

Evaluation of the Nike+ FuelBand in energy expenditure and steps taken during exercise

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ABSTRACT

PURPOSE: To assess the accuracy of the Nike+ FuelBand for estimating energy expenditure and steps taken during exercise. **METHODS:** Twenty subjects (age = 22.8 ± 2.4 yrs; body mass index = 24.9 ± 2.6 m/kg²) performed a progressive, three-interval treadmill test at three different speeds (2.0, 3.5, and 5.0 mph) with a 0% grade. Each stage lasted 8 min, with 3-min rest between intervals. Subjects wore the Nike+ FuelBand on the left wrist. Energy expenditure and steps were estimated by using its proprietary algorithm, and then compared with energy expenditure determined from indirect calorimetry and manual step count, which served as criterion measures. **RESULTS:** The Nike+ FuelBand significantly overestimated total energy expenditure by 31.1 kcal during the 5.0 mph interval (108.2 ± 29.4 kcal versus 77.0 ± 18.1 kcal, respectively; $p < .001$). No differences were found between the Nike+ FuelBand and indirect calorimetry at 2.0 mph stage (26.8 ± 8.3 kcal versus 26.1 ± 6.2 kcal, respectively; $p \geq .05$) or 3.5 mph stage (37.0 ± 10.5 steps versus 39.26 ± 8.80 steps, respectively; $p \geq .05$). Concerning steps taken, the Nike+ FuelBand significantly underestimated steps compared to a manual count at the lower speed of 2.0 mph (321.8 ± 235.4 steps versus 760.3 ± 44.8 steps, respectively; $p < .001$) No differences ($p \geq .05$) were found at 3.5 mph (845.0 ± 210.5 steps versus 952.6 ± 60.44 steps, respectively) or 5.0 mph (1222 ± 61.5 steps versus 1239 ± 143.5 steps, respectively). **CONCLUSIONS:** The Nike+ FuelBand appears to provide an accurate assessment of energy expenditure at 2.0 mph and 3.5 mph, a common self-selected walking intensity range, but overestimates at a higher speed of 5.0 mph. The Nike+ FuelBand also appears to provide an accurate assessment of steps at speeds of 3.5 mph and 5.0 mph, but underestimates at 2.0 mph, most likely due to variation in arm swing motion during walking.

Key Words: Indirect Calorimetry, Energy Expenditure, Physical Activity