

**Safety Literature 24<sup>th</sup> November 2019**

**Agreement and predictive power of six fall risk assessment methods in community-dwelling older adults**

Menezes M, de Mello Meziat-Filho NA, Araújo CS, Lemos T, Ferreira AS. Arch. Gerontol. Geriatr. 2019; 87: e103975.

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31739111

**Abstract**

A large number of fall risk assessment methods are available with a variety of performances for screening the risk of falling in older adults, but their agreement for assessing the risk of falling remains unknown. This observational prospective cohort study describes the agreement and predictive power of methods to classify the risk of falling in older adults using prospective data and published cut-off values. Fifty-two participants aged 74 years (interquartile range 69-80) were assessed using the Berg Balance Scale, polypharmacy, Falls Risk Assessment Score, Fall Risk Assessment Tool, Fall Efficiency Scale, and Posturography. Nine participants (17 %) reported at least one fall after six months. Cochran's test showed different proportions of participants classified as at high risk of falling among all methods ( $Q = 69.560$ ,  $p < 0.001$ ). A slightly better-than-chance agreement was estimated between all FRA methods (Light's  $\kappa = 0.074$ , 95%CI [0.021; 0.142]). We found both global and pairwise agreement levels that question the agreement among fall risk assessment methods for screening community-dwelling older adults.

Language: en

**Keywords**

Accidental falls; Aging; Diagnostic screening programs; Health services for the aged; Rehabilitation

## **Characteristics of falls and recurrent falls in residents of an aging in place community: A case-control study**

Anderson LK, Lane K. Appl. Nurs. Res. 2019; ePub(ePub): ePub.

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### **DOI**

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### **PMID**

31734004

### **Abstract**

**BACKGROUND:** Falls and fall-related injuries remain an ongoing and serious health problem in older adults. Many clinical and environmental factors have been implicated in falls and recurrent falls, including sleep disturbances, sensory deficits, balance problems, incontinence, comorbid conditions, and certain categories of medications. We undertook this study to determine if there was an association between these factors and falls or recurrent falls in older adult residents of an aging in place community.

**METHODS:** Our retrospective case-control study compared residents who did and did not fall in an aging in place community, as well as those who experienced recurrent versus single falls in a single year.

**RESULTS:** A total of 50 residents met the criteria for inclusion in this study, with 30 participants (60%) having experienced one or more falls during the observation period. Of the 30 participants who fell, 21 (70%) experienced more than one fall in a single year. Variables associated with falls included marital status and bowel incontinence; variables associated with recurrent falls included self-reported sleep difficulty, balance with sitting to standing and surface-to-surface transfer, use of a walker, and use of antidepressant medications.

**DISCUSSION:** Our study supports the existing nursing research that falls, and recurrent falls are the result of multiple, interrelated factors. Further research is needed into preventative measures for both falls and recurrent falls, particularly in the context of aging in place.

Language: en

### **Keywords**

Accidental falls; Aging in place; Older adults

## **Do orthopaedic and neurosciences inpatients who are at risk of falls have best practice fall prevention strategies implemented during their acute inpatient hospitalization?**

Tse C, Esler V, Hewitt L, Davidson E. *Australas. J. Ageing* 2019; ePub(ePub): ePub.

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### **DOI**

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### **PMID**

31749308

### **Abstract**

**OBJECTIVE:** To determine whether inpatients identified as being at high risk for falls received fall prevention interventions as recommended in the Best Practice Guidelines for Australian Hospitals.

**METHODS:** This cross-sectional study examined medical record data from a convenience sample of inpatients admitted to orthopaedic and neurosciences wards (N = 100). Data were compared to the fall prevention recommendations. Percentages were used to describe compliance and independent samples t-tests to assess difference in adherence.

**RESULTS:** Data revealed that 45% and 62% of recommendations were implemented amongst inpatients on orthopaedic and neurosciences ward, respectively (P < 0.001). There was a significant positive correlation between orthopaedic inpatients at higher risk of falls and those with a greater length of stay [ $r(39) = .46$ , P = 0.003]. When analysed together, patients who were admitted following a fall had a lower percentage of fall prevention strategies implemented (P < 0.001).

**CONCLUSION:** Implementation of fall prevention strategies is essential to target in the inpatient setting.

Language: en

### **Keywords**

accident prevention; falls; health planning; hospital; inpatient; neurosciences; orthopedics; recommendation

## Does obesity increase the risk and severity of falls in people aged 60 years and older? A systematic review and meta-analysis of observational studies

G R Neri S, Oliveira JS, B Dario A, M Lima R, Tiedemann A. J. Gerontol. A Biol. Sci. Med. Sci. 2019; ePub(ePub): ePub.

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### Abstract

**BACKGROUND:** Recent investigations suggest that obesity may be associated with an increased risk of falls; however, this theory has yet to be definitively confirmed. This systematic review and meta-analysis examined the strength of the association between obesity and falls, multiple falls, fall-related injuries, and fall-related fractures among older adults.

