WHAT CAN WE DO DIFFERENTLY?

Alternative approaches need to be considered for managing venous leg ulcers failing to heal despite high compression therapy: A case study to demonstrate the effectiveness of using electrical stimulation therapy (EST) alongside compression therapy.

INTRODUCTION

Venous leg ulcers affect (VLUs) approximately 1.1% of the adult population in the UK[1]. The treatment includes compression therapy, lifestyle changes and surgery if appropriate, and requires long-term management. Clinical outcomes are often poor[2], with patients enduring pain, social isolation, reduced mobility and anxiety[3,4,5].

Chronic wounds have been demonstrated to lack electrical energy (known as the current of injury)[6], which is required to stimulate cellular activity such as macrophages, endothelial cells, fibroblasts and keratinocytes[6].

In order to restore the reduced or absent electrical energy, EST can be applied to mimic the current of injury. EST is one of the most evidence based modalities in wound management. EST used with standard therapy, has been demonstrated to heal venous leg ulcers faster[7-10] and reduce pain[11-13], when used as an adjunct to standard wound care.

FIGURE 1. ACCEL-HEAL SOLO DEVICE

METHOD

A case study was undertaken to demonstrate the effectiveness of applying EST (Accel-Heal), to a patient with a left inversion fixed foot deformity and bilateral chronic venous leg ulceration, under compression therapy.

Accel-Heal is a single use, automated electrical stimulation wound therapy device designed to stimulate healing, reduce inflammation and help to alleviate pain in hard to heal wounds. The device is easily operated, wearable and, once applied and started, automatically delivers a pre-set programme of sub-sensory electrical stimulation over a continuous 12 day treatment period (see figure 1 for latest Accel-Heal version).

The patient, a 90 year old female (known as Alice) presented to the leg ulcer clinic in January 2021, with wounds to the right leg lateral aspect and left lower lateral aspect of the leg, extending to the posterior aspect of the leg, which had been present for 5 years, despite wearing high compression therapy. See holistic assessment (see table 1).

The right leg wound improved considerably, but the left leg ulcers remained slow to heal, due to poor ankle flexion. Alice's grand-daughter was getting married, and she was very keen to be able to attend without wearing any compression bandages. Accel-Heal was applied on 18th May 2021 to the lateral/posterior aspect of the left leg wounds, alongside standard moist wound healing dressings and compression therapy (see figure 2).

TABLE 1. HOLISTIC ASSESSMENT

Past Medical History	Medication	Social and mobility
Congestive cardiac failure	Levothyroxine	Widow - lives alone
Atrial fibrillation-cardioversion	Bisoprolol	Reduced mobility due to ankle deformity. No calf muscle bulk or action to left leg to support venous return. Leg elevation uncomfortable.
Hypertension	Folic acid	Transfers independently - uses wheelchair to go out.
DVT right leg 2017	Apixaban	
Pneumonia and sepsis 2017 resulting in left sided foot drop, tendon injury and left fixed ankle inversion deformity	Furosemide	
	Paracetamol	

RESULTS (SEE FIGURES 2 -4)

FIGURE 2.

WOUND ON 18TH MAY 2021. START OF ACCEL-HEAL TREATMENT

WOUND DESCRIPTION
Lateral aspect: 90% thick slough with areas of hyper-granulation and contact bleeding.

Posterior aspect: 80% thick slough. High exudate and malodour. Likely biofilm present. Peri-wound macerated due to high exudate.

DRESSINGS
Twice weekly. Emollients and steroid ointment. Foam silver non-adhesive. High absorbent dressings 20cm x 22 cm x 2 and 10cm x 22 cm x 1. 2 x type 3a compression bandages.

PAIN SCORE (VAS)
5. Discomfort during dressing changes.

LATERAL ASPECT 8.5 X 6 CM (51 CM SQUARE)

POSTERIOR ASPECT 6X4 CM

FIGURE 3.

WOUND ON 28TH MAY 21. 10-DAYS AFTER STARTING ACCEL-HEAL TREATMENT

WOUND DESCRIPTION
Lateral aspect: 60% granulation and 40% light slough.

Posterior aspect:
100% granulation.
Wound debriding, biofilm reduced, exucrate reduced. Oedema reduction.
Skin less shiny and tight to foot.

DRESSINGS
Once weekly. Emollients and steroid ointment. Silver non-adherent. High absorbent dressings 20cm x 22 cm x 1 and 10cm x 22 cm x 1.
2 x type 3a compression bandages.

PAIN SCORE (VAS)
2.5.

RESULTS
Following 10 days of Accel-Heal therapy, the wound became less colonised with considerably less exudate and malodour and reduction in oedema (see figure 3). The wound continued to show progress, with islands of epithelialisation developing across the wound bed and at the wound margins.

LATERAL ASPECT 8.5 CM X 6 CM

POSTERIOR ASPECT 6X4 CM

FIGURE 4.

WOUND ON 13TH OCTOBER 21. 21 WEEKS AFTER COMMENCING ACCEL-HEAL TREATMENT.

