

Effect of Intermittent Pneumatic Compression of Foot and Calf on Walking Distance, Hemodynamics, and Quality of Life in Patients with Arterial Claudication

A Prospective Randomized Controlled Study with 1-Year Follow-up

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Summary Background Data: Perioperative mortality, graft failure, and angioplasty limitations militate against active intervention for claudication. With the exception of exercise programs, conservative treatments yield modest results. Intermittent pneumatic compression [IPC] of the foot used daily for 3 months enhances the walking ability and pressure indices of claudicants. Although IPC applied to the foot and calf together [IPC_{foot+calf}] is hemodynamically superior to IPC of the foot, its clinical effects in claudicants remain undetermined.

Objective: This prospective randomized controlled study evaluates the effects of IPC_{foot+calf} on the walking ability, peripheral hemodynamics, and quality of life [QOL] in patients with arterial claudication.

Methods: Forty-one stable claudicants, meeting stringent inclusion and exclusion criteria, were randomized to receive either IPC_{foot+calf} and aspirin_[75 mg] (Group 1; $n = 20$), or aspirin_[75 mg] alone (Group 2, $n = 21$), with stratification for diabetes and smoking. Groups matched for age, sex, initial [ICD] and absolute [ACD] claudication distances, pressure indices [ABI], popliteal artery flow, and QOL with the short-form 36 Health Survey Questionnaire (SF-36). IPC_{foot+calf} (120 mm Hg, inflation 4 seconds x 3 impulses per minute, calf inflate delay 1 second) was used for 5 months, 2.5 hours daily. Both groups were advised to exercise unsupervised. Evaluation of patients, after randomization, included the ICD and ACD, ABI popliteal artery flow with duplex and QOL* at baseline*, 1/12, 2/12, 3/12, 4/12, 5/12, * and 17/12. Logbooks allowed compliance control. Wilcoxon and Mann-Whitney corrected_[Bonferroni] tests were used.

Results: At 5/12 median ICD and ACD, resting and postexercise ABI had increased by 197%, 212%, 17%, and 64%, respectively, in Group 1 ($P < 0.001$), but had changed little ($P > 0.1$) in group 2; Group 1 had better ICD, ACD, and resting and postexercise ABI ($P < 0.01$) than Group 2. Inter- and intragroup popliteal flow differences at 5/12 were small ($P > 0.1$). QOL had improved significantly in Group 1 but not in Group 2; QOL if the former was better ($P < 0.01$) than in Group 2. QOL in Group 1 was better ($P < 0.01$) than in Group 2 at 5/12. IPC was complication free. IPC compliance was (2.5 hours/d) $> 82\%$ at 1 month and $> 85\%$ at 3 and 5 months. ABI and walking benefits in Group 1 lasted more than a year after cessation of IPC treatment.

Conclusion: IPC_{foot+calf} emerged as an effective, high-compliance, complication-free method for improving the walking ability and pressure indices in stable claudication, with a durable outcome. These changes were associated with a significant improvement in all aspects of QOL evaluated with the SD-36. Despite some limited benefit noted in some individuals, unsupervised exercise has a nonsignificant impact overall.

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