**METHODS:** MEDLINE, Embase, CINAHL, PsycINFO, SPORTDiscus, LILACS and Web of Science databases were searched to identify observational studies that assessed the association between obesity and fall-related outcomes in participants aged 60 years and older. Two independent reviewers performed data extraction and quality assessment. Relative risks (RR) and 95% confidence intervals (CI) were pooled using random effect meta-analyses.

**RESULTS:** Thirty-one studies including a total of 1,758,694 participants were selected from 7,815 references. Pooled estimates showed that obese older adults have an increased risk of falls compared to non-obese counterparts (24 studies; RR:1.16; 95% CI: 1.07-1.26; I<sup>2</sup>:90%). Obesity was also associated with an increased risk of multiple falls (four studies; RR:1.18; 95% CI: 1.08-1.29; I<sup>2</sup>:0%). There was no evidence, however, of an association between obesity and fall-related injuries (seven studies; RR:1.04; 95% CI: 0.92-1.18; I<sup>2</sup>:65%). Fall-related fractures were reported in only one study, which demonstrated a lower risk of hip fracture with obesity (Odds Ratio: 0.65; 95% CI:0.63-0.68).

**CONCLUSIONS:** Obesity increases the risk of falls and multiple falls in people aged 60 years and older; however, there is insufficient evidence of an association with fall-related injuries or fractures. Prevention and treatment of obesity may play a role in preventing falls in older age.

Language: en

### Keywords

accidental falls; adiposity; aging; injuries; risk factors

## **Improvements in balance reaction impairments following reactive balance training in individuals with sub-acute stroke: a prospective cohort study with historical control**

Schinkel-Ivy A, Huntley AH, Danells CJ, Inness EL, Mansfield A. *Top. Stroke Rehabil.* 2019; ePub(ePub): ePub.

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### **Abstract**

**Background:** Reactive balance training (RBT) has been previously found to reduce fall risk in individuals with sub-acute stroke; however, our understanding of the effects of RBT on specific balance impairments is lacking. **Objective:** To quantify changes in common balance reaction impairments in individuals with sub-acute stroke resulting from RBT, relative to traditional balance training, using a prospective cohort study design with a historical control group. **Methods:** Individuals with sub-acute stroke completed either RBT or traditional balance training as part of their routine care during physiotherapy in inpatient rehabilitation. Reactive balance control was assessed using lean-and-release perturbations pre-intervention, post-intervention, and 6-months post-intervention (follow-up). Individuals with impaired balance reactions (delayed foot-off times, slide steps, and/or a preference for stepping with the preferred limb) at the pre-intervention assessment were identified using video and force plate data. Outcome measures (foot-off times, frequency of trials with slide steps, and stepping with the preferred limb) from the RBT participants with impaired reactions were compared for each of the three assessments to the mean values for the participants with impaired reactions in the historical control group. **Results:** Improvements were observed in all outcome measures for the RBT participants between pre-intervention and post-intervention, and/or between post-intervention and follow-up. These improvements were generally equivalent to, if not better than, the improvements demonstrated by the historical control group. **Conclusions:** Findings further support the use of RBT for post-stroke inpatient rehabilitation, and provide insight into specific balance reaction impairments that are improved by RBT.

Language: en

### **Keywords**

Stroke; lean-and-release; reactive balance control; reactive balance training; reactive stepping



## **Lower-limb factors associated with balance and falls in older adults: a systematic review and clinical synthesis**

Neville C, Nguyen H, Ross K, Wingood M, Peterson E, DeWitt J, Moore J, King MJ, Atanelov L, White J, Najafi B. J. Am. Podiatr. Med. Assoc. 2019; ePub(ePub): ePub.

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### **PMID**

31743051

### **Abstract**

**Background:** Despite evidence suggesting that lower-limb related factors may contribute to fall-risk in older adults, lower-limb and footwear influences on fall-risk have not been systematically summarized. This study was undertaken to systematically review the literature related to lower-limb and footwear factors that may increase fall-risk among community-dwelling older adults. To facilitate the transfer of findings to clinical care, the literature was synthesized and used to inform recommendations as well as the development of clinical pathways for each factor found to be an influence on fall risk. **Methods:** PubMed, Embase, PsycINFO, CINAHL, Web of Science, Cochrane Library, and AgeLine were searched for articles pertaining to age-related changes in the lower-limb and their association with fall-risk. To describe the trajectory leading or potentially leading to increased fall-risk, we examined articles that linked age-related changes in the lower-limb, footwear and orthoses to evidence-based fall-risk factors (e.g., balance impairment) or prospectively demonstrated a relationship with falls. **Results:** The systematic review consisted of 81 articles that met the inclusion criteria. Our results reflect a narrative review of the appraised literature for 8 pathways of lower-limb related influences on fall-risk in older adults. Six out of the eight pathways, including range of motion, orthoses, strength, footwear, pain, and deformity support a direct link with fall-risk. The two other pathways, including plantar skin/soft-tissue and sensory-loss, are connected via intermediate factors but lack studies that provide evidence of a direct link. The overall strength of the evidence available varied considerably for the 8 pathways presented. **Conclusions:** Findings provide much needed guidance supporting the identification and management of lower-limb and footwear-related influences on fall risk among older adults. Due to the lack or low quality of the evidence in specific areas, some recommendations should be applied with caution until more robust evidence is available.

