Patient Specific Computational Modeling to Evaluate Motor Outcomes During Deep Brain Stimulation in Parkinson’s Disease Patients

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Introduction: Parkinson’s Disease (PD) is a neurodegenerative disorder that often causes motor disability, as well other mood, sleep, cognition, and autonomic issues. The most common treatment of PD is a regimen of neurological pharmaceuticals, but these treatments have been shown to have decreased efficacy over time. Deep brain stimulation (DBS) is a treatment by which adjustable electrodes are embed either mono, or bilaterally into regions near the basal ganglia, with the most common targets being the subthalamic nucleus (STN), or the globus pallidus interna (GPi). DBS lead location and stimulation settings combine to define the volume of tissue activated (VTA), in each patient, which we hypothesize to be correlated with clinical outcomes.

Methods: Our cohort consisted of 53 patients, who all received mono-lateral stimulation. The group consisted of 23 GPi targeted patients, and 29 STN targeted patients. Pre- and 4-6 month post-operative UPDRS III, Beck Depression Inventory, and PDQ-39 scores were collected for all patients. All clinical outcome assessments were performed by a neurologist at the University of Florida Center for Movement Disorders and Neurorestoration.

Results

Variation in lead location for STN targeted patients

Mean UPDRS Difference at 4 months in STN targeted patients

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