

## Appraisal

## Critically appraised paper: Exercise interventions improve some walking-related outcomes in people with Parkinson's disease

## Synopsis

Summary of: Ni M, Hazzard JB, Signorile JF, Luca C. Exercise guidelines for gait function in Parkinson's disease: A systematic review and meta-analysis. *Neurorehabil Neural Repair*. 2018;32:872–886.

**Objective:** To review the evidence of whether exercise improves walking-related outcomes in people with Parkinson's disease. **Data sources:** MEDLINE, CINAHL Plus, PubMed, and SPORTDiscus were searched up to June 2017. **Study selection:** Randomised controlled trials involving people with Parkinson's disease, and in which exercise interventions were compared to non-exercise control interventions or another form of exercise. Outcome measures were: gait speed (comfortable and fast), stride/step length, cadence, double-leg support time (percentage of the gait cycle duration), Timed Up and Go test, 6-minute walk test, Freezing of Gait questionnaire, and the Dynamic Gait Index. **Data extraction:** Two reviewers extracted data. Methodological quality was assessed using the PEDro Scale, with differences in ratings resolved through discussion. **Data synthesis:** Of 669 trials initially identified, 40 were included in the meta-analysis, with a total of 1656 participants ranging in Hoehn and Yahr stages I to IV. PEDro scores ranged from 3 to 8 points, indicating low to high methodological quality. The studies evaluated a vast array of exercise interventions, including balance training, physiotherapy, resistance training, treadmill and overground gait training, Tai Chi, yoga, boxing, cycling, and aquatic therapy. When compared to non-exercise control groups, exercise

interventions – including balance training, cycling, physiotherapy, resistance training, treadmill training, Tai Chi, and yoga – demonstrated superior outcomes for comfortable gait speed (standardised mean difference (Hedges' *g*) 0.45, 95% CI 0.23 to 0.66), fast gait speed (0.43, 95% CI 0.06 to 0.80), stride/step length (0.38, 95% CI 0.11 to 0.65), and Timed Up and Go test (–0.46, 95% CI –0.71 to –0.21). For the majority of gait outcomes there were no significant differences in treatment effects when exercise interventions were compared against active exercise control groups. Exercise interventions had no significant effect across both exercise and non-exercise comparators on double-leg support time, 6-minute walk test, Dynamic Gait Index, and Freezing of Gait questionnaire. Subanalyses evaluated effects of cueing and exercise duration as treatment effect moderators, and found no significant effect of either on the vast majority of outcomes. **Conclusion:** Exercise interventions can improve gait speed, stride/step length, and Timed Up and Go test in people with Parkinson's disease, but at the time of this literature search there was little evidence that one form of exercise training was superior to another.

**Provenance:** Invited. Not peer reviewed.

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## Commentary

Although there is no cure for Parkinson's disease, exercise interventions are thought to help slow the rate of disease progression.<sup>1</sup> The systematic review by Ni et al recommends particular exercises to improve walking in Parkinson's disease, and concludes that 'gait-specific training, rather than a general exercise program, should be emphasized if gait is the outcome of interest.' This recommendation may be premature, given recent large randomised controlled trials of physiotherapy for Parkinson's disease not included in the review (eg, <sup>2–5</sup>). Collectively, this work indicates that rather than prescribing gait-specific training only to improve walking in Parkinson's disease, a range of exercise choices are available for patients to improve their walking.

Given the complexity and wide individual differences in movement disorders experienced by people with Parkinson's disease, contemporary physiotherapy aims to personalise exercise and physical activities. Physiotherapists also help motivate and support people with Parkinson's disease to keep moving every day. Gait-specific training is one choice within a complex array of person-centred therapies that need to be regularly reviewed and adjusted over the course of the disease. Moreover, there are now many randomised trials on less 'conventional' exercises for Parkinson's disease – such as dancing,<sup>6</sup> video-gaming,<sup>7</sup> boxing-type exercises, and robotics<sup>8</sup> – that may be considered when individualising programs.

In future exercise trials, the stage of disease progression needs be controlled, as well as Parkinson's disease medication status, movement disorders and co-morbidities. As Ni et al highlight, Parkinson's disease exercise literature is currently hampered by many small trials with low power, and therefore needs to be cautiously interpreted when making recommendations for clinical guidelines.

**Provenance:** Invited. Not peer reviewed.

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