Language: en

## Perception of whole-body motion during balance perturbations is impaired in Parkinson's disease and is associated with balance impairment

Bong SM, McKay JL, Factor SA, Ting LH. *Gait Posture* 2019; 76: 44-50.

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### Abstract

**BACKGROUND:** In addition to motor deficits, Parkinson's disease (PD) may cause perceptual impairments. The role of perceptual impairments in sensorimotor function is unclear, and has typically been studied in single-joint motions. **RESEARCH QUESTION:** We hypothesized that perception of whole-body motion is impaired in PD and contributes to balance impairments. We tested (1) whether directional acuity to whole body perturbations during standing was worse in people with PD compared to neurotypical older adults (NOA), and (2) whether balance ability, as assessed by the MiniBESTest, was associated with poor directional acuity in either group.

**METHODS:** Participants were exposed to pairs of support-surface translation perturbations in a two-alternative forced choice testing paradigm developed previously in a young healthy population. The first perturbation of each pair that was to be judged by participants was directly backward, and the second perturbation deviated from the left or right from the backward direction by 1°-44°. Participants reported whether the perturbations in each pair were in the "same" or "different" direction. Judgements from 24 to 67 perturbation pairs were used to calculate directional acuity thresholds corresponding to "just-noticeable differences" in perturbation direction. Linear mixed models determined associations between directional thresholds and clinical variables including MDS-UPDRS-III score, age, and MiniBESTest score.

**RESULTS:** 20 PD (64 ± 7 y, 12 male, ≥12 h since last intake of antiparkinsonian medications) and 12 NOA (64 ± 8, 6 male) were assessed. Directional thresholds were higher (worse) among PD participants (17.6 ± 5.9° vs. 12.8 ± 3.3°,  $P < 0.01$ ). Linear mixed models further showed that higher thresholds were associated with MDS-UPDRS-III score ( $P < 0.01$ ), and were associated with poorer balance ability among PD participants ( $P < 0.01$ ), but not among NOA participants ( $P = 0.40$ ). **SIGNIFICANCE:** Perception of whole-body motion is impaired in PD and may contribute to impaired balance and falls.

Language: en

**Keywords** Balance; Parkinson's disease; Perception; Posture

## **Prevalence and factors associated with psychological distress among older adults admitted to hospitals after fall injuries in Vietnam**

Nguyen LH, Vu HM, Vu GT, Tran TH, Pham KTH, Nguyen BT, Phan HT, Nguyen HN, Tran BX, Latkin CA, Ho CSH, Ho RCM. *Int. J. Environ. Res. Public Health* 2019; 16(22): e16224518.

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### **DOI**

10.3390/ijerph16224518

### **PMID**

31731721

### **Abstract**

Although psychological distress is one of the major health issues among aging populations, little is known about how this challenge affects older patients after falls. A cross-sectional study was conducted in Thai Binh province, Vietnam, to explore the prevalence of psychological distress and associated factors among 405 older patients after falls. The 6-item Kessler Psychological Distress Scale (K6) was used to measure psychological distress. Socio-demographic and clinical characteristics were collected using a structured questionnaire. Multivariate Tobit and Logistic regressions were used to determine factors associated with psychological distress. The prevalence of psychological distress among participants was 26.2%. Patients who were alone or older had a higher likelihood of psychological distress. Patients with a history of falls in the past 12 months were more likely to suffer from psychological distress (OR = 2.87, 95%CI = 1.74; 4.72). Having two and three comorbidities was significantly associated with greater K6 scores and a higher risk of psychological distress. This study underlined a significantly high prevalence of psychological distress among older patients after falls. Providing frequent mental health monitoring, screening, treatment, and facilitating social engagements are important implications to improve the mental health of this population.

Language: en

### **Keywords**

Kessler 6; Vietnam; fall; older adults; psychological distress



## Preventing fall injury

Bolton L. *Wounds* 2019; 31(10): 269-271.

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### DOI

unavailable

### PMID

31730506

### Abstract

Falls are the leading cause of injury, premature institutionalization, and long-term disability in elderly adults worldwide, with a fall-related fatality in the United States every 19 minutes. According to the Centers for Disease Control and Prevention, 3 million people over 65 years of age receive emergency room treatment for fall injuries at an average cost of \$30 000. The annual cost of fall injuries was more than \$50 billion in 2015. Community-based interventions effective in preventing falls include exercise, medication, and nutritional management as well as improving safety of the local environment. Evidence supporting interventions designed to reduce hospital inpatient falls is less clear despite considerable research aimed at reducing this growing problem. Those injured due to falling during a hospital stay incur higher costs, including a 6-day longer hospital stay, than non-fallers. Programs have worked to prevent other "never events," such as wound infections or pressure ulcers, but mixed results have been reported for preventing falls or fall-related injuries in hospitals. This month's Evidence Corner reviews a randomized controlled trial (RCT) and a prospective observational study<sup>6</sup> that offer important clues on how to prevent hospital inpatient falls.

