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## Interest of the task of “Stepping in place” in the assessment of freezing in Parkinson's disease patients

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Objectives: Freezing of gait (FOG) in Parkinson's disease (PD) is challenging to measure. Repetitive stepping in place (SIP) task on force plates has been proposed by Nantel and al in 2011 for identifying freezing episodes (FEs) in PD patients. These authors have correlated this task with the validated FOG questionnaire (FOG-Q). The inability to maintain a walking rhythm could be alleviated by external cues involving a sensorimotor network underlying the processing of rhythm (Dalla Bella et al., 2014)

Material and methods: 24 PD patients have been included: 8 without freezing, 8 with severe freezing and 8 mild “freezers”. PD subjects were assessed using the MDS-UPDRS, MoCA, FAST, MiniBest test, questionnaires, and were submitted to the BAASTA battery, which consists of a series of perceptual timing and sensory timing tasks. Single wireless inertial sensors were placed on the patient's lower limbs. A computerized algorithm providing automatic detection of FEs during SIP, Timed Up and Go test and 20 m walk has been used.

Results: Preliminary results show that there is some discrepancy between patients' self-assessment, SIP and walking task measurements. The occurrence of freezing episodes is highly variable in mild freezers and depends on the emotional context and the repetition of the tasks. This could be explained by the fact that the timing of our assessment has been performed in less severe off state than in Nantel's study(12 hours off dopa) and which is closer to the patients' daily life.

Discussion/conclusion: SIP is of limited interest in the assessment of freezing in patients with partial "on state". Analysis of correlations with neurological status, kinematics, perceptual and motor timing tasks will aid in clarifying the interest of this new task in the assessment of freezing in PD patients.

Keywords : freezing. Parkinson. Stepping in place. timing