addition of BMD should improve identification of those at high fracture risk. This study used a novel software program (TBS iNsight®, Med-Imaps, FR), which utilizes greyscale pixel assessment to estimate trabecular microarchitecture (trabecular bone score [TBS]) from standard spine DXA images. We hypothesized that TBS assessment would differentiate women with low trauma or prevalent vertebral fracture (VF) from those without.

Material & Methods: DXA lumbar spine (LS), proximal femur and vertebral fracture assessment (VFA) images (Prodigy or iDXA, GE Healthcare, USA) were utilized from 441 women who participated in studies at the University of Wisconsin-Madison. VFAs were evaluated for fracture by an experienced clinician. TBS was assessed by Lausanne University (CH) and blinded to fracture status. Appropriate statistics were applied and a triage approach using a TBS threshold of 1.200 subsequent to the WHO classification on the lowest of hip or LS BMD was used to test the enhancement of identifying individuals at high VF risk.

Results: Mean participant age was 71.6±7.9 years, BMI was 25.6±4.26 kg/m^2, their mean lowest T-score was -2.0±0.75 and had 158 had fractures; VF (93) or other self-reported low trauma fracture. Correlation between LS BMD and TBS was low (r=0.26). Adjusted ORs for all fractures were 1.63 (CI: 1.2-2.2; AUC 0.62) for BMD lowest T-score and 2.46 (CI: 1.9-3.1; AUC 0.74) for TBS. TBS remained significant after adjustment for LS BMD or the BMD lowest T-score (OR=2.36; CI 1.8-3.0, AUC: 0.70). When considering only VF and controls the ORs were 2.49 (CI: 1.9-3.3; AUC 0.73) and 2.57 (CI: 1.9-3.5; AUC 0.74) for TBS with and without adjustment for spine BMD respectively. 74% of VF occurred in the non-osteoporotic zone; 37% of these women had a TBS score below the 1.200 Threshold. 55% of nonfractured women were not osteoporotic and only 14% of them were below the lowest TBS thresholds (1.200)

Conclusion(s): TBS assessment enhances DXA by evaluating trabecular pattern and identifying individuals with vertebral or low trauma fracture. As most fractures occur in those with osteopenia, identifying individuals most likely to fracture can facilitate more efficient utilization of healthcare dollars.

P617

VOLUMETRIC BONE MINERAL DENSITY (VBMD) AT RADIUS SITE AND VITAMIN D STATUS IN PREMENOPAUSAL SOUTH ASIAN AND CAUCASIAN WOMEN

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Objective(s): Recent studies indicate that women of European origin have higher areal BMD than South Asian women. However this has been explained by ethnic variation in differences in bone size[1]. Few data exist on true volumetric BMD in premenopausal South Asian at the radius site. As part of the D-FINES (Vitamin D, Food Intake, Nutrition and Exposure to Sunlight in Southern England) study, we aimed to investigate differences in trabecular and cortical volumetric BMD (vBMD) between Caucasian (C) and South Asian (SA) women at the radius site and determine if it associate with serum 25(OH)D.

Material & Methods: 40 healthy premenopausal women (21 C and 19 SA), age ranges 18-55 yrs, were scanned by pQCT at the distal (4%) and (66%) radius (nondominant) using a Stratec XCT 2000 pQCT machine. Fasted blood samples were collected for vitamin D analysis.

Results: SA had significantly higher BMI ($p<0.05$) than C women. SA women had significantly lower vitamin D status than C women ($p<0.001$) with mean values of 31.53[16.32] and 80.91[20.08] nmol/l, respectively.

pQCT variables measured at 4% distal radius in SA and C women

Ethnicity	Mean[SD], SA n=14	Mean[SD], C n=19
Total area (mm^2)	340.95[37.00]**	374.81[43.29]
Total Density mg/cm^3)	312.14[45.61]	315.66[45.35]
Tubercular area (mm^2)	153.30[16.62]**	168.51[19.46]
Tubercular Density (mg/cm^3)	175.40[37.21]	178.98[35.54]
Cortical Sub Area (mm^2)	187.64[20.38]**	206.30[23.83]
Cortical Sub Density (mg/cm^3)	423.87[62.49]	427.32[60.03]

All data were at 4% site;*p<0.05, **p<0.01; Values were analysed by t-test analysis

At the 4% radius site, SA has significant lower mean value for total area, trabecular area, and cortical sub area than C women (P<0.01). SA group has slightly lower mean for total bone density, trabecular density and cortical sub density than C but differences were not significant. Total bone area is significantly negatively correlated with 25(OH)D among SA group but not with C (p<0.001).

Conclusion(s): SA women tend to has lower bone size at 4% distal radius than C women but no association exist with bone density.

References: [1]Roy et al (2005) Osteoporos Int 41:117.

P618

FOCUS (FRACTURES=OSTEOPOROSIS CARE FOR US) ON ADVOCACY INAUGURAL FORUM

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Objective(s): The objective of the Osteoporosis Canada's (OC) FOCUS on Advocacy Inaugural Forum was to bring together related health care professionals and advocates to discuss necessary changes to close the osteoporosis care gap in Canada with province-specific intervention models.

Material & Methods: The FOCUS on Advocacy Forum was attended by a multidisciplinary group of health professionals and OC volunteers from across Canada. The participants included: allied health professionals, family physicians, OC volunteers, endocrinologists, rheumatologists, internists, orthopaedic surgeons, radiologists, and geriatricians. Various interventions including Canadian and International studies were presented focusing on their methods, effectiveness and challenges. The individual needs of each province were discussed and specific mechanisms were developed to address the problem of the care gap by region.

Results: The forum was successful as it achieved a committed advocacy leadership team in each province, the identification of a key request and advocacy plan for each provincial government, and the identification of the needs of the leadership advocacy volunteers.

Conclusion(s): Hundreds of thousands of Canadians needlessly fracture each year because their osteoporosis goes undiagnosed and untreated. Less than 20% of fracture patients are offered assessment and/or treatment for their underlying osteoporosis, meaning in Canada, osteoporosis has an 80% care gap. It is therefore critical that mechanisms be put in place to ensure that an assessment for and treatment of osteoporosis is done for every fracture patient. This involves simple yet integral changes within the current health care system that requires the collaboration of provincial governments in order to make this a reality throughout Canada. Plans will soon be introduced to each provincial government for the purpose of influencing policy makers to make the necessary health system changes that will hopefully significantly reduce fracture risk among Canadians.

Disclosures: Marg MacDonell, Dr. Diane Theriault National Advocacy Co-Chairs

P619

SPINE MICROARCHITECTURE ESTIMATION (TBS) DISCRIMINATES MAJOR OSTEOPOROTIC FRACTURE FROM CONTROLS EQUALLY WELL THAN SITE MATCHED BMD AND INDEPENDENTLY: THE EASTERN EUROPE TBS STUDY

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Objective(s): BMD measurement by DXA is used to diagnose osteoporosis and assess fracture risk. Assessing trabecular architecture should improve identification of those at high fracture risk. This study used a novel software program (TBS iNsight®, Medimaps, Bordeaux, France), which utilizes grey-scale pixel assessment to estimate trabecular microarchitecture (TBS) from standard spine DXA images. We hypothesized that TBS assessment would differentiate women with low trauma fracture from those without and independently of BMD.

Material & Methods: The Eastern Europe Study (EES) is a multicenter study (Serbia, Hungary, Bulgaria, Romania and Poland) aiming at evaluating the role of TBS in clinical routine as a complement of BMD and the clinical risk factors (CRF). All scans were acquired on Hologic Discovery densitometers in routine clinical manner. TBS was assessed by the University of Lausanne (Switzerland) and blinded to fracture status. Age, BMI adjusted odds ratio (OR) per standard

deviation decrease are reported for BMD and TBS. Correlation between LS-BMD and TBS was calculated. Finally, a triage approach using TBS <1.200 subsequent to the WHO classification on the LS-BMD was used to test the enhancement of identifying individuals at high major OP fracture risk.

Results: We recruited 1268 women from the clinical routine and included 1036 of them: mean age 62.0±9.3 y, BMI 26.2±4.6, mean LS-BMD 0.858±0.142, TBS 1.207±0.124. As expected, correlation between BMD and TBS is low (r^2=0.26). Prevalence of VFx grade 2/3, major-OP Fx and all-OP Fx is 6.5%, 20.4% and 25.4% respectively. Age- and BMI-adjusted ORs are 1.86 (1.3-2.6), 1.76 (1.4-2.1), 1.7 (1.4-2.0) for BMD for the different categories of fractures and 1.33 (1.0-1.7), 1.6 (1.3- 1.9), 1.5 (1.3-1.8 & AUC 0.68) for TBS, respectively. TBS remained significant after additional adjustment for spine BMD: OR=1.28(1.05-1.6). 62% of women with major-OP Fx have a non-osteoporotic BMD and 63% of these women with fractures had TBS <1.200. Combining both BMD and TBS allows capturing 77% of the fractures vs. 38%for BMD alone.

Conclusion(s): TBS assessment enhances DXA by evaluating trabecular pattern and identifying individuals with major low trauma fracture. As most fractures occur in those with osteopenia, identifying individuals most likely to fracture can facilitate patient management.

P620
CHANGES OF BONE MINERAL DENSITY IN PATIENTS WITH RHEUMATIC DISEASES

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Objective(s): To evaluate the changes in BMD in patients with rheumatic diseases.

Material & Methods: A retrospective analysis of protocols of X-ray densitometry was performed in patients who were at the dispensary observation in the Rheumatologic Centre of Kazan City in the period from January 2010 - January 2011. 347 patients were included in analysis. 231 of them had rheumatoid arthritis (RA), 63 had ankylosing spondylitis (AS) and 53 had osteoarthritis (OA). The changes of BMD in two points were taken into account: the lumbar spine and proximal femur. T-score was evaluated in postmenopausal women and men older than 50 years. Z-test was evaluated in women before menopause and men younger than 50 years.

Results: 85 (24.5%) of 347 patients (74 women and 11 men) had osteoporosis and 145 (41.8%) patients (121 women and 21 men) had osteopenia according to the criteria of WHO. Distribution by rheumatic diseases was as follows. 55 (23.8%) of 231 patients with RA had osteoporosis and 89 (38.5%) had osteopenia. 13 (20.6%) of 63 patients with the AS had osteoporosis and 32 (50.8%) had osteopenia. Osteoporosis and osteopenia were revealed in 17 (32.1%) and 24 (45.3%) of 53 patients with OA, respectively.

Conclusion(s): Osteoporosis is often met in rheumatic diseases, especially in RA and AS. However, the prevalence of osteopenia is even higher and this situation requires the actions for prevention of osteoporosis and fractures. In addition, osteoporosis and osteopenia in OA were observed much more often than it was thought previously.

P621
BONE QUALITY IN HIP OSTEOARTHRITIS AND OSTEOPOROSIS: CLINICAL AND HISTOMORPHOMETRICAL CONSIDERATIONS

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Objective(s): We aimed at clarifying the relationship between OA and OP by combining both clinical (Harris Hip Score, HHS) and structural features (BMD and bone histomorphometry).

Material & Methods: BMD and bone quality (using bone histomorphometry) were assessed in 80 consecutive patients undergoing hip arthroplasty for osteoporotic femoral fracture (n=20, mean age 79.7) or severe OA with different BMD values (n=60: 20 patients with normal BMD, 20 patients with osteopenic BMD and 20 patients with osteoporotic BMD; mean age 68.4 years). An X-ray evaluation of the pelvis and HHS were also performed in all studied subjects. During surgery, a double osteotomy of the femoral head was performed and the samples were used for histomorphometry through Bio Quant software.

Results: Histomorphometrical analysis showed that bone volume fraction (BV/TV) was significantly lower in subjects with femoral neck fracture (19.98±4.72%) than subjects with nonosteopenic OA (31.19±5.47%; P<0.01) or osteopenic OA (28.45±5.77%; P<0.01), respectively. No difference between subjects with OP fractures and those with combined OA and OP (23.58±4.47%) was detected. Moreover, clinical scores tended to be associated with BMD and histomorphometric features; where the HHS score was lower, we also found lower BMD and BV/TV values.

Conclusion(s): Our data support evidences from recent studies indicating impaired bone quality in OA and absence of protective effect against OP.

P622
DIFFERENCE BETWEEN TOTAL AND INTACT ASSAYS FOR N-TERMINAL PROPEPTIDE OF TYPE I PROCOLLAGEN IN RENAL IMPAIRED PATIENTS

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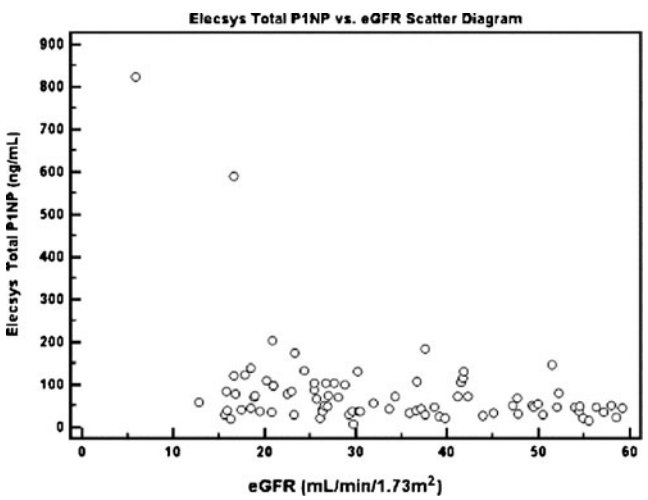
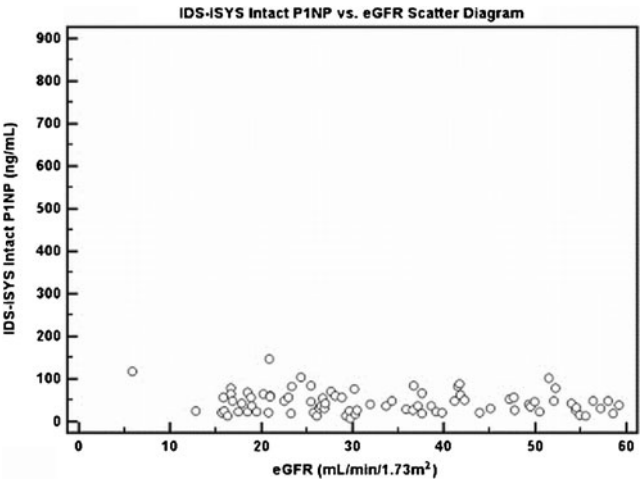
Objective(s): The amino-terminal propeptide of type I procollagen (P1NP) circulates as different forms: the larger intact trimeric and several fragment monomers. In healthy individual, the circulating P1NP is predominantly the trimeric intact with almost non-detectable monomers. Under certain conditions, especially in renal impaired patients, the proportion of monomeric form is elevated. Intact P1NP assay measures the trimeric propeptide while Total P1NP assay measures both trimeric and monomeric forms. In this study we compared these two assays in renal impaired patients.

Material & Methods: 84 serum specimens from CKD Stage 3 to 5 not on dialysis and 125 specimens from Stage 5 Dialysis patients were analyzed with the IDS-iSYS Intact P1NP and Roche Elecsys Total P1NP assays.

Results: In CKD not on dialysis subjects, the observed ranges for Total P1NP and Intact PNP were 8.5-822.8 ng/mL and 8.2-146.5 ng/mL, respectively. The correlation between the Total P1NP and GFR was r=-0.3373 (p=0.0017) and between the Intact P1NP and GFR was r=-0.1483 (p=0.1782). In Stage 5D subjects, the observed ranges were 18.4-2192.0 ng/mL for Total P1NP and 16.3-641.6 ng/mL for Intact P1NP. Their Passing Bablok regression was Total P1NP=3.68 x Intact P1NP -64.4.





Conclusion(s): Total P1NP values were much higher than Intact P1NP confirming the Total P1NP assay measures both trimeric and monomeric forms. The significant correlation between the Total P1NP and GFR indicated the Elecsys Total P1NP assay might not be suitable for renal impaired patients; the IDS-iSYS Intact P1NP is preferred.

P623
CHARACTERISTICS OF AND TREATMENT PATTERNS FOR POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS IN THE UK: A RETROSPECTIVE DATABASE STUDY USING THE GENERAL PRACTICE RESEARCH DATABASE (GPRD)

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Objective(s): Certain treatments for osteoporosis tend to be used for patients with more severe disease or who have become intolerant to oral bisphosphonates (OBP). Such practice may increase the risk of observing confounded results in a study of effectiveness and safety. This study aims to explore some of these characteristics.

Material & Methods: Postmenopausal women on treatment for, or with a diagnosis of, osteoporosis between 01/01/1993 and 31/12/2008 were selected from the UK GPRD. Osteoporosis and selected co-morbidities were identified using Read codes and treatment using Multilex Code. We examined characteristics of the year 2008 subpopulation. To evaluate risk

factors for treatment, switching and discontinuation, calendar time was stratified into 4-year periods to account for longitudinal trends in clinical practice. In each period, patients were classified according to the first event (switching or discontinuation) and a multivariable regression model was used to explore associations with patient characteristics over the year prior to switching/discontinuation.

Results: Of 62,657 eligible patients, 38,069 (60.7%) were active in the database on 31/12/2008; 21,667 received osteoporosis treatment in 2008. Selected findings are presented below.

	Patients on OBP in 2008	Patients on other Rx* in 2008	Significance (P value)
Number	21,615	52	-
Mean age (years)	75.1	76.0	-
Mean time since diagnosis of osteoporosis (years)	4.8	5.6	N/S
Median number contacts with practice in 2008 (including prescriptions and consultations)	27	35	<0.01
Prior use of others bone loss therapies	110 (0.51%)	48 (92.31%)	<0.001
Record of any fracture in 2008	1,062 (4.91%)	11 (21.15%)	<0.001
Record of vertebral fracture over study duration	744 (3.44%)	8 (15.38%)	<0.001
Treated with immunosuppressants in 2008	89 (0.41%)	1 (1.92%)	<0.05
Record of chronic obstructive pulmonary disease over study duration	154 (0.71%)	2 (3.85%)	<0.05
History of switching over study duration	60 (0.28%)	26 (50.00%)	<0.001
History of discontinuations over study duration	8,115 (37.54%)	26 (50.00%)	<0.05

*Bone loss therapies other than OBP (ibandronic acid, calcitonin, teriparatide, zoledronic acid, strontium ranelate)

Of those untreated in 2008, 8029 (48.9%) were previously treated. Of 996 patients initiating OBP treatment in 2008, 335 were treatment naïve. These patients were more likely than lapsed users to have a recorded fracture in 2008 (15.8% vs. 7.9%, P<0.001). Older age, rheumatoid arthritis, number of contacts with practice, osteoporosis duration, high BMI, fracture history, and immunosuppressant/glucocorticoid therapy were significantly associated with switching/discontinuation.

Conclusion(s): Despite the limited number of patients treated with non-OBP medications in 2008, it appears these patients are more likely to have taken an OBP in the past, discontinued or switched from their previous bone loss therapy, and have different characteristics than those on OBP. An effective and unbiased study of comparative effectiveness or safety in this area should account for these potential biases.

P624
CORRELATION BETWEEN TRABECULAR BONE STRUCTURE WITH BODY MASS INDEX AND WITH BONE MINERAL DENSITY AT POSTMENOPAUSAL WOMEN

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Objective(s): Measurement of bone mineral density by DXA is used to diagnose osteoporosis and assess fracture risk. Assessing trabecular architecture should improve identification of those at high fracture risk. Our study used a novel software program (TBS iNsight® v1.9), which utilizes grey-scale pixel assessment to estimate trabecular microarchitecture (TBS) from standard DXA images.As low body mass index (BMI) is risk factor for fracture, we wanted to investigate if assessing trabecular architecture in women with normal or high BMI could better indentify those who are in higher fracture risk independently of BMD.

Material & Methods: Our study was performed from April 2011 to September 2011 and included 914 women, 61.99 ±9.277 years old postmenopausal women, referred to our Center for osteodensitometry of lumbar spine and hip.All scans were acquired on Hologic Discovery C device.Than scans were reanalised and TBS was calculated. Before, we filled up questionnaire form, designed to analyze osteoporosis risk factors. TBS was assessed by the University of Lausanne (Switzerland). Correlation between the LS-BMD and TBS was calculated. We used TBS<1.200 as the cut off point for deteoriated microarchitecture. Correlation between patients with normal and high BMI and low BMI, and their BMD and TBS findings were analysed.

Results: Out of 914 postmenopausal women, low BMI had 61 (6.7%), normal 349 (38.2%), and high BMI 504 (55.1%). Average BMD was 0.843±0.133 g/cm², and average TBS was 1.197±0.109.

Conclusion: We found that TBS very significantly negative correlated with BMI (p<0.01), but BMD correlated positively also very significantly with BMI (p<0.01). That might be good explanation for the fact that the most common osteoporotic fractures are in the group of women with BMD at osteopenic level. Our study demonstrate added value of TBS, independent of BMD.

P625

RECOMMENDATION FOR MEASURING CLINICAL OUTCOME IN DISTAL RADIUS FRACTURES

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Objective(s): Lack of standardization of outcome measurement has hampered an evidence-based approach to clinical practice and research. We will report on the progress on establishing a minimal set of core domains for outcome measurement in distal radius fracture.

Material & Methods: We adopted a process of reviewing evidence on psychometric properties, current utilization of measures, an appropriate theoretical framework for health and disability to inform a consensus process that was focused on deriving the minimal set of core domains. Decisions were made by review of evidence and theory and establishing group consensus.

Results: We adopted the International Classification of Functioning, Disability and Health conceptual framework ratified by the WHO to define domains and concepts. In clinical practice, we agreed on the following 7 core recommendations: 1) Pain and function were regarded as the primary domains; 2) Very brief measures were needed for routine administration in clinical practice, 3) These brief measures could be augmented by additional measures that provide more detail or address additional domains for clinical research, 4) Measurement of pain should include measures of both intensity and frequency as core attributes, 5) A numeric pain scale, e.g., Visual Analogue Scale or Visual Numeric Scale or the pain subscale of the Patient-Reported Wrist Evaluation (PRWE) questionnaire were identified as reliable, valid and feasible measures to measure these concepts, 6) For function, either the Quick Disability of the Arm, Shoulder and Hand Questionnaire or PRWE-function subscale were identified as reliable, valid and feasible measures, and 7) A measure of participation and treatment complications should be considered core outcomes for both clinical practice and research.

Conclusion(s): Our approach provides preliminary steps in establishing core domains that have content relevant to patient goals (i.e., pain and function) and the providers' treatment goals (i.e., strength, range of motion, function). The panel recommendations provide flexibility in establishing customized data collection for specific indications; but offer some core consistency.

Disclosures: We would like to acknowledge the joint collaboration between the International Society for Fracture Repair and the International Osteoporosis Foundation.

P626

RISK FACTORS OF OSTEOPOROSIS IN RESIDENTS OF TATARSTAN REPUBLIC (RUSSIAN FEDERATION)

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Objective(s): Nowadays, osteoporosis (OP) is an actual problem. It is not only densitometry, that is important for the diagnosis of OP, but assessment of risk factors too. The aim of our study is to identify the frequency of decrease of BMD and the frequency of risk factors of OP among rural dwellers of the Republic of Tatarstan.

Material & Methods: 1520 people were investigated using DXA. The dynamics of dates were estimated according to T criterion among men over 50 and women in postmenopausal period, among Z criterion among men before 50 years and premenopausal women. Patients were interviewed by questionnaires, which included 30 questions related to the identification of risk factors of OP.

Results: It was found out that 42.4% (634 people) have a decrease in BMD.OP was identified at 25.6% of patients (383 people), osteopenia - at 16.8% of patients (251 people) .863 patients have the normal BMD range. OP mostly represented in women than in men. The factors leading to the development of the OP, are well represented among the villagers, but such risk factors as fractures, low BMD, reduced intake of calcium, heredity were presented more frequently. Lack of physical activity was noted in less than half of rural (42%) residents. In the group with OP 24.3% of patients reported nontraumatic fractures in the history of close relatives while in the group with osteopenia only 18.8% of patients mentioned it. In patients with OP compared with the group with normal BMD were significantly more likely ($p<0.05$) to have RA, thyroid disease, diabetes. 35.1% of patients who takes continuous corticosteroids, were revealed to have OP, at 23.6% - osteopenia. There was a significant correlation between reduced calcium intake and decreased BMD. In group of up to 50 years among both men and women, there were patients with risk of developing OP.

Conclusion(s): Risk factors of lower BMD are well represented in the examined patients with OP and osteopenia. A positive correlation between risk factors and reduced BMD confirms the necessity to identify and assess risk factors of OP.

P627
SECONDARY HYPERPARATHYROIDISM IN WOMEN WITH LOW BONE MASS

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Objective(s): PTH and bone resorbtion increases in elderly women and contribute to age-related bone loss. It is believed that deficiency in vitamin D causes secondary hyperparathyroidism, high bone turnover, mineralization defects, and hip and other fractures. The aim of this study was to assess prevalence of secondary hyperparathyroidism in postmenopausal women with low BMD. We evaluated the serum levels of vitamin D (25OHD) and relationships between 25OHD, PTH and BMD.
Material & Methods: A total of 175 postmenopausal women of the mean age 65.9±10.1 yrs (46-84 yrs) were examined. Measuring of 25OHD and PTH were performed using electrochemiluminiscence immunoassays (Roche Diagnostics, Elecsys 2010). The BMD was measured by the DXA method at the lumbar spine and hip area.
Results: The mean of the 25OHD and PTH were 48.32±22.52 nmol/L and 59.75±30.42 pg/mL (n=175). Decreased values of 25OHD (<75 nmol/L) in n=149 (85.14%), and increased values of PTH (> 65 pg/mL) in n=41 cases (24.1%) were obtained. The BMD values at the lumbar spine (L1-L4) 0.819±0.118, T-score -2.62±0.98; at the total hip BMD 0.755±0.108, T-score -1.87±0.107 and at the femoral neck BMD 0.711±0.115, T-score -1.91±0.806 were found. A strong inverse correlation between 25OHD and PTH ($r=-0.495$, $p<0.001$) were detected. Serum levels of 25OHD correlated to T-score at LS ($r=0.227$, $p<0.05$), PTH correlated to BMD at LS ($r=-0.258$, $p<0.05$), but not at the total hip and femoral neck ($p>0.05$) in the whole group. It was noticed that in the subgroup aged ≥65 years, the prevalence of elevated PTH (54.2%) is similar to those with severe insufficiency of 25OHD ≤30 nmol/L (55.5%). Correlations between 25OHD and T-score LS ($r=0.315$, $p<0.05$), BMD neck ($r=0.321$, $p<0.05$), and PTH with BMD neck ($r=-0.352$, $p<0.05$) were found.
Conclusion(s): The obtained results showed that secondary hyperparathyroidism appears in one four of postmenopausal women with osteoporosis, while vitamin D deficiency was more frequent. Furthermore, hyperparathyroidism predisposes to cortical rather than cancellous bone loss, which would be more obvious at femoral neck compared with lumbar spine and, also may explain why PTH was a significant predictor of BMD at femoral neck as confirmed by our results.

