

Can falls be prevented in Parkinson's disease?

Alberto Albanese

Patients with Parkinson's disease may benefit from a personalised exercise programme designed to help avoid falls and maintain mobility

Typical idiopathic Parkinson's disease (PD) presents with unilateral tremor, rigidity and limb bradykinesia. The disease is manageable with symptomatic treatment for several years before gait, postural and other symptoms develop. The term *lower body parkinsonism* was introduced to refer to parkinsonian syndromes marked chiefly by gait disturbance, with minimal or no upper limb difficulties.¹ Lower body parkinsonism is thought to be a disorder of vascular origin that affects non-dopaminergic brain areas responsible for locomotion.² The same regions are involved (at least in part) in the later stages of idiopathic PD.³ The principal locomotor deficit associated with parkinsonian syndromes is considered to be impaired generation of the postural shifts that mediate changes from one steady state posture or movement to another.

In the early stages of typical PD, falls are uncommon, although some gait abnormalities manifest early.⁴ Patients use voluntary control of gait to compensate for increased stride and support time, reduced swing time and loss of gait rhythmicity. As PD progresses, however, axial and postural impairment become increasingly prominent. Sudden freezing of gait is likely to disturb balance and contribute to falls, while medication related swings in motor condition and dyskinesias—particularly in the transition phase—may exacerbate postural instability, again leading to falls. Balance impairment and falls eventually number among the chief complaints of patients and their caregivers, and the risk of falls is nine times greater in PD patients than in matched controls.⁵ Nevertheless, patients with gait freezing may be able to walk using appropriate visuospatial cues, such as an L-shaped cane, which they step over.

Near falls (when grasping successfully finds external support and ground impact is avoided) usually occur at an earlier stage and lead to loss of confidence and reduced motility. Concurrent voluntary

motor tasks also interfere with gait in PD patients, showing that walking is an attention demanding activity.⁶ Compensation is easier to implement in open spaces where a walking cane is often sufficient for postural support or for cueing the necessary postural shifts. In the home, however, freezing or postural imbalance are provoked by obstacles such as furniture, or narrow spaces such as doorways. Falls at home can be severe because of the presence of corners and edges. As a result, PD patients with falls reduce their motility at home as a protective measure, and their personal and social well being suffers.⁷

Falls and freezing typically respond poorly and sometimes paradoxically to treatment with dopaminergic medication. In patients with off period gait freezing, it may be worth trying acute dopaminergic challenge or increasing the overall dose. By contrast, patients with on period freezing rarely respond to additional dopaminergic medication and may develop complicated dyskinesias. There is a clear need for alternative treatment strategies.

The randomised trial of Ashburn and colleagues,⁸ published in this issue of the journal, was designed to test the hypothesis that cognitively intact PD patients with preserved voluntary motility during an on period might benefit from a home exercise programme (see page 678). The findings of the study suggest that selected patients can benefit from a personalised programme designed to help avoid falls and maintain mobility. Balance and postural control did not improve in the exercising patients, but their reaching forward abilities were maintained and falls were reduced, although not significantly; near falling and repeat near falling were significantly reduced at both 8 weeks and 6 months. In contrast, in the non-exercised control group, the number of frequent fallers (patients with more than 10 falls) increased significantly and reaching forward also deteriorated. Patients with less severe disease benefited most from the exercises. It is noteworthy

that fractures were reduced by two-thirds in the exercised group thereby reducing the number of medical interventions.

There are various possible reasons for these findings. Firstly, during exercise, PD patients may learn to adopt simpler motor strategies (for example, performing motor tasks sequentially) or those requiring less postural involvement. This may also favour implementation of residual automatic gait and postural control. Secondly, the programme could have provided cueing strategies facilitating voluntary movement, particularly increased distal reaching. Greater distal reaching in the lower limbs would benefit gait, and in the upper limbs would improve voluntary reaching. Thirdly, exercise may favour the implementation of compensatory strategies that patients tend to lose in advanced stages of their disease. Finally, coaching by the physiotherapist may have played a role in the improvement, particularly as about 25% of the patients lived alone.

These hypotheses could be tested in a gait and balance laboratory. In fact, given the high personal and social costs associated with immobility in late PD, the encouraging findings of Ashburn *et al* suggest that further investigations to compare exercise modalities in PD patients with falls would be well worth performing.

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Correspondence to: Professor Alberto Albanese, Fondazione IRCCS Istituto Neurologico Carlo Besta, Università Cattolica del Sacro Cuore Milano, Via G Celoria, 11, 20133 Milano, Italy; alberto.albanese@unicatt.it

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