

Article

Not peer-reviewed version

Reconfiguration of Fall-Prevention Exercise for People with Dementia

[Keisuke Kokubun](#)*, [Kiyotaka Nemoto](#), Maya Okamoto, [Yoshinori Yamakawa](#)

Posted Date: 2 January 2026

doi: 10.20944/preprints202601.0104.v1

Keywords: dementia; fall prevention; exercise intervention; Otago Exercise Programme; balance training; implementation adaptation



Preprints.org is a free multidisciplinary platform providing preprint service that is dedicated to making early versions of research outputs permanently available and citable. Preprints posted at Preprints.org appear in Web of Science, Crossref, Google Scholar, Scilit, Europe PMC.

Copyright: This open access article is published under a [Creative Commons CC BY 4.0 license](#), which permit the free download, distribution, and reuse, provided that the author and preprint are cited in any reuse.

Disclaimer/Publisher's Note: The statements, opinions, and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions, or products referred to in the content.

Article

Reconfiguration of Fall-Prevention Exercise for People with Dementia

—Preserving Core Active Ingredients While Reducing Cognitive and Safety Burdens—

Keisuke Kokubun ^{1,*}, Kiyotaka Nemoto ², Maya Okamoto ³ and Yoshinori Yamakawa ^{1,4,5,6,7}

- ¹ Graduate School of Management, Kyoto University, Kyoto, Japan
 - ² Department of Medical Informatics and Management and Psychiatry, Institute of Medicine, University of Tsukuba, Tsukuba, Japan
 - ³ Nocturne Capital, Tsukuba, Japan
 - ⁴ Institute of Innovative Research, Institute of Science Tokyo, Meguro, Tokyo, Japan
 - ⁵ ImPACT Program of Council for Science, Technology and Innovation (Cabinet Office, Government of Japan), Chiyoda, Tokyo, Japan
 - ⁶ Office for Academic and Industrial Innovation, Kobe University, Kobe, Japan
 - ⁷ Brain Impact, Kyoto, Japan.
- * kokubun.keisuke.6x@kyoto-u.jp

Abstract

Falls among people living with dementia are a major adverse health outcome, strongly associated with physical disability, decline in activities of daily living (ADL), institutionalization, and increased mortality risk. The incidence of falls in this population is consistently higher than in older adults with preserved cognitive function. Although exercise interventions centered on lower-limb strength and balance training have been firmly established as effective for reducing falls among community-dwelling older adults, standard fall-prevention programs such as the Otago Exercise Programme (OEP) are implicitly designed under the assumption that participants retain adequate comprehension, memory, executive function, and self-management capacity. As a result, these programs are prone to implementation failure in dementia care and clinical settings. This paper aims to theoretically reconfigure fall-prevention exercise by decomposing existing evidence into “core active ingredients” and “design elements that impose excessive burden in dementia,” and by reconstructing a dementia-adapted framework for fall-prevention exercise. Specifically, we propose a Dementia-adapted Otago Exercise Programme (D-OEP) based on four core principles: (1) radical simplification of task structure; (2) exclusion of high-risk static balance tasks; (3) embedding balance stimuli within functional movements such as sit-to-stand and supported ankle exercises; and (4) delivery formats that assume caregiver supervision and support. Rather than eliminating balance training, this framework repositions balance stimuli into safe, repeatable functional activities, thereby suppressing fear responses and maladaptive reactions while ensuring cumulative exposure to lower-limb strength and postural control demands. The value of fall-prevention exercise lies not in theoretically optimal prescriptions but in cumulative exposure to active ingredients achieved through feasibility, adherence, and safety. This paper reframes fall prevention not as an issue of “exercise inefficacy” but as a problem of design and implementation, and provides a conceptual foundation for translating evidence into dementia care practice.

Keywords: dementia; fall prevention; exercise intervention; Otago Exercise Programme; balance training; implementation adaptation

1. Introduction

Falls are a major cause of morbidity among older adults and constitute a critical trigger for physical disability, functional decline, and institutionalization. Fall risk is repeatedly reported to be particularly high among people with dementia (Kearney et al., 2013). Dementia is associated with gait instability and abnormalities in gait parameters, which in turn contribute to increased fall risk (Modarresi et al., 2019). Moreover, falls are closely linked to impairments in postural control, balance, and cognitive function—including executive function—and in people with dementia these factors interact to increase the incidence of falls and fall-related injuries (Fernando et al., 2017). As global population aging accelerates and dementia prevalence continues to rise, fall prevention in this population has become a public health priority as well as a clinical concern.

