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A *Ray* of Hope

Deep brain stimulation (DBS) provides relief to patients suffering from Parkinson's disease, essential tremor, dystonia, and other movement disorders. Beyond decreasing tremors associated with these conditions, DBS lessens the severity of pain and other symptoms to improve overall function.

DURING a DBS procedure, a neurosurgeon, guided by magnetic resonance imaging (MRI) or computed tomography (CT) scanning, implants a neurostimulator about the size of a stopwatch to provide electrical stimulation to targeted areas of the brain.

"Since 1997, DBS has been restoring function to patients coping with essential tremor," says Paul House, MD, Assistant Professor of Neurosurgery at The University of Utah. "Most patients who undergo the treatment experience a 99 percent increase in function."

PERFECT FOR PARKINSON'S

Although symptoms of Parkinson's disease vary greatly in the way they manifest in patients, DBS electrode stimulation of the motor thalamus, subthalamus, and the internal segment of the globus pallidus has proven generally effective at decreasing tremor, improving motor function, and reducing dyskinesias. This treatment works by interfering with the electrical signals that cause the movement disorder symptoms.

"Parkinson's disease patients, through DBS, can dramatically reduce their medications and still see a decrease in their symptoms," says Dr. House. "In addition, most enjoy improved movement speed and, because of the reduction in medication intake, experience fewer overall side effects."

HOW IT WORKS

Prior to the procedure, the surgeon uses an imaging scan to determine the exact placement of the DBS system, which consists of three elements: the lead, the electrode, and the neurostimulator. The lead enters the brain through a small hole in the skull, and is implanted to position the tip of the electrode so it touches the targeted area of the brain. The insulated wire extension is implanted under the skin, often near the collarbone, and used to send electrical impulses from the neurostimulator to the brain.

"DBS has been widely used to treat neurological movement disorders," says William Couldwell, MD, PhD, Chair of the Department of Neurosurgery at The University of Utah. "Greater possibilities are on the horizon, however—DBS may also be used in the treatment of depression, psychological disorders, and even obesity."

The DBS system is reversible and adjustable, and does not damage tissue or destroy nerve cells.

Do you have a patient who could benefit from deep brain stimulation? Contact a movement disorders expert at the Clinical Neurosciences Center at The University of Utah by calling (801) 585-7575 or visiting www.utahneurosciences.com.

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–WILLIAM COULDWELL, MD, PHD, CHAIR OF THE DEPARTMENT OF NEUROSURGERY AT THE UNIVERSITY OF UTAH.

Surgical Options for Management of Movement Disorders

At the Clinical Neurosciences Center at The University of Utah, clinicians provide innovative surgical treatments to help those with movement disorders such as Parkinson's disease, dystonia, essential tremor, post-stroke tremor, and spasticity.

"Neurosurgery offers several ways to treat damage to or disease of the brain or spinal cord," says Paul House, MD, Assistant Professor of Neurosurgery at The University of Utah. "While surgeries for the treatment of movement disorders have been performed for more than 100 years, new techniques can help patients manage their symptoms more effectively."

During deep brain stimulation (DBS), for example, high-frequency electrical pulses from an implanted device (see page 6) silence the abnormal communication that causes symptoms of movement disorders to help restore function for the patient.

Other stereotactic and functional neurosurgery techniques are available for those with various types of movement disorders. Treatments include:

- **implantation of baclofen infusion pumps for spasticity**—Implantation of a pump to administer baclofen long-term can benefit areas of the brain and spinal cord that control muscle tone.
- **selected rhizotomy for spasticity**—Problematic nerves that generate unusual electrical activity in the spinal cord are identified and selectively severed to relieve pain and symptoms.
- **selective denervation of cervical muscles for spasmodic torticollis**—Surgical treatment can be used to interrupt the pathways that maintain abnormal neck movements.

To learn more about neurosurgery services at the Clinical Neurosciences Center at The University of Utah, visit www.utahneurosciences.com.

Benefits of an Interdisciplinary Team

in the Diagnosis of Movement Disorders

The medical staff at the Clinical Neurosciences Center at The University of Utah understands that movement disorders present some of the greatest challenges for clinicians. As a result, they utilize an interdisciplinary team approach to reach a definitive diagnosis and protocol for each patient.

"OUR interdisciplinary team comprised of a physician's assistant, neurologists, neuropsychologists, physical therapists, and neurosurgeons works in concert to reach a diagnosis, then maps out the best treatment plan based on each patient's specific condition and situation," says Paul House, MD, Assistant Professor of the Department of Neurosurgery at The University of Utah. "The dedicated efforts of each team member are required to ensure we offer our patients the highest quality of care."

What It Takes

Diagnosis of movement disorders starts with a comprehensive medical history and thorough physical and neurological examination. Initially, the physician's assistant meets with the patient to oversee and coordinate the process. The patient undergoes a physical and neuropsychological evaluation to assess prior management of the disorder. A neurologist then evaluates the patient, utilizing brain-imaging studies that may include computed tomography (CT), positron emission tomography (PET), or magnetic resonance imaging (MRI) scans. Once a diagnosis has been reached, the interdisciplinary team meets bi-monthly to discuss each patient's treatment plan and progress.

To learn more about neurosurgery services at the Clinical Neurosciences Center at The University of Utah, visit www.utahneurosciences.com.