ABSTRACT

TITLE:	The Metabolic Costs of Steep Incline Running v. Walking
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ABSTRACT: Ultra-mountain running (UMR) has seen a significant increase over the past decade. These races often exceed 15% gradients and rely heavily on an individual's metabolic and aerobic expenditure. Thus, the purpose of this study was to examine whether running or walking a 25% grade at a set pace is more metabolically efficient on a treadmill. Eleven trained participants (6 males, 5 females, and ages 18-55) running 20+ miles a week completed three separate trials, a maximal oxygen uptake test (VO2 max), followed by two separate 1-mile running and walking trials. Both trials were performed at a 25% grade at their set pace (mean speed = 2.9 mph, sd 0.26). The results of the dependent paired t-test indicated that heart rate (HR) had a statistically significant difference ($p<0.05$) between the walking (M=148, sd13.8) and running (M=158, sd11.4) conditions; p=0.002. VO2 scores for running (M=40 ml/kg/min, sd5.9) and walking (M=32 ml/kg/min, sd13.9) showed a statistically significant difference between the two conditions; p=0.035. Relative VO2 values for running (M=10.8, sd3.0) and walking (M=8.9, sd2.8) did not show a significance; p=0.291. RPE values for running (M=13.3, sd2.1) and walking (M=12.5, sd1.4) did not show a significance; p=0.205. The overall findings did indicate that running had increase metabolic and aerobic costs compared to walking at a 25% grade and set pace. This means that power hiking up a steep incline may be more energy preserving, while still relative to the work rate as running. Though the study was focused on trained runners and energy conservation, it can be beneficial for the fitness and exercise industry as well with the results indicating that individuals seeking weight loss can effectively burn the greatest amount of energy through incline running.