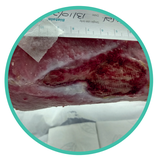
WOUND DESCRIPTION
Lateral aspect: 50% light slough Minimal exudate.

Posterior aspect:
Healed.

DRESSINGS
Once weekly. Emollients and steroid ointment. High absorbent dressing 10cm x 22 cm x 1. 2 x type 3a compression bandages.

PAIN SCORE (VAS)
0.

RESULTS
Eight weeks post Accel-Heal treatment, the wound had reduced in size. Alice reported that her foot felt more comfortable, and her shoe fitted better. The posterior wound healed on 11/08/21. Weekly dressings continued to the lateral aspect, which was noted to have significantly improved on 13/10/21.



LATERAL ASPECT 8 X 3 CM (3 CM AT WIDEST AND 1 CM AT NARROWEST) (APPROX. 24 CM SQUARE)

POSTERIOR ASPECT HEALED ON 11/08/21 (12 WEEKS AFTER ACCEL-HEAL STARTED)

PATIENT PERSPECTIVE

Alice and her family were so delighted with the results and called it a "miracle" treatment. Alice attended a family wedding 12 weeks after the treatment finished, and whilst she unable to wear hosiery, the wound was so much improved that she had no concerns about leakage or odour from the wound, and was able to enjoy the day without any pain.

ALICE STATED:

"for a long time we were getting nowhere, I feel like because of that I lost a few years as it was a real struggle so now I'm delighted to start improving...I have a great family around me who are all so pleased with the progress, just ask my daughter in law, she's thrilled'.

CLINICIAN PERSPECTIVE

The clinicians reported that the Accel-Heal device was simple to use and apply, and it was easy to judge the position of the electrode pads, under the compression bandages, to provide the optimum therapeutic results.

CONCLUSION

Alternative approaches need to be considered for the management of recalcitrant venous leg ulcers, many of which fail to heal despite following best practice with high compression therapy. Use of a small, easy to use automated electrical stimulation device (Accel-Heal), facilitated healing of a patient's venous leg ulcer in the community, which had been present for five years, and reduced her pain, providing her with an improved quality of life.

REFERENCES

1. Guest JF., Fuller GW., Vowden P. Venous leg ulcer management in clinical practice in the UK: costs and outcomes. Int Wound J 2018; 15:29–37
2. Guest J., Taylor R., Vowden K., Vowden P. (2012) Relative cost effectiveness of a skin protectant in managing venous leg ulcers: a systematic review. J Wound Care 21 (8): 389–98
3. Hareendran A., Bradbury A., Budd J., Geroulakos G et al (2005) Measuring the impact of venous leg ulcers on quality of life. J Wound Care 14 (2) 53–57
4. Herber O., Schnepp W., Reiger M. (2007) A systematic review on the impact of leg ulceration on patient's quality of life. Health Qual Life Outcomes 5: 44
5. Green J. and Jester R. (2010) Health–related quality of life and chronic venous leg ulceration: part 2. Br J Community Nurs 15 (1): S4–6
6. Milne J., Swift A., Smith J., Martin R. (2021) Electrical Stimulation for Pain Reduction in Chronic Wound Healing. J Wound Care
7. Guest JF., Ayoub N., Greaves T. (2015) Clinical outcomes and cost-effectiveness of an externally applied electroceutical device in managing venous leg ulcers in clinical practice in the UK. J Wound Care 24(12):572–580. https://doi.org/10.12968/jowc.2015.24.12.572
8. Taylor RR., Sladkevicius E., Guest JF. (2011) Modelling the cost-effectiveness of electric stimulation therapy in non-healing venous leg ulcers. J Wound Care. 20 10):464, 6, 8–72. https://doi.org/10.12968/jowc.2011.20.10.464
9. Guest JF., Singh H., Rana K., Vowden P. (2018) Cost effectiveness of an electroceutical device in treating non-healing venous leg ulcers: results of an RCT. J Wound Care. 27 (4) 230-243.
10. Ovens L (2019). Supporting the Triple Aim Framework objectives in Scotland using an innovative electroceutical therapy® to improve clinical and economic benefits for patients with venous leg ulcers. Poster presentation EWMA 2019.
11. Turner N. and Ovens L. (2018). Clinical outcome results and quality of life improvements using electroceutical treatment® - Patient perspectives. Poster presentation In: EWMA 2018.
12. Ovens L. (2019) Application of Accel-Heal® for patients with chronic venous leg ulcers: an evaluation in a community UK NHS trust. Wounds UK. 15(3):78–84.
13. Ovens L. (2018) Improving clinical outcomes and reducing the cost of venous leg ulcers (VLUs) using an externally applied electroceutical therapy® in a Community NHS Trust. Poster presentation In: Wounds UK 2018.

AUTHORS

Karen Layflurrie Clinical Lead Leg Ulcer Services HertsOne and Central London Community Healthcare Trust

Liz Ovens Independent Tissue Viability Specialist Nurse

accelheal.com