

## SafetyLit September 18, 2016

### Assessing risk of falling in older adults-a comparison of three methods

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#### Abstract

**BACKGROUND:** Various risk assessment methods have been developed to assess fall risk. Diagnostic accuracy of fall risk assessments is low and there is a scarcity of evidence regarding clinical effectiveness. **AIMS:** The aim of this study was to evaluate the diagnostic accuracy and clinical effectiveness of a standardized fall risk assessment relative to clinical and self-report assessment. **METHODS:** A single-site, prospective, longitudinal study was performed in a group of geriatric patients. Participants were patients being admitted to a geriatric rehabilitation hospital. The St. Thomas's risk assessment tool (STRATIFY), clinical assessment, and a self-report assessment (fear of falling) were used to assess fall risk at two time points (at baseline and 3-week follow-up). The primary outcome was fall events. Contingency tables were used to calculate sensitivity, specificity, positive predictive values, and negative predictive values. Fisher's exact test was used to test the association between assessments and fall events.

**RESULTS:** A total of 124 patients participated in the study. The self-report technique demonstrated the highest sensitivity and negative predictive validity. The STRATIFY tool showed the highest specificity but the lowest sensitivity. The self-report technique was associated with a lower number of fall events.

**DISCUSSION:** Given the lack of diagnostic accuracy of all three assessment techniques and the lack of evidence regarding clinical effectiveness, the usefulness of these fall risk assessments can be challenged.

**IMPLICATIONS FOR PRACTICE:** At least in settings in which fall prevention programs are a part of standard care, additional time consuming assessments may not be required.

**LINKING EVIDENCE TO ACTION:** It is questionable whether time-consuming assessments examined in this study are necessary. Further studies are needed to examine the diagnostic accuracy and clinical effectiveness of fall risk assessments.

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#### PDF Y Endnote Y

### Community-based exercise intervention for gait and functional fitness improvement in an older population: study protocol

Ramalho F, Carnide F, Santos-Rocha R, André HI, Moniz-Pereira V, Machado ML, Veloso AP.

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#### Abstract

Functional fitness (FF) and gait ability in older populations have been associated with increased survival rates, fall prevention and quality of life. One possible intervention for the improvement of FF is well-structured exercise programs. However, there are inconsistent findings regarding the effects

of exercise interventions in the maintenance of gait parameters. The aim of this protocol is to develop a community-based exercise intervention targeting an older population. The intervention aim is the improvement of gait parameters and FF. A control trial with follow-up will be performed. The primary outcome variables will be plantar pressure gait parameters. The secondary outcome variables will be aerobic endurance, lower limb strength, agility, and balance. These variables will be recorded at baseline and after 12, 24 and 36 weeks, in the intervention and control groups. If effective, this protocol can be used by exercise professionals in improving community exercise programs.

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

#### **Comparison of functional outcomes in elderly who have sustained a minor trauma with or without head injury: a prospective multicenter cohort study**

Brousseau AA, Emond M, Sirois MJ, Daoust R, Griffith LE, Lang E, Lee J, Perry JJ, Ouellet MC, Verreault R, Berthelot S, Mercier E, Allain-Boulé N, Boucher V, Tardif PA, Le Sage N.  
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#### **Abstract**

**OBJECTIVES:** The consequences of minor trauma involving a head injury (MT-HI) in independent older adults are largely unknown. This study assessed the impact of a head injury on the functional outcomes six months post-injury in older adults who sustained a minor trauma.

**METHODS:** This multicenter prospective cohort study in eight sites included patients who were aged 65 years or older, previously independent, presenting to the emergency department (ED) for a minor trauma, and discharged within 48 hours. To assess the functional decline, we used a validated test: the Older Americans' Resources and Services Scale. The cognitive function of study patients was also evaluated. Finally, we explored the influence of a concomitant injury on the functional decline in the MT-HI group.

**RESULTS:** All 926 eligible patients were included in the analyses: 344 MT-HI patients and 582 minor trauma without head injury. After six months, the functional decline was similar in both groups: 10.8% and 11.9%, respectively (RR=0.79 [95% CI: 0.55-1.14]). The proportion of patients with mild cognitive disabilities was also similar: 21.7% and 22.8%, respectively (RR=0.91 [95% CI: 0.71-1.18]). Furthermore, for the group of patients with a MT-HI, the functional outcome was not statistically different with or without the presence of a co-injury (RR=1.35 [95% CI: 0.71-2.59]).

