

**SafetyLit July 29<sup>th</sup> 2018****A novel sideways fall simulator to study hip fractures ex vivo**

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**Abstract**

Falls to the side are the leading cause of hip fractures in the elderly. The load that a person experiences during a fall cannot be measured with volunteers for ethical reasons. To evaluate injurious loads, while considering relevant energy input and body posture for a sideways fall, a subject-specific cadaveric impact experiment was developed. Full cadaveric femur-pelvis constructs (N = 2) were embedded in surrogate soft tissue material and attached to metallic surrogate lower limbs. The specimens were then subjected to an inverted pendulum motion, simulating a fall to the side with an impact to the greater trochanter. The load at the ground and the deformation of the pelvis were evaluated using a 6-axis force transducer and two high-speed cameras. Post-test, a trauma surgeon (PG) evaluated specimen injuries. Peak ground contact forces were 7132 N and 5641 N for the fractured and non-fractured specimen, respectively. We observed a cervical fracture of the femur in one specimen and no injuries in a second specimen, showing that the developed protocol can be used to differentiate between specimens at high and low fracture risk.

**PDF Y Endnote Y****A qualitative study of the determinants of adherence to NICE falls guideline in managing older fallers attending an emergency department**

McEwan H, Baker R, Armstrong N, Banerjee J.

*Int. J. Emerg. Med.* 2018; 11(1): e33.

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**Abstract**

**BACKGROUND:** The National Institute for Health and Care Excellence (NICE) 2004 Falls guideline was developed to improve the assessment and management of falls and prevention of future falls. However, adherence to the guideline can be poor. As emergency departments (EDs) are usually consulted by older adults (aged 65 and over) who experience a fall, they provide a setting in which assessments can be conducted or referrals made to more appropriate settings. The objective of this study was to investigate how falls are managed in EDs, reasons why guideline recommendations are not always followed, and what happens instead.

**METHODS:** The study involved two EDs. We undertook 27 episodes of observation of healthcare professional interactions with patients aged 65 or over presenting with a fall, supported by review of the clinical records of these interactions, and subsequently, 30 interviews with healthcare

professionals. The qualitative analysis used the framework approach.

**RESULTS:** Various barriers and enablers (i.e. determinants of practice) influenced adherence at both EDs, including the following: support from senior staff; education; cross-boundary care; definition of falls; communication; organisational factors; and staffing.

**CONCLUSIONS:** A variety of factors influence adherence to the Falls guideline within an ED, and it may be difficult to address all of them simultaneously. Simple interventions such as education and pro-formas are unlikely to have substantial effects alone. However, taking advantage of the influence of senior staff on juniors could enhance adherence. In addition, collaborative care with other NHS services offers a potential approach for emergency practitioners to play a part in managing and preventing falls.

**PDF Y Endnote Y**

**Antihistamine use and the risk of injurious falls or fracture in elderly patients: a systematic review and meta-analysis**

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*Osteoporos. Int.* 2018; ePub(ePub): ePub.

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**Abstract**

Despite their anticholinergic side effects, first-generation antihistamines are widely prescribed to elderly patients. A systematic review was conducted to synthesize real-world evidence. First-generation antihistamine use is considerably associated with an increased risk of injurious falls or fracture among the elderly.

**INTRODUCTION:** First-generation antihistamines are considered potentially inappropriate for elderly patients owing to anticholinergic side effects. We aimed to determine whether elderly patients taking antihistamines are at increased risk of injurious falls or fracture.

**METHODS:** We identified studies in MEDLINE, EMBASE, and several local databases through November 2016. Observational studies on the association between antihistamine use and the risk of injurious falls or fracture were selected. Quality of the studies and the level of evidence were assessed. The random-effects model was employed for meta-analysis, and heterogeneity was examined based on I-square and Cochrane's Q test. Subgroup analyses were performed when the heterogeneity among studies could not be explained.

**RESULTS:** From 473 identified studies, five (three case-control studies, one cohort study, and one case-crossover study) were included in our analysis based on eligibility criteria. First-generation antihistamine use showed significantly increased risk of injurious falls or fracture (odds ratio [OR] 2.03, 95% confidence interval [CI] 1.49-2.76, heterogeneity:  $p = 0.41$ ,  $I^2 = 0\%$ ). Studies including antihistamines of all generations or containing no generation information were dealing with falls during hospitalization. Among these studies, the association was statistically significant without heterogeneity (OR 2.89, 95% CI 1.71-4.89, heterogeneity:  $p = 0.42$ ,  $I^2 = 0\%$ ). Due to the small number of studies included and unadjusted results, meaningful interpretation based on subgroup analysis was limited.

**CONCLUSIONS:** First-generation antihistamine use is considerably associated with increased risk of injurious falls or fracture among the elderly. Clinicians need to exercise caution when prescribing first-generation antihistamines to elderly patients.

**PDFY Endnote Y**

**Balance and mobility improvements during inpatient rehabilitation are similar in young-old, mid-old, and old-old adults with traumatic brain injury**

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*J. Head Trauma Rehabil.* 2018; ePub(ePub): ePub.

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**Abstract**

**OBJECTIVE:** To compare balance, mobility, and functional outcomes across 3 age groups of older adults with traumatic brain injury; to describe differences between those discharged to private residences versus institutional care.

**SETTING:** Acute inpatient rehabilitation facility.

**PARTICIPANTS:** One hundred adults, mean age of  $78.6 \pm 7.9$  years (range = 65-95 years), with an admitting diagnosis of traumatic brain injury.

**DESIGN:** Retrospective case series.

**MAIN MEASURES:** Functional Independence Measure (FIM) for Cognition and Mobility; Berg Balance Scale; Timed Up and Go; and gait speed, at admission to and discharge from an inpatient rehabilitation facility.

**RESULTS:** Statistically significant improvements ( $P < .01$ ) were made on the Timed Up and Go, Berg Balance Scale, and gait speed for young-old, mid-old, and old-old adults, with no differences among the 3 age groups. Substantial balance and mobility deficits remained. The FIM cognition ( $P = .013$ ), FIM Walk ( $P = .009$ ), and FIM Transfer ( $P = .013$ ) scores were significantly better in individuals discharged home or home with family versus those discharged to an institution.

**CONCLUSION:** Preliminary outcome data for specific balance and mobility measures are reported in 3 subgroups of older adults following traumatic brain injury, each of which made significant and similar improvements. Some FIM item scores discriminated between those discharged to a private residence versus a higher level of care.

**PDF Y Endnote Y**

**Balance performance in older adults with hip osteoarthritis: a systematic review**

Picorelli AMA, Hatton AL, Gane EM, Smith MD.

*Gait Posture* 2018; 65: 89-99.

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## Abstract

**BACKGROUND:** The hip is one of the most common joints affected by osteoarthritis (OA) and it has been identified as a key risk factors for falls. Physical impairments associated with OA, such as joint pain, muscle weakness, joint stiffness and sensory dysfunction, can all negatively affect balance and increase risk of falling. **QUESTION:** Is balance performance altered in older adults with hip osteoarthritis? To determine whether static, dynamic, reactive or functional balance performance is altered in older people with hip osteoarthritis.

**METHODS:** Quantitative measures of postural control, including clinical and lab-based assessment of static, dynamic, reactive and/or functional balance performance, compared with a healthy control group or to the asymptomatic limb.

**RESULTS:** A total of 5407 articles were identified and 14 papers were included (10 with standardised mean different (SMD) data, four without SMD data). Based on data from single studies, there were medium/large effects for increased medio-lateral displacement when standing with eyes open, increased anterior-posterior and total sway path length when standing with eyes closed, greater overall instability when standing on an unstable surface, and increased displacement toward the stance leg in a lateral step in hip OA compared with controls.

