



# Surgical Approach for Obsessive Compulsive Disorder; Deep Brain Stimulation and Transcranial Magnetic Stimulation

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Obsessive-compulsive disorder (OCD) is a psychiatric condition characterized by dysfunctional beliefs and recurrent urges, often accompanied by anxiety and depression. Significant progress has been made in the field of neuromodulation for OCD, particularly through deep brain stimulation (DBS) and transcranial magnetic stimulation (TMS). Both techniques have been in use for some time, but there remain important challenges to address, particularly regarding public acceptance and ethical concerns surrounding these interventions.

DBS has emerged as a promising treatment for refractory OCD, with long-term success rates of 60-70% in symptom improvement<sup>1</sup>. Studies have demonstrated its potential as a robust intervention for patients who have not responded to conventional treatments<sup>2</sup>. Although DBS is more invasive than TMS, it has consistently yielded positive outcomes in severe, long-standing cases of OCD. In contrast, TMS, while less invasive, has shown variable effectiveness. When used in conjunction with cognitive behavioral therapy (CBT), TMS may offer benefits, though inconsistent response rates underscore the need for further investigation to enhance its efficacy.

DBS also faces challenges related to accessibility, including high costs and limited insurance coverage. Addressing these financial barriers is crucial to ensuring that patients with treatment-resistant OCD have access to this effective treatment<sup>3,4</sup>.

OCD symptoms suggest that individualized approaches, guided by detailed neuroimaging, could significantly improve treatment outcomes. Tailoring DBS targeting and stimulation parameters to patient-specific connectivity patterns is essential for maximizing efficacy while minimizing adverse effects. The development of closed-loop DBS systems, which adjust stimulation in real time based on neural feedback, represents a significant advancement in improving treatment precision and

effectiveness<sup>5</sup>.

The field of neuromodulation for OCD is advancing rapidly, with DBS offering a powerful tool for managing treatment-resistant cases. TMS also holds potential, particularly as a complementary therapy. However, overcoming barriers to access and refining personalized treatment approaches are essential for optimizing these therapies. Continued research into closed-loop systems and the integration of CBT will be critical in improving the effectiveness and accessibility of neuromodulation therapies for OCD<sup>2,3,4</sup>. Furthermore, the use of machine learning to predict individual responses to different DBS targets based on clinical and imaging data may help identify the most effective stimulation parameters.

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