# Chronic high-frequency deep brain stimulation

Patients with Parkinson's disease can develop axial symptoms, including speech, gait, and balance difficulties. Chronic high-frequency deep brain stimulation (>100 Hz) can contribute to these impairments while low-frequency stimulation (<100 Hz) may improve symptoms but only in some individuals. Factors predicting which patients benefit from low-frequency stimulation in the long term remain unclear. A study aimed to confirm that low-frequency stimulation improves axial symptoms and to go further to also explore which factors predict the durability of its effects. Vijiaratnam et al. recruited patients who developed axial motor symptoms while using high-frequency stimulation and objectively assessed the short-term impact of low-frequency stimulation on axial symptoms, other aspects of motor function and quality of life. A retrospective chart review was then conducted on a larger cohort to identify which patient characteristics were associated with not only the need to trial low-frequency stimulation but also those which predicted its sustained use. Among 20 prospective patients, low-frequency stimulation objectively improved mean motor and axial symptom severity and quality of life in the short term. Among a retrospective cohort of 168 patients, those with less severe tremor and those in whom axial symptoms had emerged sooner after subthalamic nucleus deep brain stimulation were more likely to be switched to and remain on long-term low-frequency stimulation. These data suggest that low-frequency stimulation results in objective mean improvements in overall motor function and axial symptoms among a group of patients, while individual patient characteristics can predict sustained long-term benefits. Longer follow-up in the context of a larger, controlled, double-blinded study would be required to provide definitive evidence of the role of low-frequency deep brain stimulation [1)].

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Vijiaratnam N, Girges C, Wirth T, Grover T, Preda F, Tripoliti E, Foley J, Scelzo E, Macerollo A, Akram H, Hyam J, Zrinzo L, Limousin P, Foltynie T. Long-term success of low-frequency subthalamic nucleus stimulation for Parkinson's disease depends on tremor severity and symptom duration. Brain Commun. 2021 Jul 28;3(3):fcab165. doi: 10.1093/braincomms/fcab165. PMID: 34396114; PMCID: PMC8361419.