**CONCLUSION:** This study did not demonstrate that the occurrence of a MT-HI is associated with a worse functional or cognitive prognosis than other minor injuries without a head injury in an elderly population, six months after injury.

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**Effectiveness of medication withdrawal in older fallers: results from the Improving Medication Prescribing to reduce Risk Of FALLs (IMPROVeFALL) trial**

Boyé ND, van der Velde N, de Vries OJ, van Lieshout EM, Hartholt KA, Mattace-Raso FU, Lips P, Patka P, Van Beeck EF, van der Cammen TJ. *Age Ageing* 2016; ePub(ePub): ePub.

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**Abstract**

**OBJECTIVES:** to investigate the effect of withdrawal of fall-risk-increasing-drugs (FRIDs) versus 'care as usual' on reducing falls in community-dwelling older fallers.

**DESIGN:** randomised multicentre trial.

**PARTICIPANTS:** six hundred and twelve older adults who visited an Emergency Department (ED) because of a fall.

**INTERVENTIONS:** withdrawal of FRIDs.

**MAIN OUTCOMES AND MEASURES:** primary outcome was time to the first self-reported fall. Secondary outcomes were time to the second self-reported fall and to falls requiring a general practitioner (GP)-consultation or ED-visit. Intention-to-treat (primary) and a per-protocol (secondary) analysis were conducted. The hazard ratios (HRs) for time-to-fall were calculated using a Cox-regression model. Differences in cumulative incidence of falls were analysed using Poisson regression.

**RESULTS:** during 12 months follow-up, 91 (34%) control and 115 (37%) intervention participants experienced a fall; 35% of all attempted interventions were unsuccessful, either due to recurrence of the initial indication for prescribing, additional medication for newly diagnosed conditions or non-compliance. Compared to baseline, the overall percentage of users of  $\geq 3$  FRIDs at 12 months did not change in either the intervention or the control group. Our intervention did not have a significant effect on time to first fall (HR 1.17; 95% confidence interval 0.89-1.54), time to second fall (1.19; 0.78-1.82), time to first fall-related GP-consultation (0.66; 0.42-1.06) or time to first fall-related ED-visit (0.85; 0.43-1.68).

**CONCLUSION:** in this population of complex multimorbid patients visiting an ED because of a fall, our single intervention of FRIDs-withdrawal was not effective in reducing falls. **TRIAL REGISTRATION:** Netherlands Trial Register NTR1593.

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**PDF Y Endnote Y**

**Geriatric fall-related injuries**

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*Afr. Health Sci.* 2016; 16(2): 554-559.

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**DOI** 10.4314/ahs.v16i2.24 **PMID** 27605971 **PMCID** PMC4994555

### Abstract

**BACKGROUND:** Falls are the leading cause of geriatric injury.

**OBJECTIVES:** We aimed to study the anatomical distribution, severity, and outcome of geriatric fall-related injuries in order to give recommendations regarding their prevention.

**METHODS:** All injured patients with an age  $\geq 60$  years who were admitted to Al-Ain Hospital or died in the Emergency Department due to falls were prospectively studied over a four year period.

**RESULTS:** We studied 92 patients. Fifty six of them (60.9%) were females. The mean (standard deviation) of age was 72.2 (9.6) years. Seventy three (89%) of all incidents occurred at home. Eighty three patients (90.2%) fell on the same level. The median (range) ISS was 4 (1-16) and the median GCS (range) was 15 (12-15). The lower limb was the most common injured body region (63%). There were no statistical significant differences between males and females regarding age, ISS, and hospital stay ( $p = 0.85$ ,  $p = 0.57$ , and  $p = 0.35$  respectively).

**CONCLUSION:** The majority of geriatric fall-related injuries were due to fall from the same level at home. Assessment of risk factors for falls including home hazards is essential for prevention of geriatric fall-related injuries.

