

TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION FOR THE MANAGEMENT OF CHRONIC PAIN

Sue Hepworth explains how it works

Rubbing and massage are often used to relieve pain. Transcutaneous Nerve Stimulation or TENS involves passing a mild electrical current across the skin between two electrodes, and has been described as “electrically rubbing the pain better”. The TENS machines, as we know them today, have been available since the early 1970s, but the first use of electricity as a therapy for pain goes back to the Romans, who used to treat their gout by cuddling up to an electric torpedo fish. The use of TENS really became a popular method of pain management after Professor Ronald Melzack and Professor Patrick Wall published a new theory of how pain works in 1965. This is called the *gate control* theory of pain.

Pain messages travel through the nervous system to the spinal cord and then to the brain. Not all messages get through to the brain. Basically, the gate control theory says that a “gate” exists in the spinal cord which can open to allow pain to flow through to the brain, or close to block it off. In addition to this, the nerve fibres which transmit messages to the brain are not all the same. There are thick ones (*A beta fibres*) which carry “sensation” or “touch” messages and respond quickly to stimulation, and thin ones (*A delta* and *C fibres*) which carry pain signals. The gate can be closed, blocking off pain, by stimulating the thick A beta fibres. This is why “rubbing it better” works – the rubbing sensation blocks off the pain. This is also how TENS works. Electrical impulses travel along nerve pathways preventing pain impulses from getting through the gate – so essentially the TENS machine is overriding the pain sensations.

A second theory is that the TENS machine stimulates the body to release its own morphine-like substances, known as *endorphins*. Production of these endorphins induces analgesia in its purest form; therefore, TENS may not only reduce pain but can also assist in relaxation.

Uses of TENS

TENS can be used for a range of conditions in chronic pain management. These include low back pain, arthritic pain and musculoskeletal pain. While TENS is primarily and most widely used for chronic pain management it may also be used for acute pain, for example, labour pain and pain after surgery.

A TENS machine consists of three parts: a pocket-sized stimulator, leads and electrodes. The stimulator is a transistorised battery-operated pulse generator. It has three main controls: intensity, frequency and pulse width, which can be adjusted to create different types of TENS. The leads are a pair of insulated wires that connect the stimulator to the electrodes. The leads are the part of the machine most vulnerable to damage. The electrodes are placed on your skin. TENS electrodes can be purchased in a wide variety of shapes and sizes, to suit most needs. Self-adhesive, reusable electrodes are the most common. Successful treatment of pain depends on skillfully varying the controls and electrode placement, until the best results are achieved. The main points for electrode placement are site of pain, acupuncture points and spinal nerve roots (where the nerves join the spinal cord).

Advantages of TENS

TENS is not a cure, but a therapy that can help relieve pain. The effect of TENS differs for each person and does not necessarily help all those with the same type of pain.

TENS is:

- non-invasive.
- portable.
- self-managed.
- relatively cheap.
- virtually without side-effects and contraindications.
- non-addictive.

Disadvantages of TENS

Compared with the advantages, the disadvantages are minimal. Contraindications are few. Sometimes people cannot tolerate the sensation of TENS and invariably will not respond to the therapy. Skin irritation can sometimes occur, mainly due to a reaction to the conductive gel or tape. In most cases irritation may be resolved by using an alternative product. TENS is not recommended for those with contact dermatitis or in early pregnancy and should be used only with careful evaluation and extended cardiac monitoring for those with cardiac pacemakers.

What happens during a TENS trial

Your pain will be assessed. If TENS is considered appropriate for you, you will undergo a trial. This is usually in an outpatient department at a pain clinic. Each pain clinic may vary in its procedure. You will be given a demonstration of how the TENS unit works. Then you will be given a trial treatment for thirty to ninety minutes, after which its effect will be assessed. Sometimes a TENS machine may be issued for a trial period at home of usually four to six weeks. The latter is obviously the ideal, but, due to the high demand for TENS (and associated cost implications), some clinics cannot loan out a TENS machine, even on a short-term basis. TENS machines vary in price from around £25 to £100 each. Most pain clinics have information and catalogues on different TENS units, allowing you to choose the most appropriate model for you. It is reassuring to know that most companies do offer a thirty-day money-back guarantee. This allows you to try a particular model at home for four weeks before definitely committing yourself to its purchase. In some pain clinics, patients may receive a long-term loan of a TENS machine, so it is worth asking about this. Sometimes patients may be placed on a waiting list for long-term loan of a machine; unfortunately the wait usually runs into months rather than weeks.

Even if the initial TENS trial has gone smoothly, problems can arise once you are using a machine at home, or you may be worried about some feature of the treatment. It is worth contacting the clinic to explain that you are having problems, and to ask for advice. As with learning any new skill, there is some trial and error. You may need to persevere to get the best results.

Regardless of the type of pain being treated, TENS is rarely used alone, but rather serves as an adjunct to other forms of pain management, such as medication and self-help skills. The TENS machine is a technique which once mastered, produces no serious side-effects or complications and is very easy to cope with. For the health service, the potential for reduction in cost of other treatments or medications may actually offset the cost of providing patients with these machines. Sadly, as yet, there is no comprehensive evidence to support this theory.

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TROUBLESHOOTING

- **Reduced or no stimulation (pulsing or tingling sensation). Replace or recharge the battery.**
- **Skin reaction. If you do experience inflamed or sore skin after using the TENS machine, wash and dry the area with water only. If the problem persists, contact your therapist.**
- **Burning sensation under the electrodes. Switch off the TENS machine and attach some new electrodes. If the burning persists, discontinue the TENS and contact your therapist.**
- **Attachment lead or plug becomes loose or broken. Switch off the machine. You will need to obtain a replacement lead.**
- **You've bought your own machine and are disappointed with the result. Ask for professional advice. You may benefit from a TENS trial. To have a TENS trial at a pain clinic you need to be referred by your doctor.**

