

# SOUTHWESTERN NEWS

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## **Deep brain stimulation restores quality of life for end-stage Parkinson's patients**

DALLAS – March 2, 2004 – A tiny electric wire deep in Carlene Morehead's brain constantly sends signals that tame overactive neurons, restoring her ability to walk, talk and enjoy time with her family.

Mrs. Morehead, 67, has had Parkinson's disease for 20 years. Little more than a year ago, her motor skills rapidly declined after her response to medications began to change, causing her to oscillate between having too little mobility and having excessive, uncontrolled movements. She opted to undergo a surgical procedure called deep brain stimulation.

Dr. Cole Giller, associate professor of neurological surgery and radiology at UT Southwestern Medical Center at Dallas and one of only three surgeons in Dallas who performs the operation, placed two tiny electrodes in the subthalamic nuclei on either side of Mrs. Morehead's brain and wired them to pacemakers implanted in the chest wall just below her collarbones. The electrodes deliver continuous, high-frequency electrical stimulation to cells in areas of the brain that control movement. The treatment results in marked improvement in stiffness, slowness, tremors, weakness and other disabling symptoms.

"The goal of this is to trade electricity for medication, because the electricity can be delivered at a steady rate that can be adjusted in small steps to produce the greatest benefits and the least side-effects," Dr. Giller said. "The pacemaker is actually turned on by the same doctor who has been managing the drug therapy of the Parkinson's patient."

After her recovery from surgery, Mrs. Morehead's neurologist, Dr. Padraig O'Suilleabhain, assistant professor of neurology at UT Southwestern, activated the pacemakers and made a series of adjustments in the following weeks. During this time, with adjustment of medication and stimulation, she recovered the ability to function without limitation and without the up and down response she had been experiencing. Mrs. Morehead now visits the clinic once every few months for adjustments.

"I'll come in, and I'll be having trouble with my speech, and he'll tweak it a little bit, and I'll start speaking more clearly," she said.

Dr. O'Suilleabhain said the surgery has significantly improved the quality of life for 80 percent of his patients who opted to have it, with dramatic improvements in some.

"Some of the effects of stimulation occur in the first minute after adjustment. A severe tremor can disappear right before your eyes," Dr. O'Suilleabhain said.

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Deep brain stimulation was originally approved for use in the early 1990s to provide electrical stimulation of the thalamus in patients with disabling tremors. In the last few years, neurological surgeons have found that placement of the electrodes just under the thalamus – in the subthalamic nucleus – not only improves tremors, but is effective in managing the slowness and stiffness and involuntary movements seen in Parkinson's disease. Researchers have found that the electrical stimulation continues to provide significant improvements in quality of life for at least five years after implantation. Balance and mental abilities, which can be impaired by Parkinson's disease in some people, are usually not helped by the stimulation.

The surgery is not a cure for Parkinson's disease. The gradual loss of nerve cells in the affected part of the brain continues despite the functional improvements.

Deep brain stimulation is replacing surgical procedures known as pallidotomy and thalamotomy, in which the surgeon actually creates holes in specific areas of the brain. Unlike the older procedures, deep brain stimulation is reversible, adjustable and poses less risk.

Dr. Giller has developed a unique method of pinpointing the location of the structure in the brain targeted for electrode implantation. He inserts a wire with a tiny flashlight on the tip to illuminate the area of the brain and then analyze its optical properties. Dr. Giller has used the optical probe to guide his placement of the electrode in 130 deep brain stimulation procedures, including Mrs. Morehead's.

"We can distinguish gray matter from white matter very elegantly," Dr. Giller said. "It is very easy, very quick, and we are the only ones in the world to use optical technology to do this."

Eleven months after Mrs. Morehead's surgery, she and her husband, Randall, had a glimpse of what life might have been without it. Two days before Christmas, a magnetic device in a department store shut off one of the pacemakers in her chest. Within hours, she could not walk or talk.

"By dinner time that night, I was crawling," she said. "My husband had to carry me into the doctor's office," she said.

Dr. O'Suilleabhain reactivated the pacemaker, and she was able to walk within an hour.

Mr. and Mrs. Morehead, who met in high school in Paradise, have been married 43 years. The couple has five children and 12 grandchildren. The way Mrs. Morehead sees it, enjoying time with her husband and family is what life is all about.

"We have been very pleased with the way this turned out," Mr. Morehead said.

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