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### Influence of cognitive impairment on fall risk among elderly nursing home residents

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### Abstract

**BACKGROUND:** Information relating the severity of cognitive decline to the fall risk in institutionalized older adults is still scarce. This study aims to identify potential fall risk factors (medications, behavior, motor function, and neuropsychological disturbances) depending on the severity of cognitive impairment in nursing home residents.

**METHODS:** A total of 1,167 nursing home residents (mean age  $81.44 \pm 8.26$  years; 66.4% women) participated in the study. According to the MEC, (the Spanish version of the Mini-Mental State Examination) three levels of cognitive impairment were established: mild (20-24) "MCI", moderate (14-19) "MOCI", and severe ( $\leq 14$ ) "SCI". Scores above 24 points indicated the absence cognitive impairment (NCI). Information regarding fall history and fall risk during the previous year was collected using standardized questionnaires and tests.

**RESULTS:** Sixty falls (34%) were registered among NCI participants and 417 (43%) among people with cognitive impairment (MCI: 35%; MOCI: 40%; SCI: 50%). A different fall risk model was observed for MCI, MOCI, SCI, and NCI patients. The results imply that the higher the level of cognitive impairment, the greater the number of falls ( $F_{1,481} = 113.852$ ;  $\text{Sig} = 0.015$ ), although the level of significance was not maintained when MOCI and SCI participants were compared. Depression, neuropsychiatric disturbances, autonomy constraints in daily life activity performance, and low functional mobility were factors closely associated with fall risk.

**CONCLUSION:** This study provides evidence indicating that fall risk factors do not hold a direct correlation with the level of cognitive impairment among elderly nursing home care residents.

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### **Longitudinal trends in fall accidents in community dwelling Korean adults: the 2008-2013 Korean Community Health Survey**

Hong I, Simpson AN, Logan S, Woo HS.

*Ann. Rehabil. Med.* 2016; 40(4): 657-665.

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(Copyright © 2016, Korean Academy of Rehabilitation Medicine)

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#### **Abstract**

**OBJECTIVE:** To describe the longitudinal characteristics of unintentional fall accidents using a representative population-based sample of Korean adults.

**METHODS:** We examined data from the Korean Community Health Survey from 2008 to 2013. Univariate analysis and multivariable logistic regression were used to identify the characteristics of fall accidents in adults.

**RESULTS:** Between 2008 and 2013, the incidence rate of fall accidents requiring medical treatment increased from 1,248 to 3,423 per 100,000 people ( $p < 0.001$ ), while the proportion of indoor fall accidents decreased from 38.12% to 23.16% ( $p < 0.001$ ). Females had more annual fall accidents than males ( $p < 0.001$ ). The major reason for fall accidents was slippery floors (33.7% in 2011 and 36.3% in 2013). Between 2008 and 2010, variables associated with higher fall accident risk included specific months (August and September), old age, female gender, current drinker, current smoker, diabetes, osteoarthritis, osteoporosis, and depression. A high level of education and living with a partner were negatively associated with fall accident risk. In 2013, people experiencing more than 1 fall accident felt more fear of falling than those having no fall accidents (odds ratio [OR] for 1 fall, 2.12; 95% confidence interval [CI], 2.04-2.12; OR for more than 2 falls, 2.97; 95% CI, 2.83-3.10).

**CONCLUSION:** The occurrence of fall accidents has consistently increased in Korea from 2008 to 2013. Future intervention studies are needed to reduce the increasing incidence rates of fall accidents in community dwelling adults.

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### **Medical demographics in sub-Saharan Africa: does the proportion of elderly patients in accident and emergency units mirror life expectancy trends?**

Wojda TR, Cornejo K, Valenza PL, Carolan G, Sharpe RP, Mira AE, Galwankar SC, Stawicki SP.

*J. Emerg. Trauma Shock* 2016; 9(3): 122-125.

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**Abstract** [Abstract unavailable]

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

## **Motor and mental training in older people: transfer, interference, and associated functional neural responses**

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*Neuropsychologia* 2016; 89: 371-377.