Language: en

**Relationship between fear of falling and physical activity in people aging with a disability**

Matsuda PN, Eagen T, Hreha K, Finlayson M, Molton IR. PM R 2019; ePub(ePub): ePub.

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31736266

**Abstract**

[Abstract unavailable]

Language: en

## **Reliability and construct validity of the stepping-forward affordance perception test for fall risk assessment in community-dwelling older adults**

Almeida G, Bravo J, Folgado H, Rosado H, Mendes F, Pereira C. PLoS One 2019; 14(11): e0225118.

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### **DOI**

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### **PMID**

31747394

### **Abstract**

Thus far, few studies have examined the estimation and actual performance of locomotor ability in older adults. To our knowledge, there are no studies examining the relationship between stepping-forward estimation versus ability and fall occurrence. The aim of this study was to develop and assess the reliability and validity of a new test for fall risk assessment in community-dwelling older adults. In total, 347 participants ( $73.1 \pm 6.2$  years; 266 women) were assessed for their perception of maximum distance for the stepping-forward and action boundary. The test was developed following the existing literature and expert opinions. The task showed strong internal consistency. Intraclass correlation ranged from 0.99 to 1 for intrarater agreement and from 0.83 to 0.97 for interrater agreement. Multivariate binary regression analysis models revealed an area under the curve (AUC) of 0.665 (95% CI: 0.608-0.723) for fallers and 0.728 (95% CI: 0.655-0.797) for recurrent fallers. The stepping-forward affordance perception test (SF-APT) was demonstrated to be accurate, reliable and valid for fall risk assessment. The results showed that a large estimated stepping-forward associated with an underestimated absolute error works as a protective mechanism for fallers and recurrent fallers in community-dwelling older adults. SF-APT is safe, quick, easy to administer, well accepted and reproducible for application in community or clinical settings by either clinical or nonclinical care professionals.

Language: en

## **Review of gait, cognition, and fall risks with implications for fall prevention in older adults with dementia**

Zhang W, Low LF, Schwenk M, Mills N, Gwynn JD, Clemson L. *Dement. Geriatr. Cogn. Disord.* 2019; ePub(ePub): ePub.

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**PMID** 31743907

### **Abstract**

**BACKGROUND:** Older people with cognitive impairment are at increased risk of falls; however, fall prevention strategies have limited success in this population. The aim of this paper is to review the literature to inform a theoretical framework for fall prevention in older adults with dementia. **SUMMARY:** A narrative review was conducted on fall risk factors in people with cognitive impairment, the relationship between cognition and gait, and their joint impact on the risk of falls. This was used to develop a theoretical framework for fall prevention for people with dementia. Executive function and motor function are closely related as they share neuroanatomy. This close relationship has been confirmed by observational studies including neuroimaging and intervention studies. Executive function is the cognitive domain most commonly associated with gait dysfunction. Attention, sensory integration, and motor planning are the sub-domains of executive function associated with risk of falls through gait dysfunction, whereas cognitive flexibility, judgement, and inhibitory control affect risk of falls through risk-taking behaviour. **Key Messages:** Gait, cognition, and falls are closely related. The comorbidity and interaction between gait abnormality and cognitive impairment may underpin the high prevalence of falls in older adults with dementia. Gait assessment and cognitive assessment, particularly executive function, should be integrated in fall risk screening. Assessment results should be interpreted and utilised using a multidisciplinary approach; specific strategies such as customised gait training and behavioural modulation should be considered as part of falls prevention for people with dementia.

Language: en

### **Keywords**

Cognitive impairment; Executive function; Falls prevention; Risk factors; Theoretical framework

## **The association between chronic kidney disease, falls, and fractures: a systematic review and meta-analysis**

Goto NA, Weststrate ACG, Oosterlaan FM, Verhaar MC, Willems HC, Emmelot-Vonk MH, Hamaker ME. *Osteoporos. Int.* 2019; ePub(ePub): ePub.

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### **DOI**

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### **PMID**

31720721

### **Abstract**

Patients with chronic kidney disease (CKD) are more likely to experience falls and fractures due to renal osteodystrophy and the high prevalence of risk factors for falls. However, it is not well established how great the risk is for falls and fractures for the different stages of CKD compared to the general population. The objective of this systematic review and meta-analysis was to assess whether, and in which degree, CKD was associated with falls and fractures in adults. A systematic search in PubMed, Embase, CINAHL, and The Cochrane Library was performed on 7 September 2018. All retrospective, cross-sectional, and longitudinal studies of adults (18 years of older) that studied the association between CKD, fractures, and falls were included. Additional studies were identified by cross-referencing. A total of 39 publications were included, of which two publications assessed three types of outcome and four publications assessed two types of outcome. Ten studies focused on accidental falling; seventeen studies focused on hip, femur, and pelvis fractures; seven studies focused on vertebral fractures; and thirteen studies focused on any type of fracture without further specification. Generally, the risk of fractures increased when kidney function worsened, with the highest risks in the patients with stage 5 CKD or dialysis. This effect was most pronounced for hip fractures and any type of fractures. Furthermore, results on the association between CKD and accidental falling were contradictory. Compared to the general population, fractures are highly prevalent in patients with CKD. Besides more awareness of timely fracture risk assessment, there also should be more focus on fall prevention.

