Category: Pressure ulcers

Reactivating Healing in Long-Standing Pressure Ulcers: Three Cases of Electrical Stimulation Therapy in Patients with Spinal Cord Injury

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Introduction: Patients with spinal cord injuries (SCI), can have an increased risk of developing pressure ulcers (PUs) due to immobility, insensate skin, or incontinence. Almost 80% of category 4 pressure ulcers fail to heal within 12 months[1] and those that do heal have a high risk of complications and recurrence. Normal wound healing is driven by tiny electrical signals from the cells in the wound bed, however in non-healing wounds, this 'current of injury' is severely weakened, or exhausted meaning the normal wound healing cascade does not occur.[2,3] Microcurrent electrical stimulation therapy (EST) can be applied around the wound to boost the weakened current of injury thus stimulating healing in previously non-healing wounds and this approach is recommended by international guidelines.[4] The aim of this evaluation was to explore the use of a portable microcurrent EST device^ in patients with PU as a complication of SCI.

NPIAP guideline: "We suggest using EST as an adjunct to standard wound care to promote healing for Category /Stage 2 to 4 PU, and unstageable PU"[4]

Methods: Three paraplegic patients with non-healing PUs were treated in a specialist SCI unit with a microcurrent EST device^ (Figure 1), for a 12-day pre-set treatment period alongside standard care, including off-loading. After the 12-day treatment patients continued with standard care. Wound area, wound bed tissue composition and exudate levels were recorded periodically.



***Figure 1**. EST device^*

Patient A was a 58-year old male outpatient, with a category 3 PU to the right trochanter present for 18 months. Medical history included paraplegia (T5) in 2006 due to a motorbike accident, scoliosis and neuropathic pain in both arms. EST^ was applied with the aim to expedite wound healing. Prior to EST^ the wound measured 7.5 cm^2 with moderate exudate and 50% slough (Figure 2A).
Wound size reduced by 76% (to 1.8cm^2, Figure 2B) within 4 weeks of commencing EST^, wound bed coverage with granulation tissue increased from 50% to 80%, and exudate levels reduced from moderate to low. Within 8 weeks of EST^ further progress was seen (Figure 2C). The wound healed within 25 weeks (Figure 2D).



***Figure 2**. PU (A) prior to EST^ and (B) after 4 weeks and (C) 8 weeks and (D) at healing after 25 weeks.*

Patient B was a 71-year old male admitted to hospital for vascular surgery with an extensive category 4 sacral PU of 95 cm^2 with undermining up to 3 cm, present for 5 months (Figure 3A). Previous medical history included paraplegia following a car accident in 1997, PVD, hypertension, pulmonary embolism, testicular cancer, stoma formation and prior flap closure for a previous ischial PU. He underwent a right transfemoral amputation and an axillary-femoral bypass for vascular disease. He subsequently underwent a laparoscopic cholecystectomy, which was converted to an open procedure. His recovery was complicated by persistent paralytic ileus, an ongoing oxygen requirement, and a small bowel obstruction with bowel perforation requiring further surgery.
EST^ was commenced to expedite healing for this very extensive wound. Within 4 weeks, wound size reduced by 28% (Figure 3B). Within 7 months of commencing EST^, the wound size had reduced by 96% with no undermining. The wound continues to slowly improve, despite his poor medical health (Figure 3D). A second EST^ is being considered.

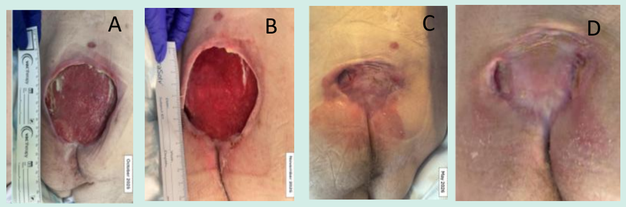


***Figure 3**. PU (A) prior to EST^, (B) after 4 weeks, (C) after 7 months and (D) after 11 months.*

Patient C was a 54-year old female with a category 4 undermining sacral PU present for 6 years. Past medical history included T4 paraplegia in 1992, previous surgical closure of sacral pressure ulcer, previous NPWT, colostomy, suprapubic catheter, eating disorder, right hip disarticulation in 2010, right & left shoulder chronic pain, depression and anxiety, PTSD, ADHD, emotional instability disorder, unilateral lower limb amputation and post thrombotic syndrome.
EST^ was applied to expedite healing for a long-standing pressure ulcer. Prior to EST^ the wound measured 8 cm^2 with undermining of 2 cm (Figure 4A). Within 5 weeks the wound measured 3.6 cm^2 (55% reduction) and undermining was reduced by 0.5 cm (25% reduction, Figure 4B). A second EST^ was applied. Wound size reduced by 81% within 10 weeks of commencing EST^, with a total reduction in undermining of 0.5cm. Unfortunately, due to infection and her eating disorder (her weight is currently only 38.8 kg), the wound deteriorated again with exposed bone. However, it is back on a healing trajectory again.

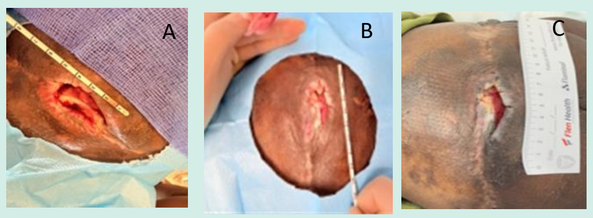


***Figure 4**. PU (A) prior to EST^, (B) after 5 weeks, (C) after 10 weeks.*

Discussion: EST^ has been shown to kick-start the healing process for recalcitrant category 3 and 4 PU, which were previously unresponsive to standard care alone. These case studies have demonstrated the safety and efficacy of EST^ in kick-starting the healing for patients with SCI complicated by long-standing and complex category 3 and 4 PUs of long duration. EST^ has previously been demonstrated to be a cost-effective therapy[5] reducing costs associated with dressings, analgesia and nursing time, and reducing the risk of surgical interventions /amputations.[5] No adverse events related to the use of the device were reported.

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^Accel-Heal Solo, Accel-Heal Technologies Limited, Hever, Kent, UK.

References: 1. Guest J., Fuller G W., Vowden P et al (2018). BMJ open 8(7):e021769; **2.** Smith, J., Nuccitelli, R., Zhao, M., et al. (2025) Advances in Wound Care, 21621918251373053; **3.**Martin R (2024). Wound Masterclass 2024;3:102-108; **4.** EPUAP/NPIAP/PPPIA: Quick reference guidelines 2026 https://internationalguideline.com.; **5.** Russell et al (2026). Presented at EWMA 2026, Bremen, Germany, 6-8 May 2026.

Abbreviations: ADHD, attention deficit hyperactivity disorder; NPWT, negative pressure wound therapy; PTSD, post-traumatic stress disorder; PU, pressure ulcer; PVD, peripheral vascular disease; SCI, spinal cord injury;