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### **Abstract**

Learning new motor skills may become more difficult with advanced age. In the present study, we randomized 56 older individuals, including 30 women (mean age 70.6 years), to 6 weeks of motor training, mental (motor imagery) training, or a combination of motor and mental training of a finger tapping sequence. Performance improvements and post-training functional magnetic resonance imaging (fMRI) were used to investigate performance gains and associated underlying neural processes. Motor-only training and a combination of motor and mental training improved performance in the trained task more than mental-only training. The fMRI data showed that motor training was associated with a representation in the premotor cortex and mental training with a representation in the secondary visual cortex. Combining motor and mental training resulted in both premotor and visual cortex representations. During fMRI scanning, reduced performance was observed in the combined motor and mental training group, possibly indicating interference between the two training methods. We concluded that motor and motor imagery training in older individuals is associated with different functional brain responses. Furthermore, adding mental training to motor training did not result in additional performance gains compared to motor-only training and combining training methods may result in interference between representations, reducing performance.

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## **Predicting imminent risk for fracture in patients aged 50 or older with osteoporosis using US claims data**

Bonafede M, Shi N, Barron R, Li X, Crittenden DB, Chandler D.

*Arch. Osteoporos.* 2016; 11(1): 26.

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### **Abstract**

Patient characteristics contributing to imminent risk for fracture, defined as risk of near-term fracture within the next 12 to 24 months, have not been well defined. In patients without recent fracture, we identified factors predicting imminent risk for vertebral/nonvertebral fracture, including falls, age, comorbidities, and other potential fall risk factors.

**PURPOSE:** Several factors contribute to long-term fracture risk in patients with osteoporosis, including age, bone mineral density, and fracture history. Some patients may be at imminent risk for fracture, defined here as a risk of near-term fracture within 12-24 months. Many patient characteristics contributing to imminent risk for fracture have not been well defined. This case-

control study used US commercial and Medicare supplemental insured data for women and men without recent fracture to identify factors associated with imminent risk for fracture.

**METHODS:** Patients included were aged  $\geq 50$  with osteoporosis, had a vertebral or nonvertebral fracture claim (index date; fracture group) or no fracture claim (control group) from January 1, 2006, to September 30, 2012, continuously enrolled and without fracture in the 24 months before index. Potential risk factors during the period before fracture were assessed.

**RESULTS:** Using data from 12 months before fracture, factors significantly associated with imminent risk for fracture were previous falls, older age, poorer health status, specific comorbidities (psychosis, Alzheimer's disease, central nervous system disease), and other fall risk factors (wheelchair use, psychoactive medication use, mobility impairment). Similar findings were observed with data from 24 months before fracture.

**CONCLUSIONS:** In patients with osteoporosis and no recent fracture, falls, older age, poorer health status, comorbidities, and other potential fall risk factors were predictive of imminent risk for fracture. Identification of factors associated with imminent risk for vertebral/nonvertebral fracture may help identify and risk stratify those patients most in need of immediate and appropriate treatment to decrease fracture risk.

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

#### **Prediction of early mortality following hip fracture surgery in frail elderly: the Almelo Hip Fracture Score (AHFS)**

Nijmeijer WS, Folbert EC, Vermeer M, Slaets JP, Hegeman JH.

*Injury* 2016; ePub(ePub): ePub.

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(Copyright © 2016, Elsevier Publishing)

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#### **Abstract**

**BACKGROUND:** Hip fractures are common in the elderly and have a high risk of early mortality. Identification of patients at high risk of early mortality could contribute to enhanced quality of care. A simple scoring system is essential for preoperative identification of patients at high risk of early mortality in clinical practice. Of risk models published, The Nottingham Hip Fracture Score (NHFS) shows the most promising results so far. However, there is still room for improvement.

**METHODS:** A cohort study including 850 patients was conducted over a period of 5,5 yr. The NHFS was adjusted for cognitive impairment (NHFS-a) and tested. Patients who died within 30days following hip fracture surgery (early mortality group) were compared to survivors. Independent risk factors for early mortality were assessed. A new hip fracture score for frail elderly was developed: the Almelo Hip Fracture Score (AHFS). The NHFS-a and the AHFS were compared for accuracy and predictive validity.