**CONCLUSION:** Balance impairments were identified in some measures, limiting the conclusions as to whether balance deficits are a problem in hip OA. Inconsistent findings suggest that balance may not be a primary contributor to increased falls risk in older adults with hip OA. Other factors, such as musculoskeletal deficits, may contribute to higher falls rate in this population.

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## Begin risk assessment for falls in women at 45, not 65

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## Abstract

The clinical and epidemiological literature provides guidelines for fall prevention starting at age 65; however, the focus on age  $\geq 65$  is not evidence based. Therefore, this study examined state-wide North Carolina emergency department visit data to examine the characteristics of falls across the age spectrum, identify the age at which the incidence of fall-related emergency department visits started to increase and determine whether these trends were similar for men and women. We determined that incidence rates of fall-related emergency department visits began to increase in early middle age, particularly for women. Since fall risk assessment and prevention activities should be initiated prior to an injurious fall, we recommend beginning these activities before age 65.

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### **Comparing Strategies Targeting Osteoporosis to Prevent Fractures after an upper extremity fracture (C-STOP Trial): a randomized controlled trial**

Majumdar SR, McAlister FA, Johnson JA, Rowe BH, Bellerose D, Hassan I, Lier DA, Li S, Maksymowych WP, Menon M, Russell AS, Wirzba B, Beaupre LA.

*J. Bone Miner. Res.* 2018; ePub(ePub): ePub.

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#### **Abstract**

We compared osteoporosis care after upper extremity fragility fracture using a low-intensity Fracture Liaison Service (FLS) versus a high-intensity FLS in a pragmatic patient-level parallel-arm comparative effectiveness trial undertaken at a Canadian academic hospital. A low-intensity FLS (active-control) that 'identified' patients and notified primary care providers was compared to a high-intensity FLS (case manager) where a specially-trained nurse 'identified' patients, 'investigated' bone health and 'initiated' appropriate treatment. 361 community-dwelling participants 50 years or older with upper extremity fractures who were not on bisphosphonate treatment were included; 350 (97%) participants completed 6-month follow-up undertaken by assessors blinded to group allocation. The primary outcome was difference in bisphosphonate treatment between groups 6-months post-fracture; secondary outcomes included differences in bone mineral density (BMD) testing and a pre-defined composite measure termed "appropriate care" (taking or making an informed decision to decline medication for those with low BMD; not taking bisphosphonate treatment for those with normal BMD). Absolute differences (%), relative risks (RR with 95% confidence intervals [CI]), number-needed-to-treat (NNT) and direct costs were compared. 181 participants were randomized to active-control and 180 to case-manager using computer-generated randomization; the groups were similar on study entry. At 6 months, 51 (28%) active-control vs 86 (48%) case-manager participants started bisphosphonate treatment (20% absolute difference; RR 1.70 [95%CI 1.28-2.24];  $p < 0.0001$ ; NNT = 5). Of active-controls, 108 (62%) underwent BMD testing compared to 128 (73%) case-managed patients (11% absolute difference; RR 1.17 [95%CI 1.01-1.36];  $p = 0.03$ ). Appropriate care was received by 76 (44%) active-controls and 133 (76%) case-managed participants (32% absolute difference; RR 1.73, [95%CI 1.43-2.09];  $p < 0.0001$ ). The direct cost per participant was \$18 Canadian (CDN) for the active-control intervention compared to \$66 CDN for the case-manager intervention. In summary, case-management led to substantially greater improvements in bisphosphonate treatment and appropriate care within 6-months of fracture than the active control. This article is protected by copyright. All rights reserved.

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### **Disparity between perceived and physiological risks of falling among older patients in an acute care hospital**

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*Appl. Nurs. Res.* 2018; 42: 77-82.

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### Abstract

**BACKGROUND:** Falls are the most frequent adverse events among hospitalised older adults. Previous studies highlighted that older adults might not understand the risk factors associated with falls and may have an altered perception of their actual risk.

**AIM:** To describe differences between perceived and actual physiological risk of falling among older adults and to explore factors associated with the differences.

**METHODS:** A prospective cohort study was done. Older adults (age 65 years and above) were interviewed one-to-one at bedside. Morse Fall Scale (MFS) and other risk factors for falls were used to identify the patients' physiological fall risks. Patients' perceived risk of falls were assessed using the Falls Efficacy Scale-International (FES-I).

**RESULTS:** Three hundred patients were recruited. Patients' mean age was 75.3 (SD = ± 6.2). Majority were males (51.7%), lived with others (91.7%), and had received primary school education (35.3%). Based on the MFS, most patients had moderate fall risk (59.7%). Using the FES-I, more than half the patients (59%) interviewed had high concerns about falling. About one-third of the patients' (31.3%) perceived risk matched with their physiological fall risk (Risk-Aware). Half of the patients' perceived risks was higher than their physiological fall risk (50.7%) (Risk-Anxious), while the remaining patients' perceived risks was reported to be lower than their physiological fall risk (18%) (Risk-Taker).

**CONCLUSION:** Older patients are poor at recognizing their fall risks. Both patients' perceived and actual fall risks should be evaluated in the inpatient setting in order to inform individualized fall prevention education and strategies.

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#### French validation of the modified-falls efficacy scale (M-FES Fr)

Perrot A, Castanier C, Maillot P, Zitari H.

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### Abstract

**INTRODUCTION:** Among the tools assessing fall related self-efficacy, the Modified-Falls Efficacy Scale (M-FES) seems to be a comprehensive and sensitive scale. However, no validated French version exists to this day.

**OBJECTIVE:** This study aims to translate the M-FES and validate this French translation (M-FES Fr).

**METHOD:** The validation steps used to translate and validate the M-FES Fr were i) forward - backward translation, ii) examination of the internal structure and reliability, iii) evaluation of the convergent validity. In this study, 310 French-speaking older adults (56 geriatric patients and 254

community-dwelling older adults) completed the M-FES Fr. Among the community-dwelling older adults, 67 fallers and 70 non-fallers were also asked to complete questionnaires related to variables such as health, fear of falling, and physical activity levels.

**ESULTS:** A two-factor solution (indoor vs outdoor activities) was suggested, which accounted for 68.1% of the total variance. Reliability estimates for both factors were good (Cronbach  $\alpha > 0.94$ , ICC  $> .93$ ). Significant differences between geriatric patients and community-dwelling older adults and between fallers and non-fallers were highlighted. Furthermore, the M-FES Fr scores were significantly linked to various risk factors for falling.

**CONCLUSION:** The M-FES Fr has psychometric properties which are similar to those found in the original version, including reliability and validity. This questionnaire will enable French-speaking researchers and health professionals to work with the same concepts as those used in other languages. Notably, the M-FES Fr could be used in the development and evaluation of intervention strategies in the prevention of falls.

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#### **Hip fractures among older people in Iceland between 2008 and 2012**

Skuladottir SS, Gudmundsdottir E, Mogensen B, Masdottir HR, Gudmundsdottir H, Jonsdottir LA, Sigurthorsdottir I, Torfadottir JE, Thorsteinsdottir T.

*Int. J. Orthop. Trauma Nurs.* 2018; ePub(ePub): ePub.

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#### **Abstract**

**INTRODUCTION:** Hip fractures are a serious injury especially among older people, mainly caused by falls and women have a higher risk. The authors studied gender differences in hip fractures, marital status, waiting times for surgery and mortality in an older population.

