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James Culwell, left and Dr. David Nathan watch Lance Bremser demonstrate use of a controller for the device.

Stilling tremors

Deep brain stimulation causes transformation

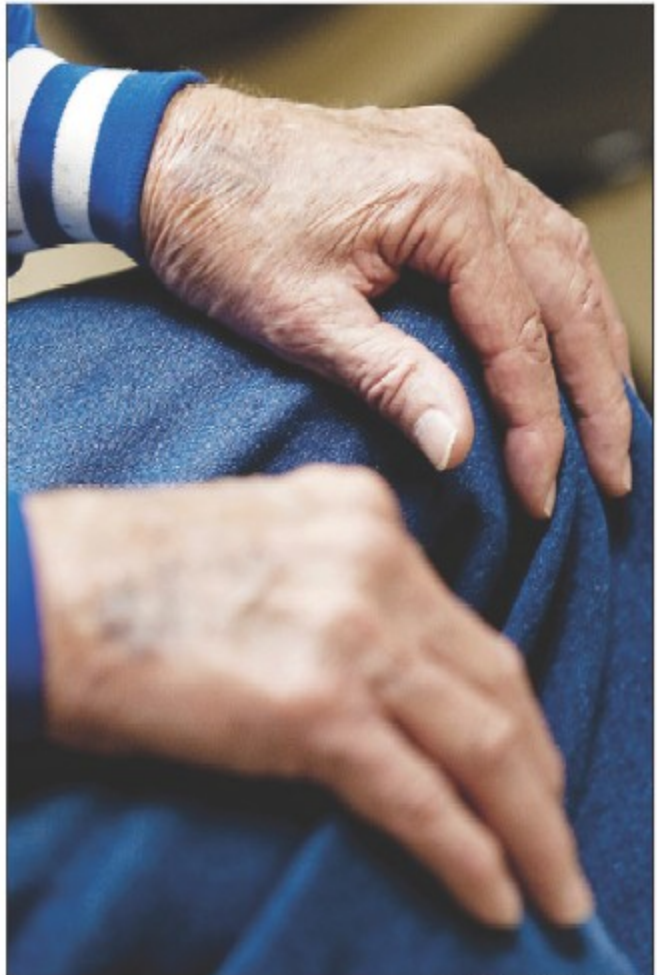
By Carrie A. Moore
Deseret News

Hours after a surgeon drilled two holes in the top of 82-year-old James Culwell's skull, Culwell was eating soup with a steady hand and dreaming of snagging a bass at Flaming Gorge.

Electrodes placed earlier that day inside his brain had not only stilled his trembling hands, but opened his heart again to the simple pleasures he had missed.

Friends who had provided care and taxi service for years "couldn't believe it" when Culwell left Salt Lake Regional Hospital in February, mostly free of the "essential tremor" of the hands and feet that had stolen much of his self-sufficiency. "They still can't," he said recently in a bit of cowboy twang.

Experienced by as many as 10 million Americans, essential tremor disorder is believed to be much more common than Parkinson's disease.



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James Culwell rests his now-steady hands on his knees during a visit to neurosurgeon Dr. David Nathan in Salt Lake City.

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which most people associate with involuntary limb movement.

Advanced treatment for both disorders, known as deep brain stimulation (DBS), introduces electrodes into regions of the brain — the globus pallidus or subthalamic nucleus — that receive signals to create the tremors, confusing the transmission of those signals much like static interferes with broadcast signals in the public airwaves.

Culwell now drives again, works around the house and is readying his boat for fishing season — all activities he was unable to do as the tremors became steadily more uncontrollable.

While the treatment has been in use in the United States for several years, new technology allows patients to recharge the battery pack implanted in their chests that run the device, rather than having to undergo replacement surgery.

Last month, an advisory panel of experts recommended that the Food and Drug Administration approve the therapy to help treat epilepsy.

Dr. Elena James, a neurologist at Salt Lake Regional, said the treatment has been used since 1987 in essential tremor (ET) patients, when medication and other interventions have failed. About 1.5 million Americans have been diagnosed with essential tremor — the nation's most common involuntary movement disorder.

Lance Bremser, a nurse in James' clinic, said the International Essential Tremor Foundation estimates some 20 million Americans have the disorder, but it has gone undiagnosed.

Though the FDA is considering deep brain stimulation as a treatment for epilepsy, James said there is no connection between ET and epilepsy, which is characterized by periodic seizures rather



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Dan Gwin, left, with Dr. Elena James, holds a control to manage the electrodes in his brain.

than continual involuntary movement.

Correctly diagnosing which disorder patients have is James' first priority, because medications to treat them differ widely, she said. The surgical procedure for DBS is something of a last resort for treatment.

Dr. David Nathan, a neurosurgeon at Salt Lake Regional, performed the procedure on Culwell and 57-year-old Dan Gwin, who have both seen marked decreased in the involuntary limb movement.

Gwin, whose Parkinson's disease eventually short-circuited his career as a bass player with the Utah Symphony, had the procedure in February 2004.

"I didn't know whether to cry or laugh," following the surgery when the shaking was gone, he said. "When I woke up, I was so tired I did both." The effect was so dramatic that Gwin was able to return to the symphony for about 6-7 months, but eventually the muscle stiffness that is part of his disease silenced his performance.

But Gwin has found that family history suits him well, and in the past decade, has produced a 7-pound, 2-ounce

"baby" in the form of two volumes of genealogical records.

Patients who undergo the procedure must be prepared for the follow-up visits that help "fine-tune" the electrode interference, so they get maximum benefit from the surgery, Nathan said. Patients get a local anesthetic in the skull, but remain conscious during the procedure so surgeons can get feedback as they place the electrodes inside the brain.

A cord that connects the electrodes to the battery pack is placed under the skin down the side of the skull, behind the ear and down the neck, to connect to a battery pack that is surgically placed in the chest.

"It's like giving them a pacemaker for the brain," without having to surgically replace the batteries, Nathan said.

Patients are then able to recharge the battery pack, often at night, when some get



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Dr. David Nathan shows a brace used in surgery to implant electrodes.

relief from their symptoms that is not available during waking hours.

So next time Culwell heads to Flaming Gorge, he'll be behind the wheel of both his car and his boat. And when his fishing pole begins to shake, the question won't be what's causing the tremor, but how big that bass on the hook really is.

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