

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

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### **Subject**

66 year old female.

### **Procedure**

Triple Hind Foot Fusion (L) Foot with a double nerve block.

### **Relevant Clinical History**

The patient had a hind foot fusion 8 years ago on her right foot which was unsuccessful and left her in a lot of pain. The patient then presented 3 years ago at The Royal Infirmary Edinburgh but due to the trauma she had endured with her previous operation she was cautious of further surgery. The patient has now returned with a view to surgical intervention.

Examination revealed degenerative change in hind foot joints, particularly talonavicular, with a reduced range of movement and deformity.

She had previously undergone bilateral hip replacements in 2012 and has had a good outcome however she still has a lot pain and dysfunction due to pain in her left foot. She has to walk with a stick and she attributes this to pain in her left foot. In spite of this she still is rather mobile. However she suffers pain every day, particularly at night and requires regular analgesia. She has a number of other co-morbidities including rheumatoid arthritis, hypothyroidism, degenerative lumbar spine, chronic kidney disease and high blood pressure. However her main problem at the moment is pain and clicking in her left foot.

On examination she has pes planus on both sides, she is able to do a double tiptoe as well as tiptoe on the right side but was unable to get onto a single leg tiptoe on the left side. She has pain and 4-5 strength on the tib post tendon on the left side, she has pain at the talonavicular joint and calcaneocuboid joint, no pain at the subtalar joint and good subtalar movement. She has good movement in the ankle joint. When she

stands on her tiptoes her calcanei invert as normal. She has a full range of movement in her ankle and normal forefoot movements and no pain on the left side.

Standing radiographs show severe degenerate changes in talonavicular joint and joint space narrowing in the subtalar and calcaneocuboid joints.

It was decided that this patient would undergo a triple fusion of her hindfoot.

### Rationale for treating with the geko™ device

Following hind foot fusion patients are advised to expect postoperative swelling<sup>1</sup>. In this case the geko™ device was chosen as a treatment modality to help accelerate the reduction of postoperative 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 fitted in recovery and worn for 24 hours per day for 5 days and then for 12 hours per day for a further 5 days

### Results

Day	geko™ use	Symptoms
Day 1- 5 Patient had a below the knee plaster cast	24 hours per day	<ul style="list-style-type: none"> <li>• No pain</li> <li>• No swelling</li> <li>• Minimal bruising</li> </ul>
Day 6-10 Patient had a below the knee plaster cast	12 hours per day	<ul style="list-style-type: none"> <li>• No swelling</li> <li>• No pain</li> <li>• Minimal bruising</li> </ul>
Day 10 Follow up	No geko™ worn	<ul style="list-style-type: none"> <li>• Plaster cast removed</li> <li>• No pain</li> <li>• No swelling</li> <li>• Minimal bruising</li> </ul>

Day 10 Follow up	No geko™ worn	<ul style="list-style-type: none"> <li>• Patient was then placed back in a below knee plaster cast and given crutches</li> </ul>
Follow up further 4 weeks	No geko™ worn Patient was put into a pre-fabricated walking boot and given a walking stick	<ul style="list-style-type: none"> <li>• Plaster cast removed</li> <li>• X Ray – showed bone fusion</li> <li>• Active ROM</li> <li>• Patient reported pain in the ankle and the foot</li> </ul>



**Patient Feedback**

This patient found the geko™ device very simple to use and apply by herself. She also felt that her foot was shrinking inside her plaster cast within the first few days and was amazed at being pain free. The patient also was impressed with how easy it was to sleep whilst wearing the geko™ device.

**Conclusion**

This case study illustrates that the geko™ device may be useful in helping to reduce swelling in patients recovering from foot surgery. The patient involved was impressed by the action of the device and thought that it was extremely beneficial for reducing the swelling and decreasing the pain.

**References**

1. Royal National Orthopaedic Hospital .A patient's guide to ankle and hind foot fusion. August 2011
2. [http://gekodevices.com/media/35901/case\\_study\\_imperial.pdf](http://gekodevices.com/media/35901/case_study_imperial.pdf)
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

