Title: Postural control deficit during Sit-To-Walk in patients with Parkinson's Disease and Freezing of Gait

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Highlights

- Dynamic postural transitions are demanding in PD patients with freezing
- COP is a better parameter than COM to discriminate the groups
- Gait analysis to classify PD patients using linear discriminant analysis

Abstract

Introduction

The intricate linkage between Freezing of Gait (FoG) and postural control in Parkinson's disease (PD) is unclear. We analyzed the impact of FoG on dynamic postural control.

Methods

24 PD patients, 12 with (PD+FoG), 12 without FoG (PD-FoG), and 12 healthy controls, were assessed in ON state. Mobility and postural control were measured with clinical scales (UPDRS III, BBS, MPAS) and with kinematic and kinetic analysis during three tasks, characterized by levels of increasing difficulty to plan sequential movement of postural control: walk (W), gait initiation (GI) and sit-to-walk (STW).

Results

The groups were balanced by age, disease duration, disease severity, mobility and balance. During STW, the spatial distribution of COP trajectories in PD+FoG patients are spread over medial-lateral space more than in the PD-FoG ($p < 0.001$). Moreover, the distribution of COP positions. in the transition between sit-to-stand and gait initiation, is not properly shifted toward the leading leg, as in PD-FoG and healthy controls, but it is more centrally dispersed ($p < 0.01$) with a delayed weight forward progression ($p < 0.05$). In GI task and