Safety Literature 17th May 2020

Block and random practice: a Wii fit dynamic balance training in older adults

Jeon MJ, Jeon HS, Yi CH, Kwon OY, You SH, Park JH. Res. Q. Exerc. Sport 2020; ePub(ePub): ePub.

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DOI 10.1080/02701367.2020.1733456 **PMID** 32401683

Abstract

Purpose: To compare the effectiveness of blocked and random practice schedules of balance training in dynamic balance abilities of older adults using Wii Fit balance game tasks. Method: Forty-one participants who were not receiving hospice care or living in a nursing home participated. Three Wii Fit balance tasks (tasks A, B, and C) were selected for training, and one task (task D) was selected as the transfer test among the nine tasks in the Wii Fit balance game software. Scores for tasks A and D were evaluated. Completion times for tasks B and C were evaluated. Moved distance for the functional reach test (FRT), completion time for the timed up and go test (TUG), and performance score for the Tinetti performance-oriented mobility assessment (POMA) were also tested as clinical balance assessment outcomes. Results: The training significantly improved the performance outcomes of clinical balance assessments and task D. There were no significant group × time interaction effects and no significant main effects by group during the acquisition and retention periods of tasks A, B, and C. However, significant main effects by time were observed for tasks A, B, and C. Conclusions: When dynamic balance training such as the Wii Fit balance system is administered to older adults in a clinical setting, either a block or a random practice schedule can be effectively used to improve the dynamic balance skills. Wii Fit-based balance training is clinically effective for improving the dynamic balance ability.

Language: en

Keywords

Contextual interference; Wii Fit; dynamic balance; practice schedule

Combined group and home exercise programmes in community-dwelling falls-risk older adults: systematic review and meta-analysis

Teng B, Gomersall SR, Hatton A, Brauer SG. Physiother. Res. Int. 2020; ePub(ePub): ePub.

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DOI 10.1002/pri.1839 **PMID** 32394595

Abstract

OBJECTIVES: The objectives of this review were to (a) determine the effectiveness of combined group and home exercise programmes on falls risk factors and falls in community-dwelling older adults at risk of falling compared to no exercise controls; and (b) explore adherence and the behaviour change techniques employed in delivering these interventions.

METHODS: Five databases were selected to identify randomized controlled trials of exercise and/or physical activity interventions to prevent falls or to improve functional performance. PROSPERO CRD42018106111.

RESULTS: Eighteen trials involving 5,960 participants were included. Meta-analyses showed significant improvements in mobility after combined programmes measured by five times sit to stand (-1.42 times, 95% confidence interval [CI] -2.00 to -0.83), timed up and go (-0.94 s, 95% CI -1.76 to -0.12), and gait speed (0.05 m/s, 95% CI 0.02 to 0.07), but not single leg stance time, compared to controls. Combined programmes reduced injurious falls rate (0.77, 95% CI 0.65 to 0.91, I2 = 0%) but not rate of falls (0.86, 95% CI 0.68 to 1.08, I2 = 66%) compared to controls. There was no change in physical activity. Adherence ranged from 55-96%, with variability in the method of measurement of adherence. There was no clear relationship between adherence and outcomes. Most interventions used the behaviour change techniques of instruction/rehearsal/demonstration and feedback/monitoring.

CONCLUSION: Group exercise with a home programme resulted in better functional performance and falls-related outcomes compared with a no exercise control group. Further research is needed to identify behaviour change techniques to improve adherence to exercise in this population.

Language: en

Keywords

aged; exercise; falls prevention; independent living

Effects of combined physical and cognitive training on fall prevention and risk reduction in older persons with mild cognitive impairment: a randomized controlled study

Lipardo DS, Tsang WW. Clin. Rehabil. 2020; ePub(ePub): ePub.

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DOI 10.1177/0269215520918352 **PMID** 32380917

Abstract

OBJECTIVE: The aim of this study is to investigate the effects of combined physical and cognitive training on fall rate and risks of falling in older adults with mild cognitive impairment.