**METHODS:** Data was obtained for all 67 years and older admitted with hip fractures to an Emergency Department (ED) in Iceland 2008-2012. The associations of covariates with mortality were analyzed using multivariable logistic regression.

**ESULTS:** The study included 1053 patients; covering 80% of hip fractures in Iceland during the study period, 72% were women. Men were more often married (51% vs. 23%) ( $P < 0.001$ ). Average waiting time was men vs. women 21.5 h/18.9 h ( $p = 0.003$ ). Mortality within 12 months was men 36% vs. women 21% (Odds Ratio (OR); 2.30, 95% Confidence Interval (CI); 1.66-3.18). Higher mortality rates were observed in older age-groups compared to 67-79 years old, i.e.80-89 years: OR 1.80 (95% CI 1.25-2.60) and 90-109 years: OR 4.52 (95% CI 2.91-7.01). Waiting time was not associated with 12-months mortality risk after adjustment.

**CONCLUSION:** Although women constitute the majority of elderly with hip fractures, men had higher mortality in our study. Further reserach that examine factors affecting gender difference will likey be of benefit and associated changes to the care already dleivered in the ED may improve mortality.

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#### PDF Y Endnote Y

### **Impact of falls on depressive symptoms among the oldest old: Results from the AgeQualiDe study**

Hajek A, Brettschneider C, van den Bussche H, Lühmann D, Oey A, Wiese B, Weyerer S, Werle J, Fuchs A, Pentzek M, Stein J, Luck T, Bickel H, Mösch E, Hesel K, Wagner M, Scherer M, Maier W, Riedel-Heller SG, König HH.

*Int. J. Geriatr. Psychiatry* 2018; ePub(ePub): ePub.

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#### **Abstract**

**OBJECTIVE:** The purpose of this study was to examine the impact of falls on depressive symptoms among the oldest old in Germany longitudinally.

**METHODS:** Data were used from 2 waves of the multicenter prospective cohort "Study on needs, health service use, costs and health-related quality of life in a large sample of oldest-old primary care patients (85+)" (AgeQualiDe). This study covers primary care patients  $\geq 85$  years (at baseline:  $n = 547$ , average age of  $88.9 \pm 3.0$  years; ranging from 85 to 100 years). General practitioner-diagnosed falls were used as explanatory variable. The Geriatric Depression Scale was used as outcome measure.

**RESULTS:** Linear fixed effects regressions showed that the occurrence of falls is associated with an increase in depressive symptoms ( $\beta = .60$ ,  $P = .02$ ), whereas changes in marital status, ageing, social support, functional decline (instrumental activity of daily living), cognitive impairment, and an increase in chronic diseases did not affect depressive symptoms. In sensitivity analysis, an increase in depressive symptoms was associated with functional impairment (basic activities of daily living; Barthel index;  $\beta = -.04$ ,  $P = .005$ ).

**CONCLUSIONS:** Based on a large, population-based longitudinal study, this study underlined the impact of falls on depressive symptoms and consequently extended previous knowledge about an association between falls and depressive symptoms in the oldest old. Developing strategies to prevent falls might also help to prevent depressive symptoms.

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#### **PDF Y Endnote Y**

### **Motor unit activity, force steadiness, and perceived fatigability are correlated with mobility in older adults**

Mani D, Almklass AM, Hamilton LD, Vieira TM, Botter A, Enoka RM.

*J. Neurophysiol.* 2018; ePub(ePub): ePub.

**Affiliation:** Department of Integrative Physiology, University of Colorado, United States.

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#### **Abstract**

The purpose of our study was to examine the associations between the performance of older adults on four tests of mobility with the physical capabilities of the lower leg muscles. The assessments included measures of muscle strength, muscle activation, and perceived fatigability. Muscle



activation was quantified as the force fluctuations—a measure of force steadiness—and motor unit discharge characteristics of lower leg muscles during submaximal isometric contractions. Perceived fatigability was measured as the rating of perceived exertion achieved during a test of walking endurance. Twenty participants ( $73 \pm 4$  yrs) completed 1–4 evaluation sessions that were each separated by at least 3 weeks. The protocol included a 400-m walk, 10-m walk at maximal and preferred speeds, a chair-rise test, and the strength, force steadiness, and the discharge characteristics of motor units detected by high-density electromyography of lower leg muscles. Multiple-regression analyses yielded statistically significant models that explained modest amounts of the variance in the four mobility tests. The variance explained by the regression models was 39% for 400-m walk time, 33% for maximal walk time, 42% for preferred walk time, and 27% for chair-rise time. The findings indicate that differences in mobility among healthy older adults were partially associated with the level of perceived fatigability (willingness of individuals to exert themselves) achieved during the test of walking endurance and the discharge characteristics of soleus, medial gastrocnemius, and tibialis anterior motor units during steady submaximal contractions with the plantar flexor and dorsiflexor muscles.

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#### **Multifactorial and multiple component interventions for preventing falls in older people living in the community**

Hopewell S, Adedire O, Copsey BJ, Boniface GJ, Sherrington C, Clemson L, Close JC, Lamb SE. *Cochrane Database Syst. Rev.* 2018; 7: CD012221.

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#### **Abstract**

**BACKGROUND:** Falls and fall-related injuries are common, particularly in those aged over 65, with around one-third of older people living in the community falling at least once a year. Falls prevention interventions may comprise single component interventions (e.g. exercise), or involve combinations of two or more different types of intervention (e.g. exercise and medication review). Their delivery can broadly be divided into two main groups: 1) multifactorial interventions where component interventions differ based on individual assessment of risk; or 2) multiple component interventions where the same component interventions are provided to all people.

**OBJECTIVES:** To assess the effects (benefits and harms) of multifactorial interventions and multiple component interventions for preventing falls in older people living in the community.

**SEARCH METHODS:** We searched the Cochrane Bone, Joint and Muscle Trauma Group Specialised Register, the Cochrane Central Register of Controlled Trials, MEDLINE, Embase, the Cumulative Index to Nursing and Allied Health Literature, trial registers and reference lists. Date of search: 12 June 2017.

**SELECTION CRITERIA:** Randomised controlled trials, individual or cluster, that evaluated the effects of multifactorial and multiple component interventions on falls in older people living in the

community, compared with control (i.e. usual care (no change in usual activities) or attention control (social visits)) or exercise as a single intervention.

**DATA COLLECTION AND ANALYSIS:** Two review authors independently selected studies, assessed risks of bias and extracted data. We calculated the rate ratio (RaR) with 95% confidence intervals (CIs) for rate of falls. For dichotomous outcomes we used risk ratios (RRs) and 95% CIs. For continuous outcomes, we used the standardised mean difference (SMD) with 95% CIs. We pooled data using the random-effects model. We used the GRADE approach to assess the quality of the evidence.