**RESULTS:** Sixty-four (7.5%) patients died within 30days following hip fracture surgery. The AHFS predicts the risk of early mortality better than the NHFS-a ( $p < 0.05$ ). Using cut-off points of  $AHFS \leq 9$  and  $AHFS \geq 13$ , patients could be divided into a low, medium or high risk group. The area under the curve improved with the AHFS compared to the NHFS-a (0.82 versus 0.72). The likelihood ratio test reveals a significantly better fit of the AHFS in comparison with the NHFS-a ( $p < 0.001$ ).

**CONCLUSIONS:** The AHFS can identify frail elderly at high risk of early mortality following hip fracture surgery accurately. With the AHFS, the patient can be classified into the low, medium or high risk

group, which contributes to enhanced quality of care in clinical practice.

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#### PDF Y Endnote Y

### Profile of fall injury in the New South Wales older adult population

Miu J, Curtis K, Balogh ZJ.

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#### Abstract

**BACKGROUND:** A previous report from the New South Wales (NSW) Trauma Registry identified falls and increasing age of severely injured patients as highly prevalent, but detailed injury and demographic profiles, outcomes and their predictors are poorly reported. This study describes the fall-injury profile in the older adult major trauma patient in NSW.

**METHODS:** A retrospective registry based study between 2010 and 2014 on patients aged 55 years and over who sustained a moderate to critical injury from a fall, examining mortality and length of stay using regression analyses.

**RESULTS:** There were 4263 major trauma falls between 2010 and 2014, most occurring at home (55.4%), on the same level (46.7%) and resulting in head injury (63.2%). Significant predictors for mortality following a fall were increased age, male gender, falls in residential care institutions, isolated head injuries and injury classified as critical (ISS 41-75).

**CONCLUSIONS:** The outcomes of falls in the older adult are very poor and a focused prospective study is required to identify areas for intervention and prevention. The predictors of mortality following a fall identified in this study can be used with existing research to develop tools and design care pathways for implementation in the emergency context to improve patient care and outcomes. Crown Copyright © 2016. Published by Elsevier Ltd. All rights reserved.

#### PDF Y Endnote Y

### Reducing falls among older people in general practice: the ProAct65+ exercise intervention trial

Gawler S, Skelton DA, Dinan-Young S, Masud T, Morris RW, Griffin M, Kendrick D, Iliffe S.

*Arch. Gerontol. Geriatr.* 2016; 67: 46-54.

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#### Abstract

**BACKGROUND:** Falls are common in the older UK population and associated costs to the NHS are high. Systematic reviews suggest that home exercise and group-based exercise interventions, which focus on progressively challenging balance and increasing strength, can reduce up to 42% of falls in those with a history of falls. The evidence is less clear for those older adults who are currently at low risk of falls.

**AIM:** ProAct65+, a large, cluster-randomised, controlled trial, investigated the effectiveness of a home exercise programme (Otago Exercise Programme (OEP)) and a group-based exercise



programme (Falls Management Exercise (FaME)) compared to usual care (UC) at increasing moderate to vigorous physical activity (MVPA). This paper examines the trial's secondary outcomes; the effectiveness of the interventions at reducing falls and falls-related injuries.

**SETTING & PARTICIPANTS:** 1256 community-dwelling older adults (aged 65+) were recruited through GP practices in two sites (London and Nottingham). Frequent fallers ( $\geq 3$  falls in last year) and those with unstable medical conditions were excluded, as were those already reaching the UK Government recommended levels of physical activity (PA) for health.

**METHODS:** Baseline assessment (including assessment of health, function and previous falls) occurred before randomisation; the intervention period lasted 24 weeks and there was an immediate post-intervention assessment; participants were followed up every six months for 24 months. Falls data were analysed using negative binomial modelling.

**OUTCOME MEASURES:** Falls data were collected prospectively during the intervention period by 4-weekly diaries (6 in total). Falls recall was recorded at the 3-monthly follow-ups for a total of 24 months. Balance was measured at baseline and at the end of the intervention period using the Timed Up & Go and Functional Reach tests. Balance confidence (CONFbal), falls risk (FRAT) and falls self-efficacy (FES-I) were measured by questionnaire at baseline and at all subsequent assessment points.

