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Transcranial DCS May Boost Mood in Chronic Low Back Pain

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May 31, 2018

MIAMI — Transcranial direct-current stimulation (tDCS), a noninvasive neuromodulation method that has been studied for the treatment of depression and other mental illnesses, may have some benefits for people who suffer from chronic low back pain, improving pain-related disability and mood symptoms, a small study suggests.

Dr Timothy Mariano

"This was a relatively small study, so one has to take the results with that in mind and not overinterpret the treatment implications," lead author Timothy Mariano, MD, formerly of Brown University, Providence, Rhode Island, and now from Harvard Medical School, Boston, Massachusetts, told *Medscape Medical News*.

"Our results would have to be replicated in larger studies and with longer follow-up, so there's interesting potential here, but it's not ready for prime time as a treatment," Mariano said.

The findings were presented here at the American Society of Clinical Psychopharmacology (ASCP) 2018.

Pain has sensory and affective components. The affective symptoms are strong drivers of disability and psychiatric comorbidity in conditions such as chronic low back pain. Treatments are usually focused on pain, and there is an overreliance on opioid pain killers, with their well-known, dangerous side effects, Mariano said.

"As pain becomes chronic, people develop a lot of maladaptive behavioral strategies that can lead to depression, avoidance of certain activities, and that's where a lot of the disability stems from," he said.

"These things are not addressed by current medications," Mariano added. "In fact, there's evidence that chronic opioid use actually reduces pain tolerance, so may have a negative effect on pain itself. So the main motivation here was to focus on the mood and the disability symptoms and see if we could help those in a way that does not rely on medications."

To test the potential of tDCS to improve mood, Mariano and his group conducted a double-blind, placebo-controlled, randomized controlled trial (RCT).

"The tDCS literature has been plagued, particularly in the past, with a lot of studies that, frankly, were poorly designed, not RCTs, not placebo-controlled," he said. "There were a lot of open-label studies, so one thing we paid special attention to was having a rigorously designed study where there was adequate blinding and randomization, and also pursuing it in a naturalistic clinical population."

The study included 21 patients with chronic low back pain of at least 6 months' duration. The intensity of the patients' pain was rated as having a score of at least 4 of 10 on the Defense and Veterans Pain Rating Scale, and the patients had undergone at least one trial of a physician-recommended medication.

The patients were recruited from the Providence VA Medical Center and Butler Hospital, Rhode Island.

Rubber electrodes (5 x 7 cm) in saline-saturated sponge pockets were placed over certain areas of the scalp. The patients received one 20-minute session each day for 10 consecutive weekdays, for a total of 10 tDCS treatments.

The patients rated their pain on a variety of measures before and after treatment with tDCS. Among these measures were the West Haven–Yale Multidimensional Pain Inventory (WHY-MPI), which assesses the degree to which pain interferes with daily life; the Roland Morris Disability Questionnaire (RMDQ), which assesses the degree of disability a patient experiences as a result of pain; the Patient Health Questionnaire (PHQ 9), which asks about depression; and the Credibility/Expectancy Questionnaire (CEQ).

At 6-week follow-up, scores were significantly improved in the active-treatment group compared with the group that received sham treatment.

Table. Outcomes for Active vs Sham tDCS

Endpoint	Mean (SD) Score With Active tDCS	Mean (SD) Score With Sham tDCS	*P* Value
WHY-MPI	48 (21.2)	35.3 (17.7)	.002
RMDQ	12.7 (5.6)	15.4 (5.5)	.001
PHQ-9	7.4 (6.1)	8.9 (6.0)	.003

In addition, the CEQ scores were significantly increased at day 10 (*P* = .038) in the group that received active tDCS compared to the group that received sham tDCS.

"To our knowledge, this is the first double-blinded, placebo-controlled RCT of multiple tDCS sessions in an attempt to modulate the affective component of chronic low back pain," Mariano said.

"The tDCS doesn't work immediately, and this is in keeping with that we're seeing in the literature with these forms of stimulation. There really isn't an immediate response," he noted. "But this is also seen with a lot of other treatments, such as ECT [electroconvulsive therapy], which doesn't work right away.

"It's also similar to many of the antidepressant medications that we use in psychiatry. They typically don't work right away, and it can take up to 8 or 12 weeks to see an effect. Still, even though there was a statistically significant separation at the 6-week follow-up, the actual difference in the scores is fairly modest," he said.

Although the numeric improvement was small, Mariano said it nevertheless points to a benefit for this population.

"Yes, it's a small numeric improvement, but if you think about this population, which is severely impaired, and we are potentially getting some improvement without relying on addictive medication, you could make a strong case that a modest improvement is still of clinical significance and clinical benefit, because tDCS doesn't have the downsides of opioid medications. These are preliminary results, and this needs to be replicated in a larger, better-funded study," Mariano said.

Encouraging Results

"Mariano et al report encouraging results on the positive effects of tDCS for pain disability and depression," Philip Gerretsen, MD, Center for Addiction and Mental Health, University of Toronto, Canada, told *Medscape Medical News*.

"Their results also add to the emerging literature supporting the potential benefit of tDCS, a safe, noninvasive treatment intervention, for multiple neuropsychiatric phenomena," Gerretsen said.

The study was funded by the National Institute of Mental Health, Butler Hospital, the Brown Institute for Brain Science, and the Center for Neurorestoration and Neurotechnology at the Providence VA Medical Center. Dr Mariano has a financial relationship with Ad Scientiam. Dr Gerretsen has disclosed no relevant financial relationships.

American Society of Clinical Psychopharmacology (ASCP) 2018. Abstract W24, presented May 30, 2018.

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Cite this article: Transcranial DCS May Boost Mood in Chronic Low Back Pain - *Medscape* - May 31, 2018.