

## Can brain 'pacemaker' improve lives of head trauma patients?

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(HealthDay)—Deep brain stimulation—a technique that sends targeted



electrical impulses to certain areas of the brain—may help people who've had a traumatic brain injury gain more independence, a new study suggests.

"Traumatic brain injury is a common condition with over 80,000 new cases of disability each year," said Dr. Ali Rezai. He's director of the Neurological Institute at Ohio State University in Columbus.

"There are few treatment options to help these individuals. The outcomes of this study demonstrate, however, improvements in disability, functional outcomes, independence, behavioral and emotional regulation, and self-control after two years with DBS [deep brain stimulation] treatment," Rezai said.

Traumatic brain injury can negatively affect memory and thinking, awareness, judgment, decision-making, problem solving and behavioral self-regulation, Rezai noted.

The DBS system is made up of three parts: the lead (or electrode); the extension; and the pulse generator (essentially the batteries), according to the U.S. National Institute of Neurological Disorders and Stroke (NINDS).

The lead is surgically placed in the area of the brain to be stimulated. The extension is a wire that's implanted from the head, under the skin, through the neck and shoulders to connect the pulse generator to the lead. The pulse generator is implanted under the skin in the collarbone area, NINDS explained.

Rezai and his colleagues investigated the effects of deep brain stimulation in four patients. All had suffered severe brain damage in automobile crashes six to 21 years earlier.



The patients didn't have problems with being awake or alert, but they were significantly impaired when it came to performing daily life functions. All required daily supervision and couldn't be alone overnight. Three needed assistance with dressing, grooming and using the toilet.

When doctors implanted the DBS system in the patients, the lead was connected to stimulate the damaged areas of the brain with <u>electrical</u> <u>impulses</u>.

After two years of treatment, the researchers reported that three of the four participants demonstrated behavioral and emotional improvements, and substantial gains in functional independence.

The investigators saw improvements in alertness and engagement among all four participants. Two needed less assistance with the activities of daily living, and three of the four increased their involvement in activities outside of the home.

"Although this is a small study, we are cautiously optimistic in that scientists reported some encouraging results in helping <u>traumatic brain</u> <u>injury</u> patients with their behavioral and their emotional difficulties," said Dr. Eugene Lai. He's a professor of neurology and neuroscience at Houston Methodist Hospital in Texas.

Lai added that <u>deep brain stimulation</u> has been a well-established procedure for treating Parkinson's disease, a progressive disorder of the nervous system that affects movement.

Lai stressed that additional larger studies are needed to confirm these traumatic brain injury findings and to refine the treatment.

"With Parkinson's disease, we know the neurophysiology well," Lai explained. "It is a little more difficult to use it on patients with brain



injury. Brain injury is not as well defined, and it is still not clear yet as to which targets [in the brain] work the best."

Although this study focused on just a few car accident victims, Rezai said the technique might be applied to those who have suffered head injuries related to sports or other causes.

He said the procedure had no major risks, complications or significant adverse events.

Lai added that infection is probably the most common side effect, although this side effect is "relatively rare."

Rezai said further exploration is needed to understand the exact mechanism of how the treatment works on brain injury. Also, this research was "open label," meaning both the scientists and the patients were aware of the treatment being administered. Rezai indicated that a future trial should be bigger and tested against a placebo (a sham form of therapy).

The study was published recently in the journal Neurosurgery.

**More information:** To learn more about deep brain stimulation, visit the <u>U.S. National Institute of Neurological Disorders and Stroke</u>.

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