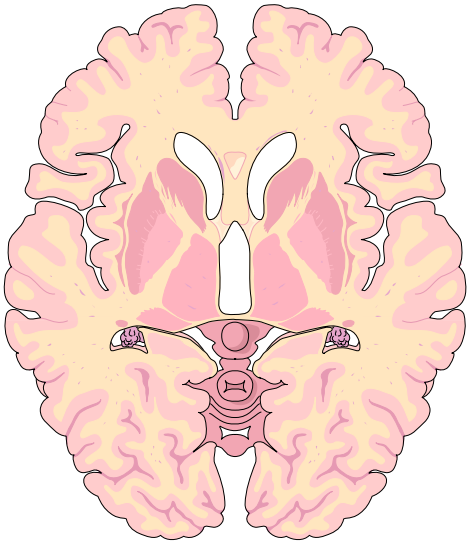
DARTMOUTH-HITCHCOCK
MEDICAL CENTER

Stereotactic Surgery for Movement Disorders



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Introduction

Patients with movement disorders, such as Parkinson's disease, may have many different symptoms. The most common symptoms are shaking, muscle stiffness, and impaired voluntary movement. These symptoms have been linked to disturbances in the part of the brain that is in charge of movement. Medicine can help treat some of these symptoms, but for some patients, medicine is not enough.

There are three common surgical procedures that can help control the symptoms of movement disorders. These procedures are:

1. Pallidotomy
2. Thalamotomy
3. Deep Brain Stimulation

You will meet with specialized doctors to see if surgery is right for you. Through office visits and testing, your doctor will determine which surgery may best control your symptoms.

Pallidotomy

This operation involves creating a small lesion in a part of the brain called the globus pallidus.

The purpose of this procedure is to interrupt the nerve pathways through the pallidus. In doing so, this will help improve some movement disorder symptoms.

The most common benefits from this procedure include less shaking, less stiffness, and less bradykinesia (slow movements). The amount of benefit varies slightly with each patient.

Risks:

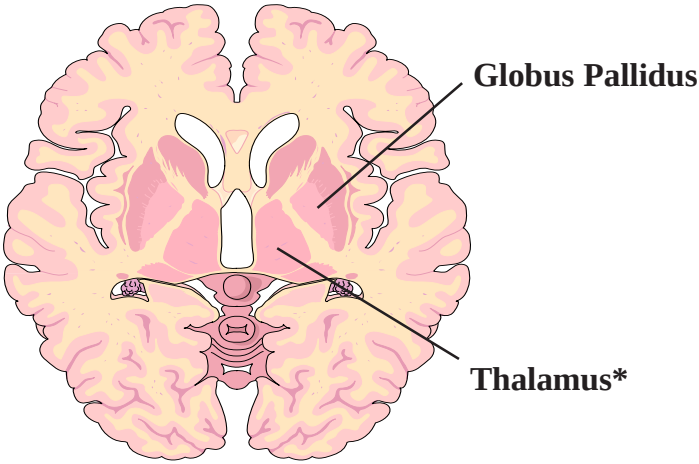
As with any surgical procedure there are risks involved. The chances of these risks are low, but do need to be discussed. The risks include infection (1-2%), stroke (1-2%), and problems with vision (as high as 16% in some reported series).

Thalamotomy

This procedure involves creating a small lesion in the thalamus of the brain. Thalamotomy has been most successful for treating shaking. Statistics show that 70 to 90% of patients have improvement in their symptoms. As with the pallidotomy, the degree of benefit varies with each patient.

Risks:

The most serious risks associated with this procedure include infection (1-2%) and stroke (1-2%).



* **Thalamus** - consists of a pair of egg-shaped structures composed of gray matter and located at the base of the cerebrum. The Thalamus functions as a relay station for the spinal cord and brain stem.

Deep Brain Stimulation (DBS)

This operation involves placing an electrode in a part of the brain called the thalamus. An electrode is a special coated wire which sends an electrical signal. This electrode is one part of a three-part system that provides electrical stimulation to the thalamus. The system includes:

1. The electrode
2. A wire that is tunneled under the scalp to a site just below the collarbone
3. A pulse generator

The purpose of this system is to reduce or eliminate tremor, stiffness, and slow movement. As with the other surgical procedures, the amount of benefit varies slightly with each patient.

Risks:

The risks associated with this surgery are similar to those of pallidotomy and thalamotomy. Unlike making a permanent cut in the brain tissue however, the stimulation may be turned off if undesirable side effects occur.

