A Shocking Revelation: Deep Brain Stimulation as a Treatment for Alzheimer’s Disease

Alzheimer’s disease, a highly debilitating neurodegenerative disorder, is the most common form of dementia worldwide.1 Those afflicted struggle with issues with memory, thinking, and behavior; the slow, progressive onset of this cognitive decline2 makes it an insidious and emotionally painful illness for patients—nearly 44 million people worldwide3—and their families. More agonizing still: there is currently no known cure.2 A recent study in the *Journal of Alzheimer’s Disease*, though, points to another way to slow the development of the disease: deep brain stimulation.4

Deep brain stimulation (DBS) involves implanting a “brain pacemaker” in a patient to deliver electrical impulses to specific regions of the brain. This alters its activities through regulation of specific action potentials, cells, or chemicals.5 DBS has proven efficacious for treating disorders like Parkinson’s disease, depression, and obsessive compulsive disorder5, and now, it appears that the therapy may find success in Alzheimer’s treatment as well. Multiple studies investigating DBS as Alzheimer’s treatment have described differentially successful results, reporting that deep brain stimulation in areas such as the fornix (implicated in the memory circuit of Papez) and the nucleus basalis of Meynert (a perception-related area that degenerates with Alzheimer’s) helped enhance memory by supporting the creation of new neurons in the hippocampus.2

The use of DBS as a treatment for Alzheimer’s disease was a happy, yet accidental, discovery: in 2008, an obese patient treated with hypothalamic DBS (in the hopes that it would regulate his appetite by suppressing his hunger cues) suddenly reported *déjà vu*, a feeling of rejuvenation, and an ability to recollect old memories in more vivid detail than he ever had before.6 Further imaging revealed that stimulation of his hypothalamus, the brain’s center for hunger and other drives, resulted in increased brain activity in his hippocampus (where short-term memories are consolidated into lasting ones).6 Though it was not intentional, this unexpected consequence opened the floodgates for new ideas for the treatment of Alzheimer’s—a disease characterized by significant memory loss.

Many studies have tested the ability of DBS to treat the symptoms of the condition, and this newest addition in the *Journal of Alzheimer’s Disease*, from neurologists at The Ohio State University, provides a longer-term study to elaborate on preexisting research. The study found that DBS in the frontal lobe, a region responsible for problem-solving, organization, planning, and judgment, helped slow the cognitive decline of subjects with Alzheimer’s.4 Though the study had a notably small sample size of three participants, the results were promising: subjects’ cognitive functions declined much more slowly than did those of controls without the treatment. One subject, who had been unable to prepare food on her own, was able to plan, organize, and cook a meal independently.4 These types of improvements have given doctors hope for the treatment outcomes of those suffering from Alzheimer’s disease, as well as other conditions that have a negative impact on cognition.

Though Alzheimer’s disease is a hot topic in the medical community, scientists have a lot to learn about which routes of treatment will be the most beneficial. The idea that DBS may successfully alleviate symptoms and slow disease progression is exciting and has sparked important discussions about next steps for treatment. Many researchers agree that alterations to higher-processing networks of the brain have the potential to improve executive functioning in patients, and the numerous ways to achieve this neuromodulation leave plenty of room for creativity and innovation in methods of treatment. Given the potential side effects of DBS—which can include surgical risks, infections, and neuropsychiatric complications7—an ideal treatment might include non-invasive methods.5 That type of therapeutic may be a reality in the future, but the best we can do, for now, is appreciate the possibilities that DBS has made apparent to treaters of the most prevalent form of dementia today.

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Works Cited

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