

Metabolic Cost of Supported Treadmill Running

Adam C. Lowe, James F. Hokanson.

State University of New York at Cortland, Cortland, NY

Supported treadmill walking and running are used in clinical and athletic settings for rehabilitation of lower extremity injuries and overcoming movement disabilities. Prescription for exercise intensity is difficult due to the added support during treadmill exercise. Currently there are no accepted methods used to calculate exercise intensity for supported treadmill running. **PURPOSE:** To measure the metabolic cost of supported treadmill running. **METHODS:** College age subjects were fitted into a full-body support harness for all trials. The harness allowed the subjects to be partially supported during treadmill running. Oxygen consumption (VO_2) was measured using an open flow system during body weight (control) and supported (experimental) running. Subjects completed control and experimental trials at treadmill speeds of $2.24 \text{ m}\cdot\text{s}^{-1}$, $2.46 \text{ m}\cdot\text{s}^{-1}$, $2.68 \text{ m}\cdot\text{s}^{-1}$, and $3.13 \text{ m}\cdot\text{s}^{-1}$. Experimental trials were classified as running at either 90% ($n = 10$) or 85% ($n = 9$) of bodyweight. Data for VO_2 , heart rate and RER were collected at rest and during all trials. **RESULTS:** Average ($\pm\text{SD}$) VO_2 under control conditions were $29.87 (\pm 2.19)$, $31.39 (\pm 2.68)$, $34.25 (\pm 2.49)$, and $37.38 (\pm 3.57) \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ for treadmill speeds of 2.24 , 2.46 , 2.68 , and $3.13 \text{ m}\cdot\text{s}^{-1}$, respectively. Average ($\pm\text{SD}$) VO_2 experimental conditions at 90% of body weight were $30.01 (\pm 1.94)$, $30.88 (\pm 2.24)$, $33.72 (\pm 1.72)$ and $35.9 (\pm 3.51) \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ for treadmill speeds of 2.24 , 2.46 , 2.68 , and $3.13 \text{ m}\cdot\text{s}^{-1}$, respectively. At 85% of bodyweight, average VO_2 was $28.3 (\pm 3.02)$, $31.18 (\pm 3.10)$, $33.02 (\pm 3.32)$, and $35.26 (\pm 3.18) \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$. A paired samples t -test of average VO_2 at control and 90% bodyweight at $3.13 \text{ m}\cdot\text{s}^{-1}$ showed that the difference between conditions was not significant ($t = 1.636$, $\text{df} = 8$, $p > 0.05$). A paired samples t -test of regression line slopes of VO_2 vs. running speed at control and 90% bodyweight showed that the difference between conditions was not significant ($t = 2.092$, $\text{df} = 8$, $p > 0.05$). The greater support (85% of body weight) also failed to show significance between average VO_2 ($t = 1.325$, $\text{df} = 8$, $p > 0.05$) and slope ($t = 1.681$, $\text{df} = 8$, $p > 0.05$). **CONCLUSION:** Supported treadmill running did not result in a significant difference in VO_2 . The failure of significant metabolic changes in supported running may be due to changes in running mechanics.

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