Exercise and Falls

This document contains all abstracts for publications relating to exercise and falls for 2020. These abstracts have been sourced from SafetyLit.org and include only those relevant to falls prevention.

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Contents:

Exercise Intervention RCT's

Effect of Senior Dance (DanSe) on fall risk factors in older adults: a randomized controlled trial

Franco MR, Sherrington C, Tiedemann A, Pereira LS, Perracini MR, Faria CRS, Negrão-Filho RF, Pinto RZ, Pastre CM. Phys. Ther. 2020; ePub(ePub): ePub.

Affiliation

Department of Physical Therapy, Faculdade de Ciências e Tecnologia, Universidade Estadual Paulista (UNESP), Presidente Prudente, Sao Paulo, Brazil.

DOI 10.1093/ptj/pzz187 **PMID** 31899491

Abstract

BACKGROUND: Older people's participation in structured exercise programs to improve balance and mobility is low. Senior Dance is an alternative option, as it may provide a safe and fun way of targeting balance.

OBJECTIVE: The aim was to investigate the effect of Senior Dance on balance, mobility, and cognitive function, compared with a control intervention.

DESIGN: The study was a randomized controlled trial. SETTING/PATIENTS: Eighty-two community-dwelling older people aged 60 years or over and cognitively intact were recruited in Brazil. INTERVENTION: Participants were randomly allocated to 2 groups, Senior Dance plus education (intervention group) and education alone (control group). The Senior Dance program consisted of 12 weeks of twice-weekly group-based dance classes. Participants in both groups attended a single 1-hour educational session on prevention of falls. MEASUREMENTS: The primary outcome was single-leg stance with eyes closed. Secondary outcomes were timed sit-to-stand test, standing balance test, timed 4-meter walk, and cognitive function tests, eg, Trail Making test and Montreal Cognitive Assessment.

RESULTS: Of the 82 participants randomized, 71 (87%) completed the 12-week follow-up. Single-leg stance with eyes closed (primary outcome) improved in the Senior Dance group (mean difference [MD] = 2.3 seconds, 95% CI: 1.1 to 3.6) compared to the control group at follow-up. Senior Dance group performed better in the standing balance tests (MD = 3.7 seconds, 95% CI: 0.6 to 6.8), were faster in the sit-to-stand test (MD = - 3.1 seconds, 95% CI: -4.8 to -1.4), and 4-meter walk test (MD = -0.6 seconds, 95% CI: -1.0 to -0.1). There were no significant between-group differences for cognitive function tests. LIMITATIONS: Participants and therapists were not blinded.

CONCLUSION: Senior Dance was effective in improving balance and mobility but not cognitive function in community-dwelling older people.

Language: en **Keywords** Accidental Falls; Aging; Balance; Dance

Effects of Otago exercise combined with action observation training on balance and gait in the old people

Leem SH, Kim JH, Lee BH. J. Exerc. Rehabil. 2019; 15(6): 848-854.

DOI 10.12965/jer.1938720.360 **PMID** 31938708

Abstract

This study aimed to investigate the effects of Otago exercise combined with action observation (AO) training on the balance, and gait in the old people to prevent falls in the community. A total of 30 old women participated and randomly assigned into three groups: AO plus Otago (n=10), Otago (n=10), or control (n=10). The AO plus Otago and Otago groups performed 50 min of strength training and balance exercises from the Otago Exercise Program 3 times a week for 12 weeks. The AO plus Otago group received an additional 20 min of training 3 times a week. We used the electronic muscle dynamometer to changes in strength, Timed Up and Go (TUG) test to evaluate dynamic balance, and the short version of the Falls Efficacy Scale-International was used to evaluate the fear of falls, and GAITRite was used to evaluate changes in the spatiotemporal parameters of walking. The muscle strength significantly increased in the AO plus Otago and Otago groups compared to the strength before training. The TUG test showed a significant improvement in the dynamic balance in both intervention groups. A significant increase was observed in the walking speed, cadence, step length, and stride length in both intervention groups. We also noted a significant change in the efficacy measures for falls. It is expected that Otago exercise combined with AO training will be used as an intervention method in hospital treatment programs and the old people facilities for preventing falls in the old people.

Language: en

Keywords

Old people; balance; Action observation; Gait; Otago exercise; Prevent falls

Effects of a resistance and balance exercise programme on physical fitness, health-related quality of life and fear of falling in older women with osteoporosis and vertebral fracture: a randomized controlled trial

Stanghelle B, Bentzen H, Giangregorio L, Pripp AH, Skelton D, Bergland A. Osteoporos. Int. 2020; ePub(ePub): ePub.

Affiliation

Institute of Physiotherapy, Faculty of Health Sciences, Oslo Metropolitan University, PO Box 4, St. Olavs Plass, 0130, Oslo, Norway.

DOI 10.1007/s00198-019-05256-4 **PMID** 31925473

Abstract

Exercise is recommended for people with osteoporosis, but the effect for people who have suffered vertebral fracture is uncertain. This study shows that a multicomponent exercise-program based on recommendations for people with osteoporosis improved muscle strength, balance, and fear of falling in older women with osteoporosis and vertebral fracture.

INTRODUCTION: Guidelines for exercise strongly recommend that older adults with osteoporosis or osteoporotic vertebral fracture should engage in a multicomponent exercise programme that includes resistance training in combination with balance training. Prior research is scarce and shows inconsistent findings. This study examines whether current exercise guidelines for osteoporosis, when applied to individuals with vertebral fractures, can improve health outcomes.

METHODS: This single blinded randomized controlled trial included 149 older women diagnosed with osteoporosis and vertebral fracture, 65+ years. The intervention group performed a 12-week multicomponent exercise programme, the control group received usual care. Primary outcome was habitual walking speed, secondary outcomes were physical fitness (Senior Fitness Test, Functional Reach and Four Square Step Test), health-related quality of life and fear of falling. Descriptive data was reported as mean (standard deviation) and count (percent). Data were analyzed following intention to treat principle and per protocol. Between-group differences were assessed using linear regression models (ANCOVA analysis).

RESULTS: No statistically significant difference between the groups were found on the primary outcome, walking speed (mean difference 0.04 m/s, 95% CI - 0.01-0.09, p = 0.132). Statistically significant between-group differences in favour of intervention were found on FSST (dynamic balance) (mean difference - 0.80 s, 95% CI - 1.57 to - 0.02, p = 0.044), arm curl (mean difference 1.55, 95% CI 0.49-2.61, p = 0.005) and 30-s STS (mean difference 1.85, 95% CI 1.04-2.67, p < 0.001), as well as fear of falling (mean difference - 1.45, 95% CI - 2.64 to - 0.26, p = 0.018). No statistically significant differences between the groups were found on health-related quality of life.

CONCLUSION: Twelve weeks of a supervised multicomponent resistance and balance exercise programme improves muscle strength and balance and reduces fear of falling, in women with osteoporosis and a history of vertebral fractures. TRIAL REGISTRATION: ClincialTrials.gov Identifier: NCT02781974. Registered 25.05.16. Retrospectively registered.

Language: en

Keywords

Exercise; Health-related quality of life; Osteoporosis; Physical fitness; Vertebral fracture

Evaluating the effects of an exercise program (Staying UpRight) for older adults in long-term care on rates of falls: study protocol for a randomised controlled trial

Taylor L, Parsons J, Taylor D, Binns E, Lord S, Edlin R, Rochester L, Del Din S, Klenk J, Buckley C, Cavadino A, Moyes SA, Kerse N. Trials 2020; 21(1): e46.

Affiliation

The University of Auckland, Faculty of Medical and Health Sciences, Auckland, New Zealand.

DOI 10.1186/s13063-019-3949-4 **PMID** 31915043

Abstract

BACKGROUND: Falls are two to four times more frequent amongst older adults living in long-term care (LTC) than community-dwelling older adults and have deleterious consequences. It is hypothesised that a progressive exercise program targeting balance and strength will reduce fall rates when compared to a seated exercise program and do so cost effectively.

METHODS/DESIGN: This is a single blind, parallel-group, randomised controlled trial with blinded assessment of outcome and intention-to-treat analysis. LTC residents (age ≥ 65 years) will be recruited from LTC facilities in New Zealand. Participants (n = 528 total, with a 1:1 allocation ratio) will be randomly assigned to either a novel exercise program (Staying UpRight), comprising strength and balance exercises designed specifically for LTC and acceptable to people with dementia (intervention group), or a seated exercise program (control group). The intervention and control group classes will be delivered for 1 h twice weekly over 1 year. The primary outcome is rate of falls (per 1000 person years) within the intervention period. Secondary outcomes will be risk of falling (the proportion of fallers per group), fall rate relative to activity exposure, hospitalisation for fall-related injury, change in gait variability, volume and patterns of ambulatory activity and change in physical performance assessed at baseline and after 6 and 12 months. Cost-effectiveness will be examined using intervention and health service costs. The trial commenced recruitment on 30 November 2018.

DISCUSSION: This study evaluates the efficacy and cost-effectiveness of a progressive strength and balance exercise program for aged care residents to reduce falls. The outcomes will aid development of evidenced-based exercise programmes for this vulnerable population. TRIAL REGISTRATION: Australian New Zealand Clinical Trials Registry ACTRN12618001827224. Registered on 9 November 2018. Universal trial number U1111-1217-7148.

Language: en

Keywords

Aged care; Exercise therapy; Falls; Long-term care; Nursing home; Randomised trials

Effects of tai chi on postural control during dual-task stair negotiation in knee osteoarthritis: a randomised controlled trial protocol

Wang X, Hou M, Chen S, Yu J, Qi D, Zhang Y, Chen B, Xiong F, Fu S, Li Z, Yang F, Chang A, Liu A, Xie X. BMJ Open 2020; 10(1): e033230.

Affiliation

Rehabilitation Department of the Affiliated 3rd Peoples' Hospital, Fujian University of Traditional Chinese Medicine, Fuzhou, China 384098067@qq.com.

DOI 10.1136/bmjopen-2019-033230 **PMID** 31900273

Abstract

INTRODUCTION: Stair ascent and descent require complex integration between sensory and motor systems; individuals with knee osteoarthritis (KOA) have an elevated risk for falls and fall injuries, which may be in part due to poor dynamic postural control during locomotion. Tai chi exercise has been shown to reduce fall risks in the ageing population and is recommended as one of the non-pharmocological therapies for people with KOA. However, neuromuscular mechanisms underlying the benefits of tai chi for persons with KOA are not clearly understood. Postural control deficits in performing a primary motor task may be more pronounced when required to simultaneously attend to a cognitive task. This single-blind, parallel design randomised controlled trial (RCT) aims to evaluate the effects of a 12-week tai chi programme versus balance and postural control training on neuromechanical characteristics during dual-task stair negotiation.

METHODS AND ANALYSIS: Sixty-six participants with KOA will be randomised into either tai chi or balance and postural control training, each at 60 min per session, twice weekly for 12 weeks. Assessed at baseline and 12 weeks (ie, postintervention), the primary outcomes are attention cost and dynamic postural stability during dual-task stair negotiation. Secondary outcomes include balance and proprioception, foot clearances, self-reported symptoms and function. A telephone follow-up to assess symptoms and function will be conducted at 20 weeks. The findings will help determine whether tai chi is beneficial on dynamic stability and in reducing fall risks in older adults with KOA patients in community. ETHICS AND DISSEMINATION: Ethics approval was obtained from the Ethics Committee of the Affiliated Rehabilitation Hospital of Fujian University of Traditional Chinese Medicine (#2018KY-006-1). Study findings will be disseminated through presentations at scientific conferences or publications in peer-reviewed journals. TRIAL REGISTRATION NUMBER: ChiCTR1800018028.

Language: en

Keywords

balance intervention; dynamic stability; knee osteoarthritis; stair ascent; stair descent

A study protocol for a randomized controlled trial evaluating vibration therapy as an intervention for postural training and fall prevention after distal radius fracture in elderly patients

Wong RMY, Ho WT, Tang N, Tso CY, Ng WKR, Chow SK, Cheung WH. Trials 2020; 21(1): e95.
Department of Orthopaedics and Traumatology, Prince of Wales Hospital, The Chinese University of Hong Kong, Sha Tin, Hong Kong SAR, China. louis@ort.cuhk.edu.hk.

DOI 10.1186/s13063-019-4013-0 **PMID** 31948477

Abstract

BACKGROUND: Fractures of the distal radius are one of the most common osteoporotic fractures in elderly men and women. These fractures are a particular health concern amongst the elderly, who are at risk of fragility fractures, and are associated with long-term functional impairment, pain and a variety of complications. This is a sentinel event, as these fractures are associated with a two to four times increased risk of subsequent hip fractures in elderly patients. This is an important concept, as it is well established that these patients have an increased risk of falling. Fall prevention is therefore crucial to decrease further morbidity and mortality. The purpose of this study is to investigate the effect of low-magnitude high-frequency vibration (LMHFV) on postural stability and prevention of falls in elderly patients post distal radius fracture.

METHODS: This is a prospective single-blinded randomized controlled trial. Two hundred patients will be recruited consecutively with consent, and randomized to either LMHFV (n = 100) or a control group (n = 100). The primary outcome is postural stability measured by the static and dynamic ability of patients to maintain centre of balance on the Biodex Balance System SD. Secondary outcomes are the occurrence of fall(s), the health-related quality of life 36-item short form instrument, the Timed Up and Go test for basic mobility skills, compliance and adverse events. Outcome assessments for both groups will be performed at baseline (0 month) and at 6 weeks, 3 months and 6 months time points.

DISCUSSION: Previous studies have stressed the importance of reducing falls after distal radius fracture has occurred in elderly patients, and an effective intervention is crucial. Numerous studies have proven vibration therapy to be effective in improving balancing ability in normal patients; However, no previous study has applied the device for patients with fractures. Our study will attempt to translate LMHFV to patients with fractures to improve postural stability and prevent recurrent falls. Positive results would provide a large impact on the prevention of secondary fractures and save healthcare costs. TRIAL REGISTRATION: ClinicalTrials.gov, NCT03380884. Registered on 21 December 2017.

Language: en

Keywords

Distal radius fracture; Fall prevention; Postural stability; Randomized controlled trial; Vibration

Effects of training with a custom-made visual feedback device on balance and functional lower-extremity strength in older adults: a randomized controlled trial

Oungphalachai T, Siriphorn A. J. Bodyw. Mov. Ther. 2020; 24(1): 199-205.

Affiliation

Human Movement Performance Enhancement Research Unit, Department of Physical Therapy, Faculty of Allied Health Sciences, Chulalongkorn University, Thailand. Electronic address: akkradate.s@chula.ac.th.

DOI 10.1016/j.jbmt.2019.03.018 **PMID** 31987545

Abstract

INTRODUCTION: Training with a slow and sustained mechanical load, such as standing on one leg, is an effective method for improving balance and increasing lower-extremity strength. Also, visual feedback during motor learning is important in facilitating efficient postural responses and balance skills. In this study, a custom-made visual feedback device was invented to provide the training modality and program based on single-leg standing combined with augmented visual feedback training. This study aimed to investigate the effects of visual feedback training using the custom-made visual feedback device on balance and functional lower-extremity strength in older adults.

METHODS: Thirty-four independent older adults were randomly allocated to a training group (TG) and a control group (CG). The participants in the TG received training with the custom-made visual feedback device. The training duration was three sessions per week, for four weeks. The participants in the CG continued their routine activities. Balance (static and dynamic balances, and balance confidence) and functional lower-extremity strength were assessed pre- and post-training.

RESULTS: Improvements in static balance (sway velocity and limit of balance during one-leg standing with eyes open) and dynamic balance (directional control of limits of stability in the backward direction) were found after training in the TG compared with the CG. No significant differences in balance confidence or functional lower-extremity strength were found between groups after training.

CONCLUSION: In older adults, training with a custom-made visual feedback device could be used to improve both static and dynamic balances, but not balance confidence and

Language: en

Keywords

Lower-extremity strength; Older adults; Visual feedback training; balance

The effects of Ai Chi for balance in individuals with chronic stroke: a randomized controlled trial

Ku PH, Chen SF, Yang YR, Lai TC, Wang RY. Sci. Rep. 2020; 10(1): e1201.

Affiliation

Department of Physical Therapy and Assistive Technology, National Yang-Ming University, Taipei, Taiwan, ROC. rywang@ym.edu.tw.

DOI 10.1038/s41598-020-58098-0 **PMID** 31988384

Abstract

This study investigated the effectiveness of Ai Chi compared to conventional water-based exercise on balance performance in individuals with chronic stroke. A total of 20 individuals with chronic stroke were randomly allocated to receive either Ai Chi or conventional water-based exercise for 60 min/time, 3 times/week, and a total of 6 weeks. Balance performance assessed by limit of stability (LOS) test and Berg balance scale (BBS). Fugl-Meyer assessment (FMA) and gait performance were documented for lower extremity movement control and walking ability, respectively. Excursion and movement velocity in LOS test was significantly increased in anteroposterior axis after receiving Ai Chi ($p = 0.005$ for excursion, $p = 0.013$ for velocity) but not conventional water-based exercise. In particular, the improvement of endpoint excursion in the Ai Chi group has significant inter-group difference ($p = 0.001$). Both groups showed significant improvement in BBS and FMA yet the Ai Chi group demonstrated significantly better results than control group ($p = 0.025$). Ai Chi is feasible for balance training in stroke, and is able to improve weight shifting in anteroposterior axis, functional balance, and lower extremity control as compared to conventional water-based exercise.

