

Transcutaneous electrical nerve stimulation (TENS)



TENS is a medication-free pain method for treating pain, that uses electrical currents through the skin. This safe technique generally reserved for the treatment of chronic pain.

Transcutaneous electrical nerve stimulation (TENS) involves applying low voltage pulses to the peripheral nervous system through electrodes placed on the skin in order to modulate the pain.

TENS devices produce biphasic electric pulses. The frequency varies from 1 to 200 Hz. TENS utilises a **modern type of electrical current that is effective in dealing with pain.** How it works depends on the frequency used. TENS can relieve pain in one of two ways:

1. **Low frequencies (less than 8 Hz)** stimulate the secretion of morphine-like substances (beta-endorphins and enkephalins) by the body. This method results in **widespread but generalized pain relief.**
2. **Frequencies above 80 Hz,** which reinforce the physiological barrier that limits the flow of pain signals (“gate control”). They stimulate the nervous system to secrete serotonin, a neurotransmitter which reinforces the blocking effect and reduces the transmission of pain impulses to the brain (known as the diffuse inhibitor system).

Serotonin and gate control lead to rapid **pain relief, but their effects are fleeting and local.**

IN PRACTICE

There are 2 ways of using TENS, the gate control method, and the endorphin method.

The gate control method

The pain relief mechanism obtained by the method known as gate control is based on saturating of the nervous system, more specifically the higher neurological structures of pain perception, with information by stimulating the skin with electric current. The sensations induced in the skin are described as “**pins and needles**“. This information generated by the electrical current applied to the skin competes with the pain “messages” and drowns them out. This is the “gate theory,” which says that because the gateway is narrow, only part of the information can pass through, in this case the tingling produced by the current on the skin. There are more of them, so they get priority.

For this analgesic "gate control" effect from the stimulation of the skin to work, electrodes therefore need to be placed on the skin surface close to the area where pain is felt.

The intensity of the current should be gradually increased, so that the tingling feeling it produces spreads to cover the whole area of the pain. For the best possible pain relief, the current should be intense enough to make the pain sensation disappear, without being so intense that it is painful in and of itself.

Using the gate control method, stimulating the skin has an immediate effect, but the relief stops as soon as the stimulation comes to an end. For some patients, a residual or post-effect is possible, which can last anything from ten minutes to several hours. This is not what happens in most cases however.

The endorphin method

The pain relief produced by the endorphin method is based on the release of endorphins, which are morphine-like substances secreted naturally by the nervous system. In this case, low frequency currents (1 to 5Hz) are used. The subject perceives them as **pulsation, or as a vibration of the muscles** that keep been seen and felt. There is a delay of 30 minutes before this method takes effect, and its effects can last several hours after the stimulation has ended.

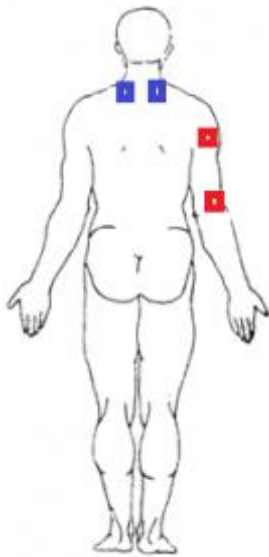
In general, the gate control method is better tolerated and appears more effective when treating so-called neuropathic pain (for example pain from sciatica sequellae). The endorphin method can prove useful in the treatment of lumbago, for example.

Commercially available TENS devices are simple and easy to use. They should not be confused with muscular stimulation devices promoted in advertising for effortless muscle enhancement. They have 2 channels, enabling 4 electrodes to be connected (2 per channel).

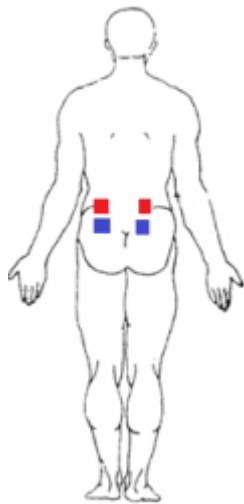
TENS devices are available to rent for periods of up to 6 months after being prescribed by a pain specialist, and the patient should have regular check-ups. After 6 months, if the device has proven effective, it is possible to buy it.

A few rules

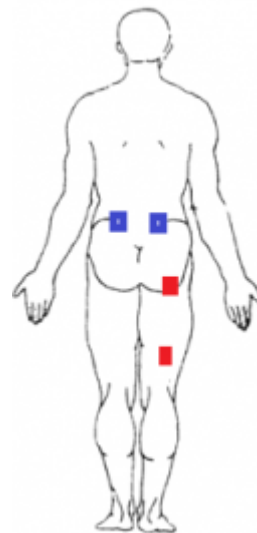
- The electrodes should be placed on dry skin (without skin cream).
- The electrodes must not be attached to areas of the skin that are painful *to the touch* (allodynia), instead, they should be placed above and below on either side of the area concerned
- The electrodes must not touch
- Never take off an electrode before turning off the device
- If only one electrode is felt, the electrodes can be swapped around
- If one electrode feels as the “stronger” than the others, it may be useful to replace it with a larger one.
- Patients need to self-assess and score how the pain changes on a visual scale or numeric scale from 0 to 10, before and during stimulation, and then for as long the beneficial effects last afterwards, noting the program used and the intensity of the current.
- The placement of the electrodes needs to be adjusted depending on the pattern of pain.



Cervichobrachial neuralgia



Chronic lumbago



Lumbar sciatica

Use of TENS to treat back pain



TENS and perineal pain:

The sensory nerve supply of the perineum is provided in large part by the pudendal nerve. This nerve is formed where 3 nerve branches or roots arising from the spinal cord converge. The main nerve branch that is part of the pudendal nerve is the S3 root. It provides sensation in the medial part of the perineum (external genitalia, anus), but also sensation in the inner side of the ankle. It is therefore possible to act (gate control effect) on the S3 root either by stimulating the area of the pain (the perineum) or by stimulating the zone of skin on the inner side of the ankle. In our experience, perineal stimulation (pain area) proves to be more effective than stimulation at the ankle. We recommend using TENS every day (in sitting position, a position that is painful for pudendal neuralgia). In general, high frequency currents (at least 80 Hz) are used. The electrodes should be placed on dry skin (without skin cream). They should be taken off at night and stored in the refrigerator. They should be changed at least every 15 days. The programs used most often are P1 (100 Hz) and P2 (80 Hz). The choice depends on which provide the patient with better coverage and tolerance.

If there is no improvement during stimulation in the first 5 days, you should discuss with your prescribing doctor.

Recommended for

- Neuropathic pain
- Phantom limb pain
- Headaches / neuralgia / sports injury / rheumatology

Contraindications

- Pregnancy, epilepsy
- Psychiatric conditions
- The device must not be used when driving
- Pacemaker



POSITION OF THE ELECTRODES FOR PERINEAL PAIN:

Two options:

