

# Brain stimulation treatment may improve depression, anxiety in older adults

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A noninvasive brain stimulation treatment improved depression and anxiety symptoms among older adults in a new University of Florida-led [study](#).

Improvements in [depression](#) and anxiety symptoms were greatest among patients who reported higher symptom levels before treatment. Among participants who experienced moderate to severe state anxiety—or anxiety associated with stressful situations or events—the treatment benefits persisted at a one-year followup.

The findings, published in the journal *Brain Stimulation*, suggest the treatment, known as [transcranial direct current stimulation](#), or tDCS, holds promise as a noninvasive, drug-free option to treat depression and anxiety symptoms, which affect 1 in 4 [older adults](#).

"Depression and anxiety can impact our overall mental health, cognitive function and ability to function independently as we age," said the study's senior author Adam Woods, Ph.D., the associate dean for research and a professor of clinical and [health psychology](#) at the UF College of Public Health and Health Professions and co-director of UF's Center for Cognitive Aging and Memory Clinical Translational Research.

"Often, front-line treatments involve medication and/or therapy, which can both be effective. However, there is also a pressing need for accessible and noninvasive options that can be deployed in people who are either nonresponsive to pharmaceutical treatment, unable to access or participate in clinic-based intensive treatment programs, or for a variety of other reasons."

Treatment benefits in the UF-led study were seen among participants

with subclinical depression and anxiety, meaning their symptoms may not meet the criteria for diagnosis. Yet, even subclinical depression and anxiety can be associated with [cognitive decline](#) in older adults, the researchers say.

The tDCS treatment is delivered by a safe and weak electrical current passed through electrodes placed on a person's head. Researchers targeted the prefrontal cortex, an area of the brain associated with cognition and emotion regulation.

The new study was the largest study of its kind with older adults participating at UF and University of Arizona study sites. Nearly 400 older adults were randomly assigned to one of two groups: 12 weeks of tDCS paired with cognitive training designed to improve working memory and processing speed, or 12 weeks of cognitive training paired with a placebo version of tDCS.

Investigators also collected a wealth of data from cognitive, functional and neuroimaging tests as well as self-report measures of psychological symptoms, including depression and anxiety.

After controlling for factors such as prescription drugs that may impact depression and anxiety symptoms, the study team found that participants who received the tDCS treatment had significant improvements in mild depression and moderate to severe state anxiety, compared with the group that did not receive tDCS.

"Extensive research has demonstrated the efficacy of active stimulation to this area of the brain in reducing psychological symptoms in individuals with diagnosed psychiatric disorders," said Hanna Hausman, the study's lead author and a UF PHHP clinical psychology Ph.D. student in neuropsychology.

"It was an unexpected yet welcome surprise to witness similar effects in our sample of older adults without significant psychiatric histories, especially on a large scale. Demonstrating this [therapeutic effect](#) is important because even subclinical depression and [anxiety symptoms](#) in older adults are associated with adverse outcomes."

Next steps for this research should include a phase 3 randomized clinical trial designed to assess the effect of tDCS and cognitive training on anxiety among a large and diverse group of older adults, the investigators say.

The Korea Food and Drug Administration has approved tDCS as an at-home treatment for depression for adults in South Korea, and with additional study, it could become an accessible and easy-to-use treatment in the U.S. once sufficient evidence is available for U.S. Food and Drug Administration approval.

"tDCS treatment is cost-effective, portable and can be seamlessly integrated with existing mental health therapies or used as a standalone intervention," Hausman said. "Its potential for at-home self-administration would further expand accessibility and reduce personnel costs, making it a promising intervention for individuals who may experience barriers accessing face-to-face clinical care."

**More information:** Hanna K. Hausman et al, tDCS reduces depression and state anxiety symptoms in older adults from the augmenting cognitive training in older adults study (ACT), *Brain Stimulation* (2024). [DOI: 10.1016/j.brs.2024.02.021](https://doi.org/10.1016/j.brs.2024.02.021)

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