

Haemodynamic augmentation in patients with peripheral arterial disease with the geko™ transcutaneous neuromuscular electrical stimulation device.

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Abstract

Introduction

The geko™ device, designed for thromboprophylaxis, has been demonstrated to improve venous, arterial and microcirculatory flow, in healthy volunteers. It is hypothesised that similar effects may be seen in arteriopathies. This study aimed to establish the haemodynamic efficacy of this device in such patients.

Methods

Following ethical approval patients were recruited from the outpatients department. After a 30 minute acclimatisation period, bilateral baseline arterial, venous and microcirculatory flow (Laser Doppler) measurements were taken. The device was applied for 60 minutes, unilaterally, and flow measurements repeated. The difference in flow from baseline was calculated and statistical analysis performed.

Results

43 patients were included, 9 females and 34 males of whom 24 were claudicants and 19 post-operative femoro-popliteal bypass grafts. Arterial volume flow increased in the active limb by 0.68L/min (mean) compared to the passive limb -0.004L/min (mean)[$p < 0.001$]. Venous volume flow increased by 0.034L/min (mean) in the active limb compared to the passive limb 0.002L/min [$p < 0.001$]. Microcirculatory flow, following 30 minutes stimulation, increased by a mean of 22.25 flux units in the active group compared to 0.39[$p < 0.001$].

Conclusion

Transcutaneous electrical neuromuscular stimulation with the geko™ device augments arterial, venous and microcirculatory flow in peripheral arterial disease patients and may prove a useful treatment adjunct in these patients.