DESIGN: The design of this study was an assessor-blinded, randomized controlled trial. SETTING: The setting for this study is the community from Manila, Philippines. SUBJECTS: In total, 92 community-dwelling older persons with mild cognitive impairment (aged 60-83) were randomly allocated to three intervention groups and one waitlist control group. INTERVENTIONS: The physical training, cognitive training, and combined physical and cognitive training intervention programs were delivered for 60 to 90 minutes, one to three times per week for 12 weeks with six-month follow-up. MAIN MEASURES: Participants were assessed at baseline, 12 weeks after baseline, and 36 weeks after baseline for fall incidence, overall fall risk, dynamic balance, walking speed, and lower limb strength.

RESULTS: No significant difference was observed across time and groups on fall incidence rate at 12 weeks ($P = 0.152$) and at 36 weeks ($P = 0.954$). The groups did not statistically differ in other measures except for a significant improvement in dynamic balance based on Timed Up and Go Test in the combined physical and cognitive training group (9.0 seconds with $P = 0.001$) and in the cognitive training alone group (8.6 seconds with $P = 0.012$) compared to waitlist group (11.1 seconds) at 36 weeks.

CONCLUSION: There was no significant difference among groups on fall rate and risks of falling post-intervention. Dynamic balance was improved with combined physical and cognitive training and cognitive training alone. Further research with a larger sample size is needed to establish whether or not the interventions are effective.

Language: en

Keywords

Mild cognitive impairment; fall incidence; older persons; risk of falls

Falls and long-term survival among older adults residing in care homes

Padrón-Monedero A, Pastor-Barriuso R, García López FJ, Martínez Martín P, Damián J. PLoS One 2020; 15(5): e0231618.

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DOI 10.1371/journal.pone.0231618 **PMID** 32379771

Abstract

OBJECTIVES: To assess the association between having suffered a fall in the month prior to interview and long-term overall survival in nursing-home residents.

METHODS: Retrospective cohort study conducting an overall survival follow-up of 689 representative nursing-home residents from Madrid, Spain. Residents lived in three types of facilities: public, subsidized and private and its information was collected by interviewing the residents, caregivers and/or facility physicians. Residents contributed to follow-up time from their baseline interviews until death or being censored at the end of the 5-year follow-up period. The association between suffering a fall during the month prior to interview and long-term overall survival was analyzed using Cox proportional hazards models. To adjust for potential confounders we used progressive adjusted models. We then repeated the analyses with severity of the fall (no fall, non-severe, severe) as the main independent variable.

RESULTS: After a 2408 person-year follow-up (median 4.5 years), 372 participants had died. In fully-adjusted models, residents who had suffered any kind of fall in the previous month showed virtually the same survival rates compared to non-fallers (hazard ratio (HR) = 1.03; 95% CI = 0.75-1.40). There was a weak graded relationship between increased fall severity and survival rates for the non-severe fall group (HR = 0.92; 95% CI = 0.58-1.45) and the severe fall group (HR = 1.36; 95% CI = 0.73-2.53) compared with residents who had not suffered any kind of fall. The hazard ratios for severe falls were higher in men, residents with less comorbidity, fewer medications, and those functionally independent.

CONCLUSION: We found no associations between having suffered a fall in the month prior to interview and long-term survival; neither did we find a marked association when severity of fall was accounted for in the whole population. In some subgroups, however, the results merit further scrutiny.

Language: en

Interventions for preventing falls in people after stroke

Scruth E. Res. Nurs. Health 2020; ePub(ePub): ePub.

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DOI 10.1002/nur.22026 **PMID** 32394469

Abstract

Persons suffering from a stroke often experience long-lasting complications after rehabilitation. One of the most common complications involves falls (Denissen et al., 2019). The decline of neuromotor performance caused by the underlying disease resulting in a stroke contributes to the majority of falls in stroke survivors (Yang and Butler, 2020). Muscle weakness, impairment in balance, loss of sensation, and limited mobility after a stroke increase the likelihood of a fall (Yang and Butler, 2020). Falls result in further complications for stroke survivors placing both psychological and economic burdens on the person and the family.

