

ABSTRACT

AUGMENTATION OF BLOOD FLOW IN LIMBS WITH OCCLUSIVE ARTERIAL DISEASE BY INTERMITTENT CALF COMPRESSION

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Purpose: This study was designed to investigate the effect of intermittent calf compression on popliteal arterial blood flow and to see how flow is influenced by position of the subject and by arterial blood pressure at the ankle.

Methods: Volume flow in the popliteal artery of subjects in the sitting and prone positions was measured with duplex ultrasonography before inflation and immediately after deflation of a pneumatic cuff placed around the calf. Eleven legs of control subjects and 41 legs of patients with symptoms (32% patients with diabetes) with decreased ankle pressure were studied. Cuffs were inflated for 2 seconds at pressures ranging from 20 to 120mmHg.

Results: An increase in arterial blood flow of two to eight times (mean 4.4 ± 2.0) was found on deflation of the cuff in seated control subjects. Little change in flow was observed when the subjects were in the prone position. In seated patients with arterial obstruction, the mean increase in arterial flow was 3.2 ± 1.6 times the resting flow. Little correlation was found between the maximum increase in flow and the ankle/brachial index.

Conclusions: An increased arteriovenous pressure gradient accounts for some but not all of the flow increase, much of which must be attributable to transient vasodilation. Because the increase in flow does not depend on an increased inflow pressure and was not adversely affected by a low resting ankle-brachial pressure index or a low toe-pressure, intermittent external limb compression may deserve investigation as a possible adjunct to the non-operative treatment of patients with severe arterial insufficiency.