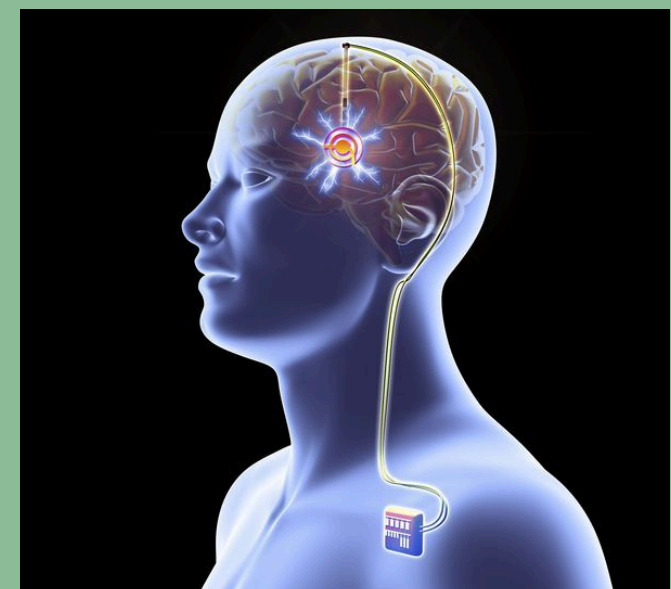


WHAT TO EXPECT AFTER DBS SURGERY

The patient should have realistic expectations post-DBS surgery. DBS will not cure PD, but it improves tremors, rigidity (stiffness), bradykinesia (slowness of movements), motor fluctuations, and dyskinesia to variable extents. A reasonable improvement in quality of life and level of independence can be expected after DBS.

Symptoms that may not improve post-DBS include freezing of gait (sudden cessation of walking as if feet are glued to the ground), poor balance, speech and swallowing problems, cognitive and psychiatric issues, and autonomic dysfunction (fluctuation of blood pressure, bladder and bowel control, sweating disturbance).

The gradual loss of independence after DBS and the appearance of new symptoms over time indicated disease progression rather than a diminishing effect of DBS.



FREQUENTLY ASKED QUESTIONS ABOUT DBS:

How long will my DBS last?

The rechargeable IPG lasts approximately 15 years, while the non-rechargeable IPG lasts 3-5 years. Newer models with a battery life of 15+ years are now available.

Can I stop my medication after DBS Surgery?

After DBS, the requirement for levodopa and add-on drugs will often decrease by 30% to 50% one year after STN DBS. Dose reduction is necessary to control dyskinesias. DBS in the GPi target will control dyskinesia even without reducing medication, and hence, patients who require medicines for some of their symptoms can continue to take medicines for optimal control of symptoms.

Is DBS safe?

DBS is a safe procedure with short- and long-term benefits, backed by scientific evidence gathered over two decades. A successful DBS program requires a multidisciplinary team, including an experienced functional neurosurgeon, a movement disorder neurologist, a psychiatrist, and a social worker. Many patients may require the services of a physiotherapist and speech therapist in the course of time. There is a minor risk of infection, bleeding, and hardware malfunction. During programming, patients might feel transient tingling, pulling sensations, facial deviation, speech change or double vision, all of which can be reversed by changing the stimulation settings. Patients should regularly check battery status, as an abrupt end of battery life can cause severe worsening of their symptoms.



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DEEP BRAIN STIMULATION FOR PARKINSON'S DISEASE

WHAT IS DBS

Deep brain stimulation (DBS) involves of surgically implanting a device similar to a pacemaker, called an implantable pulse generator (IPG), which delivers electrical current directly to specific brain areas responsible for movement control.

Current is delivered through electrodes placed on both sides of the brain via small holes drilled in the skull. The electrodes are connected by long wires that travel under the scalp and the skin of the neck to a battery-powered IPG placed just beneath the skin of the chest. When turned on, the stimulator sends electrical pulses to the targeted brain region, modifying the faulty nerve signals responsible for the symptoms of Parkinson's disease (PD).

COMPONENTS OF DBS

A DBS system consists of 3 parts that are implanted in the body:

- **Implantable pulse generator (IPG):** is a programmable, battery-powered device resembling a pacemaker that generates electric pulses. It is positioned beneath the skin of the chest, below the collarbone, or under the skin of the abdomen.
- **Leads** – Coated wires with electrodes (contacts) at the tip deliver electric pulses to the targeted brain areas. In PD, the two common regions of the brain where the electrodes are placed are the subthalamic nucleus (STN) and the globus pallidus interna (GPi). After the lead is placed in the brain, the hole in the skull is sealed. An extension wire connects the tip of the lead, which comes outside the skull through a small hole, to the IPG.
- **Extension wire** – An insulated wire that connects the lead to the IPG. It is placed under the skin and runs from the scalp, behind the ear, down the neck, and to the chest, where the IPG is placed under the skin.

The doctor programs the electrical settings in the IPG using a wireless device called a programmer. The patient can also use a handheld controller called the patient therapy controller to make slight adjustments in the strength of the current within the limits set by the doctor. The stimulation settings can be further adjusted to relieve patients' symptoms during follow-up visits if required.

CANDIDATES FOR DBS

Good candidates are persons with PD of at least 4 years duration with:

- Good response to oral Levodopa and other add-on drugs and able to walk unsupported in ON (the time when the best response to levodopa is experienced)
- Significant motor fluctuations marked disability during OFF state (the worst state when the effect of levodopa is gone) and decreased duration of ON time despite optimal medical treatment.
- Patients requiring multiple doses of levodopa and still spend more than 25% of awake time in OFF.
- Troublesome levodopa-induced dyskinesia (involuntary dance-like movements after taking levodopa)
- Disabling tremors that do not respond to oral medication.
- No significant cognitive deficits or active psychiatric symptoms .
- Age under 70 to 75 years (though there is no strict age cutoff).
- No co-morbid conditions that increase the risk of surgery or threaten life span.
- Ability to attend regular follow-up visits and have good family support.
- Realistic expectations of what might improve and what will not improve after DBS.

Poor candidates include

- Patients with dementia.
- Individuals who show inadequate response to oral dopaminergic medication and remain dependent even during the ON stage.
- Those with severe autonomic dysfunction.
- Patients with unstable psychiatric conditions.
- Patients who have severe brain atrophy on MRI.

WHAT IS DBS PROGRAMMING

DBS programming should be done by a movement disorder specialist or neurologist trained to do programming. Programming involves adjusting the parameters of the electrical impulses, namely voltage, pulse width and frequency. The goal is to optimise the electrical stimulation parameters for each individual to achieve the best clinical response and the least side effects . Initial detailed programming is generally done within a month after surgery, and subsequent programming frequency is need-based. Medicines for PD have to be titrated along with DBS programming.