

The Impact of Wearable Weights on Cardiovascular, Metabolic, and Perceptual Responses to Treadmill Walking

Kristine M Fallon, Ashley T Kuczynski, Bill I Campbell, PhD, & Marcus W Kilpatrick, PhD

Health and Exercise Science Laboratory, University of South Florida

The growing public health burden associated with insufficient physical activity has resulted in the development of numerous health initiatives and products aimed at stabilizing and reversing the negative trends reported in epidemiological literature. A relatively novel product that has only recently made its way to the market are wearable weights. These products are designed to be worn on the lower legs and arms along with regular clothing as a means to increase caloric expenditure. However, no research to date has tested the efficacy of this product. **PURPOSE:** Compare the physiological and psychological responses within bouts of aerobic exercise that vary on intensity and the presence of wearable weights. **METHODS:** Thirteen (8 female, 5 male, mean age = 24 years, mean BMI = 24) healthy volunteers were tested for aerobic fitness on a treadmill to determine VO₂ max (mean = 44 ml x kg⁻¹ x min⁻¹). Participants then completed eight 30-minute walking trials on a treadmill while oxygen consumption (VO₂), heart rate (HR), and ratings of perceived exertion (RPE) were monitored while walking at different speeds and with varying combination of upper and lower body wearable weights. The design included two intensities (slow walking and brisk walking) and four conditions (no weights, arm weights, leg weights, and arm and leg weights) for a total of eight experimental trials. **RESULTS:** Data were analyzed using ANOVA and pairwise comparisons. Analyses revealed a that VO₂ was significantly lower without the wearable weights in comparison to wearing both upper and lower weights in the slow walk trial (P < 0.001; ES = 0.97) and trended towards significance in the brisk walk trial (P < 0.09; ES = 0.37). HR did not differ across trials for the slow or brisk walk trials (P > 0.05). RPE was significantly elevated while wearing upper and lower weights in the brisk walk trial (P < 0.05; ES = 0.55), but not in the slow walk trial (P > 0.05). **CONCLUSIONS:** Findings suggest that exercising while using wearable weights increases energy expenditure, has no impact on HR, and impacts RPE only during the faster walking trials. The increased energy expenditure associated with wearing the weights was modest, but the increases within the slower walking trial occurred without increased RPE. **PRACTICAL APPLICATIONS:** This finding suggests that physical activity associated with daily living could be enhanced through the wearing of weights that can be worn under clothing without increasing perceptions of effort. In contrast, findings relative to brisk walking suggest that any beneficial increase in energy expenditure is potentially offset by significantly increased effort.

Oxygen Consumption (mL x kg ⁻¹ x min ⁻¹)		No Togs	Arm Only	Leg Only	Leg & Arm
	Slow	11.3±1.1	11.7±1.9	12.0±1.6	12.4±1.3
	Brisk	15.9±2.4	15.7±3.1	16.9±2.6	16.8±2.1

Heart Rate (beats x min ⁻¹)		No Togs	Arm Only	Leg Only	Leg & Arm
	Slow	100.0±11.3	98.6±11.5	102.2±9.8	98.9±14.9
	Brisk	113.9±13.2	115.7±10.5	115.9±18.1	116.1±12.7

Perceived Exertion (Borg 6-20 scale)		No Togs	Arm Only	Leg Only	Leg & Arm
	Slow	8.3±1.9	8.0±1.4	8.6±1.4	8.7±2.6
	Brisk	9.4±2.4	10.4±1.8	10.8±2.2	10.6±2.1

on cardiovascular, metabolic, and perceptual responses to treadmill walking.
Presented at the annual meeting of the National Strength and Conditioning
Association, Las Vegas, NV 2009.