

# Acute effects of whole body vibration on quadriceps muscle voluntary and evoked torque

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Keywords: whole body vibration, maximal voluntary contraction, peripheral fatigue

## Introduction

The use of whole body vibration (WBV) as a (re-)training modality for athletes and patients has considerably increased in recent years (Rittweger 2010). However, acute effects of WBV on neuromuscular function, and especially the influence of WBV on the extent of muscle fatigue during resistance exercise, remain to be clearly established. Therefore the purpose of the present study was to assess the acute effects of whole body vibration during repeated bouts of isometric half-squat exercise on quadriceps muscle voluntary and evoked force.

## Subject and method

Nine subjects (8 men and 1 woman, age:  $32.3 \pm 4.9$  years) volunteered to participate to a randomized cross-over study; the two sessions (with 30 Hz and 4 mm-amplitude WBV vs. without WBV, respectively WBV and CON sessions) were separated by 48h. In both session, subjects had to maintain the half squat position with a barbell loaded to 50% of body mass on the shoulders ( $80^\circ$  of knee flexion,  $0^\circ$  = legs fully extended) for 1 min, repeated 5 times with 30 sec recovery between sets. The isometric maximal voluntary contraction torque (MVC) and the amplitude of the evoked response to electrical stimulation of the femoral nerve (paired stimuli at 100 Hz evoked after the MVC, i.e. potentiated peak doublet amplitude (Pd)) for the knee extensor muscles were measured before and immediately after the fatigue task.

## Results

Our results showed a significant ( $P < 0.01$ ) reduction in MVC for both sessions ( $-22.9 \pm 6\%$  vs.  $-24.9 \pm 6\%$  for WBV and CON sessions, respectively). In addition, Pd significantly ( $P < 0.01$ ) decreased by  $26.9 \pm 6.3\%$  for WBV and by  $22.7 \pm 5.6\%$  for CON. However, MVC and Pd losses were not different ( $P > 0.05$ ) between the two sessions.

## Conclusion

Previous works have already shown impaired MVC after repeated bouts of 1-min WBV periods (de Ruiter et al. 2003). Here we show *that the decrease in the maximal force generating capacity, as measured by the MVC and the level of peripheral fatigue, as measured by the Pd, were not influenced by WBV.* Thus WBV does not seem to be an effective stimulus to induce a greater level of muscle fatigue during a single bout of resistance training.

## Bibliography

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