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The Case for Intermittent Pneumatic Compression of the Lower Extremity as a Novel Treatment in Arterial Claudication

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Appreciation of the physiologic role of the natural muscle pumps of the lower limb in enhancing the return of venous blood promoted the development of intermittent pneumatic limb compression (IPC) systems that could activate these pumps artificially. The application of IPC to the foot (IPC_{foot}), calf (IPC_{calf}) or both ($IPC_{foot+calf}$) on dependency generates a significant acute arterial leg inflow enhancement in patients with intermittent claudication that is highest with $IPC_{foot+calf}$, followed by IPC_{calf} and IPC_{foot}. This enhancement is attributable to the leg venous pressure decrease after venous expulsion with IPC, which results in arteriovenous pressure elevation, and a marked attenuation in peripheral resistance to flow due to a transient abolition of peripheral sympathetic autoregulation and the release of nitric oxide. Implementation of IPC_{foot} and $IPC_{foot+calf}$ for 3 to 5 months ($\geq$ 2.5 hours/day) has been shown to improve the walking capacity and the ankle pressure indices of patients with intermittent claudication, with a significant beneficial impact on the quality of life. As the prevalence of symptomatic peripheral arterial disease is projected to increase substantially over the next decades with the aging population in Western societies and in the absence of established, cost-effective methods of treatment for claudication, the reported efficacy of IPC in claudication certainly warrants clinical attention. Level-1 clinical evidence by three independent investigators supports the clinical role of IPC in arterial claudication, reinforced by its domiciliary applicability, the high patient compliance with which it is associated, and the modest cost. This review offers an insight into the hemodynamic and clinical effects of IPC in patients with claudication in relation to the physiologic mechanisms proposed in explanation of these effects.