Electrical Stimulation of Motor Nerves. An alternative Approach for the Enhancement of Lower Limb Blood Flow

A. Maass[1, 2], **A.T. Tucker**[1, 2], **D. Bain**[1], **M. Azzam**[2], **H. Dawson**[2], **H. Jawad**[1], **A. Johnston**[1]

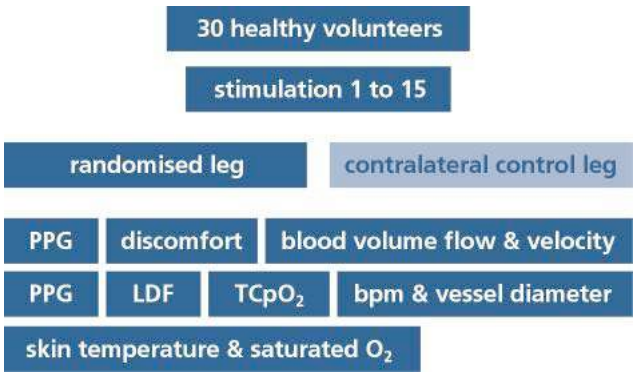
[1]Clinical Pharmacology, William Harvey Research Institute

[2]Microvascular Unit St Bartholomew's Hospital

Background

Electrical muscle stimulation of the lower limb has been shown to enhance peripheral venous blood flow. Such systems generally have low levels of patient compliance due to pain and enforced immobility. The THRIVE device, a newly developed technology, activates the venous muscle (foot and calf) pumps via transcutaneous electrical stimulation of the nerves located within the popliteal fossa. Uniquely, this system allows unrestricted ambulation while active. This study investigated the safety, efficacy and practicality of a novel neuromuscular stimulator for the augmentation of lower limb blood flow.

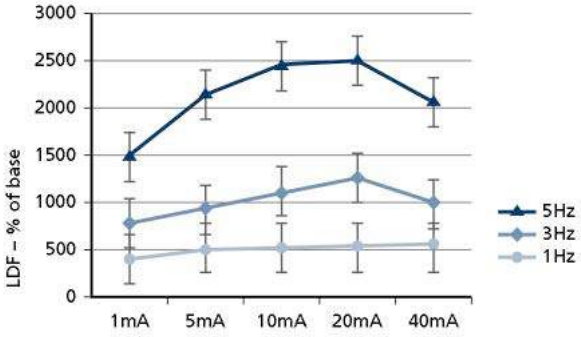
Methods



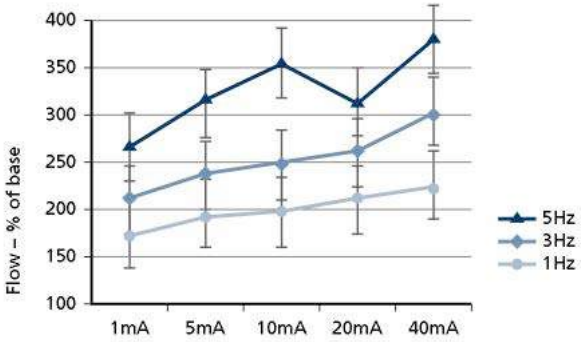
cont.

cont.

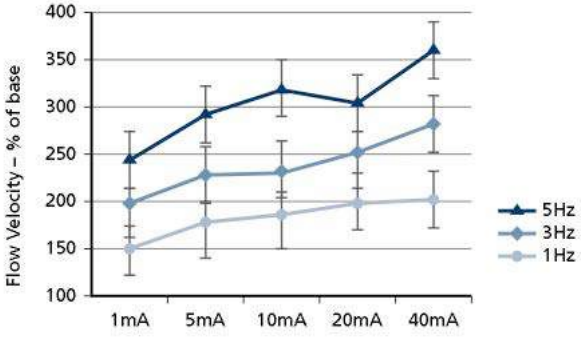
Results



a) **LDF response** is increased up to 2500 % compared to baseline



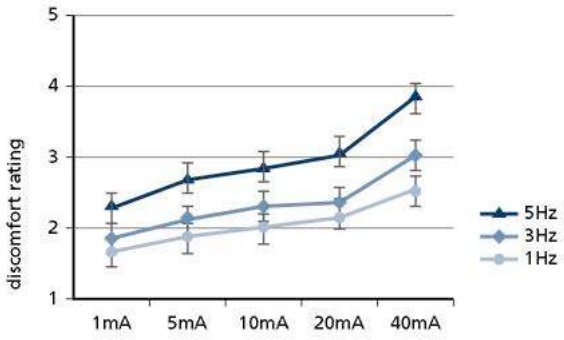
b) **Blood volume flow** is increased up to 370 % compared to baseline



c) **Blood flow velocity** is increased up to 350 % compared to baseline

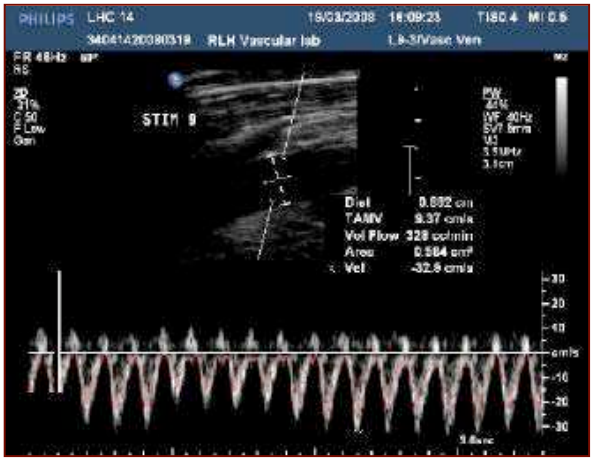
cont.

cont.



d) **Discomfort** has mainly been rated up to a VRS score of 3 indicating only mild discomfort

e) Superficial femoral vein (SFV) **at rest**



f) Superficial femoral vein with the **device active**

cont.

cont.

g) Superficial femoral artery (SFA) **at rest**

h) Superficial femoral artery with the **device active**

Conclusions

Transcutaneous electrical nerve stimulation of the lower leg, using the THRIVE system, significantly increases whole lower limb blood flow. Such a system has significant potential in the management of pathologies such as ischaemic limbs, peripheral oedema, fracture and wound care. Further potential applications are the prevention of deep vein thrombosis.

firstkind
living science