

Time Course Change of Muscle Thickness of the Tibialis Anterior Following Blood Flow Restricted Training

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ABSTRACT

Traditional resistance training programs recommend training loads of at least 60% 1-repetition maximum (1RM) to stimulate muscle hypertrophy within 3 weeks. Low-load blood flow restricted (BFR) resistance training (RT) has implications in rehabilitation since this modality has shown comparable muscle hypertrophy to high-load RT at intensities as low as 30% 1RM. However, the recommended effects of BFR on muscle size in various musculature throughout an intervention has not been thoroughly examined.

PURPOSE: Therefore, the purpose of this investigation is to measure temporal changes in muscle thickness (MT) on the tibialis anterior (TA) throughout 4 weeks of BFR training. **METHODS:** Thirteen 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=5) (172.6 ± 8.2 cm, 76.7 ± 11.1 kg, 23.4 ± 2.7 years) who were matched for training sessions, sets, and reps. During the 4-week period (8 sessions), participants underwent twice-weekly sessions of unilateral isokinetic dorsiflexion training at 30% of their daily peak torque at a velocity of 60°/s with or without BFR. Ultrasound-derived measures of muscle thickness were captured at one-third the distance from the fibular head to the medial malleolus prior to the pre- and post-intervention testing sessions. Two separate linear regression analyses were used to examine group slope differences in MT across all training sessions. **RESULTS:** Linear regression analyses indicated that the control (i.e., non-BFR) exhibited a significant, positive (b = 0.023, SE = 0.01, r²=0.626, p=0.006) increase in MT from pre- to post testing. However, there was no significant change (b=0.021, SE = 0.01, r²=0.324, p=0.086) in MT across Time for the BFR group. **CONCLUSION:** Low-load RT without BFR induces temporal changes in muscle size following a short 4-week intervention. This exemplifies the efficacy of low-load training in inducing detectable changes in muscle thickness of the TA, and does not indicate BFR has an additive effect on temporal changes in muscle size of novice males following a 4-week intervention.