

Patient-Administered E-Stim for Wound Healing: Effective, Easy—and with Excellent Outcomes in Calgary Integrated Home Care

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Alberta Health Services (AHS) has a patient-first strategy that brings evidence-based treatment to a patient in their own home and empowers the patient and their chosen care partner or family member to be directly involved in their care. The care plan takes into account cultural traditions, personal preferences, family situations and lifestyles.

Recently AHS's Calgary Integrated Home Care (IHC) Community Consult and Treat Team (CAT Team) implemented a successful patient-administered in-home electrical stimulation program (E-Stim Program) for the treatment of pressure injuries, diabetic ulcers and other chronic wounds.

About the Program

The E-Stim Program was implemented after identifying the unmet needs of home-care patients and the challenges

and obstacles in delivering patient-centred care. The Community CAT Team found that patients who had limited mobility, challenges with transportation and inability to afford parking tended to not attend clinic appointments and not to adhere to recommendations from the team due to these factors that were out of their control. Healable wounds were therefore deemed not healable due to the patient not being able to access care outside their home.

The Community CAT Team initially conducted trials of e-stim treatments in the patient's home; however, they quickly identified that these in-home treatments, though beneficial to patients, were not sustainable due to the length of time it took one home-care interventionist to complete each treatment. The patient's quality of life also suffered, as the treatment schedule was based

on the availability of home-care staff and not the personal circumstances and schedule of the patient. Patients voiced concerns about depression, lack of control over their care and poor quality of life before giving up on the in-home e-stim treatments.

In collaboration with IHC Calgary Zone CAT Team management, the patient, the patient's care partner or family, physicians and home-care interventionists, the team decided to conduct a trial of the E-Stim Program by encouraging cognitively intact and competent patients to be responsible for providing their own in-home e-stim treatments.

Prior to implementation with a particular patient, the E-Stim Program ensures that the multi-disciplinary team identifies and addresses the cause of the wound, and that the patient is competent in applying the e-stim treatments or will be



supported in doing so by a care partner or family member.

The E-Stim Program loans one of nine e-stim machines to the patient at no cost, demonstrates application of the e-stim and provides written education on the use of the machine to both patient and a chosen care partner or family member, and then monitors wound healing biweekly. The teams provides the patient with a home-care contact phone number to

answer questions or problem-solve remotely. Education on the application of e-stim includes positioning of the patient, hand hygiene, wound cleansing, a no-touch technique in wound packing and electrode attachment, removal of electrodes post-treatment and application of the dressing. Patients are encouraged to complete treatments three to five times weekly at their convenience within their pre-

scribed schedule. The E-Stim Program allows the patient to make independent decisions on who provides the treatment, when the treatment is done, the location of the treatment, and how many days per week the treatment can be accommodated in their schedule. The patient is also provided with links to a best practice guideline that matches their wound type, and to the national e-stim community website (Estim4wounds.ca).

About E-Stim

E-stim is level 1a evidence-based therapy that is used to assist in the closure of an open wound.¹ The therapy is delivered using a handheld, battery-operated, specialized electrical stimulation device that delivers high-voltage pulsed current (HVPC) to the wound, imparting a net charge to the tissues.² This net charge stimulates the cells directly involved in the wound-healing cycle to move the wound through the phases of healing. Simple, inexpensive supplies such as gauze, saline and gel are used in the wound with an electrode placed over top. A second electrode, called the dispersive electrode, is placed away from the wound to complete the circuit.³ Each treatment is one hour, repeated three to five times per week until the wound has closed.