Language: en

### **Keywords**

Accidental falls; Chronic kidney disease; Dialysis; Fracture

## **A 57-year-old woman with progressive left hand clumsiness and falls**

Paramanandam V, Olszewska DA, Shakya B, Chalissery AJ, O'Connell M, Farrell M, Lynch T. *Mov. Disord. Clin. Pract.* (Hoboken) 2019; 6(8): 656-660.

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### **DOI**

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### **PMID**

31745473

### **Abstract**

**CLINICAL HISTORY:** A 57-year old woman presented with left hand pain, periodic leg movement during sleep, gradual onset of stiffness, clumsiness, and falls. Neurological examination showed: generalized rigidity and bradykinesia. There was left hand dystonic posturing and ideomotor apraxia, as well as mirror movements of upper limbs and stimulus-sensitive myoclonus. The patient had a high-pitched voice and hypophonia (Video S1).

**DISCUSSION:** Experts discuss localization and the syndromic diagnosis and predict the underlying pathology. The pathological diagnosis is then provided and clinical learning points are considered.

Language: en

### **Keywords**

alpha-synuclein; corticobasal syndrome; cytoplasmic inclusions; multisystem atrophy; myoclonus; parkinsonism

## Association of antidepressants with recurrent, injurious and unexplained falls is not explained by reduced gait speed

Donoghue OA, Briggs R, Moriarty F, Kenny RA. Am. J. Geriatr. Psychiatry 2019; ePub(ePub): ePub.

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### Abstract

**OBJECTIVE:** To examine if antidepressants at baseline are associated with falls and syncope over 4 years follow-up and if any observed associations are explained by baseline gait speed.

**DESIGN:** Longitudinal study (three waves). **SETTING:** The Irish Longitudinal Study on Ageing (TILDA), a nationally representative cohort study. **PARTICIPANTS:** Two thousand ninety-three community-dwelling adults aged  $\geq 60$  years. **MEASUREMENTS:** Antidepressants (ATC code "N06A") were identified. Recurrent falls ( $\geq 2$  falls), injurious falls (requiring medical attention), unexplained falls, and syncope were reported at either Wave 2 or 3. Usual gait speed was the mean of two walks on a 4.88 m GAITRite walkway. Poisson regression analysis was used to examine associations between baseline antidepressant use and future falls adjusting for sociodemographics, physical, cognitive and mental health, and finally, gait speed.

**RESULTS:** Compared to non-antidepressant users, those on antidepressants at baseline were more likely to report all types of falls (24.8-40.7% versus 9.8-18%) at follow-up. Antidepressants at baseline were independently associated with injurious falls (incidence risk ratio: 1.58, 95% confidence interval: 1.21, 2.06,  $z = 3.38$ ,  $p = 0.001$ ,  $df = 32$ ) and unexplained falls (incidence risk ratio: 1.49, 95% confidence interval: 1.04, 2.15,  $z = 2.17$ ,  $p = 0.030$ ,  $df = 32$ ) independent of all covariates including gait speed.

**CONCLUSION:** There was little evidence to support the hypothesis that gait would (partly) explain any observed associations between baseline use of antidepressants and future falls. The underlying mechanisms of the observed relationships may be related to depression, vascular pathology, or direct effects of antidepressants. Clinicians should identify the best treatment option for an individual based on existing risk factors for outcomes such as falls.

Language: en

### Keywords

Medication; depression; fall; mobility

## Balance, risk of falls, risk factors and fall-related costs in individuals with diabetes

Rinkel WD, van Nieuwkastele S, Castro Cabezas M, van Neck JW, Birnie E, Henk Coert J. *Diabetes Res. Clin. Pract.* 2019; ePub(ePub): ePub.

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31738998

### Abstract

**AIMS:** Sensory loss and impaired balance are considered risk factors of incident falls. The aim of this study was to assess the relationship between degree of foot sensation and balance, risk of falls, incidence of fall-related injuries and costs in a cohort of patients with diabetes.

**METHODS:** (Non)-neuropathic subjects participating in the Rotterdam Diabetic Foot Study were followed prospectively. Subjects underwent sensory testing of the feet (39 item Rotterdam Diabetic Foot Study Test Battery (RDF-39)); balance was assessed at the second follow-up (Brief-BESTest) as were data on incident falls. Medical records and financial data were abstracted to estimate fall-related morbidity and in-hospital costs.