Exercise interventions represent one of the most consistently supported strategies for fall prevention among community-dwelling older adults. In particular, multicomponent programs combining lower-limb strength training and balance exercises have been shown to significantly reduce falls and fall-related injuries across numerous randomized controlled trials and systematic reviews (Gillespie et al., 2012; Sherrington et al., 2017). Among these, the Otago Exercise Programme (OEP) is one of the most extensively validated fall-prevention programs. Developed as an individualized, home-based intervention combining lower-limb strengthening, balance retraining, and walking exercises, OEP has been shown to improve lower-limb strength, balance, and gait, thereby reducing fall risk in older adults (Albornos-Muñoz et al., 2018; Dadgari et al., 2016). Multiple randomized controlled trials report that OEP reduces falls and fall-related injuries by approximately 30–35% (Campbell et al., 1997; Campbell & Robertson, 2007; Thomas et al., 2010).

However, despite this strong evidence base, applying established fall-prevention exercise programs directly to people with dementia is far from straightforward. Standard programs, including OEP, implicitly assume that participants can comprehend multi-step instructions, remember exercise procedures, monitor fatigue and safety, and autonomously progress exercises over time. These assumptions often do not hold even in mild-to-moderate dementia. Moreover, recent large-scale trials in people with dementia have reported that even intensive, theoretically well-designed exercise and activity interventions fail to demonstrate clear improvements in key outcomes such as ADL, quality of life, or falls. These findings suggest that the core problem may lie not in the physiological targets of exercise but in implementation and feasibility (Harwood et al., 2023).

The purpose of this paper is to propose a conceptual framework for reconstructing fall-prevention exercise interventions in a form suitable for people with dementia, while remaining grounded in the established evidence underlying programs such as OEP. This paper does not present new efficacy data; rather, it seeks to clarify which elements should be preserved, which should be suppressed, and how they should be reorganized to achieve feasible and safe implementation in dementia care.

2. Evidence Base for Exercise in Fall Prevention

2.1. Key Findings from Fall-Prevention Trials

Decades of accumulated research have established that exercise interventions significantly reduce falls among older adults. Programs demonstrating the greatest effects share several characteristics: (1) inclusion of exercises that sufficiently challenge balance; (2) inclusion of lower-limb strength training; and (3) delivery at adequate frequency and duration (Sherrington et al., 2017).

Importantly, walking-only interventions have not been shown to reduce falls. In fact, walking programs without accompanying strength or balance training may increase fall risk under certain conditions (Sherrington et al., 2017).

The Otago Exercise Programme exemplifies these principles. Despite being delivered in a realistic home setting, OEP has consistently reduced falls and fall-related injuries by approximately one-third across multiple trials, and is regarded as an intervention that successfully balances effectiveness and feasibility (Campbell & Robertson, 2007).

2.2. Active Ingredients: Beyond Exercise Form

The effectiveness of fall-prevention exercise is not determined by the names or forms of individual exercises per se. Rather, the literature consistently indicates that outcomes are driven by a small number of core active ingredients.

First, strengthening major lower-limb muscle groups—including the quadriceps, hip abductors, and ankle plantarflexors and dorsiflexors—enhances the ability to recover posture following perturbations and improves everyday mobility. Second, repeated balance stimuli in standing promote neuromuscular adaptation and improve postural control. Third, these adaptations translate into reduced fall risk only when exercises are performed consistently over months rather than weeks (Campbell & Robertson, 2007; Sherrington et al., 2017).

From this perspective, balance training should not be conceptualized as specific static tasks (e.g., single-leg stance), but rather as functional stimulation. What matters is whether postural control mechanisms are safely and repeatedly activated; the specific task format is secondary.

