When one Target is Not Enough: Combined DBS and Spinal Cord Stimulation for Refractory Gait and Dystonia in Parkinson's Disease

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Abstract

Introduction: Parkinson's disease (PD) is a progressive neurodegenerative disorder that remains a therapeutic challenge. Levodopa is the cornerstone of treatment, yet many patients become refractory and require surgical interventions such as deep brain stimulation (DBS). While DBS provides substantial benefit, its effects may be incomplete, particularly for symptoms such as foot dystonia, freezing of gait, and pain. In this context, spinal cord stimulation (SCS) has emerged as a potential adjuvant. This report explores its value in a patient with PD refractory to conventional treatments.

Clinical description: A 47-year-old man with a 10-year history of PD initially presented with asymmetric symptoms in the left upper limb, later spreading to the right with lower intensity. Over time, he developed rigidity, pain, dystonia, speech impairment, freezing in the OFF state, poor sleep, mild mood changes, despite optimized medication treatment. Bilateral STN DBS provided initial benefit, but rigidity and dystonia worsened within a year. Subsequent bilateral GPi DBS with right STN repositioning improved dystonia and rigidity/tremor by ~40%, though freezing persisted. Due to persistent pain in the left limbs, SCS was implanted using Microburst™ stimulation (T8–T10) and Fast™ stimulation (T2–T4). Timed Up and Go (TUG) and gait analyses showed progressive improvement, and reclassification of fall risk from high to low. The patient experienced marked improvement in gait, UPDRS (80%), foot dystonia (95%), and pain (100% -lower limb and 70% -upper limb).

Discussion: Although traditionally used for pain, SCS may also improve motor symptoms and dystonia.Case reports describe improvements in gait and freezing, suggesting modulation of sensorimotor networks that may complement DBS. Controlled trials, however, have yielded inconsistent results, reflecting variability in patient selection and stimulation parameters. Still, this case shows how SCS may serve as an adjuvant after DBS, especially when pain, dystonia, and gait dysfunction coexist. It underscores how individualized neuromodulation can extend therapeutic benefit beyond conventional targets.

Conclusions: SCS may unlock therapeutic potential beyond pain control in PD, offering meaningful gains in gait and dystonia where medication and DBS fall short. This case reinforces the promise of combined neuromodulation, while highlighting the need for rigorous clinical trials to define its role in advanced PD care.

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