*Supplementary materials for*

**Both a single sacral marker and the whole-body center of mass accurately estimate peak vertical ground reaction force in running**



**Figure S1.** Vertical ground reaction force ; in body weight (BW)] obtained using center of mass method (COM-M; dashed line) and sacral marker method (SACR-M; dotted line) without applying a low-pass filter to the underlying COM and sacral marker acceleration signals. is shown for two running strides and for a representative participant at 11km/h.

**Table S1.** Root mean square error [both in absolute (body weight; BW) and relative (%) units] between peak vertical ground reaction force obtained using center of mass (COM-M) and gold standard (GSM) method as well as using sacral marker method (SACR-M) and GSM at three running speeds and for all cutoff frequencies.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **COM-M vs GSM** | | | **SACR-M vs GSM** | | |
| **Cutoff frequency (Hz)** | **RMSE** | **9 km/h** | **11 km/h** | **13 km/h** | **9 km/h** | **11 km/h** | **13 km/h** |
| **2** | BW  (%) | 0.82 (34.6) | 0.96 (38.3) | 1.09 (41.5) | 0.74 (31.4) | 0.90 (35.7) | 1.04 (39.8) |
| **3** | BW  (%) | 0.32 (13.5) | 0.41 (16.5) | 0.51 (19.4) | 0.20  (8.6) | 0.31 (12.3) | 0.43 (16.4) |
| **4** | BW  (%) | 0.11  (4.5) | 0.16  (6.2) | 0.21  (8.1) | 0.14  (6.0) | 0.13  (5.3) | 0.17  (6.5) |
| **5** | BW  (%) | 0.06  (2.6) | 0.07  (2.7) | 0.08  (3.2) | 0.27 (11.4) | 0.24  (9.6) | 0.20  (7.7) |
| **10** | BW  (%) | 0.17  (7.0) | 0.17  (6.8) | 0.17  (6.5) | 0.81 (34.1) | 0.81 (32.2) | 0.78 (29.6) |
| **20** | BW  (%) | 0.24 (10.2) | 0.26 (10.2) | 0.26 (10.1) | 1.36 (57.6) | 1.39 (55.4) | 1.38 (52.3) |