P628
RELATIONSHIP BETWEEN REGIONAL DISTRIBUTION OF BODY FAT MASS (BFM) AND SERUM LEPTIN, TNFα, TESTOSTERONE FREE, β-CROSSLAPS IN MEN WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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Objective(s): The role of fat-bone interactions in the pathogenesis of osteoporosis in COPD is poorly understood. Our aim was to evaluate the relations between BFM distribution and inflammatory mediator TNFα, hormones, markers of bone metabolism in men at the age 40-70 years.
Material & Methods: Data were obtained from 98 participants who underwent DXA (analyze of body composition, the regional distribution of BFM). We examined 3 groups of patients (aged 40-70 years) and control group (15 healthy men with mean age 56 years, mean BMI 26 kg/m^2). The COPD pts were subdivided into groups according to COPD severity: the 1st was made of 20 men; GOLD I stage; mean age 55 years; FEV1 78%; BMI 27 kg/m^2, smokers 68%, packs/yrs 20; the 2nd included 43 patients; GOLD II stage; mean age 57; FEV1 55%; BMI 28 kg/m^2, smokers 80%, packs/yrs 21; the 3 d -20 patients; GOLD III stage; mean age 60; FEV1 41%; BMI 25 kg/m^2, smokers 84%, packs/yrs 28.
Results: Fat mass in Android region was directly related to serum TNFα ($r=0.33$, $p=0.02$). Total, trunk, arms fat mass were directly related to serum leptin ($r=0.21$, $r=0.36$ and $r=0.35$, $p<0.05$, respectively). Serum leptin exert negative influence on BMD in lumbar spine ($r=-0.43$, $p=0.001$), but not at femoral necks. We founded positive correlations between beta-crosslaps and total fat mass ($r=0.33$, $p=0.02$) and fat mass in android region ($r=0.32$, $p=0.02$). Total, arms, legs, trunk fat mass and fat mass in android and gynoid regions increase in COPD pts with lower level of serum testosterone free ($p<0.05$ for all relationships). The male patients at the age 40-70 years with COPD had osteopenia and osteoporosis in the presence of increased BMI (29.4 kg/m^2 and 24.7 kg/m^2, respectively) and serum leptin (2.8 ng/ml and 2.9 ng/ml, respectively, vs. 1.9 ng/ml in patients without osteopenia and osteoporosis, $p<0.05$).
Conclusion(s): The regional distribution of body fat mass play important role in the pathogenesis of osteoporosis in men with COPD.

P629
A GINGER-DERIVED BIOCOMPLEX IN TREATMENT OF PATIENTS WITH KNEE OSTEOARTHRITIS

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Objective(s): To evaluate the efficacy and safety of the ginger-derived biocomplex in treatment of patients with knee osteoarthritis in routine clinical practice.
Material & Methods: The examination of 30 patients with knee osteoarthritis (OA) was performed. The age varied 52-72 years (mean age 54.7±8.2 years). Sex distribution was as follows: 27 (90%) women and 3 (10%) men. All patients had a verified diagnosis of knee OA (criteria of Altman RD, 1995). The disease duration ranged from 1 to 8 years (mean duration was 3.9±2.7 years). The patients had the following comorbidities: arterial hypertension in 18 (60%), ischemic heart disease in 9 (30%), chronic gastroduodenitis in 20 (66.7%), varicose disease of the lower extremities in 19 (63.3%). Secondary synovitis was diagnosed in 23 (76.7%) patients. All patients were administered the ginger-derived biocomplex for 2 months. The following parameters were evaluated: the intensity of joint pain at rest and during movement on visual analogue scale (VAS), the circumference of the joint, index WOMAC, the need for NSAIDs, the effectiveness of treatment in opinion of the patient and physician.
Results: After 2 months of treatment the ginger-derived biocomplex was effective in 25 (83.3%) patients. During treatment there was a statistically significant ($p<0.05$) decrease of the following parameters: pain during movement, pain in palpation, the circumference of the "target joint " and WOMAC index. The effectiveness of treatment was evaluated by the patient as good – 15 (50%), satisfactory – 10 (33.3%), no effect – 5 (16.7%) patients. The physician evaluated the efficacy of treatment as good in 17 (56.7%) patients, satisfactory – 9 (30%), no effect – 4 (13.3%). 14 patients (46.7%) have ceased NSAID intake and 10 (33.3%) patients have lowered NSAID dose. Side effects were reported by 5 (16.7%) patients [3 (10%) - heartburn, 2 (6.7%) – nausea], possibly as a consequence of concomitant NSAIDs.
Conclusion(s): The ginger-derived biocomplex is quite effective in treatment of knee OA and safe for chronic administration, including the patients with serious comorbidities. Furthermore, this drug allows reducing the need for NSAIDs.

P630
EFFECT OF HEALTHY LIFESTYLE ON BMD VALUES

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Objective(s): To evaluate the influence of lifestyle habits, especially exercise and milk consumption on BMD.
Material & Methods: We assessed data of 156 patients (men and women, mean age 64 year, range 44-80), who addressed our rehabilitation service and had bone density measurement in northern Romania, Felix Spa. Using the risk factor questionnaires completed by all patients and DXA measurements of all patients we compared T- and Z scores of those who declared to be high dairy consumers and to take exercises to those who don't have a daily dairy intake and had a sedentary life. We also compared the influence of dietary factors to other osteoporosis risk factors.
Results: There was no difference in Z scores of the two subgroups. The minor difference in T-scores is related to the lower mean age of those who don't consume milk and not do exercises.
Conclusion(s): In comparison, other risk factors, such as BMI, sedentary lifestyle and early menopause had an impact on T- and Z-score of patients, with statistically significant differences between the yes/no subgroups. Smokers and coffee drinkers also did not show lower density values compared to non-tobacco/coffee consumers.

P631
SARCOPENIA IS MORE IMPORTANT THAN VITAMIN D DEFICIENCY AS DETERMINANT OF OSTEOPOROSIS IN CHILEAN ELDERS

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Objective(s): To study the frequency of osteoporosis and its association with vitamin D and sarcopenia in community living Chilean elders.
Material & Methods: Cross-sectional study in 741 participants in the ALEXANDROS study aged 60 and older (66.9% women, mean age 70.2±7.6 y, min 60 y, max 99 y) residing in Santiago, Chile. Socioeconomic characteristics, history of chronic diseases and self-reported disability/ functional limitations were registered. Physical performance, anthropometry, dynamometry, biochemical exams, vitamin D levels and DXA scan were performed. WHO standards for BMD classified them in normal, osteopenia and osteoporosis. Being under p25 of baseline value was defined as low dynamometry. Participants were classified as Sarcopenic using the skeletal muscle mass index (SMI) calculated as appendicular skeletal muscle mass/height^2 based on sex-specific lowest 20%. Plasma levels of 25-hydroxyvitamin D (VitD) were determined by radioimmunoassay and VitD deficiency was defined as <50 nmol/L.

Results: The frequency of osteoporosis was 23.6% (women 30.4%; men 9.7%, p<0.001) and Osteopenia 46.1% (women 30.4%; men 9.7%, p<0.001). Sarcopenia was present in 32.2% of men and 26.8% in women (p=0.07). the frequency of VitD deficiency was 62.1% similar in both men and women. Neither VitD deficiency nor vitD <25 nmol/L were associated with osteoporosis or osteopenia. Bone mass was highly correlated with SMI (men r=0.43, women r=0.51). After multinomial logistic regression the age and gender adjusted OR of having osteoporosis was associated with sarcopenia (RRR=3.62; 95%CI 2.08-6.33, p<0.01), but not with vit D plasma levels. Similar results were observed for the association of osteopenia, VitD deficiency and sarcopenia (RRR=1.78; 95%CI 1.11-2.85, p<0.02). The inclusion of BMI in the model showed that in females BMI was an independent protective factor for osteoporosis.

Conclusion(s): The results confirm that sarcopenia is more important than vitD deficiency as risk factor for osteoporosis in Chilean older people.

Disclosures: Research relating to this abstract was funded by Fondecyt Grant 1080589

P632
TEH OCCURRENCE OF HYPERCALCAEMIA IN PATIENTS COMMENCING RECOMBINANT PARATHYROID HORMONE (1-34) THERAPY

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Objective(s): Over the last ten years recombinant PTH (rPTH) therapy has been increasingly used for the treatment of severe postmenopausal osteoporosis. Foremost amongst the side effects of this drug is hypercalcaemia, which has a reported prevalence as high as 11% in some studies (1). We investigated the prevalence of hypercalcaemia in patients in our bone clinic receiving PTH therapy.

Material & Methods: From the database of the St. James's Hospital Dublin Osteoporosis Treatment and Bone Protection Clinic, we performed a retrospective review of consecutive patients receiving rPTH therapy. We selected the first 50 patients who had paired serum calcium measured both before commencing rPTH and 6 months into treatment. To define hypercalcaemia, we used our local laboratory's reference range for calcium, 2.20-2.70 mmol/L. All of the patients were also taking cholecalciferol 800 units and calcium 1000 mg daily supplements.

Results: Of the 50 patients, 45 were female and 5 were male. The mean age was 73.3 years (SD 10.3). The mean serum calcium (corrected for albumin) prior to commencing therapy was 2.40 mmol/L (SD 0.13). Mean serum calcium (corrected for albumin) six months into therapy was 2.47 mmol/L (SD 0.17). After 6 months of treatment, 4 patients were found to be hypercalcaemic, of whom one had been hypercalcaemic at baseline. The observed hypercalcaemia at 6 months was mild, ranging 2.71-2.95 mmol/L for the patients in question.

Conclusion(s): In the group we reviewed, the prevalence of new hypercalcaemia was 6%, which is lower than that observed in other studies. Taking the group as a whole, there was no significant difference between mean serum calcium at baseline and that measured 6 months into treatment. This low prevalence of hypercalcaemia may be a result of a vigilant approach to monitoring blood tests at 1 month and three months of therapy, and the judicious discontinuation of calcium and vitamin D supplements where hypercalcaemia was anticipated.

References: Neer RM, N Engl J Med 2001;344:1434

P633
EARLY POSTMENOPAUSAL WOMEN WITH IDIOPATHIC HYPERCALCIURIA PRESENT LESS CORTICAL BONE MINERAL MASS AND DIFFERENCES IN CORTICAL GEOMETRY COMPARED TO AGE-MATCHED CONTROLS: A TIBIA PQCT STUDY

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Objective(s): We assessed the effects of idiopathic hypercalciuria (IH) on bone mineral mass and bone geometry in different age groups vs. age-matched controls using pQCT of the tibia

Material & Methods: We reviewed medical records of 41 postmenopausal women with IH who presented as outpatients in our department. Inclusion criteria: 1) Recently (<6 months) diagnosed and untreated IH; 2) postmenopausal status >2 y; 3) Normal renal function (normal serum creatinine, eGFR) Exclusion criteria: 1) Diseases causing hypercalciuria other than IH (granulomatous and endocrine diseases, malignancies); 2) Bone metabolic disorders; 3) Drug-induced hypercalciuria; 4) use of any medication for osteoporosis during the last 12 months. The patients were assigned in 3 different age groups: 48-59 y (N=15), 60-69 y (N=21), 70-79 y (N=5). All patients underwent pQCT of the tibia (XCT 2000 scanner, Stratec Medicintechnic, Germany) and 3 slices were obtained at the 4% (trabecular bone), 14% (subcortical and cortical) and 38% (cortical) of tibia length sites. For each site we estimated bone

mineral content, bone areas, cortical thickness, periostal and endosteal circumference and we compared results with our published tibia pQCT database of 219 age-matched healthy postmenopausal women. We performed statistical analysis and data is expressed as mean±SD.

Results: There were no statistical differences between patients with IH and controls in all age-groups concerning variables of trabecular bone. Concerning cortical bone (38% slice), we found statistical differences only in the younger (48-59 y) age group between patients with IH vs. age-matched controls: patients with IH had lower cortical bone mineral mass (256.54±39.95 vs. 282.63±38.63 mg/cm, p=0.019), cortical area (220.4 ±33.34 mm^2 vs. 246.85±32.85, p= 0.005) and cortical thickness (3.90±0.81 vs. 4.53±0.57 mm, p=0.0005), while they had greater endosteal circumference (45.27 ±8.11 vs. 40.34±4.51 mm, p=0.001).

Conclusion(s): Early (48-59 y) postmenopausal women with IH have lower values of cortical bone mass, cortical area, cortical thickness and greater endosteal circumference vs. age-matched controls. Older women with IH were not found to have statistical differences on bone measurements vs. age-matched controls using pQCT of the tibia.

P634

THE STIFFNESS INDEX ACCORDING TO HEEL QUANTITATIVE ULTRASOUND AND BODY MASS INDEX – ANY CORRELATIONS?

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Objective(s): The heel quantitative ultrasound (QUS) is a very easy-to-do analyze in order to obtain information related fracture risk. New data revealed to correlations between the BMI and the bone health. We correlated the BMI and QUS parameter stiffness index (SI).

Material & Methods: The inclusion criteria were women in menopause. Peripheral QUS was performed with a GE Lunar Achilles device. The exclusion criteria refer to the women who were previously treated for osteoporosis with anti-resorbtives (except for vitamin D and calcium supplements). The informed consent of each woman was obtained. The linear regression and student t-test were used.

Results: We introduced the 347 patients (p) in 5 groups based on their age: group 1 (≤40 yrs) -6 p, group 2 (from 41-50 yrs) 61 p, group 3 (range 51-60 yrs) 178 p, group 4 (between 61-70 yrs) 80 p, and group 5 (from 71-80 yrs) 22 p. The correlations between BMI and QUS-SI (r^2) were: group 1 r^2=0.03 (p=0.08), group 2 r^2=0 (p<0.0001), group 3 r^2=0.08 (p<0.0001), group 4 r^2=0 (p<0.0001), group 5 r^2=0.09 (p=0.04). For all the 347 p, r^2=0.01, p<0.001.

Conclusion(s): The age groups analyze between SI and BMI revealed statistically significant no correlation.

P635

SURVIVAL IN THE ELDERLY FOLLOWING A PROXIMAL FEMUR FRACTURE: ONE-YEAR FOLLOW-UP STUDY

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Objective(s): The aim of this study was to determine the one year survival rate after a proximal femur fracture and to investigate the predictors for fatality.

Material & Methods: All patients that were admitted, with an acute proximal femur fracture caused by a fall of low energy impact from 1 May 2008 - 30 April 2009 in a main Portuguese hospital were invited to participate in the study. During hospitalization, a questionnaire was applied by personal interview to the participants, with questions about demographic characteristics, lifestyle, activities before fracture, previous fractures and clinical history. From the hospital medical records, information about type of fracture, surgical treatment, day of surgery, comorbidities and ASA score were collected. A follow-up study was conducted, by phone call interviews at 3, 6, 9 and 12 months after the fracture. Association between fatality and the independent variables were analyzed using the Kaplan-Meier method (log-rank test) and Cox Regression.

Results: 252 patients (79% women) agreed to participate in the study. Female patients presented a mean age of 80.3 SD 9.5 different from the mean age in male patients of 76.3 SD11.3 (p-value 0.02). Only 8% of the patients had no comorbidities. Hypertension disease was more frequent among the female patients (56%) than in the men (38%) (p-value 0.02) and respiratory diseases were more common in the men (36%) compared to women (13%) (p-value<0.0001). During the follow-up 23 patients were lost but information on survival for 14 of them were possible to retrieve from the hospital registers. Fatality among men was 22%, 25%, 30%, 37% respectively at 3, 6, 9 and 12 months follow-up being 8%, 14%, 20% and 23% among women. The predictors of fatality were: male gender (HR

2.53 95% CI 1.40-4.57), age (HR 1.06 95% CI 1.03-1.10), delay in surgery (HR 1.07 95%CI 1.03-1.12) and ASA score (HR 1.92 95% 1.09-3.42).

Conclusion(s): After one year, fatality was 60% higher among men, even after adjusted for confounders. For each day of delay to surgery there was an increased risk of 7% on the fatality rates.

P636
SERUM URIC ACID AND ULTRASOUND DETECTION OF MONOSODIUM URATE DEPOSITION IN PERIPHERAL JOINTS – CARDIOVASCULAR RISK FACTORS IN PATIENTS WITH OSTEOARTHRITIS

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Objective(s): Hyperuricemia (HU) is a well recognized risk factor for cardiovascular disease (CVD) associated with the development of hypertension, metabolic syndrome, diabetes mellitus and frequently found in patients with osteoarthritis (OA). Carotid intima-media thickness (IMT) of the carotid arteries assessed by ultrasonography is validated as a sensitive marker for atherosclerosis, directly associated with an increased risk of CVD. The aim of the study was to evaluate the role of serum uric as a risk factor for CVD in patients with OA as well as to prove the usefulness of ultrasound detection of monosodium urate crystal deposition in osteoarthritic joints.

Material & Methods: The study groups included 42 patients with OA without HU (mean age 49±9 years) and 46 patients with OA and HU (mean age 54±10 years), newly diagnosed, nonhypertensive, previously untreated, registered over a period of 2 years. The patients underwent complete clinical, serological evaluation (systolic and diastolic blood pressure, total cholesterol, LDL-cholesterol, HDL-cholesterol, triglycerides, serum uric acid, inflammation markers) and high resolution B-mode ultrasound to measure the IMT of the common carotid artery, as well as multiplanar evaluation of the first metatarsophalangeal joints, anterior recess of the tibiotalar joints and knee joints.

Results: IMT values were significantly higher in patients with OA and HU (0.99±0.22 mm), compared with the patients without HU (0.65±0.15 mm), $p<0.001$. 45.65% of patients with OA and HU showed US findings indicative of MSU crystal deposition, while these US signs were identified in only 11.90% of patients with OA without HU. No differences were recorded in the appearance of osteophytes between hyperuricaemic patients and those with normal uric acid levels. Differences have been seen in the aspect of the synovitis at the level of the metatarsophalangeal joints.

Conclusion(s): The present study has showed that high serum uric acid levels are associated with atherogenesis independently from hypertension in patients with OA and also with a higher index of suspicion proved by the deposition of the monosodium urate crystals in peripheral joints. Early screening for HU and MSU deposition in joints as well as lowering serum uric acid levels might be beneficial in slowing progression of IMT and reducing CVD risk in patients with OA.

P637
EVOLUTION OF BIOCHEMICAL MARKERS OF BONE REMODELING DURING TREATMENT WITH STRONTIUM RANELATE

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Objective(s): Strontium ranelate is used in the treatment of postmenopausal osteoporosis and it has also an effect on bone formation. During antiresorbtive effect of bisphosphonates (that don't influence the bone formation), after a certain period of time, it can occur the "frozen bone" – a severely suppressed bone turnover. This study evaluates the efficiency and the compliance during the therapy with strontium ranelate after 6 months for osteoporosis in postmenopausal women.

Material & Methods: We present the results of a retrospective study which included 50 women that were registered in The National Programme of Osteoporosis; the average age was 66.4±8.5 SD years, in postmenopausal for 18±8.6 SD years and with a T-score of de 3.42±0.39 SD (at the beginning of the study). They were treated daily with strontium ranelate (2 g) and vitamin D. We investigated: the presence of fracture, risk factors, biologically: calcemia, phosphatemia, vitamin D, markers of bone formation (osteocalcin), markers of bone resorption (crosslaps).

Results: Most of them received previously antiresorbtive therapy; 6 had vertebral fracture; all of them had a high compliance during the therapy; the values of calcemia remained almost the same (from 9.78±0.71 mg/dl to 9.71±0.63 mg/dl), but there was a bone formation process: osteocalcin from 22.4±27.2 ng/ml to 24.75±28.2 ng/ml and a suppressing bone resorption: cross-laps from 0.58±0.35 ng/ml to 0.49±0.31 ng/ml.

Conclusion(s): Strontium ranelate is indicated in the therapy of postmenopausal osteoporosis, especially because it has a dual mode of action on bone turnover.

P638
THE BODY MASS INDEX AND BONE MINERAL DENSITY AGE RELATED CORRELATIONS – A STUDY IN 347 WOMEN

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Objective(s): BMI influences the bone quality. But the relationship between BMI and BMD is difficult to establish. We analyze whether the BMI is correlated to BMD in age groups.
Material & Methods: This is a study in women after menopause. GE Lunar central DXA was performed, as well as bone markers. The patients who were previously treated for osteoporosis (except for vitamin D and calcium supplements) were not included. The informed consent of the patients was obtained. The statistically analyze was performed by linear regression.
Results: 347 patients (p) were introduced in 5 groups, according to their age: group 1 (≤40 yrs) 6 p, group 2 (between 41-50 yrs) 61 p, group 3 (between 51-60 yrs) 178 p, group 4 (between 61-70 yrs) 80 p, and group 5 (between 71-80 yrs) 22 p. The correlations between BMI and DXA-BMD (r^2), respective the statistically significance of the linear regression (p) were for all: 0.01, respective $p<0.001$. For each group the values were: group 1 $r^2=0.29$ ($p=0.015$), group 2 $r^2=0$ ($p<0.0001$), group 3 $r^2=0.02$ ($p<0.0001$), group 4 $r^2=0.03$ ($p<0.0001$), group 5 $r^2=0.02$ ($p=0.0002$).
Conclusion(s): Statistically significant results pointed that in age depending group we found no correlation between the BMI values and DXA-BMD.

P639
CORRELATION BETWEEN CRITERIA OF DIAGNOSIS OF LOW BMD IN ADULT AND PEDIATRIC THALASSEMIC PATIENTS

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Objective(s): Finding how is the correlation between criteria for osteoporosis in adulthood and the criteria of "low bone density" in children and how "low bone density for chronologic age" in childhood, can predict "osteoporosis" in adulthood is a matter of interest in osteoporosis studies. The main point is that serial densitometry of children (<20 y/o) that continues to adulthood (after 20 y/o) is not common. As BMD studies in Beta thalassemia major (a hemoglobin disorder) patients; in both childhood and adulthood, is routine and recommended, we tried to find how much of this patients with "low bone density for chronologic age" (Z-score≤-2) before 20 y/o, will find with osteoporosis (T-score ≤-2.5) after 20 y/o and how is correlation between two criteria for low bone mass in childhood and adulthood.
Material & Methods: The results of BMD of 30 thalassemic patients (12 men and 18 women) studied. Each of them had 1 scan before 20 y/o and 1 scan after that. The mean age of patients in childhood was 17.63 and 20.63 y/o in adulthood. The scanner was a Norland XR-46 device. The agreement of two criteria for finding osteoporosis in adulthood, obtained.
Results: "Low bone density for chronologic age" found in 33% of children (in femoral neck or L2-L4) and "osteoporosis" in 43% of patients after adulthood. Kappa score is an index for showing how 2 methods have "agreement" in diagnosis of an event (e.g., osteoporosis in adulthood, here) and don't diagnose a nonevent (not osteoporotic in adulthood, here). Kappa was 0.657 for femur Z-score≤-2 and 0.703 for spine Z-score≤-2 for femur osteoporosis. Kappa was 0.296 for femur Z-score≤-2 and 0.493 for spine Z-score≤-2 for spinal osteoporosis.
Conclusion(s): This study showed a good to moderate agreement of two criteria for finding low bone mass in childhood and adulthood, at least in femoral region, in β-thalassemia major patients. Larger studies in normal cases is needed to confirm this results.
Disclosures: Thank to Special Medical Center of Charity Foundation for Special Disease of Iran (SMC of CFFSD) and Mrs. A. Oojaghi for their valuable assistance in this study.

P640
A COMPARISON OF THE MALE OSTEOPOROSIS RISK ESTIMATION SCORE (MORES) AND THE FRAX® IN IDENTIFYING MEN WITH FEMORAL NECK OSTEOPOROSIS

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Objective(s): Compare the operating characteristics of the MORES[1] and FRAX®[2] in identifying men with femoral neck osteoporosis and assess their level of agreement.
Material & Methods: This was a blinded study of the MORES and FRAX®, administered to men ≥60 years of age, in a primary healthcare setting. Participants completed a questionnaire including demographic data, pertinent medical information, and the MORES and FRAX® variables. All participants underwent a DXA scan, which served as the references standard for femoral neck osteoporosis based on the WGO's criteria. Responses to the questionnaire and results of DXA scans were used to estimate the operating characteristics of the MORES (positivity criterion ≥6 points) and FRAX® (positivity criterion ≥9.3% 10-year risk of major osteoporotic fracture). Agreement between the

instruments was assessed applying McNemar's test and obtaining the kappa statistic for agreement.

Results: 346 men completed the study. The mean age was 70.2±7.0 years; 76.0% were non-Hispanic white, and 89.8% graduated high school or attended some college. 15 men (4.3%) had femoral neck osteoporosis. 113 men (48.3%) screened positive with the MORES, which correctly identified 12 of 15 men with osteoporosis: sensitivity 0.80 (95% CI: 0.52, 0.96), specificity 0.70 (95% CI: 0.64, 0.74), and AUC 0.82 (95% CI: 0.71, 0.92). Fifty-nine men (17.1%) screened positive with the FRAX®, which correctly identified 7 of 15 men with osteoporosis: sensitivity 0.47 (95% CI: 0.21, 0.73); specificity 0.84 (95% CI: 0.80, 0.88), and AUC 0.72 (95% CI: 0.560, 0.85). Discordance was 35.8% (McNemar's χ^2 test, p-value<0.001) and the kappa statistic was 0.071.

Conclusion(s): Both the MORES and FRAX® identified men with femoral neck osteoporosis, but they were not equivalent. The MORES tended to identify more of the men with osteoporosis than the FRAX®, but had a greater false positive rate.

References: (1) Shepherd AJ, et al. Ann Fam Med 2007;5:540. (2) Kanis JA on behalf of the WHO Scientific Group (2008) Assessment of osteoporosis at the primary healthcare level. Available at http://www.shef.ac.uk/FRAX/index.htm

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P641
ADIPOKINES: ROLE IN FORMATION OF OSTEOPENIC SYNDROME IN PATIENTS WITH END-STAGE PULMONARY DISEASE

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Objective(s): Aim of this study to evaluate associations between the adipokines (TNFα) and its receptors, leptin, adiponectin, resistin), body composition and BMD in the patients with terminal stage of chronic respiratory failure.

Material & Methods: 63 patients with end-stage of chronic respiratory failure (COPD, emphysema, fibrosis and cystic fibrosis) and 55 healthy subjects were estimated. BMD, wool body composition was measured by DXA at the lumbar spine (LS) and left femur neck (FN). We estimated respiratory function testing, serum levels TNF-a, TNFR-1, TNFR-2, leptin, adiponectin, resistin.

Results: We identified a decreased BMD characterized by T-score<-1.0 in 54/63 patients, as measured on the FN or the LS. The adiponectin, resistin, TNF-a and its receptors level were higher, but leptin level was low in lung pathology in comparison with control group. Where was positive correlation between serum leptin (r=0.64, p=0.0002; r=0.52, p=0.009) and negative association between adiponectin (r=-0.54, p=0.009; r=-0.47, p=0.003), TNF-a (r=-0.43, p=0.03; r=-0.41, p=0.04) and BMD in FN and LS. Correlated analyses showed positive correlation between resistin level (r=0.57, p=0.004), sTNFR-I (r=0.42, p=0.03) and sTNFR-II (r=0.44, p=0.04) and BMD in L2-L4 only. Parameters of body compositions and serum concentrations of leptin and adiponectin were significantly associated with FN and LS. Serum leptin levels was significant lower (p=0.047) and adiponectin concentrations was higher (p=0.039) in the osteoporosis group. Serum leptin significantly positively correlated with parameters of body composition, serum adiponectin concentrations was negative association with TNFR-1, TNFR-2 (p=0.007). There was a significant inverse relationship between leptin and adiponectin (r=-0.67, p=0.0008).

