



Mid Atlantic Regional Chapter of the American College of Sports Medicine

46th Annual Scientific Meeting, November 3rd - 4th, 2023
Conference Proceedings

International Journal of Exercise Science, Issue 9, Volume 12



Microvascular Reactivity During a Vascular Occlusion Test Following Blood Flow Restriction Resistance Exercise

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Chronic blood flow restriction (BFR) resistance exercise can improve muscular strength, hypertrophy, and microvasculature function, but the acute microvascular effects are unknown. Microvascular function can be assessed by measuring skeletal muscle oxygen (SmO₂) reactivity following a vascular occlusion test (VOT). **PURPOSE:** To compare the effects of a single BFR resistance training session and a traditional resistance exercise (TRE) session on acute microvascular reactivity in exercising and non-exercising muscle. **METHODS:** Twenty-five adults (M=14, F=11, age: 22±3yrs, body mass: 71.7±14.5kg, height: 170±10cm) completed barbell back squat 1 repetition maximum (1RM) testing followed by two randomized and counterbalanced resistance exercise visits separated by ≥ 48 hrs. Exercise visits consisted of barbell back squat exercise utilizing either BFR; (4 sets of 30-15-15-15 repetitions at 30% 1RM, with 60s of rest intervals), or TRE; (4 sets of 10 repetitions at 70% 1RM, 60s of rest intervals). During both exercise visits, a near infrared spectroscopy sensor (NIRS) measured SmO₂ during a VOT pre-and-post exercise in the vastus lateralis (VL) and flexor carpi radialis (FCR). **RESULTS:** Two-way repeated measures ANOVA found an interaction effect (p = 0.020) for SmO₂ reactivity in the VL (pre-TRE 2.94±1.10; post-TRE 3.11±1.30; pre-BFR 2.64±1.00; post-BFR 3.74±1.23). Post hoc analysis found a greater reactivity post-exercise in the VL for the BFR condition (p < 0.001), but not the TRE condition (p ≥ 0.05). There were no time, condition, or interaction effects (all p > 0.05) for the same analysis in the FCR. **CONCLUSION:** This analysis suggests that BFR, but not TRE, resulted in acutely improved microvasculature function. Moreover, it suggests that the effects are local to the exercised/occluded limb and not systemic. **SIGNIFICANCE/NOVELTY:** The current study found that BFR resistance exercise improves acute local microvascular function, which may be beneficial to those attempting to improve muscle blood flow and oxygenation while achieving muscle hypertrophy (e.g., during injury rehabilitation).