Language: en

Surface perturbation training to prevent falls in older adults: a highly pragmatic, randomized controlled trial

Lurie JD, Zagaria AB, Ellis L, Pidgeon D, Gill-Body KM, Burke C, Armbrust K, Cass S, Spratt KF, McDonough CM. Phys. Ther. 2020; ePub(ePub): ePub.
Affiliation
University of Pittsburgh, Pittsburgh, Pennsylvania.

DOI 10.1093/ptj/pzaa023 **PMID** 31998949
Abstract
BACKGROUND: Falls are the leading cause of injuries among older adults and trips and slips are major contributors to falls.

OBJECTIVE: Compare the effectiveness of adding a component of surface-perturbation training to usual gait/balance training for reducing falls and fall-related injury in high-risk older adults referred to physical therapy.

DESIGN: This was a multi-center, pragmatic, randomized, comparative effectiveness trial. SETTING: Treatment took place within 8 outpatient physical therapy clinics. PATIENTS: This study included 506 patients aged 65+ at high fall risk referred for gait/balance training. INTERVENTION: This trial evaluated surface-perturbation treadmill training integrated into usual multimodal exercise-based balance training at the therapist's discretion versus usual multimodal exercise-based balance training alone. MEASUREMENTS: Falls and injurious falls were assessed with a prospective daily fall diary, which was reviewed via telephone interview every 3 months for 1 year.

RESULTS: 211/253 (83%) of patients randomized to perturbation-training and 210/253 (83%) randomized to usual treatment provided data at 3-month follow-up. At 3 months, the perturbation-training group had significantly reduced chance of fall-related injury (5.7% vs. 13.3%; relative risk 0.43, $p < 0.01$) but no significant reduction in the risk of any fall (28% vs. 37% ST; relative risk 0.78 $p<0.07$) compared to usual treatment. Time to first injurious fall showed reduced hazard in the first 3 months, but no significant reduction when viewed over the entire first year ($p=0.67$). LIMITATIONS: The limitations of this trial included lack of blinding and variable application of interventions across patients based on pragmatic study design.

CONCLUSION: The addition of some surface perturbation training to usual physical therapy significantly reduced injurious falls up to 3 months post-treatment. Further study is warranted to determine the optimal frequency, dose, progression and duration of surface perturbation aimed at training postural responses for this population.

Language: en

Keywords

Accidental Falls; Balance; Gait: Gait Training; Rehabilitation

Rhythm-motor dual task intervention for fall prevention in healthy older adults

Kim SJ, Yoo GE. Front. Psychol. 2019; 10: 3027.

Affiliation

Department of Music Therapy, Graduate School, Ewha Womans University, Seoul, South Korea.

DOI 10.3389/fpsyg.2019.03027 **PMID** 32010035

Abstract

This study aimed to investigate the effects of a rhythm-motor dual task intervention on cognitive and gait control for older adults in relation to fall prevention. Ten healthy older adults participated in a rhythm-motor dual task intervention and 10 participated in the control group. The intervention group received 16 30-min intervention sessions for 8 weeks. During the intervention sessions, participants engaged in walking or bimanual tapping as a primary motor task with concurrent rhythm tasks including playing instruments and rhythmic chanting or singing. At pretest and post-test, measures of cognition, balance/mobility, and gait were administered. A significant difference between groups was found for part B of the Trail Making Test (TMT-B) measure that involved executive control of attention. Also, changes in the gait ratio in the dual task condition of walking while playing an instrument were significantly different between groups. The findings in this study support the use of the rhythm-motor dual task intervention for increasing available cognitive resources and improving gait control, which are critical factors in fall prevention.

Language: en

Keywords

dual task; fall prevention; healthy elderly; instrument playing; music intervention

Exercise to reduce mobility disability and prevent falls after fall-related leg or pelvic fracture: RESTORE randomized controlled trial

Sherrington C, Fairhall N, Kirkham C, Clemson L, Tiedemann A, Vogler C, Close JCT, O'Rourke S, Moseley AM, Cameron ID, Mak JCS, Lord SR. J. Gen. Intern Med. 2020; ePub(ePub): ePub.
Affiliation
Neuroscience Research Australia, University of New South Wales, Randwick, NSW, Australia.

DOI 10.1007/s11606-020-05666-9 **PMID** 32016702
Abstract
BACKGROUND: Disability and falls are common following fall-related lower limb and pelvic fractures.

OBJECTIVE: To evaluate the impact of an exercise self-management intervention on mobility-related disability and falls after lower limb or pelvic fracture.

DESIGN: Randomized controlled trial. PARTICIPANTS: Three hundred thirty-six community dwellers aged 60+ years within 2 years of lower limb or pelvic fracture recruited from hospitals and community advertising. INTERVENTIONS: RESTORE (Recovery Exercises and STepping On afteR fracturE) intervention (individualized, physiotherapist-prescribed home program of weight-bearing balance and strength exercises, fall prevention advice) versus usual care. MAIN MEASURES: Primary outcomes were mobility-related disability and rate of falls. KEY RESULTS: Primary outcomes were available for 80% of randomized participants. There were no significant between-group differences in mobility-related disability at 12 months measured by (a) Short Physical Performance Battery (continuous version, baseline-adjusted between-group difference 0.08, 95% CI - 0.01 to 0.17, p = 0.08, n = 273); (b) Activity Measure Post Acute Care score (0.18, 95% CI - 2.89 to 3.26, p = 0.91, n = 270); (c) Late Life Disability Instrument (1.37, 95% CI - 2.56 to 5.32, p = 0.49, n = 273); or in rate of falls over the 12-month study period (incidence rate ratio 0.96, 95% CI 0.69 to 1.34, n = 336, p = 0.83). Between-group differences favoring the intervention group were evident in some secondary outcomes: balance and mobility, fall risk (Physiological Profile Assessment tool), physical activity, mood, health and community outings, but these should be interpreted with caution due to risk of chance findings from multiple analyses.

CONCLUSIONS: No statistically significant intervention impacts on mobility-related disability and falls were detected, but benefits were seen for secondary measures of balance and mobility, fall risk, physical activity, mood, health, and community outings. TRIAL REGISTRATION: Australian New Zealand Clinical Trials Registry: ACTRN12610000805077.
Language: en

Keywords
exercise; fall prevention; hip fracture; randomized controlled trial

Does long-term recreational gymnastics prevent injurious falls in older women? A prospective 20-year follow-up

Uusi-Rasi K, Karinkanta S, Kannus P, Tokola K, Sievänen H. BMC Geriatr. 2020; 20(1): e37.

Affiliation

UKK Institute for Health Promotion Research, Kaupinpuistonkatu 1, FI-33500, Tampere, Finland.

DOI 10.1186/s12877-020-1428-0 **PMID** 32007107

Abstract

BACKGROUND: Exercise interventions focusing on balance and strength training have been shown to be effective for falls prevention. The aim of this 20-year register-based follow-up was to examine whether long-term participation in recreational female gymnastics is associated with a lower risk of medically-attended injurious falls.

METHODS: Health care register data of 187 women (103 recreational gymnasts and 84 sedentary controls) from the original cohort of 243 women were assessed. The mean age (sd) at baseline was 62.8 (5.4) years and the mean follow-up time was 19.4 (2.7) years (range from 5.6 to 21.0 years). Injurious falls were scrutinized from medical records. An injurious fall was defined as an event in which falling was mentioned as a reason for making contact with health-care professionals. Negative binomial regression was used to estimate incidence rate ratios (IRR) for injurious falls, and Cox-regression models for calculating hazard ratios (HR) for injured fallers with the control group as reference.

RESULTS: Recreational gymnasts had about 30% less injurious falls compared to controls, the mean IRR (95% CI) being 0.71 (0.51 to 0.96). The HR for injured fallers was 0.73 (0.52 to 1.02) favoring the recreational gymnasts. There were no statistically significant between-group differences for fractures.

CONCLUSIONS: Long-term recreational gymnastics appears to reduce the risk of injurious falls in old age.

Language: en

Keywords

Exercise; Falls; Fractures; Older women; Physical activity

Pilot outcomes of a multicomponent fall risk program integrated into daily lives of community-dwelling older adults

Szanton SL, Clemson L, Liu M, Gitlin LN, Hladek MD, LaFave SE, Roth DL, Marx KA, Felix C, Okoye SM, Zhang X, Bautista S, Granbom M. J. Appl. Gerontol. 2020; ePub(ePub): ePub.

Affiliation

Lund University, Sweden.

DOI 10.1177/0733464820912664 **PMID** 32193981

Abstract

Objectives: To evaluate whether a fall prevention intervention reduces fall risk in older adults who have previously fallen. Design: Randomized controlled pilot trial. Setting: Participants' homes. Intervention: LIVE-LiFE, adapted from Lifestyle-Intervention Functional Exercise (LiFE) integrates strength and balance training into daily habits in eight visits over 12 weeks. The adaptations to LiFE were to also provide (a) US$500 in home safety changes, (b) vision contrast screening and referral, and (c) medication recommendations. Control condition consisted of fall prevention materials and individualized fall risk summary. Measurement: Timed Up and Go (TUG) and Tandem stand. Falls efficacy, feasibility, and acceptability of the intervention. Results: Sample (N = 37) was 65% female, 65% White, and average 77 years. Compared with the control group, each outcome improved in the intervention. The LIVE-LiFE intervention had a large effect (1.1) for tandem stand, moderate (0.5) in falls efficacy, and small (0.1) in the TUG. Conclusion: Simultaneously addressing preventable fall risk factors is feasible.

Language: en

Keywords

accidental falls; community-dwelling; home hazards; lifestyle-integrated exercise; medication review

Potential long-term impact of "On The Move" group-exercise program on falls and healthcare utilization in older adults: an exploratory analysis of a randomized controlled trial

Coyle PC, Perera S, Albert SM, Freburger JK, Vanswearingen JM, Brach JS. BMC Geriatr. 2020; 20(1): e105.

Affiliation

Department of Physical Therapy, University of Pittsburgh, Pittsburgh, PA, USA.

DOI 10.1186/s12877-020-1506-3 **PMID** 32178633

Abstract

BACKGROUND: Wellness program participation may reduce the risk of falling, emergency department-use, and hospitalization among older adults. "On the Move" (OTM), a community-based group exercise program focused on the timing and coordination of walking, improved mobility in older adults, but its impact on falls, emergency department-use, and hospitalizations remains unclear. The aim of this preliminary study was to investigate the potential long-term effects that OTM may have on downstream, tertiary outcomes.

METHODS: We conducted a secondary analysis of a cluster-randomized, single-blind intervention trial, which compared two community-based, group exercise programs: OTM and a seated exercise program on strength, endurance, and flexibility (i.e. 'usual-care'). Program classes met for 50 min/session, 2 sessions/week, for 12 weeks. Older adults (≥65 years), with the ability to ambulate independently at ≥0.60 m/s were recruited. Self-reported incidence of falls, emergency department visitation, and hospitalization were assessed using automated monthly phone calls for the year following intervention completion. Participants with ≥1 completed phone call were included in the analyses. Incidence rate ratios (IRRs) and 95% confidence intervals (CIs) were calculated (reference = usual-care).

RESULTS: Participants (n = 248) were similar on baseline characteristics and number of monthly phone calls completed. Participants in the seated exercise program attended an average of 2.9 more classes (p = .017). Of note, all results were not statistically significant (i.e. 95% CI overlapped a null value of 1.0). However, point estimates suggest OTM participation resulted in a decreased incidence rate of hospitalization compared to usual-care (IRR = 0.88; 95% CI = 0.59-1.32), and the estimates strengthened when controlling for between-group differences in attendance (adjusted IRR = 0.82; 95% CI = 0.56-1.21). Falls and emergency department visit incidence rates were initially greater for OTM participants, but decreased after controlling for attendance (adjusted IRR = 1.08; 95% CI = 0.72-1.62 and adjusted IRR = 0.96; 95% CI = 0.55-1.66, respectively).

Effects of a falls exercise intervention on strength, power, functional ability and bone in older frequent fallers: FaME (Falls Management Exercise) RCT secondary analysis

Skelton DA, Rutherford OM, Dinan-Young S, Sandlund M. J. Frailty Sarcopenia Falls 2019; 4(1): 11-19.

Affiliation

Department of Community Medicine and Rehabilitation, Physiotherapy, Umeå University, Umeå, Sweden.

DOI 10.22540/JFSF-04-011 **PMID** 32300711

Abstract

OBJECTIVES: Falls Management Exercise (FaME) has been shown to reduce falls in frequent fallers and in lower risk sedentary older people. The effects of FaME on the strength, power, physical function and bone health of frequently falling older women are yet to be established.

METHODS: This paper reports secondary analysis of data from the original randomised controlled trial of FaME in 100 community dwelling women aged ≥65 years with a history of ≥3 falls in the previous year. Intervention was group delivered, weekly one hour tailored dynamic balance and strength exercise classes and home exercise for nine months. OUTCOME MEASURES INCLUDED: strength (handgrip, quadriceps, hamstrings, hip abductors, ankles), lower limb explosive power and functional tests (timed up and go, functional reach, timed floor rise and balance), analysed using Linear Mixed Model analysis. Bone Mineral Density (BMD) at hip and spine was measured in a smaller sub-group and analysed using t-tests.

RESULTS: Significant time*group interactions in all measures of strength, except isometric ankle dorsiflexion, concentric hamstring and eccentric quadriceps strength. These improvements in strength equated to average improvements of 7-45%. There were also significant improvements in explosive power (W/kg) (18%, p=0.000), timed up and go (16%, p=0.000), functional reach (17%, p=0.000), floor rise (10%, p=0.002) and eyes closed static balance (56%, p=0.000). There was a significant loss of hip BMD in the control group (neck of femur $p<0.05$; ward's triangle $p<0.02$).

CONCLUSION: The FaME intervention improves lower limb strength, power and clinically relevant functional outcomes in frequently falling older women.

Language: en

Keywords

Bone Health; Exercise; Falls; Physical Function; Power; Strength

A randomized controlled trial assessing the effects of preoperative strengthening plus balance training on balance and functional outcome up to 1 year following total knee replacement

Domínguez-Navarro F, Silvestre-Muñoz A, Igual-Camacho C, Díaz-Díaz B, Torrella JV, Rodrigo J, Payá-Rubio A, Roig-Casasús S, Blasco JM. Knee Surg. Sports Traumatol. Arthrosc. 2020; ePub(ePub): ePub.

Affiliation

IRIMED Joint Research Unit (La Fe - UV), Valencia, Spain. Jose.Maria.Blasco@uv.es.

DOI 10.1007/s00167-020-06029-x **PMID** 32342139

Abstract
PURPOSE: To investigate the effects of including balance training in a preoperative strengthening intervention on balance and functional outcomes in patients undergoing total knee replacement (TKR) and compare these effects to those induced by preoperative strengthening and no intervention.
METHODS: Eighty-two subjects scheduled for TKR were randomly allocated into the strengthening (ST, n = 28) group: a preoperative lower limb strengthening intervention; the strengthening + balance (ST + B, n = 28) group: same intervention augmented with balance training; and the control group (n = 26). The Berg Balance Scale (BBS) and the function in daily living subscale of the Knee Injury and Osteoarthritis Outcome Score (KOOS-ADL) were the primary outcomes. The secondary measures included balance and mobility, self-reported status, and knee function. The outcomes were assessed at baseline, 1 week before surgery, and 2, (primary endpoint), 6 and 52 weeks after surgery.
RESULTS: Compared with the controls, the participants in the ST and ST + B groups presented significant improvements from baseline to the end of the preoperative intervention in BBS ($p = 0.005$) and KOOS-ADL ($p < 0.001$). At 6 weeks post-surgery, the knee extensor strength values were similar in the two treatment groups and significantly higher than that in the controls. Overall, the participant outcomes in all groups stabilized at 1 year after surgery.
CONCLUSION: A preoperative strengthening intervention, regardless of whether it is complemented with balance training, enhances strength but not balance or functional outcomes at 6 weeks after surgery. Patients are expected to present similar performance at 1 year postoperatively, but adequately statistically powered trials are needed to confirm the findings. LEVEL OF EVIDENCE: II. TRIAL REGISTRATION: NCT02995668.
Language: en

Keywords
Exercise therapy; Knee osteoarthritis; Muscle strength; Postural balance; Preoperative period; Total knee arthroplasty

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.

Affiliation

Department of Community Medicine, Faculty of Medicine, Chiang Mai University, Chiang Mai 50200, Thailand.

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

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.

Affiliation

Department of Physiotherapy, School of Nursing and Health Studies, The Open University of Hong Kong, Hong Kong, China.

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

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.

