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Isometric Handgrip Training Improves Blood Pressure and Endothelial Function in Persons Medicated for Hypertension

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Hypertension is associated with endothelial dysfunction and the development of coronary artery disease. Isometric Handgrip (IHG) training reduces blood pressure (BP) in people medicated for hypertension, yet the mechanisms remain elusive. This study investigated improved endothelial function as a mechanism.

Participants (n=8, 62 ± 3.5yrs) performed 4 sets of 2-minute isometric contractions at 30% of their maximal voluntary contraction, using alternate hands, 3X/week for 8 weeks.

Prior to and following IHG training, resting BP was measured using automated brachial oscillometry. Vascular reactivity was assessed in both arms using Ultrasound to determine brachial artery flow-mediated dilation (FMD). Vasoactive medications were controlled throughout the investigation.

Post-training, systolic BP decreased (137 ± 5.3 to 121.7 ± 4.8mmHg, p=0.03), FMD increased (relative, 1.6 ± 0.3 to 4.5 ± 0.5% and normalized to average shear rate, 0.007 ± 0.001 to 0.02 ± 0.004%/s-1) and reactive hyperemic flow decreased (peak, 344.3 ± 36.5 to 258.2 ± 27.2 ml/min and average, 301.6 ± 33.1 to 239.0 ± 28.4 ml/min). Average resting diameter and resting flow remained unchanged.

IHG training improves systolic BP and endothelial function in persons medicated for hypertension. Reduced reactive hyperemic flow, accompanied by improvements in normalized FMD, suggests a heightened vasoactive sensitivity to the reactive hyperemic stimulus, implicating it as a mechanism of improved cardiovascular function.

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