

Enhancing Foot Skin Blood Flow in Patients with Infrainguinal Arterial Bypass Grafting Using Intermittent Pneumatic Compression

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Intermittent pneumatic compression (IPC) of the lower extremities has been shown to produce a significant increase in skin blood flow augmentation in controls and patients with intermittent claudication. We compare the effects of three modes of IPC of the lower limb (applied to the foot [IPCf], to the calf [IPCc] and to both [IPCfc]) on skin perfusion in 22 limbs of healthy volunteers (Group 1), 22 limbs with intermittent claudication (Group 2) and 36 limbs of arteriopathies (Group 3) with successful infrainguinal bypass grafting. Skin blood flow was obtained from the pulp of the big toe in the sitting position using the single point vertical angle laser. Laser Doppler fluxmetry recordings of five minutes duration were obtained at rest and during the application of each mode. IPC was delivered with a pump operating at the following presets: maximum inflation and deflation pressures of 120 mmHg and 0 mmHg, inflation and deflation times of 4 and 16 seconds, respectively.

All three modes produce significantly higher flux than at rest (Increase in percentage). IPCfc (Group 1: 787%; Group 2: 230%, Group 3: 339%) and IPCf (Group 1: 697%; Group 2: 257%; Group 3: 429%) generated significantly higher flux compared to IPCc (Group 1: 242%; Group 2: 98%; Group 3: 167%) ($p < 0.01$) in all three groups.

IPC applied to the foot, calf or both is an effective method of enhancing skin blood flow in patients with infrainguinal bypass, claudicants and controls. These findings suggest that the use of IPC of the lower limb may be beneficial in patients with impairment of distal skin perfusion.