Accelerometry for measuring Energy Expenditure from Physical Activity in healthy participants.

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Rationale: To evaluate which accelerometer is most suitable for healthcare professionals to estimate energy expenditure (EE) in adults.
Methods: Healthy participants completed a movement protocol (with lying, sitting, standing, walking (2, 4, 6 km/h), running (8, 10 km/h) and cycling) wearing 4 accelerometers simultaneously. Included actometers were Activ8®, Actigraph®, ActivPal®, MOX® , MoveMonitor® and Sensewear®. Reference value's for METS based on double label water studies were used as gold standard. Participants wore the FitbitVersa3®, Activ8®, PAM400 and Sensewear® one week at home. Sensewear® was used as the gold standard . Physical Activity Level (PAL) was the primary outcome variable. Participants had to estimate their own PAL and score the accelerometers on user-friendliness. Intraclass correlatiecoëfficiënt (ICC) were calculated to score validity in the movement protocol and one simple t test and blant altman plots were used to analyse the free living data.
Results:4 adults were included in the movement protocol and 20 in the free living protocol (20-61 years). 40% of the participants estimated their own PAL correct. For the MOX® it was not possible to calculate ICC because METS were not a outcome variable. The Sensewear (0.91) and Activ8 (0.87) had the highest ICC and the ActivPal (0,72) and Actigraph®(0,7) the lowest. Mean difference between PAL Activ8®, PAL Fitbit® and PAL Sensewear were not significantly different from zero. The PAM® underestimates the PAL by 0.18 (p=0.01). Fitbit® and PAM® had a high missing data score of 20-25% because the account that participants had to make was an obstacle. All accelerometers scored adequate to good on user-friendliness.
Conclusions: Fitbit® and Activ8® are valid for measuring energy expenditure from activity in adults. Accelerometry is a noninvasive way to measure EE form activity.

Non conflicts of interest