

ACCELEROMETRY-BASED ANALYSIS OF POSTURAL SWAY IN PARKINSON'S DISEASE PATIENTS WITH LEVODOPA-INDUCED DYSKINESIA

Chandler Brock¹ & Carolin Curtze¹

¹Department of Biomechanics, University of Nebraska at Omaha, Omaha, NE USA
email: cabrock@unomaha.edu

Parkinson's disease (PD) is a progressive neurodegenerative disorder, with patient numbers projected to double to 12 million in the next 20 years. Levodopa-induced dyskinesia (LID) is a major problem associated with the long-term use of levodopa for symptomatic treatment of PD. These involuntary movements can become disabling and may interfere with quality of life. Our prior research showed that PD w/ LID were less stable while standing (i.e., increased postural sway) and had a higher incidence of falls. The aim of this study is to determine if postural sway properties are altered by LID via decomposing the sway signal. We hypothesize that in the on-state, LID will exaggerate the postural sway properties. 26 individuals with PD and 10 healthy controls performed 30 seconds of postural sway under two conditions: (1) a single task: standing quietly with arms along their sides, and (2) a cognitive dual task: standing while performing a subtraction task. PD individuals were tested in their off-state (after withholding medication for > 12 hours) and on-state (medication). Sensors were attached to the subjects with the lumbar data of primary interest. The anterior-posterior (AP) acceleration signal was reconstructed w/ or w/o the 1-3 Hz dyskinesia band. Subsequently, the root mean square (RMS) sway was calculated for each of the recomposed signals. In the on-state, 14 PD subjects displayed dyskinesia with clinical ratings spanning a range from 1-9. From visual inspection, it appears that in the on-state LID increases the postural sway properties. Furthermore, the 1-3 Hz signal only provides a small contribution to sway. The results suggest that PD w/ LID have similar AP RMS values as PD w/o LID in the off-state. Lastly, PD w/ LID have higher AP RMS values in the on-state compared to PD w/o LID. A Kruskal-Wallis one-way analysis of variance test will be conducted to determine the statistical differences between the groups. Our preliminary results indicate that AP RMS sway values are elevated when comparing PD w/ LID to PD w/o LID, especially in the on-state. In conclusion, dyskinesia alters postural sway and should be taken into consideration when conducting postural sway analysis.