Affiliation
Department of Human Movement Sciences, Vrije Universiteit Amsterdam, Amsterdam Movement Sciences, Van der Boechorststraat 7, 1081 BT, Amsterdam, The Netherlands. m.pijnappels@vu.nl.

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

Effectiveness of home-based rehabilitation program in minimizing disability and secondary falls after a hip fracture: protocol for a randomized controlled trial

Sadruddin Pidani A, Sabzwari S, Ahmad K, Mohammed A, Noordin S. Int. J. Surg. Protoc. 2020; 22: 24-28.

DOI 10.1016/j.isjp.2020.06.002 **PMID** 32695954

Abstract

INTRODUCTION: Hip fractures are a major health problem globally and are associated with increased morbidity, mortality, and substantial economic costs. Successful operative treatment of hip fracture patients is necessary for the optimization of post-op mobility and functional recovery of the patient. Rehabilitation after surgical stabilization of a hip fracture is crucial in order to restore pre-fracture function and to avoid long-term institutionalization. In particular ongoing exercise which targets balance can prevent up to 40% of falls. Therefore, we have designed a post-discharge home-based physical rehabilitation intervention program to minimize disability and falls in this high-risk elderly population.

Methods and analysis: The study will be an open label, simple randomized controlled trial at a single hospital. The two arms will be equally allocated on a 1:1 ratio into intervention and control groups. The control arm will receive the usual standard postoperative rehabilitation. The intervention group will receive an extended home-based rehabilitation program twice a week continued for 3 months (12 weeks) after discharge. The Primary outcome of the study is occurrence of falls. Falls will be measured at 3, 6, 12, and 24 months by research-assistant follow-up telephone calls for both the groups. Mobility-related disability will be measured with a self-reported test at every routine follow-up for up to two years using a performance-based short battery tool. Negative binomial regression model will be used to compare number of falls in both the groups by computing incidence ratio rates.

Ethics and dissemination: Approval for the conduction of this study has been taken from the Ethical Review Committee (ERC) of the institution. Evidences which will be obtained from this study will facilitate to propose changes in existing guidelines and policies for treating fall and hip fracture patients.Trial registrationThis trial is registered on clinicaltrials.gov ID: NCT04108793.

Language: en

Keywords

Physical activity; Disability; Rehabilitation; CTU, Clinical trial unit; Elderly population; ERC, Ethical Review committee; Hip fracture; Secondary falls; THR, Total hip replacement

Effects of a 16-week multimodal exercise program on gait performance in individuals with dementia: a multicenter randomized controlled trial

Trautwein S, Barisch-Fritz B, Scharpf A, Ringhof S, Stein T, Krell-Roesch J, Woll A. BMC Geriatr. 2020; 20(1): e245.

DOI 10.1186/s12877-020-01635-3 **PMID** 32677897

Abstract

BACKGROUND: There is a high prevalence of gait impairments in individuals with dementia (IWD). Gait impairments are associated with increased risk of falls, disability, and economic burden for health care systems. Only few studies have investigated the effectiveness of physical activity on gait performance in IWD, reporting promising but inconsistent results. Thus, this study aimed to investigate the effectiveness of a multimodal exercise program (MEP) on gait performance in IWD.

METHODS: In this parallel-group randomized controlled trial, we enrolled 319 IWD of mild to moderate severity, living in care facilities, aged ≥ 65 years, and being able to walk at least 10 m. The control group (n = 118) received conventional treatment, whereas the intervention group (n = 201) additionally participated in a 16-week MEP specifically tailored to IWD. We examined the effects of the MEP on spatiotemporal gait parameters and dual task costs by using the gait analysis system GAITRite. Additionally, we compared characteristics between positive, non-, and negative responders, and investigated the impact of changes in underlying motor and cognitive performance in the intervention group by conducting multiple regression analyses.

RESULTS: Two-factor analyses of variance with repeated measurements did not reveal any statistically significant time*group effects on either spatiotemporal gait parameters or dual task costs. Differences in baseline gait performance, mobility, lower limb strength, and severity of cognitive impairments were observed between positive, non-, and negative responders. Positive responders were characterized by lower motor performance compared to negative and non-responders, while non-responders showed better cognitive performance than negative responders. Changes in lower limb strength and function, mobility, executive function, attention, and working memory explained up to 39.4% of the variance of changes in gait performance.

CONCLUSIONS: The effectiveness of a standardized MEP on gait performance in IWD was limited, probably due to insufficient intensity and amount of specific walking tasks as well as the large heterogeneity of the sample. However, additional analyses revealed prerequisites of individual characteristics and impacts of changes in underlying motor and cognitive performance. Considering such factors may improve the effectiveness of a physical activity intervention among IWD.

TRIAL REGISTRATION: DRKS00010538 (German Clinical Trial Register, date of registration: 01 June 2016, retrospectively registered, https://www.drks.de/drks_web/setLocale_EN.do).

Language: en

Keywords

Physical activity; Cognition; Walking; Dual task; Neurodegenerative disorder; Physical functional performance

Combining cognitive stimulation therapy and fall prevention exercise (CogEx) in older adults with mild to moderate dementia: a feasibility randomised controlled trial

Binns E, Kerse N, Peri K, Cheung G, Taylor D. Pilot Feasibility Stud. 2020; 6: e108.

DOI 10.1186/s40814-020-00646-6 **PMID** 32724661

Abstract

BACKGROUND: People living with dementia (PLwD) have a high fall risk as cognitive impairment compromises control of gait and balance. Fall prevention exercises that are effective in healthy older adults may not work for PLwD. Cognitive stimulation therapy (CST) has been shown to improve global cognition in PLwD. A programme which combines cognitive (CST) with physical exercises may reduce falls in PLwD. The aim of this study was to assess the feasibility of undertaking a full scale randomised controlled trial to test the effectiveness of CogEx in decreasing falls in PLwD. Specific objectives included recruitment strategy, data collection, outcome measures, intervention fidelity and facilitator/participant experience.

Methods: A mixed methods feasibility randomised controlled trial recruited people from residential aged care. Inclusion criteria were ≥ 65 years old, Montreal Cognitive Assessment (MoCA) score of 10 to 26 and able to participate in a group. Participants were randomised to CST or CST combined with strength and balance exercises (CogEx). Both CST and CogEx groups were for an hour twice a week for 7 weeks. Descriptive statistics were used to report pre- and post-intervention outcome measures (MoCA, Geriatric Depression Scale-15, Quality of Life-Alzheimer's Disease, Alzheimer's Disease Assessment Scale-Cognitive 11, Brief Balance Evaluation Systems Test and Short Form Physical Performance Battery) and attendance. Qualitative analysis of participant focus groups and facilitator interviews used a conventional approach. Sessions were video recorded and exercise completion documented.

Results: Thirty-six residents were screened with 23 participants randomised to intervention (CogEx, n = 10) or control (CST, n = 13). The assessments took 45 min to 1.5 h, and there was repetition between two cognitive measures. Ten facilitators completed training with the manualised programme. Exercises were combined into the hour-long CST session; however, limited balance training occurred with participants exercising predominantly in sitting. The facilitators felt the participants engaged more and were safer in sitting.

Conclusions: The results demonstrated that while fall prevention exercises could be scheduled into the CST structure, the fidelity of the combined programme was poor. Other components of the study design need further consideration before evaluation using a randomised controlled trial is feasible.

Trial registration: anzctr.org.au (ACTRN12616000751471) 8 Jun 2016, Australian New Zealand Clinical Trials Registry.

Language: en

Keywords

Exercise; Dementia; Cognitive stimulation therapy

Balance training monitoring and individual response during unstable vs. stable balance Exergaming in elderly adults: findings from a randomized controlled trial

Bakker J, Donath L, Rein R. Exp. Gerontol. 2020; ePub(ePub): ePub.

DOI 10.1016/j.exger.2020.111037 **PMID** 32730797

Abstract

OBJECTIVE: Exercise-based fall prevention programs mainly refer to multimodal and challenging balance exercises. Individual load monitoring and interpretations are crucial to enable adequate adaptation responses on the individual level. Thus, assessing internal responses to external stimuli throughout an intervention period need to be adequately addressed. The aim of this secondary analysis of a 3-armed randomized controlled trial was to analyze internal and external loads of unstable vs. stable balance Exergame training in healthy seniors. We intended to elucidate whether differences of external and internal load criteria occur over the intervention period.

METHODS: A total of 51 healthy seniors (females: n = 34; males: n = 17; age: 69 ± 6 years; BMI: 27 ± 5) were allocated to either volitional stepping (VOL), volitional stepping under unstable conditions (VOL + US) or an inactive control group (CON). VOL and VOL + US completed 8 weeks of Exergame based step training (three weekly sessions, 45 min each) using the Dividat Senso device. Twelve different balance Exergames were used, consisting of virtual reality like video games. The original nonswinging, stable platform was employed for VOL, whereas VOL + US used an adapted Senso mounted on a swinging Posturomed Rack. The instability level was increased for VOL + US only every second week. External (game scores) and internal (perceived efforts, using the rated perceived exertion scale (RPE)) load measures were individually recorded for every session. Statistical analysis was carried out using linear mixed-effects modelling.

RESULTS: Although VOL + US completed similar games at identical training volumes under unstable conditions, the achieved game scores did not significantly differ between both training groups ($p = 0.71$). Both intervention groups notably improved their game scores over the 8 training weeks ($p < 0.01$). A significant time x group interaction effect was observed for perceived effort ($p < 0.01$), serving as an internal load measure. Subsequent post-hoc testing revealed significant greater perceived exertion values in each of the first 7 weeks ($p < 0.05$) in VOL + US compared to VOL. No between-group differences were found for RPE in week 8. Whereas RPE values in VOL + US decreased over time (week 1: 4.6 ± 1.9; week 8: 3.1 ± 1.6), VOL indicated similar RPE values for all weeks (week 1: 3.1 ± 1.3; week 8: 2.9 ± 1.4). A detailed analysis of all twelve games revealed that differences in perceived exertion depend on the game content: in 75% of the involved games the RPE level was significantly higher in VOL + US compared to VOL ($p < 0.05$).

CONCLUSION: Monitoring internal and external loads on individual level are paramount for gaining adequate training adaptations. Our results indicate that between-group differences in perceived efforts a) can funnel over time, b) depend on game content and c) do not necessarily affect overall scoring. Future studies should individually employ and monitor measures of perceived efforts to guarantee an adequate challenge to the balance system within exercise-based fall prevention programs.

Language: en

Keywords

Virtual reality; External; Internal; Seniors; Step training; Training load

Cost-effectiveness of the PDSAFE personalised physiotherapy intervention for fall prevention in Parkinson's: an economic evaluation alongside a randomised controlled trial

Xin Y, Ashburn A, Pickering RM, Seymour KC, Hulbert S, Fitton C, Kunkel D, Marian I, Roberts HC, Lamb SE, Goodwin VA, Rochester L, McIntosh E, PDSAFE Collaborative group. BMC Neurol. 2020; 20(1): e295.

DOI 10.1186/s12883-020-01852-8 **PMID** 32781987

Abstract

BACKGROUND: PDSAFE is an individually-tailored, physiotherapist-delivered, balance, strength and strategy training programme aimed at preventing falls among people with Parkinson's. We evaluated the cost-effectiveness of PDSAFE compared with usual care for people with Parkinson's at higher risk of falling, from a UK National Health Service and Personal Social Service perspective.

METHODS: Resource use and quality of life data (EQ-5D-3L) were collected from 238 participants randomised to the PDSAFE intervention and 236 participants randomised to control, at baseline, 3 months, 6 months (primary outcome), and 12 months. Adjusted cost and quality-adjusted life-years (QALYs) were estimated using generalised linear models and uncertainty estimated using a non-parametric bootstrap.

RESULTS: Over 6 months, the PDSAFE intervention was associated with an incremental cost of £925 (95% CI £428 to £1422) and a very small and statistically insignificant QALY gain of 0.008 (95% CI - 0.006 to 0.021). The resulting incremental cost-effectiveness ratio (ICER) was £120,659 per QALY and the probability of the intervention being cost-effective at a UK threshold of £30,000/QALY was less than 1%. The ICER varied substantially across subgroups although no subgroup had an ICER lower than the £30,000 threshold. The result was sensitive to the time horizon with the ICER reducing to £55,176 per QALY when adopting a 12-month time horizon and assuming a sustained treatment effect on QoL, nevertheless, the intervention was still not cost-effective according to the current UK threshold.

CONCLUSIONS: Evidence from this trial suggests that the PDSAFE intervention is unlikely to be cost-effective at 6 months. The 12-month analysis suggested that the intervention became closer to being cost-effective if quality of life effects were sustained beyond the intervention period, however this would require confirmation. Further research, including qualitative studies, should be conducted to better understand the treatment effect of physiotherapy and its impact on quality of life in people with Parkinson's given existing mixed evidence on this topic.

TRIAL REGISTRATION: ISRCTN48152791. Registered 17 April 2014. http://www.isrctn.com/ISRCTN48152791.

Language: en

Keywords

Cost; Quality of life; Cost-effectiveness; Parkinson’s; Physiotherapist

Exercise and Risk Factors for Falls

Impact of the backward chaining method on physical and psychological outcome measures in older adults at risk of falling: a systematic review

Leonhardt R, Becker C, Groß M, Mikolaizak AS. Aging Clin. Exp. Res. 2020; ePub(ePub): ePub.

Affiliation

Faculty of Health Sciences, The University of Sydney, Camperdown, Australia.

DOI 10.1007/s40520-019-01459-1 **PMID** 31939202

Abstract

BACKGROUND: Being unable to "get up from the floor" is a risk factor and predictor of serious fall-related injuries in older age; however, floor-rise training (FRT) is not widely used. The backward chaining method (BCM) is a success-oriented, step-by-step form of FRT. This systematic review aimed to evaluate the impact of BCM on physical and psychological outcome measures, and its clinical application.

METHODS: Studies were identified through systematic searching of five databases. Criteria for inclusion were: use of BCM as a treatment method, outcome measures related to falls, and participants aged 60 + years. Study quality was evaluated using the Mixed Methods Appraisal Tool and PEDro scale, if applicable.

RESULTS: Seven studies with a total of 446 participants (mean age 82.4 ± 5.3 years) were identified. Emerging evidence shows that BCM significantly improves the ability to get up unassisted from the floor, as well as mobility with reduced fall incidence in older people. Furthermore, it can potentially reduce fear of falling. Reporting on feasibility and acceptance of BCM was limited. Study quality varied widely.

CONCLUSIONS: BCM provides a promising intervention in fall-related recovery strategies for older adults and is most effective when offered to older adults at risk of falling. Considering the small number of included studies and the varying methodological quality, these findings should be evaluated accordingly. The growing evidence regarding the benefits of BCM, yet the lack of adoption into standard care, highlights the need for further research and clinical application of this intervention approach.

Language: en

Keywords

Backward chaining method; Fall prevention; Falls; Floor rise training; Older adults

Exercise for falls prevention in community-dwelling older adults: trial and participant characteristics, interventions and bias in clinical trials from a systematic review

Ng CACM, Fairhall N, Wallbank G, Tiedemann A, Michaleff ZA, Sherrington C. BMJ Open Sport Exerc. Med. 2019; 5(1): e000663.

Affiliation

Institute for Musculoskeletal Health, The University of Sydney School of Public Health, Sydney, New South Wales, Australia.

DOI 10.1136/bmjsem-2019-000663 **PMID** 31908838

Abstract

INTRODUCTION: There is strong evidence that exercise prevents falls in community-dwelling older people. This review summarises trial and participant characteristics, intervention contents and study quality of 108 randomised trials evaluating exercise interventions for falls prevention in community-dwelling older adults.

METHODS: MEDLINE, EMBASE, CENTRAL and three other databases sourced randomised controlled trials of exercise as a single intervention to prevent falls in community-dwelling adults aged 60+ years to May 2018.

RESULTS: 108 trials with 146 intervention arms and 23 407 participants were included. Trials were undertaken in 25 countries, 90% of trials had predominantly female participants and 56% had elevated falls risk as an inclusion criterion. In 72% of trial interventions attendance rates exceeded 50% and/or 75% of participants attended 50% or more sessions. Characteristics of the trials within the three types of intervention programme that reduced falls were: (1) balance and functional training interventions lasting on average 25 weeks (IQR 16-52), 39% group based, 63% individually tailored; (2) Tai Chi interventions lasting on average 20 weeks (IQR 15-43), 71% group based, 7% tailored; (3) programmes with multiple types of exercise lasting on average 26 weeks (IQR 12-52), 54% group based, 75% tailored. Only 35% of trials had low risk of bias for allocation concealment, and 53% for attrition bias.

CONCLUSIONS: The characteristics of effective exercise interventions can guide clinicians and programme providers in developing optimal interventions based on current best evidence. Future trials should minimise likely sources of bias and comply with reporting guidelines.

Language: en

Keywords

evidence-based; exercise; fall; review; senior

Efficacy and generalizability of falls prevention interventions in nursing homes: a systematic review and meta-analysis

Gulka HJ, Patel V, Arora T, McArthur C, Iaboni A. J. Am. Med. Dir. Assoc. 2020; ePub(ePub): ePub.

