

The sweet spot? Doctors test targets for Parkinson surgery

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Doctors may be able to tailor a specialized form of brain surgery to more closely match the needs of Parkinson patients, according to results from the first large-scale effort to compare the two current target areas of deep brain stimulation surgery, or DBS.

Called the COMPARE Trial, the National Institutes of Health-funded study conducted at the University of Florida evaluated 45 [patients](#) for mood and cognitive changes related to DBS.

UF investigators found that DBS in either [brain](#) target effectively treated motor symptoms such as tremors, stiffness and slowness.

However, DBS also produced unique effects depending on the target location, especially in patients' moods and [mental sharpness](#).

The discoveries, in today's (March 13, 2009) *Annals of Neurology*, may have an impact on the selection of DBS patients, especially those with pre-existing memory, cognitive or mood disabilities.

"Both targets are FDA-approved and provide excellent outcomes for motor function in Parkinson patients," said Michael S. Okun, M.D., the principal investigator of the study and a co-director of the Movement Disorders Center at UF's McKnight Brain Institute. "But there were differences in cognitive function and [verbal fluency](#) seven months after the surgery, and that is something that should be considered when trying to tailor therapy to an individual patient's condition."

DBS received Food and Drug Administration approval in 2002 as a therapy for movement-related problems associated with essential tremor and Parkinson's disease. It uses a medical device surgically implanted in a patient's brain and connected to a power pack in the shoulder region. DBS delivers [electrical pulses](#) to targeted areas of the brain via very thin wires, known as "leads." Each lead ends with four distinct electrical "contacts."

Currently, in almost all cases worldwide, the leads are implanted in a brain region known as the [subthalamic nucleus](#). But the nearby globus pallidus interna, or GPi, may again emerge as a viable target, especially for patients with mood and cognitive issues, researchers say.

Forty-five volunteers with moderate to advanced Parkinson's disease completed the prospective, randomized study. Twenty-three received leads to the GPi and 22 to the subthalamic nucleus.

Before surgery, scientists at UF's Cognitive Neuroscience Laboratory evaluated the patients' verbal fluency, memory, attention and cognitive processing. Patients were retested about seven months later during four conditions — with stimulation at the optimal contact point on the lead as determined during previous programming sessions, with stimulation at contact points adjacent to the optimal one, and with stimulation turned off. Examiners and patients were blind to the conditions as well as to the brain target.

Generally, the target choice produced no major differences in motor function, mood or cognition in the patients. However, patients whose leads were implanted in the subthalamic nucleus, the most common surgery target, did have increased problems with verbal fluency and mood — and they tended to be more angry and irritable.

"We think it will be important to tailor the therapy to the patient," said

Kelly D. Foote, M.D., an associate professor of neurosurgery at the College of Medicine and a co-director of the UF Movement Disorders Center. "Targeting the traditional location — the subthalamic nucleus — might be better for someone who is younger and healthier. But for someone who is older with memory problems, or perhaps in the early stages of dementia, it would be important to consider the alternative."

The traditional target does have unique advantages, Foote said. It seems to be more effective at reducing a patient's medications, which may lead to an improved quality of life and cost savings. In addition, because it is relatively smaller — about a third the size of a pea — less electricity was required to stimulate this area, which is an important consideration because more surgery is required to replace DBS batteries.

More study will be necessary to determine whether DBS target choice can be tailored to meet individual patient needs. However, in considering the surgery, potential patients need to weigh the benefits of DBS against risks such as mild cognitive decline.

"It is unclear whether these mild cognitive changes are clinically significant in terms of the patient's everyday life," said Dawn Bowers, Ph.D., a professor in the department of clinical and health psychology in the College of Public Health and Health Professions and the director of the Cognitive Neuroscience Laboratory where the patients were assessed. "Though important, they pale in comparison to the tremendous boost these patients receive in motor behavior."

In the meantime, scientists say uses for DBS technology will continue to move beyond the movements disorders field.

"It is vitally important that we take the opportunities afforded to us by [deep brain stimulation](#) technology to better understand what underpins mood and cognitive circuitry in the brain," said Okun, who is also an

associate professor of neurology and neurosurgery at the UF College of Medicine and the national medical director of the National Parkinson Foundation. "What we have learned from Parkinson's disease we are now taking into other areas, and as we unlock the circuitry, we can apply new technologies to ultimately improve quality of life."

Source: University of Florida ([news](#) : [web](#))

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