**RESULTS:** A higher RDF-39 score, cerebral artery disease, type 2 diabetes, height and age were predictors of the Brief-BESTest total score. 41/296 patients (13.9%) reported two or more falls during follow-up. Predictors for recurrent falls were a higher RDF-39 score (aOR: 1.124,  $p < .0005$ ), male gender (aOR: 0.319,  $p = 0.016$ ), age (aOR: 0.938,  $p = 0.003$ ) and type 2 diabetes (aOR: 3.157,  $p = 0.100$ ). Thirty-one patients used medical resources (median € 370 (IQR: 150-977)).

**CONCLUSIONS:** Degree of sensory loss correlates significantly with an increased imbalance and risk of falls. The RDF-39 may be used as stratification tool in medical decision-making and patient information.

Language: en

### Keywords

Balance; Costs; Falls; Neuropathy; Sensory loss



**Critically appraised paper: Task-oriented gait training that focuses on the safe and correct use of a walking aid may reduce falls in people with multiple sclerosis [commentary]**

Karpatkin H. J. Physiother. 2019; ePub(ePub): ePub.

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(Copyright © 2019, Australian Physiotherapy Association)

**DOI**

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**PMID**

31718961

**Abstract**

Falls and falls-related injuries are commonly seen by clinicians who treat multiple sclerosis. Therefore, developing intervention strategies specifically targeting falls in this population should be a priority. Approaches specifically targeting people with greater multiple sclerosis-related disability and who are still walking should receive particular attention, as this population is more likely to fall or stop walking due to fear of falls.<sup>1</sup> The authors describe an intervention program combining assistive device training with task-oriented gait training with assistive devices, finding that participants who received this training had fewer falls and spent less time sitting than controls. However, there was no between-group difference in mobility scores.

Two clinically important messages emerged from this study. First, using task-specific programs, as opposed to more generalised programs (eg, aerobic fitness, resistance training), indicates that clinicians working with patients with multiple sclerosis should focus on tailoring treatments to the specific gait problems of the patient. Multiple sclerosis has a very specific clinical presentation, and clinicians who work with this population should be mindful that interventions are targeted to their patient's specific impairments and functional limitations. Second, despite the fact that the participants in this study were fairly disabled and required constant use of an assistive device, improvements in mobility were still evident after intervention, indicating that even patients with greater disability may improve mobility in meaningful ways with appropriate intervention.

Language: en

## Delayed intracranial hemorrhage in anticoagulated geriatric patients after ground level falls

Cocca AT, Privette A, Leon SM, Crookes BA, Hall G, Lena J, Eriksson EA. J. Emerg. Med. 2019; ePub(ePub): ePub.

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### Abstract

**BACKGROUND:** The reported risk of delayed intracranial hemorrhage (ICH) in a trauma patient on warfarin is estimated to be between 0.6% and 6%. The risk of delayed ICH in trauma patients taking novel oral anticoagulants (NOACs) is not well-defined.

**OBJECTIVE:** We hypothesized that there was a significant number of delayed presentations of ICH in patients on NOACs.

**METHODS:** A retrospective review of our trauma registry was performed on geriatric patients (age older than 64 years) who were initially evaluated at our level I trauma center, had fall from standing height or less, and were anticoagulated (warfarin or NOACs), from April 2017 to March 2018.

**RESULTS:** Seventy-seven patients met inclusion criteria. The mean age was  $80 \pm 7.7$  years and 46% of patients were male. The admission head computed tomography scan was positive in 20.8% of patients. Positive scans were more common in patients on warfarin vs. NOACs (30% vs. 14%;  $p = 0.074$ ) and had a significantly higher Injury Severity Score (median [interquartile range]: 9 [3-15] vs. 5 [1-9];  $p = 0.030$ ) and Abbreviated Injury Scale-Head score (median [interquartile range]: 1 [0-3] vs. 1 [0-2];  $p = 0.035$ ). The agreement between loss of consciousness (LOC) and ICH was 72% ( $\kappa = -0.064$ ;  $p = 0.263$ ). Fifty-one percent of patients had a repeat head CT. New ICH was diagnosed in 9.6% of patients. All of these patients were on NOACs.

**CONCLUSIONS:** A fall from standing or less in anticoagulated geriatric patients is a significant mechanism of injury resulting in ICH. The absence of LOC does not eliminate the possibility of ICH. There is a significant risk of delayed ICH for patients on NOACs and repeat evaluations should be performed. A prospective multicenter evaluation of this finding is warranted.

Language: en

### Keywords

NOAC; apixaban; dabigatran; geriatric; intracranial hemorrhage; rivaroxaban; traumatic brain injury; warfarin

## Effects of visual feedback training using transient Fresnel prism glasses on balance ability in stroke patients without hemispatial neglect

Ha SY, Kim SY, Sung YH. *J. Exerc. Rehabil.* 2019; 15(5): 683-687.

