

# Neuromuscular electrostimulation via the common peroneal nerve promotes lower limb blood flow in a below-knee cast

## A potential for thromboprophylaxis

[D. J. Warwick](#), MD, FRCS,FRCS(Orth), Professor, <sup>1</sup> [A. Shaikh](#), BMedSci, Medical Student, <sup>1</sup> [S. Gadola](#), Physiotherapy HPC, Rheumatology Ultrasonographer, <sup>1</sup> [M. Stokes](#), PhD, MCSP, Professor of Musculoskeletal Rehabilitation, <sup>2</sup> [P. Worsley](#), BSc, PhD, Senior Research Fellow, <sup>3</sup> [D. Bain](#), PhD, Consultant Biomedical Engineer, <sup>4</sup> [A. T. Tucker](#), PhD, SRSC, CSci, Principal Clinical Scientist, Reader in Clinical Pharmacology, <sup>5</sup> and [S. D. Gadola](#), MD, PhD, FRCP, Professor in Immunology, Consultant Rheumatologist<sup>1</sup>

## Abstract

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### Objectives

We aimed to examine the characteristics of deep venous flow in the leg in a cast and the effects of a wearable neuromuscular stimulator (geko; FirstKind Ltd) and also to explore the participants' tolerance of the stimulator.

### Methods

This is an open-label physiological study on ten healthy volunteers. Duplex ultrasonography of the superficial femoral vein measured normal flow and cross-sectional area in the standing and supine positions (with the lower limb initially horizontal and then elevated). Flow measurements were repeated during activation of the geko stimulator placed over the peroneal nerve. The process was repeated after the application of a below-knee cast. Participants evaluated discomfort using a questionnaire (verbal rating score) and a scoring index (visual analogue scale).

### Results

The geko device was effective in significantly increasing venous blood flow in the lower limb both with a plaster cast (mean difference 11.5 cm/sec<sup>-1</sup>; p = 0.001 to 0.13) and without a plaster cast (mean difference 7.7 cm/sec<sup>-1</sup>; p = 0.001 to 0.75). Posture also had a significant effect on peak venous blood flow when the cast was on and the geko inactive (p = 0.003 to 0.69), although these differences were less pronounced than the effect of the geko (mean difference 3.1 cm/sec<sup>-1</sup> (-6.5 to 10)). The geko device was well tolerated, with participants generally reporting only mild discomfort using the device.

### Conclusion

The geko device increases venous blood flow in the lower limb, offering a potential mechanical thromboprophylaxis for patients in a cast.