



Deep Brain Stimulation

A Guide to Your Care

Welcome to Vanderbilt Functional Neurosurgery

We're one of the first centers in the United States to do deep brain stimulation (DBS). Our program gives safe and effective care to patients whose problems haven't been helped with other treatment options. We always work to improve our surgery processes to give our patients the very best care.

As we treat you, we promise to:

- include you as the most important member of your health care team
- personalize your care with a focus on your values and needs
- work with you to coordinate your care
- respect your right to privacy
- communicate clearly and regularly
- serve you and your family with kindness and respect.

We're glad to be a part of your care team. We'll guide you and answer your questions every step of the way.

Thank you for choosing us for your care.

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Important contacts

DBS Coordinators

For questions about appointments or the DBS process, call your DBS coordinator:

- If your last name starts with the letters A through L: (615) 322-0141
- If your last name starts with the letters M through Z: (615) 875-5645

DBS Manufacturers and support

- Medtronic: (800) 510-6735
- Boston Scientific: (833) 327-4636
- Abbott: (800) 727-7846, option 4

Vanderbilt Neurosurgery Clinic

For questions about incisions, fevers, or pain during Stage 1 through 3 surgeries, call (615) 322-7417 or send us a message through My Health at Vanderbilt.

Vanderbilt Neurology Clinic

For questions about:

- Parkinson's or tremor medicines
- medicine refills
- DBS programming
- future surgeries of the head, neck, or chest near your DBS system
- any MRI scans with your DBS system in place

call (615) 936-0060 or send a message through My Health.

Things to do before each surgery

My Health at Vanderbilt

This is our online patient portal. If you don't already have a My Health account, you can sign up at MyHealthatVanderbilt.com. With your account, you can:

- schedule and keep track of your appointments
- see test or lab results
- email your providers
- ask for medicine refills
- pay your bill
- check your medical records.

You can get the My Health app in Apple's app store or in the Google Play store. If you have any trouble, call our Help Desk at: (615) 343-4357 (HELP).

Medicines

When you come to the hospital for each surgery, bring your Parkinson's or tremor medicine bottles with you.

Plan for a ride home from the hospital

Someone needs to drive you home after each surgery. You cannot drive yourself. Even if you take a bus, taxi, or rideshare you'll still need to have someone with you when you leave.

Plan for someone to stay with you when you get home

You'll need a caregiver to stay with you for the first week after your Stage 2 surgery. This person can help with meals, laundry, bathing, and cleaning while you heal.



Plan for a ride home from the hospital.

Your VPEC appointment

Vanderbilt Preoperative Evaluation Center (VPEC)

Bring these things with you:

- a list of surgeries you've had (with dates)
- a copy of the ID card for your pacemaker, defibrillator, cardiac stent, or any other medical device or implant, if you have one
- a list of your medicines (prescribed, supplements, and over-the-counter) with doses and when you take them.
- a list of all your allergies
- a list of providers and any specialists you see with their phone numbers
- any test results you have for your surgery, such as a blood test, pulmonary function test, electrocardiogram, stress test, or x-ray.
- copies of any advance directives (living will, appointment of health care agent, medical power of attorney)
- your insurance and pharmacy (drug) cards
- a way to pay for any co-payments, coinsurance, or deductibles you may owe.

At this appointment you will:

- have a physical exam
- learn which medicines to stop or start before surgery
- learn about any tests you may need before surgery
- learn about anesthesia (medicine used to keep you comfortable or make you go to sleep during surgery).



Medicines to stop before you begin the DBS process

There are medicines, vitamins, and herbal supplements you'll need to stop taking before the DBS surgery process begins. This is because some of them may cause you to bleed more.

One week before your Stage 1 surgery, stop taking all of these medicines

You can start taking them again 3 days after your Stage 3 surgery.

