

Validating the Adidas miCoach for estimating pace, distance, and energy expenditure during outdoor over-ground exercise accelerometer

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ABSTRACT

The Adidas miCoach was developed as a personal training system to estimate pace, distance and energy expenditure (EE) but has yet to be validated. **PURPOSE:** To validate the Adidas miCoach for estimating pace (min/km), distance (km) and EE (kcal/min) during outdoor over-ground walking and running for two different sensor configurations. **METHODS:** Six male and 8 female moderately endurance trained participants (mean \pm SD age: 28.2 \pm 8.5 y; height: 167.4 \pm 7.8 cm; mass: 60.9 \pm 11.1 kg; VO_{2max} : 54.4 \pm 5.5 mL/kg/min) completed this validation study. The protocol consisted of walking at 53.6, 80.4, and 107.2 m/min and running at 134.0, 160.8, 187.6, and 214.0 m/min on an outdoor track while wearing a portable metabolic measurement unit (Cosmed K4b₂). A miCoach sensor was attached to the right shoelaces (Laces) and a second miCoach sensor was inserted in the right insole of the shoe (Midsole). Estimated pace, distance and EE were compared to values determined by criterion methods (Actual). Data were analyzed using a repeated-measure ANOVA (pace, distance) or ANCOVA (EE) to evaluate significant differences. **RESULTS:** A significant main effect ($P < 0.035$) was observed for speed indicating an increase in measured values at each subsequent speed for pace, distance, and EE. For pace at all speeds, the laces and midsole miCoach estimated pace were significantly different from each other ($P < 0.01$), and from actual pace ($P < 0.02$). For distance, the laces and midsole miCoach estimates were similar for all speeds; however, significant differences were observed for the midsole at 53.6 m/min ($P = 0.003$) and for both laces and midsole at 80.4 and 107.2 m/min ($P \leq 0.05$) compared to actual distance. For walking speeds, miCoach estimated EE was significantly different between laces and midsole ($P < 0.04$), and compared to actual EE ($P < 0.001$); however, midsole at 160.8 m/min ($P = 0.035$) and both laces and midsole at 187.6 and 214.4 m/min ($P < 0.01$) were significantly different from actual EE. **CONCLUSION:** These data indicate that the Adidas miCoach is accurate for estimating distance. However, it lacks the ability to accurately estimate pace and EE across a range of walking and running speeds. Additionally, it appears that the laces configuration produced more accurate estimates than the midsole. Partially supported by UTEP CHS graduate enhancement funds.