7. SWACSM Abstract

Validity of Average Heart Rate and Energy Expenditure in Polar OH1 and Verity Sense While Self-Paced Walking

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ABSTRACT

Walking is the most widely used form of exercise. Advancements in wearable technology allow for the estimation of steps and energy consumption. Polar is a leading brand in wearable technology. The Polar OH1 and Verity Sense are commonly used optical sensors for activity tracking. It is unknown as to whether these devices provide a valid estimate of average heart rate (HR) and energy expenditure (EE) while walking. **PURPOSE**: The purpose of this investigation was to determine the validity of the Polar OH1 and Verity Sense during self-paced walking. **METHODS**: Twenty participants (n=10 female, n=10 male; 23.5 ± 6.48 years) participated in a 5min of self-paced walking. The Polar OH1 and Polar Verity Sense were placed on either biceps, in accordance to the manufacture recommendations. Mean absolute percent error (MAPE, ≤10%) and Lin's Concordance ($\rho \geq 0.7$) were used to validate the device's average HR (in bpm) and estimated EE (in kcals). The Polar H10 heart rate strap and COSMED K5 were used in conjunction as the criterion reference. Dependent T-tests was used to determine potential differences ($p \leq 0.05$). **RESULTS:** Heart rate was valid for self-paced walking among both the Verity Sense and OH1 optical sensors. Energy expenditure estimates were not valid during self-paced walking (see Table 1). **CONCLUSION:** The Polar Verity Sense and Polar OH1 are valid instruments for HR measures, however are not valid when attempting to estimate energy expenditure.

Table 1	Polar H10	Verity Sense	Polar OH1
Mean HR (bpm)	101±17.7	103.44±15.83	104.89±17.15
MAPE		6.62%	7.49%
Lin's Concordance		0.79	0.68
t-test		0.15	0.47
Estimated EE (Kcal)	33.95±6.35	33.17±17.91	34.72±17.91
MAPE		34.43%	31.65%
Lin's Concordance		0.46	0.45
t-test		0.81	0.93