

Safety Literature 13th October 2019

Effect of community-based group exercise interventions on standing balance and strength in independent living older adults

Alqahtani BA, Sparto PJ, Whitney SL, Greenspan SL, Perera S, VanSwearingen J, Brach JS. *J. Geriatr. Phys. Ther.* 2019; 42(4): E7-E15.

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Abstract

BACKGROUND AND PURPOSE: Many interventions to improve mobility in older adults often include exercises to address underlying impairments such as strength deficits. Task-oriented exercise interventions that focus more on walking and stepping tasks that may be encountered in the community have been considered for improving mobility in older adults. The main purpose was to examine the effect of task-oriented and impairment-based group exercise interventions on standing balance and lower extremity muscle strength.

METHODS: This is an ancillary study to a cluster-randomized clinical trial. Participants included 107 older adults. Participants were randomized by facility to 1 of 2 different interventions, or a waitlist control group. The On the Move (OTM) task-oriented intervention consisted of warm-up, timing and coordination (stepping and walking patterns), strengthening, and stretching exercises. The standard of care impairment-based exercise intervention (STD) consisted of warm-up, strength, endurance, and stretching exercises. Postural sway and balance measures were recorded before and after the 12-week interventions. An accelerometer was used to collect postural sway for 6 different standing balance conditions. A portable load cell was used to assess lower extremity muscle strength for 3 muscle groups.

RESULTS AND DISCUSSION: The OTM group had a significant reduction in sway acceleration during most of the balance conditions over the 12-week period, whereas the STD had smaller, nonsignificant reductions. Both exercise interventions had a significant reduction in sway compared with the waitlist control group in at least 1 balance condition. The OTM and STD groups had significant increases in hip abduction strength during the intervention and the STD group also had an increase in knee extension strength. The waitlist group had a significant reduction in strength in all muscle groups during the 12-week period. Strength changes in both exercise groups were significantly different from the waitlist group but not from each other.

CONCLUSION: Both exercise intervention groups had an improvement in standing balance and lower extremity strength when compared with a waitlist group that did not receive exercise. Although the exercise groups did not significantly differ from each other, the OTM exercise group showed a trend toward improvement in static standing balance conditions.

Evidence synthesis based on non-randomised studies-a critical review of studies leading to conclusions on fall risk properties of loop diuretics/beta-blockers

Wallerstedt SM, Hoffmann M. Eur. J. Clin. Pharmacol. 2019; ePub(ePub): ePub.

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31599346

Abstract

PURPOSE: To describe methodological and reporting issues in non-randomised comparative drug safety studies pooled in meta-analyses, with focus on confounding by indication.

METHODS: All studies included in statistically significant meta-analyses in a recent publication investigating fall risk properties of cardiovascular drugs were reviewed. Study characteristics were extracted and assessed.

RESULTS: Nine studies, including between 498 and 321,995 individuals, contributed data to the significant meta-analyses in which loop diuretics and beta-blockers were associated with falls, five published in 2015. Five individual studies reported a statistically significant association. In the five cohort studies, characteristics of exposed vs unexposed individuals were either not reported ($n = 3$) or differed substantially regarding morbidity ($n = 2$). Drug treatment was determined at baseline, and data on falls were collected for up to 2 years thereafter. Out of the four case-control studies, the cases and controls in only one study were matched for morbidity. Morbidity characteristics of fallers compared with non-fallers were either not reported ($n = 2$) or they differed ($n = 1$) or were reported according to the matched-for diseases ($n = 1$). Confounding by indication was explicitly discussed in two studies. None of the abstract conclusions considered causality issues or the possibility of confounding by indication.

CONCLUSIONS: Confounding by indication is a major issue in non-randomised comparative drug safety studies, a problem which may be concealed in meta-analyses. To enhance such research, compared groups need to be balanced regarding relevant factors including morbidities and characteristics adequately reported. Confounding by indication needs to be explicitly discussed and highlighted in the abstract conclusion.

Language: en

Keywords Cardiovascular drugs; Confounding by indication; Drug safety; Evidence-based medicine; Falls; Pharmacoepidemiology

Falls when standing, falls when walking: different mechanisms, different outcomes in Parkinson disease

Lieberman A, Deep A, Olson MC, Smith Hussain V, Frames CW, McCauley M, Lockhart TE. *Cureus* 2019; 11(8): e5329.