Affiliation

Toronto Rehabilitation Institute, University Health Network, Toronto, Ontario, Canada; Department of Psychiatry, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada. Electronic address: Andrea.Iaboni@uhn.ca.

DOI 10.1016/j.jamda.2019.11.012 **PMID** 31982358

Abstract

OBJECTIVES: To determine the efficacy of fall intervention programs in nursing homes (NHs) and the generalizability of these interventions to people living with cognitive impairment and dementia.

DESIGN: Systematic review and meta-analysis. SETTING AND PARTICIPANTS: NH residents (n = 30,057) living in NHs defined as residential facilities that provide 24-hours-a-day surveillance, personal care, and some clinical care for persons who are typically aged ≥65 years with multiple complex chronic health conditions.

METHODS: Meta-analysis of falls prevention interventions on number of falls, fallers, and recurrent fallers.

RESULTS: Thirty-six studies met inclusion criteria for the systematic review. Overall, fall prevention interventions reduced the number of falls [risk ratio (RR) = 0.73, 95% confidence interval (CI) = 0.60-0.88], fallers (RR = 0.80, 95% CI = 0.72-0.89), and recurrent fallers (RR = 0.70, 95% CI = 0.60-0.81). Subanalyses revealed that single interventions have a significant effect on reducing fallers (RR = 0.78, 95% CI = 0.69-0.89) and recurrent fallers (RR = 0.60, 95% CI = 0.52-0.70), whereas multiple interventions reduce fallers (RR = 0.69, 95% CI = 0.39-0.97) and multifactorial interventions reduce number of falls (RR = 0.65, 95% CI = 0.45-0.94).

CONCLUSIONS AND IMPLICATIONS: Exercise as a single intervention reduced the number of fallers and recurrent fallers by 36% and 41%, respectively, in people living in NHs. Other effective interventions included staff education and multiple and multifactorial interventions. However, more research on exercise including people with cognitive impairment and dementia is needed to improve the generalizability of these interventions to the typical NH resident.

Language: en

Keywords

Nursing homes; cognitive impairment; dementia; fall prevention; falls; long-term care

Cost-effectiveness of "Tele-Square Step exercise" for falls prevention in fibromyalgia patients: a study protocol

Carlos-Vivas J, Pérez-Gómez J, Delgado-Gil S, Campos-López JC, Granado-Sánchez M, Rojo-Ramos J, Muñoz-Bermejo L, Barrios-Fernandez S, Mendoza-Muñoz M, Prado-Solano A, Garcia-Gordillo MÁ, Adsuar JC. Int. J. Environ. Res. Public Health 2020; 17(3): e695.

Affiliation

Health, Economy, Motricity and Education Research Group (HEME), Faculty of Sport Sciences, University of Extremadura, 10003 Cáceres, Spain.

DOI 10.3390/ijerph17030695 **PMID** 31973115

Abstract

BACKGROUND: Women with fibromyalgia (FM) have 2.5 falls per year compared to the 0.5 falls in people without FM. This fact poses a significant health expense. Square Stepping Exercise (SSE) is a balance training system that has been shown to be effective in preventing falls in the elderly. However, there are neither studies in people with FM nor studies that apply SSE through video-conferencing (Tele-SSE). The objectives of this project are 1) to investigate the applicability, safety, decrease in the number of falls, and incremental cost-effectiveness ratio of prevention of falls program through Tele-SSE in women with FM, and 2) to study the transfer of obtained results to the public and private socio-health economy of Extremadura.

METHODS/Design: A randomized controlled trial with experimental (Tele-SSE) and control (usual treatment) groups will be carried out. The application of Tele-SSE will be performed for 12 months (three times per week) and one additional follow-up month after the intervention. A focus group including agents to identify key points to transfer the findings to the public and private sectors in Extremadura. One-hundred and eighteen women with FM will be recruited and randomly distributed into the two groups: Experimental (Tele-SSE; n = 59) and control group (Usual care; n = 59). Primary outcome measures will be: 1) Applicability; 2) safety; 3) annual number of falls; and 4) incremental cost-effectiveness ratio. Secondary outcomes will be: 1) Balance; 2) fear of falling; 3) socio-demographic and clinical information; 4) body composition; 5) physical fitness; 6) physical activity and sedentary behavior; 7) quality of life-related to health, mental health, and positive health; 8) pain; 9) disability level; 10) cognitive aspects; and 11) depressive symptoms. Regarding the focus group, the acceptability of the Tele-SSE will be evaluated in social-sanitary agents and will include Tele-SSE in their services offer. A statistical analysis will be carried out by treatment intention and protocol. In addition, a cost-effectiveness analysis from the perspective of the health system will be performed.

DISCUSSION: This project aims to improve the efficiency and equity of physical therapy services based on tele-exercise in preventing falls in people with FM. Furthermore, orientations will be given in order to transfer the obtained findings into the social-sanitary system and market.

Language: en

Keywords

balance; cognitive aspects; cost-effectiveness; depression; falls prevention; fibromyalgia; happiness; pain; square stepping exercise; strength

Tai Chi for improving balance and reducing falls: an overview of 14 systematic reviews

Zhong D, Xiao Q, Xiao X, Li Y, Ye J, Xia L, Zhang C, Li J, Zheng H, Jin R. Ann. Phys. Rehabil. Med. 2020; ePub(ePub): ePub.

Affiliation

Chengdu University of Traditional Chinese Medicine, Chengdu, P.R, China. Electronic address: cdzyydxjrj@126.com.

DOI 10.1016/j.rehab.2019.12.008 **PMID** 31981834

Abstract

BACKGROUND: Falls play a pivotal role in the cause of injury or death and have become a public health problem, especially for older people. Tai Chi may be an effective approach to improving balance and reducing falls. However, the conclusions of systematic reviews (SRs) have been inconsistent and the quality needs to be appraised critically.

OBJECTIVE: To provide an overview of the methodological quality, risk of bias and reporting quality as well as quality of evidence of SRs of Tai Chi for improving balance and reducing falls.

METHODS: We conducted a systematic search of English- and Chinese-language SRs in 8 electronic databases, from inception to October 2019. The methodological quality, risk of bias, reporting quality and the quality of evidence were independently assessed by 2 reviewers who used the A Measurement Tool to Assess Systematic Reviews 2 (AMSTAR 2), Risk of Bias in Systematic reviews (ROBIS), the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and Grades of Recommendations, Assessment, Development and Evaluation (GRADE). Primary outcomes were fall rate and the Berg Balance Scale score in older people and people with Parkinson disease. Secondary outcomes included these outcomes in stroke, osteoarthritis and heart failure.

RESULTS: A total of 14 relevant SRs was included: 13 were rated critically low quality and 1 was rated low quality by AMSTAR 2. By the ROBIS, all SRs were rated low risk in Phase 1 (assessing relevance) and Domain 1 of Phase 2 (study eligibility criteria). With regard to Domain 2, assessing the identification and selection of studies, 3 (21.4%) SRs were rated low risk. 11 (71.4%) were rated low risk in Domain 3 (data collection and study appraisal), 11 (71.4%) were rated low risk in Domain 4 (synthesis and findings), and 9 (64.3%) were rated low risk in Phase 3 (risk of bias in the review). According to PRISMA, the reporting was relatively complete, but there were still some reporting flaws in the topic of protocol and registration (2/14, 14.3%), search strategy (5/14, 35.7%), risk of bias (6/14, 42.9%), additional analyses (6/14, 42.9%) and funding (4/14, 28.6%). Among the 14 SRs, Tai Chi had benefits for improving balance and reducing falls in older people and people with Parkinson disease; however, no definitive conclusions could be drawn for its effectiveness in stroke, osteoarthritis and heart failure. The level of evidence for fall rate was "moderate" to "high" for older people and "low" for those with Parkinson disease. The level of evidence of the

Berg Balance Scale was "low" to "moderate" for older people and "low" for those with Parkinson disease. Among the downgraded factors, imprecision was the most common, followed by inconsistency and publication bias.

CONCLUSIONS: Tai Chi may be beneficial for improving balance and reducing falls in older people and those with Parkinson disease. Because of limitations and inconsistent conclusions, further rigorous, normative and comprehensive SRs are needed to provide robust evidence for definitive conclusions.

Language: en

Keywords

AMSTAR 2; GRADE; PRISMA; ROBIS; Tai Chi; balance; falls; overview

Pilates exercise and postural balance in older adults: a systematic review and meta-analysis of randomized controlled trials

Casonatto J, Yamacita CM. Complement. Ther. Med. 2020; 48: e102232.

Affiliation

University of Northern Paraná, Research Group in Physiology and Physical Activity, Brazil.

DOI 10.1016/j.ctim.2019.102232 **PMID** 31987246

Abstract

INTRODUCTION: The effects of exercising with the Pilates method on aspects such as balance for the general population have been reported by recent systematic reviews. However, whereas the effects of the Pilates method on improving general balance have been well studied, less is known about postural balance and the respective determinants of Pilates effects.

OBJECTIVES: (1) provide more up-to-date evidence to determine the effects of Pilates on postural balance and (2) examine the effects of length of intervention, Pilates amount per week (times per week X session duration), and study quality (risk of bias) on postural balance in older adults.

METHODS: A systematic electronic search in Medline and Scientific Electronic Library Online (SciELO) was completed in December 2018 identifying randomized controlled trials investigating the effect of a Pilates method on postural balance in healthy older adults. A subsequent meta-analysis was performed.

RESULTS: The meta-analysis involved 6 studies and 261 individuals (128 Pilates and 133 control groups). We observed an overall effect favoring the Pilates group SMD95% = 0.89 [0.29-1.49]. The subgroup mean effects were similar for "length of intervention" (low vs high) [P = 0.557], "Pilates amount per week" (low vs high) [P = 0.565], and "study quality" (low vs high) [P = 0.869].

CONCLUSION: Accordingly, our findings suggest that a Pilates training program can be considered as an effective form of exercise to improve balance in older adults. Additionally, length of intervention, Pilates amount per week, and study quality were not related to the magnitude of effect on postural balance.

Language: en

Keywords

Exercise movement techniques; Pilates training; Postural balance

Effect of different forms of physical activity on balance in older women

Filar-Mierzwa K, Długosz-Boś M, Marchewka A, Aleksander-Szymanowicz P. J. Women Aging. 2020; ePub(ePub): ePub.

Affiliation

Department of Occupational Therapy, University of Physical Education in Krakow, Krakow, Poland.

DOI 10.1080/08952841.2020.1718579 **PMID** 31977290

Abstract

The aim of this study was to analyze the effect of two types of physical activity, dance, and general exercises, on balance in older women. Study participants comprised two groups of women. The participants attended 45-min DMT (n = 20) or GRE sessions (n = 19) three times per week for 12 weeks. Before and after the training, the participants underwent the Postural Stability Test, the Limits of Stability Test, and the Fall Risk Test. Improvement of the balance was confirmed for only one test both for the dance group and the general exercises group.

Language: en

Keywords

Dance; fall risk; general exercises; older adults; postural stability

The U-shaped relationship between levels of bouted activity and fall incidence in community-dwelling older adults: a prospective cohort study

Lu Z, Lam FMH, Leung JCS, Kwok TCY. J. Gerontol. A Biol. Sci. Med. Sci. 2020; ePub(ePub): ePub.

Affiliation

Jockey Club Centre for Osteoporosis Care and Control, The Chinese University of Hong Kong, Hong Kong, China.

DOI 10.1093/gerona/glaa058 **PMID** 32115656

Abstract

BACKGROUND: It remains uncertain whether the association between physical activity (PA) and falls is U-shaped, and few studies have explored the potential mediation of PA accumulation pattern.

METHODS: We measured PA in 671 community-dwelling older adults (82.7±3.8 years) using wrist-worn accelerometer for 7 days. PA was further classified to bouted PA (≥10 min bout length) and sporadic PA (<10 min bout length) for sub-analysis. Fall incidence in the following 12-month was recorded through tri-monthly telephone interviews. Classification and Regression Tree analysis was used to identify two optimal cutoff values of each PA measurement to predict falls. Participants were then divided into "inactive", "moderately active" and "highly active" groups accordingly. Negative binomial regression models were used to estimate the association between the PA measures and fall incidence.

RESULTS: 639 participants completed 12-month follow-up. Ninety-three (14.6%) experienced a total of 118 falls. Inactive and highly active older adults had higher falls per person month relative to the moderately active group (inactive: IRR=2.372, 95%CI=1.317-4.271; highly active: IRR=2.731, 95%CI=1.196-6.232). Sub-analyses found similar significant finding with bouted PA ($p<0.001$) but not sporadic PA ($p\geq0.221$). The association between bouted PA and falls remained significant even after adjusting fall incidence for bouted activity time (inactive: IRR=3.636, 95%CI=2.238-5.907; highly active: IRR=1.823, 95%CI=1.072-3.1). Further adjustments for fall-related risk factors did not meaningfully change the results.

CONCLUSION: A U-shaped relationship was identified between bouted but not sporadic PA and fall incidence. There is an approximately two-fold increase in fall rate in highly active elderly even after adjusting for activity time.

Language: en

Keywords

Accelerometer; exercise; falls; physical activity

Effectiveness of tai chi on balance improvement in type 2 diabetes patients: a systematic review and meta-analysis

Palermi S, Sacco AM, Belviso I, Marino N, Gambardella F, Loiacono C, Sirico F. J. Aging Phys. Act. 2020; ePub(ePub): ePub.

DOI 10.1123/japa.2019-0242 **PMID** 32131053

Abstract

Balance impairments are a relevant problem in patients with diabetes, and interventions to manage this issue represent a public health need. This study reviewed the literature about the effectiveness of Tai Chi on balance improvement in patients with type 2 diabetes. Springerlink, MEDLINE, PubMed, CINAHL, Web of Science, Scopus, and Cochrane CENTRAL databases were screened. Randomized and nonrandomized controlled trials assessing balance in patients with type 2 diabetes enrolled in a Tai Chi program were considered eligible. Four studies were included in qualitative synthesis and in quantitative analysis (three randomized controlled trials and one pretest-posttest quasi-experimental study). Evidence supporting Tai Chi to improve balance in patients with type 2 diabetes was found (effect size: 0.52; 95% confidence interval [0.20, 0.84]); however, the analysis relied on a small number of studies, which raises concerns about the risk of bias. In conclusion, the results support the benefits of Tai Chi intervention to improve balance in patients with type 2 diabetes.

Language: en

Keywords

coordination; exercise; fall; hyperglycemia; prevention

A randomised feasibility study assessing an intervention to keep adults physically active after falls management exercise programmes end

Audsley S, Kendrick D, Logan P, Jones M, Orton E. Pilot Feasibility Stud. 2020; 6: e37.
Affiliation
1Division of Primary Care, University of Nottingham, Nottingham, NG7 2RD UK.

DOI 10.1186/s40814-020-00570-9 **PMID** 32161660
Abstract
BACKGROUND: Physical inactivity contributes to disability and falls in older adults. Falls prevention exercise (FaME) programmes improve physical activity and physical function and reduce falling rates. Improvements in physical function are reduced, and falls rates increase, if physical activity is not maintained. This research investigated the feasibility and acceptability of an intervention that aimed to maintain physical activity in older adults exiting FaME.
METHODS: The Keeping Adults Physically Active (KAPA) intervention comprised of six group sessions of motivational interviewing, delivered monthly by trained and mentor-supported postural stability instructor's after the FaME programme ceased. The KAPA intervention included participant manuals, illustrated exercise books, physical activity diaries and pedometers. A feasibility study was conducted in 8 FaME classes. The study design was a two-arm, cluster randomised, multi-site feasibility study comparing the KAPA intervention with usual care. A sample of 50 community-dwelling adults aged 65 years old or older were recruited. Recruitment, retention and attendance rates, self-reported physical activity and participant interviews were used to examine the feasibility and acceptability of the KAPA intervention.
RESULTS: Fifty of the sixty-seven (74.6%) participants invited into the study agreed to take part, 94.2% of the available KAPA sessions were attended and 92.3% of the recruited participants provided outcome data. The KAPA participants expressed positive views about the venues and postural stability instructors and reported enjoying the group interactions. Intervention participants discussed increasing their physical activity in response to the peer-support, illustrated home exercise booklet, physical activity diaries and pedometers. Most discussed the written tasks to be the least enjoyable element of the KAPA intervention. The proportion of participants reporting at least 150 minutes of moderate to vigorous physical activity per week rose from 56.3 to 62.5% in the intervention arm and from 41.4 to 52.0% in the usual care arm.
CONCLUSIONS: The participants found the KAPA intervention acceptable. Participants reported the exercise booklet, peer support and the physical activity monitoring tools encouraged them to keep active. A full-scale trial is needed to assess whether physical activity can be significantly maintained in response to the KAPA intervention. TRIAL REGISTRATION: Retrospectively registered on ClinicalTrials.gov (NCT03824015).
Language: en

Keywords
Falls prevention; Feasibility study; Older adults; Physical activity

A home-based exercise program focused on proprioception to reduce falls in frail and pre-frail community-dwelling older adults

Pérez-Ros P, Vila-Candel R, Martínez-Arnau FM. Geriatr. Nurs. 2020; ePub(ePub): ePub.