**RESULTS:** 294 participants (24%) reported one or two falls in the previous year. There was no increase in falls in either exercise group compared to UC during the intervention period (resulting from increased exposure to risk). The FaME arm experienced a significant reduction in injurious falls compared to UC (incidence rate ratio (IRR) 0.55, 95% CI 0.31, 0.96;  $p=0.04$ ) and this continued during the 12 months after the end of the intervention (IRR 0.73, 95% CI 0.54, 0.99;  $p=0.05$ ). There was also a significant reduction in the incidence of all falls (injurious and non-injurious) in the FaME arm compared with UC (IRR 0.74, 95% CI 0.55, 0.99;  $p=0.04$ ) in the 12 month period following the cessation of the intervention. There was a non-significant reduction in the incidence of all falls in the OEP arm compared with UC (IRR 0.76, 95% CI 0.53, 1.09;  $p=0.14$ ) in the 12 months following the cessation of the intervention. The effects on falls did not persist at the 24 months assessment in either exercise arm. However, when those in the FaME group who continued to achieve 150min of MVPA per week into the second post-intervention year were compared to those in the FaME group who did not maintain their physical activity, there was a significant reduction in falls incidence (IRR=0.49, 95% CI 0.30, 0.79;  $p=0.004$ ). CONFbal was significantly improved at 12 months post intervention in both intervention arms compared with UC. There were no significant changes in any of the functional balance measures, FES-I or FRAT, between baseline and the end of the intervention period.

**CONCLUSION:** Community-dwelling older adults who joined an exercise intervention (FaME) aimed at increasing MVPA did not fall more during the intervention period, fell less and had fewer injurious falls in the 12 months after cessation of the intervention. However, 24 months after cessation of exercise, the beneficial effects of FaME on falls reduction ceased, except in those who maintained higher levels of MVPA. OEP exercise appears less effective at reducing falls in this functionally more able population of older adults.

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**PDF Y Endnote Y**

### **The effects of antihypertensive medications on physical function**

Loprinzi PD, Loenneke JP.

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**DOI** 10.1016/j.pmedr.2016.03.009 **PMID** 27419024 **PMCID** PMC4929186

#### **Abstract**

**OBJECTIVE:** Limited research has examined the effects of antihypertensive medication use and physical function. These studies provided mixed findings while employing a convenience sample and limiting their examination to few indices of physical function and few classes of antihypertensive medications. The purpose of this study was to examine whether several antihypertensive medication classes were associated with several measures of physical function in a national sample of U.S. middle-to-older age adults.

**METHODS:** Data from the 1999-2002 and 2011-2012 NHANES were used. Antihypertensive medication use was assessed from an interviewer, and included angiotensin converting enzyme (ACE) inhibitors, peripherally-acting antiadrenergic agents and centrally-acting antiadrenergic agents. Physical function-related parameters included objectively-measured lower extremity isokinetic knee extensor strength (IKES), objectively-measured grip strength, laboratory-assessed walking performance (8 and 20 ft walk tests) and self-reported physical activity engagement.

**RESULTS:** Those on ACE inhibitors had a 37% reduced odds (OR = 0.63, 95% CI: 0.48-0.83, P = .002) of engaging in moderate-to-vigorous physical activity, had reduced knee extensor strength ( $\beta$  = - 15.4, 95% CI: - 27.2 to - 3.4, P = .01) and took longer to complete the 20 ft ( $\beta$  = .42, 95% CI: 0.02-0.81, P = .04) and 8 ft walking tests ( $\beta$  = .22, 95% CI: 0.05-0.39, P = .01). Those on peripherally-acting antiadrenergic agents had reduced grip strength ( $\beta$  = - 4.8, 95% CI: - 9.1 to - 0.5, P = .02).

**CONCLUSIONS:** Antihypertensive medication use, particularly ACE inhibitors, is associated with various measures of reduced physical function. Clinicians are encouraged to monitor the long-term mobility function of their patients on antihypertensive medications.

**PDF Y Endnote Y**

### **The management of vasovagal syncope**

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**Affiliation:** Mercers Institute, St James's Hospital, Dublin, Ireland.

