

## Chapter 1

### Introduction to Surgical Therapies for Parkinson Disease

Parkinson disease (PD) affects an estimated one million Americans, men and women of all ages and races. The cause of PD is not yet known. Though currently a cure for PD does not exist, there are many excellent treatments for its symptoms. Medications, exercise, nutrition, holistic approaches, and surgical treatment can individually and in concert reduce PD symptoms and improve quality of life. Symptoms of PD include shaking (tremor), slowness of movement (bradykinesia), muscle stiffness (rigidity), and difficulty with balance (postural instability).

During the initial stages of PD, medications effectively control PD symptoms in the vast majority of patients. However, with progression of the disease, individuals may need to use increasing doses of medication taken more frequently to achieve symptom control. With time, people with PD may notice that throughout the day they experience periods of good symptom control (“on time”) or times when symptoms are much more noticeable (“off time”) and even periods where peak medication levels produce involuntary movements (dyskinesias). When individuals experience these various states throughout the day, they are said to have motor fluctuations.

This booklet is about deep brain stimulation (DBS), a type of surgical treatment used to reduce the symptoms of PD. Deep brain stimulation therapy is a proven, effective surgery used to treat moderate-to-severe, disabling PD symptoms. Other surgeries used to treat PD include thalamotomy, pallidotomy and subthalamotomy. Of these, pallidotomy and DBS have produced among the best results to date in the treatment of PD.

#### **Pallidotomy**

When a pallidotomy is performed, a heated probe is inserted into the brain where it precisely destroys tissue in a specific region called the internal segment of the globus pallidus. Pallidotomy can improve tremor, rigidity, bradykinesia, motor

fluctuations, and in some cases, walking and balance. An advantage of pallidotomy over DBS is that there are no implanted wires or batteries. Consequently, there is no need for repeated visits to the doctor for adjustment of the device. There is no hardware to malfunction and more importantly, no risk of infection from an implanted device. Pallidotomy may offer a benefit over DBS for patients who are unable to travel to centers that perform DBS programming or for patients who live where DBS is either too expensive or not available. Pallidotomy can be as effective as DBS if performed in the correct region of the brain. Recent studies have shown the benefits of pallidotomy to be long-lasting. Unlike DBS, pallidotomy should not be performed on both sides of the brain, as it may cause permanent speech and swallowing problems.

### DBS



See Chapter 2 for a detailed overview of DBS therapy

DBS differs from pallidotomy in that it does not permanently destroy brain tissue and is entirely reversible. DBS involves the surgical placement of the DBS lead (pronounced "leed"), a thin wire with four tiny contacts, into the brain. The lead is connected to a pacemaker-like device that is implanted in the chest area, called the neurostimulator or pulse generator. This component of the system contains the battery and computer circuitry that generates the electrical pulses that are delivered via the lead to the brain. The system can be turned on or off by the patient or by the clinician. The clinician can activate one or more of the four electrodes on each brain lead to provide the stimulation and control, to some extent, exactly where in the brain stimulation takes place. Furthermore, the clinician can adjust a variety of electrical parameters or settings to control the amount of stimulation. These adjustments are often referred to as "programming" the DBS system. They allow the ability to maximize benefit and minimize side effects. This adjustability is a benefit of DBS that is not available with pallidotomy. Because DBS can be programmed and reprogrammed and given that it is reversible and can be performed on both sides of the brain, the majority of patients choose DBS over the other surgical treatments.

The following table summarizes the advantages and disadvantages of pallidotomy and DBS.

<b>Surgery</b>	<b>Advantages and Disadvantages</b>
<b>Pallidotomy</b>	Permanent destruction of brain tissue; cannot be reversed No implanted devices Should not be done bilaterally
<b>Deep Brain Stimulation</b>	Does not destroy brain tissue Reversible Can be done bilaterally System can be reprogrammed as symptoms change Requires repeated visits for programming Possibility of hardware malfunction or infection

This booklet is intended to help guide you through the process of DBS therapy, from deciding to have the surgery, through the day of surgery and on to recovery. Hopefully it will help you discuss DBS with your family, friends and health care professionals. It is not meant to replace the advice of health care professionals involved in your care.



**If you are considering DBS:**

- ✓ Consult with a movement disorders neurologist. This is a neurologist who has completed specialized training in PD and movement disorders, usually through a one to two year fellowship (make sure you ask for credentials).
- ✓ Do your homework. Learn about DBS and find out about the centers you are considering. Make sure that you choose a DBS center with an interdisciplinary team of health care professionals who have the training, technology, and expertise required to specialize in DBS therapy.
- ✓ Be prepared to invest a significant amount of time, energy, and travel for both pre-and post-operative appointments. A recent survey conducted by the DBS Society revealed that there is a significant number of post-operative visits necessary for DBS programming, especially during the first six months after surgery. Having DBS therapy requires a large emotional, physical and possibly financial commitment.

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