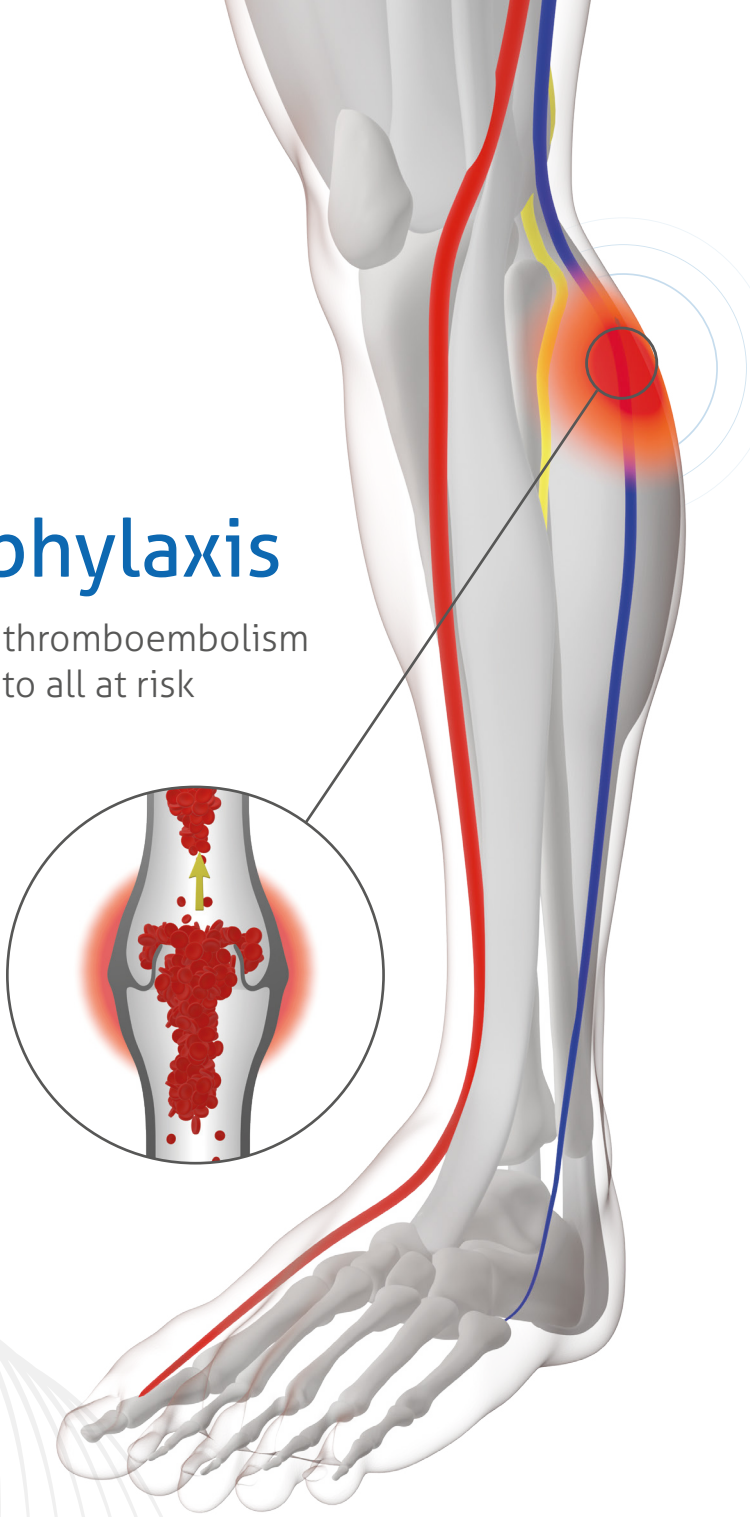
geko®
circulation support

# VTE Prophylaxis

Providing venous thromboembolism (VTE) prophylaxis to all at risk hospital patients



www.gekodevices.com

# NICE guidance (MTG19) supports the geko® device for reducing the risk of VTE[1]

The geko is a battery powered, disposable, **neuromuscular electrostimulation device** designed to increase blood flow in the deep veins of the leg[2], reducing the risk of VTE.