2.3. Implications for Adaptation in Dementia

High-difficulty balance tasks commonly used in fall-prevention programs—such as unsupported single-leg stance or backward walking—place substantial demands on attention allocation, dual-task processing, and risk evaluation. In people with cognitive impairment, these demands are often unmet, and tasks may trigger fear responses, avoidance behavior, freezing, or maladaptive movement patterns. Consequently, exercises intended to prevent falls may paradoxically compromise safety and increase fall risk (Campbell & Robertson, 2007; Sherrington et al., 2017).

At the same time, completely eliminating balance stimuli would remove a central mechanism of fall prevention. The key question, therefore, is not whether to include balance training, but how to deliver it. This challenge lies at the heart of redesigning exercise interventions for people with dementia.

3. Why Standard Fall-Prevention Programs Often Fail in Dementia

3.1. Cognitive and Executive Constraints

Most standard fall-prevention programs are designed for cognitively intact older adults and implicitly require participants to: (1) understand and execute multi-step instructions; (2) remember exercise sequences between sessions; (3) self-monitor fatigue, pain, and safety; and (4) adjust difficulty appropriately. These capacities are often compromised even in mild-to-moderate dementia, particularly due to declines in attention, working memory, and executive function, which directly undermine exercise safety and continuity.

This mismatch between task demands and cognitive processing capacity means that even physically simple exercises can impose excessive cognitive load. Situations such as listening to verbal instructions while maintaining posture, switching tasks, or judging when to stop or continue may exhaust attentional resources, leading to confusion, freezing, or inappropriate compensatory movements. As a result, the physiological efficacy demonstrated in other populations may fail to manifest in dementia due to implementation barriers.

3.2. Balance Tasks as Triggers of Fear and Maladaptive Responses

Many fall-prevention programs emphasize balance as an independent training task, such as single-leg stance, tandem stance, or backward walking. For cognitively intact individuals, these tasks are perceived as controlled challenges. In people with dementia, however, the same tasks are often perceived as threatening or confusing.

Fear of falling is common in dementia and is associated with reduced self-efficacy, avoidance behavior, and altered movement patterns (Cox & Vassallo, 2015). Furthermore, impaired sensory–

cognitive–motor integration may result in freezing, excessive co-contraction, or abrupt compensatory steps when confronted with unfamiliar static balance tasks. These responses reflect cognitive–motor integration deficits rather than purely psychological factors. Thus, even biomechanically “appropriate” balance challenges may become counterproductive in dementia.

3.3. *Lessons from PrAISED: More Is Not Always Better*

These challenges are clearly illustrated by recent large-scale trials targeting people with dementia. The PrAISED trial integrated strength, balance, and functional tasks, incorporated individualized tailoring and behavior-change strategies, and delivered up to 50 therapy sessions (Harwood et al., 2023). Despite its ambitious design, PrAISED failed to demonstrate clear improvements in primary outcomes such as ADL, quality of life, or falls.

This does not imply that exercise is ineffective, but rather highlights an implementation gap: even physiologically sound interventions may fail when cognitive, emotional, and practical constraints limit sufficient exposure and continuity. Importantly, PrAISED also underscores that increasing complexity and intensity does not necessarily translate into better outcomes in dementia, and may instead amplify cognitive burden, fatigue, fear, and non-adherence (Booth et al., 2018).

3.4. *Adherence as a Central Mechanism*

Even among cognitively intact older adults, perfect adherence to prescribed exercise programs is uncommon. Nevertheless, evidence suggests that repeated exposure to strength and balance stimuli at a feasible frequency can reduce falls. In dementia, this principle becomes even more critical.

Accordingly, program design should prioritize simplicity, predictability, emotional safety, and supervised delivery to secure cumulative exposure to active ingredients. This is not a compromise, but a mechanism-driven strategy.

3.5. *Redefining Failure: Design Mismatch Rather Than Inefficacy*

In summary, standard fall-prevention programs often fail in dementia not because exercise itself is ineffective, but because program design mismatches the dementia context—characterized by executive dysfunction, fear responses, impaired self-regulation, and caregiving constraints. The key question, therefore, is not how to intensify standard programs, but how to re-deliver their active ingredients in a form that works in dementia.