**MAIN RESULTS:** We included 62 trials involving 19,935 older people living in the community. The median trial size was 248 participants. Most trials included more women than men. The mean ages in trials ranged from 62 to 85 years (median 77 years). Most trials (43 trials) reported follow-up of 12 months or over. We assessed most trials at unclear or high risk of bias in one or more domains. Forty-four trials assessed multifactorial interventions and 18 assessed multiple component interventions. ( $I^2$  not reported if = 0%). Multifactorial interventions versus usual care or attention control This comparison was made in 43 trials. Commonly-applied or recommended interventions after assessment of each participant's risk profile were exercise, environment or assistive technologies, medication review and psychological interventions. Multifactorial interventions may reduce the rate of falls compared with control: rate ratio (RaR) 0.77, 95% CI 0.67 to 0.87; 19 trials; 5853 participants;  $I^2$  = 88%; low-quality evidence. Thus if 1000 people were followed over one year, the number of falls may be 1784 (95% CI 1553 to 2016) after multifactorial intervention versus 2317 after usual care or attention control. There was low-quality evidence of little or no difference in the risks of: falling (i.e. people sustaining one or more fall) (RR 0.96, 95% CI 0.90 to 1.03; 29 trials; 9637 participants;  $I^2$  = 60%); recurrent falls (RR 0.87, 95% CI 0.74 to 1.03; 12 trials; 3368 participants;  $I^2$  = 53%); fall-related hospital admission (RR 1.00, 95% CI 0.92 to 1.07; 15 trials; 5227 participants); requiring medical attention (RR 0.91, 95% CI 0.75 to 1.10; 8 trials; 3078 participants). There is low-quality evidence that multifactorial interventions may reduce the risk of fall-related fractures (RR 0.73, 95% CI 0.53 to 1.01; 9 trials; 2850 participants) and may slightly improve health-related quality of life but not noticeably (SMD 0.19, 95% CI 0.03 to 0.35; 9 trials; 2373 participants;  $I^2$  = 70%). Of three trials reporting on adverse events, one found none, and two reported 12 participants with self-limiting musculoskeletal symptoms in total. Multifactorial interventions versus exercise Very low-quality evidence from one small trial of 51 recently-discharged orthopaedic patients means that we are uncertain of the effects on rate of falls or risk of falling of multifactorial interventions versus exercise alone. Other fall-related outcomes were not assessed. Multiple component interventions versus usual care or attention control The 17 trials that make this comparison usually included exercise and another component, commonly education or home-hazard assessment. There is moderate-quality evidence that multiple interventions probably reduce the rate of falls (RaR 0.74, 95% CI 0.60 to 0.91; 6 trials; 1085 participants;  $I^2$  = 45%) and risk of falls (RR 0.82, 95% CI 0.74 to 0.90; 11 trials; 1980 participants). There is low-quality evidence that multiple interventions may reduce the risk of recurrent falls, although a small increase cannot be ruled out (RR 0.81, 95% CI 0.63 to 1.05; 4 trials; 662 participants). Very low-quality evidence means that we are uncertain of the effects of multiple component interventions on the risk of fall-related fractures (2 trials) or fall-related hospital admission (1 trial). There is low-quality evidence that multiple interventions may have little or no effect on the risk of requiring medical attention (RR 0.95, 95% CI 0.67 to 1.35; 1

trial; 291 participants); conversely they may slightly improve health-related quality of life (SMD 0.77, 95% CI 0.16 to 1.39; 4 trials; 391 participants;  $I^2 = 88\%$ ). Of seven trials reporting on adverse events, five found none, and six minor adverse events were reported in two. Multiple component interventions versus exercise This comparison was tested in five trials. There is low-quality evidence of little or no difference between the two interventions in rate of falls (1 trial) and risk of falling (RR 0.93, 95% CI 0.78 to 1.10; 3 trials; 863 participants) and very low-quality evidence, meaning we are uncertain of the effects on hospital admission (1 trial). One trial reported two cases of minor joint pain. Other falls outcomes were not reported.

**AUTHORS' CONCLUSIONS:** Multifactorial interventions may reduce the rate of falls compared with usual care or attention control. However, there may be little or no effect on other fall-related outcomes. Multiple component interventions, usually including exercise, may reduce the rate of falls and risk of falling compared with usual care or attention control.

**PDF Y Endnote Y**

### **NewsCAP: Deaths from falls in older adults increased 31% from 2007 to 2016**

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**Abstract** [Abstract unavailable]

**PDF Y Endnote Y**

### **Non-contact sensor-based falls detection in residential aged care facilities: developing a real-life picture**

Borda A, Gilbert C, Said C, Smolenaers F, McGrath M, Gray K.

*Stud. Health Technol. Inform.* 2018; 252: 33-38.

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(Copyright © 2018, IOS Press)

**DOI** unavailable **PMID** 30040679

**Abstract**

**BACKGROUND:** Few studies of sensor-based falls detection devices have monitored older people in their care settings, particularly in Australia. The present investigation addressed this gap by trialling the feasibility and acceptability of a non-contact smart sensor system (NCSSS) to monitor behaviour and detect falls in an Australian residential aged care facility (RACF).

**METHODS:** This study used a mixed methods approach: a) Pilot study implementation at a RACF, b) Post-pilot interviews, c) Analysis and review of results.

**RESULTS AND DISCUSSION:** Data was collected for four RACF participants over four weeks of the NCSSS pilot. No falls were recorded during the uptime of the system. Numerous feasibility challenges were encountered, for example in the installation, configuration, and location of sensors for optimal detection, network and connectivity issues, and maintenance requirements. These factors may affect NCSSS implementation and adherence.

**PDF Y Endnote Y**

### Objective measures of gait and balance in healthy non-falling adults as a function of age

Virmani T, Gupta H, Shah J, Larson-Prior L.

*Gait Posture* 2018; 65: 100-105.

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**DOI** 10.1016/j.gaitpost.2018.07.167 **PMID** 30048846

#### Abstract

**BACKGROUND:** Neurodegenerative diseases increase in incidence with age. Prior studies using differing populations and gait paradigms have reported various parameters changing with age, some of which correlate with falls and mortality. Here we use three different paradigms to evaluate gait and balance in healthy non-fallers.

**RESEARCH QUESTION:** What objective gait and balance parameters are correlated with aging.

**METHODS:** Healthy subjects aged 21-79 years without histories of falls, lower extremity orthopedic procedures or chronic pain were included. Subjects walked on a 20 × 4 foot pressure sensor mat (Zeno Walkway, Protokinetics, Havertown, PA) under three different gait paradigms, (i) steady-state gait, (ii) dual-task while texting on a cellular phone and (iii) tandem gait. Data was collected and analyzed using PKMAS software (Protokinetics). Linear regression analysis, stepwise multivariate analysis, and grouped analysis of gait parameters was performed using SPSS 24 (IBM).

**RESULTS:** Seventy-five subjects were enrolled. Grouped analysis and linear regression analysis showed differing significance in parameters tested. Step-wise multivariate analysis of all 31 parameters assessed from three different gait paradigms, showed weak but significant correlations in age with (i) stride-to-stride variability in (i) integrated-pressure of footsteps and (ii) stride-length during steady-state gait, (iii) mean stride-length on dual-task, and (iv) mean step-width on tandem gait ( $R^2 = 0.382$ ,  $t = 2.26$ ,  $p = 0.026$ ).

**SIGNIFICANCE:** In a population of healthy subjects without prior history of falls or medical illness that should affect gait, there were weak but significant age-related changes in objective measures of steady state gait and balance. Future prospective longitudinal data will help predict the relevance of this in relation to falls in the elderly.

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#### PDF Y Endnote Y

### Older adults' sedentary behavior and physical activity after hip fracture: results from an outpatient rehabilitation randomized controlled trial

Zusman EZ, Dawes M, Fleig L, McAllister MM, Cook WL, Guy P, Brasher PMA, McKay HA, Khan KM, Ashe MC.

*J. Geriatr. Phys. Ther.* 2018; ePub(ePub): ePub.

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(Copyright © 2018, American Physical Therapy Association)

**DOI** 10.1519/JPT.000000000000193 **PMID** 30028352

#### Abstract



**BACKGROUND AND PURPOSE:** Prolonged sedentary time and limited physical activity can result in deleterious effects on health and mobility, especially for older adults with fall-related hip fracture. Therefore, the purpose of this study was to examine the effect of a multidisciplinary clinic on sedentary behavior and physical activity (prespecified secondary outcomes) and provide descriptions of activity patterns over 1 year for men and women.