Affiliation

Department of Nursing, Universidad Católica de Valencia San Vicente Mártir, 46007 Valencia, Spain; Frailty and Cognitive Impairment Research Group (FROG), University of Valencia, 46010 Valencia, Spain; Department of Physiotherapy, Universitat de València, 46010 Valencia, Spain.

DOI 10.1016/j.gerinurse.2020.01.017 **PMID** 32199736

Abstract

Frailty and falls are closely associated with each other as well as with disability, hospitalization, and death. Exercise can reduce these risks in both robust and frail older people. This before-after, non-randomized intervention study assessed a one-year proprioception training program with individual daily home exercises in 564 community-dwelling people aged 70 years and over, with different frailty phenotypes. After the exercise program, we observed a moderate reduction in the mean number of falls, fear of falls, body mass index and body fat percentage in frail and pre-frail participants. These results suggest that a home proprioception program may be a viable alternative to complex multicomponent exercise programs in settings where these are not feasible, since home proprioception can reach a larger population at a lower cost, and it affords clear benefits.

Language: en

Keywords

Community dwelling; Falls; Frail; Older people; Proprioception exercises

A qualitative study exploring physical therapists' views on the Otago Exercise Programme for fall prevention: a stepping stone to "age in place" and to give faith in the future

Cederbom S, Bjerk M, Bergland A. Physiother. Theory Pract. 2020; ePub(ePub): ePub.

Affiliation

Department of Physiotherapy, Faculty of Health Sciences, OsloMet - Oslo Metropolitan University, Oslo, Norway.

DOI 10.1080/09593985.2020.1731895 **PMID** 32090667

Abstract

Background: One of the most effective interventions to prevent falls is exercise. A commonly used program that prevents falls is the Otago Exercise Programme (OEP). Despite this, user-based knowledge of its applicability in real-world settings for older adults who are dependent on formal care in their homes is lacking. Purposes: To explore how physical therapists (PTs) experience the applicability of the OEP in clinical practice for home-dwelling older adults who are dependent on formal home care and to determine their beliefs regarding the benefits of the OEP for living longer at home. Methods: Semi-structured interviews were conducted with 17 physical therapists. Data were analyzed using qualitative thematic analysis. Results: The OEP was described by PTs to be applicable in clinical practice. Their experience was that the OEP seemed to be meaningful and to have a strong relationship with everyday activities. The OEP improved physical function, mood, self-efficacy, and participation in social activities in older adults, as well as provided faith in the future. Conclusion: The OEP is suitable for use in a primary care setting, and according to the perceptions of physical therapists, the OEP contributes to older adults' capability to live longer at home.

Language: en

Keywords

Fall; home-based intervention; independence; older; self-efficacy

Bend don't break: stretching improves scores on a battery of fall assessment tools in older adults

Johnson NF, Hutchinson C, Hargett K, Kosik K, Gribble P. J. Sport Rehab. 2020; ePub(ePub): ePub.

DOI 10.1123/jsr.2019-0246 **PMID** 32087599

Abstract

CONTEXT: Falls and loss of autonomy are often attributed in large part to musculoskeletal impairments in later adulthood. Age-related declines in flexibility contribute to late adulthood musculoskeletal impairment. The novel sitting-rising test has been proposed to be a quick, effective screening of musculoskeletal fitness, fall risk, and all-cause mortality in older adults. The timed up and go and 5 times sit-to-stand tests are two of the 3 most evidence-supported performance measures to assess fall risk.

OBJECTIVE: This study aimed to determine if 5 weeks of flexibility training could increase sitting-rising test, timed up and go, and 5 times sit-to-stand scores in community-dwelling older adults. PARTICIPANTS: Forty-seven adults aged 60 years and older (mean age = 66.7 y, SD = 4.1) participated in this study. Participants completed a static stretching protocol consisting of 3 weekly 1-hour stretching sessions.

RESULTS: The protocol improved flexibility as seen in sit-and-reach scores and improved scores on all outcome variables. Specifically, there was a significant increase in sitting-rising test scores from preintervention (M = 7.45, SD = 1.45) to postintervention (M = 8.04, SD = 1.36), t(42) = -5.21, P <.001. Timed up and go scores demonstrated a significant decrease from preintervention (M = 8.85, SD = 1.32) to postintervention (M = 8.20, SD = 1.35), t(46) = 5.10, P <.001. Five times sit-to-stand scores demonstrated a significant decrease from preintervention (M = 12.57, SD = 2.68) to postintervention (M = 10.46, SD = 2.06), t(46) = 6.62, P <.001. Finally, significant increases in sit-and-reach scores were associated with improved functional performance (r = -.308, P =.03).

CONCLUSION: Findings suggest that flexibility training can be an effective mode of low-level exercise to improve functional outcomes. Static stretching may help to improve musculoskeletal health, promote autonomy, and decrease mortality in community-dwelling older adults.

Language: en

Keywords

aging; flexibility; geriatric; mobility

Effects of aquatic physical intervention on fall risk, working memory and hazard-perception as pedestrians in older people: a pilot trial

Nissim M, Livny A, Barmatz C, Tsarfaty G, Berner Y, Sacher Y, Giron J, Ratzon NZ. BMC Geriatr. 2020; 20(1): e74.

Affiliation
Sackler Faculty of Medicine, School of Health Professions, Department of Occupational Therapy, Tel Aviv University, Tel Aviv, Israel.

DOI 10.1186/s12877-020-1477-4 **PMID** 32075583

Abstract

BACKGROUND: Normal aging is associated with balance, mobility and working memory decline that increase fall risk and influence activity of daily living functions. Mounting evidence suggests that physical activity is beneficial for decreasing aging effects. Previous studies have focused on land-based physical activity. Research concerning the aquatic environment is scarce. The primary objectives of this three arm intervention pilot study were to examine the effects of an aquatic physical intervention program on balance, gait, fall risk and working memory among community-dwelling older individuals. The secondary objective was to examine the effects of an aquatic physical intervention program on safety of street-crossing among community-dwelling older individuals.

METHODS: Forty-two healthy participants aged 65 or older were enrolled into one of three intervention groups: aquatic physical intervention (API) (N = 13), on-land physical intervention (OLPI) (N = 14) or non-physical intervention (NPI) (N = 15). The intervention took place from 2018 until 2019 at Tel-Aviv University, Sheba medical center and Reich Center. The protocol included 30-min sessions twice a week for 12 weeks. Balance, gait and fall risk were assessed by the Tinneti test, working memory abilities were assessed by digit span and Corsi blocks tests and simulated safe streets-crossing was assessed by the hazard perception test for pedestrians. Testing and data collection was conducted at baseline, after six weeks and 12 weeks of intervention. All members of the professional team involved in evaluating participants were blind to the intervention group to which participants were allocated.

RESULTS: The differences in Tinetti balance ($F(2, 39)=10.03$, $p < 0.01$), fall risk ($F(2, 39)=5.62$, $p0 > .05$), digit span forward ($F(2, 39)=8.85$, $p < 0.01$) and Corsi blocks forward ($F(2, 39)=3.54$, $p < 0.05$) and backward ($F(2, 39)=6.50$, $p < 0.05$) scores after 12 weeks between the groups were significant. The API group showed improved scores. The differences in hazard perception test for pedestrians scores after 12 weeks of intervention between the groups were marginally significant ($F(2, 39)=3.13$, $p = 0.055$). The API group showed improved scores.

CONCLUSIONS: These findings may affect experts working with the elderly population when making decisions concerning therapeutic prevention interventions for the deficiencies of elderly patients. Older adults practicing aquatic physical activity could contribute to their increased safety. TRIAL REGISTRATION: Trial registration number: ClinicalTrials.gov Registry NCT03510377. Date of registration: 10/31/2017.

Language: en

Physical activity and falls among a national cohort of older veterans

Marciniak D, Alexander NB, Hoffman GJ. J. Appl. Gerontol. 2020; ePub(ePub): ePub.

Affiliation

University of Michigan, Ann Arbor, USA.

DOI 10.1177/0733464820915807 **PMID** 32274955

Abstract

The more than 20 million U.S. veterans have a history of physical activity engagement but face increasing disability as they age. Falls are common among older adults, but there is little evidence on veterans' fall risk. We conducted a retrospective cohort study using 48,643 observations from 14,831 older (≥65 years) Americans from the 2006-2014 waves of the Health and Retirement Study. Veterans reported more noninjurious falls (26.6% vs. 24.0%, p <.002), but fewer fall-related injuries (8.9% vs. 12.3%, p <.001) than nonveterans. In adjusted analyses, for each 5-year increase in age, the odds of a noninjurious fall were greater for veterans (odds ratio [OR] = 1.05, 95% confidence interval [CI] = [1.01, 1.10]) and, among those with regular physical activity, the odds were lower for veterans compared with nonveterans (OR = 0.89; 95% CI = [0.81, 0.99]). For veterans, physical activity engagement may prove a particularly effective mechanism for reducing the aging-related risks associated with falls and fall injuries.

Language: en

Keywords

aging; disability; falls; physical activity; veterans

Fall prevention behaviour after participation in the Stepping On program: a pre–post study

Tiedemann A, Purcell K, Clemson L, Lord SR, Sherrington C. Public Health Res Pract. Published online early.

Affiliation

Institute for Musculoskeletal Health, School of Public Health, Faculty of Medicine and Health, University of Sydney, NSW, Australia

DOI 10.17061/phrp30122004

Abstract

Objective: The Stepping On program has been shown to prevent falls among community-dwelling people in a research setting and was implemented statewide by the New South Wales (NSW) Ministry of Health in 2008. This study measured ongoing fall prevention strategies and behaviours undertaken by Stepping On participants during the 6 months after program completion. Secondary objectives were to document participant satisfaction with the program, and to identify motivators for, and barriers to, fall prevention behaviour and uptake of the strategy.

Methods: We conducted a pre–post prospective study among Stepping On program participants, with 6-month follow-up. Participants commenced Stepping On in 2015 and 2016 in 15 Local Health Districts across NSW. A study-specific survey was completed at baseline and 6 months after completion of Stepping On. Measures were current self-reported fall prevention strategies and behaviours; the Falls Behavioural (FaB) Scale; the Incidental and Planned Exercise Questionnaire (IPEQ); and motivators for, and barriers to, uptake of fall prevention strategies and behaviours.

Results: Baseline questionnaires were completed by 458 participants (mean age 77; standard deviation [SD] 6.7; 76% female). Both baseline and follow-up surveys were completed by 291 participants (64%; mean age 78; SD 6.9; 76% female). Program satisfaction was high – 251 participants (86%) completed the whole program, 284 (98%) said it increased their awareness of falls, and 284 (98%) would recommend Stepping On to others. There were statistically significant increases in the proportion of participants who reported doing regular balance and strength exercise (74% vs 24%; $p < 0.0001$), and using safe walking strategies (78% vs 51%; $p < 0.0001$) at follow-up compared with baseline. There was also a significant improvement in the FaB Scale, indicating less risk-taking behaviour (mean increase 0.15 out of 4; 95% confidence interval [CI] 0.12, 0.19; $p < 0.0001$), and an increase in IPEQ-reported structured exercise (mean increase 2.0 hours per week; 95% CI 1.6, 2.5; $p < 0.0001$). The main motivators for, and barriers to, uptake of structured exercise included participants' health, availability and access to local programs, and the amount of time available to take part.

Conclusion: This study demonstrates the appeal of the Stepping On program, and its positive impact on fall prevention behaviours among adults in the community aged 65 years and older. It is important to note the study limitations – namely, the self-reported nature of the measures used and the large amount of missing data.

Language: en

Effect of Wii Fit© exercise on balance of older adults with neurocognitive disorders: a meta-analysis

Sultana M, Bryant D, Orange JB, Beedie T, Montero-Odasso M. J. Alzheimers Dis. 2020; ePub(ePub): ePub.

Affiliation

Gait and Brain Lab, Parkwood Institute, Lawson Health Research Institute, London, ON, Canada.

DOI 10.3233/JAD-191301 **PMID** 32310168

Abstract

BACKGROUND: Exercise is beneficial to maintain balance. Wii Fit©, a video game-based exercise, offers an enjoyable way to exercise and is feasible for older adults with neurocognitive disorders (NCD).

OBJECTIVE: To evaluate the effects of Wii Fit© exercise training on the balance of older adults with NCD.

METHODS: Systematic review and meta-analysis of randomized control trials using Cochrane collaboration tools. The participants were older adults (60 years and over) with NCD. Balance was measured with Berg Balance Scale (BBS) and Timed Up and Go (TUG). Two reviewers independently searched, selected, extracted data, assessed risk of biases, and determined the quality of evidence. Outcomes were evaluated using Grading of Recommendations Assessment, Development, and Evaluation (GRADE). A meta-analysis was performed.

RESULTS: The literature search identified 522 source documents of which titles and abstracts were reviewed for 428 after removing 94 duplicates. The reviewers selected five studies out of 50 after a full text review. The overall effect of Wii Fit© exercise training on BBS was moderate, significant, and clinically meaningful (standardized mean difference [SMD]=0.5 standard deviation [SD] [95% confidence interval CI] 0.08, 0.84]). No effect was observed with TUG scores (SMD=0.00 SD [95% CI -0.44, 0.44]). The GRADE quality of evidence was very low.

CONCLUSION: Wii Fit© exercise training has a positive effect on balance in older adults with NCD. However, further research with sufficient power is needed to evaluate its effectiveness.

Language: en

Keywords

Aged; neurocognitive disorders; postural balance; video games

Agility-based exercise training compared to traditional strength and balance training in older adults: a pilot randomized trial

Lichtenstein E, Morat M, Roth R, Donath L, Faude O. PeerJ 2020; 8: e8781.

Affiliation
Department of Sport, Exercise and Health, University of Basel, Basel, Switzerland.

DOI 10.7717/peerj.8781 **PMID** 32328344
Abstract
BACKGROUND: In addition to generally high levels of physical activity, multi-component exercise training is recommended for the maintenance of health and fitness in older adults, including the prevention of falls and frailty. This training often encompasses serial sequencing of balance, strength, endurance and other types of exercise. Exercise training featuring integrative training of these components (i.e. agility training) has been proposed, as it more likely reflects real life challenges like stop-and-go patterns, cutting manoeuvers, turns and decision-making. In this study, we compared the efficacy of an agility-based training to the traditional strength and balance training approach with regard to selected risk factors for falls and frailty.
METHODS: We trained twenty-seven community-dwelling healthy seniors (16♂; 11♀; age: 69.5 ± 5.3 y; BMI: 26.4 ± 3.7 kg/m2) for 8 weeks in a group setting with 3 sessions per week, each lasting 50 minutes. Participants were randomized into either the agility group (AGI; n = 12), that used the integrative multi-component training, or the traditional strength and balance group (TSB; n = 15). TSB performed balance and strength exercises separately, albeit within the same session. The training of both groups progressively increased in difficulty. Outcomes were static and dynamic balance (single leg eyes open stand, Y-balance test, reactive balance), lower limb (plantar flexion and dorsal extension) and trunk flexion and extension maximum strength and rate of torque development (RTD). In addition, we tested endurance by the six-minute walk test (6MWT). We calculated linear mixed effects models for between-groups comparisons as well as effect sizes (ES) with 95 % confidence intervals.
RESULTS: Small ES in favor of AGI were found for plantar flexion strength (ES > 0.18[-0.27;0.89]) and RTD (ES > 0.43[-0.19;1.36]) as well as trunk extension RTD (ES = 0.35[-0.05;0.75]). No other parameters showed notable between group differences. Compliance was high in both groups (AGI: 90 ± 8% of sessions; TSB: 91 ± 7% of sessions).
DISCUSSION: Agility-based exercise training seems at least as efficacious as traditional strength and balance training in affecting selected physical performance indicators among community-dwelling healthy seniors. In particular, lower limb and trunk extension explosive strength seem to benefit from the agility training.
Language: en

Keywords
Agility training; Dynapenia; Exercise training; Explosive strength; Fall prevention; Frailty; Healthy ageing; Multi-component training; Old age; Strength and balance

Effects of exercise-based interventions on fall risk and balance in patients with chronic obstructive pulmonary disease: a systematic review

Delbressine JM, Vaes AW, Goërtz YM, Sillen MJ, Kawagoshi A, Meijer K, Janssen DJA, Spruit MA. J. Cardiopulm. Rehabil. Prev. 2020; 40(3): 152-163.

Affiliation

Department of Research and Development, CIRO, Horn, the Netherlands (Mss Delbressine and Goërtz, and Drs Vaes, Sillen, Janssen, and Spruit); Department of Rehabilitation, Akita City Hospital, Kawamoto Matsuoka-cho, Akita, Japan (Dr Kawagoshi); NUTRIM School of Nutrition and Translational Research in Metabolism, Maastricht, the Netherlands (Drs Meijer and Spruit); Department of Health Services Research, CAPHRI School for Public Health and Primary Care, Faculty of Health Medicine and Life Sciences, Maastricht University, Maastricht, the Netherlands (Dr Janssen); Department of Respiratory Medicine, Maastricht University Medical Centre (MUMC+), Maastricht, the Netherlands (Dr Spruit); and REVAL-Rehabilitation Research Center, BIOMED-Biomedical Research Institute, Faculty of Rehabilitation Sciences, Hasselt University, Diepenbeek, Belgium (Dr Spruit).