The geko device stimulates the common peroneal nerve **activating the calf and foot muscle pumps**, increasing venous, arterial and microcirculatory blood flow[3,4]. The increase in blood flow is similar to that achieved by walking, equal to 60%[3], without a patient having to move[3].

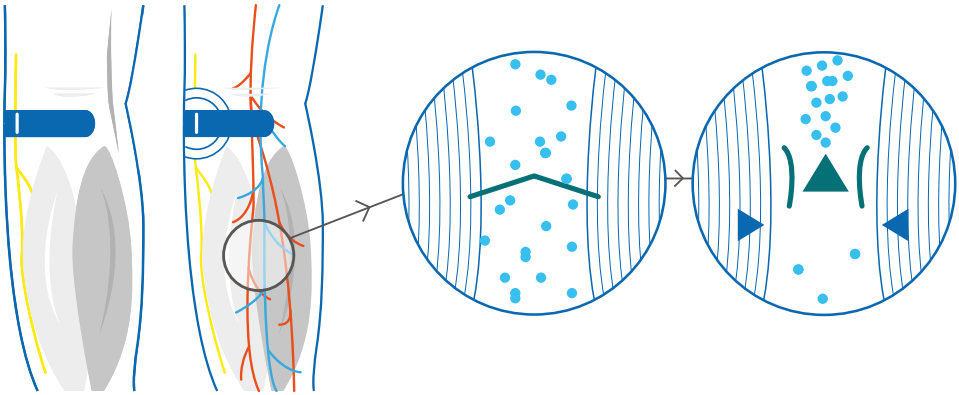


*Figure 1- Image modified for illustrative purposes[5]*

# The geko® device prevents stasis in the deep veins of the calf where early thrombi form[2]

A recent study by Professor Andrew Nicolaides and Dr Maura Griffin has measured the effect of the geko device on blood flow in the deep veins of the calf. The study has shown significant volume and velocity increases within the gastrocnemius, peroneal and posterior tibial veins – of particular clinical importance as early thrombi often form in these veins[2].

This was further supported by Labropoulos et al when they demonstrated that isolated calf DVT was detected in 282 limbs of 251 patients examined. The peroneal veins were most frequently involved with 115 limbs (41%) affected. Posterior tibial and gastrocnemius vein involvement accounted for 37% and 29% respectively[6].

This study is the first time that a mechanical device has been able to demonstrate enhancement to blood flow for the prevention of stasis in the deep veins of the calf, and is the result of the unique dorsiflexion achieved by the geko device. With this proven ability to prevent stasis in the deep veins of the calf, the study strongly supports use of the geko device for reducing the risk of VTE[7].

**Proven ability to prevent stasis in the deep veins of the calf**

# The geko® device increases blood flow in the deep veins in the lower limb

The three Doppler flow readings clearly validate the muscle contraction and rhythmic blood flow increases before and after geko device application and show distinct increases in both peak volume and velocity.

## The gastrocnemius vein

The venous colour filling highlights the rhythmic muscle contractions resulting from the application of the geko device. The gastrocnemius vein (top of the image) emptying into the popliteal vein (middle of the image) with the popliteal artery lying posterior to the popliteal vein.