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31598436

Abstract

Our retrospective study of falls and resultant trauma in consecutive Parkinson disease (PD) patients seen in one year at the Muhammad Ali Parkinson Clinic found that multiple-fallers could be divided into patients who fell mainly when walking or those who fell mainly when standing. Patients who fell when walking were more likely to visit an emergency room or be admitted to a hospital. Of 455 consecutive patients who were evaluated over a one-year period, 51 were excluded because they had atypical Parkinson disorders, had multiple risk factors for falling, or were demented. Unified Parkinson Disease Rating Scales and Zeno Walkway results were compared among non-fallers, single-fallers, and multiple-fallers. Among multiple-fallers, comparisons were made between patients who fell mainly when standing and those who fell mainly when walking. Most patients (197, 49%) did not fall, 142 (35%) fell once, and 65 (16%) fell more than once. Multiple-fallers differed significantly from single-fallers and non-fallers: they had PD significantly longer ($p < 0.001$), were more severely affected ($p < 0.001$), and took shorter steps ($p < 0.001$). Of 65 multiple-fallers, 26 (40%) fell mainly when standing, 28 (43%) fell mainly when walking, and 11 (17%) fell equally often when standing or walking. Falls when walking resulted in more severe injuries. Patients who fell mainly when standing did not realize they could fall when standing; engaged in inappropriate weight shifting, bending, reaching, and multitasking; and failed to use their assistive devices. Such patients would benefit from being counseled about falling when standing. Patients who fell mainly when walking were aware they could fall, despite using an assisted device, and were more likely to have freezing of gait (FOG). They were more likely to sustain a severe injury, and were more likely to be admitted to an emergency room or hospital. Such patients would benefit from reducing, if possible, FOG.

Language: en

Keywords falls when standing; falls when walking; locomotion; parkinson disease; postural stability



Gender differences in function, physical activity, falls, medication use, and life satisfaction among residents in assisted living settings

Resnick B, Boltz M, Galik E, Holmes S, Fix S, Zhu S. Res. Gerontol. Nurs. 2019; ePub(ePub): ePub.

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31584687

Abstract

The purpose of the current study was to test for gender differences among residents living in assisted living settings. This was a secondary data analysis using data from the first 64 facilities participating in the ongoing Function Focused Care for Assisted Living study using the Evidence Integration Triangle (FFC-AL-EIT). A total of 593 residents were recruited. Differences by gender with regard to function, physical activity, falls, total number of medications, and satisfaction with assisted living were tested using multivariate analysis of variance. There were 166 (28%) men and 427 (72%) women with a mean age of 88 (SD = 7.5 years). Participants had five (SD = 2) comorbidities and took on average 6.88 medications (SD = 3.47). Participants had moderate functional impairment with a mean of 64.13 (SD = 19.09) on the Barthel Index and engaged in 43.8 (SD = 76.12) minutes daily of moderate level physical activity. Women reported higher satisfaction with activities (4.32 [SD = 1.14]) than men (3.85 [SD = 1.51]), and women received more medications than men (7.09 [SD = 3.51] vs. 6.34 [SD = 3.31]). Current study findings suggest that deprescribing may be particularly important for women versus men and focusing on expanding activity options to include those preferred by men should be considered in assisted living settings. [Research in Gerontological Nursing, xx(x), xx-xx].

Language: en

Joint movements associated with minimum toe clearance variability in older adults during level overground walking

Carter SC, Batavia MZ, Gutierrez GM, Capezuti EA. *Gait Posture* 2019; 75: 14-21.

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31586752

Abstract

BACKGROUND: Approximately one-third of falls are caused by the swing foot contacting an object or the ground, resulting in a trip. The increased incidence of trip-related falls among older adults may be explained by greater within-person minimum toe clearance (MTC) variability. **RESEARCH QUESTION:** Will kinematic variability at any of the 6 major joints in the lower limbs, individually or in combination, be associated with MTC variability?

METHODS: This cross-sectional study investigated whether single or multiple joint movements best explained MTC variability in older adults. Twenty healthy older adults (7 males, 13 females; mean age = 71.3 ± 7.2 years) were recruited. Participants were fitted with a modified Cleveland Clinic marker set and walked for 50 trials at self-selected speeds over a 7-meter walkway (with a rest at 25 trials) while 6 infrared cameras recorded kinematics.

