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Heart Rate Responses to Three Unweighted Conditions on an Alter-G® Treadmill

Lauren B. Roberts, Jacqueline Santaniello, Bryanne N. Bellovary, James F. Hokanson, Erik Lind.
State University of New York – College at Cortland, Cortland, NY

A lower body positive pressure treadmill (LBPP) uses forced air into an inflatable chamber to produce pressure. This pressure produces a lift, or body weight support, over a range of unweighted conditions, which can assist in facilitating rehabilitation or training purposes. Most studies using a LBPP examine heart rate responses during bouts of exercise. Yet, little is known about internal chamber air pressure (CAP) changes during unweighted conditions and its effect on heart rate (HR) responses during standing rest. **PURPOSE:** To measure the effects of changes in CAP on standing heart rate (HR) at different unweighted conditions over time. **METHODS:** Thirty-eight apparently healthy participants ($N = 38$; BMI = 25.48 ± 4.27) participants (17 female, 21 male) stood in a LBPP treadmill chamber under pressures of 70%, 35%, and 90% unweighted conditions. HR was measured using a smart watch at minute one- and three of a three-minute stage. A 3x2 within repeated measures ANOVA with Bonferroni pairwise comparisons ($p < 0.05$) determined significant differences in HR between the three pressures used and over time. **RESULTS:** HRs at the two time points for each of the three unweighted conditions: 70% (76 ± 12 ; 77 ± 12 bpm) 35% (77 ± 11 ; 74 ± 12 bpm), and 90% (79 ± 12 ; 81 ± 12 bpm). A significant interaction was noted for pressure*time ($p < 0.001$). HR in the 35% condition decreased over time ($p = 0.002$) compared to the other conditions where HR remained stable ($p = 1.00$; $p = 0.973$). Upon completing the 35% condition (74 ± 12 bpm), HR significantly increased at the first minute of the 90% condition (79 ± 12 bpm). HR in the 90% continued to increase above the first time point of 35% (81 ± 12 vs. 77 ± 11 bpm, respectively). **CONCLUSION:** This suggests the most unweighted condition puts the most pressure on the body to assist with venous return. The quick release of pressure (35% to 90%) possible decreased stroke volume to an extent causing HR to increase.