4. Dementia-Adapted Fall-Prevention Exercise Framework

This section describes a dementia-adapted Otago Exercise Programme (D-OEP) reconstructed on theoretical principles and presented in a reproducible intervention protocol. The aim is not mere simplification, but principled redesign that preserves core active ingredients while accommodating dementia-specific constraints.

The framework begins from the recognition that the standard OEP assumption—older adults who can understand instructions and safely self-manage home exercises—does not hold in dementia (Campbell & Robertson, 2007).

4.1. *Design Principles*

The framework is based on four principles:

First, prioritize structural simplification of tasks.

Exercise types are deliberately limited, order is fixed, and the same sequence is used each session. In dementia, motor learning relies more on repetition and habituation than on cognitive understanding; thus, predictability is essential.

Second, exclude high-risk static balance tasks.

Unsupported single-leg stance, tandem stance, and backward walking impose high cognitive and postural demands and may provoke fear, confusion, or maladaptive movements in dementia

(Cox & Vassallo, 2015). These reactions can rigidify postural strategies and increase fall risk; therefore, such tasks are excluded.

Third, embed balance stimuli within functional movements.

Balance is not treated as an independent task. Instead, balance demands are embedded in meaningful functional movements—such as sit-to-stand and supported ankle exercises—thereby preserving balance stimulation while minimizing fear and confusion.

Fourth, assume caregiver-supported delivery.

Supervision, verbal cueing, and environmental safety checks are not optional supports but core components of the intervention. In dementia, delivery format itself constitutes part of the intervention (Taylor et al., 2017).

4.2. Program Structure

Frequency: 2–3 sessions per week

Duration: approximately 20–30 minutes per session

Structure: identical exercises and sequence each session

A typical session flow is illustrated in Supplementary Figure S1. Each session begins with environmental and safety checks, followed by simple cues or demonstrations, then sit-to-stand, heel raises, and toe raises in a fixed order. All exercises are performed with support and supervision. When feasible, brief supervised walking is added.

4.3. Core Exercises

1. Sit-to-Stand

Description: Repeatedly stand up from a chair, achieve full standing, then slowly sit down.

Dosage: 10 repetitions × 2 sets

Rest: 1–2 minutes between sets

Support: Chair or handrail permitted; supervisor present

Active ingredients preserved:

Lower-limb strength (quadriceps, gluteals); dynamic balance via center-of-mass transfer.

Sit-to-stand is a fundamental daily activity, easy to understand, and less likely to provoke fear than abstract balance tasks. Performance is closely linked to lower-limb strength and postural control (Moreira et al., 2025), and repeated training improves strength and balance-related outcomes (Hyun et al., 2021).

2. Heel Raises (with support)

Description: Stand holding a chair or rail; slowly raise and lower heels.

Dosage: 10 repetitions × 2 sets

Support: Always supported; slow, controlled movement

Active ingredients preserved:

Ankle plantarflexor strengthening; ankle strategy stimulation.

3. Toe Raises (with support)

Description: Stand holding support; lift and lower toes.

Dosage: 10 repetitions × 2 sets

Active ingredients preserved:

Ankle dorsiflexor strengthening; anterior–posterior postural control.

In practice, reducing to one set is permitted depending on fatigue or attention (see Supplementary Materials).

4.4. Positioning of Balance Training

Unsupported static balance tasks (e.g., single-leg stance) are not performed. Instead, balance stimuli are embedded in:

- Center-of-mass transfer during sit-to-stand
- Standing control during heel and toe raises
- Functional postural control during movement

This approach reflects the risk that abstract static balance tasks provoke fear or maladaptive responses in dementia.

4.5. Walking

Walking is treated as an optional adjunct:

- 5–10 minutes
- Always supervised
- Indoors or safe outdoor settings

Walking alone is not considered a substitute for strength and balance exercises (Sherrington et al., 2017).

4.6. Progression Rules

Difficulty progression is not applied.

- Repetitions and sequence are fixed
- No “advance if able” judgments
- If unwell or fatigued, reduce repetitions only

Progression judgments impose cognitive burden and increase risk.