Conclusion(s): These results shows possibly role of adipokines in the increasing of bone loss at the terminal stage of chronic respiratory failure.

P642
INVOLVEMENT OF OPG IN THE HEALING PROCESSES OF FEMORAL OSTEOPOROTIC FRACTURES

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Objective(s): In animal model osteoprotegerin (OPG) protects bone from excessive resorption and exert increases bone mass and density. Increased OPG is supposed to be a homeostatic mechanism limiting bone loss in elderly people. But compensatory elevation of serum OPG levels in osteoporotic fractures has been recently considered insufficient to limit bone loss leading to fracture. The objective of this study was to monitor serum OPG levels in osteoporotic patients affected by first femoral neck fracture during healing period of 6 months.

Material & Methods: 43 women with untreated postmenopausal osteoporosis between 55-76 years old affected were recruited. They were free by important cardiovascular, renal, endocrine, tumor and intestinal comorbidity. They were divided in two groups fractured and unfractured. The first group was composed

by 23 women that had an access to hospital with diagnosis of femoral neck fracture and were treated with intramedullary nail or un-cemented prostheses. A second homogeneous group of 20 postmenopausal osteoporotic patients without clinical evidence of fractures was considered as control. Serum OPG levels were measured in both groups by ELISA. In fractured group the test were repeated at 1st, 3 rd and 6th month.

Results: Serum OPG levels were significantly higher in fractured than in unfractured group from the beginning to 3 rd month, while at 6th month no statistical differences were detected. In particular a peak was measured between 1st and 3 rd month. Serum OPG levels was increased for decade but fractured patients revealed a further significant increase. Since there is not a normality range of OPG and patients are within two decades, data can seems to related to the presence of a fracture rather than senescence.

Conclusion(s): The increased circulating OPG in fractured vs. un-fractured osteoporotic women suggests the involvement of OPG in the healing processes of bone.

References: Anastasilakis AD. Horm Metab Res 2008, 40,281; Boyce BF. Arch Biochem Biophys 2008, 473,139; Grundt A. Biochem Biophys Res Commun 2009, 389,550; Marchelli D. J Orthop Traumatol 2009,10,55; Ota N. Endocrinology 2009, 150,4823

P643

COMBINATION OF OSTEOARTHRITIS AND DISEASES OF PERIPHERAL VEINS OF LOWER EXTREMITIES IN CLINICAL PRACTICE

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Objective(s): To study features of osteoarthritis (OA) in combination with diseases of peripheral veins of lower extremities (DPVLE).

Material & Methods: 81 patients with OA were examined, 40 of them (49.4%) had DPVLE [14 (17.3%) patients – post thrombophlebitic syndrome, 26 (32.1%) - varix dilatation]. According to the presence of DPVLE 2 groups were formed (comparable on age, gender, disease duration, clinical characteristics and therapy).

Results: Patients with combination of OA and DPVLE had significantly ($p>0.05$) higher the pain intensity on visual analogue scale (VAS) at rest and moving, increased joint swelling, inflammation indices, palpatory tenderness of areas of muscular infiltration and functional activity deterioration according to Lecken test compared with patients without signs of venous insufficiency. After treatment the patients with both diseases still had higher ($p>0.05$) scores of pain and local inflammation. Periarticular circulation impairments in patients with OA and DPVLE were characterized by progressing pulse volume loss, haemostasia and venous circulation impairment (α/β, Ac/Ad) compared with patients without DPVLE.

Conclusion(s): Combination of OA and DPVLE unfavorably influences patients' quality of life, increases cost of therapy and acquires timely therapy.

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COMPUTING STRUCTURAL PARAMETERS FROM DUAL-ENERGY X-RAY ABSORPTIOMETRY USING A 3D RECONSTRUCTION METHOD

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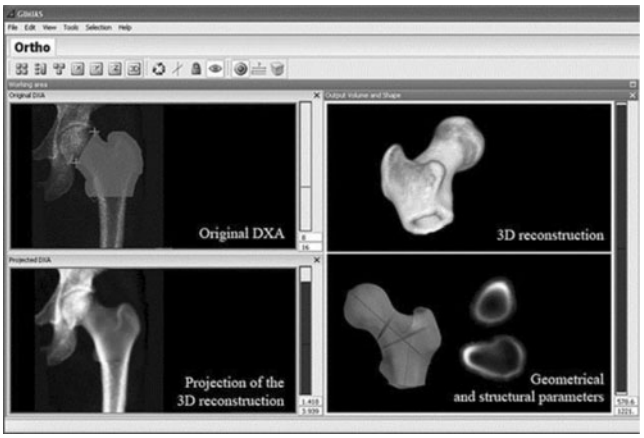
Objective(s): This paper presents a method to extract a set of 3D structural parameters quantifying the geometry and strength of the proximal femur, using a previously developed 3D reconstruction method from DXA [1].

Material & Methods: The reconstruction method uses a 3D statistical model constructed from a dataset of QCT scans, which describes the statistical variations in shape and BMD distribution. A 3D reconstruction is subsequently acquired by registering the statistical model onto the 2D DXA image so that the projection of the model matches the DXA image. This reconstruction method has been shown to produce accurate reconstructions (shape accuracy of 1.1 mm and density reconstruction errors of 4.9% [1]). From the 3D reconstructions, a set of geometrical and structural parameters is automatically computed for two regions of interest (narrow femoral neck and intertrochanteric region). To validate the method, structural parameters were computed from 3D DXA reconstructions of 30 patients and compared with parameters obtained from QCT.

Results: The comparison resulted in correlation coefficients (for the narrow femoral neck and intertrochanteric region respectively) of: $r=0.88$ and $r=0.95$ (slice area), $r=0.92$ and $r=0.95$ (cross-sectional area), $r=0.89$ and $r=0.97$ (cross-sectional moment of inertia), $r=0.89$

and r=0.93 (section modulus). The geometrical parameters showed correlation coefficients of r=0.94 (femoral neck axis length) and r=0.90 (femoral neck shaft angle). All the correlations were statistical significant (p-value



Conclusion(s): This method provides a set of automatically computed 3D structural parameters, from only one single DXA image, which normally requires a QCT acquisition. The software potentially allows for an improved diagnosis of osteoporosis and fracture risk estimation, while maintaining DXA as the current standard modality.

References: [1] Whitmarsh et al. IEEE Transactions on Medical Imaging 30, 2101(2011).

P645
CHANGES OF MINERAL BONE DENSITY IN PATIENTS WITH ANKYLOSING SPONDYLITIS

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Objective(s): To determine the features of mineral bone density (MBD) changes in patients with ankylosing spondylitis (AS) depending on demographical data, clinical and laboratory findings.

Material & Methods: 42 patients (male - 36 (85.7%), female - 6 (14.3%), 21-47 years of age, mean age 33.2±8.4, mean disease duration 7.8±5.9 years) with proven diagnosis of AS were included in the study performed at The centre of osteoporosis treatment and prevention. All patients were HLA-B27 positive, 23 (54.8%) had peripheral arthritis. Evaluation included back pain assessment with VAS scale, morning stiffness duration assessment, modified Schöber's test, limitation of chest expansion assessment, calculation of BASDAI, BASFI and ASDAS-CRP scores, ESR and CRP levels. To evaluate MBD all patient underwent DXA of lumbar spine (L1-L4) and hip neck.

Results: Among male patients normal MBD was found in 6 (16.7%) patients, 19 (52.8%) had osteopenia, 11 (30.5%) - osteoporosis. Among male patients normal MBD was found in 1 (16.7%) patients, 1 (16.7%) had osteopenia, 4 (66.6%) - osteoporosis. MBD of lumbar spine in male patients was significantly higher compared to females ($p<0.05$). Patients with high disease activity and peripheral arthritis had significantly lower MBD of lumbar spine. Patients with osteoporosis and osteopenia had higher pain score on VAS compared to patients with normal MBD. Association between MBD and duration of AS, Schöber's test results, disease activity and CRP was found.

Conclusion(s): High clinical activity, presence of peripheral arthritis, significant changes in spinal movement were found to be predictors of MBD decrease in patients with AS. Patients with AS and osteopenia had more pain.

P646
VERTEBRAL FRACTURES PREVALENCE AND ABDOMINAL AORTIC CALCIFICATION IN MEN

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Objective(s): Vertebral fracture assessment (VFA) imaging with a bone densitometer can simultaneously detect prevalent VFs and AAC an important cardiovascular disease risk factor independent of clinical risk factors. Objective was to study the relation between the prevalence and severity of VFs using VFA in asymptomatic men and the prevalence and severity of AAC.

Material & Methods: We enrolled 709 men with mean±SD (range) age, weight and BMI of 62.4±8.6 (45-89) years, 75.9±12.9 (40-163) and 26.4±4.0 (16.6-43.8) kg/m^2, respectively. Lateral VFA images and scans of the lumbar spine and proximal femur were obtained using a GE Healthcare Lunar Prodigy densitometer. VFs were defined using a combination of Genant semiquantitative approach and morphometry. VFA images were scored for AAC using a previously validated 24 point scale.

Results: VFs were identified using VFA in 475 (40.3%): 166 (26.0%) had grade 1 and 68 (14.2%) had at least one grade 2 or 3 vertebral fracture. The prevalence of grade 2/3 vertebral fractures was 42 (38.9%) in men with osteoporosis and was higher ($p<0.0001$) compared to 15 (5.9%) in men with normal BMD and to 39 (11.2%) with osteopenia. VFA images showed that 82% of the evaluable participants did not have any detectable AAC whereas the AAC score distribution ranged between 1-15. Conversely, the prevalence

of significant atherosclerotic burden, defined as a radiographic 24-point AAC score of 5 or higher, was 2.8% and concerned essentially patients over 66 years. The group of men with moderate/severe vertebral fractures had a statistically significant higher AAC score and higher proportion of subjects with extended AAC, and lower weight, height, and lumbar spine and total hip BMD and T-scores than those without a VFA-identified vertebral fracture. A positive statistical correlation was noted between age and the SDI, and a statistical negative correlation between the AAC score and lumbar spine and total hip BMD. Multiple regression analysis showed that the presence of grade 2/3 VFs was associated to AAC and osteoporosis in any site.

Conclusion(s): VFA imaging has the potential to contribute to identification of subclinical cardiovascular disease in men.

P647
HEALTH BELIEFS AND ATTITUDES OF GREEK MEN ABOUT OSTEOPOROSIS: APPLICATION OF THE HEALTH BELIEF MODEL

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Objective(s): The aim of the study was to determine the beliefs of Greek men about osteoporosis and their perceived vulnerability, severity of the disease, the costs and the benefits of preventive measures, as projected through the Health Belief Model.

Material & Methods: 330 men were enrolled in the study, which was performed at the Orthopaedic Outpatients Department of a tertiary military hospital in Thessaloniki, Greece, between April-July 2011.

The Osteoporosis Health Belief Scale (OHBS) was the research tool for the conduction of the study and it was the first time OHBS was translated into Greek and distributed to a Greek male population. It consists of 42 questions/statements. Groups of six questions assess each of the seven constructs of the Health Belief Model. The maximum possible score is 210 points for the OHBS and 30 for each construct. Correlation of age with the average score at each construct of the OHBS was explored with the Spearman's ρ correlation coefficient and the ANOVA, the Tuckey Honestly Significant Difference and the t tests for other demographic parameters. Correlation among the constructs was assessed with the Pearson's r correlation coefficient. All statistical analyses were performed with the SPSS 19 software.

Results: The mean age of the participants was 28.3 years (SD=8.18), ranging between 18-65 years. The median age was 26 years. 148 men (44.8%) had a higher education degree. 43 (13%) of the participants had been informed about osteoporosis in the past. Cronbach's α coefficient ranged between 0.747-0.835 for the 7 constructs, establishing the reliability of the Greek OHBS version. The average total score was 126.33 (74-175) with a SD=11.57. The median score was 126.

Conclusion(s): The scores at different OHBS subgroups indicated that men consider osteoporosis a serious disease (17.21 points), which is not a women's privilege (susceptibility 16.18 points).They are also aware of the benefits of adequate calcium intake and regular exercise and present weak barriers to beneficial behaviours. The strongest positive correlation was found between the constructs “health motivation” and “exercise benefits”.

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VITAMIN D DEFICIENCY IN CHILDREN OF UKRAINE

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Objective(s): To determine the frequency of vitamin D deficiency and insufficiency in children of different region of Ukraine and to evaluate the influence of 25OHD and PTH level to BMD.

Material & Methods: It was examined 220 practically healthy children aged 10-18 yr. old who lived in different regions of Ukraine. 25-OH vitamin D and PTH were evaluated by electrochemiluminescence method (Elecsys 2010, Roche). Vitamin D deficiency was diagnosed in level of 25-OH vitamin D below 50.0 nmol/l, vitamin D insufficiency – between 74.5-50.0 nmol/l. BMD was determined by ultrasound densitometry Sahara (Hologic). Children were examined during October-November 2011.

Results: Vitamin D deficiency was registered in 92.2% children, 45.9% of schoolchildren had 25-OH vitamin D level below 25 nmol/l. 6.4% examined patients had vitamin D insufficiency. 0.9% of examined children had secondary hyperparathyroidism. Low mineral density was registered in 4.8% children. No significant correlation between 25-OH vitamin D and BMD. Only in children 12-15 yrs. old with vitamin D deficiency it was significant correlation between

PTH level and all data of ultrasound densitometry (stiffness index (r=-0.32, p<0.01), broadband ultrasound attenuation (r=-0.26, p<0.05), speed of sound (r=-0.31, p<0.02).
Conclusion(s): High level of vitamin D deficiency (92.2%), secondary hyperparathyroidism (0.9%), negative significant correlation between PTH level and data of ultrasound densitometry in pubertal children with vitamin deficiency make doctors to research the effective methods of treatment and prophylactics of revealed disorders.

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PTH(1-84) REPLACEMENT THERAPY IN HYPOPARATHYROIDISM (HYPOPT): A RANDOMIZED CONTROLLED TRIAL ON PHARMACOKINETICS AND DYNAMIC EFFECTS FOLLOWING 24 WEEKS OF TREATMENT

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Objective(s): In HypoPT, lack of PTH necessitates treatment with calcium and vitamin D analogues in order to avoid hypocalcemia.
Material & Methods: To study if replacement with the missing hormone possesses advantages, we randomized 62 patients with HypoPT to 24-wks of daily SC injection of PTH (1-84) 100 μg or similar placebo, in addition to conventional therapy. After 24-wks, we performed a 24 h biochemical monitoring on 39 patients (22 on PTH) in order to assess effects on diurnal variations in calcium-phosphate homeostasis. Following injection, blood samples were obtained at 0.25, 0.5, 1.0, 1.5, 2, 3, 4, 5, 6, 7, 8, 10, 12, 16, 20, 24 h, urine was collected in time intervals: 0-2, 2-4, 4-8, 8-16, 16-24 h.
Results: During the 24-wks of therapy patients on PTH reduced their daily dose of calcium and active vitamin D significantly by 75% and 73%, respectively. Plasma PTH levels rose immediately, reaching a peak level of 246 (interquartile range (IQR): 181;396) pg/ml at the first time point of measurement, followed by a gradually decrease reaching pre-dosing levels after 16 h, with a plasma $t_{½}$ of 4.6 (IQR 4.1;5.8) h. PTH caused significant changes in the diurnal rhythms of plasma Ca^{2+} and 1,25(OH)2D levels, with rising Ca^{2+} levels reaching a peak app. 8 h following administration. Between 4-12 h, asymptomatic hypercalcemia (>1.32 mmol/l) was present in 41% of PTH treated patients. Despite hypercalcemia, renal excretion of calcium was significantly lower 4-8 h following injection in the PTH- compared with the placebo-group, and 24 h urinary calcium did not differ between groups. Renal excretion (24 h) of magnesium was lower in the PTH- (4.7, IQR: 4.1;6.7 mmol/d) compared with the placebo- (5.7; IQR: 4.0;7.7 mmol/d, p<0.05) group. PTH caused lower phosphate levels, although treatment did not affect diurnal rhythms of plasma phosphate or magnesium levels.
Conclusion(s): A fixed dose of 100 μg/d PTH(1-84) may be too high, as transient hypercalcemia developed in some patients. However, PTH decreased urinary calcium losses in the hour following injection and magnesium losses throughout the study period. Accordingly, PTH may possess advantages compared with conventional treatment if administered in doses adapted to the patient's needs.

P650
PECULIARITY BONE TURNOVER MARKERS IN CHILDREN WITH OSTEOGENESIS IMPERFECTA

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Objective(s): To determine the peculiarity of the bone turnover markers in children with osteogenesis imperfecta.
Material & Methods: 19 children aged 1-15 years old with OI were examined. 10 healthy persons of appropriate age formed control group. Markers of bone formation and bone resorption, such as serum N-MID Osteocalcin, serum P1NP, and serum β-CTx, were measured by electrochemiluminescence (Elecsys 2010, Roche).
Results: All patients with OI had significantly higher level of P1NP, β-CTx and osteocalcin. The level of P1NP was (555.78±69.60 vs. 148.01±41.24 ng/ml) (P=0.001), β-CTx was 1.992±0.21 vs. 0.850±0.11 ng/ml (P=0.0013), osteocalcin 130.29±11.23 vs. 51.57±5.81 ng/ml (P=0.00014).
Conclusion(s): Patient with OI has higher level of bone turnovers markers. Assessment of such bone markers may be the earliest laboratory test for OI. It is necessary to evaluate the critical level of bone turnover markers which will point to formation OI.

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BONE MINERAL DENSITY (BMD) IN PATIENTS WITH SPINAL CORD INJURY (SCI) REGARDING NEUROLOGICAL FINDINGS AND DURATION OF NEUROLOGICAL IMPAREMENT

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Objective(s): Osteoporosis is one of the complications that occur in patients with quadriplegia and paraplegia, after SCI. The aim of this study was to determine to what extent the degree and the level of spinal cord lesions, muscle tone and the time after the injury affect BMD.
Material & Methods: This prospective research was carried out from May 2009 - December 2011 in Rehabilitation Clinic "Dr Zotovic" in Belgrade. BMD was measured at the femoral neck using DXA method, expressed in g/cm^2, on the LUNAR DPX device. Statistic elaboration was done with SPSS statistical software.
Results: In our group 32 patients were studied, men aged 18-40. Based on the level of neurological and motor impairment, patients were classified as: quadriplegia (9 patients, 28.1%) and paraplegia (23 patients, 71.9%); based on the impairment degree by ASIA classification (American Spinal Injury Association -impairment scale) as: complete (ASIA A) and incomplete (ASIA B,C,D) According to the period of time after the injury, patients were divided into: acute- 7 patients (21.9%); subacute - 8 patients (25%) and chronic 17 patients (53.1%). Muscle tone was assessed with the Ashworth spasticity scale (1-4); flaccid (14 patients, 43.7%), with normal tone (3 patients, 9.4%) with present spasticity (15 patients, 46.9%)There was no statistically significant difference between BMD measured in patients with quadriplegia and paraplegia with complete and incomplete lesion. There was no statistically significant difference between BMD measured in patients with different muscle tone. Statistically significant difference was found between BMD and the period after the injury (the length of duration of lesion).
Conclusion(s): Based on our tests, whose results are in a line with the results of other authors, we can conclude that the level and degree of spinal cord lesions and muscle tone in patients with quadriplegia and paraplegia do not affect the decrease in mineral bone density, whilst the time elapsed since the occurrence of the injury affects significantly the BMD reduction, which is a certain risk factor for the occurrence of fractures.

P652
ARE BONE REMODELLING MARKERS AFFECTED BY SUBCLINICAL HYPERTHYROIDISM?

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Objective(s): Osteoporosis and subclinical hyperthyroidism are both silent diseases until their complications emerge. So, their precocious diagnosis is of extreme importance. Thyroid hormones are known for a long time to affect bone metabolism. However, recent work also point to a possible action of TSH alone in bone remodeling, inhibiting both formation and resorption. So, patients with subclinical hyperthyroidism (normal thyroid hormones and suppressed TSH) can be more prone to a BMD reduction/osteoporosis and fractures. The aim of this study was to evaluate the correlations between bone remodelling markers, the thyroid function and BMD in postmenopausal women with subclinical hyperthyroidism.
Material & Methods: In 49 women with subclinical hyperthyroidism, postmenopause, the body lean and fat masses (kg) and the BMD (g/cm^2) at the lumbar spine (L_1-L_4), proximal femur, distal radius and whole body were evaluated by DXA (QDR Discovery, Hologic). Plasma levels of osteocalcin, CTX, bone alkaline phosphatase, PINP, as well as those of thyroid hormones, PTHi, calcium, IGF1, vitamin D and pituitary hormones were determined. No patient was previously treated for hyperthyroidism and/or osteoporosis. Descriptive and comparative tests were used and statistical significance was considered for $P<0.05$.
Results: The means of the BMD (±SD) were at the lumbar spine 0.925 (±0.16) g/cm^2 and femoral neck 0.764 (±0.14) g/cm^2. Of the several significant correlations found, we emphasize those between TSH and osteocalcin, BMD and trabecular bone T-score, and also between iPTH and CTX.
Conclusion(s): The results of this study seem to suggest that the suppressed TSH can affect bone formation in the trabecular bone. Also, bone resorption was associated to PTH levels. Finally, the global results of this study emphasize the importance of evaluating thyroid function in postmenopausal women because of the increased risk of osteoporotic fractures in subclinical hyperthyroidism.

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BONE TURNOVER IN PATIENTS WITH CHRONIC SPINAL CORD INJURY

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Objective(s): To determine the peculiarity of the bone turnover markers in patients with chronic spinal cord injury (SCJ).
Material & Methods: 52 patients were divided into three groups. First group included 10 patients with early chronic SCJ (average age 26.0±1.44 years, duration of trauma period – under 1 year), the second group included 21 patients with late chronic SCJ (average age 32.4±1.6 years, duration of trauma period – over 1 year) and the third group consisted of 21 healthy individuals of appropriate age (average age of 33.8±1.5 years). Markers of bone turnover (osteocalcin, serum P1NP, serum β-CTx, and PTH) were determined by the electrochemiluminescence method (Elecsys 2010, Roche).

Results: The results of examination showed patients with early chronic SCJ had significantly higher bone formation and bone resorption markers than persons of second group: osteocalcin (41.5±10.1 vs. 25.6±1.7 ng/ml, F–4.5, p=0.04), P1NP (235.4±68.7 ng/ml vs. 57.1±4.2, F–13.7, p<0.0001), serum β-CTx (1.77±0.17 vs. 0.63±0.06 ng/ml, F–14.6, p<0.0001), PTH (19.8±4.7 vs. 42.4±5.3 ng/ml, F–7.4, p=0.01). The average level of bone turnover markers in patients of first group were significantly higher compared with healthy persons of control group: P1NP (235.4±68.7 vs. 40.8±7.4 ng/ml, F–13.1, p<0.0001), serum β-CTx (1.77±0.17 vs. 0.36±0.05 ng/ml, F–15.3, p<0.0001), PTH (19.8±4.7 vs. 40.8±3.9 ng/ml, F–4.9, p=0.01). The level of osteocalcin in group 2 and 3 without difference (25.6±1.7 vs. 27.7±4.4 ng/ml, F–2.5, p=0.09). It is important to note that the considerable difference between second and third group was only in serum β-CTx level (0.63±0.06 vs. 0.36±0.05 ng/ml, F–10.1, p=0.03).

Conclusion(s): The bone formation and bone resorption markers in patients with early chronic SCJ were significantly higher than appropriate data of healthy individuals and persons with chronic SCJ with duration of trauma over 1 year.

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FREQUENCY OF VITAMIN D DEFICIENCY AMOUNT UKRAINIAN POPULATION

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Objective(s): To study determine the frequency of vitamin D deficiency and insufficiency and it influence to BMD in patients of different region of Ukraine.

Material & Methods: It was examined 1575 people aged 20-95 yrs. old who lived in different regions of Ukraine. 25-OH vitamin D and PTH level was evaluated by electrochemiluminescence method (Elecsys 2010, Roche). Vitamin D deficiency was diagnosed in level of 25-OH vitamin D below 49.5 nmol/l, vitamin D insufficiency – between 74.5-50.0 nmol/l. BMD was determined by ultrasound densitometry Sahara (Hologic) and DXA (Lunar).

Results: Vitamin D deficiency was registered in 81.8% persons, 13.6% examined had vitamin D insufficiency. It was determined negative significant correlation between PTH and 25OHD (r=-0.16, p<0.0000001). Secondary hyperparathyroidism was diagnosed in 11.9% patients. The mean level of 25OHD was significantly higher in southern resident of the country (p<0.001) and during summer (p<0.05). No significant correlation between 25OHD and BMD was found. But, only patients with vitamin D deficiency had significant negative correlations between PTH level and BMD at the level of femur neck (r=-0.12, p<0.004), dual femur (r=-0.09, p<0.004), upper and lower extremities (r=-0.11, p<0.01 and r=-0.10, p<0.01 accordingly), forearm 33% (r=-0.20, p<0.001).

Conclusion(s): In Ukrainian population the frequency of vitamin D deficiency is 81.8%. Only patients with vitamin D deficiency have significant negative correlations between PTH level and BMD at the level of femur neck, dual femur, forearm 33%, upper and lower extremities.

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BONE AND MUSCLE CHANGES WITH TERIPARATIDE THERAPY FOR 18 MONTHS – A PILOT PROSPECTIVE STUDY FROM A CONVENIENCE COHORT

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Objective(s): To determine changes in bone and muscle morphometry with 18 months of teriparatide therapy.

Material & Methods: Patients prescribed 20 μg/day teriparatide sc de novo were asked to participate in an 18-month study. DXA (Hologic) scans of the lumbar spine (LS) and femoral neck (FN) were acquired at study entry as were single slice pQCT (Stratec) scans (2.3±0.5 mm thick) at the 4% radius and 66% calf at in-plane resolutions of 200 μm and 500 μm, respectively. Participants were followed at 6-month intervals for 18-months, repeating DXA and pQCT scans at each visit. All pQCT scans were randomized upon analysis. Images of radii were semi-automatically segmented using OsteoQ (Teneos Software Inc) to provide apparent microstructural parameters. Calf muscle was segmented using SliceOmatic (Tomovision) to determine muscle (vMD, MCSA) and bone (vBMD, BCSA) volumetric densities and cross-sectional areas. Linear mixed models evaluated repeated measures of bone and muscle over 18-months, adjusting for age and BMI. Post-hoc time comparison was adjusted by Dunnett's method.

Results: 32 participants (6 M, 26 F, age: 63.7±11.6 yrs, BMI: 24.8±17.0 kg/m^2, FN T-score:-2.4±0.7) were followed for a mean of 12.3±9.3 months with 78% completing at least 15 months. Bone volume fraction and BMD of the LS and FN were unchanged (p>0.900) (Table). vMD significantly increased at 12 months with adjustment for age and BMI (p=0.049). Apparent increases in MCSA were not significant (p=0.146). Cortical bone density at the 66% site was

decreased after 6 months ($p<0.001$). Maximum hole area marginally decreased by 18 months ($p=0.095$) at the 4% distal radius.

