



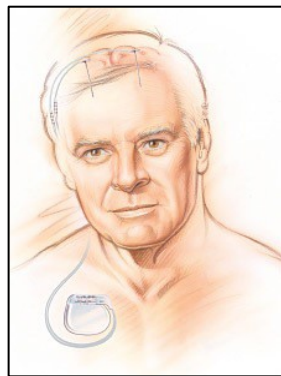
## Deep Brain Stimulation Preoperative Information and Guide

### Enclosed are instructions and a description of the deep brain stimulation (DBS) procedure.

DBS is unlike most other neurosurgical procedures. First of all, you may be awake for a great deal of the procedure. Also, you often see the results of the surgery immediately. Tremors arrest on the table, rigidity and dystonia can sometimes melt away during the operation. The success of DBS often depends on active participation of patient. Unlike other surgeries, DBS is done in stages or parts. All this makes DBS a very different experience for most patients. This guide is to help prepare you for the surgery. There is no way we can predict exactly how the surgery will go; we hope to prepare you for what might occur. This should help answer some questions and calm some fears. It is OK to be somewhat fearful of any operation, especially one involving your brain. **Remember, your safety is the most important thing to our team. We put you first: your safety, your results and your comfort.**

### **The Preliminary Stage** –Pulse generator and Fiducial Placement

At this surgery you will have your battery pack (Implantable Pulse Generator or IPG) or packs and skull markers placed for surgical planning. This surgery is done under **general anesthesia** or while you are asleep. **If you have Parkinson's Disease, please continue to take your medication normally.** We place all the wires under the skin from your head to your chest or abdomen. This operation usually takes 30 to 45 minutes. We perform a head CT after your surgery that is used for surgical planning. You can go home after the surgery with pain medication and antibiotics.

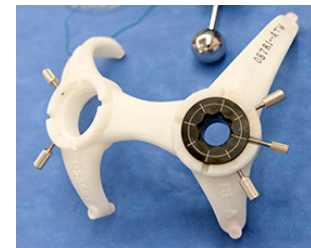


There will be some discomfort along

the path of the wires, but this will go away with time. There can even be some bruising. If you have any questions, please call the office and we will get back to you as soon as possible.

The markers or “fiducials” that are placed are important for surgical accuracy. We use a custom, 3-D printed platform to accurately deliver the leads to the target. These fiducials help maintain that accuracy and act as anchor points for the 3-D platform. The system is called the **StarFix Microtargeting** system. Dr. Levine was one of the first users of Starfix. His first Starfix case was in 2002. Using specially formatted MRI and CT scans, Dr. Levine identifies the targets for the DBS implantation. Once the targets are determined, a computer program constructs the platform using 3-D printing.

As part of the work up Dr. Levine or your neurologist will order a specially formatted, outpatient MRI for DBS evaluation and planning. This can be done 6-8 months before surgery. If you cannot have an MRI for medical reasons, we can accommodate.



StarFix Platform

The custom-built platform will be drafted to fit your surgery and anatomy. It is constructed and shipped to the hospital for sterilization in time for your surgery. All you need to do is keep the areas clean and dry. No special care is needed. You may shower after the second day of placement and gently towel dry your hair/head. You will be discharged to home after a CT scan is performed. **The DBS Lead Placement** is done 1 – 2 weeks after the preliminary surgery. You will be admitted the day of surgery for implantation of the DBS lead(s).



### **DBS Lead placement** or the “Big Surgery”

This is the day. The surgery is broken down into phases: preparation, opening, recording, implantation and closing. The day will start with introduction to the team: the surgeon (Dr. Levine), the anesthesiologist and the anesthesia team, the scrub technician/nurse and the circulating nurse, and the electrophysiologist. We are all there to help you get through the surgery safely, comfortably, and with good results. **If you have Parkinson’s Disease, please stop your Parkinson’s Disease medication after 4pm the day before surgery.** This may be difficult but it allow us to adequately assess you during surgery.

#### **Preparation**

Frameless surgery is usually shorter than the frame-based surgery. And most people find it more comfortable, as you able to move more freely. After introductions are done, you will be sedated and if needed a catheter will be placed in your bladder for your comfort. All intravenous and other catheters will be placed with sedation.