4.7. Implementation and Safety

- Always supervised by caregiver or staff
- Environmental safety checks (non-slip floor, stable chair)
- Immediate cessation if pain, dizziness, or distress occurs

4.8. Summary Comparison with Standard OEP

Component	Standard OEP	Dementia-adapted OEP
Strength	5–6 exercises	3 core exercises
Balance	Static + dynamic	Embedded in function
Repetitions	Progressive	Fixed (10 × 2)
Delivery	Self-directed	Supervised

4.9. Summary

The dementia-adapted OEP preserves the core mechanisms of standard OEP while prioritizing feasibility, safety, and adherence in dementia care.

5. Mapping to the Otago Exercise Programme

Figure S2 conceptually illustrates the structural differences and theoretical continuity between the standard Otago Exercise Programme (OEP) and the dementia-adapted OEP (D-OEP) proposed in this study. Whereas the standard OEP provides lower-limb strengthening, static and dynamic balance tasks, and walking as independent components, D-OEP preserves these active ingredients while suppressing static balance tasks and progression rules, and re-embedding balance demands within functional movements. This figure demonstrates that D-OEP is not a simplified version of OEP, but an implementation-adapted reconstruction that retains core mechanisms.

5.1. Rationale for Explicit Mapping

Although OEP has strong evidence for reducing falls in community-dwelling older adults, its underlying assumptions—particularly self-management and independent execution—do not hold in dementia. Therefore, explicit mapping to OEP is necessary to demonstrate that the dementia-adapted framework represents not a dilution, but a principled reconfiguration that preserves active ingredients (Campbell & Robertson, 2007).

5.2. Preserved Active Ingredients

First, lower-limb strengthening is preserved. Repetitive stimulation of key muscle groups emphasized in OEP is functionally maintained through sit-to-stand, heel raises, and toe raises.

Second, standing balance stimulation is preserved. While OEP delivers balance retraining through diverse explicit tasks, the present framework embeds balance demands within functional movements. Balance is therefore not removed; only its mode of delivery shifts from explicit tasks to implicit stimulation.

Third, dosage and continuity are emphasized. Meta-analyses confirm that repeated exposure over a sufficient duration is necessary for exercise to reduce falls (Sherrington et al., 2011).

5.3. Reconfigured Elements: From Abstract Tasks to Functional Integration

Standard OEP includes multiple static and dynamic balance tasks and emphasizes progression. In dementia, however, task switching, comprehension, and fear responses often undermine adherence. The present framework integrates balance stimuli into daily movements and delivers them in a fixed order with minimal cognitive switching.

5.4. Suppressed Elements and Compensation

The suppressed elements include:

- (1) unsupported static balance tasks;
- (2) complex progression rules;
- (3) assumptions of independent self-execution.

These suppressions do not represent omissions but are accompanied by compensatory design. Sit-to-stand, supported ankle exercises, and brief supervised walking provide repeated exposure to standing control while reducing fear and accident risk.

5.5. Delivery Format as the Core Difference

The most fundamental difference lies in who delivers and supervises the program. In dementia, caregiver support often becomes an essential implementation condition, consistent with previous home-based intervention studies (Taylor et al., 2017).

5.6. Summary

By suppressing assumptions that frequently fail in dementia while preserving OEP's active ingredients, the proposed framework aims to balance theoretical coherence and real-world feasibility.

6. Implications for Research, Practice, and Policy

6.1. Implications for Research Design (RCTs)

First, when evaluating exercise interventions in dementia, reliance solely on primary outcomes such as falls or ADL may obscure improvements in implementation-related outcomes such as safety, acceptability, and adherence. The PrAISED trial demonstrated that even intensive interventions may not yield clear improvements in traditional endpoints (Harwood et al., 2023).

Second, treating progression as an indicator of intervention quality should be reconsidered in dementia, where progression decisions themselves impose cognitive burden and may compromise safety and adherence.

Third, intervention fidelity should be assessed not by task matching but by exposure to mechanisms—specifically, whether balance stimuli are safely and repeatedly delivered in standing contexts.

6.2. Implications for Care and Clinical Practice

By limiting the program to a small number of functional movements, this framework accommodates time and staffing constraints in care facilities and home settings. Reframing balance training as an implicit component of daily movements may reduce resistance and fear among both participants and caregivers.

