

# Essential tremor patient regains independence following surgery

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For nearly 30 years, Tom Rogers' left hand would shake when he tried to use it, making even simple tasks such as drinking a glass of water, writing a check, or making a sandwich challenging. The tremor eventually became so disruptive that he lost use of his dominant hand. Rogers sought care and learned that his tremor was a symptom of Parkinson's disease, yet felt he was suffering from something different.

"I was familiar with Parkinson's because my father had it and I knew this wasn't the same," said Rogers, a 66-year-old retired truck driver who resides in Oswego, Ill. "It was exactly the opposite of my dad's tremor which would start when he was still or relaxed. My hand would shake when I had something in it or tried to use it."

Also convinced that her husband was suffering from something other than Parkinson's, Pam Rogers began searching the internet. Through her research the couple learned about another movement disorder called [essential tremor](#) and found their way to Northwestern's [Parkinson's Disease](#) and Movement Disorders Center. Northwestern Medicine® movement disorder specialists diagnosed Rogers with essential tremor, a neurological disorder that causes shaking in the hands, head, voice and occasionally the legs and trunk. An estimated 10 million Americans have essential tremor making it eight times more prevalent than Parkinson's, yet the two are often confused.

"Essential tremor is not a life-threatening disease, but it worsens over time and can be very debilitating," explained Joshua Rosenow, MD,

director of functional neurosurgery at Northwestern Memorial Hospital and associate professor of neurosurgery at Northwestern University Feinberg School of Medicine. "Severe cases can profoundly impact a person's quality of life and limit the ability to function independently. As the condition progresses, it becomes more challenging for these patients to eat, feed themselves, write or drive. Some even become too frustrated or embarrassed to go out in public because of their tremor."

The disorder can be treated with medications, but many do not adequately control the tremor or cause negative side effects that outweigh the benefit. Patients are encouraged to eliminate any stimuli that increase their tremor, such as caffeine or life stress. When those treatments fail, deep brain stimulation (DBS) surgery is an option for some patients.

"Essential tremor is a vastly undertreated disorder, but DBS is tremendously effective, often much more so than medications," explained Rosenow. "DBS involves implanting small electrodes into very specific region deep in the brain to deliver continuous high frequency electrical impulses. Each electrode is connected to an extension wire that runs under the skin down to the chest where a battery pack is implanted. This pack acts as a 'pacemaker' for the brain and helps control the tremor."

After medication failed to control his tremor, Rogers made the decision to have DBS surgery. "It got to the point where I couldn't even sign my own name with my left hand and it was beginning to affect my right hand as well," said Rogers. "I knew if I ignored it, eventually I wouldn't be able to function on my own."

During DBS, the surgeon first plans the surgery by mapping out the best path for the electrode using detailed 3-D images of the brain. The patient is awake for part of the surgery and becomes a key member of the team

as they map out the correct location for the electrode. Local anesthetic is given so that no discomfort is felt.

"The surgeon and neurophysiologist determine the exact placement for the electrode by listening to the nerve cell signals, which have a unique pattern in each area of the brain," said Rosenow, who performed Rogers' DBS surgery. "The patient's legs and arms are moved to see what effect the electrode is having and the patient is also asked to speak, look around and relate if there is any tingling or pulling in the arms, legs or face. In Tom's case, we asked him to mimic bringing a glass to his mouth because this was something that was impacted greatly by his tremor."

Rogers immediately felt a change when his surgical team found the right spot in his brain. "It was instantaneous," he recalled. "I said 'Doc, you found ground zero.' It was shaking and then all of a sudden it stopped."

A permanent electrode is placed once the correct location is found and the surgical team tests it by turning on the charge. They look for both a decrease in tremor, as well as any unwanted side effects. Once satisfied with the location, the electrode is secured and the patient is put back under general anesthesia for the remainder of the surgery. In the months following surgery, the implanted battery pack is programmed to achieve the optimal balance between stimulation and medication.

"Following surgery, we work with the patient to tailor the level of stimulation and treatment to their needs," said Cindy Zadikoff, MD, a movement disorders specialist at Northwestern Memorial and assistant professor of neurology at the Feinberg School, who helps select patients for DBS surgery and has special expertise in programming the stimulation devices. "In rare cases, the surgery itself turns off the tremor by causing what is known as a micro-lesion effect. Tom was one of these unique situations; in more than six months since surgery his device has not been turned on and his tremor has not returned."

DBS surgery allowed Rogers to regain use of his left hand and gave him the ability to do things that most people take for granted like write checks to pay his bills or drink a glass of water. "My hand is steady as a rock, it's amazing," Rogers said. "It's like I've been given back a new life."

Along with essential tremor, DBS is approved as a treatment for other movement disorders including Parkinson's and dystonia. Brain stimulation is currently being studied as a potential treatment for a wide range of disorders including chronic pain, bipolar depression, addiction, epilepsy and a number of other conditions.

"Millions of people have essential tremor and suffer without ever knowing they can explore an option such as brain stimulation surgery," said Rosenow. "This [surgery](#) can have tremendous benefit for essential tremor and allow patients to regain the ability to do things that may have been lost because of their tremor."

Provided by Northwestern Memorial Hospital

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