Table I. Comparing reliability of pQCT muscle measures obtained by water-shed versus threshold-based segmentation separated by participant subgroups, Young adult (age:25.6±3.3, BMI: 23.9±4.8), older adult (age: 74.0±9.2, BMI: 25.7±4.0), SCI (age: 44.1±9.4, BMI: 23.9±3.3). vMD = muscle volumetric density, MCSA = muscle cross-sectional area.

Reliability Data	RMSSD (units)			RMSCV (% error)		
Variable & Method	Young	Older	SCI	Young	Older	SCI
Water-Shed vMD (mg/cc)	0.89	1.43	0.85	1.18	2.01	1.42
Threshold-Based vMD (mg/cc)	1.73	1.22	2.43	2.36	1.77	4.06
Water-Shed MCSA (mm^2)	34.96	53.97	52.34	0.49	0.93	1.38
Threshold-Based MCSA (mm^2)	154.35	105.37	142.10	2.57	1.77	2.94

Conclusion(s): This pilot study showed modest effects of teriparatide at 20 μg/day sc to improve muscle density, a surrogate of muscle adiposity, despite inconsistent effects on bone microstructure. The clinical implications of these muscle changes have yet to be determined.

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VITAMIN D AND RHEUMATOID ARTHRITIS

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Objective(s): Vitamin D deficiency has been implicated in the pathogenesis of autoimmune diseases, such as diabetes mellitus type 1 and multiple sclerosis. Reduced vitamin D intake has been linked to increased susceptibility to the development of rheumatoid arthritis (RA) and vitamin D deficiency has been found to be associated with disease activity in RA patients. The aim was to evaluate vitamin D status in RA patients and to assess the relationship between vitamin D levels and disease activity.
Material & Methods: In a cohort of 44 patients suffering from RA 25(OH)D3 levels, PTH levels, C-reactive protein and ESR were measured. Disease activity was evaluated by calculating the DAS28 score. A control group (n=44), matched for age and sex, was evaluated as well. All patients fulfilled the American College of Rheumatology criteria for the classification of RA.
Results: In the cohort of 44 RA patients 25(OH)D3 levels were found to be low as compared to the control group, 25 (OH)D3 being 15.36±1.09 ng/ml and 24.9±1.2 ng/ml, in the patient and control group, respectively (Student's t test, $p<0.05$). PTH levels were 70.82±7.22 pg/ml (normal values 10.0-65.0 pg/ml), CRP 7.59±1.64 mg/l (normal values <3 mg/l) and ESR was 36.7±4.5 mm/h in the group of RA patients. Levels of 25(OH)D3 were found to be negatively correlated to the DAS28 score, correlation coefficient being -0.065. Levels of 25(OH)D3 were also found to be negatively correlated to CRP and ESR, correlation coefficient being -0.11 and -0.16, respectively.
Conclusion(s): It appears that vitamin D deficiency is highly prevalent in RA patients, and that vitamin D deficiency may be linked to disease severity in RA. As vitamin D deficiency has been linked to diffuse musculoskeletal pain, these results have therapeutic implications. Vitamin D supplementation may be needed both for the prevention of osteoporosis as well as for pain relief in rheumatoid arthritis patients.

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BENEFIC EFFECT OF THE USE OF FLEXIBLE AND MINIMALIST FOOTWEAR ON KNEE OSTEOARTHRITIS

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Objective(s): To analyze the therapeutic effect of chronic use of the flexible, nonheeled commercial shoe Moleca® on clinical aspects of women with knee osteoarthritis (OA).
Material & Methods: Six women with an established diagnosis of knee OA according to ACR criteria were evaluated after assignment of approved informed consent. The intervention consisted of the use for a 6 month period of Moleca® footwear (RS, Brazil) for at least 6hours daily and for 7 days a week. This is a light (mean weight=172±19.6 g, range 142-193 g depending on size) double canvas flexible flat walking shoe nonheeled, with a 5-mm antislip rubber sole and a 3-mm internal wedge of ethylene vinyl acetate. Assessment was done at baseline and 6 months later. All patients were screened and evaluated by a rheumatologist at baseline for clinical examination and x-rays. Subsequent procedures were performed by the same physiotherapist to

assess pain (visual analogue scale – VAS), WOMAC index and knee adduction moment during gait calculated by inverse dynamics method using 6 infrared cameras and a multicomponent force plate. T-test was used to compare pre/post intervention effects and $P<0.05$ was considered significant.

Results: Mean age of patients was 69±6 yrs, weight=65.9± 12.1 kg, height=152±5 cm, BMI=28.6±4.9 kg/cm^2. All women had knee OA grade 2 or 3 (Kellgren-Lawrence). Average use of Moleca® was 7:24±3:47 h monthly. Remarkably, 6 months after intervention, a reduction of 56.6% and 73.9% of VAS for pain at night and at the moment of assessment, respectively, was observed (P=0.048 and P=0.015). Total WOMAC score diminished 44.9% (p=0.001), WOMAC pain subscale decreased 55.2% (p=0.015), and WOMAC function index improved 43.6% (p=0.004). The first (p= 0.533) and the second (p=0.686) knee adduction moment peaks were alike, while significant reduction of 11.2% in knee loading (p=0.001) was achieved during midstance.

Conclusion(s): We have demonstrated in this pilot study that elderly women with knee OA have a benefit effect on pain and function following a 6 month period of use of a specific flexible, nonheeled shoe. These preliminary results warrant further studies aiming to evaluate long term benefit of this intervention in a larger sample population.

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BONE MINERAL DENSITY RESPONSE TO INTRAVENOUS PAMIDRONATE IN WOMEN WITH OSTEOPOROSIS – PRELIMINARY ANALYSIS

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Objective(s): Use of bisphosphonates for osteoporosis treatment is effective in reducing fracture risk, however oral formulations are sometimes not well tolerated or contraindicated by diseases of the gastrointestinal tract. The availability of intravenous pamidronate in the health care system makes this medication often prescribed to treat osteoporosis, despite the lack of studies that prove their antifracture efficacy and not approved by the FDA for this purpose. The objective of this study was to evaluate the therapeutic response of pamidronate in a group of women with osteoporosis through the gain in BMD over a period of 36 months.

Material & Methods: We evaluated retrospectively based on chart review, 127 patients that received Pamidronate during a period of 4 years. Clinical data and BMD results were evaluated by DXA at 0, 12, 24 and 36 months of treatment. We stratified the patients according to an arbitrary criteria in patients with or without high risk of fracture.

Results: We excluded from the final analysis 53 patients for different reasons. The final study consisted of 74 women, mean age 68 years, the majority (93%) were white and with high risk of fracture 74%. We observed a significant gain in lumbar spine BMD after 36 m (p=0.006), with maintenance in early times. For the subgroup without high risk of fracture, significant gain was observed at 24 and 36 months (p=0.018 and 0.002, respectively). Femoral BMD was maintained, without significant gain. A negative correlation between serum PTH and BMD was noted, and for each increase of 1 pg/ml in PTH a reduction of 0.61 g/cm^2 in BMD was observed.

Conclusion(s): Considering the BMD response, pamidronate was safe and effective in treating women with osteoporosis with better results at the lumbar spine in patients without a high risk of fractures.

P659
ANALYSIS OF OSTEOPOROSIS RISK-FACTOR FOR WOMEN AFTER MENOPAUSE: THROUGH THE FREE MEDICAL-EXAMINATION CAMPAIGN

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Objective(s): We performed research and analysis to determine the risk factors of osteoporosis for women after menopause by conducting a survey and measuring the bone density through a free program to diagnose osteoporosis.

Material & Methods: Kyungpook National University organized and then started the free osteoporosis diagnosis program on May 11, 2005. One hundred forty six women whose age was between the early forties and late eighties took the survey. The risk factors for osteoporosis were analyzed according to the data which was obtained from the survey. The measurements of the BMD of right calcaneus area were recorded by the use of ultrasound equipment.

Results: Within the results, between the advancing age (P=0.000) of subjects, the lower BMI (P=0.002), the more children (P=0.004), the breast fed longer (P=0.047), the individuals who had a lower age when menopause began (P=0.037) and their BMD showed significant correlation.

Conclusion(s): The results express that the osteoporosis risk-factors for Korean women, despite the advancing age and the lower BMI as absolute factors, that the more children, the longer breast feeding and the lower the age that menopause began, would result in a lower density of bone.

P660
COULD BMD REFLECT THE REAL CHANGE IN HUMAN BONE MINERAL?

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Objective(s): BMD is an important index in diagnosing osteoporosis and other metabolic bone diseases, predicting fractures, and monitoring treatment. DXA is most widely used technique for assessments of BMD and considered as the gold standard for the minimum exposure to radiation, low cost, high reproducibility, and ease of use. Author performed an experimental study to determine the relationship between the change in BMD measured by DXA and real change in mineral of human long bone.
Material & Methods: A pair of humeri and femora from one male cadaver was cut into specimen about half in length. Demineralized area of 3 specimens from a pair of humerus and 4 specimens from a pair of femur were immersed into 1 N HCl from 10 min to maximum 70 min with 10 min intervals for different level of demineralization. All 7 specimens were checked with BMD using by DXA (GE-Lunar Prodigy) and analysed respectively. The amount of calcium and phosphorus both from demineralized and normal area were measured and expressed in percentage of demineralizatioin.
Results: As demineralization was going on with time of immersion into HCl, there was statistically significant correlation between the change of BMD and real change of calcium amount (γ=0.65) in humerus, and also in femur (γ=0.63). There was statistically significant correlation only in femur between BMD and phosphorus (γ=0.77), and not in humerus (γ=0.42). In summary, there was a high linear regression between BMD and real bone mineral with minimum of 89% and maximum of 97% as coefficient of determination (R^2) (p<0.05). Through correlation analysis, correlation coefficient (γ) between BMD measured by DXA and mineral of human long bone showed a high correlation as maximum of 0.84 (p<0.05).
Conclusion(s): Our study showed a statistically significant high relationship between BMD measured by DXA and mineral of human long bone. Therefore, the measurement of DXA is considered to reflect the real change of mineral in human long bone as well as that of BMD. The limitation of this study was that it was based on artificially induced demineralization only one pair of cadaveric humerus and femur so that vertebrae were excluded.

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BONE MINERAL DENSITY, IL-1β AND TNF α IN PATIENTS WITH OSTEOARTHRITIS

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Objective(s): Our study to investigate the relationship between osteoarthritis (OA) and osteoporosis (OP).
Material & Methods: The study was carried out in 103 Hospital of Vietnam Military Medical University (VMMU) from October 2009 - October 2010. 101 patients with OA and 53 healthy individual to determine concentration of IL-1β and INFα in serum by flow cytometry-assisted immunoassay with Bio-Plex kit. They also to evaluate the BMD by DXA (Hologic system).
Results: The results showed that:

- Concentration of both cytokine in patient group is higher than healthy individual group (p<0.001).
- BMD of patient group is lower than healthy individual group (p<0.001).
- The study found out a relation between the percentage of the patients with higher concentration of IL-1β, TNFα and osteopenia also osteoporosis.

Conclusion(s): The results of our study showed that OA may induce the OP. IL-1β and INFα were involved to the not only pathology of OA but also the pathology of OP.

P662
VITAMIN D DEFICIENCY AND GASTROINTESTINAL DISORDERS

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Objective(s): Vitamin D deficiency is increasingly recognized today having taken the form of a modern epidemic. Vitamin D, being synthesized in the skin under the effect of ultraviolet light has been originally thought of as occurring only in areas of the world where people are not exposed to the sun. However, it has recently been observed that vitamin D deficiency exists even in sunny areas. Recent observations suggest that vitamin D deficiency is related to significant comorbidity, specifically to the occurrence of diabetes mellitus and cardiovascular disease. Observations also correlate vitamin D deficiency with gastrointestinal disorders, including gastritis, Helicobacter pylori infection and cholocystectomy. The aim of the study was to describe the relationship between vitamin D deficiency and gastrointestinal disorders.
Material & Methods: A group of 52 consecutive patients diagnosed with vitamin D deficiency aged (62.77±10.48

years, mean±SD), 45 women and 7 men are described. Vitamin D was measured by radioimmunoassay.
Results: BMI was 30.26±5.83, glycosylated hemoglobin HbA1c was 7.5±2.11% and 25(OH)D3 was 11.8±4.03 ng/ml. Amongst the group of 52 patients with vitamin D deficiency 14 had undergone cholocystectomy and had gastritis and 3 had Helicobecter pylori infection diagnosed by gastroscopy and subsequent histology.
Conclusion(s): These data show that vitamin D deficiency is associated with significant comorbidity. Gastrointestinal disorders seem to be related to vitamin D deficiency. Cholocystectomy and gastritis, as well as Helicobacter pylori infection, may affect the absorption of vitamin D2 from the gastrointestinal tract and may thus be related to the aetiology and pathophysiology of vitamin D deficiency in this group of affected patients.

P663
VITAMIN D AND OBESITY

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Objective(s): Low vitamin D levels have been found in patients with diabetes mellitus type 2 and have been correlated with poor glycemic control. There are observations suggesting that vitamin D levels may be low in obesity. The aim was to study vitamin D levels in obese individuals.
Material & Methods: The levels of 25(OH)D3 were measured in 30 obese individuals aged 42.67 years (mean), range 27-64, BMI 35.49 (mean), range 30-46 and 37 control subjects, aged 58.3 years (mean), range 33-83, BMI 24.9, range 21-29. The levels of 25(OH)D3 were measured by radioimmunoassasy.
Results: Vitamin D levels were lower in the obese patients than the control subjects, levels being 21.87±12.36 ng/ml (mean±SD) in the obese patients as compared to 38.42±15.31 ng/ml in the control group, $p<0.05$ (Student's t test).
Conclusion(s): It appears that vitamin D levels may be low in obesity. The aetiology of low vitamin D levels in obesity is still obscure. Vitamin D may be stored in the fat and thus its real levels within the body may be normal, low levels being detected only in the blood. Alternatively, vitamin D may be destroyed in obesity, as a result of increased oxidative reactions occurring in the context of obesity. Thus, low vitamin D levels may be another pathophysiological mechanism resulting in increased morbidity in the obese.

P664
PRIMARY HYPERPARATHYROIDISM AND VITAMIN D DEFICIENCY

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Objective(s): Primary hyperparathyroidism is a rather frequent disorder characterized by high plasma PTH levels and high plasma calcium levels. Vitamin D deficiency is prevalent in all areas of the world, being however very frequent in old age. Vitamin D deficiency has been described in patients with primary hyperparathyroidism. When present, vitamin D deficiency may be associated with large size parathyroid adenomas and poses therapeutic dilemmas, as calcium and vitamin D supplementation may increase PTH levels. The aim was to describe the case of a patient with primary hyperparathyroidism and vitamin D deficiency.
Material & Methods: A patient, male aged 87 years, was hospitalized for coronary insufficiency. During hospitalization high plasma calcium was observed, calcium levels being 10.5 mg/dl.
Results: Laboratory investigations revealed high plasma PTH levels, PTH being 117 pg/ml (normal values 10-65 pg/ml) and low plasma 25(OH)vitamin3 levels, 25(OH)D3 being 8 ng/ml (normal values <30 ng/ml). BMD was measured in the neck of the left femur and revealed a T-score of -3.05. Vitamin D supplementation was initiated followed by the administration of alendronate. Ultrasonography revealed an adenoma beneath the right lobe of the thyroid gland.
Conclusion(s): Vitamin D deficiency may be found in the context of primary hyperparathyroidism. When present, vitamin D supplementation should be initiated cautiously, as it may aggravate the clinical picture of primary hyperparathyroidism. Cautious vitamin D supplementation is however necessary and will not cause an increase in plasma calcium and PTH levels.

P665
TRABECULAR BONE TEXTURE MEASUREMENT: A REVIEW OF AVAILABLE TECHNIQUES AND OF EMERGING APPLICATIONS

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Objective(s): The WHO working group on Osteoporosis recognized in 1993 that this bone disease is dual, characterized by a gradual loss of calcium content and a destruction of bone architecture. Both aspects certainly play a role in the

bone fragility observed in osteoporosis. The loss of calcium content has been extensively studied by measuring BMD. Bone texture has remained largely inaccessible.

Material & Methods: Histomorphometric parameters described by Parfitt et al, such as Trabecular Number, Trabecular Thickness, Trabecular Spacing, Bone Volume/Total Volume, remain the gold standard of bone texture measurement. A limitation in their usage is the requirement for a bone biopsy in order to perform a microscopic assessment.

Results: Attempts to develop a noninvasive quantification of bone texture have explored different approaches, which can be classified as three-dimensional and two-dimensional. High resolution MRI belongs to the first category; various texture parameters have been defined, using a skeleton graph analysis technique, which correlate with the thinning of trabeculae in osteoporotic bone. Also three-dimensional, the High Resolution peripheral QCT allows the determination of apparent histomorphometric parameters that correlate with the Parfitt parameters. It has been largely demonstrated that information contained in a three-dimensional structure is transferred to its two-dimensional projection, as performed by a high resolution X-Ray. This technique has particularly retained the attention due to its ease of use and better economic performance. From the X-Ray image of a bone, different sets of parameters have been derived, the majority of them based on an analysis of the fractal geometry of the image and the determination of its fractal dimension.

Conclusion(s): Changes in bone texture have been shown to occur in osteoporosis. Used in combination with bone densitometry, the texture parameters appear to improve the prediction of bone fragility. Changes also occur in the subchondral bone in Osteoarthritis and are reported to be sensitive to treatment. More recently, it was also found that rheumatoid arthritis disturbs the texture of the subchondral bone.

P666
VITAMIN D LEVELS IN CHILDREN OF VITAMIN D DEFICIENT IMMIGRANT MOTHERS

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Objective(s): It is important that the mother is vitamin D-sufficient enabling her to cope with the increased need of calcium during pregnancy when the fetus accretes large amounts of calcium. During pregnancy, vitamin D is transferred through the placenta to the fetus where it is stored. Consequently, the mother must increase her vitamin D intake to avoid deficiency. In the newborn, vitamin D stores are depleted by approximately 8 weeks of age, if not supplemented. Breast fed infants are at risk of becoming deficient as the amount of vitamin D taken up from the breast milk is low. I, Sweden, it is recommended to supplement all infants with 10 μg (400 IE) of vitamin D_3 daily starting from 2 weeks of age. We aimed to study if this recommendation is sufficient in infants of vitamin D deficient immigrant mothers.

Material & Methods: We characterized a cohort of 68 pregnant immigrant women living in Stockholm and compared their vitamin D levels with 51 nonimmigrant pregnant women**.** The levels of 25 (OH) $VitD_3$ was measured with a competitive RIA (Dia Sorin, Stillwater, MN). Intra-assay and interassay variations were 5% and 9%, respectively.

Results: Of the immigrant pregnant women, 77.9% had 25 (OH) $VitD_3$ levels <25 nmol/L and of those 29.4% had levels <12 nmol/L. In contrast control subjects only 3.9% had vitamin D levels <25 nmol/L and none of these had a level <12 nmol/L. We also made an attempt to monitor the infants of immigrant mothers and were able to follow 25/64 born infants up to the age of 6-12 months. Their mothers originated from Middle Asia (16), Africa (7) and South America (2). All newborns had normal birth weight and Apgar scores. The table details 25 (OH) $VitD_3$ levels in the pregnant mothers (at week 12 and at delivery), in the umbilical cord at delivery, and in the infants at 6-12 months of age. Unfortunately, calcium levels could only be measured in 11/25 newborns and were then found to range between 2.3-3.0 mmol/L which is normal. None of the children were reported to have a history of hypocalcemic seizures or any other condition leading to hospitalization. As shown in the table, most children had normal levels of vitamin D when assessed at 6-12 months of age (range 38-142 nmol/L) and none of them were severely deficient.

	Mother; week 12 (n=25)	Mother; at delivery (n=12)	Umbilicus cord (n=12)	Infant; 6-12 mth (n=25)
25 OH vit D3 nmol/l (range)	14.8 (4.6) (10-28)	15.4 (8.7) (10-39)	23.3 (11.1) (20-54)	82.8 (29.7) (38-142)

Conclusion(s): The daily recommended supplementation dose of 10 μg vitamin D_3 is sufficient for children of vitamin D deficient immigrant women. Furthermore, our data suggest that compliance is good with the recommended vitamin D supplementation. A well organized network of well-baby clinics may have facilitated the good outcome.

P667
ESTABLISHMENT OF PARATHYROID HORMONE (PTH) REFERENCE RANGE ON 10 DIFFERENT ASSAY KITS: IMPACT OF THE RECRUITMENT OF THE POPULATION

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Objective(s): Reference values (Rv) for serum PTH levels are generally obtained by measuring PTH in a apparently healthy subjects population. Exclusion criteria are important and should correspond to any causes of altered PTH secretion, including vitamin D (VTD) insufficiency, very frequent in the general population and thus prevalent in an apparently healthy group. However, excluding VTD insufficient subjects requires the measurement of 25-hydroxy vitamin D (25OHD) levels, which was not considered in most studies which provided serum PTH Rv for different immunoassays. Some studies have shown that this could decrease the upper normal limit for PTH by 25-35% depending on the assay considered. Thus, for a given PTH assay, the Rv may significantly vary, depending on the reference population that has been recruited, and especially whether the VTD status has been taken into account. We thus used the same reference population of VTD-replete normal subjects to establish Rv for 10 PTH kits and compare them with those provided by the manufacturers.
Material & Methods: We selected 120 apparently healthy Caucasian women (48.6±15.2 y., min-max: 20-79), and men (51.5±17.5 y., min-max: 19-80). Inclusion criteria were a 25OHD concentration ≥75 nmol/L, serum calcium and phosphate levels comprised between 2.15-2.60 and 0.74-1.51 mmol/L, respectively, and an estimated GFR ≥60 mL/min/1.73 m^2. The use of drugs known to influence bone and calcium/phosphorus metabolism was an exclusion criteria.
Results: There was no significant difference in PTH levels nor in age between men and women. With all the tested PTH assays, the distribution of the concentrations was Gaussian. The results observed were lower than the Rv provided by the manufacturers with an upper normal limit only slightly different for 3 kits (Abbott Architect, DiaSorin Liaison N-tact and Ortho Vitros) but frankly lower (21-46.1%) for the 7 other kits. The difference was most important for the Beckman Access (-46.1%), the DiaSorin N-tact IRMA (-33.9%), and the DiaSorin Liaison 1-84 (-32.8%).
Conclusion(s): An important multicentre work should be performed to recruit a very extensive reference population of vitamin D-replete, apparently healthy subjects in order to establish the PTH Rv for all the available kits.

P668
ASSOCIATION OF SERUM OSTEOCALCIN AND AORTIC CALCIFICATIONS IN THE MEN FROM MINOS STUDY

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Objective(s): Metabolic syndrome (MetS) is associated to an increased risk of cardiovascular events. As osteocalcin deficient mice present a metabolic syndrome-like phenotype, we hypothesized that there may be a link in humans between osteocalcin, MetS and abdominal aortic calcifications (AAC), an intermediate criterion of the risk of cardiovascular events.
Material & Methods: We performed a cross-sectional analysis in the 798 men aged 51-85 of the MINOS cohort. We used the recent harmonized criteria to define MetS (Alberti et al. Circulation 2009). We assessed AAC semi-quantitative score from the lumbar spine radiographies according to Kauppila's method. Blood was collected in the fasting status.
Results: Blood glucose was correlated with BMI ($r=0.26$; $p<0.001$) and osteocalcin ($r=-0.22$; $p<0.001$). Median [IQR] of osteocalcin was lower in patients with MetS than in normal patients (17.4 ng/mL [8.0] vs. 18.5 ng/mL [7.5]; $p=0.01$). Serum osteocalcin was negatively correlated with the severity of MetS based on the number of MetS traits ($p<0.001$). Osteocalcin decreased across tertiles of AAC score and was lower in men with more calcifications (AAC score >4) ($p<0.005$). The highest serum osteocalcin concentrations were associated to a lower prevalence of high calcification score (OR=0.78 [0.64-0.94] per SD increase; $p=0.01$) in the multivariate logistic regression adjusted for age, smoking, hypertension, sport activity, vitamin K antagonist, serum level of creatinine, phosphorus, HDL-cholesterol, 25OHD, triglycerides and testosterone. In the multi-adjusted logistic regression model, the lowest quartile of osteocalcin was associated with higher prevalence of AAC score >4 compared with the three upper quartiles (OR=1.72 [1.14-2.60]; $p<0.01$). In a stepwise logistic regression including other biochemical bone turnover markers (sCTX, P1NP, BSAP), osteocalcin was the only bone marker retained in the model and significantly associated with the aortic calcification score (OR=0.80 [0.65-0.77] per SD increase; $p=0.02$).
Conclusion(s): In this cohort of older men, we found that higher serum osteocalcin level was independently associated with lower prevalence of MetS and less severe AAC. Osteocalcin level might be an independent cardiovascular risk factor.

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RISK FACTORS FOR HIP OSTEOARTHRITIS

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Objective(s): To evaluate individual risk factors for hip osteoarthritis

Material & Methods: The research included 148 respondents, aged 55-75 years. Research was conducted during 2009 in Special Hospital for Rheumatic Diseases in Novi Sad. All responders were divided into two groups. The first group (n=74) was diagnosed hip osteoarthritis, according to the classification criteria set by the American College of Rheumatology. The second group (n=74) who based on the conducted diagnostic procedure, were excluded from having the hip osteoarthritis. Before they included, all examinees were a part of the diagnostic procedure during which the diagnosis was established, or excluded. The diagnostic procedure involved: anamnestic data with emphasis of hip pain; physical examination; radiography of hip, as well as collecting data through with interview. A conversation in the form of an interview was conducted with each examine. Examinees filled in identical questionnaires. As a part of identifying the presence/ absence of the observed risk factors the following data were monitored: ages, gender, overweight verified by the BMI≥25 kg/cm^2; presence / absence of anamnestic data on the existence of hip osteoarthritis in family; vertical load of the hip during professional activity. Examines were classified into groups depending on the load hip: sitting job and standing job with heavy lifting.

Results: The research didn't show any difference regarding the gender between groups. Ratio between men and women in the first group was much in favour of women. Positive family anamnesis for hip osteoarthritis was prevalent in the first group. In the first group, weight mean±SD kg/cm^2 (81.82±12.18) and BMI mean±SD kg/cm2 (30.18±4.6). It was statistically significant between groups (p 0.01). Also found more respondents (87.8%) from the first group was overweight, BMI ≥25.5 kg/cm^2 . It was statistically significant between groups (p 0.01). Standing job with heavy lifting was prevalent in the first group of respondents (62%). It was statistically significant between groups (Fisher test, p 0.05).

Conclusion(s): Positive anamnesis for hip osteoarthritis, overweight, standing job with heavy lifting are important independent risk factors for hip osteoarthritis

P670

A VERY HIGH PREVALENCE OF VITAMIN D INADEQUACY COMBINED WITH LOW DIETARY CALCIUM INTAKE IS FOUND IN EUROPEAN POSTMENOPAUSAL WOMEN

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Objective(s): A lack of calcium intake and a low vitamin D level represent a risk factor for osteoporosis. The recommended nutritional intake of calcium is equal to 800 mg/day for European adults but increases to a minimum of 1000 mg/day in women after menopause. The WHO recommends 1300 mg/day for European menopausal women. There are no clear international agreements on what constitutes a level of vitamin D inadequacy, but recent publications suggest that the circulating level of vitamin D should be over 80 nmol/L or at least between 50-80 nmol/L. The objective of this study was to assess the prevalence of low calcium dietary intake combined with low vitamin D level in European postmenopausal osteoporotic women.

