# Transcutaneous spinal cord stimulation

Widespread demyelination in the central nervous system can lead to progressive sensorimotor impairments followingmultiple sclerosis, with compromised postural stability during standing being a common consequence. As such, clinical strategies are needed to improve postural stability following multiple sclerosis. The objective of a study was therefore to investigate the effect of non-invasive transcutaneous spinal stimulation on postural stability during upright standing in individuals with multiple sclerosis.

Center of pressure displacement and electromyograms from the soleus and tibialis anterior were recorded in seven individuals with multiple sclerosis during standing without and with transcutaneous spinal stimulation. Center of pressure and muscle activity measures were calculated and compared between no stimulation and transcutaneous spinal stimulation conditions. The relationship between the center of pressure displacement and electromyograms was quantified using cross-correlation analysis.

For transcutaneous spinal stimulation, postural stability was significantly improved during standing with eyes closed: the time- and frequency-domain measures obtained from the anterior-posterior center of pressure fluctuation decreased and increased, respectively, and the tibialis anterior activity was lower compared to no stimulation. Conversely, no differences were found between no stimulation and transcutaneous spinal stimulation when standing with eyes open.

Following multiple sclerosis, transcutaneous spinal stimulation improved postural stability during standing with eyes closed, presumably by catalyzing proprioceptive function. Future work should confirm underlying mechanisms and explore the clinical value of transcutaneous spinal stimulation for individuals with multiple sclerosis [1)].

1)
Roberts BWR, Atkinson DA, Manson GA, Markley R, Kaldis T, Britz GW, Horner PJ, Vette AH, Sayenko DG. Transcutaneous spinal cord stimulation improves postural stability in individuals with multiple sclerosis. Mult Scler Relat Disord. 2021 May 7;52:103009. doi: 10.1016/j.msard.2021.103009. Epub ahead of print. PMID: 34023772.