Stop all aspirin and all medicines that contain aspirin

Alka Seltzer	Goody's and BC Powders
Anacin	Midol
Ascriptin	Mobigesic
Aspergum	Norgesic
Bayer, all kinds	P-A-C Analgesic
Buffaprin	Pepto Bismal
Buffrin, all kinds	Sine off Aspirin
Cama arthritis pain relief	St. Joseph's Aspirin
Doan's pills	Trigesic
Ecotrin	Ursinus Inlay Tabs
Empirin	
Excedrin	

Stop ibuprofen and all medicines that contain ibuprofen

Advil, all kinds	Ibuprofen
Bayer Ibuprofen	Motrin IB
Dristan Sinus	Nuprin
Haltran	Sine Aid IB

Also stop these medicines

- anti-inflammatories (Naproxen, Aleve, Mobic) Celebrex is OK to take
- all multi-vitamins
- Vitamin E, all fish oils, and all fatty acid supplements
- all herbal supplements

Talk to your providers if you take blood thinners

They'll tell you when to stop and start taking them again.

Xarelto	Lovenox
Coumadin	Pradaxa
Plavix	Eliquis

DBS surgery: Stage 1

Before surgery

- Shave your hair no more than 3 days before your surgery. Use a clipper guard size #1.
- Wash your hair with baby shampoo the night before surgery.
- Do not eat anything after midnight the night before surgery. You may drink clear liquids up to 2 hours before the surgery (water, clear tea, fruit juice with no pulp, black coffee with NO creamer, or carbonated drinks).
- Keep taking your Parkinson's or tremor medicines as you usually do.

On the day of surgery

- Look at the surgery letter the clinic sent you to find the time you need to check-in. Go to Vanderbilt Hospital Radiology, Room 1145, on the 1st floor of the main hospital.
- Bring your Parkinson's or tremor medicine bottles with you.
- After check-in, we'll take you to a smaller radiology waiting room. You may have 1 person with you.
 - You'll have an IV put in for medicines.
 - You'll meet your anesthesiology team.
 - You'll sign a consent form.
 - Then, we'll take you to the operating room.

The surgery

- The surgery will take about 2 hours.
- You'll be under general anesthesia (asleep).
- We'll place bone markers (small screws) in your skull through small cuts the surgeon makes.
- You'll have a brain MRI and CT scan of the head. These tests help us map the areas of the brain. The surgeon will use the images to plan your surgery and to make a special frame for your Stage 2 surgery.

After surgery

- After you wake up, we'll take you to the radiology recovery room.
- If you don't have any problems and we know it's safe for you to leave, you can go home about 2 hours after surgery.
- You'll get an ibuprofen-like pain medicine before you leave. This will help with your transition home.
- We will not give you any prescriptions, this includes opioids, before you leave.

You must have someone drive you home!

You can't leave on your own. If you don't have a ride, you may have to stay in the hospital overnight or reschedule your surgery.

DBS surgery: Stage 1

At home

Pain

You may take extra strength acetaminophen (Tylenol) for pain. Do not take more than 3000 mg in 24 hours. Take this medicine as soon as you get home. Do not wait to take it. The pain can be harder to treat if you wait.

Your incisions

- You can shower 1 day after you get home. Gently wash your incisions with baby shampoo and then pat them dry.
- Use baby shampoo every day to wash your scalp and incisions until we see you in the clinic again.
- Do not touch or pick at your incisions, even if they start to scab.
- Your incisions will be closed with stitches. These stitches will dissolve on their own in 4 to 6 weeks.
- It can take as long as 1 month for your incisions to heal all the way. If you have any questions, let us know.
- Until your incisions heal (usually about 4 weeks), do not:
 - do any strenuous activities like housework, yard work, or working out
 - swim or put incisions under water.

- For 1 month after your surgery, do not lift anything more than 10 pounds (a gallon of milk).
- For 3 months after your surgery, do not dye your hair.
- Change your pillowcase every day while your incisions heal.
- Do not wear anything that fits tightly on your head until you see your surgeon for your incision check. If you do wear a headscarf, skull cap, or hat, you must wash it every day.

Driving

It's OK to start driving the day after Stage 1 DBS surgery. But do not drive within 24 hours of taking pain medicines.

