Task influences on articulation and voice parameters in ON and OFF deep brain stimulation in Parkinson's subjects D. Sidtis, D. Katsnelson, T. Rogers, J. J. Sidtis

This study is based on the assumptions that basal ganglia control processes underlying articulation and voice interact with task conditions, and that speech is made up of several elements, each of which may have a different vulnerability to ON or OFF deep brain stimulation (DBS) conditions. To examine these questions, we utilized four tasks that differ in motor control features, five acoustic measures of motor speech, and four clinical ratings. Four speech tasks, sentence repetition, reading, conversation, and "conversation-repetition," were obtained from Parkinson's speakers with DBS in subthalamic nuclei. To examine motor speech properties, acoustic measures using the PRAAT analysis system included F0 mean and variability (SD and CoVar), harmonic-to-noise ratio (HNR), and fluency (derived from syllable length measures). In addition, three expert listeners rated dysfluencies, blocks, voice and rate changes, and articulatory imprecision in all speech samples. In the acoustic study, main effects of task and of DBS were found for F0 Mean. When conversation and conversation repetition were compared, significant effect of task emerged for the HRN and the dysfluency parameter. These results suggest that motor speech characteristics depend on task, and that individual motor speech characteristics are variably affected by DBS.