Material & Methods: The assessment of calcium dietary intake with a validated self-questionnaire and of 25-hydroxyvitamin D [25(OH)D] with a commercial radioimmunoassay (DiaSorin) was performed in 8532 osteoporotic European women from 9 European countries (i.e., Belgium, Denmark, France, Germany, Hungary, Italy, Poland, Spain, UK).

Results: Mean age of the women was 74.2 (7.1) years with a BMI of 25.7 (4.2) kg/m². The level of 25(OH)D was 61.0 (27.2) nmol/L and the mean calcium dietary intake was 930.7 (±422.9) mg/day. Surprisingly, only 108 of out the 8532 patients (=1.18%) included in this study have a calcium intake superior to 1300 mg and a 25(OH)D level superior to 80 nmol/L. This prevalence only increase to 27.1% when minimal cutoff levels of 800 mg of calcium and 50 nmol/L of vitamin D are considered.

Conclusion(s): Calcium dietary intake and vitamin D level are very low in European postmenopausal women. A greater awareness is needed to resolve this public health problem.

P671

SEVERE PREVALENT VERTEBRAL FRACTURES PREDICT SUBSEQUENT VERTEBRAL AND NONVERTEBRAL FRACTURES: A 3-YEAR PROSPECTIVE STUDY

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Objective(s): To examine whether a prevalent severe vertebral fracture predicts subsequent fracture and to assess the effect of strontium ranelate to reduce fracture in patients with such prevalent severe vertebral fracture.

Material & Methods: Analysis of two 3-year randomized controlled trials investigating the clinical effect of strontium

ranelate. Vertebral and major non-vertebral fractures (i.e., ribs sternum, wrist region, pelvic sacrum, collarbone, humerus, proximal femur) were assessed during the 3 years. At baseline on standard radiographs, each vertebra received a severity grade corresponding to either no fracture either a mild, moderate or severe fracture based on a semiquantitative visual assessment. All women received calcium and vitamin D during the whole length of the study.

Results: 6137 women aged mean (SD) 75.1 (6.1) years were included in this study. In the placebo group, after 3 years of follow-up, 43% of the women with a prevalent severe vertebral fracture had experienced a new vertebral fracture compared to only 12.5% of the women without any vertebral fracture (OR 3.46 [2.87-4.18]). The logistic regression analysis, adjusted for age, BMI, femoral neck BMD and number of prevalent vertebral fractures, showed that the presence of a severe vertebral fracture was significantly associated with new vertebral fractures over a 3-year follow-up period. In women with severe prevalent vertebral fracture (N=680), strontium ranelate was able to significantly reduce the risk of new vertebral fractures (OR 0.75 [0.61-0.91]).

Conclusion(s): In summary, severe prevalent vertebral fracture is an independent predictor of new vertebral and non-vertebral fractures that could be taken into account in fracture risk management.

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RELATIONSHIPS BETWEEN CHANGES IN BONE MINERAL DENSITY AND VERTEBRAL FRACTURES INCIDENCE: AN ANALYSIS OF THE LAST 2 YEARS OF A 10-YEAR TREATMENT WITH STRONTIUM RANELATE

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Objective(s): We have previously shown that, in women treated for 3 years with strontium ranelate, an increase in hip BMD, but not spine BMD, was associated with a proportional reduction in vertebral fracture incidence (Bruyere et al, J Clin Endocrinol Metabol, 2007). As a matter of fact, each 1% in femoral neck or total proximal femur BMD was associated with decreased risk to experience a new vertebral fracture by 3% (95% adjusted CI 1%-5%) and 2% (1%-4%), respectively. Some women have now been treated for 10 years with strontium ranelate. Our objective is to assess the relationship between change in BMD and vertebral fracture incidence in the last 2 years of the 10-year treatment.

Material & Methods: We have included women from the strontium ranelate arm of the Spinal Osteoporosis Therapeutic Intervention study (SOTI) and the TReatment Of Peripheral OSteoporosis study (TROPOS) having received the treatment for 10 years.

Results: 116 women with femoral neck and total hip BMD and fracture data available during the 10 years of follow-up were included in the present analysis. During the last two years of follow-up, 12 patients experienced a new vertebral fracture. After having controlled for age, BMI at year 9, BMD at year 9, number of vertebral fracture at year 0, number of new vertebral fracture from year 0 to year 8, we found that the BMD change at the femoral neck from years 9 to 10 was significantly associated with vertebral fractures incidence during the same period of time (p=0.03). Each 1% increase in femoral neck BMD was associated with a 15% (95% adjusted CI 2-26%) decreased risk to experience a new vertebral fracture. The same trend was observed for total hip BMD (7% [95%CI -3% to 17%) but it did not reach statistical significance (p=0.16). Women with new vertebral fractures from years 9-10 experienced during the same period a decrease of 2.4 (4.7)% in femoral neck BMD, compared to an increase of 1.5 (8.3)% in women without new vertebral fracture.

Conclusion(s): During the last 2 years of a 10-year treatment with strontium ranelate, the increase in femoral neck BMD was associated with a proportional reduction of the incidence of new vertebral fractures. These results confirm that the assessment of femoral neck BMD could be of interest to monitor women treated with strontium ranelate.

P673
EFFECT OF COLLAGEN HYDROLYSATE IN ARTICULAR PAIN: A 6-MONTH RANDOMISED, DOUBLE-BLIND, PLACEBO CONTROLLED STUDY

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Objective(s): Evaluation of the efficacy and safety of a food supplement made of collagen hydrolysate 1200 mg/day vs. placebo during 6 months, in subjects with joint pain at the lower or upper limbs or at the lumbar spine.

Material & Methods: Comparative double-blind randomized multicenter study in parallel groups including 200 patients of both genders of at least 50 years old with joint pain assessed as ≥30 mm on a visual analogical scale (VAS). Patients were randomised to receive collagen hydrolysate 1200 mg/day or placebo during 6 months. The primary outcome was the comparison of the percentage of clinical responder between the active collagen hydrolysate group and the placebo group after 6 months of study. A responder subject was defined as a subject experiencing a clinically significant improvement (i.e., by 20% or more) in the most painful joint using the VAS score. Quality of life changes was assessed using the EQ-5D and the SF-

36. All analyses were performed using an intent-to-treat procedure.
Results: At 6 months, the proportion of clinical responders to the treatment, according to VAS scores, was significantly higher in the collagen hydrolysate (CH) group 51.6%, compared to the placebo group 36.5% ($p<0.05$). However, there was no significant difference between groups at 3 months (44.1% vs. 39.6%, $p=0.53$). No statistically significant difference was observed between groups, neither concerning the EQ-5D changes ($p=0.54$), nor for any of the dimensions of the SF-36 questionnaire (p between 0.33 and 0.98). No significant difference in terms of security and tolerability was observed between the two groups.
Conclusion(s): This study suggests that collagen hydrolysate 1200 mg/day could increase the number of clinical responders (i.e., improvement of at least 20% on the VAS) compared to placebo after a follow-up of 6 months. More studies are needed to confirm the clinical interest of this food supplement.

P674
PREDICTION OF FUTURE KNEE SURGERY IN PATIENT WITH OSTEOARTHRITIS BY THE USE OF A NEW DEFINITION OF X-RAY PROGRESSION

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Objective(s): With structure modifying osteoarthritis (OA) drugs, a classical definition of progressor is a joint space narrowing (JSN) of 0.5 mm or more between baseline and the last available radiograph. However, because of the variability in joint space width assessment, the robustness of the result could be challenged. Moreover, this definition does not take into account intermediate measurements and the consistency between various JSN assessments. The objective of the present study is to assess the clinical relevance of a new definition of x-ray progressor that takes these points into account.
Material & Methods: 131 subjects with primary knee OA were followed prospectively for a mean eight years. Joint space width was assessed from standard x rays at baseline and each year during three years. The rate of knee OA related surgery was recorded for the following five years. Classical x-ray progressor was defined as a JSN of at least 0.5 mm. The new x-ray progressor criteria was based on three arbitrary rules: (1) a JSN of 0.6 mm or more at the last visit or (2) a JSN of 0.30 mm or more during two consecutive visits; or (3) a JSN of 0.45 mm or more, with at least one future visit with a JSN of 0.20 mm or more.
Results: After 3 years of follow-up, an x-ray progression was observed in 11.4% of the patients when considering classical definition and in 13.7% with the new definition. After 8 years of follow-up, 13 patients had experienced knee OA related joint surgery. When considering the classical definition (i.e., ≥0.5 mm), the risk to experience a knee surgery in patients with an x-ray progression was not significantly higher (OR 3.32 [0.68-15.35]) compared to subject without x-ray progression. However, with the new definition, the risk to experience a knee surgery was significantly higher (OR 6.01 [1.30-27.72]) in patients with an x-ray progression compared to subject without progression.
Conclusion(s): This new definition of progressor patients, that takes into account intermediate visits and JSN consistency over time, provides a more robust definition of responders and reflects a clinically relevant progression in patients with knee osteoarthritis. Other JSN cutoff values should be considered in the algorithm.

P675
PERCEPTION, KNOWLEDGE AND USE BY GENERAL PRACTITIONERS OF BELGIUM OF THE FRAX® TOOL

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Objective(s): The FRAX tool, that calculates the 10-year probability of having a fracture, has been recently developed by the WHO to improve the sensitivity of the BMD measure and thus to enable an earlier identification of patients at high risk of fracture. Little is known about the perception and knowledge that GPs have about this tool in their daily practice.
Material & Methods: A survey has been conducted as part of a screening campaign for various diseases launched by the Province of Liège in Belgium. The primary objective of the present study was to assess the perception and the knowledge of the FRAX tool by GPs. The secondary objective was to assess the impact of an information brochure, about the FRAX tool, created by the University of Liège in collaboration with the Province of Liège, on these outcomes. The survey was sent to a sample of 700 GPs after only half of them had received the information brochure.
Results: The survey results show that, out of the 193 doctors who responded to the survey, one third know the FRAX tool but less than 20% use it in their daily clinical practice. In addition, the survey highlights a lack of sufficient knowledge of the FRAX algorithm by medical doctors who know but do not use the FRAX tool. Among those who use it, the FRAX tool is largely seen as a complementary but not as an essential tool in the diagnosis or in the management of osteoporosis. It appears that the brochure could improve the knowledge of the FRAX tool but it would not be more

efficient on its use in daily practice than the other sources of information (e.g., medical representative, scientific conferences, scientific journals).

Conclusion(s): To inform medical doctors about the FRAX tool is essential to expect it to be used in daily practice. This survey shows that even if an information brochure has a significant and positive effect on the knowledge of the FRAX tool, other sources of information seem necessary to promote its effective use

P676

PREVENTION OF SPINAL CORD INJURY INDUCED OSTEOPOROSIS USING LOW INTENSITY PULSE MAGNETIC FIELD

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Objective(s): Osteoporosis is a known consequence of spinal cord injury (SCI) and occurs in almost every SCI patient. It manifests itself as an increase in the incidence of lower extremity fractures. The pathogenesis of osteoporosis after SCI remains complex and perplexing. Disuse may play an important role in the pathogenesis of osteoporosis, but neural factors also appear to be important. SCI also leads to impaired calcium and phosphate metabolism. However, the concomitant prescription of bone-active drugs for the prevention and treatment of osteoporosis remains low, despite the availability of effective therapies. The present study was proposed to investigate the efficacy of Extremely Low Frequency Magnetic Field (ELF-MF) in SCI model of osteoporosis.

Material & Methods: Adult male Wistar rats (n=24) were equally divided into sham, SCI and SCI+MF groups. Complete transection of spinal cord (T11 vertebra) was surgically performed under anesthesia whereas in sham group only laminetomy was done. Post-SCI day 1, rats were either exposed (2 h/d x 8 weeks) to ELF-MF (17.96 μT, 50 Hz; SCI+MF group) or sham exposed (SCI group). BBB score was recorded weekly. All the rats were sacrificed post-SCI week 8; tibia and femur bones were isolated for the analysis of bone mineral content (BMC, total Ca, P, C), BMD and biochemical status (osteocalcin, collagen I, alkaline phosphatase).

Results: BBB score decreased ($p<0.001$) in SCI vs. sham group at all time points which was restored ($p<0.001$) post-SCI wk 2 onwards in SCI+MF group. However, the BBB score was significantly lower in SCI+MF group vs. sham group. In the bones, Ca, P and C contents significantly decreased post-SCI vs. sham group which recovered by MF except for P and C in femur and tibia, respectively. While, there was no statistically significant difference in SCI+MF group vs. sham group except for C content in both the bones. Electron microscopic study revealed the enhancement of microstructural composition and compactness in cortical and trabecular part of treated bones.

Conclusion(s): The results suggest that the chronic (2 h/d x 8 weeks) ELF-MF exposure (17.96 μT, 50 Hz) to SCI rats is effective in attenuating SCI induced osteoporosis.

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STRONTIUM RANELATE AND RISK OF VENOUS THROMBOEMBOLISM (VTE): AN UPDATE OF A RETROSPECTIVE COHORT STUDY IN THE UK GENERAL PRACTICE RESEARCH DATABASE (GPRD)

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Objective(s): To update the evaluation of the risk of venous thromboembolism (VTE) associated with strontium ranelate (SrRan) in routine clinical practice using the General Practice Research Database (GPRD) in the UK.

Material & Methods: Retrospective cohort study including female patients at least 50 years aged, with a record of osteoporosis and/or a prescription for an anti-osteoporotic treatment between Dec 2004 - Dec 2010. This represented a three years extension of the study period compared to the previous evaluation (*). New users of SrRan (N=6454) were compared to untreated osteoporotic patients (without any prior anti-osteoporotic treatment) (N=15846) and to new users of alendronate (N=59173). The risk of VTE was compared between these cohorts using a Cox proportional-hazards regression model with adjustment for the main risk and confounding factors.

Results: Compared to the previous evaluation, the number of patients receiving SrRan and the exposure to SrRan were multiplied by 2.7 and 4.1, respectively. Annual incidence rates of VTE were similar in the three cohorts: 8.7/1000 patient-years (PY) for SrRan, 7.7/1000 PY for alendronate, 8.3/1000 PY in osteoporotic untreated patients. Estimates were consistent with published results (*). Adjusted hazard ratio showed no significant increase in the risk of VTE associated with SrRan

compared to osteoporotic untreated patients (HR=0.82, 95%CI [0.60; 1.13]) or to patients prescribed alendronate (HR=1.06, 95% CI [0.82; 1.37]). No statistical interaction between treatments and age was found and adjusted comparisons in patients below 80 years or over 80 years were also nonsignificant.

Risk of VTE in SrRan patients vs. untreated osteoporotic patients or alendronate patients

	OP-untreated	Strontium ranelate	Alendronate
All patients N (PY)	15846 (13320)	6454 (7599)	59173 (99042)
Patients with VTE[1]	111	66	764
Annual incidence (per 1000 PY) [95%CI]	8.3 [6.8 ; 9.9]	8.7 [6.6 ; 10.8]	7.7 [7.2 ; 8.3]
Adjusted HR[2][95%CI]	0.82 [0.60 ; 1.13]		1.06 [0.82 ; 1.37]
Patients 50-79 years N (PY)	11256 (9525)	3980 (5060)	39110 (69042)
Patients with VTE[1]	66	31	425
Annual incidence (per 1000 PY) [95%CI]	6.9 [5.3 ; 8.6]	6.1 [4.0 ; 8.3]	6.2 [5.6 ; 6.7]
Adjusted HR[2][95%CI]	0.76 [0.48 ; 1.19]		1.03 [0.72 ; 1.49]
Patients >=80 years N (PY)	4590 (3795)	2474 (2539)	20063 (30001)
Patients with VTE[1]	45	35	339
Annual incidence (per 1000 PY) [95%CI]	11.9 [8.4 ; 15.3]	13.8 [9.2 ; 18.4]	11.3 [10.1 ; 12.5]
Adjusted HR[2][95%CI]	0.99 [0.63 ; 1.55]		1.11 [0.78 ; 1.58]

[1] VTE includes pulmonary embolism, deep venous thrombosis, and retinal vein thrombosis. [2] Adjusted Hazard Ratio estimate based on a Cox proportional-hazards regression model.

Conclusion(s): This study did not show any significant association of VTE with SrRan compared to osteoporotic untreated patients or to alendronate in current clinical practice. This update confirms previously published results.

References: *Breart *et al.* Osteoporos Int 2010;21:1181.

P678

PERIOSTIN DEFICIENCY INCREASES CORTICAL MICROCRACKS AND REDUCES WOVEN BONE FORMATION IN MICE SUBJECTED TO FATIGUE LOADING

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Objective(s): Susceptibility to microcracks depends on bone microstructure, turnover and material properties, however the role of distinct bone matrix constituents on fatigue damage and repair remains poorly understood. We previously reported that deficiency of the matricellular protein periostin is associated with decreased collagen crosslinks. Here we analyzed the role of periostin in response to fatigue, including cortical porosity, microcracks and callus formation.

Material & Methods: Twelve week-old *Postn*$^{-/-}$ and *Postn*$^{+/+}$ mice were subjected to a fatigue stimulus of the tibia by in vivo axial compression. Two weeks after the fatigue, we evaluated tibia bone microarchitecture by μCT40; the number of "pores" (>14 μm) and osteocytic lacunae at the one third distal by μCT50 (1 μm resolution); microcracks by fuschin staining; and cortical strength by 3 points bending.

Results: In *Postn*$^{+/+}$ mice, fatigue significantly increased Ct.TV and Ct.BV (+14.8% and +12.7% vs. contralateral tibia, $p<0.05$). A woven bone response was present in 75% of the fatigued bone. The number of pores increased 8-fold in the fatigued tibia, whereas cracks number/BPm and surface/BS increased +172% and +375%, respectively, compared to the nonfatigued side ($p<0.05$). In contrast, in *Postn*$^{-/-}$, fatigue did not change Ct.TV and Ct.BV, and only 16% of the fatigued bones presented a woven bone. In the control tibias, *Postn*$^{-/-}$ tended to have higher number of osteocyte lacunae compared to *Postn*$^{+/+}$ with a significant lower degree of anisotropy (-4.8%, $p<0.05$); and significant higher cracks surface/BS than *Postn*$^{+/+}$ (4.18±1.14% vs. 0.85±0.17%, $p<0.05$). Fatigue increased the number of pores in the same range than *Postn*$^{+/+}$. Fatigue increased cracks number/BPm and surface/BS (+78% and +83% vs. nonfatigued bone, $p<0.05$). Despite *Postn*$^{-/-}$ response similarly to fatigue on cracks than *Postn*$^{+/+}$, cracks number/BPm was higher in the fatigued tibia of *Postn*$^{-/-}$ compared to *Postn*$^{+/+}$ (2.22±0.17 vs. 0.97±0.10 1/mm, $p<0.05$). In accordance with a lower repair, fatigue decreased stiffness and plastic energy in *Postn*$^{-/-}$ (-29.4% and -38.4% in fatigue vs. nonfatigue tibia, $p<0.05$) but not in *Postn*$^{+/+}$.

Conclusion(s): In absence of periostin, microcracks reached a high proportion in fatigued bone and woven bone repair is reduced. The possible link between more osteocyte lacunae and microcracks and lower woven bone formation are still under investigation.

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STRONTIUM RANELATE UNCOUPLES BONE FORMATION FROM BONE RESORPTION IN MALE OSTEOPOROTIC PATIENTS

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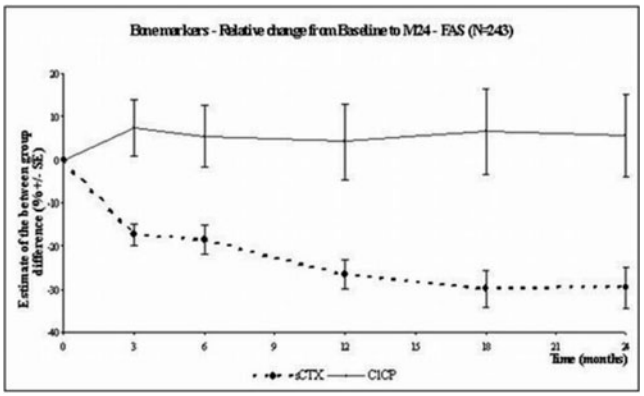
Objective(s): In postmenopausal osteoporotic women, results obtained with strontium ranelate (SrRan) on bone

markers in SOTI and TROPOS studies demonstrated a dissociation between bone formation and resorption in favour of bone formation. The objective of the present study is to assess the effect of strontium ranelate on serum C-terminal propeptide of type I procollagen (CICP), a marker of bone formation and on serum cross-linked C-telopeptides of type I collagen (s-CTX), a marker of bone resorption, in men with primary osteoporosis.

Material & Methods: CICP (MicroVue™ C1CP EIA from Quidel) and s-CTX (Serum CrossLaps® ELISA from IDS) were assayed in the MALEO study, a randomised placebo-controlled trial in 243 men with osteoporosis over 2 years. All markers were measured at baseline and after 3, 6, 12, 18 and 24 months. Blood samples were taken under fasting conditions. Differences over time in biochemical markers level between SrRan and placebo were assessed by analysis of variance with baseline biochemical markers level as covariate.

Results: Mean age of the study population was 72.7 (5.7) years, lumbar and femoral neck BMD T-Score were -2.7±1.0 and -2.3±0.7 respectively. Baseline values were 0.46 (0.26) ng/mL for CICP and 77.9 (34.3) ng/mL for s-CTX. From 3 months of treatment, the serum concentration of CICP was higher in the SrRan than in the placebo group, with a mean (SD) 7.4% (4.5) between-group difference [95%CI:-1.4%; 16.2%] which persisted at each evaluation during the 2-year follow-up. s-CTX concentration was lower in the SrRan than in the placebo group at each time point from month 3, with a mean (SD) –17.2% (6.6) between-group difference ($p<0.001$), and at each subsequent evaluation during the 2 years (all $p<0.001$).



Conclusion(s): As in postmenopausal women, those results showed that there was a dissociation between bone formation and bone resorption with strontium ranelate in osteoporotic men.

P680
STRONTIUM RANELATE REDUCES THE NUMBER OF RADIOLOGICAL OR RADIOCLINICAL PROGRESSORS IN PATIENTS WITH PRIMARY KNEE OSTEOARTHRITIS

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Objective(s): Strontium ranelate (SrRan) has demonstrated a structure-modifying activity associated with symptoms improvement in patients with knee OA in a large, randomised, placebo-controlled, double-blind phase-III 3-year study. Patients with joint space width narrowing (JSN) of 0.5 mm over 3 years have a higher risk of undergoing any OA-related lower limb surgery (1). Both radiological progression and lack of improvement in symptoms have been considered by the GREES as clinically relevant endpoints (2). The objective of this planned analysis was to describe the efficacy of SrRan on radiological and radioclinical progression.

Material and Methods: 1683 patients with symptomatic primary knee OA (ACR criteria) were included and randomly assigned to SrRan 1 g, 2 g or placebo for 3 years. Radiological progressors between baseline and last observation (defined as patients with a JSN≥0.5 mm) and radioclinical progressors (defined as patients with a JSN≥0.5 mm and with a lack of clinical improvement in symptoms (e.g., ≤20% improvement in WOMAC pain subscore) were compared across groups in the ITT using a chi-square test.

Results: Radiological progressors between baseline and last observation were significantly less frequent in the SrRan groups than in the placebo group: 22.3% ($p<0.001$), 25.6% ($p=0.012$) in the SrRan 1 g and 2 g groups, respectively, compared to the placebo group (33.1%). The RRR (and NNT) compared to placebo were 32.7% (NNT=10) and

22.7% (NNT=14) in the 1 g and 2 g group, respectively. Similar results were observed when considering patients with both significant radiological progression and lack of symptom improvement. Less radioclinical progressors were observed in the SrRan 1 g and 2 g group than in the placebo group (7.7%, p=0.049; 6.5%, p=0.008 vs. 11.6%, respectively). The RRR (and NNT) compared to placebo were 34.0% (NNT=26) and 44.1% (NNT=20) in the 1 g and 2 g group, respectively.

Conclusion(s): Strontium ranelate 1 and 2 g/day reduce the number of knee OA patients with a radiological and radioclinical progression. This shows that SrRan could have a positive effect in decreasing lower limb surgery.

References: (1) Bruyere et al, Ann Rheum Dis (2005);64:1727. (2) Altman et al, Osteoarthritis Cartilage (2005);3:13.

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THE RELATIONSHIP BETWEEN LEG MUSCLE STRENGHT AND POWER AND PQCT BONE MINERAL PARAMETERS IN OLDER PERSONS LIVING IN THE COMMUNITY

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Objective(s): To investigate whether objective measures of leg muscle strength and power are associated with indexes of bone health in older men and women randomly selected from the population living in the Chianti area, Tuscany, Italy.

Material & Methods: pQCT at the tibial site was used to estimate bone volumetric density (mg/cm^3), cross-sectional area (mm^2), and both compressive (bone strength index, BSI) and bending strength (polar and cross-sectional moment of inertia) in 374 women and 332 men. Objective measures of knee extension strength and power were obtained using standard methods and protocols.

Results: Independent of anthropometric, lifestyle- and biochemical-related confounders and compared with muscle strength, leg muscle power was significantly stronger associated with higher cortical thickness (p:0.0029), cortical bone density (p:0.0102), and narrower medullary area (p:0.0013) in older women. Consistently, in women leg muscle power was positively associated with parameters of bone strength, i.e., total and cortical cross-sectional (p:0.0003; p<0.0001), and total and cortical polar moment of inertia (p:0.0003; p<0.0001), and bone strength index (p<0.0001). In men, leg muscle power was a negative correlate of total and cortical tibial bone area (p:0.0135 and p<0.0002), while both leg muscle strength and power were positively associated with total (p:0.0080 and p:0.0380) and cortical polar moment of inertia (p:0.0080 and p:0.0441).

Conclusion(s): In older women leg muscle power has a positive influence on cortical bone thickness, density and strength, suggesting that measurements of leg power may be useful in identifying and targeting elderly women who may require intervention to prevent bone loss.

References: 1/ Liu XS, Cohen A, Shane E, et al. (2010) J Bone Miner Res 25:2229. 2/ Ashe MC, Liu-Ambrose TY, Cooper DM, Khan KM, McKay HA (2008) Osteoporos Int 19:1725.

P683

IMAGING EWE BONE STRUCTURE IN ILIAC CRESTS AND VERTEBRAL BODIES: CORRELATIONS BETWEEN μ-CT SCAN AND TEXTURAL ANALYSIS (BMA^{TM}) PARAMETERS

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Objective(s): Bone microarchitecture is usually assessed by high-resolution microtomodensitometry (μCT), but this cannot be applied in routine clinical settings due to irradiation, cost and availability concerns. Furthermore, this technique can only be used ex vivo excepted in small animal studies. Texture analysis of bone has shown to be correlated to bone strength. Our purpose here was to find possible correlation between μCT and textural analysis on sheep excised iliac crests and vertebral bodies.