**METHODS:** We conducted a parallel-group, single-blinded randomized controlled trial comparing a multidisciplinary clinic and usual care (intervention) with usual care (control). We recruited 53 community-dwelling older adults aged 65+ years who were 3 to 12 months postfracture and collected data at baseline, 6, and 12 months; study staff were blinded to group allocation. The clinic included a geriatric assessment by the geriatrician, physiotherapist, and occupational therapist. Referrals were made to other professionals, when indicated. We collected the accelerometer-measured sedentary behavior and physical activity at 3 time points. We used linear mixed-effects models to compare groups at 6 and 12 months and mixed models to compare outcomes between men and women.

**RESULTS:** Participants were sedentary for more than 10 hours of a 13-hour day, and there were no significant differences between the study groups at 6 months (2.4 [95% confidence interval: -22.4 to 27.2] minutes) or 12 months (-3.7 [95% confidence interval: -33.6 to 26.1] minutes). Compared with women, men spent 47.2 min/d more in sedentary time ( $P = .052$ ) and 43.8 min/d less in light physical activity ( $P = .047$ ).

**DISCUSSION:** Older adults after hip fracture spend prolonged periods of waking hours sedentary with very little activity.

#### PDF Y Endnote Y

#### Perceptions of falls and falls prevention interventions among Personal Alert Victoria clients

Ayton D, Morello R, Natora A, Yallop S, Barker A, Soh SE.

*Health Soc. Care Community* 2018; ePub(ePub): ePub.

**Affiliation:** Department of Health and Human Services, Vic., Australia.

(Copyright © 2018, John Wiley and Sons)

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#### Abstract

This paper explores the perceptions and experiences of falls among Personal Alert Victoria (PAV) clients and identifies barriers and enablers to engagement in falls prevention interventions. Data were collected via semistructured telephone interviews ( $n = 12$ ) and a client survey with open-ended and closed-ended questions ( $n = 46$ ). Descriptive statistics and thematic analysis was guided by the COM-B model (capability, opportunity, and motivation) for behaviour change. The interview and survey explored experiences of falls, falls risk factors, access and participation in falls prevention interventions, access to health and support services, and experiences using the PAV service. Capability barriers identified included poor health, lack of time, low health literacy, and perceived high intensity of exercise classes. Opportunity barriers were lack of transport, high cost, and long waiting times for falls prevention interventions. Motivation barriers were the belief that falls are inevitable and a perceived lack of relevance of falls prevention interventions. Enablers identified were a focus on broader health and well-being benefits (capability), hospitalisations or rehabilitation that incorporates falls prevention in recovery (opportunity), and raising awareness of falls risk

(motivation).

FINDINGS suggest that further research is required to inform the tailoring of positive health messages to improve the uptake of falls prevention interventions by PAV clients.

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**PDF Y Endnote Y**

**Quantitative mobility assessment for fall risk prediction in dementia: a systematic review**

Dolatabadi E, Van Ooteghem K, Taati B, Iaboni A.

*Dement. Geriatr. Cogn. Disord.* 2018; 45(5-6): 353-367.

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(Copyright © 2018, Karger Publishers)

**DOI** 10.1159/000490850 **PMID** 30041187

**Abstract**

**BACKGROUND:** Impairments of gait and balance often progress through the course of dementia, and are associated with increased risk of falls.

**SUMMARY:** This systematic review provides a critical analysis of the evidence linking quantitative measures of gait and balance to fall risk in older adults with dementia. Various instrumented measures of gait and postural stability including gait speed and non-instrumented performance measures including Timed Up and Go were shown to be capable of distinguishing fallers from non-fallers.

**Key Messages:** Existing reviews indicate that impairments of gait and balance are associated with increased risk of falls in cognitively intact older people. There are inconsistencies, however, regarding the characteristics most predictive of a fall. In order to advance fall prevention efforts, there is an important need to understand the relationship between gait, balance, and fall risk, particularly in high-risk populations such as individuals with dementia.

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**PDF Y Endnote Y**

**Reducing the burden of dizziness in middle-aged and older people: a multifactorial, tailored, single-blind randomized controlled trial**

Menant JC, Migliaccio AA, Sturnieks DL, Hicks C, Lo J, Ratanapongleka M, Turner J, Delbaere K, Titov N, Meinrath D, McVeigh C, Close JCT, Lord SR.

*PLoS Med.* 2018; 15(7): e1002620.

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(Copyright © 2018, Public Library of Science)

**DOI** 10.1371/journal.pmed.1002620 **PMID** 30040818

**Abstract**

**BACKGROUND:** Dizziness is common among older people and is associated with a cascade of debilitating symptoms, such as reduced quality of life, depression, and falls. The multifactorial aetiology of dizziness is a major barrier to establishing a clear diagnosis and offering effective therapeutic interventions. Only a few multidisciplinary interventions of dizziness have been conducted to date, all of a pilot nature and none tailoring the intervention to the specific causes of

dizziness. Here, we aimed to test the hypothesis that a multidisciplinary dizziness assessment followed by a tailored multifaceted intervention would reduce dizziness handicap and self-reported dizziness as well as enhance balance and gait in people aged 50 years and over with dizziness symptoms.

**METHODS AND FINDINGS:** We conducted a 6-month, single-blind, parallel-group randomized controlled trial in community-living people aged 50 years and over who reported dizziness in the past year. We excluded individuals currently receiving treatment for their dizziness, those with degenerative neurological conditions including cognitive impairment, those unable to walk 20 meters, and those identified at baseline assessment with conditions that required urgent treatment. Our team of geriatrician, vestibular neuroscientist, psychologist, exercise physiologist, study coordinator, and baseline assessor held case conferences fortnightly to discuss and recommend appropriate therapy (or therapies) for each participant, based on their multidisciplinary baseline assessments. A total of 305 men and women aged 50 to 92 years (mean [SD] age: 67.8 [8.3] years; 62% women) were randomly assigned to either usual care (control;  $n = 151$ ) or to a tailored, multifaceted intervention ( $n = 154$ ) comprising one or more of the following: a physiotherapist-led vestibular rehabilitation programme (35% [ $n = 54$ ]), an 8-week internet-based cognitive-behavioural therapy (CBT) (19% [ $n = 29$ ]), a 6-month Otago home-based exercise programme (24% [ $n = 37$ ]), and/or medical management (40% [ $n = 62$ ]). We were unable to identify a cause of dizziness in 71 participants (23% of total sample). Primary outcome measures comprised dizziness burden measured with the Dizziness Handicap Inventory (DHI) score, frequency of dizziness episodes recorded with monthly calendars over the 6-month follow-up, choice-stepping reaction time (CSRT), and gait variability. Data from 274 participants (90%; 137 per group) were included in the intention-to-treat analysis. At trial completion, the DHI scores in the intervention group (pre and post mean [SD]: 25.9 [19.2] and 20.4 [17.7], respectively) were significantly reduced compared with the control group (pre and post mean [SD]: 23.0 [15.8] and 21.8 [16.4]), when controlling for baseline scores (mean [95% CI] difference between groups [baseline adjusted]: -3.7 [-6.2 to -1.2];  $p = 0.003$ ). There were no significant between-group differences in dizziness episodes (relative risk [RR] [95% CI]: 0.87 [0.65 to 1.17];  $p = 0.360$ ), CSRT performance (mean [95% CI] difference between groups [baseline adjusted]: -15 [-40 to 10];  $p = 0.246$ ), and step-time variability during gait (mean [95% CI] difference between groups [baseline adjusted]: -0.001 [-0.002 to 0.001];  $p = 0.497$ ). No serious intervention-related adverse events occurred. Study limitations included the low initial dizziness severity of the participants and the only fair uptake of the falls clinic (medical management) and the CBT interventions.