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### Abstract

The center of mass of the body in patients with stroke was oriented toward the nonparetic side. Abnormal weight shift increases the risk of falls. Therefore, many therapists make an effort to help their functional recovery through balance training. Our aim was to investigate the effect of visual feedback intervention using a Fresnel prism on static and dynamic balance in stroke patients without hemispatial neglect. Participants were assigned to control group (n=10) and experimental group (n=9). In the control group, neurodevelopmental therapy was performance for 30 min. In the experimental group, Fresnel prism glasses were applied with neurodevelopmental therapy for 30 min. We executed motor-free visual perception test for visual perception, balancia for static balance ability, and functional reach test and Berg balance test for dynamic balance ability, respectively. All tests were measured immediately after intervention. The visual perception function showed significant difference between unaffected side performance behaviors and visual perceptual processing time ( $P<0.05$ ). In the static balance, there was a significant difference in sway velocity and sway distances ( $P<0.05$ ). Dynamic balance was also significant different between groups ( $P<0.05$ ). Visual feedback using Fresnel prism helps to control the static and dynamic balance ability by inducing weight shift toward the affected side in stroke patients. Therefore, a Fresnel prism may be suggested as an intervention tool to assist weight training for patients with stroke.

Language: en

### Keywords

Dynamic balance; Fresnel prism; Static balance; Stroke; Visual feedback

## **Instrumental assessment of balance and gait in depression: a systematic review**

Belvederi Murri M, Triolo F, Coni A, Tacconi C, Nerozzi E, Escelsior A, Respino M, Neviani F, Bertolotti M, Bertakis K, Chiari L, Zanetidou S, Amore M. *Psychiatry Res.* 2019; ePub(ePub): ePub.

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### **Abstract**

Psychomotor symptoms of depression are understudied despite having a severe impact on patient outcomes. This review aims to summarize the evidence on motor features of depression assessed with instrumental procedures, and examine age-related differences.

We included studies investigating posture, balance and gait ascertained with instrumental measurements among individuals with depressive symptoms or disorders. Studies on subjects with specific physical illnesses were excluded. Methodological quality was assessed with the Newcastle - Ottawa Scale (NOS) and PRISMA guidelines were followed. 33 studies (13 case-control, five cross-sectional, nine longitudinal and six intervention) with overall low-medium quality were included. Different instruments were employed to assess posture (e.g. digital cameras), balance (balance, stepping platform) or gait (e.g. Six-Minute-Walking Test, instrumented walkways).

RESULTS suggest that depression in adults is associated with significant impairments of posture, balance and gait. Motor abnormalities among depressed older adults may depend on the interplay of physical diseases, cognitive impairment and mood. Very few intervention studies measured motor symptoms as outcome. Available evidence suggests, however, that antidepressant drugs and physical exercise may be beneficial for motor abnormalities. Despite the lack of high-quality studies, instrumental assessments confirm the presence and importance of motor abnormalities in depression, with potential age-related differences in their pathophysiology.

Language: en

### **Keywords**

Agitation; Depression; Gait; Postural stability; Psychomotor retardation; Slowing

## Root cause analysis of fall-related hospitalisations among residents of aged care services

Sluggett JK, Lalic S, Hosking SM, Ilomäki J, Shortt T, McLoughlin J, Yu S, Cooper T, Robson L, Van Dyk E, Visvanathan R, Bell JS. *Aging Clin. Exp. Res.* 2019; ePub(ePub): ePub.

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### Abstract

**BACKGROUND:** Fall-related hospitalisations from residential aged care services (RACS) are distressing for residents and costly to the healthcare system. Strategies to limit hospitalisations include preventing injurious falls and avoiding hospital transfers when falls occur. **AIMS:** To undertake a root cause analysis (RCA) of fall-related hospitalisations from RACS and identify opportunities for fall prevention and hospital avoidance.

**METHODS:** An aggregated RCA of 47 consecutive fall-related hospitalisations for 40 residents over a 12-month period at six South Australian RACS was undertaken. Comprehensive data were extracted from RACS records including nursing progress notes, medical records, medication charts, hospital summaries and incident reports by a nurse clinical auditor and clinical pharmacist. Root cause identification was performed by the research team. A multidisciplinary expert panel recommended strategies for falls prevention and hospital avoidance.

**RESULTS:** Overall, 55.3% of fall-related hospitalisations were among residents with a history of falls. Among all fall-related hospitalisations, at least one high falls risk medication was administered regularly prior to hospitalisation. Potential root causes of falling included medication initiations and dose changes. Root causes for hospital transfers included need for timely access to subsidised medical services or radiology. Strategies identified for avoiding hospitalisations included pharmacy-generated alerts when medications associated with an increased risk of falls are initiated or changed, multidisciplinary audit and feedback of falls risk medication use and access to subsidised mobile imaging services.

**CONCLUSIONS:** This aggregate RCA identified a range of strategies to address resident and system-level factors to minimise fall-related hospitalisations.

Language: en

### Keywords

Falls; Hospitalisation; Long-term care; Nursing home; Residential aged care; Root cause analysis

## Six weeks of balance or power training induce no generalizable improvements in balance performance in healthy young adults

Giboin LS, Gruber M, Kramer A. BMC Sports Sci. Med. Rehabil. 2019; 11: e31.