Walking recovery for stroke survivors is the most important priority. Research to date has shown that only 50% of stroke survivors demonstrate walking improvements after rehabilitation (Little, Perry, Mercado, Kautz, & Patten, 2020) Nurses caring for stroke survivors play an important role in balancing the goals of the patient with the trajectory of the diagnosis and aims of rehabilitation. Additionally, nurses must understand the type of gait disorders the stroke has resulted in. Stroke survivors often have gait asymmetries, which fall into two categories: spatial and temporal. Both gait asymmetries are predictors of falls in stroke survivors (Little et al., 2020).

Preventing falls in stroke survivors has resulted in various exercise-based fall prevention training programs being developed and outcomes published (Little et al., 2020). Interventions aimed at preventing falls in stroke survivors in the literature to date include assistive devices, post-hospitalization intensive therapy through home visits, brain stimulation, and targeted exercises (Denissen et al., 2019). Preventing falls both in the hospital setting and in the home for the stroke survivor starts early in the hospitalization with the nurse and other healthcare team members and involves many different interventions ...

Language: en

Multi-system physical exercise intervention for fall prevention and quality of life in pre-frail older adults: a randomized controlled trial

Chittrakul J, Siviroj P, Sungkarat S, Sapbamrer R. Int. J. Environ. Res. Public Health 2020; 17(9): e3102.

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DOI 10.3390/ijerph17093102 **PMID** 32365613

Abstract

Effective interventions for indicated fall prevention are necessary for older adults with frailty. We aimed to determine the effectiveness of a Multi-system Physical Exercise (MPE) for fall prevention and Health-Related Quality of Life (HRQOL) in pre-frail older adults. This randomized control trial with allocation concealment included 72 adults aged 65 and above, identified as pre-frailty and with mild and moderate fall risk scores measured by the Physiological Profile Assessment (PPA). Randomly, using block randomization, participants were divided into two groups: an MPE group (n = 36) and a control group (n = 36). The intervention consisted mainly of proprioception, muscle strengthening, reaction time, and balance training and was carried out three days per week for 12 weeks. The primary outcome was fall risk assessed using PPA at 12 weeks post-baseline and at a 24 week follow-up. Significant differences were found in the improvement in fall risk, proprioception, muscle strength, reaction time and postural sway, and fear of fall scores in the MPE group compared with controls at week 12 and 24. In addition, HRQOL had increased significantly in the MPE group in comparison to controls. The MPE program significantly increased muscle strength and improved proprioception, reaction time, and postural sway leading to fall risk reduction in older adults with pre-frailty. Therefore, the MPE program is recommended for used in day-to-day primary care practice in the pre-frail population.

Language: en

Keywords

fall risk; frailty; multi-system physical exercise; older adults; quality of life

Perturbation-based gait training to improve daily life gait stability in older adults at risk of falling: protocol for the REACT randomized controlled trial

Rieger MM, Papegaaij S, Steenbrink F, van Dieen JH, Pijnappels M. BMC Geriatr. 2020; 20(1): e167.

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DOI 10.1186/s12877-020-01566-z **PMID** 32380950

Abstract

BACKGROUND: The European population is rapidly ageing. There is an urgent need for innovative solutions to reduce fall risk in older adults. Perturbation-based gait training is a promising new method to improve reactive balance responses. Whereas positive effects on task-specific dynamic balance recovery during gait have been shown in clinical or laboratory settings, translation of these effects to daily life gait function and fall risk is limited. We aim to evaluate the effect of a 4-week perturbation-based treadmill training on daily-life dynamic gait stability, assessed with inertial sensor data. Secondary outcomes are balance recovery performance, clinical balance and gait assessment scores, the amount of physical activity in daily life and falls incidence during 6 months follow-up.