**CONCLUSIONS:** A multifactorial tailored approach for treating dizziness was effective in reducing dizziness handicap in community-living people aged 50 years and older. No difference was seen on the other primary outcomes. Our findings therefore support the implementation of individualized, multifaceted evidence-based therapies to reduce self-perceived disability associated with dizziness in middle-aged and older people. **TRIAL REGISTRATION:** Australian New Zealand Clinical Trials Registry ACTRN12612000379819.

**PDF Y Endnote Y**

### **Sedentary behaviors, physical activity, and changes in depression and psychological distress symptoms in older adults**

Andrade-Gómez E, Martínez-Gómez D, Rodriguez-Artalejo F, García-Esquinas E.

*Depress. Anxiety* 2018; ePub(ePub): ePub.

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**DOI** 10.1002/da.22804 **PMID** 30040170

#### **Abstract**

**BACKGROUND:** Television (TV) viewing and computer use have been associated with higher risk of depression, but studies specifically assessing the impact of these and other types of sedentary behaviors (SBs) on the mental health of older adults are scarce and their results are inconclusive. Similarly, the association between specific types of recreational physical activity (rPA) and mental health in older adults is poorly understood.

**METHODS:** In 2012, information on SBs, rPA, and other health behaviors was collected with validated questionnaires from community-dwelling older adults participating in the Seniors-ENRICA cohort. In 2012 and 2015, symptoms of depression and mental distress were assessed using the GDS-10 and the General Health Questionnaire-12 (GHQ-12), respectively.

**RESULTS:** Time spent watching TV was prospectively associated with higher (worse) GDS-10 scores in women ( $\beta$  [95% confidence interval (CI)] comparing the second and third tertiles of TV viewing to the first: 0.21 [-0.04 to 0.46] and 0.37 [0.13-0.62], respectively; P-trend: < 0.01), but not in men (-0.11 [-0.35 to 0.13] and -0.18 [-0.44 to 0.08]; P-trend: 0.16). Women, but not men, who spent more time in other SBs, including reading, using the computer and commuting, showed a lower number of depressive symptoms (-0.19 [-0.44 to 0.06] and -0.34 [-0.60 to -0.08]; P-trend: 0.01) and lower (better) GHQ-12 scores (-0.33 [-0.67 to -0.00] and -0.35 [-0.69 to -0.00]; P-trend: 0.05) at follow-up. Both in men and women, higher levels of rPA, such as walking, practicing sports, and do-it-yourself activities, were associated with lower GDS-10 scores (-0.07 [-0.25 to 0.11] and -0.19 [-0.36 to -0.01]; P-trend: 0.04) and with lower GHQ-12 scores (-0.02 [-0.26 to 0.22] and -0.23 [-0.47 to -0.00]; P-trend: 0.06).

**CONCLUSIONS:** Older women who spent more time watching TV and less time in other SBs showed a higher number of depressive symptoms. Data suggest that increasing rPA may improve mental health in older adults, particularly among women.

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#### **PDF Y Endnote Y**

### **Teeth and covariates: association with risk of falls**

Kohli S, Wui Vun AL, Daryl Philip C, Muhammad Aadil C, Ramalingam M.

*Int. J. Dent.* 2018; 2018: e7127209.

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**DOI** 10.1155/2018/7127209 **PMID** 30034470 **PMCID** PMC6035810

#### **Abstract**

**PURPOSE:** Falls occur commonly in geriatric populations and undesirably influence their life, morbidity, and mortality. The aim of this study was to analyze the association between the number



of teeth present among the elderly population and covariates in relation to the risk of falls.

**MATERIALS AND METHODS:** This study was conducted at various old age homes in the Klang Valley region of Malaysia involving the geriatric population aged 60 years and above. A detailed questionnaire consisting of sociodemographic data including sex, age, household income, and dental variables such as the number of teeth and chewing difficulty was obtained. The Tinetti test (TT) was used to evaluate the patients' ability to walk, to maintain postural balance, and to determine their risk of falling. The short version of the Geriatric Depression Scale was used to assess depression among the participants, and the Barthel Scale was used to analyze the subject's ability to perform the activities of daily living (ADL).

**RESULTS:** Statistically significant association was observed in relation to the number of teeth present and risk of falls ( $p < 0.05$ ). Subjects who had 19 teeth or less in total had moderate to highest risk of falls ( $p=0.001$ ) in comparison with subjects who had 20 teeth or more. Those aged 70 years and above showed the highest risk of falls ( $p=0.001$ ) in comparison with the subjects aged between 60 and 69 years. Subjects with depression ( $p=0.03$ ) and presence of illness related to fall showed statistically significant difference ( $p=0.001$ ) in comparison with those who did not suffer from the same. Compromised ADL ( $p=0.001$ ) (which included ability to perform several tasks like indoor mobility, climbing stairs, toilet use, and feeding) and low monthly income ( $p=0.03$ ) was also observed among subjects who had higher risk of falls.

**CONCLUSION:** According to the results achieved, there was a high statistically significant association observed between the number of teeth present, age, depression, ADL, and presence of illness in relation to the risk of falling among the geriatric population. Henceforth, oral rehabilitation of elderly patients with less number of teeth may reduce their risk of falls.

#### PDF Y Endnote Y

#### **The effectiveness of exercise for fall prevention in nursing home residents: a systematic review and meta-analysis**

Cao PY, Zhao QH, Xiao MZ, Kong LN, Xiao L.

*J. Adv. Nurs.* 2018; ePub(ePub): ePub.

**Affiliation:** Department of Nursing, The First Affiliated Hospital of Chongqing Medical University, Chongqing, China.

(Copyright © 2018, John Wiley and Sons)

**DOI** 10.1111/jan.13814 **PMID** 30043462

#### **Abstract**

**AIM:** To determine the effectiveness of exercise on fall prevention in nursing home residents.

**BACKGROUND:** Nursing home residents have a high risk of falling. No conclusive evidence exists on the effectiveness of exercise on fall prevention in nursing home residents.

**DESIGN:** Systematic review and meta-analysis of randomized controlled trials.

**DATA RESOURCES:** Databases of PubMed, Web of Science, EMBASE, Cochrane Central Register of Controlled Trials, Cumulative Index to Nursing and Allied Health Literature and China Biology Medicine were searched from inception to March 2017, with no language limitation.

**METHODS:** The review was conducted according to the guidelines of the Cochrane Collaboration. Studies on exercise interventions to prevent falls in nursing home residents were eligible. The primary outcome was the odds ratio with 95% confidence intervals of falls.

**RESULTS:** Nine studies were included in the meta-analysis where exercise was compared with daily routine, social activities and other methods in preventing falls. Regarding falls, the pooled effect size of seven studies showed that exercise had no effect on fall prevention in nursing home residents. There was low heterogeneity. No significant publication bias was observed.

**CONCLUSIONS:** The results of the systematic review and meta-analysis suggested that exercise did not play a role in preventing falls. Further studies with high quality and larger samples are required to support or counter the results. This article is protected by copyright. All rights reserved.

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**Trauma team activation criteria and outcomes of geriatric trauma: 10 year single centre cohort study**

Hung KK, Yeung JHH, Cheung CSK, Leung LY, Cheng RCH, Cheung NK, Graham CA.

*Am. J. Emerg. Med.* 2018; ePub(ePub): ePub.

