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[Neurorehabil Neural Repair](#). 2010 Jun;24(5):420-7. doi: 10.1177/1545968309356301. Epub 2010 Jan 6.

Long-term TENS treatment improves tactile sensitivity in MS patients.

[Cuypers K](#), [Levin O](#), [Thijs H](#), [Swinnen SP](#), [Meesen RL](#).

Source

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Abstract

BACKGROUND:

Transcutaneous electrical nerve stimulation (TENS) is commonly used in neurorehabilitation for the treatment of pain and spasticity.

OBJECTIVE:

The long-term effects of sensory stimulation by means of TENS on hand sensitivity were investigated in patients with multiple sclerosis (MS).

METHODS:

TENS was applied for 3 weeks (1 hour per day) on the median nerve region of the dominant hand. Sensitivity was assessed by the Semmes-Weinstein monofilaments before and 12 hours following the last intervention as well as 3 weeks later.

RESULTS:

Long-lasting increases in tactile sensitivity were achieved by repetitive stimulation of sensory afferents with TENS in MS patients but not in healthy subjects. This increased sensitivity was not only restricted to the median nerve area but also expanded to the ulnar nerve area. Remarkably, MS patients reached the same level of sensitivity as healthy subjects immediately after the intervention, and long-term effects were reported 3 weeks later.

CONCLUSIONS:

The findings of this study demonstrated lasting improvements in tactile sensitivity of the fingers as a result of a long-term TENS intervention in MS patients, who ultimately reached a level comparable with that of healthy subjects.

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2.

[Mult Scler](#). 2009 Nov;15(11):1376-7. doi: 10.1177/1352458509107020.

Multiple sclerosis patients with bladder dysfunction have decreased symptoms after electro-acupuncture.

[Tjon Eng Soe SH](#), [Kopsky DJ](#), [Jongen PJ](#), [de Vet HC](#), [Oei-Tan CL](#).

3.

[Mult Scler.](#) 2007 May;13(4):527-33. Epub 2007 Jan 29.

The effects of transcutaneous electrical nerve stimulation (TENS) on spasticity in multiple sclerosis.

[Miller L](#), [Mattison P](#), [Paul L](#), [Wood L](#).

Source

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Abstract

Spasticity is a common and often disabling symptom associated with multiple sclerosis (MS). Transcutaneous electrical nerve stimulation (TENS) has been found effective in reducing spasticity in conditions such as stroke, but there is little evidence to support its use in MS. The aim of this study was to evaluate the effectiveness of TENS on spasticity in MS and, furthermore, to compare two different application times. Thirty-two subjects were randomized into two groups, and a single, blind, crossover design was used to compare two weeks of 60 minutes and 8 hours daily of TENS applications (100 Hz and 0.125 ms pulse width). Outcomes were examined using the Global Spasticity Score (GSS), the Penn Spasm Score (PSS), and a visual analogue scale (VAS) for pain. The results of the study demonstrated that there were no statistically significant differences in the GSS following either 60 minutes or 8 hours daily of TENS ($P=0.433$ and 0.217 , respectively). The 8-hour application time led to a significant reduction in muscle spasm ($P=0.038$) and pain ($P = 0.008$). Thus, this study suggests that, whilst TENS does not appear to be effective in reducing spasticity, longer applications may be useful in treating MS patients with pain and muscle spasm.

4.

[Clin J Pain.](#) 2006 Nov-Dec;22(9):812-9.

Efficacy of transcutaneous electrical nerve stimulation (tens) for chronic low-back pain in a multiple sclerosis population: a randomized, placebo-controlled clinical trial.

[Warke K](#), [Al-Smadi J](#), [Baxter D](#), [Walsh DM](#), [Lowe-Strong AS](#).

Source

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Abstract

OBJECTIVE:

This study was designed to investigate the hypoalgesic effects of self-applied transcutaneous electrical nerve stimulation (TENS) on chronic low-back pain (LBP) in a multiple sclerosis (MS) population.

METHODS:

Ninety participants with probable or definite MS (aged 21 to 78 y) presenting with chronic LBP were recruited and randomized into 3 groups (n=30 per group): (1) low-frequency TENS group (4 Hz, 200 micros); (2) high-frequency TENS group (110 Hz, 200 micros); and (3) placebo TENS. Participants self-applied TENS for 45 minutes, a minimum of twice daily, for 6 weeks. Outcome measures were recorded at weeks 1, 6, 10, and 32. Primary outcome measures included: Visual Analog Scale for average LBP and the McGill Pain Questionnaire. Secondary outcome measures included: Visual Analog Scale for worst and weekly LBP, back and leg spasm; Roland Morris Disability Questionnaire; Barthel Index; Rivermead Mobility Index; Multiple Sclerosis Quality of Life-54 Instrument, and a daily logbook. Data were analyzed blind using parametric and nonparametric tests, as appropriate.

RESULTS:

Results indicated a statistically significant interactive effect between groups for average LBP ($P=0.008$); 1-way analysis of covariance did not show any significant effects at any time point once a Bonferonni correction was applied ($P>0.05$). However, clinically important differences were observed in some of the outcome measures in both active treatment groups during the treatment and follow-up periods.

DISCUSSION:

Although not statistically significant, the observed effects may have implications for the clinical prescription and the use of TENS within this population.

5.

[Neurorehabil Neural Repair](#). 2003 Jun;17(2):79-82.

The effect of transcutaneous electrical nerve stimulation on spasticity in multiple sclerosis patients: a pilot study.

[Armutlu K](#), [Meriç A](#), [Kirdi N](#), [Yakut E](#), [Karabudak R](#).

Source

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Abstract

The aim of this study was to examine the effects of transcutaneous electrical nerve stimulation on spasticity in patients with multiple sclerosis. The study was carried out in the Hacettepe University School of Physical Therapy and Rehabilitation. The subjects in the study were 10 clinically definite, primary and secondary progressive type multiple sclerosis outpatients with mild to moderate spasticity in the plantar flexor muscles of the ankle. Stimuli of frequency 100 Hz and pulse width 0.3 msec were used 20 minutes per day for 4 weeks. Patients were assessed by electromyography, Modified Ashworth Scale, and Ambulation Index. Electromyography was performed before and after the daily treatment of spastic muscles with transcutaneous electrical nerve stimulation in order to assess the effect on muscle relaxation. The Modified Ashworth Scale and Ambulation Index were used before and after 4 weeks' treatment. After 4 weeks of treatment, there were statistically significant reductions in spasticity of both extremities as assessed by myoelectric activity and the Modified Ashworth Scale ($P < 0.05$). Ambulation Index level was not improved significantly ($P > 0.05$).