When to call us

Call the Neurosurgery clinic at (615) 322-7417 or send a message through My Health if you have:

- redness, swelling, or drainage at or around your incision sites
- a fever of 101.5°F (38.6°C) or higher
- pain that gets worse and does not go away, even with medicines
- any questions.

DBS surgery: Stage 2

Before surgery

- Wash your hair with baby shampoo the night before surgery.
- Do not eat after midnight the night before your surgery. You may drink clear liquids up to 2 hours before surgery (water, clear tea, fruit juice with no pulp, black coffee with NO creamer, carbonated drinks).

Stop taking your Parkinson's or tremor medicines by 6 p.m. the night before surgery.

On the day of surgery

- Bring your Parkinson's or tremor medicine bottles with you.
- Get to the hospital 2 hours before your scheduled surgery time.
- Go to the main entrance of VUH and check in at the admitting office.
- After check in, you'll wait in the waiting room until we call your name. We'll take you to the holding room. You may have 1 person with you.
 - We'll put in your IV for medicines.
 - You'll meet your anesthesiology team.
 - You'll sign a consent form.
 - We'll place a foley or condom catheter to drain urine from your bladder.
 - Then, we'll take you to the operating room for surgery.

The surgery

Stage 2 surgery usually takes 3 to 5 hours.

You'll be awake during the surgery. Your surgeon will tell you what they're doing as they operate. We'll do all we can to keep you comfortable.

Steps of Stage 2 surgery

- We'll attach the custom head frame to the bone markers (screws) while you're under local anesthesia. This means the surgical area will be numb.
- We'll make a small opening to place the lead into the target location of the brain.
- We'll do stimulation testing using electrical impulses. At the same time, we'll have you do certain tasks like holding a cup and putting your finger to your nose. This will help confirm the target area.
- We'll remove the bone markers.
- We'll coil up the DBS wires and put them under your skin until the Stage 3 surgery. During Stage 3, we'll connect the battery.

DBS surgery: Stage 2

After surgery

- We'll take you to the recovery room.
- We'll do a CT scan of your brain to record the correct placement of your electrodes and to check for bleeding or swelling in the brain.
- Your surgeon will talk to your family or caregivers about the results of your surgery and what to expect.
- After the CT scan, we'll take you to your hospital room.
- You'll restart your Parkinson's or tremor medicines. Your nurse will talk with you about your dosing schedule.
- We'll help you manage your pain while you're in the hospital.
- You'll get out of bed and walk in the hallway the day after surgery. You'll heal faster and manage your pain better if you move around.
- You'll be able to go home the day after your surgery as long as there are no problems. Our goal is for you to leave around 10 a.m.
- You'll leave the hospital with a plan to help you manage your pain.

You must have someone drive you home!

You can't leave on your own. If you don't have a ride, you may have to stay in the hospital overnight or reschedule your surgery.

At home

Your medicines

Keep taking your Parkinson's or tremor medicines as usual.

If you need an opioid pain medicine, we'll give you a prescription. Follow the directions on the bottle. Take less as your pain gets better. We do not refill opioid pain medicines.

You'll also need to take a stool softener or a laxative as narcotics can cause constipation. Try not to strain when you go to the bathroom.

Remember, do not take any aspirin or aspirin products until you're done with all your DBS surgeries and your surgeon says it's OK to take them.

DBS surgery: Stage 2

Your incisions

- You may shower the 1st day after surgery. Gently wash your scalp and incisions with baby shampoo and pat dry.
- Use baby shampoo every day to wash your hair and incisions until we see you in the clinic again.
- For 1 week after surgery, put bacitracin ointment on the incisions once a day. Do not use any other ointments or creams, unless your surgeon tells you to.
- Do not touch or pick at your incisions even if they begin to scab.
- Your incisions will be closed with stitches. They'll dissolve on their own in 4 to 6 weeks.
- It can take as long as 1 month for your incisions to heal all the way. If you have any questions, talk to your surgeon or nurse.
- Until your incisions heal all the way, do not:
 - soak in the bath or hot tub
 - swim
 - make any movements that could strain your incisions, like reaching over your head or twisting your upper body
 - do any strenuous activity, like house projects, baby sitting, helping someone move, working out, or yard work.

