

CASE REPORT

TAILORED USE OF COMPENSATION STRATEGIES TO ENABLE EXERCISE
DESPITE FESTINATION IN PARKINSON'S DISEASE

Berber E. A. KOELMANS, MSc¹, Niek A. VERWEY, MD, PhD², Sjors C. F. VAN DE WEIJER, MSc³, Bastiaan R. BLOEM, MD, PhD³ and Jorik NONNEKES, MD, PhD^{4,5}

¹Department of Physiotherapy, KwadrantGroep, Nijmegen, The Netherlands

²Department of Neurology, Medisch Centrum Leeuwarden, Nijmegen, The Netherlands

³Radboud University Medical Centre, Donders Institute for Brain, Cognition and Behaviour, Department of Neurology, Centre of Expertise for Parkinson and Movement Disorders, Nijmegen, The Netherlands

⁴Radboud University Medical Centre, Donders Institute for Brain, Cognition and Behaviour, Department of Rehabilitation, Centre of Expertise for Parkinson and Movement Disorders, Nijmegen, The Netherlands

⁵Department of Rehabilitation, Sint Maartenskliniek, Nijmegen, The Netherlands

Despite increasing evidence for, and heightened awareness of, the importance of exercise in Parkinson's disease, many patients remain sedentary. This tendency to lead an inactive lifestyle has various underlying reasons, including the presence of gait and balance impairments that complicate the patients' ability to perform sports activities. This case report illustrates that a personally tailored approach may be required in these patients, supported, if needed, by the use of compensation strategies or novel technological advances.

Key words: exercise; gait; festination; personalized training; Parkinson's disease; physical therapy.

Accepted Mar 9, 2021; Published Apr 15, 2021

Jrm-CC 2021; 4: jrmcc00055

Correspondence address: Berber E. A. Koelmans, FAITH Research, KwadrantGroep Parkhoven, afd. fysiotherapie, Dorhoutstraat 6, 8933 DD Leeuwarden, The Netherlands. E-mail: berber.koelmans@kwadrantgroep.nl

Encouraging exercise has become an integral part of the management of persons with Parkinson's disease (PD), as an important non-pharmacological approach to improve symptoms (1). However, despite increasing evidence for, and heightened awareness of, the importance of exercise in PD, many patients remain sedentary (2, 3). This tendency to lead an inactive lifestyle has various underlying reasons, including the presence of gait and balance impairments that complicate the patients' ability to perform sport activities. This case report illustrates that a personally tailored approach may be required in such

LAY ABSTRACT

Exercise is important for people with Parkinson's disease. However, the presence of walking problems due to the condition may complicate patients' ability to perform sports activities. This case report illustrates that a personally tailored approach is needed in such cases. This may include the use of novel technological advances (such as a special walker).

cases, supported, if needed, by the use of compensation strategies or novel technological advances.

CASE REPORT

A 73-year-old man with PD had been followed in our outpatient clinic for over 25 years. Because of disabling response fluctuations, he had switched from oral dopaminergic medication to an intraduodenal levodopa pump therapy 3 years previously. Earlier in his life he had run 36 marathons, but, to his regret, he had had to give up running due to progressive gait and balance problems, in particular, festination. The festination resulted from a stooped posture, combined with small balance-correcting steps (see Video 1, Under-scaled balance-correcting steps (in both forward and backward directions) in response to the push-and-release test), resulting in forward running at an increasingly faster pace (see Video 2, Running in a patient with Parkinson's disease. The patient has a stooped posture, and small steps, resulting in running forward at an increasingly faster pace). After a fall due to festination

5 years earlier, he had given up running. A normal walker did not provide enough support, and falling incidents continued to occur on a daily basis. Personalized training with a physiotherapist specialized in PD management followed, including gait and balance exercises according to the European Physiotherapy Guideline for PD (4). However, his festination did not improve significantly with training, with a need for assistive devices. A special walker with a U-shaped frame was prescribed (uMotion). This walker (which is similar to the U-step walker, (In-Step Mobility Products, Skokie, USA) but due to its undercarriage design is more suitable for outdoor use) offers greater stability compared with a standard walker, and also has a drag brake option (whose resistance can be tailored) to prevent patients from moving forwards at an increasingly faster pace. With this walker, the patient was able to run again, with a 400-m lap time of less than 3 min (see Video 3, Running with a special walker (uMotion), which prevents the phenomenon of festination). He has since been running several laps twice a week. Evaluation revealed better scores for quality of life (Parkinson's Disease Questionnaire-39 total score 19.7 before running, and 15.6 after personalized training, with specific improvements in the subscales Activities of Daily Living, Depression, and Functional Mobility).

DISCUSSION

The importance of this case report is three-fold. First, it emphasizes the impact of gait and balance impairments on the ability of persons with PD to perform sports activities. Even patients who are highly motivated to exercise, such as the current patient, can be markedly hindered by these limitations, to an extent where they have to stop their sports activities. Secondly, this case report illustrates that tailored use of non-

pharmacological interventions can help to overcome these barriers, and to maintain or improve an active lifestyle (5). Finally, just like any athletes, those with PD require and deserve a skilled therapist who can act as a coach to co-design an individually tailored exercise programme, and to promote compliance by offering the appropriate guidance.

ACKNOWLEDGEMENTS

Ethical approval was not required because of local regulations. Signed informed consent was obtained for publication of the videos. The Center of Expertise for Parkinson & Movement Disorders was supported by a centre of excellence grant from the Parkinson's Foundation.

This study was supported by a ZonMW Veni grant (16.196.022) to Jorik Nonnekes.

The authors have no conflicts of interest to declare.

REFERENCES

1. Schenkman M, Moore CG, Kohrt WM, Hall DA, Delitto A, Comella CL, et al. Effect of high-intensity treadmill exercise on motor symptoms in patients with de novo Parkinson disease: a phase 2 randomized clinical trial. *JAMA Neurol* 2018; 75: 219–226.
2. van Nimwegen M, Speelman AD, Hofman-van Rossum EJ, Overeem S, Deeg DJ, Borm GF, et al. Physical inactivity in Parkinson's disease. *J Neurol* 2011; 258: 2214–2221.
3. Fertl E, Doppelbauer A, Auff E. Physical activity and sports in patients suffering from Parkinson's disease in comparison with healthy seniors. *J Neural Transm Park Dis Dement Sect* 1993; 5: 157–161.
4. Domingos J, Keus SHJ, Dean J, de Vries NM, Ferreira JJ, Bloem BR. The European physiotherapy guideline for Parkinson's disease: implications for neurologists. *J Parkinsons Dis* 2018; 8: 499–502.
5. Nonnekes J, Nieuwboer A. Towards personalized rehabilitation for gait impairments in Parkinson's disease. *J Parkinsons Dis* 2018; 8: S101–S106.