The Effect of a Backpack Hip Strap on Energy Expenditure While Walking
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Previous studies have demonstrated that energy cost increases as the weight of the load increases, but few investigations have been conducted that focus on backpack carriage specifically. PURPOSE: To examine the effect of backpack hip strap use on walking energy expenditure while carrying a loaded backpack. METHODS: A crossover design was used in which 15 young, healthy male subjects walked at a self-selected pace for two 10-minute loaded backpack trials either with a hip strap (strapped) or without a hip strap (non-strapped). Oxygen consumption (VO₂), rating of perceived exertion (RPE), respiratory exchange ratio (RER), and heart rate (HR) were monitored throughout each 10-minute trial. Change scores from the 4th to 10th minute were calculated for each variable. A t-test was used to evaluate the difference between trials for each variable. RESULTS: The change in VO₂ (-0.62±0.40 vs. 0.33±0.23, p=0.04) and RPE (1±0.25 vs. 2±0.21, p<0.01) from the 4th to the 10th minute were different for the strapped versus non-strapped condition, respectively. There was no difference in the change in RER (0.04±0.01 vs. 0.03±0.01, p>0.05) or HR (3.53±0.93 vs. 4.07±1.39, p>0.05) for the strapped versus unstrapped condition, respectively. CONCLUSIONS: These results suggest wearing a hip strap reduces the energy expenditure and perceived exertion in as little as 10 minutes of walking. The reduced energy expenditure found with using a hip strap may have a significant impact on an individual’s ability to hike or march for extended periods of time.