

UCSF neurosurgeons test new device for placing brain implants

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A new MRI device that guides surgeons as they implant electrodes into the brains of people with Parkinson's disease and other neurological disorders could change the way this surgery, called deep brain stimulation, is performed at medical centers across the country, according to a group of doctors at University of California, San Francisco.

Deep brain stimulation can help to alleviate patients' symptoms, and the new device will make the procedure faster and more comfortable for the patient. It grew out of a home-grown technique developed by a team of UCSF neurosurgeons and [radiologists](#) at UCSF.

"It's an evolutionary step in the way these surgeries are done," said UCSF [neurosurgeon](#) Paul Larson, MD, who will present initial test data on the new device today at the 79th Annual Scientific Meeting of the American Association of Neurological Surgeons in Denver. Larson was part of the team that developed the technique, with Alastair Martin, PhD and Philip Starr, MD, PhD.

UCSF is the first hospital to test this device, manufactured by the Southern California company Surgivision and approved by the U.S. [Food and Drug Administration](#) last summer. UCSF's initial test results were collected in six mock surgeries on three cadaver brains and on dozens of artificial targets made of water- and gelatin-filled plastic.

Deep Brain Stimulation

Parkinson's disease affects about 1 percent of the U.S. population over 50 – about 1.5 million people – a population expected to increase as Baby Boomers age.

Many with severe symptoms from Parkinson's disease have benefited from deep brain stimulation – similar to putting a pacemaker inside a heart patient's chest. Over the last decade, doctors have performed tens of thousands of these surgeries; medical teams at UCSF perform about two a week.

Scientists aren't sure why deep brain stimulation works, but they believe it relates to the electric current being delivered to tiny parts of the brain, altering abnormal brain circuitry and alleviating symptoms by overriding the signals coming from those parts of the brain. One crucial part of the technique is accurately targeting the appropriate part of the brain.

Traditionally the surgery takes place with the patient awake so that brain activity can be fully monitored. A surgeon bolts a metal frame to a patient's head and then passes a small electrode into the target area in the brain, making recordings and testing the effect of patient movement on brain activity.

The New Technique

In 2004, the UCSF team developed a way to guide the placement of these electrodes while the patient was inside an MRI scanner. A standard MRI can show hi-res structures deep inside the brain, and surgeons can use these images to more accurately place the electrodes, potentially cutting the surgery time in half. Because the recording and testing step with smaller [electrodes](#) is eliminated from the process, it can also be

done while the patient is asleep.

Despite these advantages, the original technique relied on specially modified parts and procedures unique to UCSF rather than a commercially available system. Any hospital that wanted to use this technique would have to develop its own homemade system. As a result, Larson said, "We were the only people in the world doing it."

Now with the availability of the new device, he predicts, more medical centers will start to use MRI to guide [deep brain stimulation](#).

"The system provides the accuracy and reliability for us to do these operations safely and effectively," Larson said.

Provided by University of California, San Francisco

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