- For 1 month after surgery, do not lift anything more than 10 pounds (a gallon of milk).
- For 3 months after surgery, do not dye your hair.
- Change your pillowcase every day while your incisions heal.
- Do not wear anything that fits tightly on your head until you see the surgeon for your incision check. If you do wear a head scarf or skull cap, wash it every day.

Confusion

After surgery, you may feel tired, out of it, and confused. You should get a little better each day. If any of these symptoms get worse, call us.

Because you may have confusion and will have a greater risk of falling, have someone stay with you for 2 weeks after surgery to help you with daily living activities.

Swelling and pain

You may have swelling around your incisions and forehead for several days after surgery. This will move down your face and can even cause the eyelids to swell. This is normal and will go away on its own. Sitting up can help lower the swelling.

You may have pain on or around your incisions. This is normal and the pain should get a little better each day.

DBS surgery: Stage 2

Driving

Do not drive until your surgeon tells you it's safe. We can talk about this at your first follow-up visit in the clinic.

Never drive when you take pain medicine.

Please note

After Stage 2 surgery, you may notice that your motor symptoms get better. This is called the honeymoon phase. It may last for days or weeks. The symptoms will likely come back. You'll see the real effect of your DBS therapy once the process is complete and we turn on the system.

When to call us

Call the Neurosurgery clinic at (615) 322-7417 or send a message through My Health if you have:

- redness, swelling, or drainage at or around your incision sites
- a fever of 101.5°F (38.6°C) or higher
- pain, sick stomach, or throwing up that gets worse and does not go away even with medicines
- any new weakness, numbness, or tingling in your face, arms, or legs
- a hard time with speech
- more sleepiness than usual
- confusion that lasts more than 1 week after surgery or gets worse
- any questions.

DBS surgery: Stage 3

Before surgery

- Wash your hair with baby shampoo the night before surgery.
- Do not eat anything after midnight the night before your surgery. You may drink clear liquids up to 2 hours before the surgery (water, clear tea, fruit juice with no pulp, black coffee with NO creamer, or carbonated drinks).
- Keep taking your Parkinson's or tremor medicines as you usually do.

On the day of surgery

- Get to the hospital 2 hours before your scheduled surgery time.
- After check in, you'll wait in the waiting room until we call your name. Then we'll take you to the holding room. You may have 1 person with you.
 - We'll place an IV for medicines.
 - You'll meet your anesthesiology team.
 - You'll sign a consent form.
 - Then, we'll take you to the operating room for surgery.

The surgery

Stage 3 surgery usually takes about 1 hour.

You'll have general anesthesia (asleep). You will not feel anything during the surgery.

Steps of Stage 3 surgery

- We'll put the DBS battery under the skin below your collar bone.
- We'll then use extension wires to connect the leads to the battery.
- We'll close your skin with stitches. These will dissolve on their own.

After surgery

- When the surgery is over, we'll take you to the recovery room. We'll watch over you as you wake up.
- If you don't have any problems and we know it's safe for you to leave, you can go home about 2 hours after surgery

You must have someone drive you home!

You can't leave on your own. If you don't have a ride, you may have to stay in the hospital overnight or reschedule your surgery.

DBS surgery: Stage 3

At home

Your incisions

- You may shower the 1st day after surgery. Gently wash your scalp and incisions with baby shampoo and pat dry.
 - For 1 week after surgery, put bacitracin ointment on the incisions once a day. Do not use any other ointments or creams, unless your surgeon tells you to.
 - Use baby shampoo every day to wash your scalp and incisions until we see you in the clinic again.
 - Do not touch or pick at your incisions even if they begin to scab.
 - Your incisions will be closed with stitches. They'll dissolve on their own in 4 to 6 weeks.
- It can take as long as 1 month for your incisions to heal all the way. If you have any questions, talk to your surgeon or nurse.
 - Until your incisions heal, do not:
 - soak in the bath or hot tub
 - swim
 - make any movements that could strain your incisions, like reaching over your head or twisting your upper body
 - do any strenuous activity, like house projects, baby sitting, helping someone move, working out, or yard work.

