

**People living with long-term pain may be offered treatment with a TENS machine to help ease their symptoms, but what is it? How does it work? And what can it bring to your pain management toolkit? Physiotherapist Dr Pete Gladwell draws upon his clinical experience and research to answer these questions and explain the effects and benefits of TENS**

## **How does TENS work?**

TENS stands for transcutaneous electrical nerve stimulation. TENS devices have been around since the 1960s and help in pain management by delivering electrical impulses across the skin.

TENS machines are usually a small box with wires leading to self-adhesive pads, although wearable belts suitable for back pain are also available. The pads are placed on either side of, on top of or close to the painful area. When switched on you get a tingling sensation under the pads. My usual advice is to aim for a strong, but comfortable, sensation.<sup>1</sup> The right sensation for you can be found using the controls on the TENS machine.

The TENS machine works through different mechanisms.<sup>2</sup> Some research shows that the TENS machine operates through the pain-gate, a special system that helps to block pain messages going up through the spinal cord. Other evidence suggest that the TENS machine also stimulates some of the opioid systems, or natural pain-killing systems, within the body. The third mechanism, which my research suggests as well,<sup>3</sup> is the distraction mechanism; it may actually just take your mind off the pain.

## **Can TENS be useful to everyone?**

For some people, using a TENS machine leads to pain relief. For others, the sensation just takes their mind off the pain for a while.

Unfortunately, for some people it is not helpful or they find the sensation too unpleasant. In our clinics we encourage people to change the sensation to suit them, but it may not work as people's experience of pain is diverse.

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<sup>1</sup> Sluka K.A., Bjordal J.M., Marchand S., Rakel B.A. (2013). 'What Makes Transcutaneous Electrical Nerve Stimulation Work? Making Sense of the Mixed Results in the Clinical Literature'. *Physical Therapy*. 93(10):1397-1402.

<sup>2</sup> Vance C.G.T., Dailey D.L., Rakel B.A., Sluka K.A. (2014). 'Using TENS for pain control: the state of the evidence'. *Pain Management*. 4(3):197-209.

<sup>3</sup> Gladwell P.W. (2013). *Focusing outcome measurement for transcutaneous electrical nerve stimulation evaluation: incorporating the experiences of TENS users with chronic musculoskeletal pain* [PhD Thesis]. Bristol, UK: University of the West of England.

People should NOT use TENS if they have epilepsy, a heart rhythm disorder, a pacemaker fitted or if they are pregnant (except for pain relief during labour).<sup>4</sup> If you are unsure, speak to your healthcare professional.

As far as we can tell, the TENS machine can be used for all pain conditions, providing there is no health reason preventing its use. However, it can be difficult if you have many pain sites especially if the pain can move and vary throughout the day, so you end up chasing after the pain with the TENS machine.

People with widespread pain such as fibromyalgia syndrome may feel that it is difficult to choose a specific area to treat, but recent research shows that it is possible to select treatment areas such as the back of the neck and the lower back, to see if the TENS machine can offer an overall, systemic benefit. The randomized controlled trial exploring exactly this approach showed that using TENS in this way can relieve pain experienced during movement.<sup>5</sup> It is down to each individual to try out different approaches to see what may help them, and it helps to build up confidence in using TENS and trying out different ways of using it.

### **Different Strategies**

We asked people who had experience of using TENS about the ways that they used their TENS machine, the benefits they got and how they overcame their problems.<sup>6,7</sup> From this research, there seemed to be five main strategies that people had worked out to gain the most from their TENS machine:

1. Use the TENS machine only on a bad day or during a flare-up to help cope and get through the pain
2. Use TENS intermittently during the day during a rest break, perhaps in combination with relaxation techniques
3. Use TENS for particular activities (such as walking or sitting, e.g. in the cinema) which would otherwise have been difficult because of pain
4. Use TENS on and off all day to help with most daily activities
5. Use TENS in the morning, to help with the extra pain and stiffness that some people experience first thing.

These different methods show how a range of people can find using a TENS machine beneficial by using different strategies.

When it comes to the benefits, some people talk about direct pain relief. However, some people also find the distraction from their pain really quite helpful. This is known as counter-stimulation, where a more pleasant sensation helps you to manage your pain. These people

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<sup>4</sup> NHS Choices, <http://www.nhs.uk/conditions/tens/pages/introduction.aspx> [accessed 14/04/15].

<sup>5</sup> Dailey D.L. et al. (2020) *Transcutaneous Electrical Nerve Stimulation Reduces Movement-Evoked Pain and Fatigue: A Randomized, Controlled Trial*. *Arthritis Rheumatol*, 2020 ;72(5): p. 824-836.

<sup>6</sup> Gladwell, P.W., et al., Problems, Solutions, and Strategies Reported by Users of TENS for Chronic Musculoskeletal Pain: A Qualitative Exploration Using Patient Interviews. *Physical Therapy*, 2016. 96(7): p. 1039-1048.

<sup>7</sup> Gladwell, P.W., et al., Direct and Indirect Benefits Reported by Users of Transcutaneous Electrical Nerve Stimulation for Chronic Musculoskeletal Pain: Qualitative Exploration Using Patient Interviews. *Physical Therapy*, 2015. 95(11): p. 1518-1528.

asserted that the distraction was a separate benefit from pain relief, as it can just provide a break. Some people said that using TENS could help them to do more despite not necessarily reducing the amount of pain. Others found that TENS use could help them to fall asleep more easily. These aspects are currently the focus of research on the benefits of TENS machines.

### Hints and Tips

- One strategy some people find helpful is to use the machine when at rest in a comfortable position, perhaps while you are having a break or before sleep. Another strategy is to use TENS during particular activities that would otherwise be difficult to manage
- The preferred type of sensation is personal. There are some people who feel that the stronger the sensation, the more effective the TENS machine will be. The settings on most machines can be adjusted to suit individual preferences and can be tweaked during a treatment session
- Despite being hypoallergenic, the pads can aggravate the skin. Rubber pads with gel are an alternative that can be less of an irritant. However, some people do continue to react to the pads. In this case it is important to limit use to short periods where pain relief is crucial and also to change the position of the pads regularly to avoid the problem
- Be persistent! Sometimes patients have to plug away at a problem for two or three months before they feel sure that they are getting the benefits. Changing the settings and changing tack can help you work out whether TENS can work for you.

### More information

- An information sheet can be found on the North Bristol NHS Trust Pain Clinic website at <http://www.nbt.nhs.uk/our-services/a-z-services/pain-clinic/pain-clinic-patient-information-leaflets>
- Listen to [Airing Pain 9: Relieving Pain, TENS and Acupuncture](#).

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