

Long-term Intermittent Compression Increases Arteriographic Collaterals in a Rabbit Model of Femoral Artery Occlusion

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Objective: To assess the effects of intermittent limb compression on arterial formation in a rabbit-model.

Design: Animal study.

Material and methods: New Zealand rabbits (n = 11), aged 2-years, weight of at least 4.0 kg, underwent bilateral superficial femoral artery ligation. In ten of these, the experimental leg underwent 60 minutes of daily intermittent compression for a ten week period with 3 sec/90 mmHg pressure inflation and a cycle of 3 times per minute. The contra-lateral limbs were not treated. At the end of the ten-week period, high-resolution angiograms were obtained by barium infusion into the aorta. The angiograms were analyzed in a blinded manner and the number of collateral arteries larger than 100 microns, was counted. Following perfusion-fixation, histological specimens of transverse sections of the compressed semi-membranous muscle were examined.

Results: The compressed limbs demonstrated a significantly ($8.1 \pm .87$ vs $6.0 \pm .97$; $p < 0.005$) greater number of collateral vessels, ranging in size from 100 – 700 microns, as compared to the control sides. The mean size of collaterals in the compressed limbs was not significantly different (0.33 ± 0.17 vs 0.31 ± 0.16). Microscopic examination of the collaterals confirmed remodeling by a typical neo-intima consisting of 6 – 7 cell-layers.

Conclusions: Intermittent limb compression increases the number of angiographical collateral arteries.