

Electrical Stimulation (ES) for the Treatment of Wounds

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Introduction

Electrical stimulation (ES) for the treatment of wounds is addressed by this guideline.

Health Equity Consideration

Health equity is the highest level of health for all individuals; health inequity is the avoidable difference in health status or distribution of health resources due to the social conditions in which individuals are born, grow, live, work, and age. Social determinants of health are the conditions in the environment that affect a wide range of health, functioning, and quality of life outcomes and risks. Examples include the following: safe housing, transportation, and neighborhoods; racism, discrimination, and violence; education, job opportunities, and income; access to nutritious foods and physical activity opportunities; access to clean air and water; and language and literacy skills.

Criteria

The use of electrical stimulation (ES) for the treatment of wounds is considered medically necessary when **all** of the following apply:

- The individual has **any** of the following conditions:
 - chronic stage 3 or stage 4 pressure ulcer(s)
 - arterial ulcer(s)
 - diabetic ulcer(s)
 - venous stasis ulcer(s)
- The wound has been assessed, measured, and described.
- A wound therapy program including **all** of the following has been tried, and there are no measurable signs of improved healing:
 - application of appropriate topical dressings
 - debridement to remove necrotic tissue (if present)
 - treatment or intervention to correct any infection and/or underlying condition that may hinder the healing process (if needed)
 - repositioning and mobilization program for offloading of pressure

- ongoing care of diabetes (for individuals with diabetic ulcers)
- establishment of adequate circulation to the wound site (for individuals with arterial ulcers)
- application of compression bandages and/or garments (for individuals with venous ulcers)
- The treatment is used in the home and supervised by a medical professional with training and expertise in wound evaluation and management.

Initial Rental

- Initial rental period of one month (30 days)

Continued Rental

- Continued rental of an electrical stimulation (ES) device is considered medically necessary when **all** of the following apply:
 - There is monthly documentation that the wound is improving.
 - There is monthly documentation of wound length, width, and depth.
 - There is monthly documentation of proper use of the device and continued benefit.

Rental Period Exceeding Four Months

Use of an electrical stimulation (ES) device exceeding four months in total duration is considered medically necessary when **all** of the following apply:

- There is monthly documentation that wound healing is progressing.
- There is monthly documentation of wound length, width and depth.
- There is monthly documentation of proper use of the device and continued benefit.
- There is monthly documentation of specific and detailed information to explain the continuing problems with the wound and what additional measures are being undertaken to address those problems and promote healing.
- There is monthly documentation of why a switch to alternative treatments alone is not possible.

Discontinuation

Continued coverage of an electrical stimulation (ES) device for wounds and ulcers described in this guideline is considered not medically necessary when there is documentation of **any** of the following:

- Criteria for continued rental of the device has not been met.
- There is documentation of 100% epithelialized wound bed.
- In the judgment of the treating practitioner, adequate wound healing has occurred to the degree that ES for the treatment of wound(s) may be discontinued.