METHODS: The study is a monocenter assessor-blinded randomized controlled trial. The target study sample consists of 70 older adults of 65 years and older, living in the community and with an elevated risk of falling. A block-randomization to avoid seasonal effects will be used to allocate the participants into two groups. The experimental group receives a 4-week, two times per week perturbation-based gait training programme on a treadmill, with simulated slips and trips, in combination with cognitive dual tasks. The control group receives a 4-week, two times per week treadmill training programme under cognitive dual-task conditions without perturbations. Participants will be assessed at baseline and after the 4-weeks intervention period on their daily-life gait stability by wearing an inertial sensor on the lower back for seven consecutive days. In addition, clinical balance and gait assessments as well as questionnaires on falls- and gait-efficacy will be taken. Daily life falls will be followed up over 6 months by a fall calendar.

DISCUSSION: Whereas perturbation-based training has shown positive effects in improving balance recovery strategies and in reducing laboratory falls, this study will contribute to investigate the translation of perturbation-based treadmill training effects in a clinical setting towards improving daily life gait stability and reducing fall risk and falls. TRIAL REGISTRATION: NTR7703 / NL66322.028.18, Registered: January 8, 2019; Enrolment of the first participant April 8, 2019.

Language: en

Keywords

Accidental falls; Activities of daily living; Aging; Cognitive aging; Exercise test; Motor skills; Perturbation training; Postural balance; Treadmill; Walking

Risk factors for recurrent falls in older adults: a study protocol for a systematic review with meta-analysis

Jehu DA, Davis JC, Liu-Ambrose T. BMJ Open 2020; 10(5): e033602.

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DOI 10.1136/bmjopen-2019-033602 **PMID** 32376749

Abstract

INTRODUCTION: Older adults who fall recurrently (i.e., >1 fall/year) are at risk for functional decline and mortality. Key risk factors for recurrent falls in community-dwelling older adults are not well established due to methodological limitations, such as recall bias. A better understanding of the risk factors for recurrent falls will aid in refining clinical practice guidelines for secondary fall prevention strategies. The primary objective of this systematic review with meta-analysis is to examine the risk factors for recurrent falls in prospective studies among community-dwelling older adults.

METHODS AND ANALYSIS: A comprehensive search for articles indexed in MEDLINE, EMBASE, PsycINFO and CINAHL databases as well as grey literature was conducted on April 25, 2019. We will use MeSH and keyword search terms around the following topics: falls, recurrence, fall-risk, ageing and prospective studies. Prospective studies with monthly falls monitoring for 12 months, investigating risk factors for recurrent falls in older adults will be included. One author will complete the search. Two authors will remove duplicates and screen the titles and abstracts for their potential inclusion against the eligibility criteria. Two authors will screen the full texts and extract the data using a piloted extraction sheet. Included studies will be evaluated for the risk of bias with the Joanna Briggs Institute Prevalence Critical Appraisal tools. The quality of reporting will be determined with the Strengthening the Reporting of OBservational studies in Epidemiology. The data extraction will include study characteristics as well as sociodemographic, balance and mobility, sensory and neuromuscular, psychological, medical, medication and environmental factors. The results will be presented via figures, summary tables, meta-analysis (when possible) and narrative summaries. ETHICS AND DISSEMINATION: No ethics approval will be required.

Language: en

Keywords

meta-analysis; older adults; recurrent falls; risk factors; systematic review

The association between fear of falling and orthostatic hypotension in older adults

Arik F, Soysal P, Capar E, Kalan U, Smith L, Trott M, Isik AT. Aging Clin. Exp. Res. 2020; ePub(ePub): ePub.

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DOI 10.1007/s40520-020-01584-2 **PMID** 32394371

