



Essential tremor (ET) is one of the most common movement disorders, yet only about 50 percent of patients receive satisfactory benefit from the currently available medications. For patients with disabling tremor that is not adequately controlled by propranolol, primidone, or other medications, surgical treatments may be an option. Advances in the understanding of brain anatomy, more detailed imaging methods to better see the brain, and improved surgical techniques now allow for greater surgical accuracy and increased benefits with fewer complications

than when surgical treatments were first introduced. Current surgical options for ET include deep brain stimulation (DBS) and thalamotomy.

Potential candidates for surgical procedures are ET patients who do not experience satisfactory tremor control with medications, and who have disabling tremor that affects their ability to perform activities of daily living such as eating, writing, drinking, dressing, working, or enjoying their hobbies.

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## Surgical Options for Essential Tremor:

### Deep Brain Stimulation

Deep brain stimulation (DBS) surgery is an FDA-approved treatment that has been proven to significantly reduce the tremor associated with ET. In DBS surgery, there is no destruction of the brain. Rather, a wire (electrode or lead) is placed in the ventral intermediate nucleus (VIM) nucleus of the thalamus, located deep in the brain. The wire connects under the skin to a pacemaker-like device in the chest that provides mild electrical currents to control symptoms. In ET, DBS of the VIM nucleus of the thalamus is the most commonly used surgical procedure to control tremor.

Patients who have significant memory problems and patients who have unstable medical conditions that would increase surgical risk are not candidates for surgery. Persons with other medical conditions requiring repeated MRI using a full body-scan also may not be candidates for DBS.

### Stereotactic Thalamotomy

Stereotactic thalamotomy is a surgical procedure that destroys part of the thalamus in order to block the abnormal brain activity thought to cause ET. Currently, thalamotomy is rarely performed due to the risk of serious side effects and the availability of DBS, which is safer, does not destroy brain tissue and has fewer complications.

### Gamma Knife® Radiosurgical Thalamotomy

Gamma Knife® radiosurgical thalamotomy is a technique in which a thalamotomy is performed with beams of radiation rather than a surgical incision or use of electrodes. In a single outpatient treatment, the surgeon uses a Gamma Knife device to focus high-energy gamma rays precisely on an area in the brain that causes tremor. These rays result in the death of the brain cells that generate ET. The procedure takes approximately one hour and the benefit may not be apparent until three to six weeks afterward. This procedure should be restricted to patients with severe tremor who because of unstable medical conditions are not candidates for DBS.



Essential Tremor (ET)

# Surgical Options (cont.)

## If you are considering surgery:

Be proactive in asking questions to ensure that you know what to expect. Involve your family members and invite them to be there with you when you are asking questions. Informed patients and families make better decisions about medical treatment. False expectations and inaccurate information are avoided when the appropriate research has been done. Make sure your expectations are reasonable and you understand both the benefits and risks of undergoing a surgical procedure for ET. In order to do this, it is important to ask questions.

- Am I a candidate for DBS? Why/Why not?
- How does DBS work?
- Will my head or voice tremor be helped? (If you have a head or voice tremor.)
- I understand DBS is not a cure, but how much tremor control should I expect?
- What if you can't get satisfactory tremor control?
- I have tremor in both hands—can you implant a device on both sides at the same time, or does each one require a separate procedure?
- How long should the battery last, and how is it replaced?
- What are the possible side effects?
- What are the surgical risks?
- What happens if I get an infection?
- What are my limitations? For instance, what about scuba diving? When I fly, will it be difficult to get through airport security?
- Are there limitations to MRI or CT Scans that I need to be aware of?
- What are the potential benefits?
- How many procedures for ET have you done? Have they been successful?
- Can you connect me with other patients who have had DBS?
- What can I expect the day of the surgery? How long does the procedure take? Do I have to stay in the hospital? When can I go back to work? Is there anything I need to avoid after surgery?
- What follow-up will be required?
- Will my insurance cover the procedure? (Although DBS has been available in Europe and Canada since 1995 and U.S. FDA-approved since 1997, you should check with your insurance carrier to make sure they cover the procedure and follow-up. While Medicare and most commercial insurers have covered the device and procedure, don't take anything for granted—take the necessary steps to make sure you are covered.)

**This information was reviewed by Kelly E. Lyons, PhD.**

This information is not intended as medical advice or to replace your current medical therapy. Discuss your difficulties with your physician or other healthcare professional in order to help develop a well-rounded treatment plan that is right for you.

The IETF does not make medical recommendations.



### Our Mission:

The IETF funds research to find the cause of essential tremor (ET) that leads to treatments and a cure, increases awareness, and provides educational materials, tools, and support for healthcare providers, the public, and those affected by ET.