

Information About Deep Brain Stimulation to Discuss With Your Doctor

We have created this factsheet to provide information on deep brain stimulation (DBS) that can help you initiate discussions with your doctor and healthcare team.

The best treatment option for Parkinson's disease (PD) will vary from one individual to the next, and for every person, the best treatment will change over the course of the disease. The mainstay of treatment is medication, such as levodopa, that compensates for the loss of dopamine in the brain. But as the disease progresses, and more dopamine producing neurons die, more levodopa is needed, often requiring higher and more frequent doses throughout the day to maintain effective control of symptoms. People with PD may develop increasing amounts of OFF time (periods during the day when levodopa and other medications are not offering benefit), and dyskinesia (uncontrolled movements usually during the time of peak benefit from a dose of levodopa). At this stage of the disease, DBS may provide an important treatment option to reduce OFF time, improve dyskinesia, and potentially improve quality of life.

What is DBS?

DBS is a surgical procedure in which thin electrodes are implanted into parts of the brain that control movement. Scientists believe that the electrodes deliver tiny electrical pulses to these brain regions to disrupt abnormal brain signals. This allows the brain to function in a way to restore more normal movement and often enables people with PD to take less antiparkinsonian medications. The electrodes are connected by an extension wire to an electrical pulse generator that is implanted under the skin in the chest. The electrodes and the wire are also under the skin so that no part of the system is external. Unlike earlier forms of PD surgery, DBS modulates but does not destroy brain tissue. It may be adjusted over time to refine its benefit, or even stopped entirely if it doesn't provide enough benefit or if researchers develop better treatments.

What Benefits May DBS Offer?

DBS is not a cure for PD, but it may help control motor symptoms and enable people with PD to take less

antiparkinsonian medications. For many people with PD, this surgery can reduce tremor and rigidity, improve movements, help reduce dyskinesia, and reduce OFF time. DBS does not usually increase the peak benefit derived from an appropriate dose of levodopa—the best levodopa response before DBS is a good indicator of the best response after DBS—but it can help extend the amount of ON time without dyskinesia, which may significantly increase quality of life.

DBS does not provide most people with PD benefit for their non-motor symptoms such as depression, sleep disturbance, or anxiety. DBS also does not typically improve postural instability or walking problems. If a symptom you have does not respond to levodopa, it is not likely to respond to DBS. DBS may also worsen thinking and memory (cognition) function in patients at risk and is not recommended in patients with significant presurgical cognitive impairment.

What Are the Risks of DBS?

DBS is a surgical procedure. As with any surgery, there are some risks associated with it. Some of the risks of DBS include infection surrounding the device hardware and bleeding in the brain or implant site. Your neurosurgeon will discuss additional risks with you. Studies have shown that the risks are relatively small, but they should be kept in mind when considering DBS. As with any surgical procedure, the best outcomes tend to occur at high volume DBS centers that perform many of these procedures.

Am I a Good Candidate for DBS?

Before considering DBS, it is very important to be evaluated by a movement disorder specialist (a neurologist who is highly trained in treating PD). Often, medication adjustments and other treatment changes can offer significant benefits and may delay the need for surgery.

DBS is not for everyone. It is approved by the United States Food and Drug Administration (FDA) for those with PD of at least four years' duration. It is most often recommended for those whose symptoms respond strongly to levodopa but who have dyskinesia. In addition, the best surgical candidates tend to be

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younger patients (people with PD over 70 years tend to have higher rates of complications), without dementia, and have no other major medical conditions.

Because PD worsens over time, it is important to discuss and plan for the option of surgery beforehand. Talk with your neurologist about whether DBS is right for you and, equally important, when is the right time for surgery. If your neurologist has not yet brought up surgery as an option, you may want to ask about it, even long before you are a candidate.

If you are already part of a PD support group, other group members may have experiences to offer that can help you with your decision making. Some chapters of APDA sponsor DBS support groups whose members may be able to offer you valuable information. As you consider going forward, your neurologist will refer you to a neurosurgeon who will perform the procedure. Talk to the neurosurgeon and make sure all your questions are answered as you consider your decision. There are several different brain regions that can be targeted based on symptoms, and your neurosurgeon and neurologist will be best able to advise which is most appropriate for you.

What Happens During DBS?

Most DBS procedures are performed while the person with PD is awake under local anesthesia, with their head immobilized in a rigid frame, so that the surgical team can monitor the person with PD's response to the electrode placement as it occurs. A few centers now offer image-guided placement, in which the surgery is performed under general anesthesia without the frame. The pulse generator is usually implanted during a second surgery, which is scheduled about a week after the first.

What Happens After the Procedure?

You will likely remain in the hospital for one or two nights following your first surgery (electrode placement). Following your second surgery (pulse generator), you will probably go home the same day.

The stimulator is turned on several weeks later, after you recover from surgery. Adjustment of the stimulator may take repeated visits over several weeks or even longer. Adjusting the stimulation settings after surgery is a critical part of optimizing the treatment and is key to obtaining the most benefit. Your treatment team will recommend changes in your drug treatment at the same time to maximize your ON time while reducing dyskinesia.

Resources

APDA provides information, education, and support to those impacted by PD, and funds scientific research into the causes, prevention, and treatments of PD. We provide a nationwide network of programs, activities, and events to facilitate a better quality of life for the Parkinson's community. Through our website, apdaparkinson.org, you can find the full range of resources we offer, as well as links to other important sources of information and support.

National Headquarters

American Parkinson Disease Association
Parkinson Plaza
135 Parkinson Ave.
Staten Island, NY 10305-1946

Telephone: 800-223-2732

Website: apdaparkinson.org

Email: apda@apdaparkinson.org

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