Moreover, the assumption of caregiver-supported delivery aligns with real-world dementia care. Home-based interventions incorporating caregiver support have demonstrated improvements in balance and falls efficacy (Taylor et al., 2017).

6.3. Implications for Policy and Service Design

Policies that mandate faithful replication of named programs such as OEP may inadvertently create implementation mismatches in dementia care. Policy frameworks should prioritize preservation of active ingredients and allow rational adaptation. Short-duration, supervised, and routine-integrated formats are more scalable.

6.4. Redesigning the Evidence–Practice Interface

In dementia, designs that maximize internal validity may undermine external validity. The PrAISED experience highlights the need to conceptualize exercise interventions not solely as physiological prescriptions, but as problems of cognitive–motor integration and implementation science (Harwood et al., 2023).

7. Conclusion

Falls among people living with dementia represent a serious yet potentially preventable health outcome. However, direct application of established fall-prevention exercise programs is often infeasible due to cognitive, emotional, and practical constraints. This paper reframes this difficulty not as exercise inefficacy but as a design mismatch.

By preserving the active ingredients underlying the Otago Exercise Programme—lower-limb strengthening, standing balance stimulation, and sufficient cumulative exposure—while suppressing elements that commonly fail in dementia (high-risk static balance tasks, complex progression, and self-management assumptions), we propose a principled reconfiguration that embeds balance demands within functional movements.

As summarized in Supplementary Figures S1 and S2, balance is not eliminated but repositioned. Embedding balance stimuli within predictable and meaningful movements such as sit-to-stand, supported ankle exercises, and brief supervised walking may reduce fear and accident risk while maintaining repeated exposure. Positioning caregiver support as a core intervention component further aligns the framework with real-world dementia care and with lessons from large-scale trials such as PrAISED.

Future research should evaluate this framework using realistic outcome sets that include adherence, acceptability, safety, and intermediate functional measures alongside falls. We hope that this work provides a conceptual and methodological foundation for responsibly translating fall-prevention evidence into dementia care practice.

Supplementary Materials: The following supporting information can be downloaded at the website of this paper posted on Preprints.org.