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### Abstract

**BACKGROUND:** Training programs for fall prevention often fail to induce large general effects. To improve the efficacy of fall prevention programs, it is crucial to determine which type of training is most effective in inducing generalizable effects, i.e., improvements in untrained situations. Two likely candidates are balance and resistance training. Here, we assessed whether either varied balance training or a training program aiming to increase leg power would improve performance and acquisition rate of a novel balance task.

**METHODS:** Forty-two healthy recreationally active subjects (16 females, age  $24 \pm 3$ y) were assigned to a control group, a varied practice balance group or a loaded squat and plyometrics power group, training for 6 weeks (twice per week, 40 min per session). Before and after the training, we measured peak power in countermovement jumps and balance performance in two different untrained balance tasks (10 trials pre and 50 trials post-training).

**RESULTS:** After training, the performance and the acquisition rate in the two untrained tasks were similar for all groups (no group  $\times$  time interaction), i.e., no generalization of learning effect was induced by either form of training. Peak power in the countermovement jump did not change significantly in any of the groups.

**CONCLUSIONS:** Neither a six-week power training nor a varied balance training improved performance or acquisition of an untrained balance task. This underpins the task-specificity principle of training and emphasizes the need for studies that assess the mechanisms of transfer and generalization, thus helping to find more effective intervention programs for fall prevention.

Language: en

### Keywords

Learning to learn; Motor learning; Postural control; Sensorimotor; Specificity; Strength; Transfer

## Test-retest reliability of stability outcome measures during treadmill walking in patients with balance problems and healthy controls

de Jong LAF, van Dijsseldonk RB, Keijsers NLW, Groen BE. *Gait Posture* 2019; 76: 92-97.

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### Abstract

**BACKGROUND:** Improvement of balance control is an important rehabilitation goal for patients with motor and sensory impairments. To quantify balance control during walking, various stability outcome measures have described differences between healthy controls and patient groups with balance problems. To be useful for the evaluation of interventions or monitoring of individual patients, stability outcome measures need to be reliable.

**RESEARCH QUESTION:** What is the test-retest reliability of six stability outcome measures during gait? **METHODS:** Patients with balance problems ( $n = 45$ ) and healthy controls ( $n = 20$ ) performed two times a two-minute walk test (2MWT). The intraclass correlation coefficient (ICC) and Bland-Altman analysis (coefficient of repeatability; CR) were used to evaluate the test-retest reliability of six stability outcome measures: dynamic stability margin (DSM), margin of stability (MoS), distance between the extrapolated centre of mass (XCoM) and centre of pressure (CoP) in anterior-posterior (XCoM-CoPAP) and medial-lateral (XCoM-CoPML) direction, and inclination angle between centre of mass (CoM) and CoP in anterior-posterior (CoM-CoPAP-angle) and medial-lateral (CoM-CoPML-angle) direction. A two way mixed ANOVA was performed to reveal measurement- and group-effects.

**RESULTS:** The ICCs of all stability outcome measures ranged between 0.51 and 0.97. Significant differences between the measurements were found for the DSM ( $p = 0.017$ ), XCoM-CoPAP ( $p = 0.008$ ) and CoM-CoPAP-angle ( $p = 0.001$ ). Significant differences between controls and patients were found for all stability outcome measures ( $p < 0.01$ ) except for the MoS ( $p = 0.32$ ). For the XCoM-CoP distances and CoM-CoP angles, the CRs were smaller than the difference between patients and controls. **SIGNIFICANCE:** Based on the ICCs, the reliability of all stability outcome measures was moderate to excellent. Since the XCoM-CoPML and CoM-CoPML-angle showed no differences between the measurements and smaller CRs than the differences between patients and controls, the XCoM-CoPML and CoM-CoPML-angle seem the most promising stability outcome measures to evaluate interventions and monitor individual patients.

Language: en

**Keywords** Balance control; Gait; Reliability; Spinal cord injury; Stability; Stroke

## **Vestibular exercises as a fall prevention strategy in patients with cognitive impairment**

Varriano B, Sulway S, Wetmore C, Dillon W, Misquitta K, Multani N, Anor C, Martinez M, Cacchione E, Rutka J, Tartaglia MC. *Can. J. Neurol. Sci.* 2019; ePub (ePub): ePub.

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### **Abstract**

Vestibular impairment (VI) and cognitive impairment (CI) are risk factors for senior falls. We tested the feasibility of a self-directed 12-week vestibular rehabilitation (VR) program in Memory Clinic patients (65 years +) with a fall, CI and VI. We assessed recruitment, exercise adherence and ability to complete questionnaires / assessments. Twelve patients with CI and falls were screened and 8/12 (75% - prevalence) had VI. All patients completed the screening tests / questionnaires (100% - completeness); 7/8 patients were recruited (87.5% - recruitment); 1/7 (85.7% - attrition) patient attended follow-up. VI is prevalent in patients with CI experiencing falls but traditional VR is not possible, so it should be explored.

Language: en

### **Keywords**

Cognitive decline; Falls; Rehabilitation research; Vestibular diseases