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### Arterial Blood Pressure Responses Reflect Differences in Alter-G® Treadmill Chamber Pressure in College Age Participants

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Lower body positive pressure (LBPP) treadmills utilize an inflatable chamber to provide a range of unweighted conditions for meeting specific rehabilitation or training purposes. Positive pressure is achieved by pumping air into the chamber, which results in a lower body lift or unweighted condition. Creating an unweighted condition for the user reduces the physiological strain on the lower body during treadmill exercise. Yet, little is known about internal chamber air pressure changes during unweighted conditions and its effect on arterial blood pressure (BP) during a resting state. **PURPOSE:** To study changes in chamber air pressure (CAP) and arterial BP across three unweighted conditions at rest. **METHODS:** Apparently healthy participants ( $N = 38$ ;  $BMI = 25.48 \pm 4.27$ ) stood in the LBPP treadmill chamber under positive pressures of 70%, 35%, and 90% unweighted conditions, respectively. CAP was measured using a portable weather station barometer inside the chamber and arterial BP was measured with an automatic BP cuff. Measurements were recorded at the beginning and end of a 3-minute stage for each condition. A 3x2 within repeated measures ANOVA with Bonferroni pairwise comparisons ( $p < 0.05$ ) determined significant differences between the three conditions and time. If sphericity was violated, Greenhouse-Geisser correction was used. **RESULTS:** CAP was statistically ( $ps < 0.001$ ) highest at 35%, lowest at 90%, with 70% in between ( $760.6 \pm 8.8$ ,  $737.7 \pm 10.9$ ,  $744.8 \pm 7.6$  mmHg, respectively). Systolic BP (SBP) was lower at 90% compared to 70% and 35% ( $127 \pm 12$ ,  $134 \pm 11$ ,  $133 \pm 10$  mmHg, respectively;  $ps < 0.001$ ). Diastolic BP (DBP) at 90% was lower than 70% ( $p = 0.031$ ), but no different from 35% ( $78 \pm 7$ ,  $80 \pm 7$ ,  $79 \pm 8$  mmHg, respectively). SBP and DBP decreased over time ( $p = 0.04$  &  $0.001$ , respectively) for all conditions. An interaction for pressure\*time ( $p = 0.022$ ) indicated that CAP decreased over time at 35% ( $p = 0.031$ ), but remained stable at 90% and 70% ( $ps = 1.0$ ). **CONCLUSION:** As expected, chamber air pressure is significantly different between 70%, 35%, and 90%. SBP at 90% is consistently lower than that at 70% and 35%. This suggests that the decrease in CAP resulted in a lower arterial BP. These findings are the first to demonstrate internal chamber air pressure across different unweighted conditions in a resting state.