Material & Methods: We used a new device (BMA, D3A^{TM} Medical Systems) to get digitized X-rays of 12 iliac crests and 12 L6-vertebral bodies, respectively. The texture parameters given by the device for each ROI were the fractal dimension (Hmean), the co-occurrence matrix, and the run length matrix. All samples also were imaged using X-ray radiation μCT (SkyScan 1072). After interactive thresholding, binary images of the region of interest were obtained and up to 40 static histomorphometric parameters were measured.

Results : The Spearman correlation coefficients between μCT and texture parameters measured in the same ROIs were calculated. For iliac crest measurements: Hmean was correlated with trabecular space (TbSp; r=0.783; p<0.0001);

trabecular thickness (TbTh; r=0.709; p=0.001), connectivity index (r=-0.699, p=0.002), Euler number (r=0.653; p=0.004) and fractal dimension (FD; r=-0.591; p=0.011). There was no correlation involving neither the co-occurrence matrix nor the run length matrix. For vertebral body measurements: Hmean was correlated with connectivity index (r=-0.435, p=0.024), Euler number (r=0.442; p=0.022) and fractal dimension (FD; r=-0.498; p=0.028). The co-occurrence matrix, and the run length matrix were correlated with trabecular pattern factor (TbPf ; r=-0.425; p=0.022 and r=-0.444; p=0.021, respectively); small model index (SMI; r=-0.394; p=0.043 and r=-0.395; p=0.042, respectively); trabecular thickness (TbTh; r=0.437; p=0.023 and r=0.407; p=0.036 respectively).

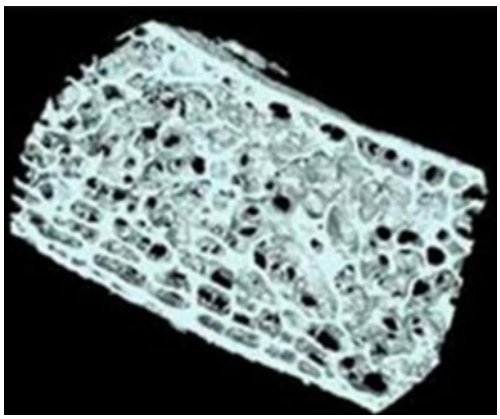

Figure: 3D μCT image of a sheep iliac crest

Conclusion(s): The found correlations between textural analysis and μCT parameters could be useful for describing *in vivo* bone trabecular structure in big animal models that are frequently used to evaluate new therapeutic solutions.

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TIANEPTINE AMELIORATES OVARIECTOMY-INDUCED BONE LOSS IN WISTAR RATS

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Objective(s): Depression is associated with stress in the hypothalamic-pituitary-adrenal (HPA) axis which can induce the production of bone resorbing cytokines such as TNFα [1]. Therefore, this study was designed to investigate the possible alleviating effects of tianeptine on femoral bones of ovariectomized Wistar albino rats as an animal model for osteoporosis, as tianeptine was found to attenuate depression induced stress in HPA axis and to decrease level of TNFα in previous studies [2-3].
Material & Methods: Two weeks following a bilateral ovariectomy, tianeptine treatment was started and continued for four consecutive weeks. At the end of the fourth week of treatment, we determined the changes in density and other morphometric parameters such as volume and porosity in rats' femoral bones using μCT scan. Moreover, serum levels of TNFα and bone turnover biomarkers such as C-terminal telopeptides type I (CTX) and osteocalcin (OC) were measured.
Results: Femoral bones density and volume were significantly decreased in ovariectomized rats while bone porosity was significantly elevated as compared to sham group. Tianeptine treatment for four weeks significantly attenuated the altered values of femoral bones density, volume and porosity. Furthermore, rats in the ovariectomy group had an elevated level of serum TNFα and bone turnover biomarkers when compared to sham group. These elevations were significantly inhibited by tianeptine treatment to the ovariectomized rats.
Conclusion(s): Our results revealed that tianeptine could prevent ovariectomy-induced bone loss in Wistar albino rats. This osteoprotective effects might be trough stabilization of stress in HPA axis which could ameliorate the elevated level of the bone resorbing inflammatory cytokine namely TNFα.
References: 1. Cizza, G, S Primma, G Csako, Trends Endocrinol Metabol 2009;20:367. 2. Castanon N, Psychoneuroendocrinology 2004;29:778. 3. Breivik T, et al, J Clin Periodontol 2006;33:469.

P685
THE EFFECT OF CYTOKINES TNF-ALPHA AND GM-CSF ON OSTEOCLAST-SPECIFIC GENE EXPRESSION IN HUMAN U-937 CELL CULTURES

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Objective(s): To study the effect of cytokines TNFα and GM-CSF on the expression of some osteoclast-specific genes in cultured human monocytic cell line U-937.
Material & Methods: The study was performed using methods for culturing a continuous cell line U-937. Differentiation was stimulated with TNFα (10 ng/ml) and GM-CSF (50 ng/ml). The expression level of osteoclast-specific genes and results of the selected cell line differentiation were assessed using comprehensive molecular biological techniques using the RNeasy Mini Kit (Qiagen) and the iScript cDNA Synthesis Kit (Bio-Rad Laboratories); real time PCR in the 96 CFX™ Real-Time PCR Detection Systems. All experiments were conducted in independent triplicates, and the obtained mean values were used to determine the fold changes for osteoclast-specific gene

expression using the formula proposed by Livak and Schmittgen, statistical data analysis was performed using the Microsoft Excel 2007 spreadsheet software. Results are presented as mean±SD. Reliability of differences (p) was assessed with the Student's t-test. The differences were considered reliable for $p<0.05$.

Results: The panel of osteoclast marker genes was identified and primers to determine the expression of their mRNA. Characterization of the cell line U-937 was presented, and the target gene expression in the cell line U-937 was analyzed after stimulation in accordance with worked-out protocols. The analysis revealed an expression of osteoclast-specific genes in U-937 cells, what is inconsistent with findings reported by our foreign colleagues, perhaps due to a higher sensitivity of the real-time PCR method. From the results, TNFα plays a critical role in reducing the osteoclast-specific gene expression, however, we can talk about the additional suppression of osteoclastogenesis by the cytokine GM-CSF.

Conclusion(s): 1. For the first time the expression of eleven genes involved in osteoclastogenesis was studied, to determine the level of their mRNA by Real-Time PCR in cell cultures of human monocytic line U-937. 2. It was shown that stimulation with TNFα (10 ng/ml) and with combination of TNFα (10 ng/ml) and GM-CSF (50 ng/ml) of the culture of human monocytic cell line U-937 resulted in reduction of the level of mRNA genes encoding transcription factors, osteoclast-specific receptors and osteoclast's enzymes ($p<0.05$).

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THE SURFACE POROSITY OF CERAMIC BIOMATERIALS PREDEFINES THE ACTIVITY AND RESORPTION CAPACITY OF OSTEOCLASTS

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Objective(s): This study investigated the effects of the porosity of calcium phosphate ceramics on the resorption activity of osteoclasts (OCs) to answer the question whether the degree of (surface) microporosity influences the capability of OCs to set up a sealing zone on porous biomaterials.

Material & Methods: Commercially available beta-tri-calcium phosphate (β-TCP) powder was pressed to disks and sintered at nine temperatures from 900-1280°C (from 900-1250°C increasing in increments of 50°C) thereby yielding different surface micro-porosities. Rabbit osteoclasts were seeded in a bone marrow cell suspension onto these disks and incubated for 48 h. After incubation the cells were fixed, and the F-actin proteins of the cytoskeleton were stained. The transformation of the cytoskeleton into ring-shaped structures (actin rings) indicated fully developed and actively resorbing osteoclasts.

Results: SEM imaging showed different degrees of surface microporosity as a function of the sintering temperature. Furthermore the attachment of osteoclasts to the substrates and the resorbing activity (resorption lacunae were visible) on highly sintered disks with a low degree of microporosity were confirmed. Actin ring stainings confirmed that highly porous surfaces (900-1100°C) do not support the attachment of osteoclasts and the development of actin rings, indicating that no active resorption by osteoclasts took place. Starting with a lower degree of micro-porosity (at 1150°C) to nearly completely fused disks (at 1280°C) the percentage of cells with actin rings increased with a decreasing micro-porosity.

Conclusion(s): We have shown that disks with lower degrees of micro-porosity that occur in β-TCP at sintering temperatures of ≥1150°C support the formation of actin rings, and the activation of OCs. Higher degrees of microporosity (≤1100°C) seem to interfere with the attachment and differentiation process of OCs. We speculate that without the surface modification done by OCs during the resorption process of ceramic bone graft substitutes, the osteoblast attachment is decreased and the new bone formation could be delayed. These findings should be taken into consideration whenever biomaterials intended as bone graft substitutes are designed.

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CRITICAL EXPERIMENTAL MODEL IN RATS AIMING TO STUDY DIFFERENT BONE GRAFTS INTEGRATION

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Objective(s): This study aims to present the surgical procedure performed in rats skull aiming to evaluate different bone grafts combined or not to osteogenic proteins.

Material & Methods: Animals were selected for application of different types of bone (autologous, homologous, and heterologous) associated or not to osteogenic proteins, and control group. The bone defects (5 mm of diameter) were performed on left parietal region using a trephine bur adapts to implant device. Firstly, it was made the hair cutting and skin cleaning, after this, the surgical procedure starts by sagittal incision and

posterior soft tissues removal aiming to expose the bone surgical area. The interesting area of the animals´ skull was based on the perfect delimitation considering the sagittal, coronal and occipital sutures. In sequence, the trephine bur was positioned perpendicularly over the left parietal bone with maintenance of the periosteum, and the bone defect was performed slowly under abundant saline solution irrigation. It was necessary to pay attention to not perforate the connective tissue that recovers the brain during the surgical procedure. After the bone defects creation, the materials studied were inserted on the bone defect area for posterior analysis.

Results: It was possible to observe that using this experimental model for bone evaluation, the surgical procedure is easy and quick to be performed and the materials inserted in the surgical area remained well adapt to the bone walls.

Conclusion(s): This surgical procedure was adequate for evaluation of the bone repair using materials with osteogenic properties.

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EXPERIMENTAL MODEL USING OSTEOPOROTIC RATS: LONG BONE REPAIR CONTAINED BY INTRAMEDULLARY PIN

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Objective(s): Osteoporosis is a common systemic disease that may appear with advancing age, especially in women. This condition significantly affects the quality of life, leading to bone fractures and their complications. In osteoporotic patients, one of the most common pathological bone fractures affects the femur. This experimental study aimed to test a new model of mechanical fracture in femurs using ovariectomized animals. In this experimental model, the fracture was create using a mechanical equipment aiming at better delineating the fracture line, which results in more accurate histological analyses. The bone fragments were stabilized by intramedullary stainless steel pins to preserve the animals' masticatory function, by supporting movement and maintaining muscle tone.

Material & Methods: A bilateral ovariectomy was used for osteoporosis induction. In this way, the animals were submitted to the same estrogen deficiency presented by women at menopause condition. After 3 months, osteoporotic condition was confirmed by DXA exam. At this point, the femur was fractured using a microsaw adapted to a dental surgical machine, providing a uniform fracture line. Bone fragments were stabilized using aseptic intramedullary pins (K-wire, stainless steel), keeping the animals function without damage to the bone healing process.

Results: After the surgery, animals presented a good stabilization of the bone fragments and the healing process occurred without any complications.

Conclusion(s): The implantation of surgical stainless steel pins kept the animals' movement and preserved the bone margins, by friction reduction between the fragments.

Disclosures: The authors are grateful to FAPESP for financial support.

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EVALUATION OF THE BONE HEALING PROCESS IN BONE DEFECTS GRAFTED WITH HYDROXYAPATITE ASSOCIATED WITH LOW LASER APPLICATION IN ANIMALS UNDER PASSIVE TOBACCO EXPOSURE

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Objective(s): Nowadays, bone defects have been treat using autografts, and some biomaterials like hydroxyapatite have also been used for the same purpose, replacing in this way, the autografts. Contributing to the bone healing process, laser therapy has been shown to contribute to accelerate the fracture repair by improving local microcirculation and increasing collagen synthesis, however, bone tissue health conditions are essential for the implant osteointegration. Thus, excessive tobacco consumption, by an active or passive smoker, may harm the healing process due to its deleterious effects on bone tissue. The aim of this study was to evaluate the bone healing process stimulated by laser application combined to hydroxyapatite granules application in animals submitted to passive tobacco exposure.

Material & Methods: Porous hydroxyapatite granules were implanted in bone defects performed in the distal femoral epiphysis of 20 rats Wistar (*Rattus norvegicus*) submitted to prolonged passive tobacco exposure during eight months. After biomaterials implantation, gallium-arsenide laser irradiation was applied on the recipient area (5.0 J/cm^2). Animals were divided into four groups: control receiving hydroxyapatite implants without (group G1) and with (group G2) laser therapy, animals submitted to (passive tobacco) receiving hydroxyapatite implants without (group G3) and with (group G4) laser therapy. After

eight weeks of the biomaterial implantation, the animals were sacrificed and the bone samples of implanted area were submitted to histological processing for posterior histological analysis.

Results: According to the results, good radiopacity was observed of the implant recipient area and hydroxyapatite granules in all of the studied groups. New bone formation around the hydroxyapatite granules showing trabecular and cortical characteristics was observed in G1 and G2 groups. In groups submitted to passive tobacco exposure (G3 and G4), the hydroxyapatite granules were involved by connective tissue without bone neoformation.

Conclusion(s): Passive tobacco exposure injures the bone neoformation and the laser therapy protocol used was not adequate to stimulate the osteogenic process in this experimental animal model.

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TRANSGLUTAMINASE ANTIBODIES, CELIAC DISEASE, BIOCHEMICAL MARKERS AND BONE DENSITY

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Objective(s): To study how prevalent transglutaminase antibodies (TgA) are among patients referred to screening for osteoporosis and if these patients have more severe osteoporosis.

Material & Methods: A total of 26,856 subjects had a DXA scan at Aarhus University Hospital (13.5% men, 86.5% women, mean age 58.8±14.3 years, spine T-score -1.41.6, spine Z-score -0.1±1.6). Among these, 627 had TgA tests between May 2008 - October 2011. A TgA (IgA) of ≥7*103 IU/l was considered positive. Parathyroid hormone (iPTH), 25-hydroxy-vitamin D (25OHD) were measured using routine laboratory methods in an ISO9000 certified department of clinical biochemistry.

Results: In total 11 were positive (1.8%, 95% CI: 0.9-3.1%). Among patients referred from general practice, 3/266 (1.1%, 95% CI: 0.2-3.3%) were positive, indicating a number needed to screen of 90 patients (95% CI: 30-500) for one positive test. Among patients referred from hospital departments 2/216 (0.9%, 95% CI: 0.1-3.3%) were TgA positive, with 6/145 (4.1%, 95% CI: 1.5-8.8%) referred from the medical gastroenterology department being positive, p=0.04 for difference between referring authority. The characteristics are shown in the table below. In general, the patients differed little from the overall population from which they were drawn. Patients positive for TgA did not differ from those negative for TgA. Thus, multiple linear regression only found age and BMI associated with BMD, while no association with presence of TgA could be found. Also, no significant association with the referring authority could be found.

Table 1: Characteristics of subjects

Variable	Positive TgA (n=11)	Negative TgA (n=616)	p
Age (years)	54.0±13.7	58.3±16.0	0.38
Women	9 (82%)	536 (87%)	0.61
BMI (kg/m^2)	23.5±6.1	26.0±13.6	0.28
T-score of total hip	-1.6±1.1	-1.4±2.7	0.76
T-score of lumbar spine	-0.8±1.6	-1.1±1.5	0.47
Plasma iPTH (pmol/l)	5.9±3.1	6.2±3.9	0.88
Plasma 25OHD (nmol/l)	88±23	78±32	0.51

Conclusion(s): The prevalence of TgA is low among patients referred for osteoporosis evaluation in Denmark; this is therefore also likely to be the case for celiac disease itself. The patients who tested positive for TgA did not have lower bone density, and did not differ in terms of vitamin D status and other parameters of biochemical bone status than patients without TgA.

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ANTIEPILEPTIC DRUG-INDUCED OSTEOPOROSIS IN MICE: A MODEL TO STUDY MECHANISMS AND MANAGEMENT OF BONE LOSS IN EPILEPTICS

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Objective(s): Bony adverse effects are amongst the potentially adverse clinical consequences with antiepileptic drugs (AEDs). There is a dearth of data on the prevention and treatment of AED-induced bone disease. Further, no reports regarding the possible interaction between AEDs and concomitant anti-osteoporotic agents are available. Thus, an animal model of osteoporosis using AEDs might guide the possible mechanisms and management of bone loss in epileptic patients.

Material & Methods: The model of bone loss was developed in mice following chronic administration of phenytoin (PHT), sodium valproate (SVP) and levetiracetam (LTM). The doses of AEDs were calibrated on the basis of histopathological analysis of femur and lumbar vertebrae and bony changes were confirmed using BMD analysis and bone turnover markers. The effect of bisphosphonates on

antiepileptic efficacy of phenytoin was determined using maximal electroshock seizure threshold test (MEST). Both preventive and curative effects of bisphosphonates were studied and results were compared with calcium and vitamin D_3 (CVD) supplementation.

Results: PHT (35 mg/kg, po), SVP (300 mg/kg po) and LTM (200 mg/kg, po) induced bone loss in mice after 4 months of administration. Induction of bone loss was marked by lowered BMD in both femoral and lumbar vertebrae. LTM, however, only affected the lumbar BMD. The histopathological findings and bone turnover markers (bone-specific alkaline phosphatase, hydroxyproline, tartarate-resistant acid phosphatase) were indicative of bone loss. Bisphosphonates administration[1] in phenytoin treated groups significantly prevented or reverted bony adverse effects and exhibited no pharmacodynamic interaction with phenytoin at the experimental level.

Conclusion(s): AEDs (PHT, SVP and LTM) could compromise bone loss and thus can be used as a model of bone demineralization in mice. The effect of bisphosphonates in PHT-induced bone loss provides the first experimental evidence for prescribing an anti-osteoporotic agent with AED therapy. Our future experiments would focus on comparing newer AEDs with the conventional ones with respect to bone health and identifying anti-osteoporotic agents that can be prescribed safely with other AEDs.

References: [1]Khanna S, Pillai KK, Vohora D. Bone 2011;48:597.

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VITAMIN D RECEPTOR GENE POLYMORPHISMS AND HLA DRB1*04 INTERACTION IN SAUDI TYPE 2 DIABETES PATIENTS

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Objective(s): The vitamin D receptor (VDR) gene has been involved in the modulation of susceptibility to inflammatory and autoimmune conditions and could play a role in the pathogenesis of type 2 diabetes mellitus (T2DM). Susceptibility to T2DM, was very recently also suggested to associate with HLA alleles. We evaluated possible correlations between VDR polymorphisms, HLA alleles, and risk of developing T2DM.

Material & Methods: Individuals part of a well characterized cohort followed in Riyadh, KSA (N=627: 368 T2DM patients and 259 healthy controls) were analyzed. Genomic DNA was extracted from blood and genotyped for the VDR gene single nucleotide polymorphisms (SNPs) of Fok-1, Taq-1, ApaI and Bsm-I. Analyses were run by allelic discrimination real time PCR. HLA genotyping was performed as well by PCR using sequence specific primers (PCR-SSP).

Results: T2DM is significantly associated with the VDR Taq1 (rs731236-AG) and Bsm-I (rs1544410-T -CT) genotypes and the VDR rs1544410-T allele. Significant interactions resulting in a robust increase of the OR were detected between Taq1 and Bsm-I VDR polymorphisms and HLA DRB1*04; finally, VDR polymorphisms correlated with metabolic parameters of susceptibility to T2DM including serum cholesterol and HDL levels.

Conclusion(s): VDR polymorphisms are present in T2DM and correlate with HLA DRB1*04 and metabolic parameters; our results confirm an association between T2DM and HLA and add this condition to the list of diseases that are likely modulated by an HLA/VDR interaction.

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IMPORTANCE OF ALTERED EXPRESSION OF GENES INVOLVED IN TRANSFORMING GROWTH FACTOR BETA SIGNALING IN DIFFERENT HUMAN METABOLIC BONE DISEASES

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Objective(s): TGFβ is one of the most important and abundant factors in the bone environment, helping to retain the balance between the dynamic processes of bone resorption and bone formation. TGFβ stimulates matrix protein synthesis and promotes the early stage of osteoblast differentiation and survival. In contrast, TGFβ inhibits the recruitment of osteoclast precursors. Our aim was to identify expression changes of genes belong to the canonical TGFB signalling cascade in different pathologic stages of human bone tissue (osteoporosis, fibrous dysplasia, osteonecrosis of femoral head and postmenopausal condition), and to describe the relationships between these genes using multivariate data analysis.

Material & Methods: 15-20 bone tissue samples were collected from each group with sex and age matched controls. Messenger RNA was prepared and reverse-transcribed to cDNA. The expression differences of selected 12 genes were analyzed in Taqman probe-based quantitative real-time RT-PCR system. Canonical variates analysis (CVA) was used to check whether various pathologic and physiologic states of human bone tissue are separable by the genetic information/data.

Results: Genes contributing to signal transduction via TGFβ pathway exhibited strongly significant differences in patients suffering in different metabolic bone disease and healthy subjects. Thus, we have demonstrated that osteoporosis, fibrous dysplasia, osteonecrosis of femoral head and postmenopausal condition of bone are distinguishable by complex transcription pattern of genes in the canonical TGFβ network.

Conclusion(s): Separation of the non-physiological groups from healthy controls by CVA suggests the involvement of a new candidate gene subset that might be useful for a deeper understanding of the genetic aspects of these multifactorial diseases, as well as it can contribute to the development of future diagnostic tools.

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EXAMINATION OF CYP2C8 rs1934951 POLYMORPHISM IN HUNGARIAN PATIENTS SUFFERING FROM BISPHOSPHONATE-INDUCED OSTEONECROSIS OF THE JAW

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Objective(s): Osteonecrosis of the jaw (ONJ) is a major complication associated with long-term use of bisphosphonates which are often used in the treatment of osteoporosis and tumors with malignancy-related bone disease. Bisphosphonate-induced ONJ is an active area of investigation, however, its mechanism of action is still unclear. In this study, we aimed to investigate the effect of CYP2C8 rs1934951 SNP that was previously suggested to be associated with ONJ and its relationship to a number of clinical and biochemical factors in 46 Hungarian subjects with bisphosphonate-induced ONJ (35 with malignancy and 11 with osteoporosis). The polymorphism distribution was also determined in 223 healthy subjects.

Material & Methods: All subjects underwent physical examination and completed a detailed questionnaire on family and medical histories and lifestyle habits. Blood samples were collected from each subject and genomic DNA was extracted. Genetic analysis of CYP2C8 rs1934951 polymorphism was carried out by pre-designed TaqMan primer/probe sets. The genetic data together with clinical and biochemical parameters were evaluated by chi-square test, logistic regression analysis, Kruskal-Wallis nonparametric test.

Results: There was no difference in CYP2C8 rs1934951 genotype or allele distribution between ONJ and healthy subjects. Significant correlation was seen between this polymorphism and the localization of ONJ among the affected patients. In the multiparametric logistic regression model, the risk of mandibular localization of ONJ was 19.2-fold higher in subjects with AG genotype than in normal GG genotype. ONJ presence in the mandibular region (76%) increased 3.3-fold compared to maxilla (23%) in case of AG carriers ($p \leq 0.041$). There was no significant variation of ONJ localization site in patients with GG genotype (mandible 58%: maxilla 42%, respectively).

Conclusion(s): In this study, we demonstrated a significant positive correlation between CYP2C8 rs1934951 polymorphism and the localization of ONJ among the affected patients.

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RELATED BIOLOGICAL RESEARCH IN THE INTERFACE BETWEEN BONE CEMENT AND BONE AFTER PERCUTANEOUS VERTEBROPLASTY

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Objective(s): Pertaneous vertebroplasty (PVP) is widely used in the treatment of painful osteoporotic vertebral compression fractures with the injection of polymethylmethacrylate (PMMA) cement, the controversy for PMMA damage to the osteoporotic bone tissue and to effect the fractures repairing never stop. This study aimed to observe the biological changes on PMMA cement and bone interface post-operation of PVP.

Material & Methods: 72 old female rabbits, each age 3.0~3.5y rabbits were assigned randomly to two groups of 36 each, PMMA cement were injected into vertebral body in rabbits via mimic PVP, Sacrificed at 1 h, 24 h, 3 d, 7 d, 4 w, 12 w. The expression VEGF and collagen type I, the tissue response and repair reaction in the interface between PMMA and bone tissue were observed dynamically with RT-PCR and Western blot technique, the osteocalcin expression were studied by immunohistochemistry.

Results: Compared with the control group, the expression of collagen I increased at 1 h, and was higher from 24 h to 3 d. From 4 weeks to 12 weeks, expression of collagen type I was always higher after injection of PMMA. The expression of VEGF decreased at 1 h and 24 h, significantly increased at 3 days postvertebroplasty, decreased once again at 7 days, then increased significantly at 4-12 weeks. Osteocalcin expression continued to increase during 4-12 week, lamellar bone formation at 4 weeks.

Conclusion(s): PMMA would not cause local bone permanent necrosis, interface injury repairing cycle could be prolonged in a vertebroplasty.

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INCREASED TLR2 EXPRESSION AND BONE LOSS ONSET IN TYPE 1 DIABETES PEDIATRIC PATIENTS FROM BRAZIL

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Objective(s): Type 1 diabetes (T1D) is an autoimmune inflammatory disease and Toll-LikeReceptors (TLRs) are key in triggering hyperglycemia-induced inflammation which determines the changes in bone tissue of individuals with T1D.

Material & Methods: We investigated the association between TLR2, MyD88, IL-1β, IL-6 and TNFα mRNA expression with bone loss in T1D children and adolescents assisted at a pediatric hospital (HOSPED/UFRN) in Natal-RN/Brazil. Eighty type 1 diabetic patients (T1D group) and 92 normoglycemic subjects (NG group) aged between 6-20 years were included. Metabolic control was evaluated by glucose and glycated hemoglobin. Total and bone alkaline phosphatase, CTX and BMD by DXA (g/cm^2 and Z-score) of the lumbar spine (L1-L4) was measured. TLR2, MyD88, IL-1β, IL-6, TNFα, IGF1, IGF1R, RANK, RANKL and OPG mRNA expression were evaluated by real time PCR.

Results: Glucose and glycated hemoglobin were increased in T1D compared to NG ($p<0.05$), indicating a poor metabolic control of these patients. Significantly higher TLR2, MyD88, IL-1β and IL-6 mRNA expression in T1D compared to NG ($p<0.05$) suggests the presence of a TLR2-induced inflammatory process associated with poor glycemic control. An association of TLR2 with MyD88 ($p=0.0001$), IL6 ($p=0.00618$) and TNFα ($p=0.0001$) was also observed. The risk of early bone loss associated with inflammatory process could be evidenced by increased RANK, RANKL, OPG and reduced IGF1 and IGF1R mRNA expression, and lower BMD values in T1D when compared to NG ($p<0.05$).

Conclusion(s): These results suggest a possible association of TLR2-mediated pro-inflammatory process with bone loss onset in T1D patients.

