

Deep Brain Stimulation

Information for patients and families

Read this information to learn:

- What deep brain stimulation is
- What to expect before and during surgery
- What happens after you go home
- Who to call if you have any questions

Krembil Neuroscience Centre



What is deep brain stimulation?

Deep brain stimulation (DBS) is a treatment for health problems such as Parkinson's disease. DBS sends electrical impulses (signals that move along small electrical wires) to certain areas deep in your brain. This can help relieve your symptoms without harming your brain.

To have this treatment, you need surgery to put the parts of the DBS system inside your body. A surgeon who specializes in surgery on the brain and nervous system, called a neurosurgeon, does the surgery.



Electrodes

These are thin wires that are placed deep inside your brain. The exact spot depends on your symptoms.

Extension wires

These are placed under the skin of your scalp, neck and chest. They connect the electrodes to the Internal Pulse Generator.



Internal Pulse Generator (IPG)

This is a battery-operated device. It creates electrical impulses and sends them through the wires to the electrodes. It is also called a neurostimulator.

The IPG is implanted (put under your skin) in your chest, near your collarbone.

There are 2 steps to the surgery. These steps may happen on the same day or on different days.

- **Step 1:** You have the electrodes placed into certain areas of your brain.
- **Step 2:** You have the extension wires and IPG put in. The parts of the DBS system are connected, without turning it on.

What happens before surgery?

You meet with members of your health care team and may have tests to see if DBS is right for you. The appointments and tests you have depend on the reason for your DBS surgery.

1. Meeting with the neurologist and neurosurgeon

Your neurologist and neurosurgeon check your health to see if DBS is a good choice for you and you are well enough for brain surgery. They explain the surgery, its risks and benefits, and answer your questions.

Bring a family member or support person to this appointment.

To help decide if DBS is a good and safe treatment for you, you may also have these appointments or tests:

- psychiatric evaluation
- psychological assessment
- Magnetic Resonance Imaging (MRI) – This is a special test that produces very detailed images of your brain.

Depending on your health problem, you may also need a medicine test and/or to be videotaped.

If DBS is a good treatment for you, your neurosurgeon's office will schedule a pre-admission assessment for you.

2. Pre-admission assessment

You have your pre-admission appointment a few days or weeks before your surgery. This visit takes about 3 to 4 hours.

Please bring:

- ✓ your Ontario health card (OHIP card). If you do not have an OHIP card, please bring another form of government-issued photo ID (such as a driver's license, passport, or other provincial health card).
- ✓ all the medicines you take in the containers they came in

During this visit:

- you meet an admitting department clerk, an anesthetist, a nurse, and a pharmacist
- we ask you specific questions about your health and medical history
- you may have tests, such as blood tests, an electrocardiogram (ECG) and a chest x-ray

How do I prepare for surgery?

- Do not eat any food or drink after midnight the night before your surgery. Your stomach must be empty.
- Do not take any Parkinson's or tremor medicines.
- Bring your Ontario health card (OHIP).
- Bring your medicines to the hospital.

What happens on the day of surgery?

Come to the Pre Operative Care Unit (POCU), 2nd floor, Fell Pavilion at 6:00 am to check in on the day of your surgery.

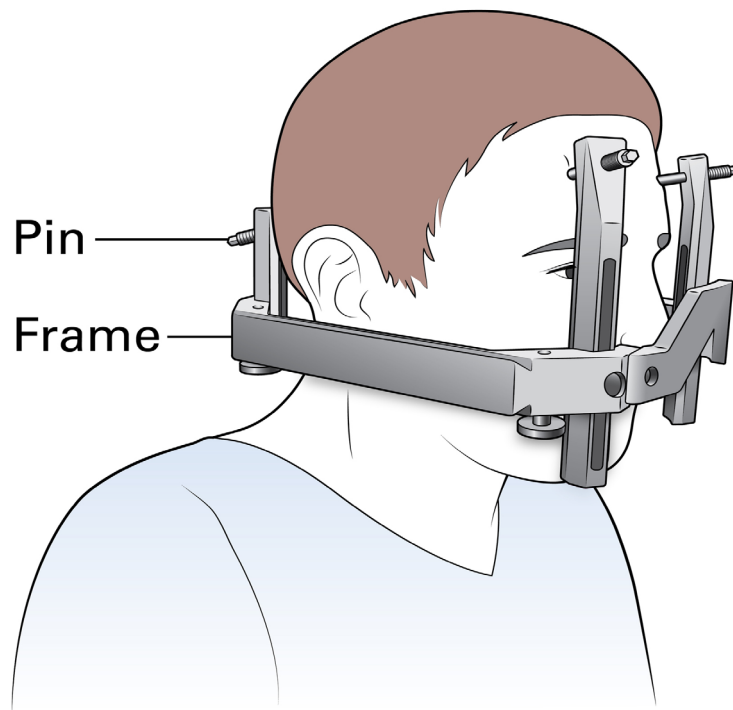
After you check in, the nurses admit you and help you get ready for surgery. They check your blood pressure, pulse, temperature and breathing. They will also put an IV in your arm and help you change into a hospital gown.

Before your surgery

1. We put a special frame on your head in the MRI department.

This frame has 2 pins at the front and 2 at the back to keep your head still during surgery.

We give you a local anesthetic (medicine) with a small needle to numb the areas where the pins are put in.



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Important: If you have claustrophobia (a fear of closed spaces) or can't hold still because of your health problem, tell your neurosurgeon before the date of your surgery.