Background and Supporting Information

- **Chronic ulcers** are defined as ulcers that have not healed within 30 days of occurrence. A chronic ulcer, or non-healing wound, either does not progress through an orderly and timely sequence of repair, or the repair process is impaired and does not reach resolution.
- **Pressure ulcers** occur most commonly near the sacrum or ischial tuberosities and may occur in other areas including, but not limited to, the knees, heels, or other bony prominences. Risk factors for skin breakdown and pressure ulcers may include spinal cord injury, increased pressure over bony prominences, asymmetric posture, and extended duration of sitting.
- The National Pressure Injury Advisory Panel (NPIAP) provides a method for classification of pressure injuries. The system is supported by the Wound Ostomy Continence Nurses (WOCN) Society:
 - **Stage 1 pressure injury:** Intact skin with a localized area of non-blanchable erythema, which may appear differently in darkly pigmented skin. Presence of blanchable erythema or changes in sensation, temperature, or firmness may precede visual changes. No purple or maroon discoloration, as these may indicate deep tissue pressure injury.
 - **Stage 2 pressure injury:** Partial-thickness loss of skin with exposed dermis. The wound bed is viable, pink or red, moist, and may present as an intact or ruptured serum-filled blister. Adipose (fat) and deeper tissue are not visible. Granulation tissue, slough, and eschar are not present. These injuries commonly result from adverse microclimate and shear in the skin over the pelvis and shear in the heel. This stage should not be used to describe moisture associated skin damage including incontinence associated dermatitis, intertriginous dermatitis, medical adhesive-related skin injury, or traumatic wounds (e.g., skin tears, burns, abrasions).
 - **Stage 3 pressure injury:** Full-thickness skin loss, in which adipose (fat) tissue is visible in the ulcer, and granulation tissue and rolled wound edges are often present. Slough or eschar may be visible. The depth of tissue damage varies by anatomical location; areas of significant adiposity can develop deep wounds. Undermining and tunneling may occur. Fascia, muscle, tendon, ligament, cartilage, and bone are not exposed. If slough or eschar obscures the extent of tissue loss, this is an unstageable pressure injury.
 - **Stage 4 pressure injury:** Full-thickness skin and tissue loss with exposed or directly palpable fascia, muscle, tendon, ligament, cartilage, or bone. Slough or eschar may be visible. Rolled wound edges, undermining, or tunneling often occur. Depth varies by anatomical location. If slough or eschar obscures the extent of tissue loss, this is an unstageable pressure injury.

- **Unstageable full-thickness pressure injury:** Full-thickness skin and tissue loss in which the extent of tissue damage within the ulcer cannot be confirmed because it is obscured by slough or eschar. If slough or eschar is removed, a stage 3 or stage 4 pressure injury will be revealed. Stable eschar (e.g., dry, adherent, intact without erythema or fluctuance) on the heel or ischemic limb should not be softened or removed.
- **Deep tissue pressure injury (DTPI):** Intact or nonintact skin with localized area of persistent non-blanchable deep red, maroon, or purple discoloration, or epidermal separation revealing a dark wound bed or blood-filled blister. Pain and temperature change often precede skin color changes. Discoloration may appear differently in darkly pigmented skin. This injury results from intense or prolonged pressure and shear forces at the bone-muscle interface. The wound may evolve rapidly to reveal the actual extent of tissue injury or may resolve without tissue loss. If necrotic tissue, subcutaneous tissue, granulation tissue, fascia, muscle, or other underlying structures are visible, this indicates a full-thickness pressure injury (i.e., unstageable, stage 3, or stage 4). DTPI is not used to describe vascular, traumatic, neuropathic, or dermatologic conditions.

Evidence Discussion

A 2024 review by Preetam et al. presented evidence that electrical stimulation supported wound healing by accelerating closure, reducing inflammatory activity, and enhancing angiogenesis, cell migration, and proliferation. The authors found that low level electrical currents facilitated coordinated activity among keratinocytes, fibroblasts, and endothelial cells, which contributed to improved structural restoration of the wound environment. The review concluded that electrical stimulation represented a promising adjunct modality for both chronic and acute wound types, as it improved biological processes essential to tissue repair. However, the authors noted that the evidence was primarily mechanistic and preclinical, lacking quantitative clinical outcome data.

A 2023 randomized controlled trial reported by Zulbaran-Rojas and colleagues examined the effectiveness of daily home-based electrical stimulation (E-stim) therapy to expedite wound healing in individuals with chronic diabetic foot ulcers (DFUs). The study randomized 33 individuals to an intervention group (one hour of home-based E-Stim therapy using a bio-electric stimulation technology (BEST®) platform (Tennant Biomodulator® PRO) daily for four weeks), or a control group (treatment with an identical but non-functional placebo device). The participants continued adjunctive treatments in addition to standard of care (i.e., topical mupirocin, calcium alginate, and/or wet to dry dressings). The primary outcome included wound area reduction at four weeks. The results of the study demonstrated that the intervention group had a significant reduction in wound area of 22% ($P = .002$) at four weeks. Wound area reduction was unchanged in the control group ($P = .982$). In addition, the reported

adherence to daily home electrical stimulation therapy was 93.3%. In conclusion, the authors opined that daily home-based electrical stimulation was an effective adjunctive therapy to accelerate wound healing in individuals with DFUs.

