Research In Focus: A Weekly Digest of
New Research from the NIDILRR Community

Electrical Stimulation May Help Reduce Nerve Pain for People with Spinal Cord Injury

A spinal cord injury (SCI) is damage anywhere along the spinal cord, usually from an accident or other trauma. Nearly half of people with SCI experience recurring nerve pain in areas below their injury. This pain may not go away, even with medications. Transcranial direct current stimulation (tDCS) is a procedure that may reduce nerve pain in people with SCI by "resetting" brain areas that react to pain. In tDCS, a weak electrical current is applied to the scalp using two electrodes on opposite sides of the head. In past studies, tDCS was found to have mixed results in people with SCI, with some studies showing a benefit and others showing no effect. In a recent NIDILRR-funded study, researchers looked at the impact of tDCS treatment on nerve pain in people with SCI over time. The researchers wanted to find out how a week of treatment would affect pain levels over a 3-month period, compared with a placebo treatment. They also wanted to find out if adding a second set of treatment sessions would increase the benefits.

Researchers at the Spaulding-Harvard Spinal Cord Injury System Center and the Boston-Harvard Burn Injury Model System Center enrolled 33 people with SCI in a study. All participants were at least 18 years old and reported ongoing nerve pain that was moderate or severe (at least a 4 on a 10-point pain intensity scale). They had experienced their SCI for an average of 5 years. Half of the participants were placed in the experimental group where they received active tDCS treatment, while the other half were in a comparison group where they received a placebo treatment.

During the first phase of the study, all participants attended 5 daily treatment sessions over 1 week. During each 20-minute session, the participants in the experimental group received a weak electrical current via the electrodes affixed to their scalp throughout the session. The participants in the comparison group wore the same electrodes, but only received current during the first 30 seconds of the session. None of the participants knew if they were in the experimental or the comparison group.

To find out whether the tDCS treatment decreased pain, the researchers asked all participants to indicate how bad their pain was on average, using a simple scale from 0 (no pain at all) to 10 (pain as bad as you can imagine). In addition to rating their average pain level, the participants used the same scale to rate the least and most severe pain they had ever experienced, and the pain they were currently experiencing. The participants in both groups completed the pain scale to rate their pain severity before treatment, at the end of the last treatment session, one week after treatment was over, and 12 weeks after treatment was over.

Nine of the participants (6 from the experimental group, and 3 from the comparison group) chose to continue to a second phase of the study, where they received 10 more treatment sessions over 2 weeks. They rated their pain severity at the end of the last treatment of this second set of treatment sessions, and again 2, 4, and 8 weeks after this second set of treatments was over.

For the participants who received the first set of sessions, the researchers found that there were no differences between the groups immediately after the participants finished their sessions. However, one week after treatment, the participants in the experimental group reported lower levels of average pain than the participants in the comparison group. Participants in the treatment group also rated their least severe pain as less severe than they did before treatment while their most severe pain was unchanged. The participants in the experimental group with the most severe pain at baseline reported the biggest decrease in their pain. For the 9 participants who received both the first and second sets of sessions, the researchers found that the participants in the experimental and comparison groups reported similar pain levels right after the treatment and 2 weeks after. However, at 4 and 8 weeks after the treatment, the experimental group participants reported lower average pain levels than the participants in the comparison group.

The authors noted that 19 participants dropped out of this study before the final follow-up for Phase 1, which may have limited the interpretation of the results. This dropout rate may be an indication of difficulty for people with SCI to come to a clinic for daily visits. Researchers may want to explore the effectiveness of home-based tDCS devices, which patients may be able to use under a doctor's supervision.

According to the authors, tDCS may be a simple, well-tolerated treatment for nerve pain in people with SCI. While the benefits of tDCS may not be clear immediately after treatment, the benefits may be better realized one week later. Repeating tDCS treatments may help increase and extend the benefits for reducing pain. Future research may be useful in testing treatment regimens that combine tDCS with traditional medications for relieving nerve pain for people with SCI.

To Learn More

Learn more about pain after SCI in this factsheet from the Model Systems Knowledge Translation Center: http://www.msktc.org/sci/factsheets/pain

The Northwest Regional SCI Center holds regular panel discussions featuring people with SCI and experts discussing a variety of topics. Among the videos are several on pain and pain management:

- Perspectives on Pain
- Managing Chronic Pain after SCI

How does tDCS work? Watch this video from the Boston-Harvard Burn Injury Model System Center to see how the treatment is delivered: https://www.youtube.com/watch?v=Q07jLFrMwGI&feature=youtu.be

To Learn More About this Study

Thibaut, A., Carvalho, S., Morse, L.R., Zafonte, R., Fregni, F. (2017) Delayed pain decrease following M1 tDCS in spinal cord injury: A randomized controlled clinical trial. Neuroscience Letters, 658, 19-20. This article is available from the NARIC collection under Accession Number J76835.

Research In Focus is a publication of the National Rehabilitation Information Center (NARIC), a library and information center focusing on disability and rehabilitation research, with a special focus on the research funded by NIDILRR. NARIC provides information, referral, and document delivery on a wide range of disability and rehabilitation topics. To learn more about this study and the work of the greater NIDILRR grantee community, visit NARIC at www.naric.com or call 800/346-2742 to speak to an information specialist.

NARIC operates under a contract from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR), Administration for Community Living, Department of Health and Human Services, contract #GS-06F-0726Z.