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COLLAGEN ENZYMATIC CROSSLINKS DEFICIENCY AND BONE QUALITY

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Objective(s): A collagen enzymatic crosslink (ECL) deficiency, such as pyridinium ECL, alters the mechanical properties of bone organic matrix[1]. However, the influence of such a deficiency on mineral characteristics is not well documented. Our hypothesis was that a decrease in pyridinium ECL modifies the arrangement of collagen fibers and consequently disrupts the mineral characteristics of bone mineral. To investigate the relationship between ECL and mineral phase, a model of lathyritic rats was designed[2]. This model consists to inhibit the lysyl oxidase, enzyme catalyzing the ECL formation, by using a lathyrogen agent such as β-aminopropionitrile (ßAPN)[3].

Material & Methods: Twenty Wistar rats (28 day-old) received either 666 mg/kg/day of ßAPN (LATH) or vehicle (CTL) twice daily during 30 days. At necropsy, left tibia and radii were embedded in PMMA for histomorphometry and Fourier transform infrared microspectroscopy (FTIRM). By the latter, mineral maturity (age of mineral, 1030/1110 cm^{-1} area ratio), and crystallinity index (crystal size/strains, FWHM 604 cm^{-1})[4] were measured. Right tibia and radii were stored at -20°C until biochemical dosage (HPLC) of ECL, pyridinoline (PYD) and desoxypyridinoline (DPD). Histomorphometry and FTIRM were performed on radii in which the decrease of ECL was higher than in tibia. Non-parametric tests (U Mann-Whitney) were performed.

Results: A significant body weight loss was observed in all LATH animals, after the 14th day of injection, compared to CTL rats. In LATH rats, significant decreases of both ECL and collagen synthesis were observed compared to CTL. Moreover, a significant decrease of BV/TV, an increase in growth plate thickness and cortical porosity were observed. Cortical thickness was not modified. Mineral maturity and crystallinity index were unchanged in LATH animals.

Conclusion(s): An ECL deficiency does not affect the quality of bone mineral phase.

References: 1- Oxlund *et al*, Bone 1995;17:365S; 2- Farlay *et al,* 2010 J Bone Miner Res 25 (Suppl 1): SU0065. 3- Farlay *et al*, PLoSONE, 2011;6:e28736. doi:10.1371/journal.pone.0028736. 4- Farlay et al. J Bone Miner Metab 2010;28:433.

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ESTROGEN RECEPTOR GENE AND COLIA1 POLYMORPHISMS AND THE RISK OF LOW BONE MASS IN TYPE 1 DIABETIC PATIENTS

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Objective(s): Osteoporosis is a common skeletal disease characterized by low bone mass and microarchitectural deterioration with increased susceptibility to fracture. Osteoporosis has a complex etiology and is considered to be a multifactorial polygenic disease. There are more than 100 genes associated with BMD. Our aim was to investigate the frequency of occurrence of COLIA1 (+1245 G/T, rs 1800012), ESR1 (+397 T/C, rs 2234693), ESR1 (+351A/G, rs 9340799) single nucleotide polymorphisms (SNPs) in type 1 diabetic patients.

Material & Methods: 62 patients (26 men and 36 women; mean age 31.46±8.55; duration of the disease 13.40±7.41; HBA1c 8.25±0.95%) were examined during the study. BMD was measured by DXA. QIAamp DNA Blood Mini Kit (Qiagen, USA) was used to purify DNA from whole blood, gene polymorphisms were detected in PCR-RFLP (restriction fragment length polymorphism) analysis. Patients with comorbidities and conditions associated with low BMD were excluded from the study.

Results: Esr-PvuII SNP was detected in 43.55% of cases; Esr-XbaI - in 85.48%; Col-Van91I – B 37.1%. There were 24% of homozygotes with Esr-PvuII and 15% with Esr-XbaI. The combination of heterozygous Esr-PvuII and Esr-XbaI SNPs was revealed in 40% of cases while the combination of homozygous Esr-PvuII and Esr-XbaI in 13% of cases.

Conclusion(s): \The results of the study reflect the high frequency of Esr-PvuII and Esr-XbaI SNPs which probably may explain the occurrence of low BMD in type I diabetic patients.

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PRECLINICAL INVESTIGATION OF BONE FRACTURE: A MULTISCALE APPROACH FOR MOUSE MODELS

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Objective(s): Bone fracture is the primary health concern for patient with osteoporotic and brittle bones. In this study, we developed methods to investigate the multiscale fracture behaviour of a mouse model of the brittle bone disease, osteogenesis imperfecta.

Material & Methods: Femora of 10 heterozygous oim mice (Het, B6C3Fe-a/a-Col1a2±) and 10 wildtype (WT) mice were dissected and notched on the posterior surface of the mid-diaphysis. Bone toughness at the organ level was determined by testing the left femora in three-point bending while immersed in physiological solution. The origin of bone toughness at the microstructural level was characterized by observing the crack path in the Het and WT bones: the right femora were polished on their periosteal surface, soaked in physiological solution for at least 12 h, then introduced in an environmental scanning electron microscope and tested in three-point bending using an in situ loading stage. Fracture toughness was calculated at each stage of the crack extension. To determine the contribution of the nanostructure to the bone toughness, we investigated the presence of enzymatic and non-enzymatic crosslinks within the bone by using infrared spectroscopy and molecular autofluorescence, respectively.

Results: Het bones exhibited a brittle behavior with fracture occurring just after the yield point of the tissue. Toughness of Het bone was significantly lower than that for WT bone. High resolution real-time images of the crack propagation showed that in both Het and WT bone cracks propagated through the canals. WT mouse bone exhibited crack deflections, a typical toughening mechanism seen in human bone. In contrast, Het bones showed a flat crack surface with a shorter stable crack growth. At the nanoscale, the ratio of the enzymatic crosslinks was comparable between the Het and WT groups, while there was an increase of the nonenzymatic crosslinks in the Het bones.

Conclusion(s): Micro- and nanostructure of the bone have implications for its fracture toughness. The compromised molecular and fibril crosslinking, and the reduced lamellar structure and increased intracortical porosity characteristic of Het bone affect the mechanisms of crack initiation and propagation, respectively. The altered fracture behavior explains the increased fracture risks of brittle bone.

P700
EFECT OF SUBCHRONIC COAL DUST EXPOSURE ON MICROSTRUCTURE AND ATOMIC MINERAL PROFILE IN HEAD FEMORAL RATS

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Objective(s): Our previous study conclude that coal dust exposure induce decrease osteoblast and increase osteoclast on femoral rats. It's mean that coal dust exposure has effect on bone cell population, so aim of this study is to evaluate an effect of subchronic coal dust exposure on microstructure and atomic profile in femoral head of rats.
Material & Methods: A total of 16 Wistar healthy male rats, weighed 200-250 g, aged 8 weight were randomly into two groups, control groups and coal dust exposure groups (dose 12.5 mg/m^3/h/day for 28 days). Coal dust exposure was done by equipment model 2010 available in Pharmacology Laboratory, Faculty of Medicine, University of Brawijaya, Malang. Microstructure analysis was done by scanning electron microscope. Atomic mineral profile analysis was done by X-Ray fluorescence.
Results: Microstructure of normal rats show granule as imbalance formation and resorption of bone, trabecular integrity, and minimal hole. Microstructure of femoral head coal dust exposure groups show decreasing trabecular thickness, decreasing formation, and smooth surface. Atomic mineral decreasing in coal dust groups than control are sulphur and calcium. Atomic mineral increasing in coal dust groups than control are phosphor, nickel, zinc, chromium, and copper.
Conclusion(s): Subchronic coal dust exposure induce change of microstructure and substitution or incorporation atomic profile in femoral head of rats.

P701
PHARMACOKINETICS OF TRANSDERMAL BA058 ADMINISTERED BY SMTS MICRONEEDLE ARRAYS IN RATS AND MONKEYS

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Objective(s): BA058 is a novel synthetic analog of hPTHrP (1-34) developed as an anabolic therapy for osteoporosis treatment. Daily BA058 subcutaneous (SC) injection has demonstrated safety and efficacy in phase I and II clinical trials and is currently enrolling in a phase III fracture prevention study. There exists in the osteoporosis field a significant opportunity to improve patient convenience and compliance with an alternate delivery route that avoids injection.
Material & Methods: We investigated the use of 3M's solid microneedle array technology to deliver BA058 transdermally. The sMTS (solid Microstructured Transdermal System) consists of a microneedle array containing approximately 320 microneedles that penetrate the skin to about 250 μm, through the stratum corneum into the upper dermis. The PK of BA058 delivered by sMTS arrays applied to the skin for only 5 minutes was evaluated in rats and cynomolgus monkeys.
Results: Pharmacokinetic profiles from rats treated with BA058-sMTS (10, 25, 50 μg) or BA058 SC injection (25 μg) revealed a Tmax that was earlier with BA058-sMTS (5 min) compared to SC injection (15 min). In addition to more rapid absorption, half-life (T1/2) was also shorter with BA058-sMTS (~25 min), vs. SC injection (~36 min). BA058-sMTS achieved a Cmax that exceeded SC injection, and as the dose increased, Cmax and AUC increased generally proportionally. A similar PK profile was observed in monkeys with BA058-sMTS (25, 50, 100 μg). The Cmax for BA058-sMTS was again earlier than SC injection (5 min vs. 1 h) and T1/2 shorter with sMTS (30 min vs. 80 min). The Cmax and AUC increased with BA058-sMTS dose. Additional studies in monkeys with longer skin contact times did not result in additional BA058 release. BA058-sMTS application was well tolerated with no local skin irritation observed. Rapid release and clearance of BA058 represents a profile suitable to maximize the bone anabolic activity of BA058. This was confirmed in osteopenic rats where repeat BA058-sMTS application increased bone mass, comparable to SC injection.
Conclusion(s): PK studies with BA058-sMTS demonstrate good delivery of BA058 in rats and monkeys. Transdermal delivery of BA058 using sMTS technology potentially represents a more convenient and compliance enabling new approach for osteoporosis treatment.

P702
THE POSSIBLE MECHANISM BETWEEN MAPK / AKT GENE EXPRESSION IN PERIPHERAL BLOOD MONONUCLEAR CELL AND BONE MINERAL DENSITY IN OBESE SUBJECTS

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Objective(s): It has been reported that enhancing MAPK/AKT pathways cause inhibition of osteoclastic differentiation. Osteoclasts primarily involved in bone resorption derived from hematopoietic precursors of monocyte/macrophage series. One of the biological markers for osteoclastic function is crosslaps. Expression of MAPK/AKT may affect in obesity

and effect on osteogenic process in throughout of life. In the present study, we tested the hypothesis that the potential correlation between expression of MAPK and AKT in peripheral blood mononuclear cell and BMD in Lumbar spine (L2-L4) and Total hip BMD that measured by DXA in obese subjects. Moreover, we analyzed the relationship between relative MAPK and AKT gene expression with crosslaps.
Material & Methods: Overall 251 obese subjects participant in this cross-sectional study. The PBMCs were separated from whole blood by Ficoll-hypaque technique. Total cellular RNA was extracted and the cDNA was synthesized. Real-time PCR using specific primer pairs for determine the AKT, MAPK and beta actin gene expression.
Results: The mean of age and BMI were 33.74±8.96 years and 33.24±3.24 kg/m^2, respectively. Based on BMD T-score the prevalence of osteopenia in lumbar spine and hip were 35.1% and 9.2%, respectively. The relative expression of AKT and MAPK were significantly higher in obese osteopenic subjects. We found significant higher crosslaps concentration in osteopenic obese subjects also. However, Lumbar spine BMD was negatively correlated with relative MAPK gene expression, but there was no significant in total hip BMD.
Conclusion(s): We have presented results demonstrating the impaired bone metabolism and increased bone resorption at various sites may be affected by this mechanism and the activation of MAPK/AKT pathway may be were a compensate mechanism to prevention of bone loss in obesity.

P703
IS THERE CORRELATION BETWEEN PPARγ GENE EXPRESSION IN OBESE'S PERIPHERAL BLOOD MONONUCLEAR CELLS AND SUSCEPTIBILITY TO OSTEOPENIA?

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Objective(s): Extensive data have shown that both adipogenesis and osteogenesis share multiple common signaling pathways, such as peroxisome proliferator-activated receptor γ (PPARg). Expression of PPARγ in obese persons PBMC is correlated with obesity-related factors. Interestingly it has been demonstrated that expression of all three PPAR isoforms throughout the development and maturation period of osteoclasts generated from human PBMCs. We design current study to examine whether expression of PPARg in obese persons PBMC is correlated with obesity-related factors and Lumbar spine (L2-L4) and total hip BMD that measured by DXA.
Material & Methods: Totally 228 obese subjects were participated in this cross-sectional study. The PBMCs were separated from whole blood by Ficoll-hypaque technique. Total cellular RNA was extracted and the cDNA was synthesized. Real-time PCR using specific primer pairs for determine the PPARg and beta actin gene expression.
Results: The mean of age and BMI were 36.24±11.75 years and 31.31±4.44 kg/m^2, respectively. We showed lumbar spine BMD was negatively correlated with relative PPARg gene expression. Considering hip BMD, this association was not significant. Based on BMD T-score the prevalence of osteopenia in lumbar spine and hip were 38.1% and 11.1%, respectively. We found significant higher PPARg gene expression in osteopenic patients in Lumbar spine (L2-L4) compare to healthy subjects. In group with high PPARg gene expression according to NTILES, the circulating TNFa and hs-CRP were significantly higher than groups with low PPARg gene expression.
Conclusion(s): The expression of PPARγ is affected in inflammatory conditions. It appears that the modifying of PPARg gene expression in inflammatory state of obesity, with joint role in adipogenesis and osteogenesis, may justify the controversial reports about obesity and bone mass density. Further experimental study is needed to shed some light on this process.

P704
OVEREXPRESSION OF UNCOUPLING PROTEIN 2 MAY MODIFY THE RESTING METABOLIC RATE IN OSTEOPENIC OBESE SUBJECTS

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Objective(s): Uncoupling protein 2 (UCP-2), a member of the mitochondrial anion carrier family, dissipates the proton electrochemical gradient across the inner mitochondrial membrane through an uncoupling process and is involved in the control of energy expenditure process. The expression of this uncoupling protein in monocyte is strongly influenced by inflammation and oxidative. Significant correlation between basal metabolic rate (BMR) and BMD has been reported in postmenopausal women and elderly men. However, the relationship between BMR and BMD in adult obese subjects has not been studied yet. In this study, we aimed to investigate the relationship between RMR and Lumbar spine (L2-L4) and Total hip BMD in adult obese and to determine whether obesity contribute to this relationship. Moreover, we analyze the correlation between PBMC's UCP2 gene expressions in various resting metabolic rate level.
Material & Methods: The participants were 255 adult obese (55 men and 200 women). The mean of age and BMI were 34.77±8.35 years and 34.45±4.14 kg/m^2, respectively. Lumbar spine (L2-L4) and total hip BMD were measured by DXA. Participants were assessed following an overnight fasting for resting metabolic rate (RMR) by means of indirect calorimetry. The PBMCs were separated from whole blood by Ficoll-

hypaque technique. Total cellular RNA was extracted and the cDNA was synthesized. Real-time PCR using specific primer pairs for determine the gene expression.

Results: Based on BMD T-score the prevalence of osteopenia in lumbar spine and hip were 28.22% and 12.3% respectively. We found significant lower computed RMR in compare with predicted value in osteopenic patients in lumbar spine (L2-L4) BMD. Also mean of RMR/kg was significant lower in osteopenic person compare to healthy controls. Interestingly we found that the expression of UCP2 in in osteopenic obese's PBMC was approximately 2.5-times higher than healthy subjects.

Conclusion(s): These finding indicate that possible responsibility of bone metabolism as a major component of RMR in obese persons. As know, obesity is chronic inflammation state with effectual role on many compensatory mechanisms to ameliorate obesity complications. PBMC's UCP2 overexpression with recognized potential role is one of the compensatory pathways.

P705
ASSOCIATIONS BETWEEN LIPID AND AMINO ACID EXCHANGE IN PATIENTS WITH COXARTHROSIS

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Objective(s): The aim of the present study was to establish associations between the level of lipids and the content of free amino acids (AAs) in blood plasma and bone tissue (BT) in patients with stage III coxarthrosis.

Material & Methods: Samples of compact and spongy BT from femoral neck and those of blood serum were taken from 12 patients (6 women and 6 men aged 54.6±9.9 years) hospitalized for hip joint replacement due to coxarthrosis. The content of 32 free AAs was determined in both blood plasma and BT in their perchloric acid extracts using reversed-phase high performance liquid chromatography with precolumn derivatization. Serum total cholesterol (Chol), high-(HDLP) and low- (LDLP) cholesterol were determined by the electrophoretic method using a spectrophotometer. Lipid extraction from BT was performed by means of the Folch Method employing a mixture of chloroform and methanol in the ratio of 2:1.

Results: Lipid content in BT averaged 8.75±5.9 mg/100 g. In blood plasma Chol averaged 5.83±0.81 mM/l, HDLP was 1.27±0.43 mM/l, LDLP was 3.79±0.87 mM/l. There was a strong positive correlation between the content of lipids in BT and HDLP of blood plasma (r=0.87), between the lipid content in bones and the level of α-aminobutyric acid in spongy BT (r=0.80) and Gln (r=0.83) of blood plasma. There were negative correlations between the HDLP and a number of AAs in compact BT as well as some AAs of spongy BT: Trp (r=-0.80) and Orn (r=-0.83). HDLP correlated positively with Gln (r=0.67) and Cys (r=0.79) of blood plasma. LDLP had no correlations with AAs of BT but had positive correlations with a number of AAs of blood plasma: Asp (r=0.67); Ser (r=0.72); His (r=0.79); 1-methylHis (r=0.68); Arg (r=0.72); Ala (r=0.69); Lys (r=0.78).

Conclusion(s): Patients with coxarthrosis had close associations between lipids transport (both direct and indirect) and AAs exchange both in BT and blood plasma.

P706
ROSIGLITAZONE DECREASED MUSCLE CROSS-SECTIONAL AREA AND INCREASED %FAT WHILE MAINTAINING GLYCEMIC CONTROL IN WOMEN WITH TYPE 2 DIABETES (T2D)

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Objective(s): Rosiglitazone (RSG) stimulates stem cells to differentiate into fat cells and improves resistance to glucose, resulting in changes in muscle metabolism and body fat content. This study evaluated the effect on muscle mass and adiposity.

Material & Methods: This double blind study randomized postmenopausal women with T2D to RSG or metformin (MET) for 1 year followed by 6-month open-label MET. Markers of glycemic control were determined in all subjects; hip muscle lean cross-sectional area (CSA), percentage intermuscular fat in the muscle bed (%FAT), mean Hounsfield Unit of muscle tissue (LHU, a measure of intramuscular fat) and pelvic total lean body area (LBA) were assessed using hip QCT scans in a subset of subjects.

Results: In RSG, a 4.9% decrease (185.05 vs. 176.06 cm^2) in CSA, and a 13.3% increase (0.15 vs. 0.17%) in %FAT, were observed at 1y ($p<0.001$). LHU did not change. After discontinuation of RSG, CSA and %FAT showed partial recovery but still differed from baseline ($p=0.0009$ and $p=0.03$ respectively). In MET, 7.9% loss (43.09 vs. 39.68 HU) of LHU at 18 months ($p<0.01$) and a decrease of 2.6% LBA (212.06 vs. 206.46 cm^2) ($p=0.03$) at 18 months were observed. Decreases from baseline (BL) to Week 52 in HbA1c were similar between treatment groups, fasting plasma glucose decreased from BL more in RSG compared to MET. HOMA-S increased from BL in RSG and decreased in MET.

Changes in Glycemic Parameters

	Change from Baseline to Week 52: Mean (SD)		Change from Week 52 to Week 76: Mean (SD)	
	RSG (N=114)	Metformin (N=111)	RSG (N=114)	Metformin (N=111)
HbA1c (%)	-0.50 (0.791)	-0.49 (0.719)	0.20 (0.704)	0.07 (0.782)
FPG (mg/dL)	-16.21 (34.537)	-11.38 (27.118)	7.69 (24.023)	5.71 (23.899)
	%Change from Baseline: Geometric Mean (+SE,-SE)		% Change from Week 52: Geometric Mean (+SE, -SE)	
HOMA-S (%)	16.77(11.196, 22.633)	-5.15 (-9.259, -0.861)	-16.72 (-20.815, -12.415)	-12.03 (-15.213, -8.732)

Conclusion(s): One year RSG treatment results in loss of lean hip muscle tissue and an increase of intermuscular fat, with no change in intramuscular fat. Changes trended to BL levels after discontinuation of RSG. RSG improved glycemic control and insulin sensitivity. These data highlight the relationship between metabolic and structural effects of RSG and supports the hypothesis that RSG promotes differentiation of stem cells to adipocytes in this population.

P707
APTAMER-FUNCTIONALIZED LIPID NANOPARTICLES FACILITATES SIRNAS TARGETING OSTEOBLASTS

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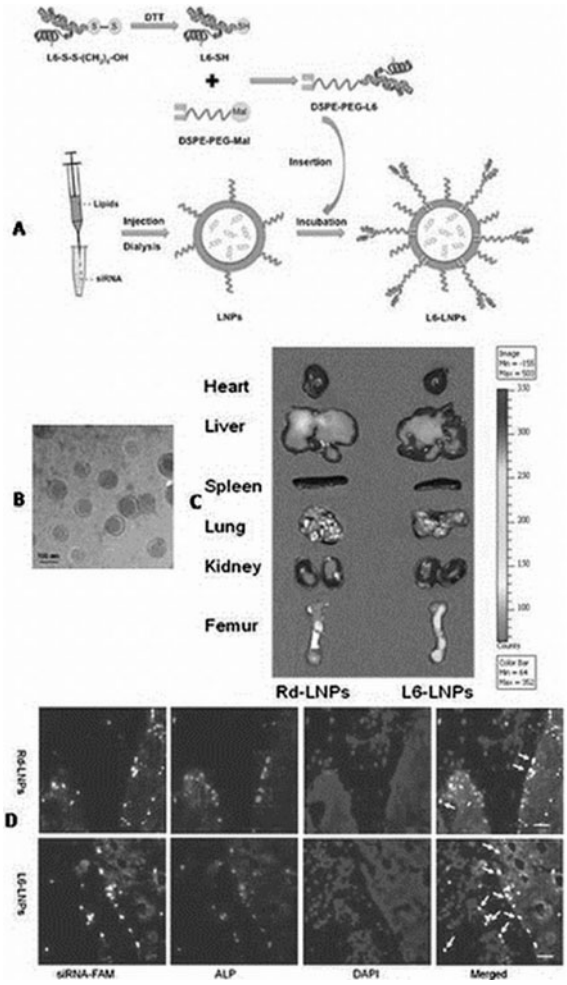
Objective(s): The cell-specific siRNA delivery system targeting osteoblasts is still not available to facilitate RNA interference-based bone anabolic therapy. In previous study, we performed ssDNA aptamer selection and the best performing aptamer sequence L6 was obtained for targeting osteoblasts, so the aim of present study is to prepare L6 modified lipid nanoparticles (LNPs) and test whether it facilitates siRNAs targeting osteoblasts.

Material & Methods: Lipids in ethanol were added slowly under strong vortex to CKIP-1 siRNA solution to form LNPs. Then, the dialysis was performed and L6 or random sequence was attached to the surface of LNPs. The physical properties of L6-LNPs were characterized and the osteoblast-selectivity and cellular uptake were determined by flow cytometry. Gene knockdown efficiency was evaluated and the cytotoxicity was also investigated. The tissue distribution in ovariectomized rat was imaged and the localization of siRNA in osteoblasts was examined by immunohistochemistry analyses.

Results: The preparation procedure was described as Fig.1A. The average particle size of L6-LNPs was 84.0±5.3 nm and the morphology was shown as Fig.1B. There is no effect of LNPs on the selectivity of L6 and L6 on the surface of LNPs facilitate the cellular uptake of CKIP-1 siRNA in target cells (ROS 17/28) but no uptake in nontarget cells (BRL-3A). L6-LNPs-siRNA exhibited above 50% knockdown efficiency at a low concentration of 10 nM in vitro and no significant cytotoxicity. The intensity of the intraosseous fluorescence signal was stronger, whereas that of the hepatic fluorescence signal was lower in L6-LNPs-siRNA group (Fig. 1 C). Colocalization of fluorescence labeled siRNA with Alp-positive cells was dominantly documented when L6-LNPs-siRNA was administered, whereas there were few instances of such overlapping staining when Rd-LNPs-siRNA was administered (Fig. 1D).



Conclusion(s): L6-functionalized lipid nanoparticles facilitated osteogenic siRNAs targeting osteoblasts, demonstrating L6-LNPs as a promising osteoblast-targeted delivery system for RNAi-based bone anabolic strategy.

P708
BOTH VEGF RECEPTOR 2 (VEGFR2) AND THE PARATHYROID HORMONE TYPE 1 RECEPTOR (PTH1R) MEDIATE THE EARLY ANTIAPOPTOTIC RESPONSE TO MECHANICAL STIMULATION IN MLO-Y4 CELLS

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Objective(s): Mechanical loading plays a key role in bone formation and maintenance by preventing osteocyte apoptosis through a mechanism involving β-catenin accumulation and extracellular signal-regulated kinase (ERK) nuclear translocation. Both vascular endothelial growth factor (VEGF) and PTHrP have a crucial role in bone formation. VEGF receptor 2 (VEGFR2) has recently been shown to mediate the mechanical response of endothelial cells in a VEGF- independent manner. Moreover, activation of the PTH type 1 receptor (PTH1R) in osteocytes increases periosteal bone formation by targeting the Wnt pathway. In osteoblasts, VEGF-independent VEGFR2 activation appears to be in part responsible for the antiapoptotic effect of PTHrP. In this work, we aimed to evaluate the putative roles of the VEGF and PTHrP systems in early (10 min to 1 h) osteocyte mechanosensing.
Material & Methods: MLO-Y4 osteocytes were subjected to mechanical strain by either pulsatile fluid flow (PFF; 10 dyn/cm^2, 8 Hz) or exposure to a hypotonic medium (230 mOsm) for 10-60 min. Cells were preincubated with either PTHrP (1-36) (100 nM) or VEGF165 (6 ng/ml) as positive agonists, or with the following antagonists and inhibitors: the PTH1R antagonists, [Asn10, Leu11, D-Trp12] PTHrP (7-34) amide [PTHrP(7-34)] and JB 4250 (each at 1 μM); a neutralizing monoclonal VEGF antibody (0.1 μg/ml) and the VEGFR2 phosphorylation inhibitor, SU5416 (1 μM). In some experiments, cells were transfected with a dominant negative VEGFR2 plasmid, a VEGFR2 overexpressing plasmid or empty vector (pcDNA). Cell viability, western blot and inmunocytochemistry assays were performed.
Results: Mechanical stimuli, VEGF165 and PTHrP(1-36) all similarly stimulated cell viability and ß catenin stabilization related to its membrane relocalization. Both SU5416 and transfection with a dominant negative VEGFR2 plasmid -in contrast to a VEGF neutralizing antibody- or PTHrP(7-34) decreased these events. In contrast, VEGFR2 overexpression in MLOY4 cells mimicked the effect of PFF on both ß catenin and nuclear ERK relocalization. Mechanical stimulation also increased PTH1R in the cell membrane.
Conclusion(s): Our in vitro findings strongly support the role of both VEGFR2, in a VEGF-independent manner, and the PTH1R in the mechanisms whereby mechanical stimuli promote osteocyte viability.