RESULTS: Seven joint movements were evaluated, and swing hip flexion-extension variability was the only joint movement significantly associated with MTC variability ($r = 0.577$, $p = 0.008$) and explained 29.6% (adjusted R²) of the variance of MTC variability in older adults ($F(1, 18) = 8.897$, $p = 0.008$). **SIGNIFICANCE:** Identifying the joint movement/s associated with inconsistencies in toe clearance will improve our understanding of endpoint control in older adults and may lead to the development of effective trip prevention strategies.

Language: en

Keywords

Falls; Foot clearance; Minimum toe clearance; Tripping

Ten years change in post-fracture care for hip fracture patients

Shimodan S, Sato D, Takahashi K, Nakamura Y, Hyakkan R, Watanabe T, Hishimura R, Ota M, Shimizu H, Hojo Y, Hasegawa Y, Chubachi T, Yasui K, Tsujimoto T, Tsukuda Y, Asano T, Takahashi D, Takahata M, Iwasaki N, Shimizu T. *J. Bone Miner. Metab.* 2019; ePub(ePub): ePub.

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Abstract

INTRODUCTION: This multicenter, retrospective study aimed to clarify the changes in postoperative care provided by orthopaedic surgeons after hip fractures and clarify the incidence of secondary fractures requiring surgery.

MATERIALS AND METHODS: Subjects were patients with hip fracture treated surgically in seven hospitals during the 10-year period from January 2008 to December 2017. Data on patient demographics, comorbidities, preoperative and postoperative osteoporosis treatments, and secondary fractures were collected from the medical records.

RESULTS: In total, 4764 new hip fractures in 982 men and 3782 women (mean age: 81.3 ± 10.0 years) were identified. Approximately 10% of patients had a history of osteoporosis drug treatment and 35% of patients received postoperative drug treatment. The proportion of patients receiving postoperative drug therapy increased by approximately 10% between 2009 and 2010, 10% between 2010 and 2011, and 10% between 2011 and 2013. Although the rate of secondary fractures during the entire period and within 3 years decreased from 2011, the rate of secondary fracture within 1 year remained at around 2% every year.

CONCLUSIONS: The approval of new osteoporosis drugs and the establishment of osteoporosis liaison services have had a positive effect on the use of postoperative drug therapy in the orthopedic field. Our finding that the rate of secondary fracture within 1 year of the initial fracture remained around 2% every year, despite improvements in postoperative drug therapy, suggests that both rehabilitation for preventing falls and early postoperative drug therapy are essential to prevent secondary fractures.

Language: en

Keywords

Anti-osteoporosis therapy; Hip fracture; Osteoporosis liaison service; Secondary fracture



Bone mass and strength and fall-related fractures in older age

Uusi-Rasi K, Karinkanta S, Tokola K, Kannus P, Sievänen H. J. Osteoporos. 2019; 2019: e5134690.

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31583071

Abstract

INTRODUCTION: Low bone mineral density is a risk factor for fractures. The aim of this follow-up study was to assess the association of various bone properties with fall-related fractures.

MATERIALS AND METHODS: 187 healthy women aged 55 to 83 years at baseline who were either physically active or inactive were followed for 20 years. They were divided into two groups by whether or not they sustained fall-related fractures: fracture group (F) and nonfracture group (NF). At baseline, several bone properties were measured with DXA and pQCT, and their physical performance was also assessed.

RESULTS: During the follow-up, 120 women had no fall-related fractures, while 67 (38%) sustained at least one fall with fracture. NF group had about 4 to 11% greater BMD at the femoral neck and distal radius; the mean differences (95% CI) were 4.5 (0.3 to 8.6) % and 11.1 (6.3 to 16.1) %, respectively. NF group also had stronger bone structure at the tibia, the mean difference in BMC at the distal tibia was 6.0 (2.2 to 9.7) %, and at the tibial shaft 3.6 (0.4 to 6.8) %. However, there was no mean difference in physical performance.

CONCLUSIONS: Low bone properties contribute to the risk of fracture if a person falls. Therefore, in the prevention of fragility fractures, it is essential to focus on improving bone mass, density, and strength during the lifetime. Reduction of falls by improving physical performance, balance, mobility, and muscle power is equally important.

Language: en

Older adults sacrifice response speed to preserve multisensory integration performance

Jones SA, Beierholm U, Meijer D, Noppeney U. *Neurobiol. Aging* 2019; 84: 148-157.