2. You have a brain MRI (Magnetic Resonance Imaging) or CT (Computed Tomography) scan

- These tests create clear pictures of your brain. These will help your neurosurgeon position the DBS electrodes.
- For the MRI, a box and coil are attached to the frame. This may feel heavy.
- If you have an MRI, it will take about 45 minutes. If you have a CT scan, it will take 15 minutes. Please try to stay as still as possible. This helps the technician get the clearest pictures of your brain.
- After the MRI, we remove the box and coil. Only the frame will remain for the surgery.

3. We take you to the holding area.

In this area, a nurse will check that everything is ready for your surgery. You may also see the anesthetist. This is the doctor who may give you the anesthetic and monitor you during your surgery.

What happens during surgery?

When everything is ready, you go to the operating room. The surgical team helps you move onto the operating table and get comfortable. The table is angled so your back is raised, but not all the way. Your head frame is attached to the table to keep your head still.

Step 1: Placing the electrodes

You are awake for this part of the surgery. It will take from 3 to 5 hours.

The neurosurgeon will:

- shave and wash your head with a special soap to kill any germs
- numb parts of your scalp so you won't feel pain
- make an incision (cut) on the top of your head and 2 small holes about the size of a nickel (called burr holes). There will be 1 hole on each side of your head if you are having surgery for both sides of your body
- put in each electrode so the tip is in the proper area of your brain
- stimulate the electrodes and measure how your brain cells react
- ask you how you feel and whether you feel things like tingling or numbness
- check your stiffness, tremor or slowness to make sure the proper areas of your brain are stimulated
- use plastic caps to make sure the electrodes stay in place and close the incision and holes with staples.
- remove the frame from your head

This step takes 3 to 5 hours to complete.

Step 2: Placing the extension wires and IPG

We give you medicine so you are asleep during this part of the surgery.

The neurosurgeon will:

- connect the extension wires to the electrodes
- place the wires under your skin, from the top of your head, behind your ear, down your neck to your chest.
- connect the extension wire to the IPG unit
- place the IPG under the skin below your collarbone, with the IPG turned off
- close the incision in your chest with staples

This step takes about 45 minutes to complete.

Patients often have steps 1 and 2 two or three days apart. In this case, your electrodes will be left outside of your head and covered by a bandage. The day after your surgery, we ask you to take part in a research study to help us learn more about how the brain works.

What happens after surgery?

Post Anesthetic Care Unit (PACU)

- When the surgery is finished, you go to the PACU for 1 to 3 hours to recover.
- The nurses check your blood pressure, pulse, temperature and breathing often, as you wake up. If you have pain or nausea, they will give you medicines that will help.
- You may have an oxygen mask over your mouth and/or nose.
- There will be a bandage covering the incision on your head and chest.
- When you are ready, we take you to your room on the Neurosurgery Unit (5A or 5B).

Neurosurgery Unit

- In the Neurosurgery Unit, your health care team continues to check your recovery.
- You may have a headache, feel pain at your incisions and have nausea. This will slowly get better. The nurses can give you medicines for your pain and nausea if you need them.
- In the afternoon or evening you can start to drink and eat.
- Later in the day or the next day, the nurses help you get out of bed and walk. You may feel dizzy, so it is important that someone is with you the first few times you get out of bed.
- You have another MRI to check the position of the electrodes.

When can I go home?

You can expect to go home 1 or 2 days after surgery if both steps are done on the same day.

If you have step 2 on a separate day, you usually go home the next day.

Please plan for someone to take you home before 11:00 am on the day you are discharged home.

Before you leave the hospital, a member of your health care team will review:

- your medicines
- how to care for yourself, what to watch for and how to get help if you need it
- your follow-up appointments, including when your DBS system will be turned on

What happens after I leave the hospital?

Turning your DBS on

Your DBS will probably not be turned on before you leave the hospital. We will give you instructions about when it will be turned on. Depending on the reason you had the DBS put in, you will have regular follow-up appointments to check how the DBS is working.

Appointment with your neurosurgeon

You will see your neurosurgeon 6 to 8 weeks after your surgery. They will check your condition and incisions.

Tests and scans

You may have other appointments for psychiatric evaluation, neuropsychological testing and brain MRIs. Comparing these results with the results from before your surgery lets the neurologist and neurosurgeon see how well the DBS treatment is working.

Visiting your family doctor

Make an appointment with your family doctor to have your staples removed 10 to 14 days after surgery.

DBS registration card

You will get a registration card for your DBS system. You will get a temporary card before you leave the hospital and a permanent one in the mail from the company that makes your DBS system. Carry this card with you all the time.

Medic Alert

You may want to get a Medic Alert bracelet. In an emergency, the bracelet tells medical staff that you have a DBS system.

How long does the IPG battery last?

The battery lasts about 3 to 5 years. You may notice a return of the symptoms you had before when the battery is low. When the battery wears out, you will need surgery to replace the IPG. You can go home the same day you have this surgery.

What do I need to do to stay safe with a DBS system?

You must take extra steps to protect yourself and stay safe when you have a DBS system.



Follow these rules for safety when you have a DBS system.

- Do not have a body MRI. You can have a brain MRI. Tell your health care providers you have a DBS so they can take steps to keep you safe.
- Do not have diathermy treatments (heat therapy). Diathermy treatments deliver energy to heat and heal tissues in your body.
- Do not put direct heat on any part of the DBS system. This could damage it and affect your health.



Tell all your health care providers that you have a DBS system, and always carry your DBS registration card.

Who can I call if I have any questions?

If you have any questions, please ask a member of your health care team during your appointments or give us a call.

Neurosurgeons

Dr. Lozano Phone: 416 603 6200

Dr. Hodaie Phone: 416 603 6441

Dr. Kalia Phone: 416 603 5866

Neurologists

Dr. Fasano and Dr. Munhoz

Phone: 416 603 5800, extension 5729

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