Preparing for Surgery

We ask that your neurologist send us a summary of your condition. We will need to know what medications you are taking, and any past treatments for your movement disorder. This information is useful when determining if surgery is right for you.

Your surgery will be arranged by your surgeon's secretary. The secretary will work with you to see when you are available. Before your surgery, you will come to the hospital for preoperative testing. This testing is required for all surgical patients. If you are having a thalamotomy or pallidotomy, there will be other tests as well. These extra tests will measure how much your motor skills, memory, language, and psychosocial aspects have been affected by the movement disorder. You should plan to spend most of the day here for the testing.

Do not take blood thinning medicines such as aspirin, aspirin-containing products, or non-steroidal anti-inflammatory drugs (such as ibuprofen or Advil) for 2 weeks before this surgery, or as directed by your surgeon. If you take any of these medications in this two week period, your surgery will be cancelled and set for a later date.

If you are on Coumadin, a potent blood thinner, talk to your doctor about when to stop taking this drug before surgery.

Stereotactic Surgery

Stereotactic means the accurate and precise method of locating and treating small areas in the brain. This surgery is done using a specialized frame which holds the head in place. This allows the surgeon to precisely map out the area for surgery.

The frame will be attached to your head using local anesthesia. During that time you may be sitting in a wheelchair. While the frame is being placed, you will feel pressure on the sides of your head.

Pallidotomy and Thalamotomy:

When the frame is in place, you will have an MRI scan so that the exact measurements and calculations for your surgery can be identified.

After the **MRI***, you will go back to the operating room. For the next portion of the procedure you will be lying down. There will be a brief period of time while some further adjustments are made before starting the surgery.

* **MRI (Magnetic Resonance Imaging) -** MRI uses a strong magnetic field and bursts of radio frequency waves to create an image that produces pictures of cross-sections of the head and body.

You will be awake but lightly sedated during the procedure. This will allow for communication between you and the operative team. Your surgeon will ask you questions during the procedure. The entire surgery usually takes about four hours.

The surgery is performed through a small incision in your scalp. A small opening is then made through the skull using a drill. Throughout your surgery, the surgical team will be testing your strength, sensation, speech, and vision. After identifying the precise region of the brain for this surgery, the tip of the special surgical instrument is heated to create the desired lesion. The surgery is done on the opposite side from your symptoms as this is how the brain's pathways work.

Deep Brain Stimulation (DBS):

DBS surgery differs in two ways. First, instead of making a lesion, an electrode will be placed. Second, after the electrode is placed, you will be given general anesthesia. Then the wire from the electrode will be tunneled down to a place below your collarbone. This is where the transmitter will be placed. This will add one hour to the surgical time.

After Surgery

After surgery, you will go to the recovery room. You will stay there for about one hour. Then you will go to the inpatient unit to stay overnight.

When you go home, you will have one or two stitches in your scalp for Pallidotomy and Thalamotomy. For DBS you will have 3 incisions—2 on your head and one below your collar bone. These stitches will need to be removed in 17 to 21 days. We can set up an appointment for this before you leave the hospital. If you live more than an hour away, you may be able to see a local doctor to have your stitches removed. This can be discussed with your doctor.

If you had DBS, you will need to see the nurse in the Neurosurgery clinic about 4 weeks after discharge. This appointment is needed to program your stimulator.

Going Home

There is nothing special you need to do after you leave the hospital. We advise you to to rest and recover. Talk to your doctor if you are planning any long trips during the four to six weeks after your surgery.

Most patients go back to their normal routines easily because their symptoms get better. There is no need for you to be near the hospital, unless your doctor requests otherwise. We will set up an appointment for you to see your surgeon about six (6) weeks after surgery.

If you have DBS, you will be instructed to carry an identification card with you. You will also receive a magnet when you see the nurse for programming 4 weeks after surgery. The magnet can be used to turn the transmitter on and off. The battery is good for 3-5 years.

Further Information:

Laitenen, Lauri V., M.D., Ph.D., A. Tommy Bergenheim, M.D., and Marwan I. Haiy, M.D., Ph.D. **Leksell's posteroventral pallidotomy in the treatment of Parkinson's disease**. J. Neurosurgery 1992; Jan (76): 53-61.

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Dartmouth-Hitchcock Medical Center is a charitable organization and has a financial assistance policy.

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Revised / PE 3/31/05
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RL: 9.0