Zheng et al. (2022) performed a systematic review and meta-analysis to evaluate the efficacy of electrical stimulation (ES) in the treatment of individuals with diabetes-related ulcers. The authors reviewed ten randomized controlled trials including 352 individuals that compared ES with a control group or standard of care. The primary outcomes were ulcer area reduction and healing rates. The results of the meta-analyses reported that individuals treated with ES had a significant percentage of ulcer area reduction ($P < .001$) and ulcer healing rates ($P < .05$) when compared to the control group. In summary, the authors concluded that ES could be used as a treatment for individuals with diabetes-related ulcers in clinical practice.

Borges et al. (2023) conducted a systematic review to evaluate the efficacy of electric stimulation therapy (EST) in the healing of venous leg ulcers (VLUs). The review included eight randomized controlled trials (RCTs) and three case series involving 716 individuals with VLUs. Among the included studies, the primary outcome was ulcer healing. The change in the ulcer size was the main method used to determine ulcer healing ($n = 8$), followed by the ulcer healing rate ($n = 6$), exudate levels ($n = 4$), and the time to healing ($n = 3$). Compared with the control group, five of eight RCTs detected a statistically significant improvement in at least one VLU healing outcome after EST. In two of the five RCTs demonstrating improved outcomes with EST, the improved healing was only found in individuals who had not undergone surgical treatment of VLUs. Moreover, the use of EST led to accelerated wound closure. All case series reported improvements in wound healing outcomes with EST. After EST, the individuals' exudate levels decreased compared with the controls, except for individuals who had undergone surgery, for whom the exudate levels were similar. Thus, the authors concluded that this study supported the use of EST to accelerate wound healing for VLUs, most notably in individuals who were not surgical candidates.

Chen et al. (2023) conducted a systematic review and meta-analysis to evaluate evidence of the effectiveness and safety of ES for treating pressure ulcers. The study included 17 randomized controlled trials which used electrical stimulation for the treatment of pressure ulcers. When compared with sham ES or standard wound care, ES resulted in a statistically significant reduction in ulcer area ($P < .001$), reduction in ulcer size ($P = .02$), and an increase in the number of healed ulcers ($P = .04$). Based on the results of the study, the authors reported low to moderate evidence that that electrical stimulation could help reduce the absolute wound surface area and increase the ulcer healing rate.

A 2020 Cochrane review by Arora and colleagues aimed to determine the efficacy of ES for treating pressure ulcers. The review included 20 studies with 913 participants. ES was administered for a median duration of five hours per week. The majority of

pressure ulcers were stage 3 (45%) and on the sacral and coccygeal region (30%). The authors reported moderate certainty evidence that ES increases the proportion of pressure ulcers healed compared with no ES (11 studies, 501 participants (512 pressure ulcers)). The effect on time to complete healing and the surface area of pressure ulcers was uncertain (very low certainty evidence). Thus, the authors acknowledged that future research should focus on larger-scale trials to determine the efficacy of ES in the treatment of pressure ulcers.

In 2017, the Wound, Ostomy and Continence Nurses Society published guidelines on the prevention and management of pressure ulcers. The guidelines stated that ES can be considered as adjunctive treatment and rated the evidence as level A, indicating that there are two or more supporting randomized controlled trials (RCTs) of at least ten humans with pressure ulcers (at Level I or II), a meta-analysis of RCTs, or a Cochrane Systematic Review of RCTs.

Codes

Codes addressed in this guideline

The inclusion of any code in this table does not imply that the code is under management or requires prior authorization. Refer to the applicable health plan for management details. Prior authorization of a code listed in this table is not a guarantee of payment. The Certificate of Coverage or Evidence of Coverage policy outlines the terms and conditions of the member's health insurance policy.

HCPSC Code	Description
E0761	Non-thermal pulsed high frequency radiowaves, high peak power electromagnetic energy treatment device
E0769	Electrical stimulation or electromagnetic wound treatment device, not otherwise classified

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