

Establishing a Postsurgical TENS Program

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The December 1978 issue of *PHYSICAL THERAPY* afforded the clinician a sound theoretical and biographical presentation of transcutaneous electrical nerve stimulation (TENS). Although Gersh offers some practical guidelines for the use of TENS,¹ this information needs to be expanded to include a day-to-day perspective on the postsurgical use of TENS.

The purpose of this paper is to present a number of basic suggestions to guide the clinician interested in establishing a postsurgical TENS program. These observations and suggestions are based on our hospital experience with postsurgical TENS programs.

Selection of Equipment

Most types of commercially available dual-channel TENS units will be adequate for a postsurgical program. The dual-channel system is a must for the types of electrode placement combinations described later in this paper. Stimtech EPC Mini Dual*, Medtronic Neuromod,† and Medgeneral Microceptor II†† have been used successfully in our clinics. In facilities that use TENS in postsurgical treatment, we suggest 8 to 10 units per 100 active hospital beds. More units can be purchased as the TENS program develops.

TENS electrodes that are sterile and specifically made for postsurgical application are available. These electrodes are not always compatible with the equipment on hand, but banana plugs and adapters that permit interchange of leads at the female receptacle

of a unit or that modify the terminal end of the lead to accept another type of electrode can be obtained from electronics stores. Standard carbon electrodes and leads can be made sterile by autoclaving at 125°C and 15 pounds pressure for 15 minutes; single-use electrodes can be gas-sterilized with ethylene oxide. Sterilized electrodes and leads are routinely wrapped in a protective envelope that allows for an extended shelf life. The central supply personnel, who normally sterilize operating-room equipment and supplies, can be consulted about how best to sterilize the devices.

Application of Electrodes

The three types of electrode placements we most often use for abdominal surgery are a crossed method and two uncrossed methods (Figure). The crossed method is the method of choice because complete

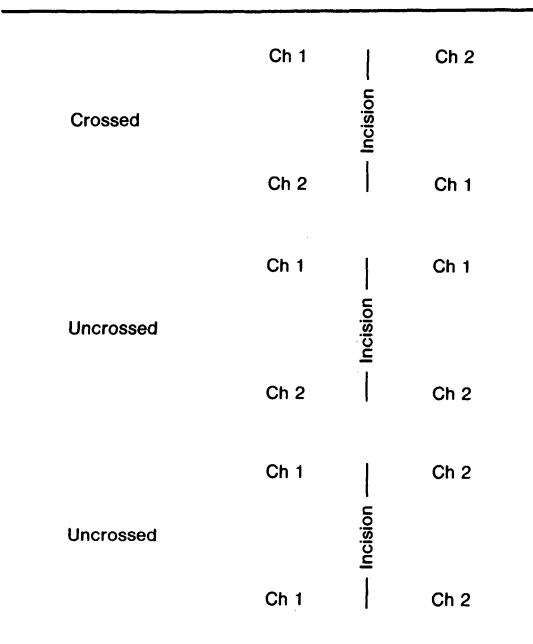


Figure. Crossed and uncrossed electrode placements.

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TABLE

Acupuncture Points for TENS in All Types of Surgery^a

Point	Location
H-7	In middle of crease caused by wrist flexion, at lateral border of pisiform bone.
LI-4	Radial aspect of midpoint of second metacarpal bone, over motor point of first interosseus muscle.
ST-36	3.0 body-inches ^b distal to intersection of lateral and apical (distal) margins of patella or 1.0 body-inch distal and lateral to tibial tubercle.
ST-35	In joint space on each side of patellar ligament.
SP-6 ^c	3.0 body-inches above tip of medial malleolus just posterior to tibial border.
LV-3	Between first and second metatarsal bones and 2.0 body-inches proximal to corresponding metatarsophalangeal joints.

^a Treat bilaterally when possible.

^b Body-inch is width of patient's thumb at the interphalangeal joint.