We will then position you in a neck collar/brace. This is done with your help to maximize your comfort. The position you will be in for the surgery is similar to that of lying in a chez-lounge. Imagine yourself on a beach, on a cruise or wherever you would rather be while reclining in a chez-lounge. Once positioned the remainder of the preparation includes shaving, sterile washing and draping of your scalp. A total head shave is preferred, and lowers the infection rate.

#### **Opening and recording**

The next phase: opening, is done with local anesthetic and more sedation. The surgery in some circumstances can be done under general anesthesia while you sleep. The incision(s) and hole(s) are made to get the electrode into the brain. This should be a painless. Once the opening is completed, we will begin to localize the area of brain that needs stimulation. We will refer to this as the target. While we make the holes, you should not feel pain, but you might feel vibration. Once this phase is completed, we will allow you to wake up and participate in your surgery during recording. Sometimes the whole surgery is done under general anesthesia and in those circumstances, you will remain asleep for the

whole surgery.

The recording phase of the operation helps get the lead to the target. By listening to the cells in your brain we can identify where we are so that we can accurately place the lead and get the best results possible. You will hear noise that sounds like static: that’s your brain. You can actually hear the cells in your brain firing! This is exciting to some patients and down-right dull to others. During the recording period we might stop and move your arms and legs. We are listening for cells that respond to movement in your body. This also helps localize where we are in your brain. Usually, one attempt at recording is all we need, sometimes it may take more. If you get uncomfortable, tell us and we will try to get you comfortable. Once we are happy with the recording phase we move toward implantation and closing.

#### **Implanting and Closing**

The implantation phase is the most important part. We will place the actual DBS lead and test the stimulation. Your symptoms may just melt away right in front of you. We will run you through some tests while stimulating to check for undesirable side-effects as well as expected benefit. Among these tests will be some tongue twisters to check your speech. As we turn the stimulator on you may feel some tingling or buzzing sensation in your body or face. This is not unusual and should fade away. You should tell us if you get any of these sensations when we stimulate you. You should also tell us when they stop. This helps us get you the best result possible.

Once the implant process is over for both sides, we will sedate you again. We will give you more local anesthetic and begin closing. All the bone screws are removed. The connections to the pulse generator are established and you are sent to the recovery room. **YOU MADE IT!**

A routine CT scan of the brain is done the next day. If there are no problems on the CT scan you will be discharged to home with pain medication. You should call the office (301-718-9611).

#### **Follow-Up**

Now that all the surgery is over, you should have an appointment with your neurologist. They will do the programming. In addition, Dr. Levine still needs to see you to check the



wounds and remove any remaining staples or sutures that are not absorbable. Dr. Levine would also like to see you from time to time (once every 6 months to a year). This is to ensure the battery is working. Also, you should see or call Dr. Levine immediately for any of the following:

1. Wires sticking out of the skin/ scalp
2. Wounds that are oozing/red/ draining
3. Blow to the head near stimulator site

Final Note:

Please read all the literature and manuals from the device manufacturer given to you when the surgery is completed. All the appropriate warnings and information about the neurostimulator are there. Not everybody likes to read manuals, but this one is very important. This guide does not serve as a replacement to those warnings and instructions.

PLEASE CALL THE OFFICE WITH ANY QUESTIONS

Zachary T. Levine MD FAANS



**Prior to admission**

STOP all aspirin/ibuprofen like drugs and all blood thinners prior to surgery. Each blood thinner is different and requires specific instructions. Please check with primary care physician for specific information.

***For the battery placement operation, you do not have to stop Parkinson's medications.***

***For the DBS Lead placement surgery, please stop all Parkinson's medications after 4pm the day prior to the surgery.***

Bring any preoperative MRIs or imaging of the brain

Bring all medications with you to the hospital in their bottles with labels.

Bring a list of any allergies and previous surgeries.

Bring positive thoughts and we will provide the rest.

**Expectations:**

***Please remember DBS is NOT a cure. DBS is used to treat symptoms and most people need to continue with medical treatment as well. Hopefully, you can lower the dose you are taking. You still need to follow-up with your neurologist. DBS has been shown to dramatically improve quality of life but it is not a replacement for medicine. In two studies it has shown to be superior to medication for some movement disorders. DBS does not treat all the symptoms of any given disorder. Please speak to your neurologist to clarify.***