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Legs and Trunk Muscle Hypertrophy Following Walk Training with Restricted Leg Muscle Blood Flow

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ABSTRACT

We examined the effect of walk training combined with blood flow restriction (BFR) on the size of blood flow-restricted distal muscles, as well as, on the size of non-restricted muscles in the proximal limb and trunk. Nine men performed walk training with BFR and 8 men performed walk training alone. Training was conducted two times a day, 6 days/wk, for 3 wk using five sets of 2-min bouts (treadmill speed at 50 m/min), with a 1-min rest between bouts. After walk training with BFR, MRI-measured upper (3.8%, $P < 0.05$) and lower leg (3.2%, $P < 0.05$) muscle volume increased significantly, whereas the muscle volume of the gluteus maximus (-0.6%) and iliopsoas (1.8%) and the muscle CSA of the lumbar L4-L5 (-1.0) did not change. There was no significant change in muscle volume in the walk training alone. Our results suggest that the combination of leg muscle blood flow restriction with slow walk training elicits hypertrophy only in the distal blood flow restricted leg muscles. Exercise intensity may be too low during BFR walk training to increase muscle mass in the non- blood flow restricted muscles (gluteus maximus and other trunk muscles).

Key words: Vascular occlusion, magnetic resonance imaging, ultrasound

Key Points

- Previous studies of blood flow restricted walk training have focused solely on thigh muscles distal to pressure cuffs placed on the upper most portion of the proximal thigh.
- In the current study, both proximal and distal muscles were evaluated following the combination of walk training with leg blood flow restriction (BFR). Muscle hypertrophy only occurred in the thigh and lower leg, which were the blood flow restricted muscles examined.
- No significant change was observed in the non-restricted trunk muscles following 3 weeks of twice-daily BFR walk training.

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