DOI 10.1097/HCR.0000000000000513 **PMID** 32355076

Abstract

PURPOSE: Chronic obstructive pulmonary disease (COPD) is a highly prevalent disease characterized by airflow limitation and is associated with decreased balance and increased fall risk. Since falls are related to increased mortality, interventions targeting balance and fall risk could reduce morbidity and mortality. The objective of this review was to systematically assess the effects of exercise-based interventions on fall risk and balance in patients with COPD.

METHODS: PubMed, Web of Science, EMBASE, and CINAHL were screened for randomized controlled trails and within-group studies evaluating effects of exercise-based interventions on fall risk or balance in patients with COPD. Data were presented in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement.

RESULTS: Fifteen studies were identified, 6 randomized controlled trails and 9 within-group studies. All interventions reported positive effects on balance outcomes. No studies reported fall risk. Taking current recommendations of balance outcome measures in patients with COPD into account, pulmonary rehabilitation combined with balance training had the highest effect size. Nine papers had concerns regarding bias, mostly due to the lack of blinding outcome assessors.

CONCLUSIONS: Exercise-based interventions have a positive effect on balance in patients with COPD. Pulmonary rehabilitation with balance training seems to have the most beneficial effect on balance. The effects on fall risk, as well as the long-term intervention effects remain unclear. A standardized balance assessment and research on long-term effects and fall risk are recommended.

Language: en

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.

Affiliation

Yonsei University - Wonju Campus.

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.

Affiliation

School of Health and Rehabilitation Sciences, The University of Queensland, Brisbane, Queensland, Australia.

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

Evaluation of a balance and mobility program for older adults at risk of falling: a mixed methods study

Osho OA, Harbidge C, Hogan DB, Manns PJ, Jones CA. J. Eval. Clin. Pract. 2020; ePub(ePub): ePub.

DOI 10.1111/jep.13413 **PMID** unavailable

Abstract

RATIONAL, AIMS, AND OBJECTIVES: The FallProof Balance and Mobility Program is a multifactorial fall prevention intervention that targets intrinsic risk factors such as muscle strength, balance, gait, and posture. Using mixed methods, we evaluated the implementation of the program for older adults at high risk of falling in the community.

METHODS: A pre-post program evaluation and semi-structured interviews were used to evaluate FallProof Balance and Mobility Program offered to older adults who were recurrent fallers. Over a 1-year period, the 12-week program was offered five times. Feasibility, acceptability, and outcome evaluation along with semi-structured interviews were done. Over the course of the evaluation, participants were evaluated three times (baseline, 12, and 16 weeks).

RESULTS: Of the 19 participants, who enrolled in the program, 16 completed the program and 12 attended at least 80% of the classes. Fourteen participants had mildly impaired cognition (Montreal Cognitive Assessment <26). Large gains (effect size 0.90) were seen with self-management (Partner-in-Health Scale). Participants were very satisfied with the program. Three themes emerged from the semi-structured interviews: (a) fall-related benefits, (b) variety of activities and motivating instructors, and (c) deterrents to participation.

CONCLUSION: Findings provided insights into pragmatic issues of implementing a balance and mobility program for older adults at risk of falling. The FallProof program was found to be feasible and acceptable in a small cohort of older adults from the community.

Language: en

Keywords

elderly; falls; mobility; rehabilitation; prevention program

Association between walking 5000 step/day and fall incidence over six months in urban community-dwelling older people

Aranyavalai T, Jalayondeja C, Jalayondeja W, Pichaiyongwongdee S, Kaewkungwal J, Laskin JJ. BMC Geriatr. 2020; 20(1): e194.

DOI 10.1186/s12877-020-01582-z **PMID** 32503501

Abstract
BACKGROUND: Walking is the most common population-wide campaign for health promotion in older people. However, the cutoff threshold for walking steps/day to identify the older people who are at risk of falling is not recommended. Therefore, the objectives were to investigate the association between all possible risk factors including physical performance, physical activity and fall incidence over the six-month in community-dwelling older people who had low-risk of falling and to identify walking threshold (steps/day) for reducing risk of fall.
METHODS: The older people who aged ≥60 years and had free of falling for 1 year were invited to participate in this study. They lived in five communities in Bangkok Thailand. Demographics and physical performances were collected at baseline. Walking (step/day) and 24-h physical activity (PA) were monitored for 5 consecutive days by the Actical® accelerometer wrapped on non-dominant wrists. The Physical Activity Scale for the Elderly (PASE) questionnaire was used to record activities in the past 7 days by interview. A monthly calendar was used to record fall incidence over the 6 months. Unadjusted and adjusted hazard ratio (HR) with 95% confidence interval (CI) were analyzed using the Cox's proportional hazard regression. The Kaplan Meier curve illustrated the probability to survive from fall over the 6 months.
RESULTS: Of 255, 33 older people (12.94%) reported first-fall incidence over the 6 months. Fall incidence density rate was 0.79 per 1000 person-day. Our findings showed that significant association between fall incidence and behavioral risk factors including PASE scores < 100 (HR = 3.53; 95% CI: 1.24-10.04), walking < 5000 steps/day (HR = 3.6; 95% CI: 1.76-7.31) and moderate to vigorous intensity of PA at < 60 min/week (HR = 3.66; 95% CI: 1.12-12.01). Fall incidence were related to the following risk factors: age (HR = 3.54; 95% CI: 1.37-9.11), took polypharmacy/antipsychotics (HR = 4.32; 95% CI: 2.12-8.79), presence of urinary incontinence (HR = 2.87; 95% CI: 1.45-5.68), low functional mobility by Timed Up and Go ≥13.5 s (HR = 6.43; 95% CI: 2.65-15.57).
CONCLUSIONS: This study proposed walking ≥5000 steps/day as a cutoff threshold to recommend for reducing risk of falling in community-dwelling older people who had low-risk of falling.
Language: en

Keywords
Older people; Physical activity; Falls; Walking

Effect of home-based tai chi, yoga or conventional balance exercise on functional balance and mobility among persons with idiopathic Parkinson's disease: an experimental study

Khuzema A, Brammatha A, Arul Selvan V. Hong Kong Physiother. J. 2020; 40(1): 39-49.

DOI 10.1142/S1013702520500055 **PMID** 32489239

Abstract

Background: Individuals with Parkinson's disease (PD) invariably experience functional decline in a number of motor and non-motor domains affecting posture, balance and gait. Numerous clinical studies have examined effects of various types of exercise on motor and non-motor problems. But still much gap remains in our understanding of various therapies and their effect on delaying or slowing the dopamine neuron degeneration. Recently, Tai Chi and Yoga both have gained popularity as complementary therapies, since both have components for mind and body control.

Objective: The aim of this study was to determine whether eight weeks of home-based Tai Chi or Yoga was more effective than regular balance exercises on functional balance and mobility.

Methods: Twenty-seven individuals with Idiopathic PD (Modified Hoehn and Yahr stages 2.5–3) were randomly assigned to either Tai Chi, Yoga or Conventional exercise group. All the participants were evaluated for Functional Balance and Mobility using Berg Balance Scale, Timed 10

m Walk test and Timed Up and Go test before and after eight weeks of training.

Results: The results were analyzed using two-way mixed ANOVA which showed that there was a significant main effect for time as F (1, 24) =74.18 .... Walk test showed a significant interaction. But there was no significant main effect between the groups for both balance and mobility.

Conclusion: The findings of this study suggest that Tai Chi as well as Yoga are well adhered and are attractive options for a home-based setting. As any form of physical activity is considered beneficial for individuals with PD either Tai Chi, Yoga or conventional balance exercises could be used as therapeutic intervention to optimize balance and mobility. Further studies are necessary to understand the mind–body benefits of Tai Chi and Yoga either as multicomponent physical activities or as individual therapies in various stages of PD.

Keywords

Tai Chi; balance; Parkinson's disease; home-based setting; yoga

Health promotion and prevention: the impact of specifically adapted judo-inspired training program on risk factors for falls among adults

Arkkukangas M, Strömqvist Bååthe K, Ekholm A, Tonkonogi M. Prev. Med. Rep. 2020; 19: e101126.

DOI 10.1016/j.pmedr.2020.101126 **PMID** 32489772 PMCID

Abstract

Globally, falls and fall-related injuries constitute a severe threat to public health at all ages. New approaches are warranted since existing knowledge and actions have failed to reduce the incidence of falls and fall-related injuries, both at work and during leisure time. The purpose of this quasi-experimental study was to investigate the impact of a 10-week supervised judo-inspired exercise program, Judo4Balance, provided in a workplace setting among men and women targeting: physical functions, activity level, fall-related self-efficacy, and techniques for safe landing when falling. A total of 79 adults from seven different workplaces in Sweden, mean age 45 years (18-68), participated in the program. The study was conducted from May 2018 to June 2019. The 10-week exercise program performed in a workplace setting improved physical and psychological functions, as well as techniques for falling safely, factors of great importance to prevent falls and fall-related injuries among men and women. Therefore, it is suggested that the judo-inspired exercise program may be an effective tool in the quest to promote health and prevention of risk factors for falls and fall-related injuries among those of working age.

Language: en

Keywords

Exercise; Accidental falls; Self-efficacy; Physical exercises

Thai dance exercises benefited functional mobility and fall rates among community-dwelling older individuals

Kaewjoho C, Mato L, Thaweewannakij T, Nakmareong S, Phadungkit S, Gaogasigam C, Amatachaya S. Hong Kong Physiother. J. 2020; 40(1): 19-27.

DOI 10.1142/S1013702520500031 **PMID** 32489237

Abstract

BACKGROUND: With dramatic increase in the number of older individuals, special efforts have been made to promote the levels of independence and reduce fall rates among these individuals.

Objective: To investigate the effects of Thai dance exercises over 6 weeks on functional mobility and fall rates in community-dwelling older individuals.

Methods: Sixty-one community-dwelling older adults were interviewed and assessed for their demographics and fall data during 6 months prior to participation in the study. Then they completed the quasi-experimental Thai dance exercise program for 50 minutes/day, 3 days/week over 6 weeks. Their functional mobility relating to levels of independence and safety were assessed prior to training, at 3-week and 6-week training. After completing the program at 6 weeks, participants were prospectively monitored for fall data over 6 months.

Results: Participants improved their functional mobility significantly after 3- and 6-week training

Conclusion: The current findings further extend benefits of Thai dance as an alternative musical exercise program to promote levels of independence and safety among community-dwelling older adults.

Language: en

Keywords

Older adult; fall; walking; balance; cultural dance

A 10-week yoga practice has no effect on cognition, but improves balance and motor learning by attenuating brain-derived neurotrophic factor levels in older adults

Čekanauskaitė A, Skurvydas A, Zlibinaite L, Mickeviciene D, Kilikevičienė S, Solianik R. Exp. Gerontol. 2020; ePub(ePub): ePub.

DOI 10.1016/j.exger.2020.110998 **PMID** 32544572

Abstract

Despite studies investigating the effect of yoga on cognitive and motor functioning in older adults, the effect on dual-task performance and motor learning and the specific mechanisms underlying the positive effect of yoga remain unclear. Thus, the aim of this study was to investigate the effects of yoga on cognition, balance under single- and dual-task conditions, and motor learning. The potential role of brain-derived neurotrophic factor (BDNF) in induced improvement was also explored. Participants aged 60-79 years were randomized to either a control group (n = 15) or a yoga group (n = 18) for a 10-week period. The yoga group received 90-min duration yoga classes two times per week. Changes in cognition, balance under single- and dual-task conditions, and learning fast and accurate reaching movements were assessed. Yoga practice decreased ($P < 0.05$) the velocity vector of the center of pressure under single- and dual-task conditions, whereas no changes in cognitive performance were observed. Although reaction and movement times during learning were decreased in both groups ($P < 0.05$), a faster reaction time ($P < 0.05$) and shorter movement time ($P < 0.05$) were observed in the yoga group than in the control group. Significant moderate relationships ($P < 0.05$) between changes in BDNF levels and functional improvements were observed. Thus, 10 weeks of yoga practice resulted in improved balance and learning in the speed-accuracy motor task that were mediated by increased BDNF levels, but had no impact on cognition in older adults.

Language: en

Keywords

Stress; Executive functions; BDNF; Dual-task; Mood

Older adults' preferences for, adherence to and experiences of two self-management falls prevention home exercise programmes: a comparison between a digital programme and a paper booklet

Mansson L, Lundin-Olsson L, Skelton DA, Janols R, Lindgren H, Rosendahl E, Sandlund M. BMC Geriatr. 2020; 20(1): e209.

DOI 10.1186/s12877-020-01592-x **PMID** 32539711

Abstract
BACKGROUND: Fall prevention exercise programmes are known to be effective, but access to these programmes is not always possible. The use of eHealth solutions might be a way forward to increase access and reach a wider population. In this feasibility study the aim was to explore the choice of programme, adherence, and self-reported experiences comparing two exercise programmes - a digital programme and a paper booklet.
METHODS: A participant preference trial of two self-managed fall prevention exercise interventions. Community-dwelling adults aged 70 years and older exercised independently for four months after one introduction meeting. Baseline information was collected at study start, including a short introduction of the exercise programme, a short physical assessment, and completion of questionnaires. During the four months intervention period, participants self-reported their performed exercises in an exercise diary. At a final meeting, questionnaires about their experiences, and post-assessments, were completed. For adherence analyses data from diaries were used and four subgroups for different levels of participation were compared. Exercise maintenance was followed up with a survey 12 months after study start.
RESULTS: Sixty-seven participants, with mean age 77 ± 4 years were included, 72% were women. Forty-three percent chose the digital programme. Attrition rate was 17% in the digital programme group and 37% in the paper booklet group (p = .078). In both groups 50-59% reported exercise at least 75% of the intervention period. The only significant difference for adherence was in the subgroup that completed ≥75% of exercise duration, the digital programme users exercised more minutes per week (p = .001). Participants in both groups were content with their programme but digital programme users reported a significantly higher (p = .026) degree of being content, and feeling supported by the programme (p = .044). At 12 months follow-up 67% of participants using the digital programme continued to exercise regularly compared with 35% for the paper booklet (p = .036).
CONCLUSIONS: Exercise interventions based on either a digital programme or a paper booklet can be used as a self-managed, independent fall prevention programme. There is a similar adherence in both programmes during a 4-month intervention, but the digital programme seems to facilitate long-term maintenance in regular exercise.
TRIAL REGISTRATION: ClinTrial: NCT02916849.
Language: en

Keywords
Aged; Aged, 80 and over; eHealth; Self-management; Exercise; Accidental falls; mHealth; Digital health; Falls prevention; Independent living

Does neuromodulation transcranial direct current stimulation (tDCS) associated with peripheral stimulation through exercise to walk have an impact on falls in people with Parkinson's disease?

Arêas FZS, Nakamura-Palacios EM, Boening A, Arêas GPT, Nascimento LR. Med. Hypotheses 2020; 144: e109916.

DOI 10.1016/j.mehy.2020.109916 **PMID** 32526508

Abstract

Parkinson's disease (PD) is one of the most prevalent neurodegenerative diseases in the world, with a high degree of disability. Among the various therapeutic possibilities, brain stimulation appears in a promising approach, with deep brain stimulation (DBS) being the best described and successful, yet it has the limitation of being invasive. In this context we present transcranial direct current stimulation (tDCS), a non-invasive treatment that brings a new perspective when thinking about treatment of neurological diseases. It is easy to handle, low cost, few side effects and good adherence to patients. TDCS presents good evidence for clinical practice, but when it comes to PD the results obtained are inconclusive and some protocols have not yet been tested. In this hypothesis we propose that the use of tDCS applied in the supplemental motor areas, together with a gait training, can facilitate the motor learning and modulate the neurons for better potentiation of the exercises together with patients with walking difficulties due to PD.

Language: en

Keywords

Rehabilitation; Electrical stimulation; Gait; Parkinson

Pilot study on the effects of an adapted physical activity program focused on the quality of life and risk indicators for falls in independent dwelling-women over 65 years

de Battista M, Goncalves A, Martinez C, Strubel D, Charbonnier E. Geriatr. Psychol. Neuropsychiatr. Vieil. 2020; 18(2): 205-212.

Affiliation

Univ. Nîmes, EA7352 CHROME/APSY-V, Nîmes, France.

DOI 10.1684/pnv.2020.0859 **PMID** 32554352

Abstract

Falls can have multiple detrimental consequences in the elderly, and this is particularly relevant for women. To prevent the risk of falling, intervention programmes based on physical exercises focusing on balance appear to be the most efficient, which explains the multiplication of this type of action at the local level. However, these actions are very rarely evaluated.

