

## **Case study 6: Using the geko™ device to prevent oedema and promote functional activity following foot surgery**

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### **Subject**

28 year old female

### **Procedure**

Right scarf lateral release Akin osteotomy

### **Relevant Clinical History**

This patient works as a child minder is normally fit and well and currently not on medication.. She is active and participates in Zumba classes at least once or twice a week and from 12 years of age has noticed bunions on both feet; the right side being worse than the left. She has generalised ligamentous hyperlaxity scoring almost 7 on the Baton scale and has hyperpronated feet on both sides. This has led to bilateral hallux valgus with a prominent medial eminence which causes her pain.

X-rays show a drop to the medial longitudinal arch and an incongruent hallux valgus on the right side with uncovering of the sesamoids.

### **Clinical Presentation**

On examination pre-operatively:

- Pain on walking 8/10 VAS
- Numbness
- Inflammation
- Bilateral Hallux Valgus
- Prominent medial eminence

She requires a lateral release and a Scarf and Akin osteotomy to correct the 1<sup>st</sup> metatarsal. Given her ligamentous laxity there is chance of recurrence and she is likely to require further surgery in her 40s.

Post operatively she will require a medial arch support to try and hold this foot straighter and to ensure that the correction is maintained.

**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. 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 70% 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>• Hyperlaxity score 7 on the Baton Scale</li> <li>• Bilateral Hallux Valgus</li> <li>• Prominent medial eminence</li> <li>• Pain 8/10 on walking, 6/10 at rest VAS</li> <li>• Inflammation</li> <li>• Numbness</li> <li>• Struggling with 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>• Numbness on 1st Metatarsal</li> <li>• Pain 2/10 VAS</li> <li>• No swelling L=R</li> <li>• Minimal bruising</li> <li>• Patient still using the heel wedge shoe</li> <li>• No crutches required</li> <li>• Dressing changed to minimal</li> <li>• Patient can increase activity levels as pain allows</li> <li>• Full Active range of movement</li> <li>• Full Passive range of movement</li> </ul>

### 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 patient has made a good recovery with the help of the geko™ device with pain reduced, no swelling and minimal bruising 10 days post operation. Together with previous case studies this case supports the routine use of the geko™ device to aid recovery following foot surgery.

### 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

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