Abstract

The aim of this study was to determine the relationship between the fear of falling/the degree of fear of falling (FoF) and orthostatic hypotension (OH) in older adults. This cross-sectional study was conducted with 314 older outpatients. If the total score of the Falls Efficacy Scale-International scale was 16-19, 20-27 and ≥ 28, it was assumed that there was low FoF, moderate FoF and high FoF, respectively. OH was evaluated for the 1st (OH1) and 3rd (OH3) minutes, after transitioning from the supine position to standing. Participants were aged 65-93 years (mean age 74.2 ± 8.5 years) and 193 (61.5%) were female. Among the FoF groups, significant differences were found for age, gender, education, marital status, who the patient lived with, the history of falling and hypertension, Timed Up-Go test score and hemoglobin levels ($p < 0.005$). The prevalence of OH1 and OH3 was found to be significantly higher in those with an FoF score of 20 and above than those below 20 ($p < 0.005$). After adjustment for potential confounders, participants who reported a high FoF had higher risk for OH1 and OH3 (OR 2.14, 95% CI 1.14-4.0, $p = 0.017$; and OR 2.72, 95% CI 1.46-5.09, $p = 0.002$, respectively), but those with moderate FoF had no increased risk of having OH compared to low FoF ($p > 0.05$). There is a close relationship between high FoF and OH in older adults. Therefore, when evaluating an older patient with OH, FoF should be evaluated, or FoF should also be questioned in older patients with OH.

Language: en

Keywords

Fear of falling; Older; Orthostatic hypotension

The effect of fall biomechanics on risk for hip fracture in older adults: a cohort study of video-captured falls in long-term care

Yang Y, Komisar V, Shishov N, Lo B, Korall AM, Feldman F, Robinovitch SN. J. Bone Miner. Res. 2020; ePub(ePub): ePub.

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DOI 10.1002/jbmr.4048 **PMID** 32402136

Abstract

Over 95% of hip fractures in older adults are caused by falls, yet only 1-2% of falls result in hip fracture. Our current understanding of the types of falls that lead to hip fracture is based on reports by the faller or witness. We analyzed videos of real-life falls in long-term care to provide objective evidence on the factors that separate falls that result in hip fracture from falls that do not. Between 2007-2018, we video-captured 2377 falls by 646 residents in two long-term care facilities. Hip fracture was documented in 30 falls. We analyzed each video with a structured questionnaire, and used Generalized Estimating Equations to determine relative risk ratios (RRs) for hip fracture associated with various fall characteristics. All hip fractures involved falls from standing height, and pelvis impact with the ground. After excluding falls from less than standing height, risk for hip fracture was higher for sideways landing configurations (RR = 5.50; 95%CI: 2.36-12.78) than forward or backward, and for falls causing hip impact (3.38; 1.49-7.67). However, hip fracture risk was just as high in falls initially directed sideways as forward (1.14; 0.49-2.67), due to the tendency for rotation during descent. Falling while using a mobility aid was associated with lower fracture risk (0.30; 0.09-1.00). 70% of hip fractures involved impact to the posterolateral aspect of the pelvis. Hip protectors were worn in 73% of falls, and hip fracture risk was lower in falls where hip protectors were worn (0.45; 0.21-0.99). Age and sex were not associated with fracture risk. There was no evidence of spontaneous fractures. In this first study of video-captured falls causing hip fracture, we show that the biomechanics of falls involving hip fracture were different than non-fracture falls for fall height, fall direction, impact locations, and use of hip protectors.

Language: en

Keywords

Biomechanics; Falls; Hip fracture; Hip protectors; Video capture

Validity of balance and mobility screening tests for assessing fall risk in COPD

McLay R, Kirkwood RN, Kuspinar A, Richardson J, Wald J, Raghavan N, Ellerton C, Pugsley S, Beauchamp MK. Chron. Respir. Dis. 2020; 17: e1479973120922538.

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DOI 10.1177/1479973120922538 **PMID** 32390529

