Project Name: Quantifying motor control outside the laboratory

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Summary: Laboratory-based instrumented gait and movement analysis is extremely accurate and provides objective indications about motor problems, the efficacy of a treatment or rehabilitation programme, and the progression of a condition. However, tests in the laboratory often fail to reproduce the same conditions experienced in the real environment. For example, freezing of gait (FOG) is a common symptom of Parkinson’s disease (PD). It is described as the patient’s inability to continue walking despite intending to do so (Nutt et al, 2011). Freezing of gait is a critical problem for the patients because it increases the likelihood of falls (Bloem et al, 2004). The problem is that FOG episodes are extremely reduced when the patient is in a clinical or research setting. The laboratory environment is probably too controlled, and patients can focus on gait only. Because of the lack or objective data, scientists cannot understand what triggers a FOG episode and how a patient can recover from it. In this project, we will measure outdoor and normal gait using wearable sensors that can measure gait parameters and muscle activation non-invasively. This protocol will be tested in healthy participants to be then transferred to PD patients. The objective is to record gait in more ecological conditions and more FOG episodes. The ultimate goal is to record gait and muscle activation accurately to understand what triggers FOG in PD patients.

Student Role: The student will gain skills in data analysis, wearable sensor technology, carrying out a healthy volunteer study, working in a team.