P709
SELECTION OF APTAMERS SPECIFICALLY TARGETING OSTEOBLAST AND MECHANISTIC INVESTIGATION OF APTAMER-MEDIATED SIRNA CELLULAR UPTAKE

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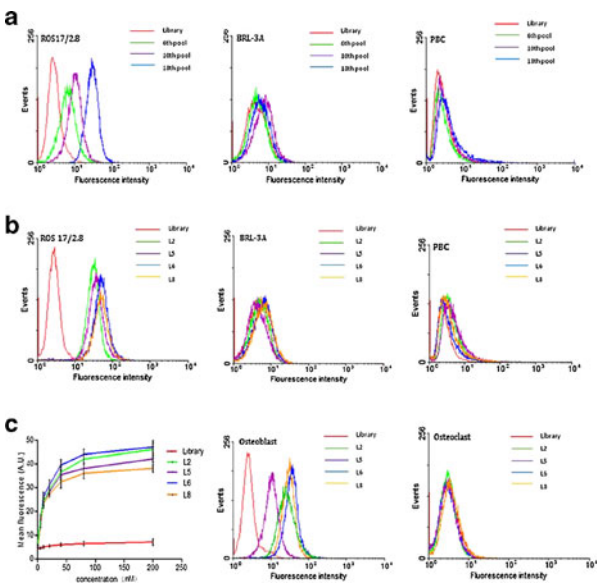
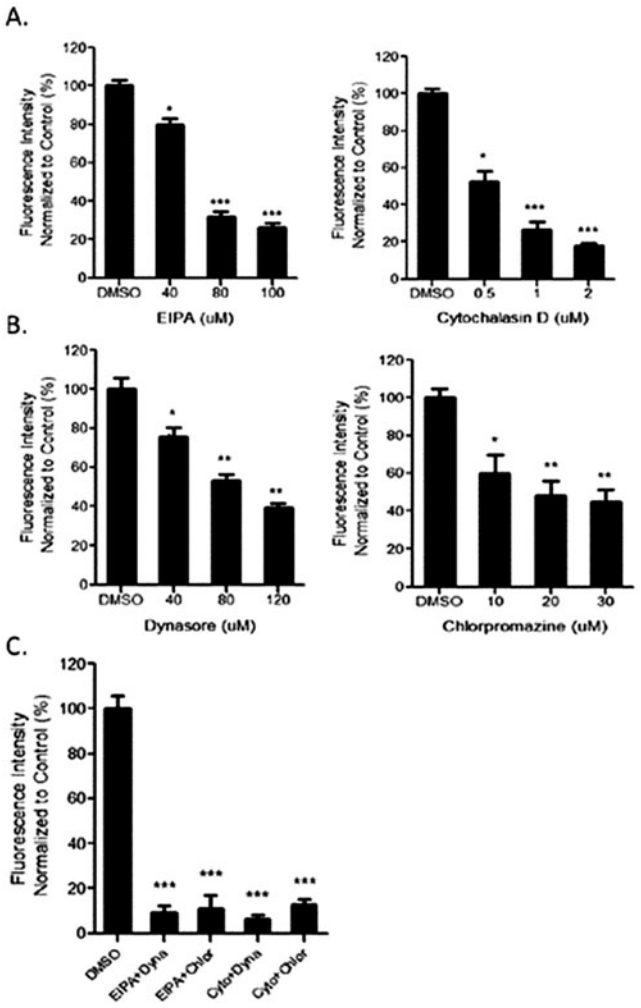
Objective(s): To select ssDNA aptamer specifically targeting osteoblast and investigate the mechanism of aptamer-mediated siRNA cellular uptake.
Material & Methods: Aptamers specifically targeting osteoblast were selected by Cell-SELEX, with rat osteoblastic cell (ROS17/2.8) as target and rat hepatocyte (BRL-3A) and peripheral blood cell with remove of erythrocyte (PBC), as negative controls. Candidate aptamers were truncated for binding assay. K_d of the aptamer-cell interaction was calculated. Flow cytometry was used to confirm the binding affinity of aptamers with primary normal osteoblast and osteoclast isolated from rat. The optimal aptamer was conjugated to surface of lipid nanoparticles(LNPs) to generate a siRNA delivery system. Flow cytometry was used to evaluate siRNA cellular uptake after addition of inhibitors for different endocytic pathways.
Results: Truncated sequences L2, L5, L6, and L8 chosen from the DNA pool showed high fluorescence intensity with target cell, and no obvious fluorescence intensity with negative cells (Fig. 1A, 1B and 1 C). Aptamers L6 and L8 showed good binding affinity toward primary normal osteoblast except osteoclast (Fig. 1D).



L6 (the shortest one) was conjugated to surface of LNPs to generate the siRNA delivery system. Relative fluorescence intensity of siRNA in ROS17/2.8 decreased in dose-dependent manner after addition of EIPA or Cytochalasin D (inhibitors of macropinocytosis) (Fig. 2A) and Dynasore or Chlorpromazine (inhibitors of clathrin) (Fig. 2B), respectively. Furthermore, additive decrease effect was observed after addition of inhibitors of both pathways (Fig. 2 C).



Conclusion(s): L6 could specifically target osteoblast and facilitate siRNA cellular uptake via macropinocytosis and clathrin pathway while macropinocytosis pathway plays a dominating role.

P710

INCREASED CKIP-1 PROTEIN LEVEL NEGATIVELY ASSOCIATES WITH DECREASE IN BOTH OSTEOCALCIN MRNA AND SMAD1/5 PROTEIN LEVELS IN BONE SPECIMENS FROM AGING MEN

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Objective(s): Recently published findings surprisingly indicate that age-related loss of trabecular bone in men is predominantly due to decreased bone formation (1). The mechanistic understanding of the decreased bone formation is an open question. BMP signaling is an important one responsible for bone formation. CKIP-1 has been newly identified to be critically required by Smurf 1 to ubiquitylate Samd1/5 for regulating BMP signaling (2). However, the age-related expression patterns of CKIP-1, Smad1/5 and Smurf1 protein levels and osteocalcin mRNA level in bone specimens from aging men remain unclear. In this study, we aim to examine the age-related expression patterns of CKIP-1, Smad1/5 and Smurf1 protein levels and osteocalcin mRNA level in bone specimens from aging men.

Material & Methods: The bone specimens collected from proximal femur in 31 male fractured patients (age range: 50-85 yr) without metabolic and malignancy diseases were obtained during internal fixation or malposition as part of routine treatment. Western blotting was performed for quantifying protein expression of CKIP-1, Smad1/5 and Smurf1 in bone, respectively. In addition, Q-PCR was performed for examining osteocalcin mRNA expression in bone. All the data were organized according to the following three age groups: 50-59 yr group (age range: 50-59; n=11) which taken as baseline, 60-69 yr group (age range: 60-69; n=13) and 70-85 yr group (age range: 70-85; n=9).

Results: CKIP-1 expression level increased with age, whereas levels of both Smad1/5 protein expression and osteocalcin mRNA decreased with age (Figure 1). No difference was found in Smurf1 expression level among the three age groups.

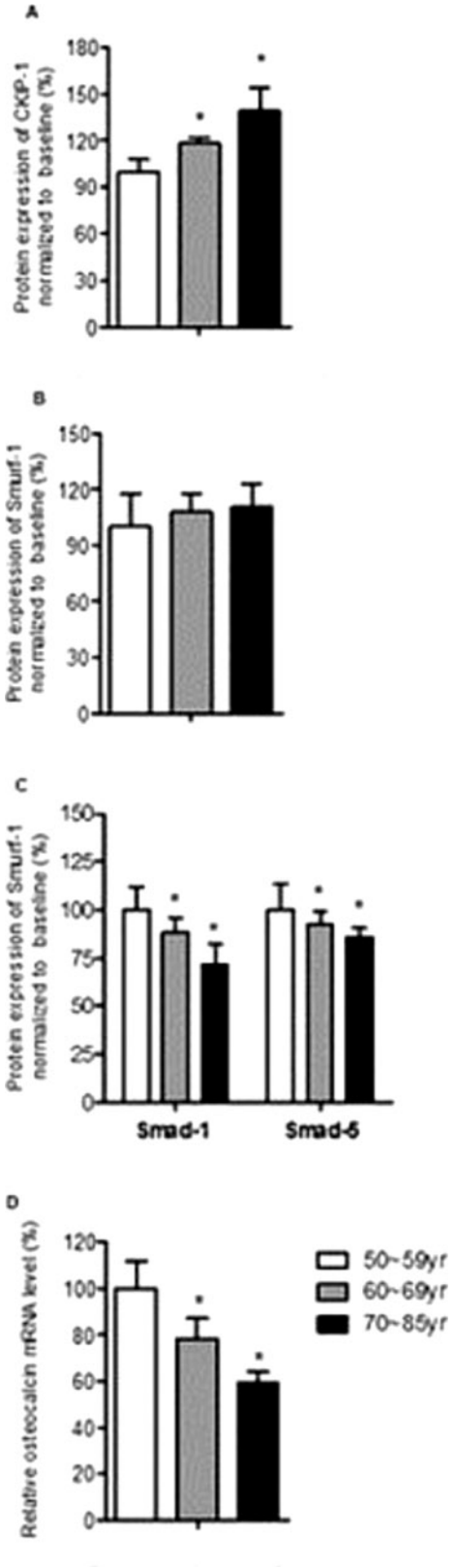

Figure 1 Increased CKIP-1 protein expression level negatively associates with decrease in both osteocalcin mRNA and Smad1/5 protein levels in bone specimens from aging men (*P<0.05 vs 50–59 years group as baseline).

Conclusion(s): Increased CKIP-1 protein expression level negatively associates with decrease in both osteocalcin mRNA and Smad1/5 protein levels in bone specimens from aging men.

References: 1. Compston J. J Osteoporos 2011;2011:108324. 2. Lu K, Zhang L, He F. Nat Cell Biol 2008;10:994.

P711
COLLAGEN TYPE V FACILITATE THE DIFFERENTIATION OF RABBIT ADIPOSE TISSUE-DERIVED STEM CELLS INTO A CHONDROCYTE-LIKE PHENOTYPE "IN VITRO"

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Objective(s): Among a variety of biological functions, including an anti-inflammatory effect, collagen V (COLV) regulates the diameter of collagen fibers with an important role in the development of functional tissues. Therefore the aim of this study was to evaluate, in rabbits, the influence of COLV in the induction of differentiation of adipose tissue-derived stem cells to a chondrocyte-like cell phenotype.

Material & Methods: Rabbits New Zealand were used as source of adipose-tissues for the isolation of mesenchymal stem cells (MSCs). Preliminary characterization of mesenchymal lineage and differentiation into chondrocyte-like phenotype was confirmed by immunofluorescence analysis using antibodies to collagens I, II (polyclonals), III and CD34 (monoclonals). After 2 and 3 weeks in culture, in the presence or absence of COLV, cell aggregates were fixed for 2 hours in 4% formaldehyde, then dehydrated with ethanol and washed with xylene. After embedded in paraffin, different sections were stained with toluidine blue, Alcian blue and Picrosirius for evaluation in the optic microscope.

Results: Proteoglycans and collagen were demonstrated by Picrosirius staining confirming the existence of collagen expression. Remarkably, compared to control cultures, in the presence of COLV stimulation, MSCs were capable to increase collagen I and II expressions confirming its chondrocyte-like cell phenotype.

Conclusion(s): We conclude that COLV may facilitate the differentiation of rabbit adipose tissue-derived stem cells into a chondrocyte-like phenotype. Further studies are urged in order to evaluate the influence of this protein in the ability of chondrocytes to remodel osteoarthritic joint surface at ultrastructural and molecular levels. As a result, the role of COLV in osteoarthritis physiopathology, its clinical significance and therapeutic implications could be elucidated.

P712

SP1 AND -1997 G/T GENETIC POLYMORPHISM OF COL1A1 GENE AND BONE MINERALISATION IN JUVENILE IDIOPATHIC ARTHRITIS

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Objective(s): The aim of our study was to evaluate the role of genetic markers in bone metabolism and mineralization in JIA children.
Material & Methods: We included 196 JIA children, 81 boys and 115 girls. Bone mineralization parameters were detected by DXA of lumbar spine L1-L4. Bone biochemical markers were osteocalcin, C-terminal telopeptides (CTT), PTH, Ca, Ca++, P, total alkaline phosphatase (TAP) activity. We have detected Sp1 (rs1800012) and -1997 G/T (rs1107946) polymorphisms in type I α1 chain collagen gene (COL1A1).
Results: We revealed gender differences in Sp1 genotype distribution in children with low BMD (LBMD): boys had GG genotype in 89.5% and girls in 54.2% (p=0.03). In boys GG genotype presence increased LBMD – OR=2.96 (95%CI: 0.59-14.9) compare in girls in which GG presence decreased LBMD – OR=0.56 (95%CI: 0.36-2.7). Also, children carried T allele (GT and TT genotypes) despite on higher inflammatory parameters had better mineralization dates. In total group children with GG genotype had higher osteocalcin (111.0±56.1 ng \ml and 85.9±39.9 ng/ml in GT+TT, p=0.02) and CTT levels (1.22±0.45 ng\ml and 0.99±0.38 ng\ml in GT+TT, p=0.02). In children, who have not been treated with steroids GG genotype was associated with lower BMD Z-score in boys (-1.24±0.14SD and 0.29±0.98SD in GT+TT, p=0.006) and lower height in girls (142.9±28.0 cm and 156.3±21.6 cm in GT+TT, p=0.025). In children with Tanner stage I GG genotype was associated with more rare LBMD (12.8% vs. 36.4% in GT+TT, p=0.05) and with frequent LBMD in children with Tanner stage II-III (37.8% and 5.9% in GT+TT, p=0.01). GG genotype of -1997 G/T polymorphism was associated with lower Ca++ (1.1±0.11 mmol\l and 1.15±0.006 mmol/l in GT+TT, p=0.03), inorganic phosphate (1.67±0.16 mmol/l and 1.57±0.22 mmol/l in GT+TT, p=0.04) and osteocalcin level (82.3±18.4 ng/ml and 115.5±24.2 ng/ml, p=0.01) in children with Tanner stage II-III and lower BMD (0.84±0.14 g\cm2 and 0.91±0.1 in GT+TT, p=0.04) and lower BMD Z-score (-1.275±1.25SD and -0.5±1.0SD in GT+TT, p=0.009)
Conclusion(s): We have revealed different changes in mineralization and metabolism, associated with sex, Tanner stage and treatment due to COL1A1 gene polymorphisms in children.

P713

VITAMIN K CATABOLITE PREVENTS BONE LOSS IN OVARIECTOMIZED MICE

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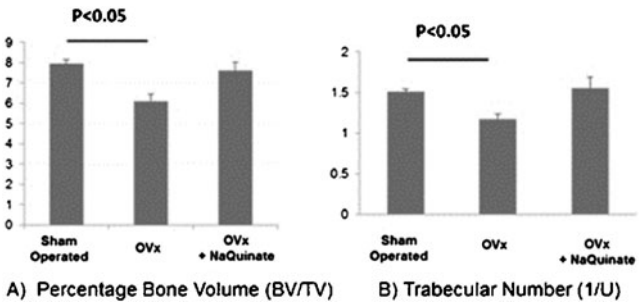
Objective(s): High dose vitamin K (VK) for the treatment of osteoporosis has been used for many years in the Far East. While the ability of this regimen to maintain bone mass is contentious, the data demonstrating reduction in fracture rates remains interesting. The administration of 45 mg/day VK is far in excess of the amount required for the normal γ-carboxylation of osteocalcin in aged populations, which led us to hypothesize that a catabolite of VK may be responsible for positive bone effects from high dose therapy. A 7-carbon carboxylic acid side chain catabolite (NaQuinate) is only found in appreciable amounts with high dose VK (Harrington et al., 2005). This molecule is a potent inhibitor of IL-6 in cultured stimulated cells, including osteoblast-like cells MG63.
Material & Methods: *In vivo* proof-of-principle experiments with ovariectomized (OVx) C57Bl/6 mice were done to investigate the potential of the active catabolite, NaQuinate, to protect against oestrogen-deficiency bone loss. Sham operated, OVx and OVx NaQuinate treated (15 μg/day i.p.) mice (n=8/group) were maintained under standard animal house conditions with free access to food and water for 5 weeks. Thereafter the right rear tibae were subjected to μCT and the platform of data gathered to look at bone changes in each group.
Results: The μCT data shows that OVx induced a decrease in the percentage bone volume and trabecular number. These deleterious effects were all prevented with NaQuinate treatment.



Conclusion(s): High dose VK increases levels of a rarely seen catabolite that has physiological anti-inflammatory activity and can inhibit oestrogen-deficiency bone loss.

References: Harrington DJ, Soper R, Edwards C, et al, J Lipid Res 46:1053.

Disclosures: We gratefully acknowledge the support of the Heptagon Fund.

P714
POSSIBLE INVOLVEMENT OF PTH IN THE SECRETED FRIZZLED RELATED PROTEINS (SFRPS) REGULATION AND WNT SIGNALLING PATHWAY

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Objective(s): The aim of this study was to evaluate *in vivo* and *in vitro* the effect of different degrees of secondary hyperparathyroidism and different PTH concentrations on bone turnover-related and Wnt pathway signaling-related gene expression.

Material & Methods: After inducing chronic renal failure (CRF) by 7/8 nephrectomy in 36 rats, one group was fed normal phosphorus (P) diet (NPD) (0.6%P) and other was fed high P diet (HPD) (0.9%P). Rats were sacrificed at 8, 16 and 20 weeks. Blood samples were collected and the left tibia was removed to assess gene expression. In the *in vitro* study, UMR106 cells were exposed to vehicle or different concentrations of PTH (1-34). After 24 h, cells were collected to analyze gene expression.

Results: After 20 weeks, CRF rats fed HPD diet showed a significant increase in serum PTH and P levels, together with a significant decrease in serum calcium. Moreover, the bone gene expression of bone turnover markers together with Wnt inhibitors, such as sFRP1, sFRP2, sFRP4 and DKK1, was significantly increased. *In vitro*, cells exposed to PTH were able to significantly increase FGF23, osteocalcin, OPG, Cbfa1 and cathepsin K gene expression. Like in the *in vivo* experiments, PTH were also able to significantly increase sFRP1, 2 and 4 gene expression in a concentration dependent manner.

Table 1. Bone gene expression of bone turnover markers and Wnt-related gene expression measured by qRT-PCR in the *in vivo* and *in vitro* studies.

In vivo study	Osteocalcin (R.U.)	OPG (R.U.)	Cbfa1 (R.U.)	Cathepsin K (R.U.)	Lrp5 (R.U.)	sFRP1 (R.U.)
8 weeks NPD	1.20 ± 0.34	0.87 ± 0.36	0.82 ± 0.36	2.41 ± 0.80	1.56 ± 0.84	1.63 ± 0.45
16 weeks NPD	0.73 ± 0.59	0.83 ± 0.28	0.81 ± 0.18	2.57 ± 1.36	0.95 ± 0.39	2.73 ± 0.93
20 weeks NPD	1.06 ± 0.15	0.89 ± 0.06	0.96 ± 0.22	2.33 ± 0.45	0.97 ± 0.09	1.34 ± 0.30
8 weeks HPD	2.27 ± 0.98*#	4.33 ± 1.50*#	2.81 ± 0.88*#	3.34 ± 0.69*	1.33 ± 0.41	5.89 ± 1.62*#
16 weeks HPD	8.84 ± 1.43*#	6.50 ± 2.40*#	3.73 ± 1.70*#	5.99 ± 2.80*	1.75 ± 0.96	8.51 ± 2.69*#
20 weeks HPD	13.06 ± 3.75*#	9.33 ± 4.39*#	5.96 ± 1.50*#	27.03 ± 6.69*#	1.20 ± 0.36	17.87 ± 2.99*#
Reference group	1.00 ± 0.50	1.00 ± 0.31	1.00 ± 0.15	1.00 ± 0.36	1.00 ± 0.26	1.00 ± 0.21
	sFRP2 (R.U.)	sFRP4 (R.U.)	DKK1 (R.U.)			
8 weeks NPD	1.90 ± 0.91	0.96 ± 0.22	1.75 ± 0.54			
16 weeks NPD	1.17 ± 0.38	1.25 ± 0.29	1.30 ± 0.36			
20 weeks NPD	1.47 ± 0.40	1.07 ± 0.09	0.98 ± 0.04			
8 weeks HPD	2.12 ± 0.38*	2.87 ± 1.39*#	5.52 ± 2.14*#			
16 weeks HPD	19.13 ± 10.30*#	13.99 ± 5.35*#	3.05 ± 1.62			
20 weeks HPD	8.59 ± 2.59*#	30.17 ± 6.61*#	4.57 ± 1.57*#			
Reference group	1.00 ± 0.20	1.00 ± 0.30	1.00 ± 0.24			
In vitro study	FGF23 (R.U.)	Osteocalcin (R.U.)	OPG (R.U.)	Cbfa1 (R.U.)	Cathepsin K (R.U.)	Lrp5 (R.U.)
Vehicle	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00
10^{-8} M PTH	1.32 ± 0.32	1.17 ± 0.15	2.83 ± 0.88*	1.45 ± 0.06*	1.49 ± 0.12*	0.89 ± 0.17
10^{-7} M PTH	1.72 ± 0.25*	1.71 ± 0.47	9.87 ± 2.16	2.05 ± 0.53*	2.38 ± 0.41*	1.17 ± 018
10^{-6} M PTH	4.96 ± 1.44*	2.66 ± 0.85*	5.34 ± 1.44*	1.60 ± 0.19*	2.12 ± 0.24*	1.00 ± 0.16
	DKK1 (R.U.)	sFRP1 (R.U.)	sFRP2 (R.U.)	sFRP4 (R.U.)		
Vehicle	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00		
10^{-8} M PTH	1.10 ± 0.15	1.52 ± 0.54	1.56 ± 0.43	1.93 ± 0.37		
10^{-7} M PTH	0.99 ± 0.2	1.97 ± 0.51*	5.90 ± 1.68*	4.43 ± 0.55*		
10^{-6} M PTH	1.07 ± 0.36	2.05 ± 0.36*	11.01 ± 0.86*	6.72 ± 1.11*		

R.U.: Relative Units referred to Reference group (rats with normal renal function and NPD diet) (*in vivo* study) and to vehicle group (*in vitro* study). *In vivo* study: #p<0.05 compared to time-matched NPD group and *p<0.05 compared to Reference group. *In vitro* study: *p<0.05 compared to vehicle group.

Conclusion(s): *In vivo*, the PTH increments were associated with a significant increase in the expression of genes involved in bone turnover and Wnt pathway inhibition. The *in vitro* study partly confirmed the *in vivo* results, demonstrating for the first time that PTH directly increase sFRPs, suggesting that PTH is involved in the sFRPs and Wnt signaling pathway regulation.

P715
BREAKING THE FRAGILITY FRACTURE CYCLE IN THE UK: A CONSENSUS APPROACH

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Objective(s): To describe development in the UK of a consensus shared by professional organisations, patient societies, policy makers and pharmaceutical manufacturers, and steps taken to implement a systematic approach to fragility fracture care and prevention of secondary fractures.

1. Outline the problem: 50% of people who have a hip fracture will have had a previous 'herald' fragility fracture. Despite this, evidence shows that most do not receive bone protecting treatments. But whose job is it anyway? A gap has been identified in the health and social care system.
2. Describe the solution to the care gap: the emergence of the Fracture Liaison Service (FLS) model in Glasgow and other UK locations; and evidence of the effectiveness of the FLS in identifying and treating patients, and reducing fracture rates.
3. Illustrate provision of secondary fracture prevention in the UK using data gathered in UK Government-commissioned audits including the National Audit of Falls and Bone Health in Older People and the National Hip Fracture Database.
4. Describe the consensus of professional organisations, patient societies, policy makers and pharmaceutical manufacturers and the ways they have worked together to implement systematic secondary fracture prevention creating a unified momentum.
5. Provide additional detail about the work programmes led by the National Osteoporosis Society to encourage systematic secondary fracture prevention including influencing of politicians, officials and service providers; mass-participation campaigning; the FLS Education Programme; and developing standards for FLS.

Conclusion(s): The consensus shared by professional organisations, patient societies, policymakers and pharmaceutical manufacturers has driven momentum around the need for universal systematic approaches to secondary fracture prevention. This is reflected in the creation of national policy levers in the four UK-nations and a steady increase in FLS provision across the UK.

P716
PREDICTIVE VALUES OF ACHILLES MACHINE AND FRAX IN THE DETECTION OF OSTEOPOROSIS AMONG PRE AND POST-MENOPAUSAL WOMEN

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Objective(s):

- To estimate the prevalence of osteoporosis among pre and postmenopausal Saudi women in Riyadh city .
- To assess the predictive value of the Achilles machine in detecting osteopenia and osteoporosis.
- To find the predictive value of FRAX assessment tool and detection osteoporosis.

Material & Methods:
This is a community based household cross-sectional of 1500 women. Eligible women in each household were randomly selected and invited to the primary health care center to participate in the study. Especially designed questionnaire was used and filled by a trained interviewer. Women were requested to be screened by QUA (Quantitative Utrasonography) for osteoporosis and had their weight and height measured. Furthermore, referral to King Khalid university hospital was done for those with positive screening results (≤-1 SD) in order to perform DXA and blood tests.

Results: Overall prevalence of osteoporosis and osteopenia was 19. 94% and 48.81% respectively. Osteoporosis of femur was 3.4% and of the lumbar was 19.2%. Achilles values with (cut off point ≤-1) detected 37.3% of cases of lumbar osteoporosis (P=0.004) and 90% of cases of femur osteoporosis (P=0.031). FRAX assessment tool with and without BMD, when compared to lumbar T-Scores of DXA was 82.4% and 74% under the roc curve, respectively. While femur T-scores of (DXA) were 56.1% and 55.1% under roc curve, respectively.

Conclusion(s): Osteoporosis is prevalent in Saudi females. Achilles machine was of acceptable predictive value for mass screening. FRAX assessment tool was of acceptable predictive value when compared with lumbar T scores.

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LIFE STYLE FACTORS RELATED TO WOMEN'S OSTEOPOROSIS

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Objective(s): Osteoporosis is a serious and growing problem in the world. It is one of the most prevalent diseases among middle-aged and elders. Previous studies have considered high prevalence of osteoporosis especially in women, and also, its various prevalence in communities with different life styles and nutritional habits.
The aim of the present study was to determine lifestyle factors related to osteoporosis among women.

Material & Method(s): In this cross-sectional study, 500 women who were referred to Iran University of Medical Sciences bone densitometry centers during 2006 were selected. Data were gathered by questionnaire.

Results: Finding revealed statistical significant relationship between osteoporosis and drinking coffee, consumption of ice-cream, pattern of yoghourt drink, dried whey and cheese consumption, exposure to sunlight and it's duration ($P<0.05$). The results of discriminant analysis showed that drinking coffee and exposure to sunlight were the most important related factors with osteoporosis.

Conclusion(s): According to the finding and considering osteoporosis prevalence in Iran, women's education regarding life style factors related to osteoporosis is suggested.