METHODS: Our sample consists of 26 women (75.0 ± 6.7 years old), randomly assigned to two groups: an intervention group (GI) that has benefited from a balance-oriented adapted physical activity (APA) program focused on balance and conducted in an associative structure; and a control group (GC). Our study aims to evaluate different parameters such as physical (functional mobility, balance), subjective (balanced confidence) and health (quality of life) indicators in women over 65 years of age, living independently at home.

RESULTS: In people completing the program, we observed an improvement in equilibrium capabilities (significant increase in POMA score; $p < 0.05$), in balance and functional mobility (significant decrease in TUG score; $p < 0.01$) and in balance confidence (significant increase in ABC-S; $p < 0.05$).

CONCLUSION: The implementation of a short programme by the associative structure seems to be an interesting approach for the prevention of falls in autonomous elderly women.

Language: en

Keywords

balance; elderly; falls; prevention

Do exercises prevent falls among older adults: where are we now? A systematic review

Senderovich H, Tsai PM. J. Am. Med. Dir. Assoc. 2020; ePub(ePub): ePub.

DOI 10.1016/j.jamda.2020.05.010 **PMID** 32646820

Abstract

OBJECTIVE: To determine whether single interventions (SI), multifactorial interventions (MI), or multiple component interventions (MCI) including vitamin D supplementation prevent the incidence of falls and fall risk factors among older adults who are community-dwelling or living in long-term care facilities.

DESIGN: Systematic review.

METHODS: PubMed, Scopus, MEDLINE, and Cochrane were searched with restrictions applied to publication year (2015–2019) and language (limited to studies published in English). After duplicate removal and title and abstract screening, 2 authors independently identified eligible studies on the basis of inclusion criteria. Risk of bias and quality of evidence were assessed.

RESULTS: Thirty-four studies were included after screening titles and abstracts from 855 citations and 129 full-text articles. Thirteen randomized-controlled trials and clinical trials (5 on MI, 1 on MCI, and 7 on SI) including 2232 participants and 21 systematic reviews (assessing SI, MI, MCI, or all) were extracted for qualitative synthesis. Fifteen out of 20 studies that reported outcomes on falls rate found a significant reduction. Seventeen out of 23 studies with outcomes on fall risk factors concluded a significant improvement. Five studies found no significant differences in falls incidence, and 5 studies found no significant differences in fall risks. One study reported worsened outcomes, including poorer balance.

CONCLUSION AND IMPLICATIONS: Although results are inconclusive, SI, MI, and MCI involving exercises may prevent falls. Vitamin D supplementation may be beneficial alongside exercise; however, whether vitamin D use consistently reduces falls incidence or fall risks remains uncertain. Exercises that are individually tailored to participants' capabilities and risks may be the most effective falls prevention interventions. Implementation may reduce medical costs and improve quality of life for older adults who are community-dwelling or are living in long-term care facilities.

Language: en

Keywords

Falls; vitamin D; interventions; geriatric; exercises

Community care staff attitudes towards delivering a falls prevention exercise intervention to community care clients

Burton E, Boyle EJ, O'Connell H, Lewin G, Petrich M, Hill KD. Health Soc. Care Community 2020; ePub(ePub): ePub.

DOI 10.1111/hsc.13101 **PMID** 32687249

Abstract

Millions of older people world-wide receive community care services in their home to assist them to live independently. These services often include personal care, domestic assistance and social support which are delivered by non-university trained staff, and are frequently long term. Older people receiving community care services fall 50% more often than individuals of similar age not receiving services. Yet, few ongoing community care services include exercise programs to reduce falls in this population. We conducted an earlier study to examine the feasibility of community care staff delivering a falls prevention program. A critical finding was that while some of the assessment and support staff responsible for service delivery delivered the falls prevention exercise program to one or two clients, others delivered to none. Therefore, the aim of this qualitative sub-study was to understand reasons for this variation. Semi-structured interviews were conducted with 25 participating support staff and assessors from 10 community care organisations. Staff who had successfully delivered the intervention to their clients perceived themselves as capable and that it would benefit their clients. Older clients who were positive, motivated and wanted to improve were perceived to be more likely to participate. Staff who had worked at their organisation for at least 5 years were also more likely to deliver the program compared to those that had only worked up to 2 years. Staff that did not deliver the intervention to anyone were more risk averse, did not feel confident enough to deliver the program and perceived their clients as not suitable due to age and frailty. Experienced staff who are confident and have positive ageing attitudes are most likely to deliver falls prevention programs in a home care organisation.

Language: en

Keywords

qualitative; falls; older people; home care; attitudes; motivation; staff perceptions

The effectiveness of exercises on fall and fracture prevention amongst community elderlies: a systematic review and meta-analysis

Wong RMY, Chong KC, Law SW, Ho WT, Li J, Chui CS, Chow SKH, Cheung WH. J. Orthop. Translat. 2020; 24: 58-65.

DOI 10.1016/j.jot.2020.05.007 **PMID** 32695605

Abstract

OBJECTIVE: To analyze the effectiveness of exercise interventions on falls and fall-related fracture prevention among community-dwelling elderlies.

Methods: Literature search was conducted in Pubmed and Embase. Keywords used for literature search were "fracture" AND "fall" AND "exercise". Randomized controlled trials involving community-dwelling elderlies older than 60 years old with physical exercises as intervention were included. A systematic review and meta-analysis was performed. The primary outcomes were falls and fractures.

Results: Twelve studies were included and 4784 participants were involved with a mean age of 75.4. The most common exercise interventions were strength and balance exercises. The results of meta-analysis of 11 studies showed that exercise intervention had beneficial effect on fall prevention (RR = 0.71, 95% CI, 0.62-0.82; I2 = 24%, p < 0.0001). The effect was better when exercise intervention applied to women participants (RR = 0.64, 95% CI, 0.49-0.83; I2 = 28%, p = 0.00009) compared to men and women participants (RR = 0.75, 95% CI, 0.64-0.89; I2 = 24%, p = 0.001). The results of meta-analysis of seven studies showed that physical exercise had significant effect on fracture prevention (RR = 0.54, 95% CI, 0.35-0.83; I2 = 25%, p = 0.005). However, the effect was significant when exercise intervention applied to women participants only (RR = 0.37, 95% CI, 0.20-0.67; I2 = 0%, p = 0.001) but not significant when exercise intervention applied to both genders (RR = 0.80, 95% CI, 0.58-1.09; I2 = 0%, p = 0.15).

Conclusion: Exercise interventions, especially the combination of strength and balance training, were effective in preventing falls. Resistance exercises and jumping exercises were effective for fracture prevention among community-dwelling older population. The effectiveness of exercise interventions on fracture prevention have more significant effect on women. Further studies are needed to test the effectiveness of exercise interventions in men.

Translational potential: The use of effective exercises or biophysical interventions including vibration therapy can be incorporated into Fracture Liaison Services to prevent future fall and fracture.

Language: en

Keywords

Prevention; Systematic review; Exercise; Fall; Fracture

Outcomes associated with scale-up of the Stepping On falls prevention program: a case study in redesigning for dissemination

Mahoney JE, Gangnon R, Clemson L, Jaros LV, Cech S, Renken J. J. Clin. Transl. Sci. 2020; 4(3): 250-259.

DOI 10.1017/cts.2020.17 **PMID** 32695497

Abstract

INTRODUCTION: Translating complex behavior change interventions into practice can be accompanied by a loss of fidelity and effectiveness. We present the evaluation of two sequential phases of implementation of a complex evidence-based community workshop to reduce falls, using the Replicating Effective Programs Framework. Between the two phases, workshop training and delivery were revised to improve fidelity with key elements.

Methods: Stepping On program participants completed a questionnaire at baseline (phase 1: n = 361; phase 2: n = 2219) and 6 months post-workshop (phase 1: n = 232; phase 2: n = 1281). Phase 2 participants had an additional follow-up at 12 months (n = 883). Outcomes were the number of falls in the prior 6 months and the Falls Behavioral Scale (FaB) score.

Results: Workshop participation in phase 1 was associated with a 6% reduction in falls (RR = 0.94, 95% CI 0.74-1.20) and a 0.14 improvement in FaB score (95% CI, 0.11- 0.18) at 6 months. Workshop participation in phase 2 was associated with a 38% reduction in falls (RR = 0.62, 95% CI 0.57-0.68) and a 0.16 improvement in FaB score (95% CI 0.14-0.18) at 6 months, and a 28% reduction in falls (RR = 0.72, 95% CI 0.65-0.80) and a 0.19 score improvement in FaB score (95% CI 0.17-0.21) at 12-month follow-up.

Conclusions: Effectiveness can be maintained with widespread dissemination of a complex behavior change intervention if attention is paid to fidelity of key elements. An essential role for implementation science is to ensure effectiveness as programs transition from research to practice.

Language: en

Keywords

falls prevention; Implementation; dissemination; evidence-based programs; fidelity

Effects of enriched physical activity environments on balance and fall prevention in older adults: a scoping review

Shafizadeh M, Manson J, Fowler-Davis S, Ali K, Lowe AC, Stevenson J, Parvinpour S, Davids K. J. Aging Phys. Act. 2020; ePub(ePub): ePub.

DOI 10.1123/japa.2019-0395 **PMID** 32732456

Abstract

The incidence of falling, due to aging, is related to both personal and environmental factors. There is a clear need to understand the nature of the major risk factors and design features of a safe and navigable living environment for potential fallers. The aim of this scoping review was to identify studies that have examined the effectiveness of environments, which promote physical activity and have an impact on falls prevention. Selected studies were identified and categorized into four main topics: built environment, environment modifications, enriched environments, and task constraints. The results of this analysis showed that there are a limited number of studies aiming to enhance dynamic postural stability and fall prevention through designing more functional environments. This scoping review study suggests that the design of interventions and the evaluation of an environment to support fall prevention are topics for future research.

Language: en

Keywords

falling; constraints; enriched environments; postural stability

The safety and feasibility of a Halliwick style of aquatic physiotherapy for falls and balance dysfunction in people with Parkinson's disease: a single blind pilot trial

Terrens AF, Soh SE, Morgan P. PLoS One 2020; 15(7): e0236391.

DOI 10.1371/journal.pone.0236391 **PMID** 32730325

Abstract

BACKGROUND: There is growing evidence that aquatic physiotherapy may be effective for people with Parkinson's Disease (PD) but most studies have investigated land based type exercises in the aquatic environment. Few studies have examined customised aquatic therapies such as the Halliwick concept which focuses on trunk rotation and core stabilisation.

OBJECTIVE: The primary aim was to determine the feasibility of a Halliwick style aquatic physiotherapy intervention for people with PD. The secondary aim was to compare the Halliwick intervention with traditional aquatic and land based physiotherapy in terms of disease severity, balance and fear of falling.

METHODS: Halliwick style aquatic, traditional aquatic and land based physiotherapy were trialled in a single blind pilot study. All interventions ran for 60 minutes per week over 12 weeks. Feasibility outcomes were safety, adherence and attrition. Secondary outcomes included the Unified Parkinson's Disease Rating Scale motor subsection (UPDRS-III), Berg Balance Scale (BBS), Mini BESTest and modified Falls Efficacy Scale (mFES).

RESULTS: 30 participants with moderate PD were recruited. Participant mean age was 72 years (SD 8.4; range 51-86) with moderate disease severity (median Hoehn & Yahr score 3; IQR 1).No falls occurred during intervention sessions, however ten participants reported falls during the study period. No other adverse consequences were reported. All groups had adherence over 85%. No within group significant differences were found in UPDRS-III, BBS or mFES scores post-intervention for all groups, but the Halliwick aquatic group improved significantly in the Mini BESTest post-intervention ($p = 0.011$, 95% CI -7.36,-1.31, $t(10) = -2.98$).

CONCLUSIONS: Despite people with PD being a vulnerable population, aquatic physiotherapy, including the Halliwick style is a safe treatment option. Promising results for balance in the Halliwick aquatic group were observed, but further studies with larger sample sizes is required to increase confidence in the results.

Language: en

Effectiveness of physical therapy interventions in reducing fear of falling among individuals with neurological diseases: a systematic review and meta-analysis

Abou L, Alluri A, Fliflet A, Du Y, Rice LA. Arch. Phys. Med. Rehabil. 2020; ePub(ePub): ePub.

DOI 10.1016/j.apmr.2020.06.025 **PMID** 32745544

Abstract

OBJECTIVE: To summarize the effectiveness of physical therapy (PT) interventions to reduce fear of falling (FOF) among individuals living with neurological diseases.

DATA SOURCES: PubMed, PEDro, Scopus, Web of Science, PsycINFO, CINAHL, and SportDiscuss were searched from inception until December 2019.

STUDY SELECTION: Clinical trials with either the primary or secondary aim to reduce FOF among adults with neurological diseases were selected.

DATA EXTRACTION: Potential papers were screened for eligibility and data extracted by two independent researchers. Risk of bias was assessed by the Cochrane Risk of Bias tool for randomized clinical trials and the NIH Quality Assessment Tool for pre-post studies. A meta-analysis was performed among trials presenting with similar clinical characteristics. The Grading Recommendations, Assessment, Development and Evaluation- GRADE was used to rate the overall quality of evidence.

RESULTS: Sixty-one trials/3954 participants were included in the review and 53 trials/3524 participants in the meta-analysis. The included studies presented, in general, with a low to high risk of bias. A combination of gait and balance training was found to be significantly more effective compared to gait training alone in reducing FOF among individuals with Parkinson's Disease (PD) (Mean Difference- MD = 11.80, 95% CI, 8.22 - 15.38; $p < 0.001$). Home-based exercise and leisure exercise demonstrated significant improvement in reducing FOF over usual care in multiple sclerosis (MS) (MD = 15.27, 95% CI, 6.15 - 24.38, $p = 0.001$). No statistically significant between-groups differences were reported among individuals with stroke and spinal cord injury (SCI). The overall quality of evidence presented in this review ranges from very low to moderate according to the assessment with the GRADE approach.

CONCLUSION: Gait with lower limb training combined with balance training is effective in reducing FOF in individuals with PD. Also, home-based or leisure exercise is effective among individuals with MS. However, due to several limitations of the included studies, further research is needed to examine the effectiveness of FOF intervention among individuals with neurological diseases.

Language: en

Keywords

systematic review; fear of falling; meta-analysis; neurological diseases; physical therapy

Changes in the static balance of older women participating in regular Nordic walking sessions and Nordic walking combined with cognitive training

Piotrowska J, Guszkowska M, Leś A, Rutkowska I. Int. J. Environ. Res. Public Health 2020; 17(15): e5617.

DOI 10.3390/ijerph17155617 **PMID** 32759833

Abstract

Regular Nordic walking (NW) improves physical fitness, including the ability to maintain balance, in older adults. However, little is known about whether complementing the exercise programme with cognitive training (CT) contributes to increased effects. The aim of the study was to determine and compare the effect of regular NW and NW combined with CT on the ability to maintain static balance in older adults. The study examined 61 women aged 64 to 93 years living in adult day care centres. Twenty people participated in a three-month programme combining NW and CT (group NW + CT), 20 people participated only in NW classes (group NW), and 21 people were a control group (group C). The Romberg balance test, Fullerton Functional Fitness Test, and Attention and Perceptivity Test were used. After the programme, an increase in the time of maintaining the balance (with eyes open on the left and right legs) was observed in groups NW + CT and NW, with no such changes found in group C. This increase was greater in group NW + CT. Increased agility and strength of the hand were predictors of improving the ability to maintain balance. Regular NW improved the ability to maintain balance with eyes open in female residents of adult day care centres.

Language: en

Keywords

aging; physical activity; cognitive training; Nordic walking

Novel mat exergaming to improve the physical performance, cognitive function, and dual-task walking and decrease the fall risk of community-dwelling older adults

Peng HT, Tien CW, Lin PS, Peng HY, Song CY. Front. Psychol. 2020; 11: e1620.

DOI 10.3389/fpsyg.2020.01620 **PMID** 32793044

Abstract

Physical exercise and cognitive training were previously demonstrated to improve the physical functioning and decrease the incidence of falls for older adults. This study aimed to utilize an interactive exergame mat system to develop a novel cognitive-physical training program and explore the training effects on physical performance, cognitive function, dual-task walking (DTW), and fall risk compared to the control condition. In this quasi-experimental non-randomized controlled intervention study, 110 community-dwelling older adults participated. The exercise group (n = 56; mean age, 70.7 ± 4.6 years) performed ladder-type, three-by-three grid-type, and circle-type mat exergames with simultaneous cognitive-physical training (EMAT), while the control group (n = 54; mean age, 72.0 ± 5.7 years) underwent a multicomponent exercise intervention focused on physical and cognitive training. A 2 h training session was completed weekly for 3 months. Functional fitness (including upper- and lower-extremity strength and flexibility, grasp strength, aerobic endurance, static balance, dynamic balance and agility), a foot tapping test (FTT), the Montreal Cognitive Assessment (MoCA), DTW, and a fall risk questionnaire (FRQ) were assessed before and after the interventions. The EMAT program enhanced upper-extremity strength, lower-extremity strength and flexibility, aerobic endurance, and dynamic balance and agility; improved DTW and FTT performances; and decreased FRQ score. EMAT also showed a significant advantage over control in terms of lower-extremity strength and flexibility, aerobic endurance, dynamic balance and agility, and FRQ score (all $P < 0.05$). The current study provides evidence of the effects of a novel mat exergaming program on physical and cognitive performance. EMAT effectively reduced the fall risk and increased the dual-task ability of walking, factors that are important in fall prevention for community-dwelling older adults.

