

Closed loop deep brain stimulation

A closed loop deep brain stimulation (CLDBS) system automatically adjusts stimulation parameters by the brain response in real-time. The CLDBS continues to evolve due to the advancement in brain stimulation technologies.

Deep brain stimulation (DBS) has advanced treatment options for a variety of neurologic and neuropsychiatric conditions. As the technology for DBS continues to progress, treatment efficacy will continue to improve and disease indications will expand. **Hardware** advances such as longer-lasting batteries will reduce the frequency of **battery replacement** and segmented leads will facilitate improvements in the effectiveness of stimulation and have the potential to minimize stimulation side effects. Targeting advances such as specialized imaging sequences and "**connectomics**" will facilitate improved accuracy for lead positioning and trajectory planning. Software advances such as closed-loop stimulation and remote programming will enable DBS to be a more personalized and accessible technology ¹⁾.

Embedded **closed loop deep brain stimulation** was feasible, safe, and had a comparable outcome to conventional TS DBS for the treatment of tics ²⁾.

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Frey J, Cagle J, Johnson KA, Wong JK, Hilliard JD, Butson CR, Okun MS, de Hemptinne C. Past, Present, and Future of Deep Brain Stimulation: Hardware, Software, Imaging, Physiology and Novel Approaches. Front Neurol. 2022 Mar 9;13:825178. doi: 10.3389/fneur.2022.825178. PMID: 35356461; PMCID: PMC8959612.

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Cagle JN, Okun MS, Cernera S, Eisinger RS, Opri E, Bowers D, Ward H, Foote KD, Gunduz A. Embedded Human Closed-Loop Deep Brain Stimulation for Tourette Syndrome: A Nonrandomized Controlled Trial. JAMA Neurol. 2022 Sep 12. doi: 10.1001/jamaneurol.2022.2741. Epub ahead of print. PMID: 36094652.

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