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Effects of Blood Flow Restrictive Bicep Curl Exercise on Arterial Stiffness- Pilot Study

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The use of blood flow restriction (BFR) exercise in athletic and clinical settings has increased in the last five years. **PURPOSE**: To investigate the effects of autoregulated (AR) and non-autoregulated (NAR) BFR bicep curl exercise on arterial stiffness. AR BFR cuffs adjust pressure as the muscle undergoes concentric and eccentric contractions, maintaining a constant pressure in the limb throughout the entire range of motion. NAR BFR training cuffs do not adjust pressure throughout the range of motion thus causing greater pressures in the limb during concentric contraction when the muscle size is enlarged. How this exercise acutely impacts arterial stiffness is not well understood. **METHODS**: Following a randomized familiarization period with AR or NAR BFR bicep curl exercise, 5 adults (23±1 years; 2 female) participated in 3 randomized sessions with AR-BFR, NAR-BFR, and no-BFR (no cuffs) separated by 1-week washout periods. Using 20% of the 1 repetition maximum (1-RM) with 2-second concentric/eccentric cadence, participants performed 4 sets of bicep curls to failure. Training limb occlusion pressure (LOP) was set at 60% of supine LOP for both BFR sessions. Measurements before and immediately following the training session included blood pressure acquisition, arterial tonometry, and ultrasonography of the carotid artery. Between and within effects of treatment on central systolic blood pressure (cSBP), central diastolic BP (cDBP), central pulse pressure (cPP), central mean arterial pressure (cMAP), pulse wave velocity (PWV), beta-stiffness index (β-stiff), and arterial compliance (AC) were analyzed with two-way ANOVAs. **RESULTS**: There were no baseline differences in cSBP, cDBP, cPP, cMAP, cf- (carotid-femoral) PWV, cr- (carotid-radial) PWV, β-stiff, and AC (all $p > 0.05$). cMAP significantly increased in the NAR-BFR (mean difference = 3±3 mmHg, $p = 0.04$), and cDBP significantly increased in the no-BFR (mean difference = 2±2 mmHg, $p = 0.03$). And there was an interaction effect in cPP between AR-BFR and NAR-BFR (mean difference = 31±3 mmHg, $p = 0.03$). **CONCLUSION**: The present findings show acute AR-BFR training did not impact arterial stiffness while acute NAR-BRF training increased central blood pressures. **SIGNIFANCE/NOVELTY**: This study is the first to show AR-BFR exercise does not acutely influence indices of arterial stiffness. Moreover, it may have a protective effect on changes in blood pressure that were experienced with NAR-BFR exercise, providing a safer alternative for patients with cardiovascular and other clinical diseases.