MoCap method in assessment of rest tremor in patients with Parkinson's disease treated with deep brain stimulation (DBS) surgery

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Introduction: In addition to the typical motor symptoms, many patients with idiopathic Parkinson's disease (PD) develop balance disorders. These disorders, alongside gait disturbances, are the main cause of falls in PD. The treatment of balance disorders in PD is difficult, and the results of both pharmacological and invasive therapy are often unsatisfactory. One of the most innovative methods of objective analysis of movement disorders in PD patients is Motion Capture (MoCap).

The main objective was to determine the usability of the MoCap System in the quantitative assessment of balance disorders in PD patients and also analysis of the impact of Deep Brain Stimulation (DBS) on balance disorders in this group.

Material and methods: The trial included 12 patients treated with DBS in the Medical University of Silesia Neurosurgery Clinic. Motion analysis was performed in the Motion Capture studio of the Polish-Japanese Institute of Information Technology in Bytom. The study compared the average sway radius measured with MoCap (sways of Centre of Mass – COM) and by force platform (Centre of Pressure – COP). For the assessment, four sessions were recorded: S1 – recording of deflection without medication or DBS, S2 – only DBS, S3 – only medication, S4 – DBS and medication. Data analysis was performed with MetLab software.

Results: A positive correlation between the average sway radius of COM and average sway radius of COP was shown. Reduction of the sway radius in patients with DBS was observed.

Conclusions: The tested method for balance disorders assessment is objective, repeatable and shows a positive correlation with the COP movement trajectory analysis .

Key words: Parkinson's Disease; balance disorders; Motion Capture Studio

Ann. Acad. Med. Siles. 2014; 68, 5 (supl. 1): S18

eISSN 1734-025X
www.annales.sum.edu.pl
Published online 25.11.2014