Language: en

Keywords

elderly; cognitive training; combined physical; exergame; fall prevention; smart exercise

The effects of physical exercise on balance and prevention of falls in older people: a systematic review and meta-analysis

Papalia GF, Papalia R, Diaz Balzani LA, Torre G, Zampogna B, Vasta S, Fossati C, Alifano AM, Denaro V. J. Clin. Med. 2020; 9(8): e2595.

DOI 10.3390/jcm9082595 **PMID** 32796528

Abstract

The aims of this systematic review and meta-analysis were to evaluate the effects of physical exercise on static and dynamic balance in the elderly population, and to analyze the number of falls and fallers. A systematic literature search was conducted using PubMed-Medline, Cochrane Central, and Google Scholar to select randomized clinical trials that analyzed the role of exercise on balance and fall rate in patients aged 65 or older. Sixteen articles were included in this review. Applying the Cochrane risk-of-bias tool, three studies were determined to be at low risk of bias, nine at unclear risk of bias, and four at high risk of bias. The meta-analysis showed improvements in dynamic balance ($p = 0.008$), static balance ($p = 0.01$), participants' fear of falling ($p = 0.10$), balance confidence ($p = 0.04$), quality of life ($p = 0.08$), and physical performance ($p = 0.30$) in patients who underwent physical exercise compared to controls. The analysis of the total numbers of falls showed a decreased likelihood of falls in patients who participated in exercise programs ($p = 0.0008$). Finally, the number of patients who fell at least once was significantly reduced in the intervention group ($p = 0.02$). Physical exercise is an effective treatment to improve balance and reduce fall rates in the elderly.

Language: en

Keywords

systematic review; falls; older people; meta-analysis; balance; physical exercise

Effects of an intervention to reduce fear of falling and increase physical activity during hip and pelvic fracture rehabilitation

Pfeiffer K, Kampe K, Klenk J, Rapp K, Kohler M, Albrecht D, Büchele G, Hautzinger M, Taraldsen K, Becker C. Age Ageing 2020; 49(5): 771-778.

DOI 10.1093/ageing/afaa050 **PMID** 32832985

Abstract

BACKGROUND: fear of falling and reduced fall-related self-efficacy are frequent consequences of falls and associated with poorer rehabilitation outcomes. To address these psychological consequences, geriatric inpatient rehabilitation was augmented with a cognitive behavioural intervention ("Step by Step") and evaluated in a RCT.

METHODS: one hundred fifteen hip and pelvic fracture patients (age = 82.5 years, 70% female) admitted to geriatric inpatient rehabilitation were randomly allocated to the intervention or control group. The intervention consisted of eight additional individual sessions during inpatient rehabilitation, one home visit and four telephone calls delivered over 2 months after discharge. Both groups received geriatric inpatient rehabilitation. Primary outcomes were fall-related self-efficacy (short falls efficacy scale-international) and physical activity as measured by daily walking duration (activPAL3™ sensor) after admission to rehabilitation, before discharge and 1-month post-intervention.

RESULTS: in covariance analyses, patients in the intervention group showed a significant improvement in fall-related self-efficacy (P = 0.025, d = -0.42), but no difference in total daily walking duration (P = 0.688, d = 0.07) 1-month post-intervention compared to the control condition. Further significant effects in favour of the intervention group were found in the secondary outcomes "perceived ability to manage falls" (P = 0.031, d = 0.41), "physical performance" (short physical performance battery) (P = 0.002, d = 0.58) and a lower "number of falls" (P = 0.029, d = -0.45).

CONCLUSIONS: the intervention improved psychological and physical performance measures but did not increase daily walking duration. For the inpatient part of the intervention further research on the required minimum intensity needed to be effective is of interest. Duration and components used to improve physical activity after discharge should be reconsidered.

Language: en

Keywords

older people; fear of falling; physical activity; falls efficacy; hip fractures; pelvic fractures

Power training improves bone mineral density and fall risk for a postmenopausal woman with a history of osteoporosis and increased risk of falling: a case report

Aquino M, DiMenna FJ, Petrizzo J, Otto RM, Wygand J. J. Bodyw. Mov. Ther. 2020; 24(3): 44-49.

DOI 10.1016/j.jbmt.2020.02.026 **PMID** 32826007

Abstract

The purpose of this case study was to assess the degree to which a 12-month power-based resistance-training program improved bone mineral density (BMD) and fall risk for a 70-year-old postmenopausal woman with osteoporosis and increased risk of falling. After an eight-week strength-development phase, we had the patient perform 44 weeks of resistance training with maximal force mobilization by instructing her to complete as many repetitions as possible during each 60-s set. We used dual-energy X-ray absorptiometry (DEXA) to assess BMD and Dynamic Gait Index (DGI) to assess fall risk before and after the intervention. Post compared to pre-training testing indicated an increase in BMD in the lumbar spine (24%) and femoral neck (29%) resulting in changes in T-score of 0.7 and 0.4 SD, respectively. Testing also revealed a seven-point change in DGI which improved her status to "safe ambulator." After a 12-month period of power training, BMD was increased and fall risk was reduced for a postmenopausal woman with osteoporosis and increased risk of falling.

Language: en

Keywords

Fall risk; Physical therapy; Osteoporosis; Postmenopausal; Power resistance training

Tai chi for the prevention of falls among older adults: a critical analysis of the evidence

Nyman SR. J. Aging Phys. Act. 2020; ePub(ePub): ePub.

DOI 10.1123/japa.2020-0155 **PMID** 32839351

Abstract

Despite interest as to the benefits of Tai Chi, there remains a controversy over its effectiveness as an exercise intervention for preventing falls among older adults. This review synthesizes the evidence base with a focus on meta-analyses and randomized controlled trials with community-dwelling older adults. It provides a critical lens on the evidence and quality of the trials. High-quality evidence suggests that Tai Chi is an effective intervention for preventing falls in community settings; however, there is unclear evidence for long-term care facilities and an absence of evidence for hospital settings. When compared directly with other exercise interventions, Tai Chi may offer a superior strategy for reducing falls through its benefits on cognitive functioning. Using data from the current Cochrane review, a new synthesis is presented suggesting that 71-81% of community-dwelling older adults are adherent to class-based Tai Chi interventions. The practical opportunities and challenges for practitioners are discussed.

Language: en

Keywords

meta-analysis; exercise; review; randomized controlled trial; accidental fall

Can treadmill slip-perturbation training reduce longer-term fall risk upon overground slip exposure?

Lee A, Bhatt T, Liu X, Wang Y, Wang S, Pai YCC. J. Appl. Biomech. 2020; ePub(ePub): ePub.

DOI 10.1123/jab.2019-0211 **PMID** 32843581

Abstract

The purpose was to examine and compare the longer-term generalization between 2 different practice dosages for a single-session treadmill slip-perturbation training when reexposed to an overground slip 6 months later. A total of 45 older adults were conveniently assigned to either 24 or 40 slip-like treadmill perturbation trials or a third control group. Overground slips were given immediately after initial training, and at 6 months after initial training in order to examine immediate and longer-term effects. The performance (center of mass stability and vertical limb support) and fall percentage from the laboratory-induced overground slips (at initial posttraining and at 6 mo) were measured and compared between groups. Both treadmill slip-perturbation groups showed immediate generalization at the initial posttraining test and longer-term generalization at the 6-month retest. The higher-practice-dosage group performed significantly better than the control group ($P < .05$), with no difference between the lower-practice-dosage and the control groups at the 6-month retest ($P > .05$). A single session of treadmill slip-perturbation training showed a positive effect for reducing older adults' fall risk for laboratory-induced overground slips. A higher-practice dosage of treadmill slip perturbations could be more beneficial for further reducing fall risk.

Language: en

Keywords

older adults; dosage; longer-term generalization; stability

Scale-up of the Stepping On fall prevention program among older adults in NSW: program reach and fall-related health service use

Paul SS, Li Q, Harvey L, Carroll T, Priddis A, Tiedemann A, Clemson L, Lord SR, Close JC, Sherrington C. Health Promot. J. Austr. 2020; ePub(ePub): ePub.

DOI 10.1002/hpja.413 **PMID** 32860442

Abstract

ISSUE ADDRESSED: We describe the reach of the scale-up of Stepping On, a fall prevention program targeting community-dwellers aged ≥65 years in NSW, along with fall-related ambulance service use and fall-related hospitalisations after scale-up.

METHODS: Data on program provision were received from Local Health Districts. Routinely-collected fall-related ambulance usage and hospital admissions in NSW residents aged ≥65 years between 2009 and 2015 were compared within Statistical Local Areas prior to and following implementation of Stepping On using multilevel models.

RESULTS: Between 2009-2014 the program was delivered in 1,077 sites to 10,096 older adults. Rates of fall-related ambulance use and hospital admissions per 100-person-years were 1-2 in people aged 66-74, 4-5 in people aged 75-84 and 12-13 in people aged ≥85. These rates increased over time (p<.001). The interaction between time and program delivery was not significant for fall-related ambulance use or hospital admissions. The time-related increase in fall-related ambulance usage in people aged 75-84 years may have been moderated by the Stepping On program (rate ratio 0.97, 95% CI 0.93-1.00, p=.045).

CONCLUSIONS: There was no indication of a reduced rate of fall-related ambulance use or hospital admissions across the entire sample. Ambulance call-outs for falls in people aged 75-84 years may have reduced following program participation. SO WHAT?: Program scale-ups need to reach a large proportion of the target population with a focus on those groups contributing most to fall-related health service utilisation. Linking individual participants' health data as part of large-scale evaluations may provide better insights into program outcomes.

Language: en

Keywords

injury; older people; program evaluation; community based intervention

Does yoga reduce the risk of falls in older people?

Tew GA, Ward L, Hewitt C, Tiedemann A. BMJ 2020; 370: m3246.

DOI 10.1136/bmj.m3246 **PMID** 32883704

Abstract

Nearly a third of people aged over 65 years and over half of people older than 80 have a fall at least once a year. Falls and fall related injuries can be life changing and may result in chronic disability, admission to assisted living, or death. A fall can also precipitate a fear of falling, which may lead to restriction of activity and hence physical deconditioning. This in turn increases the risk of future falls.

Clinical guidelines from several countries recommend multifactorial interventions for preventing falls in older people, with exercise as a key component. A recent Cochrane review (108 randomised controlled trials, 23 407 participants) concluded there is strong evidence that well designed exercise programmes reduce the number of falls by about a quarter among older people living in the community. Such programmes also reduce the number of people experiencing one or more falls. Exercise that mainly involved balance and functional training reduced falls.

Yoga is a mind-body practice that typically involves a combination of physical postures, breathing exercises, and concentration/meditation. Yoga has become a popular means of promoting physical and mental wellbeing and is shown to improve health related quality of life in older people. Evidence from observational studies suggests it is an acceptable and attractive form of exercise …

Language: en

Effectiveness of exercise intervention on fall-related fractures in older adults: a systematic review and meta-analysis of randomized controlled trials

Wang Q, Jiang X, Shen Y, Yao P, Chen J, Zhou Y, Gu Y, Qian Z, Cao X. BMC Geriatr. 2020; 20(1): e322.

DOI 10.1186/s12877-020-01721-6 **PMID** 32887571

Abstract

BACKGROUND: Exercise intervention can significantly improve physical function and bone strength; however, the effect of exercise on fall-related fractures in older adults remains controversial. This study aimed to assess the effectiveness of exercise intervention on fall-related fractures in older adults by conducting a meta-analysis of randomized controlled trials (RCTs).

METHODS: PubMed, EMBASE, and Cochrane databases were systematically searched for RCTs through November 24, 2019 to investigate the effectiveness of exercise intervention on fall-related fractures in older adults. Pooled relative risk (RR) with 95% confidence interval (CI) was calculated using the random-effects model. Sensitivity, subgroup, and publication bias analyses were also conducted.

RESULTS: A total of 7704 older adults and 428 fall-related fracture events from 20 RCTs were selected for the final meta-analysis. The follow-up duration across included trials ranged from 6.0 months to 7.0 years. The pooled RR suggested that exercise intervention was associated with a reduced fall-related fracture risk in older adults (RR: 0.74; 95% CI: 0.59-0.92; P = 0.007; I2 = 12.6%). The pooled conclusion was robust and not affected by any individual trial. Subgroup analysis revealed that the significant effect of exercise intervention on fall-related fractures was mainly detected when the study reported results from both male and female subjects, when it did not report the baseline body mass index, when individuals received both home- and center-based interventions, when the follow-up duration was > 1.0 year, and when it was a high-quality study.

CONCLUSIONS: Regular exercise intervention could prevent fall-related fractures in older adults. Further large-scale RCTs should be conducted to assess the effectiveness of different exercise programs on fall-related fractures at various sites.

Language: en

Keywords

Exercise; Meta-analysis; Older adults; Fracture risk

Recipient and instructor perspectives of an adapted exercise-based fall prevention programme for adults aged 50+ years with vision impairment: a qualitative study nested within a randomised controlled trial

Dillon L, Clemson L, Nguyen H, Jakobsen KB, Martin J, Tinsley F, Keay L. BMJ Open 2020; 10(9): e038386.

DOI 10.1136/bmjopen-2020-038386 **PMID** 32883736

Abstract

OBJECTIVE: Older adults with vision impairment currently have no access to tailored fall prevention programmes. Therefore, the purpose of this study, nested within an ongoing randomised controlled trial (RCT), is to document the adaptation of an existing fall prevention programme and investigate the perspectives of instructors involved in delivery and the older adults with vision impairment receiving the programme (recipients).

DESIGN: We documented programme adaptations and training requirements, and conducted semistructured, individual interviews with both the instructors and the recipients of the programme from 2017 to 2019. The content of each interview was analysed using behaviour change theory through deductive qualitative analysis.

SETTING: New South Wales and Australian Capital Territory, Australia.

PARTICIPANTS: The 11 trained instructors interviewed were employees of a vision rehabilitation organisation and had delivered at least one programme session as part of the RCT. The 154 recipients interviewed were community-dwelling adults aged ≥50 years with vision impairment and no diagnosis of dementia, and had completed their participation in the programme as part of the intervention group of the RCT.

RESULTS: Six key themes were identified relating to recipient (delivery aptitude, social norms, habit formation) and instructor (individualised adaptation, complimentary to scope of practice, challenges to delivery) perspectives. With initial training, instructors required minimal ongoing support to deliver the programme and made dynamic adaptations to suit the individual circumstances of each recipient, but cited challenges delivering the number of programme activities required. Recipient perspectives varied; however, most appreciated the delivery of the programme by instructors who understood the impact of vision impairment.

CONCLUSIONS AND IMPLICATIONS: This novel qualitative study demonstrates that the adapted programme, delivered by instructors, who already have expertise delivering individualised programmes to older people with vision impairment, may fill the gap for a fall prevention programme in this population.

TRIAL REGISTRATION NUMBER: ACTRN12616001186448.

Language: en

Keywords
epidemiology; preventive medicine; qualitative research; public health; geriatric medicine; ophthalmology

The effect of Tai Chi exercise on postural time-to-contact in manual fitting task among older adults

Pan J, Liu C, Li L, Zhang S. Gait Posture 2020; 82: 61-67.

DOI 10.1016/j.gaitpost.2020.08.124 **PMID** 32896796

Abstract

BACKGROUND: A fall would impact elderly population's quality of life, which associate with diminished physical and psychological function, and can even be life-threatening. Tai Chi has been used to improve age-related postural instability in locomotion. However, it does not fully explain the mechanism of a lower risk of falling among the Tai Chi population compared to other healthy older adults.

RESEARCH QUESTION: The maintenance of postural stability is more complicated than minimizing postural movements. Postural time to contact is an important temporal measure of postural stability under fitting tasks, which might further clarify the benefits of long term Tai Chi exercise.

METHODS: Participants were required to fit a block (90 × 90 mm) through two different openings (130 × 130 mm and 100 × 100 mm) at two different distances (arm's length or 130 % of arm's length). Kistler forceplate and Vicon system were used to collect center of pressure and kinematic data, respectively. Postural time to contact was used to assess instantaneous perturbation for postural system.

RESULTS: Tai Chi group exhibited significant longer postural time to contact in quiet standing and shorter postural time to contact in fitting tasks, expecting for close-small condition, compared to the brisk walking and sedentary groups ($p < .05$). In addition, both large and small opening condition, Tai Chi group showed a shorter postural time to contact than brisk walking and sedentary groups ($p < .0001$).

SIGNIFICANCE: Long term Tai Chi exercise would promote the regulation of posture and decrease the postural constrain to increase the overall stability when performing fitting tasks. Therefore, Tai Chi exercise can be considered as a feasible method to enhance postural control and stability in older adult.

Language: en

Keywords

Tai Chi; Fitting task; Postural stability; Time to contact