

## Longitudinal analysis of gait in people with Parkinson's disease to improve the detection of risk of falls

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Within 3 years of diagnosis, more than 85% of people with Parkinson's disease (PD) develop gait problems, which may lead to falls resulting in serious injury and reduced quality of life. The evolution of gait impairments with PD progression and the relationship between locomotor performance and falls in PD are unclear. In addition, large individual variations exist at the level of gait performances corresponding to specific levels of disease severity. Deficits in cognitive and sensory-motor functions in PD also impair the ability to walk while doing another task (i.e., dual-tasking). When attentional resources in PD patients are allocated to more than one task, gait abnormalities increase. This suggests that dual-task walking may present a higher sensitivity to predict future falls in PD patients.

The goals of this project are 1) to determine the effects of an attention-demanding task (i.e., phoneme monitoring) on gait in PD patients and age-matched controls, 2) to characterize within-participant changes of gait performance over six-month intervals and their relationship to changes in cognition, and 3) to predict near falls, falls and mobility impairments occurring during a one-year follow-up period in PD patients based on baseline gait performance. The longitudinal design of this study consists in assessing gait during single and dual-task walking every six months, and to collect information about falls and near falls. This project will improve the objective assessment of fall risk in PD patients using gait parameters during cognitively challenging conditions, similar to those experienced in patient's daily life.