

How to use electrical stimulation for wound healing

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WOUND & SKIN CARE

ELECTRICAL STIMULATION can help speed wound healing by increasing capillary density and perfusion, improving wound oxygenation, and encouraging granulation and fibroblast activity. Several manufacturers make the high-voltage pulsed current simulator used for this therapy.

Electrical stimulation can be applied in one of two ways. For the first method, one electrode (positive or negative polarity) is applied to sterile, conductive material, such as saline-moistened gauze, placed in the wound. The conductive surface of the other electrode is applied nearby on intact dry skin.

The second method involves positioning the conductive surfaces of two electrodes with the same polarity on intact dry skin on opposite borders of the wound, straddling the wound. A third electrode with the opposite polarity is placed nearby on intact dry skin.

In both methods, the pulse frequency is set to 100 pulses/second and the voltage is set to deliver a current that produces a moderately strong but comfortable tingling sensation (in sensate skin) or a just-- visible muscle contraction (in insensate skin, as in patients with spinal cord injuries). The voltage required is typically between 50 and 150 volts.

Polarity of the electrode or electrodes placed on or straddling the wound depends on the wound's clinical needs. To promote autolysis, use positive polarity to attract negatively charged neutrophils and macrophages. To encourage granulation tissue development, use negative polarity to attract positively charged fibroblasts. To stimulate wound resurfacing, use positive polarity to attract negatively charged epidermal cells.

Treatments are typically given for 1 hour a day, 5 to 7 days a week, as long as documented assessment indicates that the wound is healing.

Electrical stimulation can be used on chronic wounds, including pressure ulcers, diabetic ulcers, venous ulcers, and arterial ulcers. The treatment is contraindicated in patients who have basal or squamous cell carcinoma in the wound or peri-- wound skin, and in wounds with osteomyelitis that aren't responding to systemic antibiotic therapy. Also avoid this therapy if the wound contains ion residues of iodine or silver, if the patient has a pacing device, or if the wound is over the heart.

In general, electrical stimulation therapy is applied in the same way regardless of wound type. However, you may need to change electrode polarity and the dosage of current as the wound heals. For example, if you were treating a quadriplegic patient with a Stage IV pressure ulcer that hadn't responded to 4 weeks of standard wound care, you'd first apply negative polarity

to increase granulation and fibroblast activity. After granulation tissue has filled the wound cavity, however, you'd switch to positive polarity to promote epidermal cell migration.

Similarly, if you were treating a full-thickness venous ulcer on the ankle that hadn't responded to standard therapy, you'd first apply negative polarity to increase fibroblast activity and capillary density, then positive polarity to enhance epidermal resurfacing.

Patients receiving electrical stimulation therapy should be under the supervision of a physical therapist or licensed health care provider who's trained in using this therapy. A wound care specialist can determine when standard interventions have failed. A physical therapist then would determine the appropriate polarity to use in electrical stimulation therapy and when the polarity should be changed.

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