References

- Albornos-Muñoz, L., Moreno-Casbas, M. T., Sánchez-Pablo, C., Bays-Moneo, A., Fernández-Domínguez, J. C., Rich-Ruiz, M., ... & Rivera-Álvarez, A. (2018). Efficacy of the Otago Exercise Programme to reduce falls in community-dwelling adults aged 65–80 years old when delivered as group or individual training. *Journal of advanced nursing*, 74(7), 1700-1711. <https://doi.org/10.1111/jan.13583>
- Booth, V., Harwood, R. H., Hood-Moore, V., Bramley, T., Hancox, J. E., Robertson, K., ... & Logan, P. A. (2018). Promoting activity, independence and stability in early dementia and mild cognitive impairment (PrAISED): development of an intervention for people with mild cognitive impairment and dementia. *Clinical Rehabilitation*, 32(7), 855-864. <https://doi.org/10.1177/0269215518758149>
- Campbell, A. J., Robertson, M. C., Gardner, M. M., Norton, R. N., Tilyard, M. W., & Buchner, D. M. (1997). Randomised controlled trial of a general practice programme of home based exercise to prevent falls in elderly women. *Bmj*, 315(7115), 1065-1069. <https://doi.org/10.1136/bmj.315.7115.1065>
- Campbell, J., & Robertson, C. (2007). *Otago exercise programme to prevent falls in older adults: A home-based, individually tailored strength and balance retraining programme*. Accident Compensation Corporation (ACC). <https://www.livestronger.org.nz/assets/Uploads/acc1162-otago-exercise-manual.pdf>
- Cox, C., & Vassallo, M. (2015). Fear of falling assessments in older people with dementia. *Reviews in clinical gerontology*, 25(2), 98-106. <https://doi.org/10.1017/S0959259815000106>
- Dadgari, A., Hamid, T. A., Hakim, M. N., Chaman, R., Mousavi, S. A., Hin, L. P., & Dadvar, L. (2016). Randomized control trials on Otago exercise program (OEP) to reduce falls among elderly community dwellers in Shahroud, Iran. *Iranian Red Crescent Medical Journal*, 18(5), e26340. <https://doi.org/10.5812/ircmj.26340>
- Fernando, E., Fraser, M., Hendriksen, J., Kim, C. H., & Muir-Hunter, S. W. (2017). Risk factors associated with falls in older adults with dementia: a systematic review. *Physiotherapy Canada*, 69(2), 161-170. <https://doi.org/10.3138/ptc.2016-14>
- Gillespie, L. D., Robertson, M. C., Gillespie, W. J., Sherrington, C., Gates, S., Clemson, L., & Lamb, S. E. (2012). Interventions for preventing falls in older people living in the community. *Cochrane database of systematic reviews*, (9). <https://doi.org/10.1002/14651858.CD007146.pub3>
- Harwood, R. H., Goldberg, S. E., Brand, A., van Der Wardt, V., Booth, V., Di Lorito, C., ... & Masud, T. (2023). Promoting Activity, Independence, and Stability in Early Dementia and mild cognitive impairment (PrAISED): randomised controlled trial. *bmj*, 382. <https://doi.org/10.1136/bmj-2023-074787>
- Hyun, S. J., Lee, J., & Lee, B. H. (2021). The effects of sit-to-stand training combined with real-time visual feedback on strength, balance, gait ability, and quality of life in patients with stroke: a randomized controlled trial. *International journal of environmental research and public health*, 18(22), 12229. <https://doi.org/10.3390/ijerph182212229>
- Jones, M. T., Dong, Y., Zhu, H., Soares, A., Patel, C., Hergott, C., ... & Jehu, D. A. (2024). The impact of the 6-month adapted Otago Exercise Program on clinical measures of physical function relative to usual care alone in people living with dementia in residential care facilities: A pilot randomized controlled trial. *Alzheimer's & Dementia*, 20, e087435. <https://doi.org/10.1002/alz.087435>
- Kearney, F. C., Harwood, R. H., Gladman, J. R., Lincoln, N., & Masud, T. (2013). The relationship between executive function and falls and gait abnormalities in older adults: a systematic review. *Dementia and geriatric cognitive disorders*, 36(1-2), 20-35. <https://doi.org/10.1159/000350031>
- Modarresi, S., Divine, A., Grahn, J. A., Overend, T. J., & Hunter, S. W. (2019). Gait parameters and characteristics associated with increased risk of falls in people with dementia: a systematic review. *International psychogeriatrics*, 31(9), 1287-1303. <https://doi.org/10.1017/S1041610218001783>
- Moreira, J., Cunha, B., Félix, J., Santos, R., & Sousa, A. S. (2025). Sit-to-stand and stand-to-sit kinematics in older adults with and without functional disability: A principal component analysis. *Australasian Journal on Ageing*, 44(3), e70089. <https://doi.org/10.1111/ajag.70089>
- Sherrington, C., Michaleff, Z. A., Fairhall, N., Paul, S. S., Tiedemann, A., Whitney, J., ... & Lord, S. R. (2017). Exercise to prevent falls in older adults: an updated systematic review and meta-analysis. *British journal of sports medicine*, 51(24), 1750-1758. <https://doi.org/10.1136/bjsports-2016-096547>

- Sherrington, C., Tiedemann, A., Fairhall, N., Close, J. C., & Lord, S. R. (2011). Exercise to prevent falls in older adults: an updated meta-analysis and best practice recommendations. *New South Wales public health bulletin*, 22(4), 78-83. <https://doi.org/10.1071/nb10056>
- Taylor, M. E., Lord, S. R., Brodaty, H., Kurrle, S. E., Hamilton, S., Ramsay, E., ... & Close, J. C. (2017). A home-based, carer-enhanced exercise program improves balance and falls efficacy in community-dwelling older people with dementia. *International psychogeriatrics*, 29(1), 81-91. <http://dx.doi.org/10.1017/S1041610216001629>
- Thomas, S., Mackintosh, S., & Halbert, J. (2010). Does the 'Otago exercise programme' reduce mortality and falls in older adults?: a systematic review and meta-analysis. *Age and ageing*, 39(6), 681-687. <https://doi.org/10.1093/ageing/afq102>

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.