

Simultaneous Bilateral Implantation of DBS Electrodes for Parkinson's Disease using a Frameless Customized Platform: First Report in Latin America

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Abstract

Introduction: Deep Brain Stimulation (DBS) for Parkinson's Disease (PD) has been historically performed with frame-based stereotaxy. However, extended operative time and patient discomfort motivated the evaluation of frameless technology, achieving accurate electrode placement like conventional techniques. We report the first case in Latin America of bilateral DBS implantation for Parkinson's Disease using a frameless platform.

Clinical description: A 64-year-old female with a 5-year evolution of Parkinson's disease presented left-sided onset hemibody and mixed-phenotype tremor. The patient experienced motor fluctuations, and morning akinesia despite optimized pharmacological therapy including levodopa-carbidopa-entacapone, rotigotine, and mirtazapine, with partial tremor control. Non-motor symptoms include anxiety, insomnia, and depression. The levodopa Challenge Test (LCT) demonstrated a 53% improvement in Unified Parkinson's Disease Rating Scale (MDS-UPDRS Part III), confirming dopaminergic responsiveness. Based on persistent tremor, motor complications, absence of psychiatric conditions or cognitive impairment, the patient was considered for a bilateral subthalamic nucleus (STN) DBS.

Discussion: Simultaneous bilateral DBS using a customized frameless platform proved to be feasible and safe. The simultaneous bilateral DBS strategy reduces operation time in both half arcs strategy. In this procedure, the operative time was 120 minutes, which is comparable with dual-arc technique (136.4 ± 20.93 minutes). Moreover, the surgical time is significantly reduced, and this technology is even more advanced than semi-frame systems, since it does not require either a CT scan or an MRI with the stereotactic frame on the day of surgery. StarFix planning and guidance system provides an accurate position of electrodes by integrating pa-

tient-specific cranial geometry into a customized platform. Its precision is comparable with other frameless systems and its accuracy is related with the increasing experience of the surgical team.

Conclusions: This frameless platform demonstrated feasibility, accuracy, and operative DBS efficiency. This first case highlights the potential of frameless systems to expand access to DBS therapy in Latin America. Further studies with larger cohorts of patients and long-term follow-up are needed to confirm the benefit of these approaches.

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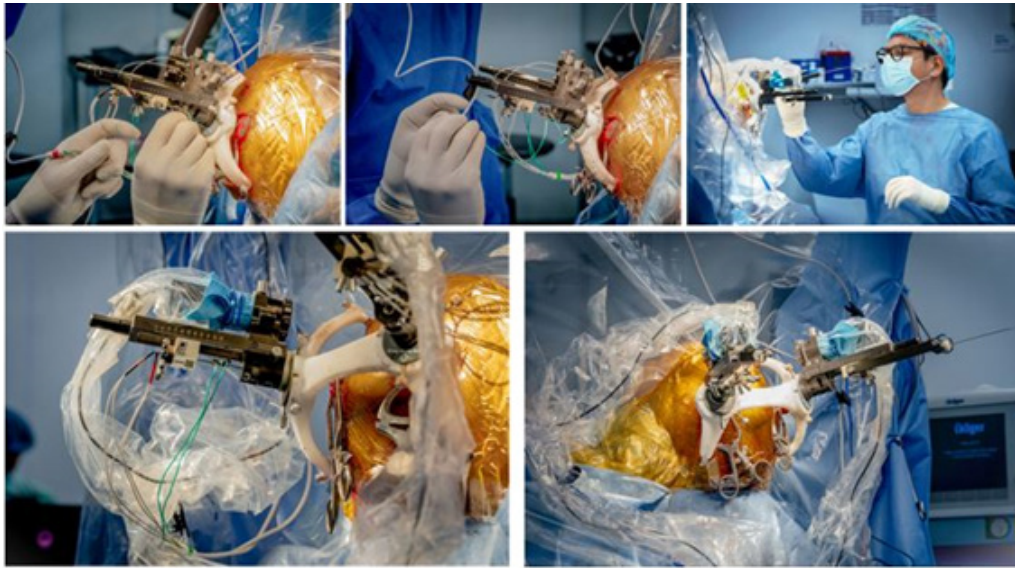


Figure 1. Frameless DBS implantation using a patient-specific StarFix platform.