

Body Weight Support on Anti-Gravity Treadmill Induces Less Physiological Strain While Running

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ABSTRACT

The anti-gravity treadmill developed by AlterG® can be used as an alternative to traditional treadmill running. The AlterG® unloads an individual's body weight through lower body positive pressure (LBPP) and can support up to 80% of an individual's body weight. The cardiorespiratory response resulting from a bout of exercise on an AlterG® treadmill may be attenuated compared to similar exercise on a traditional treadmill. **PURPOSE:** The purpose of this study was to compare the physiological responses of running at 0%, 15%, 30%, and 45% of body weight support (BWS) on the AlterG® to a traditional treadmill.

METHODS: Ten healthy, active males (n = 3) and females (n = 7) (mean ± SD; age 23 ± 3 yrs, weight 60 ± 9.4 kg, height 167.6 ± 6.4 cm) completed two separate treadmill sessions in a randomized order. The exercise sessions included running on an AlterG® treadmill at 6 mph and 1% grade with 0%, 15%, 30% and 45% BWS for 8 min each. The other exercise session included running on a traditional treadmill (TT) at 6 mph and 1% grade for 8 min. Oxygen consumption (VO₂) and respiratory exchange ratio (RER) were measured every minute through indirect calorimetry. Heart rate (HR) was measured every minute with a heart rate monitor and values were averaged during the last five minutes of each exercise trial. Rating of perceived exertion (RPE) was measured every other minute. Multivariate ANOVA was used for statistical analysis for each dependent variable (p < 0.05). **RESULTS:** BWS at 15%, 30% and 45% on the AlterG® treadmill significantly reduced VO₂ 18.5%, 28.3 and 33.7% compared to TT and 0%. Additionally, HR with BWS at 15%, 30% and 45% was significantly reduced 8.9%, 13.1% and 17.9% compared to TT and 0%. RER during 30% and 45% was significantly different (-8.6% and -7.4%) from TT. Perceived exertion during 45% BWS was significantly lower (10-20%) than all protocols. There was no significant difference in VO₂ or HR reported between 30% and 45%. 0% BWS displayed no significant difference in VO₂ or HR when compared to the traditional treadmill. **CONCLUSION:** Increasing the percentage of BWS while running on the AlterG® treadmill reduced VO₂ and HR compared to TT and 0%. Greater levels of BWS (30% and 45%) resulted in lowered RER and perceived exertion (45% only). The AlterG® treadmill appears to lessen the physiological demands of running compared to a traditional treadmill.