^c Contraindicated in pregnancy.

stimulation of the treatment area reduces the need to locate dermatomes or acupuncture points (communication from C. Castel, January 1979). If patients experience unpleasant sensations across the incision, switching to one of the uncrossed methods is an alternative. Uncrossed electrode placements are achieved by either placing channel 1 electrodes on one side of the incision and channel 2 electrodes on the opposite side, or channel 1 electrodes at one end of the incision and channel 2 electrodes at the opposite end.

Our experience has shown that, in those difficult cases that do not receive sufficient pain relief by the crossed or uncrossed method, pain management can be made more effective by placing electrodes at acupuncture points. Peripheral surgeries such as medial meniscectomies may respond better to acupuncture point placement of TENS electrodes than to other types of electrode placement (communication from C. Castel, January 1979). Various acupuncture points effective in postoperative pain management are listed in the Table.²

To use TENS immediately after surgery, electrodes can be applied in the operating room by the surgeon or attending nurse. If this is impractical, the electrodes may be applied and the TENS activated in the recovery room before the patient is fully awake. In our experience, the greatest pain relief occurs when the TENS unit is applied while the patient is anesthetized. When electrodes are applied in the recovery room, the bandages must be partially removed so that the electrodes can be placed within 2 cm of the incision. The skin must be cleaned of excess surgical scrub and

adhesive tape residue using warm sterile water and sterile gauze.

Adjusting the TENS Unit

Because the TENS will usually be applied while the patient is unconscious and unable to respond, the intensity should be adjusted according to a preselected standard. One suggested method of setting the unit is to use the highest available pulse rate, the lowest pulse width, and an intensity setting that is tolerated well as an initial setting for other acute conditions. Increasing the intensity to a motor-response threshold, then turning down the setting until no motor response is observed, usually establishes a satisfactory initial intensity level.³

Another method of adjusting the TENS unit is to increase the pulse rate and pulse width to maximum, increase the intensity to a point of the patient's discomfort, and then reduce the pulse width to the patient's tolerance.⁴ In this latter method, the patient must be sufficiently conscious to describe the sensation during the TENS adjustment.

Maintenance Treatment

The patient and the TENS unit should be rechecked within two hours of application to ensure proper operation of the unit and correct electrode placement and to establish the patient's level of awareness. Postsurgical patients are usually able to describe the effectiveness of the unit at this time, and an increase in intensity is often warranted as the patient accommodates to the electrical stimulus. At this visit, you may wish to describe the purpose, maintenance, and adjustments of the unit. The patient should be encouraged to breathe, cough, and maintain an appropriate level of activity. Some therapists visit the patients before surgery to educate them and to determine appropriate initial TENS settings.

Batteries are changed every 8 to 24 hours, depending on the brand and model of the unit. Every 24 hours the electrode application site is checked, and, if necessary, single-use electrodes are changed or gel is applied to standard electrodes. The electrode placement is changed if the adhesive tape or the electrode surface has caused significant irritation. Antiinflammatory ointments such as the hydrocortisone creams, available by prescription, are effective in reducing the redness and itching at these sites of irritation. The duration of treatment with TENS is from one to three days of continuous use.

Documentation

A log of patient and treatment variables will be helpful in documenting the effects of your postsurgical TENS program. The log should include the electrode placement, the type of unit, initial and subsequent control settings, pain medications taken, the patient's subjective pain response, and the patient's activity level. These data will allow you to determine which treatment variables are most effective and which procedures require revision.

Promoting the Program

An important consideration in developing a postsurgical TENS program is enlightening the surgeons about its benefit. Begin by using TENS for chronic and acute cases such as cervical strains, fractures, and arthritis. Discuss the theory and application of TENS with the nursing staff; often a few positive comments from a surgical nurse will be very helpful. Compile and distribute research literature that is available from most manufacturers, including some very short

positive articles. Make a presentation on TENS before the medical and nursing staffs. Stress the reduced incidence of paralytic ileus and respiratory complications.⁵ You may wish to give the physicians a review of pain mechanisms, including such topics as the gate theory of pain and endogenous opiates.

The information briefly presented here describes one way of approaching a practical clinical situation. No doubt, many of you will be able to offer other valid suggestions for developing a postsurgical TENS program.

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