

Pushing or pulling to predict falls in Parkinson disease?

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SUMMARY

This Practice Point commentary discusses the findings and limitations of an open-label study in which the standard pull test was compared with the new 'push and release' (PR) test to identify fallers among patients with Parkinson disease. Patients were divided into two groups (prior fallers, $n=36$, and non-fallers, $n=46$) and received the two tests in both a dopaminergic on and an off state. In the off state, both balance tests had similar diagnostic accuracy, but, in the on state, the PR test was more accurate than the pull test in classifying retrospective fallers (76.8% vs 87.8%). This commentary critically discusses the merits of the present findings. We also highlight the importance of evaluating Parkinson patients who are prone to falling, and the need to select the appropriate battery of balance tests on the basis of medication condition.

KEYWORDS falls, Parkinson disease, postural instability, pull test, push and release test

COMMENTARY

For general neurologists, falling represents one of the most challenging aspects of patient management in Parkinson disease (PD). Falls are very common in patients with PD, and are associated with a high morbidity and mortality.^{1,2} Moreover, quality of life is markedly diminished when patients start falling. One of the most difficult aspects of management has been the development of reliable assessment tools to identify, in a timely fashion, patients prone to falling and, thus, prevent further falling. Unfortunately, all currently available balance tests have only limited accuracy of predicting who is most likely to fall. According to a recent meta-analysis, the strongest predictor of falling to date is the occurrence of falls in the preceding year.² However, the previous occurrence of falls is an unsatisfactory 'after the fact' predictor because, by definition, this criterion cannot predict the very first fall. This is not a trivial issue, because the same meta-analysis also demonstrated that even patients without a history of falls have a considerable fall risk.² Thus, development of new sensitive and specific evaluations of postural instability that capture early fall risk is urgently needed.

Currently, the most widely used approach to clinically evaluate postural instability in PD is the pull test, which appears as a single item on the Unified Parkinson's Disease Rating Scale.³ This single item approach has been utilized as a quick and efficient way to determine gross

postural instability. A simple backward pull to the shoulders is applied, and the patient's ability to recover is assessed on a 0–4 scale. The pull test has several important shortcomings, including a lack of formal consensus on its exact execution. A particular problem is the inconsistency in the strength of the shoulder pull, within and between raters (depending on experience or physical strength), as well as within and between patients who may have different degrees of instability. Consequently, the pull test has a poor intra-rater and inter-rater consistency, correlates poorly to objective measures of postural instability (as quantitatively ascertained in a balance laboratory) and is a poor predictor of actual falls in daily life.³

The 'push and release' (PR) test was recently proposed as a more consistent and, apparently, more sensitive alternative to the pull test.⁴ The essence of the PR test is to eliminate the inconsistency of the stimulus by instructing patients to actively push backward against the palms of the examiner's hands (placed on the patient's scapulae), allowing the trunk to move backward while the examiner supports the individual's weight. Balance is then perturbed when the examiner suddenly removes the external support, forcing the patient to take a backward step to regain balance. The initial assessments showed that examiners indeed applied more consistent perturbation forces to the patients with the PR test than with the pull test.⁴ Moreover, inter-rater correlations were higher with the PR test. Finally, the PR test

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had a good sensitivity in identifying individuals with a low balance confidence, but was less specific for those with high balance confidence. The PR test also correlated better with self-reported prior falls, when compared with the pull test.⁴

The present paper by Valkovic and colleagues⁵ takes these findings one step further. Both the standard pull test and the new PR test were applied to a sizeable group of 88 patients with PD, with the tests being executed only once on each occasion; the cohort was divided into prior fallers (at least one fall in the preceding 6 months; $n = 36$) and non-fallers ($n = 46$). The new element here was that patients were tested twice, in both a dopaminergic on and off state. The main results were that both balance tests had similar diagnostic accuracy in the off state, while the PR test was more accurate in classifying retrospective fallers in the on state (76.8% vs 87.8%). A practical implication would be that the PR test represents the best balance test and predictor of falls whenever patients are examined in their medication on state (which is often the case in everyday clinical practice for neurologists and other health-care professionals). Indeed, this is an advantage over the pull test, which is unfortunately least reliable when used in the on medication condition.³

Several shortcomings of the study are worth mentioning and can help to place the findings into perspective. First, although the title of the paper suggests otherwise, this was not a predictive study. Faller and non-faller status was ascertained retrospectively, which is not infallible. More importantly, this study at best demonstrated the relative capability of the PR test to determine, post hoc, whether a prior falling event occurred. Future studies with prospective follow-up remain necessary to fully define the capacity of this test to predict future falls. Second, the PR test identifies falls caused by impaired righting reflexes, but many other factors can contribute to falls, such as freezing, cognitive decline or autonomic failure. A single test is unlikely to predict all of these types of falls. Third, there are also troubles with executing the PR test. Some patients, particularly those with low balance confidence, are hesitant

to push back into the examiner's hands. On the basis of further clinical experience, the original inventors of the PR test, therefore, recommend that patients should not actively push into the examiner's hands, but rather lean passively backward.⁴ The merits of this variant remain to be formally demonstrated. Fourth, a problem with interpreting the potential superiority of the PR test is that it differs from the pull test not only in terms of stimulus delivery, but also in terms of the scoring system. Specifically, the rating for the PR test seems to be more sensitive for the early stages of postural instability. However, applying the PR rating scale to the pull test did not improve the accuracy of the pull test to the same degree as is achieved by performing the PR test itself.⁴ Finally, fallers and non-fallers in the study differed considerably in terms of disease severity, so one hardly needed an extra test to differentiate between the two groups. Further investigations in patients with early postural instability and without prior falls remain to be conducted in future studies and will hopefully help to fully determine the clinical value of the PR test.

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PRACTICE POINT

Clinicians should consider using the 'push and release' (PR) test as part of a battery of complementary gait and balance examinations. A particular merit of the PR test seems to be its good diagnostic accuracy in the on medication state, at least for identifying prior fallers. Patients with an abnormal PR test should be candidates for an intensive multifactorial intervention program, including optimization of Parkinson medication, physical therapy and education.

Competing interests

The authors declared no competing interests.