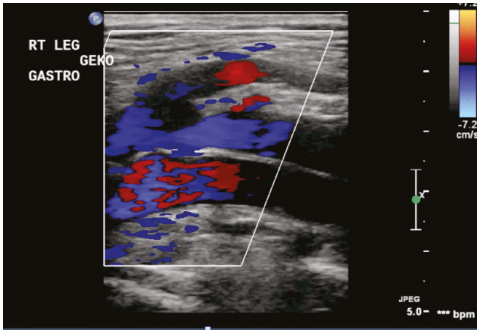
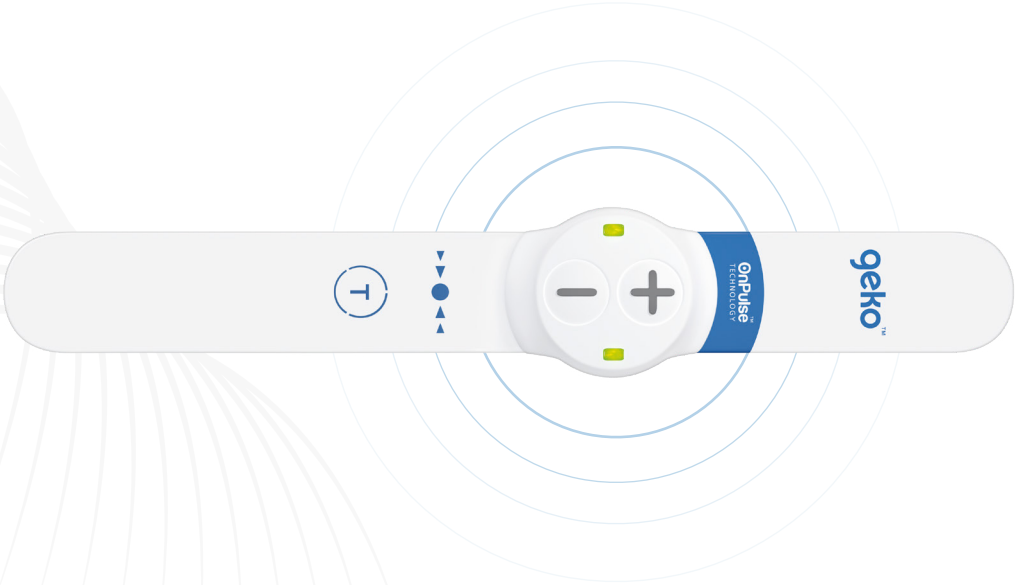



*Figure 1. After activation of the geko device*

**137%** increase in peak velocity as a % of baseline



## The peroneal vein

The image clearly validates the muscle contraction resulting from

the applied geko® device. The results show the rhythmic increases in peroneal venous flow which would otherwise show low flow states without the use of the device.

**216%** increase in peak velocity as a % of baseline

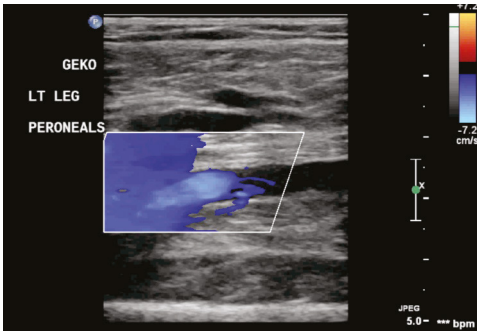



*Figure 2. After activation of the geko device*

## The posterior tibial vein

The geko device increases venous blood flow through neuromuscular activation via the common peroneal nerve.

After the activation of the geko device, the Doppler flow pattern shows a distinct increase in not only peak velocity but overall flow too.

**112%** increase in peak velocity as a % of baseline

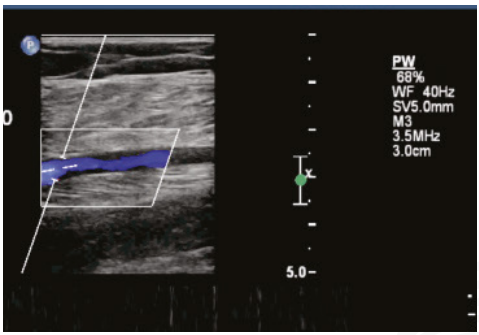
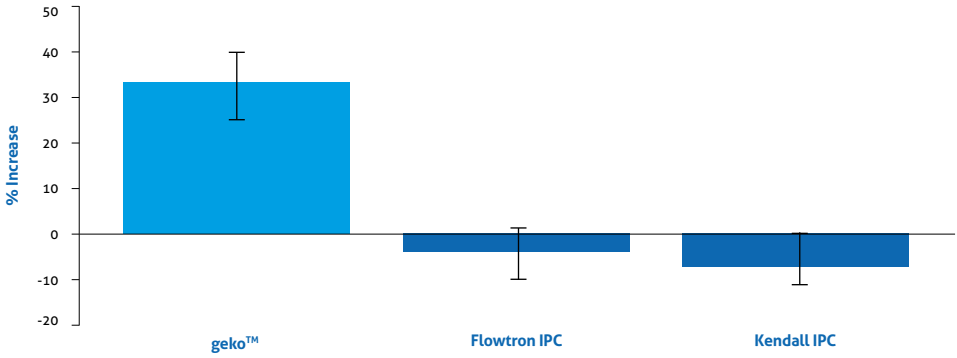



*Figure 3. After activation of the geko device*

# Study comparison between the geko® device and IPC mechanical compression

## The geko device is 30% better than IPC at augmenting venous flow (p<0.001).

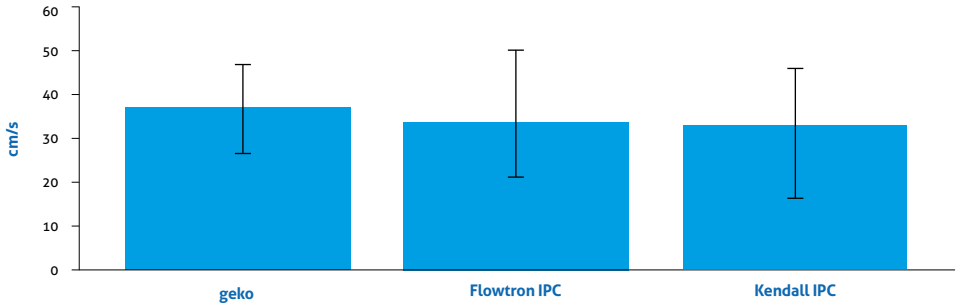
## Blood volume - Venous Blood Flow % Increase (+/- SED)




The results show that the geko device is superior to IPC Huntleigh Flowtron™ and IPC Kendall SCD™ mechanical compression in enhancing blood flow in the lower limbs.

At higher geko settings increases in the femoral venous and arterial blood volume flow of ~30% was seen over the other two devices.

## Blood velocity - Peak Venous Velocity (+/- 95%CI)




The peak velocity produced by the geko device is approximately equivalent to the peak velocity produced by IPC. This means that although the geko device produces more venous flow than IPC over any given time period, the geko device does not produce velocities or shear stresses higher than those produced by IPC or by physiological norms such as walking.

cm/s is centimetres per second

# The geko® device is cost saving[1,3]

The savings, as outlined within the NICE guidance, would result from a reduction in the relative risk of DVT and the associated conditions of VTE such as post thrombotic syndrome as well as reduced length of stay.

## NICE guidance estimates a cost saving of

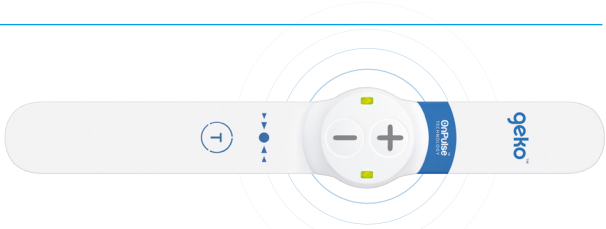
# £197*

When the device is used for a period of

# 6 days

when compared to no VTE prophylaxis and that under these circumstances use of the device will be **cost saving until day 14.**

In high risk patients when a combination of pharmacological and mechanical VTE prophylaxis is desirable but current mechanical prophylaxis is contraindicated or impractical, the **geko device** in combination with pharmacological prophylaxis will be cost neutral for up to 3 days compared to pharmacological prophylaxis alone.




