TACSM Abstract

Cross-Transfer Effects on Muscle Strength, Size, and Quality following Unilateral Blood Flow Restriction Training

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ABSTRACT

Unilateral resistance training (RT) has been shown to induce contralateral strength improvements in the untrained homologous muscle. Notably, low-load blood flow restriction (BFR) RT has shown superior increases in muscle strength and hypertrophy compared to low-load non-BFR RT. Previous literature has also reported that BFR RT has systemic cross-transfer effects of strength on other active skeletal muscles compared to low-load non-BFR RT. **PURPOSE**: Therefore, the purpose was to examine the cross-transfer effects of 4 weeks of unilateral BFR dorsiflexion RT on muscle strength, hypertrophy, and muscle quality. **METHODS**: Fourteen untrained participants were randomized into two groups: (BFR; n=8) (177.6 ± 4.1 cm, 84.8 ± 15.1 kg, 21.3 ± 1 years) or control (non-BFR; n=6) (173.2 ± 7.5 cm, 77.9 ± 10.3 kg, 23 ± 2.6 years). Subjects completed 4 weeks (8 sessions) of unilateral isokinetic dorsiflexion RT at 30% of their daily peak torque at a velocity of 60°/s. Isokinetic peak torque, echo intensity (EI), and muscle cross-sectional area (mCSA) were taken bilaterally pre and post RT. Statistical analyses included 3 separate 3-way mixed factorial ANOVAs (Group [BFR, non-BFR] x Time [pre, post] x Leg [right, left]). **RESULTS**: For isokinetic strength, there were no significant interactions or main effects ($p>.05$). For EI, there were no significant interactions ($p>.05$); however, when collapsed across time and leg, there was a significant main effect for group ($p=.017$; BFR (91.7 ± 1.6 vs. non-BFR (84.8 ± 1.9); mean ± SE). Furthermore, there was no significant interaction for mCSA ($p>.05$), but there was a significant main effect for time ($p<.001$; pre (6.9 ± .26) to post (7.5 ± .26)) and a significant main effect for leg ($p<.001$; right (7.5 ± .26), left (6.8 ± .26)). **CONCLUSION**: The BFR group was shown to have greater echo intensity following training, yet there was no RT-induced change in muscle quality. Interestingly, low-load RT with and without BFR induced hypertrophy in both the trained and untrained legs without increases in isokinetic dorsiflexion strength. These findings may be due to the untrained population that can be susceptible to similar hypertrophic effects regardless of additional training interventions like BFR.