Deep Brain Stimulation (DBS) may be a neurosurgical procedure involving the location of a medical device called a neurostimulator (sometimes mentioned as a "brain pacemaker"), which sends electrical impulses through implanted electrodes to specific targets within the brain (brain nuclei) for the treatment of movement disorders including paralysis gaits, tremor, and dystonia. While its underlying principles and mechanisms aren't fully understood, DBS directly changes brain activity during a controlled manner.

DBS has been approved by the Food and Drug Administration as a treatment for tremor since 1997. DBS was approved for dystonia in 2003, obsessive–compulsive disorder (OCD) in 2009 and epilepsy in 2018. DBS has been studied in clinical trials as a possible treatment for chronic pain for various affective disorders, including major depression. It’s one among few neurosurgical procedures that allow blinded studies.

Parkinson's disease: DBS is employed to manage a number of the symptoms of paralysis gaits that can’t be adequately controlled with medications. It's recommended for people that have PD with motor fluctuations and tremor inadequately controlled by medication or to those that are intolerant to medication as long as they are doing not have severe neuropsychiatric problems. Four areas of the brain are treated with neural stimulators in PD. These are the pallidum internes, thalamus, nucleus and therefore the pedunculopontine nucleus. However most DBS surgeries in routine practice target either the pallidum internes or the nucleus. DBS of the pallidum internes reduces uncontrollable shaking movements called dyskinesias. This permits a patient to require adequate quantities of medicines (especially levodopa), thus resulting in better control of symptoms. DBS of the nucleus directly reduces symptoms of Parkinson's.

This permits a decrease within the dose of antiparkinsonian medications. DBS of the PPN may help with freezing of gait, while DBS of the thalamus may help with tremor. The potential exists for neuropsychiatric side effects after DBS including Apathy, Hallucinations, Hyper sexuality, Cognitive dysfunction, Depression and Euphoria. However these could also be temporary and associated with correct placement of electrodes and calibration of the stimulator, so these side effects are potentially reversible.

DBS has been used experimentally in treating adults with severe Tourette syndrome that doesn't answer conventional treatment. Despite widely publicized early successes, DBS remains a highly procedure for the treatment of Tourette's, and more study is required to work out whether long-term benefits outweigh the risks. The procedure is well tolerated, but complications include "short battery life; abrupt symptom worsening upon cessation of stimulation, hypomanic or manic conversion, and therefore the significant time and energy involved in optimizing stimulation parameters". As of 2006, five people with TS had been reported on; all experienced reduction in tics and therefore the disappearance of obsessive-compulsive behaviors.

The procedure is invasive and expensive, and requires long-term expert care. Benefits for severe Tourette's aren't conclusive, considering less robust effects of this surgery seen within the Netherlands. Tourette's is more common in pediatric populations, tending to remit in adulthood, so generally this is able to not be a recommended procedure to be used on children. Because diagnosis of Tourette's is formed supported a history of symptoms instead of analysis of neurological activity, it's going to not always be clear the way to apply DBS for a specific person. Thanks to concern over the utilization of DBS in Tourette syndrome treatment, the Tourette Association of America convened a gaggle of experts to develop recommendations guiding the utilization and potential clinical trials of DBS for TS.

Adverse effects

DBS carries the risks of operation with a complication rate associated with the experience of the surgical team. the main complications include hemorrhage (1–2%) and infection (3–5%). The potential exists for neuropsychiatric side effects after DBS including Apathy, Hallucinations, Hyper sexuality, Cognitive dysfunction, Depression and Euphoria. However these could also be temporary and associated with correct placement of electrodes and calibration of the stimulator, so these side effects are potentially reversible.

Deep brain stimulation won't cure your disease, but it's going to help lessen your symptoms. If deep brain stimulation works, your symptoms will improve significantly, but they typically don't get away completely. In some cases, medications should be needed conditions.