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**DOI** 10.1016/j.ajem.2018.06.011 **PMID** 30041911

**Abstract**

**BACKGROUND:** With the aging population, the number of older patients with multiple injuries is increasing. The aim of this study was to understand the patterns and outcomes of older patients admitted to a major trauma centre in Hong Kong from 2006 to 2015, and investigate the performance of the trauma team activation (TTA) criteria for these elderly patients.

**METHODS:** This was a retrospective cohort study from a university hospital major trauma centre in Hong Kong from 2006 to 2015. Patients aged 55 or above who entered the trauma registry were included. Patients were divided into those aged 55-70, and above 70. To test the performance of the TTA criteria, we defined injured patients with severe outcomes as those having any of the following: death within 30 days; the need for surgery; or the need for intensive care unit (ICU) care. **RESULTS:** 2218 patients were included over the 10 year period. The 30-day mortality was 7.5% for aged 55-70 and 17.7% for those aged above 70. The sensitivity of TTA criteria for identifying severe outcomes for those aged 55 or above was 35.6%, with 91.6% specificity. The under-triage rate was 59% for age 55-70, and 69.1% for those aged above 70.

**CONCLUSION:** There is a need to consider alternative TTA criteria for our geriatric trauma population, and to more clearly define the process and standards of care in Hong Kong.

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**PDF Y Endnote y**

**Balance, falls, and exercise: beliefs and experiences in people with hemophilia: a qualitative study**

Flaherty LM, Schoeppe J, Kruse-Jarres R, Konkle BA.

*Res. Pract. Thromb. Haemost.* 2018; 2(1): 147-154.

**Affiliation:** Division of Hematology University of Washington Seattle WA USA.

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### Abstract

**BACKGROUND:** Prior research has established that falls are commonplace in adults with hemophilia, and advises that physical therapy and exercise are successful in fall prevention. Recognizing obstacles and catalysts to physical therapy and exercise in people with hemophilia may augment the efficacy of efforts to prevent falls in this population.

**OBJECTIVES:** To learn about the experiences and ideas of patients with hemophilia, especially associated with balance, falls, and exercise.

**METHODS:** Semi-structured interviews with 14 adult patients with hemophilia were performed. The interviews were coded for themes founded on the study aims.

**RESULTS:** Most subjects described difficulty with balance, often ascribed to joint problems. They believed that staying strong and fit could positively influence balance, but expressed concerns and fear related to falling. Those who exercised regularly did not view exercise as hazardous, while those who did not dependably exercise articulated worry that dangers of exercise may offset the benefits. The most common obstacle to exercise was pain and having someone to exercise with was often described as an enabler. Barriers to partaking in physical therapy included weak proof of its success and distrust in the therapist. Positive physical therapy experiences in the past and the connection with the therapist were reported as facilitators.

**CONCLUSIONS:** People with hemophilia describe some attitudes and experiences that are unique to hemophilia while others are found in the general population. Attending to fear, pain, and support for interventions, while encouraging a robust therapeutic alliance and a plan for routine exercise may aid fall prevention behaviors.

### PDF Endnote

#### Definition of balance and cognition related to disability levels in vestibular migraine patients

Balci B, Şenyuva N, Akdal G.

*Noro Psikiyatı Ars* 2018; 55(1): 9-14.

**Affiliation:** Department of Neurology, Dokuz Eylül University Medical Faculty, İzmir, Turkey.

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DOI 10.29399/npa.12617 PMID30042635 PMCID PMC6045802

### Abstract

**OBJECTIVE:** To compare the balance and cognition of vestibular migraine (VM) patients with migraineurs without vertigo history and healthy subjects, and to examine the effects of disability level on these functions. **MATERIAL-METHOD:** The study consisted of 32 VM patients, 32 migraineurs and 31 healthy subjects with similar sex and age. Balance functions were assessed with Balance Evaluation Systems Test (BEST), dizziness and headache severity with Visual Analogue Scale (VAS), disability related to dizziness with Dizziness Handicap Inventory (DHI), cognition with Stroop test.

**RESULTS:** There was no statistical significant difference among the three groups in terms of age, gender, height, weight, marital status and education levels ( $p > 0.05$ ). Headache severity was higher in migraineurs than vestibular migraineurs and healthy subjects, also dizziness severity was higher in vestibular migraineurs than migraineurs and healthy subjects ( $p < 0.0167$ ). The outcomes of BEST 4, 5, 6 and BEST-total were significantly impaired in VM patients than migraineurs and healthy subjects, and worse in migraineurs rather than healthy subjects ( $p < 0.0167$ ). Stroop effect of cognitive

examination was worse in VM and migraine patients rather than healthy subjects ( $p < 0.0167$ ). There was no significant difference between VM and migraineurs ( $p > 0.0167$ ). There was a negative correlation between Stroop effect and BEST-total in VM patients significantly ( $r = -0.509$ ,  $p = 0.003$ ), and no significant correlation in migraineurs ( $p > 0.05$ ). Disability levels of VM patients were low in 38.7%, mild in 51.6% and severe in 9.7% related to DHI. There was no significant difference between balance and cognition function in terms of disability levels ( $p > 0.05$ ).

**CONCLUSION:** The balance and cognition in VM patients and migraineurs were impaired rather than healthy subjects. The patient groups differed from each other in terms of vertiginous complaints rather than cognition. Solving the functional limitations with further longitudinal examinations can facilitate the treatment. The appropriate physiotherapy programs and patient education methods can be planned for these various issues.

#### PDF Y Endnote Y

#### **Effects of motor fatigue on walking stability and variability during concurrent cognitive challenges**

Kao PC, Pierro MA, Booras K.

*PLoS One* 2018; 13(7): e0201433.

**Affiliation:** Department of Physical Therapy, University of Massachusetts Lowell, Lowell, Massachusetts, United States of America.

(Copyright © 2018, Public Library of Science)

**DOI** 10.1371/journal.pone.0201433 **PMID** 30048551

#### **Abstract**

Cognitive-motor interference, a negative influence on the performance of one or both tasks, is manifested when simultaneously performing a cognitive and a motor task. Motor fatigue reduces the ability of generating a required force level. However, little is known about the effects of motor fatigue on the cognitive-motor dual-tasking performance, an important capability during our daily lives. This study investigated how motor fatigue affects dual-task walking performance. Eighteen healthy younger adults walked on a treadmill under three different conditions: walking only, walking while receiving the Paced Auditory Serial Addition Test (PASAT) or a modified Stroop test before and after a lower-extremity fatiguing exercise. We computed dynamic margins of stability (MOS), step and joint kinematic variability, and short-term local divergence exponent (LDE) of the trunk motion. We found that subjects had similar values of short-term LDE during all conditions, indicating that local stability was not affected by the motor fatigue or dual-task conditions. Compared to the baseline, subjects had significantly greater mean MOS after the fatiguing exercise by walking with greater step length and width while having significantly greater gait variability. In contrast, subjects walked with similar mean MOS but significantly less gait variability during the dual-task conditions, indicating that subjects used different adaptive strategies when walking with motor fatigue and during dual-task conditions. There were no significant differences in the number of errors for the two cognitive tests before and after the fatiguing exercise. The current findings demonstrate that motor fatigue does not affect cognitive but motor performance in younger adults.

#### PDF Y Endnote Y

### **Gait characteristics and falls in Parkinson's disease: a systematic review and meta-analysis**

Creaby MW, Cole MH.

*Parkinsonism Relat. Disord.* 2018; ePub(ePub): ePub.

