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Short-term resistance training with blood flow restriction enhances microvascular filtration capacity of human calf muscles

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Abstract

Resistance training increases muscle strength and endurance but may require high intensity and long duration to enhance capillarity. Vascular occlusion during low-load resistance training augments the strength and endurance gains compared with low-load resistance training alone, but in this study we investigated whether it also promotes microvascular filtration capacity, an index of capillarity. Nine healthy males performed short-term low-intensity resistance training of the calf muscles (four sets of 50 heel raises, three times a week for 4 weeks) under restricted (thigh cuff inflated to 150 mmHg on the non-dominant leg) or unrestricted (dominant leg without thigh cuff)

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resting blood flow were assessed by strain gauge plethysmography, and calf muscle strength and fatigue were assessed respectively by maximal voluntary contraction and force decline during electrically evoked ischaemic contractions in both legs. Calf filtration capacity increased by 26% in the restricted leg but did not increase significantly in the unrestricted leg. Calf muscle strength was 18% greater in the restricted leg but unchanged in the unrestricted leg. Calf muscle fatigue and resting blood flow did not change in either leg. Resistance training promoted microvascular filtration capacity, an effect that was somewhat enhanced by blood flow restriction, and could be due to increased capillarization.

Q Keywords: [Microvascular filtration](#) [ischaemia](#) [capillarization](#) [angiogenesis](#)

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