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Examining the Cardiovascular Response to Blood Flow-Restricted Resistance Exercise

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Low-intensity, blood flow-restricted (BFR-LI) resistance training has become popular in rehabilitation and sport performance settings. BFR-LI protocols occlude venous return to an active muscle during repeated contractions, and have been reported to achieve similar strength and hypertrophy outcomes as high-intensity (i.e., high load) resistance training (HI) over time. While the outcomes seem promising, evidence regarding the expected cardiovascular response to these interventions is limited. **PURPOSE:** To determine the effect of an acute bout of BFR-LI, compared to traditional low-intensity (LI) and HI protocols, on blood pressure (BP) and hemodynamic variables in normotensive, college-aged males. **METHODS:** Apparently-healthy college-aged males were recruited. Participants completed a 3-5 repetition maximum (RM) test to estimate their 1RM on a leg extension machine. Participants randomly completed three volume-matched training sessions: 4 sets each of 1) HI- 70% 1RM for 8 reps; 2) LI- 35% 1RM for 16 reps, 3) BFR-LI- 35% 1RM with venous occlusion for 16 reps. Rapid-inflation cuffs were used to induce venous occlusion in the BFR-LI condition by inflating to a value halfway between systolic and diastolic BP. Sets were separated by 1-minute rest periods. Bilateral BP and non-invasive hemodynamic measures were taken pre-exercise, after each set, and 2 minutes post-exercise. A within-subjects, repeated-measures ANOVA was used to compare pertinent cardiovascular variables across conditions. **RESULTS:** Bilateral differences in SBP and DBP were not present ($P>0.05$). Expectedly, a time effect was observed in both SBP and DBP ($P<0.05$). No interactions (time X condition) were observed in SBP ($P>0.05$), however, interactions existed in both the right and left DBP ($P<0.05$). Participants reported that the BFR-LI condition required more exertion than the LI or HI conditions ($P<0.05$; RPE Set 4-LI Δ 2 ± 1.37 and RPE Set 4-HI Δ 1.52 ± 1.3 , respectfully). There were no significant differences noted in the heart rate ($P>0.05$). **CONCLUSION:** Arm selection may not be critical when assessing blood pressure during blood flow restricted or traditional resistance training. With subsequent sets, the blood pressure response was remarkable. **SIGNIFICANCE/NOVELTY:** To our knowledge, this is the first investigation to report the simultaneous bilateral blood pressure response to acute exercise with blood flow restriction.