

FDA Approves New Surgical Option for ET

The U.S. Food and Drug Administration has recently approved a new treatment for essential tremor – it’s called focused ultrasound. Now that this approach is available in the U.S., Canada, and many other parts of the world, let’s explore how it works, the potential benefits and considerations, and where to get treatment.

Patients with essential tremor do not have many treatment options. Current medications for tremor control are only effective in about half of patients. Those who are significantly debilitated may seek surgical alternatives like deep brain stimulation (DBS) or gamma knife thalamotomy. A promising new approach called focused ultrasound is now another option for patients to consider.

How Focused Ultrasound Works

Most people are familiar with ultrasound being used to “see” unborn babies and other areas inside the body. These same sound waves are applied in focused ultrasound. The technology uses multiple beams of sound all directed on one spot to generate heat, much like how a magnifying glass focuses beams of sunlight to burn a hole in a leaf. The patient has their head shaved and wears a helmet during treatment that contains the transducers that deliver the ultrasound beams. The sound energy travels through the skin, skull, and brain to heat the target tissue without harming nearby tissue. The destruction of the target tissue interrupts circuits of the brain responsible for tremor.

How are the doctors able to see into the brain? They use an MRI (magnetic resonance imaging) machine. The patient lies inside the MRI tube for the entire procedure so the physicians can visualize the brain, validate they are targeting the correct region, and monitor the exact amount of heat being applied. Patients are awake during the procedure, talking with the medical team as they assess progress in reducing the tremor throughout the process. Directly following the procedure, tremor has

been shown to be reduced by 47% in a majority of patients.

Picking the Right Treatment for You

Is this treatment for everyone? Just like any surgery, patients who seek focused ultrasound must be evaluated to see if their diagnosis, medical history, and symptoms match the treatment criteria. It is not a one-size-fits-all approach.

According to study results recently published in *The New England Journal of Medicine*, the technology comes with benefits and risk considerations. The procedure is minimally-invasive and does not require an overnight hospital stay. The benefits can be felt immediately, with patients recovering rapidly and quickly returning to activities of normal life (usually the next day). There is no need for the neurosurgeon to drill holes in the head or implant a pacemaker and wires in the body. Focused ultrasound offers a reduced risk of infection and blood clot formation, and no exposure to radiation. Finally, it offers relief without the need for periodic adjustments.

Considerations for choosing focused ultrasound include the understanding that it permanently destroys part of the brain—the results cannot be undone—and the treatment effect is not adjustable. The treatment is currently considered safe to treat just one side of the brain, so it reduces tremor on one side of the body (usually the dominant side). The procedure may take several hours of lying completely still inside the MRI machine. Some patients may experience temporary pain, dizziness, or nausea during the procedure. There is also

Photo provided by Insightec, manufacturer of the Exablate Neuro focused ultrasound system.



a chance patients could experience longer lasting side effects, such as gait disturbance or numbness.

Where to Get Treatment

Focused ultrasound is currently available to treat essential tremor at several leading academic medical centers in North America, Europe, and Asia. The Focused Ultrasound Foundation (www.fusfoundation.org) and Insightec (www.insightec.com), the company that makes the device, have lists of treatment sites around the world. The Focused Ultrasound Foundation is engaged in funding research for essential tremor as well as expanding the use of this technology to treat patients with other neurological disorders, including Parkinson's disease, epilepsy, brain tumors, obsessive-compulsive disorder, depression, dystonia, and Alzheimer's disease. ©

North American Treatment Locations:

Stanford University Medical Center

Stanford, CA
Contact: Evalina Salas (650) 724-4131
tremorstudy@stanford.edu
Neurosurgeon: Casey Halpern, MD

University of Maryland Medical System

Baltimore, MD
Contact: Charlene Aldrich (410) 328-5332
caldrich@smail.umaryland.edu
Neurosurgeon: Howard Eisenberg, MD
Neurologist: Paul Fishman, MD

Brigham and Women's Hospital

Boston, MA
Contact: Heather Galvin Carter 617-732-6600
hgalvin1@partners.org
Neurosurgeon: G. Rees Cosgrove, MD

Weill Cornell Medical College

New York, NY
Weillcornell.org/parkinsons-disease-movement-disorders
212-746-4966
Neurosurgeon: Dr. Michael G. Kaplitt

Ohio State University Neurological Institute

Columbus, OH
Contact: Amelia Hargrove (614) 366-6639
amelia.hargrove@osumc.edu
Neurosurgeon: Dr. Vibhor Krishna
Neurologist: Dr. Punit Agrawai

University of Virginia

Charlottesville, VA
Contact: Keren Osteen (434) 924-0451
ksh5m@virginia.edu
Neurosurgeon: W. Jeff Elias, MD
Neurologist: Dr. Binit Shah

Swedish Medical Center

Seattle, WA
Contact: Michelle Bauer (206) 320-2847
Focusedultrasound@swedish.org
Neurosurgeon: Ryder Gwinn, MD

Sunnybrook Health Sciences Centre

Toronto, Ontario, Canada
Contact: Todd Mainprize 416 480-4739
Email todd.mainprize@sunnybrook.ca
Neurosurgeon: Todd Mainprize, MD