**Affiliation:** School of Exercise Science, Australian Catholic University, Brisbane, Australia.

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**DOI** 10.1016/j.parkreldis.2018.07.008 **PMID** 30041848

#### **Abstract**

**INTRODUCTION:** Given the high rate of falls during walking in people with idiopathic Parkinson's disease (PD), identifying at risk individuals and developing targeted interventions to reduce falls incidence is paramount. Numerous studies have investigated gait-related risk factors for falls in PD, however findings are inconsistent across studies, and thus a synthesis of the current evidence is needed to guide clinical practice and the development of interventions to reduce falls risk. The objective of this study was to systematically review the literature regarding the association between walking biomechanics and falls in people with PD, and where possible, perform meta-analyses.

**METHODS:** The study was performed in accordance with the PRISMA guidelines. Databases were searched until January 2018 to identify articles that reported on the association between walking biomechanics and prospective or retrospective falls in people with PD.

**RESULTS:** Twenty-six articles were included (15 prospective studies, 11 retrospective studies). Articles reported on spatiotemporal and kinematic characteristics, and muscle activation patterns. Meta-analyses revealed slower walking speed, lower cadence, shorter strides and more mediolateral head and pelvis motion in those at higher risk of future falls.

**FINDINGS** from prospective and retrospective articles were largely consistent.

**CONCLUSION:** Our findings identify spatiotemporal and kinematic characteristics of gait that are risk factors for falls in PD. Modification of these characteristics may have the potential to mediate falls risk, and future research to investigate this possibility is merited. The influence of body and ground reaction forces, and muscle activation patterns on falls risk in PD is currently under-researched.

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**PDF Y Endnote Y**

### **Mortality, risk factors and causes of death in Swedish patients with open tibial fractures - a nationwide study of 3, 777 patients**

Tampe U, Widmer LW, Weiss RJ, Jansson KA.

*Scand. J. Trauma Resusc. Emerg. Med.* 2018; 26(1): e62.

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**DOI** 10.1186/s13049-018-0531-0 **PMID** 30045769

#### **Abstract**

**BACKGROUND:** Open tibial fractures are serious, complicated injuries. Previous studies suggested an increased risk of death, however, this has not been studied in large population-based settings. We aimed to analyze mortality including causes of death in all patients with open tibial fractures in Sweden. Moreover, we wanted to compare mortality rates with the Swedish population and

determine whether treatment-related or demographic variables were independently associated with death.

**METHOD:** We searched the Swedish National Hospital Discharge Register for all patients with open tibial fracture between 1998 and 2010. We collected the following variables: age, gender, length of stay, mechanism of injury and treatment rendered. We then cross-referenced the Swedish Cause of Death Register to determine the cause of death, if applicable. We compared mortality in the study population with population-based mortality data from Statistics Sweden and determined whether variables were independently associated with death using regression analysis.

**RESULTS:** Of the 3777 open tibial fractures, 425 (11.3%) patients died. The most common causes of death for elderly patients were cardiovascular and respiratory disease. Patients aged 15-39 years succumbed to external causes (accidents, suicides or poisoning). Increasing age (OR 25.7 (95% CI 11.8-64.8)  $p < 0.001$ ), length of hospital stay (HR 1.01, (95% CI 1.01-1.02,)  $p < 0.001$ ), limb amputation (OR 4.8 (95% CI 1.86-11.1)  $p < 0.001$ ) and cause of the accident were independently associated with an increased mortality.

**CONCLUSION:** Patients with open tibial fractures have an increased risk of death compared with the general population in all age- and gender-groups. External causes of death are over-represented and indicate a subgroup with a risky behaviour among younger males. Elderly patients have an increased risk of dying comparable to hip fracture patients. They are at risk for cardiovascular and respiratory failure and should be treated with urgency, emphasizing the need for specialized geriatric trauma units.

#### PDF Y Endnote Y

#### **Rhythmic auditory stimulation for reduction of falls in Parkinson's disease: a randomized controlled study**

Thaut MH, Rice RR, Braun Janzen T, Hurt-Thaut CP, McIntosh GC.

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#### **Abstract**

**OBJECTIVE:** To test whether rhythmic auditory stimulation (RAS) training reduces the number of falls in Parkinson's disease patients with a history of frequent falls.

**DESIGN:** Randomized withdrawal study design.

**SUBJECTS:** A total of 60 participants (aged 62-82 years) diagnosed with idiopathic Parkinson's disease (Hoehn and Yahr stages III or IV) with at least two falls in the past 12 months.

**INTERVENTION:** Participants were randomly allocated to two groups and completed 30 minutes of daily home-based gait training with metronome click-embedded music. The experimental group completed 24 weeks of RAS training, whereas the control group discontinued RAS training between weeks 8 and 16. **MAIN MEASURES:** Changes in clinical and kinematic parameters were assessed at baseline, weeks 8, 16, and 24.

**RESULTS:** Both groups improved significantly at week 8. At week 16-after the control group had discontinued training-significant differences between groups emerged including a rise in the fall

index for the control group (  $M = 10$ ,  $SD = 6$ ). Resumption of training reduced the number of falls so that group differences were no longer significant at week 24 (  $M_{\text{experimental}} = 3$ ,  $SD = 2.6$ ;  $M_{\text{control}} = 5$ ,  $SD = 4.4$ ;  $P > 0.05$ ). Bilateral ankle dorsiflexion was significantly correlated with changes in gait, fear of falling, and the fall index, indicating ankle flexion as a potential kinematic mechanism RAS addresses to reduce falls.

**CONCLUSION:** RAS training significantly reduced the number of falls in Parkinson's disease and modified key gait parameters, such as velocity and stride length.

**PDF Y Endnote Y**

**Walking stability during normal walking and its association with slip intensity among individuals with incomplete spinal cord injury**

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**Abstract**

**BACKGROUND:** Ambulatory individuals with incomplete spinal cord injury (iSCI) experience frequent falls suggesting impairments in their balance control. Individuals with iSCI are more stable during normal walking as compared to able-bodied individuals; however, it is not known whether this increased stability helps prevent hazardous slips.

**OBJECTIVE:** Compare walking stability during normal walking between iSCI and able-bodied individuals, and to study the association between stability during normal walking and the intensity of an unexpected slip perturbation.

**DESIGN:** Cross-sectional

**SETTING:** University of Saskatchewan

**PARTICIPANTS:** Twenty iSCI (15 males; age:  $M=60.05$ ,  $SD=17.77$  years) and 16 (12 males; age:  $M=58.92$ ,  $SD=17.10$  years) able-bodied (AB) individuals.

**METHODS:** Stability measures during unperturbed walking at a self-selected speed were collected from all the participants. Additionally, stability measures were also collected from 10 of the AB participants walking at a slower speed. An unexpected slip perturbation was recorded in all participants during a self-selected speed trial and peak-slip heel velocity post slip was recorded.

**MAIN OUTCOME MEASUREMENTS:** Measures of stability: ankle co-contraction, required coefficient of friction, walking velocity, foot angle, antero-posterior margin of stability, percentage double support, step length and width were compared between - iSCI, AB-self selected, and AB-slow walking groups. Associations between slip intensity, indicated by peak post-slip heel velocity, and stability measures were also examined through correlation analysis.

**RESULTS:** Individuals with iSCI, walked slower, took shorter steps, and spent a greater percentage of time in double support compared to AB individuals walking at a self-selected pace ( $p < .01$ ). Slower walking velocity was correlated with slower post-slip velocity in participants with iSCI ( $p = .01$ ) only.

**CONCLUSIONS:** Individuals with iSCI walk with greater stability than AB individuals during unperturbed walking due to a lower self-selected speed, which appears to reduce the intensity of an

unexpected slip perturbation. LEVEL OF EVIDENCE: Level III.

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