Deep Brain Stimulation

Parkinson’s disease (PD) results in a wide variety of impairments, many of which adversely affect gait. Decreased mobility negatively affects quality of life, and individuals with PD are at increased risk of falling. The current standard for evaluating motor impairment associated with PD is the Unified Parkinson’s Disease Rating Scale (UPDRS), a qualitative assessment completed in the clinic. This study evaluated the ability of the Kinesia™ sensors to quantify motor symptom severities, both with deep brain stimulation on and off, during gait related activities and the potential for meaningful continuous home monitoring.

Methods

42 individuals with PD completed the protocol. 19 of these individuals completed the protocol both with deep brain stimulation (DBS) on, at the individual’s typically used clinician determined settings, and off.

Five Kinesia™ motion sensor units, each containing a tri-axial accelerometer and tri-axial gyroscope, were placed on the back of each foot, each thigh, and the sternum.

The individuals performed the UPDRS gait related tasks. Video of the tasks was recorded and evaluated based on the UPDRS guidelines by three clinicians.

Continuous Evaluation

The potential for the sensors to provide a continuous assessment of an individual’s activities was evaluated. Activities were classified based on data from the thigh sensor, which provided information about orientation and velocity.

Continuous Evaluation provides a well defined instantaneous measure of impairment in predefined tasks.

Correlation to UPDRS Scores

Kinematic measures had correlations greater than 0.7 with the UPDRS scores for all of the tasks except posture.

Discrete Evaluation

Discrete evaluation provides a well defined instantaneous measure of impairment in predefined tasks.

Related Publications


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