Abstract

People with chronic obstructive pulmonary disease (COPD) have balance impairments and an increased risk of falls. The psychometric properties of short balance tests to inform fall risk assessment in COPD are unknown. Our objective was to determine the validity (concurrent, convergent, and known-groups) of short balance and mobility tests for fall risk screening. Participants with COPD aged ≥ 60 years attended a single assessment. Correlation coefficients described the relationships between the Brief Balance Evaluation Systems Test (Brief BESTest), Single-Leg Stance (SLS), Timed Up and Go (TUG), and Timed Up and Go Dual-Task (TUG-DT) tests, with the comprehensive Berg Balance Scale (BBS), chair-stand test, and measures of exercise tolerance, functional limitation, disability, and prognosis. Independent t-tests or Mann-Whitney U tests were used to examine differences between groups with respect to fall risk. Receiver operating characteristic curves examined the ability of the screening tests to identify individuals with previous falls. A total of 86 patients with COPD completed the study (72.9 ± 6.8 years; forced expiratory volume in 1 second: 47.3 ± 20.3% predicted). The Brief BESTest identified individuals who reported a previous fall (area under the curve (AUC) = 0.715, p = 0.001), and the SLS showed borderline acceptable accuracy in identifying individuals with a fall history (AUC = 0.684, p = 0.004). The strongest correlations were found for the Brief BESTest and SLS with the BBS (r = 0.80 and r = 0.72, respectively) and between the TUG and TUG-DT with the chair-stands test (r = 0.73 and r = 0.70, respectively). The Brief BESTest and SLS show the most promise as balance screening tools for fall risk assessment in older adults with COPD. These tests should be further evaluated prospectively.

Language: en

Keywords

BriefBESTest; COPD; accidental falls; balance; mobility

Evaluation of balance and fall risk in patients with plantar fasciitis syndrome

Ağırman M. Sisli Etfal Hastan Tip Bul 2019; 53(4): 426-429.

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DOI 10.14744/SEMB.2018.68736 **PMID** 32377120

Abstract

OBJECTIVES: In this study, we aimed to investigate plantar fasciitis syndrome on balance and the risks of the falls.

METHODS: Fifty patients with clinical diagnosed plantar fasciitis participated in this study. Patients were evaluated using the visual analog scale (VAS) for pain. Balance and fall risk were measured with the biodex balance system. Postural stability and fall risk were measured with total score (TS), antero-posterior (AP) and mediolateral (ML) as statically and dynamically at 2. and 8. degrees. Nineteen healthy volunteers with no active complaints and no previous plantar fasciitis/calcaneal spur were included in this study as a control group.

RESULTS: The mean VAS value in the patient group was 6.65±1.84. There was no statistical difference between the mean age and body mass index of patients and control groups. A statistically significant difference was found between the group in TS2 (p=0.005), TS8 (p=0.009), AP2 (p=0.006), AP8 (p=0.018), DR2 (p=0.01) and DR8 (p=0.002) in favor of the control group. There was no statistical difference between the groups in the static and dynamic mediolateral balance evaluations.

CONCLUSION: The findings demonstrated that postural balance, especially in the antero-posterior plane, was impaired in patients with plantar fasciitis syndrome and increased risk of falls.

Language: en

Keywords

Plantar fasciitis; balance; fall risk

Risk of serious falls between hemodialysis and peritoneal dialysis patients: a nationwide population-based cohort study

Wang HH, Wu JL, Lee YC, Ho LC, Chang MY, Liou HH, Hung SY. Sci. Rep. 2020; 10(1): e7799.

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DOI 10.1038/s41598-020-64698-7 **PMID** 32385311

Abstract

The association between serious falls and dialysis modality [hemodialysis (HD) and peritoneal dialysis (PD)] is unclear. A nationwide population-based retrospective cohort study with 127,823 end-stage renal disease patients aged over 18 years was conducted with the unmatched cohort of 101,304 HD and 7,584 PD patients retrieved from Taiwan's National Health Insurance Research Database during 2000-2013. A total of 7,584 HD and 7,584 PD patients matched at 1:1 ratio by propensity score were enrolled to the study. Serious falls were defined by the diagnostic codes, E code, and image studies. Cox regression model and competing-risk model were used for statistical analysis. HD patients were older and had more comorbidities at baseline than PD patients. After matching and adjustment, HD patients had a higher risk of serious falls than PD patients [sHR 1.27 (95% CI 1.06-1.52)]. Females, elders, a history of falls before dialysis, comorbidity with stroke or visual problems, using diuretics, α-blockers, and mydriatics were associated with higher risks of serious falls among dialysis patients. The risk of serious falls was higher in HD patients than PD patients. Health professionals should create age-friendly environments, reduce unnecessary medications, and raise patients' awareness of falls in daily life.

Language: en