

ANSWERING QUESTIONS ABOUT DEEP BRAIN STIMULATION



THE
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The most common surgical treatment for Parkinson's disease is deep brain stimulation (DBS). Similar to available drug treatments, DBS does not slow down the disease or restore sick and dying nerve cells affected by Parkinson's disease, but rather offers symptomatic benefits. In DBS, a thin electrode is implanted into the brain, targeting motor circuits that are not functioning properly. Small electrical pulses from a device similar to a cardiac pacemaker are then used to stimulate a small brain region and block the signals that cause some Parkinson's symptoms.

William J. Marks, MD, MS-HCM answers common questions associated with DBS.

MJFF: When in the disease course is DBS recommended?

WM: The standard answer is that DBS is intended to be used for "advanced Parkinson's disease," but that phrase isn't all that practically helpful and may be misleading. A better way to think about DBS candidacy is that it should be considered when motor problems produced in PD (slowness, stiffness, shaking, walking problems, wearing off of medication, fluctuations of motor symptoms, dyskinesia) are no longer sufficiently treated by an optimized medication regimen.

MJFF: How does a physician decide whether to recommend DBS?

WM: A physician will assess the extent to which PD motor symptoms are sufficiently controlled (from the patient's perspective) to determine whether and when to recommend DBS. One effective means for assessing this is to consider what percentage of the day motor symptoms are adequately controlled and what percentage of the day

they are not. If motor symptoms present difficulty for a significant extent of the day (perhaps 20 percent or greater) it may be an indicator of insufficient medication control. Another important factor is how severe motor symptoms are when they do emerge, and the extent to which they interfere with a person's ability to engage in the everyday activities of a patient's life.

MJFF: Can DBS be performed too early or too late in the course of PD?

WM: Currently, many would consider the use of DBS to be "too early" if all PD motor symptoms for a patient were adequately controlled through the entire day with a medication regimen that produced no unacceptable side effects. "Too late" refers to the concept that in the later stages of PD, for some patients, they may develop symptoms that do not respond to medication or to DBS, such as severe balance problems or significant cognitive difficulties. These resistant symptoms might be responsible for disability and their persistence would



overshadow any benefit to motor symptoms that DBS might provide. If a patient has become severely disabled for a long period of time, it may be more difficult to “rescue” individuals than it would have been to use DBS as a preventative measure.

MJFF: Is there an age limit for DBS?

WM: There is no absolute age cut-off for use of DBS although some centers find that older (70 or above) patients may not experience as robust a response as younger patients. Other factors (such as types of symptoms present, responsiveness to levodopa, cognitive function) are probably more important to consider than age per se.

MJFF: What symptoms does DBS treat? Which does it not treat?

WM: Most patients find that DBS is effective in treating:

- » Slowness or lack of movement (bradykinesia and akinesia)
- » Stiffness of muscles (rigidity)
- » Shaking of the limbs (tremor)
- » Gait problems that remain responsive to levodopa
- » Mild balance problems that remain responsive to levodopa
- » Motor fluctuation (variations in level of motor symptoms and their control by medication)
- » Dyskinesia (involuntary, excessive movements of the body, usually occurring when medications peak)
- » Dystonia (painful abnormal muscle activation that causes toe curling or twisting of hand or feet)
- » Nighttime motor symptoms that emerge due to lack of frequent medication doses
- » Body pain from PD (sometimes)

As with levodopa, DBS does not typically improve:

- » Speech problems
- » Swallowing problems
- » Cognitive problems
- » Mood problems (depression, anxiety)
- » Freezing of gait or other movement that occurs when medications are working at their best
- » Moderate or greater balance problems
- » Bladder, bowel, or sexual dysfunction

MJFF: How common are infections associated with DBS?

WM: Clinical experience and formal studies commonly show an infection rate of three to four percent. Such infections most commonly occur in the chest region at the site where the neurostimulator (“pacemaker”) is implanted. Infections most commonly occur weeks or months after the surgical procedure to implant the device. Treatment usually entails removal of the device component in the infected area, treatment with intravenous antibiotics, and then re-implantation of a brand new replacement device. In cases where the infection involves the chest region, usually the brain leads can be left in place (as long as the infection has not spread), so that no additional brain surgery would be required. Rarely, infection can originate in the brain at the level of the electrode which can be more serious, and in some cases require the removal and re-implantation of the electrode.

MJFF: What causes the infections?

WM: Any time the human body is opened during surgery — and particularly when foreign objects like medical devices are inserted inside — bacteria and other organisms can enter, grow, and cause an infection. Other possible sources of infection arise from the bloodstream and can “seed” other parts of the body, though this mechanism is less likely.

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