

Study of brain pacemaker shows promise in slowing decline of Alzheimer's

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Tom Moore takes care of his wife LaVonne, who has Alzheimer's disease. A new study shows that an implanted pacemaker that sends electrical stimulation to LaVonne's brain slowed the progression of her symptoms, allowing her to retain functionality longer. Credit: The Ohio State University Wexner Medical Center

While most treatments for Alzheimer's disease focus on improving memory, researchers at The Ohio State University Wexner Medical Center conducted a study aimed at slowing the decline of problem-solving and decision-making skills in these patients.

For the first time ever, thin electrical wires were surgically implanted into the frontal lobes of the brains of patients with Alzheimer's disease to determine if using a brain pacemaker could improve cognitive, behavioral, and functional abilities in patients with this form of dementia.

The [deep brain stimulation](#) (DBS) implant is similar to a cardiac pacemaker device, except that the pacemaker wires are implanted in the brain rather than the heart.

Findings of the study are published online in the *Journal of Alzheimer's Disease*.

"We have many memory aides, tools and pharmaceutical treatments to help Alzheimer's patients with memory, but we don't have anything to help with improving their judgments, making good decisions, or increasing their ability to selectively focus attention on the task at hand and avoid distractions. These skills are necessary in performing daily tasks such as making the bed, choosing what to eat and having meaningful socializing with friends and family," said Dr. Douglas Scharre, co-author of the study and director of the Division of Cognitive Neurology at Ohio State's Wexner Medical Center's Neurological Institute.

"The frontal lobes are responsible for our abilities to solve problems, organize and plan, and utilize good judgments. By stimulating this region of the brain, the Alzheimer's subjects cognitive and daily functional abilities as a whole declined more slowly than Alzheimer's patients in a matched comparison group not being treated with DBS," he said.

The pilot study found that DBS targeting frontal brain regions can reduce the overall performance decline typically seen in people with mild or early stage Alzheimer's, Scharre said.

Scharre is a neurologist who focuses on treating patients with Alzheimer's and other dementias. He collaborated with Dr. Ali Rezai, a neurosurgeon who specializes in neuromodulation, to conduct this clinical trial.

"This same technology has been successfully used to treat more than 135,000 patients worldwide with Parkinson's disease. Our findings suggest that frontal network modulation to improve executive and behavioral deficits should be further studied in [patients](#) with Alzheimer's disease," said Rezai, the former director of Ohio State's Neurological Institute who is now leading the Rockefeller Neuroscience Institute at West Virginia University.

All three study participants showed improvement, including LaVonne Moore, 85, of Delaware, Ohio. When she entered the study in 2013, she was not doing any meal preparation. After two years of deep-brain stimulation, she could independently initiate preparations of a simple meal, assemble ingredients and cook the meal.



Dr. Douglas Scharre examines Alzheimer's patient LaVonne Moore. She was part of a pilot study at The Ohio State University Wexner Medical Center to test how deep brain stimulation may help slow the progression of Alzheimer's symptoms. LaVonne and Tom Moore look at family photo albums together. After 65 years of marriage, Tom is now taking care of LaVonne, who has Alzheimer's Disease. However, the progression of the disease has been slower than a typical Alzheimer's patient after she received deep brain stimulation in the frontal lobes of her brain during a pilot study at The Ohio State University Wexner Medical Center. Dr. Douglas Scharre reviews a brain scan of an Alzheimer's patient. He co-lead a study at The Ohio State University Wexner Medical Center to explore how deep brain stimulation may help slow the progression of Alzheimer's symptoms and allow patients to retain functionality longer. Credit: The Ohio State University Wexner Medical Center

She was able to organize an outing, including arranging transportation and destination, planning for the weather and bringing the needed money. She also regained independence to select her clothing attire, researchers noted.

Her 89-year-old husband, Tom Moore, said her Alzheimer's disease has progressed, but more slowly than he expected. "LaVonne has had Alzheimer's disease longer than anybody I know, and that sounds negative, but it's really a positive thing because it shows that we're doing something right," Moore said. She didn't hesitate to volunteer for the study, he added.

He said she told him: "I will do anything to help others not go through what I'm going through."

Next, Ohio State researchers want to explore non-surgical methods to

stimulate the frontal lobe, which would be a less invasive treatment option to slow down the symptoms of Alzheimer's disease.

Alzheimer's disease is the most common form of degenerative dementia, affecting more than 5 million Americans. By 2050, this number could rise as high as 16 million, according to the Alzheimer's Association.

The [disease](#) - which has no cure and is not easily managed - becomes progressively disabling with loss of memory, cognition and worsening behavioral function, in addition to a gradual loss of independent functioning, Scharre said.

Provided by The Ohio State University

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