

Transcutaneous Electrical Nerve Stimulation

TENS Machines

For various reasons, pain-killing medication is not always acceptable. Another option for pain relief is a Transcutaneous Electrical Nerve Stimulator (TENS machine).

How do TENS machines work?

Transcutaneous means 'through the skin'. TENS machines deliver small electrical pulses to the body via electrodes placed on the skin. TENS machines are thought to affect the way pain signals are sent to the brain. Pain signals reach the brain via nerves and the spinal cord. If pain signals can be blocked then the brain will receive fewer signals from the source of the pain. We may then feel less pain.

TENS machines are thought to work in two ways.

- When the machine is set on a high pulse rate (90-130 Hz) it triggers the 'pain gate' to close. This is thought to block a pain nerve pathway to the brain. This is the normal method of use.
- When the machine is set on a low pulse rate (2-5 Hz) it stimulates the body to make its own pain easing chemicals called endorphins. These act a bit like morphine to block pain signals.

Can TENS machines be used by everybody?

TENS machines tend to be mainly used to help reduce pain from problems in muscles, joints and nerves rather than abdominal, chest or head pains. Unlike a lot of medication there are virtually no side-effects when using a TENS machine. However, people with the following *must not* use a TENS machine:

- When the cause of the pain is not known or not diagnosed.
- Pregnancy (unless specifically medically advised).
- Pacemakers.
- Epilepsy or certain types of heart disease.

Never place the electrodes

- In the mouth
- On or near the eyes
- Transcerebrally (on each temple)
- On the front of the neck (due to the risk of acute hypotension through a vasovagal reflex)
- On areas of numb skin/decreased sensation
- On broken skin areas or wounds
- On or near the Trigeminal nerve if you have a history of Herpes zoster induced Trigeminal neuralgia (Postherpetic neuralgia)

How do you use a TENS machine?

It is best to use a TENS machine only on the advice of a doctor or other health professional. They are not suitable for all types of pain or all conditions. There are various types and brands of machine. *Always follow the manufactures instructions supplied with the machine.* You may also find the following general points helpful.

- TENS machines are designed so that you can move around with them working. You can tuck the machine in a pocket or clip it onto a belt.
- Before placing the electrode pads on the skin make sure the machine is switched off.
- Test the machine by holding the pads between the fingers and then carefully turn it on. You should feel a tingling sensation.

- Make sure the skin where the pads are applied is clean and dry and there are no cuts, grazes or areas of skin irritation.
- Place the pads either side of the pain. Use either self-adhesive pads or flexible rubber pads which should be completely covered on the surface to be applied to the skin with a thin layer of conductive gel. The pads should not be put within an inch (2-3 cm) of each other. Your physiotherapist or doctor will show you where to put the pads.
- Fix the pads to the skin with tape if you intend moving around.
- Set the pulse rate to the required setting (about 100 Hz is about right to start with).
- Switch on the machine slowly and turn it up gradually until you feel a tingle sensation. The sensation needs to be quite strong but not uncomfortable. After a few minutes the sensation will start to drop away slightly. This is called 'accommodation'. When this happens, turn the machine up slightly and then leave it for the rest of the time in use. Do not turn it up too high as this can cause over-stimulation which may make pain worse. There should be no muscle contraction.
- At the end of the session turn the machine off and disconnect the electrodes from the machine. If you intend using TENS again later there is no need to remove the electrode pads from the skin. Simply tuck the wires out of the way and carry on as normal.
- Check that the pads or tape do not irritate the skin. If the skin is red you may need to use a different type of pad, contact gel or tape.
- The machine should be used for at least 45 minutes but can be used for up to 12 hours before the electrodes need to be cleaned and re-sited.
- When you have finished using the machine for the day carefully remove the pads from the skin and clean the skin with ordinary soap and water. Do not pull directly on the wires to remove the pads. If there is any redness or irritation from the pads or tape then the next time you use the machine use a different area of skin.
- If you use rubber pads, clean off the conducting gel with mild soap and water and rinse them well. Do not wash the self-adhesive type of pad.

Cautions when using a TENS machine

- Do not place electrode pads on broken or damaged skin.
- Do not place electrode pads over the front or side of the neck, close to eyes or in the mouth.
- Do not use over areas of reduced sensation.
- Do not use near water such as in the bath or shower.
- Do not use when driving or operating machinery.
- Do not turn TENS up too high as this can cause over-stimulation which may make pain worse. *There should be no muscle contraction.*

TENS units should **only** be used under the direction of a doctor or physical therapist. Electrodes are attached to the surface of the skin over or near the area where you are experiencing pain. It is important that you learn how to:

- correctly put on the electrodes (proper placement is important)
- operate the unit
- change the batteries
- vary the controls and settings (both the frequency and voltage)
- set the proper duration and intensity of the stimulation (which depends on the location and type of pain)