## Cost neutral for up to 3 days of device use.

The adoption of the NICE guidance and the use of the geko device supports the NHS objective of providing

## cost effective

VTE prevention to all at risk hospital patients.

* Recalculated cost saving is now £337 based on independent health economic analysis conducted in 2017.[8]

# Providing venous thromboembolism (VTE) prophylaxis to all at risk hospital patients

## Self-contained and wearable, the geko device is:

- Simple and easy to use
- Small and light (weighing just 10g) with no leads or wires, enables the patient to be as mobile as possible
- No tripping hazard

## UKCA marked (UKCA0120) and CE marked (CE1639):

- To increase blood circulation
- For the prevention of venous thrombosis
- For the prevention and treatment of oedema

## NICE guidance:

NICE guidance (MTG19) supports use of geko device for people who have a high risk of VTE.

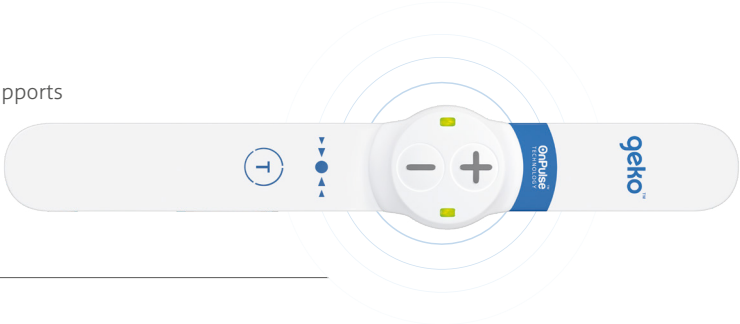
## USA:

In the USA geko devices are sold for increased blood circulation and the post-surgical stimulation of the calf muscles to prevent venous thrombosis and oedema reduction.

**Caution:** Federal law restricts this device to sale by or on the order of a licensed healthcare practitioner.

## RCN Accredited:

The geko device user training programme is RCN accredited for VTE prevention.





**References**

1. NICE medical technologies guidance [MTG19] Published date June 20 2014
2. A.Nicolaides, M Griffin, Measurement of blood flow in the deep veins of the lower limb using the geko™ neuromuscular electro-stimulation device. Journal of International Angiology August 2016-04
3. Tucker A, Maass A, Bain D, Chen LH, Azzam M, Dawson H, et al. Augmentation of venous, arterial and microvascular blood supply in the leg by isometric neuromuscular stimulation via the peroneal nerve. The International journal of angiology: official publication of the International College of Angiology, Inc. 2010 Spring;19(1): e31-7
4. Jawad, H., Bain, D., Dawson, H., Crawford, K., Johnston, A., Tucker, A.T. The effectiveness of a novel neuromuscular electrostimulation method versus intermittent pneumatic compression in enhancing lower limb blood flow. 2014 Journal Vasc Surg. Vol 2, No 25
5. Klabunde, RE (2014). Cardiovascular Physiology Concepts. Available at: http://cvphysiology.com/Microcirculation/M010 [Accessed 21 Feb. 2018].
6. Labroupoulos N, Webb M, Kang SS, Mansour A, Filliung DR, Size GP, et al. Patterns and distribution of isolated calf deep vein thrombosis J Vasc Surg 1999;30:787-91.
7. Jingwei L, Zhe Z, Xuesong L, Hui J, Ning L, Wenbo W. Clinical observation of neuromuscular electrical stimulation in prevention of deep venous thrombosis after total hip replacement. Chin J Bone Join Injury 2017;32(6):615-6.
8. Independent economic analysis by Mtech Access Ltd, April 2017.



**Firstkind Ltd,**
**Suite 3, St John's Court,**
**Easton Street,**
**High Wycombe,**
**HP11 1JX, United Kingdom**

**T: +44 (0)845 2222 921**
**W: www.gekodevices.com**



MPLDVTN0375v5