Heart Rate Variability Following Blood Flow Restriction Resistance Exercise and Traditional Resistance Exercise

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The autonomic system is influenced by blood flow restriction (BFR) at rest primarily through increases in sympathetic activity. The effect of BFR on the autonomic system in conjunction with resistance exercise is not well known. Autonomic function can be non-invasively assessed by frequency-domain analysis of heart rate variability (HRV). While imperfect, low-frequency (LF) HRV is an index of sympathetic activity, and high-frequency (HF) HRV is an index of parasympathetic activity. **PURPOSE:** To compare the effects of a single BFR resistance training session and a traditional resistance exercise (TRE) session on HRV. **METHODS:** Twenty-five adults (M=14, F=11, age: 22±3yrs, body mass: 71.7±14.5kg, height: 170±10cm) participated in the study. Participation included an enrollment visit with barbell back squat 1 repetition maximum (1RM) testing followed by two randomized and counterbalanced barbell back squat exercise visits ≥ 48 hrs apart. The BFR exercise visit consisted of 4 sets of 30-15-15 repetitions at 30% 1RM with 60s rest intervals. The TRE exercise visit consisted of 4 sets of 10 repetitions at 70% 1RM with 60s rest intervals. During both exercise visits, a chest strap heart rate monitor was worn which wirelessly transmitted an electrocardiogram signal to a recording computer. Pre- and post-exercise resting electrocardiograms were analyzed in the frequency-domain using fast Fourier transformation. **RESULTS:** Two-way repeated measures ANOVA found an interaction effect for LF HRV (pre-TRE 48.98±17.71nu; post-TRE 80.39±11.86nu; pre-BFR 49.06±20.72nu; post-BFR 72.07±14.76nu; interaction p = 0.039), as well as HF HRV (pre-TRE 49.82±16.92nu; post-TRE 19.72±11.05nu; pre-BFR 49.68±19.03nu; post-BFR 27.709±14.30nu; interaction p = 0.046). Bonferroni post hoc analysis showed increased LF and decreased HF HRV post-exercise in both conditions (each p < 0.05). Additional post hoc analysis examined the change from baseline and displayed attenuated changes in LF (TRE +30.90±14.42Δnu; BFR +23.01±18.82Δnu; p = 0.039) and HF HRV (TRE -29.67±14.01Δnu; BFR -22.00±18.15Δnu; p = 0.046) in BFR vs TRE. **CONCLUSION:** Both TRE and BFR resistance exercise increased sympathetic activity and decreased parasympathetic activity indices of HRV, but the changes were attenuated for BFR. **SIGNIFICANCE/NOVELTY:** This preliminary investigation suggests that BFR resistance exercise causes less autonomic stress on the body than TRE. This may have beneficial implications for exercise training and recovery.