An in-service evaluation of a neuromuscular electrostimulation device in non-healing venous leg ulcers

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Introduction

In England, it is estimated that there are 739,000 leg ulcers, incurring an annual healthcare expenditure of approximately £3.1 billion. This places a huge burden on NHS resources[1]. For venous leg ulcers (VLUs) in particular, over 50% fail to heal in 12 months and many recur[2].

There are many options available for treating leg ulcers, however some wounds are challenging and require additional interventions to assist healing. This poster discusses an in-service evaluation of the geko™ device, a neuromuscular electrostimulator (NMES), as an adjunctive intervention in non-healing wounds.

Method

The specialist skin team decided to undertake an in-service evaluation of the geko™ device in patients with venous leg ulcers that were not on a positive healing trajectory.

The geko™ device is a small, self-adhesive, wearable NMES device that is applied to the surface of the skin on the lateral aspect of the leg just below the knee, over the head of the fibula.

It delivers a charge-balanced electrical pulse once per second to the common peroneal nerve which passes through this site, eliciting a muscular twitch of the foot, so activating the calf and foot muscle pump, and thus increasing venous, arterial, and microvascular flow[3].

The geko™ device has several stimulation levels to ensure a dorsiflexion is achieved whilst being comfortable for the patient.

12 patients were initially recruited into the evaluation (7 female and 5 male). One male patient, however, was excluded at initial assessment as his ulcer was not venous in aetiology.

Wound durations ranged from 5 weeks to over 2 years.

All patients continued with standard care during the evaluation period:

- 1 patient – treated without compression.
- 1 patient – declined compression.
- 2 patients – treated with 14-17mmHg of graduated compression.
- 7 patients – treated with 40 mmHg compression bandaging.

The geko™ device was positioned (as per the instructions for use) to the skin over the common peroneal nerve at the head of fibula on each patient's affected leg. A regular twitch of the foot indicated that the muscles of the leg were being stimulated. The usage was 12 hours on and 12 hours off each day for seven days a week. Patients were given training on application and removal of the geko™ device. A barrier film was prescribed for patients to apply under the geko™ device to minimise the risk of any skin reactions.

Weekly assessments were carried out by the tissue viability team.

Results

- 2 patients were withdrawn from the evaluation after the first week due to non-concordance.
- 9 patients completed the evaluation period of a minimum of 4 weeks. Some patients continued with the geko™ device after the evaluation period due to the improvements in their wounds.
- 2 patients healed within 2 weeks.
- 5 patients healed within 12 weeks.
- 1 patient healed at 14 weeks.
- 1 patient had not healed but their wound was now on a positive healing trajectory (patient declined the use of any compression).

NB Healing was defined as complete epithelialisation of the wound.

- No adverse events or skin reactions (even in high temperatures).
- All patients reported that the geko™ device was easy to use and enjoyed being involved in their own care.
- 5 patients reported pain prior to the geko™ device evaluation. All 5 patients then reported a reduction in pain with the geko™ device use and stated that they were able to reduce or stop their analgesia.
- An improvement to the wound bed i.e. debridement of devitalised tissue and formation of healthy granulation tissue was noted in a short period of time in all patients.

Discussion

In this evaluation, the application of the geko™ device, an adjunctive therapy to promote healing was positive for all 9 patients with static venous leg ulcers.

Adding the geko™ device to standard care demonstrated efficacy in improvements to the wound bed, reduction of pain, and wound healing in 8 of the 9 wounds, resulting in a significant positive impact on quality of life.

The effectiveness of adding the geko™ device to standard care shown in this in-service evaluation has also been demonstrated in a recently published randomised self-controlled study[4].

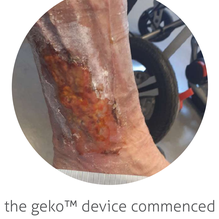
In this study, multi-layer compression alone was compared to multi-layer compression combined with neuromuscular electrostimulation. Adding neuromuscular electrostimulation to multi-layer compression resulted in a significant two-fold increase in the rate of wound healing over a 4-week period.

Conclusion

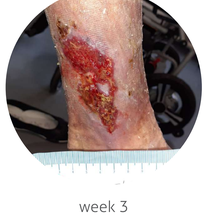
Lower limb wounds can prove challenging to patients and health care professionals alike. This in-service evaluation shows that very positive outcomes can be achieved by adding the geko™ device to standard care in the management of venous leg ulcers that are not following a positive healing trajectory.

Case study - Patient evaluation

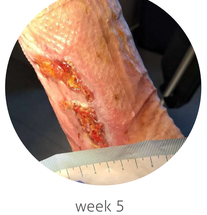
- 71 year old female, leg ulcer to left medial gaiter area, arterial past medical history and pacemaker in place.
- In 20mmHg of graduated compression, wound had been present for 9 months.
- A few weeks after starting the geko™ device, the patient was discharged by her vascular consultant due to the improvements in her wound.
- Wound fully healed by week 14.



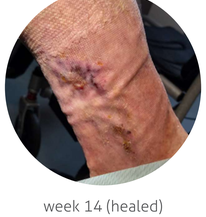
the geko™ device commenced



week 3



week 5



week 14 (healed)

1. National Wound Care Strategy Programme. Leg Ulcer Recommendations. 2023. Available at: NWCSP-Leg-Ulcer-Recommendations-1.8.2023.pdf (nationalwoundcarestrategy.net) (last accessed 25 September 2023).
2. Guest, J.F., Fuller, G.W. and Vowden, P., 2018. Venous leg ulcer management in clinical practice in the UK: costs and outcomes. International wound journal, 15(1), pp.29-37.
3. Tucker, A.T., Maass, A., Bain, D.S., Chen, L.H., Azzam, M., Dawson, H. and Johnston, A., 2010. Augmentation of venous, arterial and microvascular blood supply in the leg by isometric neuromuscular stimulation via the peroneal nerve. International Journal of Angiology, 19(01), pp.e31-e37.
4. Bull, R.H., Clements, D., Collarte, A.J. and Harding, K.G., 2023. The impact of a new intervention for venous leg ulcers: A within patient controlled trial. International Wound Journal.

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