

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 (VO_2), 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 VO_2 (-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.