

## Case study 5: Using the geko™ device to prevent oedema and promote functional activity following foot surgery

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### **Subject**

73 year old female

### **Procedure**

Right scarf lateral release Akin osteotomy

### **Relevant Clinical History**

The patient, a non-smoker, used to enjoy swimming, playing golf, tennis and squash.

She previously presented with a hallux valgus and pain on full weight bearing (8/10 VAS) and a history of pain caused by footwear.

Conservative management with orthotic solutions including the use of a spacing wedge proved unsuccessful. She was supplied with a heel wedge shoe and crutches for 6 weeks to help mobility.

### **Clinical Presentation**

On examination pre-operatively:

- Pain on weight bearing 8/10 VAS
- Osteoarthritis of the great toe
- Swelling
- Inflammation
- Cosmetic adduction of the first metatarsal
- Hallux Valgus

It was decided that the patient would be treated with a scarf and Akin osteotomy

### Rationale for treating with the geko™ device

The aim of surgery was to relieve pain and improve the alignment of the big toe. Surgery to correct Hallux Valgus is a largely successful operation<sup>1</sup>, with a good or very good outcome in 85% of patients<sup>1</sup>. However, the NHS Choices website advises patients that after bunion surgery, the foot and ankle may be swollen for three months or longer post-surgery. Swelling may occur because of the post-operative rehabilitation instructions that are necessary to ensure bone healing. The patient was partial weight bearing with a heel wedge shoe and walked with elbow crutches. This prevents the foot and ankle muscle pumps from working as normal, and leads to a frequent tendency towards swelling. In addition to swelling, impaired wound healing<sup>1</sup> may also occur in 2-4% of patients.


The geko™ device was therefore chosen as a treatment modality to help accelerate the reduction of this oedema and also to increase blood flow. This is because Neuromuscular Electro-stimulation (NMES) has been found to be effective at increasing venous flow and reducing oedema in the lower limb. The geko™ device has also been used successfully to heal wounds<sup>2</sup>. The small size and portability of the geko™ device means that it is ideal for providing treatment to patients continuously throughout the day whilst they are active and at rest. The geko™ device is effective at providing up to 60% of the blood flow achieved with maximal effort dorsiflexion movements<sup>3</sup>.

### The geko™ device

The geko™ device was worn for 3 consecutive days for 24 hours per day, followed by 6 hours a day for the next 7 days. The patient was followed up at day 10 post-operation.

### Results

<p><b><u>PRE OP</u></b></p> <p><u>geko™ use pre-op</u> Patient did not use the geko™ device pre op</p> <p><u>geko™ use post-op</u> The geko™ device was applied to the patient in recovery 1-hour post op.</p> <p>No activity was taken during this time of using the device.</p>	<ul style="list-style-type: none"> <li>• Pain 8/10 VAS on Full Weight Bearing</li> <li>• Swelling</li> <li>• Inflammation</li> <li>• Stiffness of the great toe</li> <li>• Hallux Valgus</li> <li>• Pins and Needles</li> <li>• Problems with activity levels and footwear</li> </ul>
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<b>DAY 1 - DAY 10</b>	<b>SYMPTOMS DAY 7</b>
<p><u>geko™ use</u></p> <p>The geko™ device was worn for 24 hours a day for three days and for 6 hours a day for a further 7 days.</p>	<ul style="list-style-type: none"> <li>• No Swelling</li> <li>• Minimal Bruising on 1st Metatarsal</li> <li>• Pain 2/10 VAS Pin on 2nd Metatarsal</li> <li>• Dressing removed/ Wound dry</li> <li>• Pin to be removed 2 weeks post-operation</li> <li>• Light dressing applied</li> <li>• Active range of movement of the 1st Metatarsal</li> </ul> 

### Patient Feedback

*“The geko™ device is excellent. It kept the swelling at bay, my dressing came off easily after the first week because there was no swelling. The instructions for use were very easy to follow and there would be nothing that I would want to change about the device. It was very easy to apply and very comfortable, an excellent device.”*

### Conclusions

The geko™ device offers patients a drug-free treatment option to simply increase blood circulation in the lower limb and prevent swelling following foot surgery. This is important because excess fluids impede oxygen delivery and wound healing. This patient has made a good recovery with the help of the geko™ device and has added to our growing experience of its health benefits following foot surgery. The device was well tolerated and was found to be easy to use by the patient

### References

1. Wülker N, Mittag F: The treatment of hallux valgus. Dtsch Arztebl Int 2012; 109(49): 857–68. DOI: 10.3238/arztebl.2012.0857
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3. Tucker AT, Maass A, Bain DS, Chen L-H, Azzam M, Dawson H, Johnston A: Augmentation of venous, arterial and microvascular blood supply in the leg by isometric neuromuscular stimulation via the peroneal nerve. Int J Angiol. 2010 Spring; 19(1): e31–e37. PMID: PMC2949997