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31586863

Abstract

Aging has been shown to impact multisensory perception, but the underlying computational mechanisms are unclear. For effective interactions with the environment, observers should integrate signals that share a common source, weighted by their reliabilities, and segregate those from separate sources. Observers are thought to accumulate evidence about the world's causal structure over time until a decisional threshold is reached. Combining psychophysics and Bayesian modeling, we investigated how aging affects audiovisual perception of spatial signals. Older and younger adults were comparable in their final localization and common-source judgment responses under both speeded and unspeeded conditions, but were disproportionately slower for audiovisually incongruent trials. Bayesian modeling showed that aging did not affect the ability to arbitrate between integration and segregation under either unspeeded or speeded conditions. However, modeling the within-trial dynamics of evidence accumulation under speeded conditions revealed that older observers accumulate noisier auditory representations for longer, set higher decisional thresholds, and have impaired motor speed. Older observers preserve audiovisual localization performance, despite noisier sensory representations, by sacrificing response speed.

Language: en

Keywords

Aging; Bayesian causal inference; Bayesian model; Decision making; Evidence accumulation; Multisensory integration; Multisensory perception; Ventriloquist effect

Rapid cognitive decline and recurrent falls in a 71 year-old man due to cerebral amyloidangiopathy-related inflammation (CAA-RI)

Dörr S, Schickel R, Lucke-Paulig L, Schöntag S, Lobmann R. *Geriatrics (Basel)* 2019; 4(4): e4040056.

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31581713

Abstract

Cognitive decline and falls in the elderly are common and are often accepted as natural and inevitable by relatives and health care professionals, but frequently there are specific and treatable diseases that should be revealed. In our case, cerebral amyloid angiopathy-related inflammation (CAA-RI) was causative for neuro-psychiatric symptoms and worsening of gait in a 71 year-old man with recurrent falls and decline of gait and cognition. Cerebral amyloidangiopathy (CAA) is an important cause of cerebrovascular disorders in the elderly, characterized by leukoencephalopathy combined with lobar or small cortical hemorrhage due to amyloid deposition in cortical and leptomeningeal vessels. In several conditions, amyloid deposition can provoke inflammation or edema that lead to -normally reversible- encephalopathy. CAA-RI is then characterized by subacute neurobehavioral symptoms, headache, seizures or stroke-like signs. The first therapeutic option after confirming the diagnosis is treatment with glucocorticoids. Despite treatment with prednisolone, our patient could not regain his unrestricted mobility and self-help competence. Our report aims to sharpen awareness for CAA and its inflammatory form (CAA-RI) in healthcare professionals involved in medical care of the elderly and provide a short summary of this disease.

Language: en

Keywords

ARIA; Alzheimer's disease; CAA; CAA-RI; amyloid-related imaging abnormalities; cerebral amyloid angiopathy; cerebral amyloid angiopathy-related inflammation; fall in elderly; intracerebral hemorrhage; microbleeding; superficial siderosis

The effect of therapeutic exercises on balance, quality of life and pain in patients who were receiving neurotoxic chemotherapy

Bahar-Ozdemir Y, Akyuz G, Kalkandelen M, Yumuk F. Am. J. Phys. Med. Rehabil. 2019; ePub(ePub): ePub.

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31592877

Abstract

OBJECTIVE: To evaluate the effect of lower extremity strengthening and balance exercises on balance, quality of life (QoL) and neuropathic pain (NP) of the cancer patients receiving neurotoxic chemotherapy (N-CTX).

DESIGN: Patients who were planning to receive N-CTX agents were included in the first group. They were trained before the N-CTX sessions with the 10-week home-based exercise program including lower extremity strengthening and balance exercises. The second group of patients who had received the 3 cycle of N-CTX had no exercise program. Both groups were evaluated after the 3 cycle. Neurocom Balance Master and Berg Balance Scale (BBS) were used to evaluate balance. The NP was questioned by PainDETECT questionnaire (PD-Q) and the QoL was assessed with EORTC QLQ-C30.

RESULTS: Sixty patients were admitted to this study. Twenty-four patients were in the exercise group (F=14, M=10) and 36 patients were in the control group (F=17, M=19). Socio-demographic and clinical data of both groups were similar. BBS ($p=0.005$), EORTC QLQ-C30 global QoL, physical function and emotional status were higher, symptom scores and PD-Q score were lower in the exercise group ($p<0.05$). Balance tests were different between the groups.

CONCLUSION: Strengthening and balance exercises have a valuable effect on balance, QoL and NP in patients receiving N-CTX.

Language: en