DBS surgery: Stage 3

- For 1 month after surgery, do not lift anything more than 10 pounds (a gallon of milk).
- For 3 months after surgery, do not dye your hair.
- Change your pillowcase every day while your incisions heal.
- Do not wear anything that fits tightly on your head until you see the surgeon for your incision check. If you do wear a head scarf or skull cap, wash it every day.

Neck tightness

After Stage 3 surgery, you may notice your neck feels tight. This is normal. Move your neck from side to side several times a day to stretch your muscles.

Driving

Do not drive until your surgeon tells you it's safe to do so. We can talk about this at your first follow-up visit in the clinic.

Never drive when you take pain medicine.

When to call us

Call the Neurosurgery clinic at (615) 322-7417 or send a message through My Health if you have:

- redness, swelling, or drainage at or around your incision sites
- a fever of 101.5°F (38.6°C) or higher
- pain that gets worse and does not go away when you take medicines
- any questions.



Call us if you have any questions.

After DBS implantation

You'll come in for your first follow-up visit 4 to 6 weeks after Stage 3 surgery. If you have any questions, call your DBS coordinator.

If you have Parkinson's Disease

You'll need to be off your Parkinson's medicines for this clinic visit. Your DBS coordinator will talk with you about this.

Your follow-up visit

You'll have 3 different appointments during your follow-up visit.

Neurology appointment

- This visit can take at least 1 hour to make sure your settings are correct.
- Bring all of your DBS equipment to this visit. Make sure you charge your remote and connector before you get here.
- We'll turn on and program the DBS system.
- We can talk about your Parkinson's or tremor medicines.

Neurosurgery appointment

- We'll check your incisions to make sure they look good and are healing the way they're supposed to.
- We can talk about changes in activity restrictions and hair routines.
- We can also talk about driving restrictions.

Imaging appointment

Here, we'll do a CT scan of your head to check on the lead placement and make sure your wires are in the right place.

The CT scan won't be in the same building as your neurology and neurosurgery appointments. Your DBS coordinator will talk with you about this.

Living with your DBS

Now that you have a DBS, there are tips you should follow to make sure you stay healthy and your DBS works like it should. Let us know if you have any questions.

Your hand-held remote and Implant ID

Always take these when you travel, go to the doctor, or have any special testing or surgery.

Future surgeries or procedures

If you have an upcoming surgery or procedure and have questions about your device, call your DBS neurologist and your implant manufacturer.

If you're having surgery near any part of your DBS system (head, neck, or chest), call your DBS neurologist to make sure it's safe. And ask them to contact your DBS manufacturer for any precautions related to your implanted device.

For any surgery, contact your DBS neurologist or the DBS manufacturer to find out what you need to do about your DBS device.

Avoid these tests and activities

- Avoid any ultrasound around the battery device.
- Avoid any procedure that uses electric current around the battery device.
- Do not go to the chiropractor.
- Do not scuba dive or go under water deeper than 33 feet (10 meters).
- Do not skydive.
- Do not weld.

Also avoid metal detectors that you have to walk through

This could be at the airport, courthouse, or schools. They can turn off your device. Ask about a hand wand or pat down instead. Remember to have your implant ID card with you at these times.

Living with your DBS

These tests and activities are safe

- X-rays and CT scans are OK.
- Mammograms. Call your DBS neurologist or DBS manufacturer for details.
- Hand-held X-ray wands or scanners are OK.
- MRIs. It's safe to have an MRI with a DBS system if you meet certain conditions. It's best to get your MRI at a DBS center. They'll know how to handle your DBS system and scan. Before you have an MRI, call your DBS neurologist to ask if you should turn it off or put it in MRI mode for the scan. Bring your implant ID card and remote with you. Tell the MRI technician you have a DBS implant.
- Using and being around microwaves is OK.
- You can use a TENS unit. But do not place it over the implanted DBS hardware.
- Dyeing your hair. Wait 3 months after your Stage 2 surgery before you dye your hair.



Vanderbilt Neurosurgery Clinic

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