The contraindications for this treatment are few but include malignancy, unknown wound etiology, pregnancy, untreated osteomyelitis, severe arterial insufficiency, cardiac pacemaker, blood clots, and treatment in areas near the eyes, genitalia and over the anterior neck or carotid sinus.⁴

E-stim produces a pins-and-needles-like sensation and is generally well tolerated. It is used to accelerate healing in wounds that are delayed in healing due to underlying comorbidities. Stimulation with e-stim increases the circulation to the wound, delivering oxygen and nutrients that are needed to facilitate wound healing. E-stim will activate macrophage activity and phagocytosis, resulting in a decrease in bacteria and bioburden in the wound.³ With a decrease in bacteria and necrotic tissue in the wound, deposition of granulation tissue and epithelialization can occur. E-stim's few side effects include skin irritation under the electrode, pain or muscle spasm if the intensity is set without sufficient patient feedback, and wound infection or deterioration if proper hand washing and aseptic techniques are not used when applying the electrode and dressings to the wound.⁴



A Case Study

An example of the E-Stim Program in action involves a recent home-care patient with paraplegia living in rural Alberta. He was seen at the Sheldon M. Chumir Wound Clinic in June 2019 with a pressure or shear injury to his right ischial tuberosity (IT). The wound had been present for over a year despite the patient having had daily home care for dressing changes. A home-care occupational therapist had seen him for assessment of transfers and wheelchair seating with resolution of all possible causes of the wound. Unfortunately wound healing did not progress as expected. The team implemented the E-Stim Program for this patient, and he was started on e-stim in the home, with rural home-care monitoring the wound and reporting back to the Community CAT Team in IHC Calgary Zone every two weeks. The patient's wife assisted in applying the e-stim treatments in the evening after she arrived home from work. The patient's right IT wound healed within four weeks and has stayed healed for the past three months. The patient reports that the e-stim treatments in the home were easy to do and that he was thrilled the wound healed so quickly.

Benefits of Patient-Administered E-Stim

To the system: Implementation of the E-Stim Program in the home has many benefits. The e-stim machines are inexpensive and can be used on multiple patients. The IHC Calgary Zone's cost in supplies in providing the treatment is \$13 for two electrodes that can be used for the duration of the treatment. The antibacterial properties of e-stim allow for the use of simple wound dressings only. No advanced dressings, such as silver, are ever needed or used

when treating with e-stim. There is also a significant decrease in the number of required home-care visits, thus freeing up home-care staff to see other patients.

To patients and their families and care partners: The cost to the patient is minimal, as they only need to supply gauze, wound gel and saline. Patients report an increase in quality of life because they do not have to attend wound clinic appointments and wait for home-care nurses to visit. Patients report that they like having the independence to choose when

to do their treatments and wound care. Finally, patients with IT and sacral pressure injuries report that the e-stim provides the added benefit of a decrease in wound exudate, requiring fewer dressing, clothing and cushion-cover changes.

To the community: A complete policy and procedure guideline for the E-Stim Program and e-stim process was developed and shared with assisted-living and long-term facilities, Workers' Compensation Board patients, and the Spinal Cord Injury Clinic in acute care in Calgary, AB. Through collab-

oration, the Community CAT Team was able to share resources with these organizations to meet the needs of their patients. The e-stim implementation process outlined in the document empowers staff to show compassion for patients living with wounds in the community, and promotes accountability in assessing the cause of a wound and being fiscally responsible in providing wound treatments. The E-Stim Program that has been developed supports and respects patient-driven goals in a home environment. It is

now reaching patients in assisted-living facilities in Calgary and patients living in rural Alberta.

The IHC Calgary Zone Community CAT Team's vision for the E-Stim Program is that of the AHS: "Healthy Albertans. Healthy Communities, together," which mirrors the AHS's mission statement: "To provide a patient-focused, quality health system that is accessible and sustainable for all Albertans." 🇨🇦

References

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References: 1. Kirsner R, et al. Randomized controlled trial on the efficacy and acceptance of a single-use negative pressure wound therapy system versus traditional negative pressure wound therapy in the treatment of lower limb chronic ulcers (VLU and DFU). Poster presented at Wild on Wounds National Wound Conference, September 12-15, 2018. Poster 18.

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