

The next step

Citation for published version (APA):

Gerards, M. H. G. (2023). *The next step: perturbation-based balance training and falls prevention in older adults*. [Doctoral Thesis, Maastricht University]. Maastricht University. <https://doi.org/10.26481/dis.20230323mg>

Document status and date:

Published: 01/01/2023

DOI:

[10.26481/dis.20230323mg](https://doi.org/10.26481/dis.20230323mg)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

Impact paragraph

Annually, approximately one in three adults aged 65 years and older, and 50% of adults above the age of 80 years, experience a fall.¹ Falls are the leading cause of injuries and injury related death in older adults and present not only a substantial threat to health, but also to wellbeing. In 2020, every 5 minutes an older adult visited the emergency department due to a fall incident.² As our population is ageing, the need for effective and efficient falls prevention interventions increases. Therefore, this thesis was centered around a promising new intervention for falls prevention in older adults: perturbation-based balance training (PBT).

Effectiveness of PBT for older adults

From our literature review, we concluded that PBT seems a feasible and effective approach to prevent daily-life falls in older adults with and without neurological conditions. However, in our own study we did not find a meaningful additional effect of PBT to usual care physiotherapy on balance control. In combination with mixed findings from other recent studies, this indicates that more research is needed to determine whether PBT can be effective for falls prevention in older adults, especially in a way that can be implemented in clinical practice. Based on this evidence, it would be premature to advise physiotherapists to purchase (costly) equipment to provide PBT in their clinical practice. If physiotherapists already have equipment and apply PBT in their clinical practice, it would be useful to systematically document and report their data, as this information may be helpful in the further development and implementation of PBT interventions.

Development and implementation of PBT protocols

The results of our literature review and interviews provide important insights for the further development and implementation of PBT interventions for older adults. Even effective interventions are likely to fail if they are not acceptable to the target population. It was found that being able to feel safe during training, as well as the perceived impact of increased self-efficacy and balance confidence were facilitating factors for the acceptability of PBT. Moreover, participants who experienced initial apprehension or anxiety during training described that the gradual progression of the training difficulty was a facilitating factor for mitigating this anxiety. Thus, we recommend that these factors are considered in the development of future PBT interventions. Conversely, a new theme also emerged from the interviews. Some participants described challenges regarding the training setting, such as having a preference for a social aspect to training (e.g. group training) and having difficulties in travelling to the training location. Knowing about these potential barriers can also help

in the development of future interventions, enhancing their effectiveness through improving acceptability. Moreover, these findings can be combined with factors that should be considered in the design of PBT protocols as identified in our literature review (e.g., perturbation characteristics such as magnitude). For example, gradual progression of perturbation magnitude can be considered as a strategy to mitigate anxiety during training.

Falls prevention? Not for me.

We found that including participants for our study proved challenging, despite the fact that we approached older adults who had recently visited our hospital's outpatient clinic due to a fall incident. From the potentially eligible older adults that were approached, approximately half of them declined to participate in the study. Older adults quite often mentioned reasons like i) they did not view themselves as someone who needed balance training or falls prevention, despite having recently fallen one or multiple times or ii) the burden of participating in the study and training was too high (mostly in combination with (care for) comorbidities or in terms of time). We found that these drops in inclusion rates and reasons not to participate were comparable to those of falls prevention in general.^{3,4} Additionally, in interviews with older adults who had participated in our PBT program we found that they had little prior knowledge about falls prevention, and those who had thought about it were unsure of who to approach about the topic or if it could be beneficial for them. However, these older adults generally described that they would consider anything they could do to prevent future fall incidents as valuable. These findings highlight that there is still a need to improve communication to inform older adults not only about the possible consequences of falls, but also specifically about how falls prevention can potentially benefit them. For example, involving older adults in the planning of how to promote an intervention can provide better insight in their perspective.

Sharing science

While the theoretical development of PBT interventions at this point may be focused in science, in the end they are specifically developed for the benefit of older adults, physiotherapists and medical practitioners. It is important to disseminate our findings in ways that are accessible by anyone who may be interested. Therefore, all studies in this thesis have been published under open-access licenses in scientific peer-reviewed journals, and have been presented and discussed at a number of national and international conferences aimed at researchers and health professionals. Additionally, summaries of our work will be published in trade journals and local news items, to enhance knowledge translation to health professionals without a scientific background and the general public.

Concluding remark

Given the substantial burden of falls on individuals and society, it is essential to evaluate promising new interventions. While PBT is a promising intervention for falls prevention, the results of this thesis highlight the challenge of applying PBT in a way that optimizes effectiveness as well as feasibility and acceptability in clinical practice. The findings of this thesis provide important insights that can offer starting points to address this challenge for future research and implementation.

References

1. Tinetti ME, Speechley M, Ginter SF. Risk factors for falls among elderly persons living in the community. *N Engl J Med.* 1988;319(26):1701-7.
2. Stam C, Blatter B. Letsels 2020: Kerncijfers Letsel Informatie Systeem. Amsterdam: Veiligheid NL; 2021.
3. Elskamp AB, Hartholt KA, Patka P, van Beeck EF, van der Cammen TJ. Why older people refuse to participate in falls prevention trials: a qualitative study. *Exp Gerontol.* 2012;47(4):342-5.
4. Nyman SR, Victor CR. Older people's recruitment, sustained participation, and adherence to falls prevention interventions in institutional settings: a supplement to the Cochrane systematic review. *Age Ageing.* 2011;40(4):430-6.