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#### **Abstract**

Vasovagal syncope, or the "common faint", is the most common cause of syncope. Although it is considered a benign condition, there is a significant economic burden and significant impact on quality of life in patients with recurrent syncope, particularly in older adults. Typical vasovagal syncope usually occurs in young adults, and can often be diagnosed on the basis of history, in the absence of structural heart disease. Atypical vasovagal syncope, which is more common in older adults, can be more difficult to diagnose, however. In atypical vasovagal syncope, there is often a short or absent prodrome, and amnesia for loss of consciousness is common and it can, therefore, often be misdiagnosed, for example as falls. A more standardized approach to the diagnosis and

management of patients presenting with syncope or unexplained falls is required, and it is anticipated that the number of Syncope Units will increase. Treatment of vasovagal syncope is largely conservative; however, medical or device therapy may be required when syncope is severe and refractory to conservative treatment, as there is significant impact on quality of life and it can be associated with injury. The aim of this article is to provide an overview of the diagnosis and management of vasovagal syncope.

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### **Using embedded sensors in independent living to predict gait changes and falls**

Phillips LJ, DeRoche CB, Rantz M, Alexander GL, Skubic M, Despina L, Abbott C, Harris BH, Galambos C, Koopman R.

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#### **Abstract**

This study explored using big data, totaling 66 terabytes over 10 years, captured from sensor systems installed in independent living apartments to predict falls from pre-fall changes in residents' Kinect-recorded gait parameters. Over a period of 3 to 48 months, we analyzed gait parameters continuously collected for residents who actually fell ( $n = 13$ ) and those who did not fall ( $n = 10$ ). We analyzed associations between participants' fall events ( $n = 69$ ) and pre-fall changes in in-home gait speed and stride length ( $n = 2,070$ ). Preliminary results indicate that a cumulative change in speed over time is associated with the probability of a fall ( $p < .0001$ ). The odds of a resident falling within 3 weeks after a cumulative change of 2.54 cm/s is 4.22 times the odds of a resident falling within 3 weeks after no change in in-home gait speed.

RESULTS demonstrate using sensors to measure in-home gait parameters associated with the occurrence of future falls.

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**PDF Y Endnote Y**

### **Vision loss in older adults**

Pelletier AL, Rojas-Roldan L, Coffin J.

*Am. Fam. Physician* 2016; 94(3): 219-226.

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(Copyright © 2016, American Academy of Family Physicians)

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#### **Abstract**

Vision loss affects 37 million Americans older than 50 years and one in four who are older than 80 years. The U.S. Preventive Services Task Force concludes that current evidence is insufficient to assess the balance of benefits and harms of screening for impaired visual acuity in adults older than 65 years. However, family physicians play a critical role in identifying persons who are at risk of vision loss, counseling patients, and referring patients for disease-specific treatment. The conditions that cause most cases of vision loss in older patients are age-related macular degeneration,

glaucoma, ocular complications of diabetes mellitus, and age-related cataracts. Vitamin supplements can delay the progression of age-related macular degeneration. Intravitreal injection of a vascular endothelial growth factor inhibitor can preserve vision in the neovascular form of macular degeneration. Medicated eye drops reduce intraocular pressure and can delay the progression of vision loss in patients with glaucoma, but adherence to treatment is poor. Laser trabeculoplasty also lowers intraocular pressure and preserves vision in patients with primary open-angle glaucoma, but long-term studies are needed to identify who is most likely to benefit from surgery. Tight glycemic control in adults with diabetes slows the progression of diabetic retinopathy, but must be balanced against the risks of hypoglycemia and death in older adults. Fenofibrate also slows progression of diabetic retinopathy. Panretinal photocoagulation is the mainstay of treatment for diabetic retinopathy, whereas vascular endothelial growth factor inhibitors slow vision loss resulting from diabetic macular edema. Preoperative testing before cataract surgery does not improve outcomes and is not recommended.

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

#### **Vitamin D supplementation and its influence on muscle strength and mobility in community-dwelling older persons: a systematic review and meta-analysis**

Rosendahl-Riise H, Spielau U, Ranhoff AH, Gudbrandsen OA, Dierkes J.

*J. Hum. Nutr. Diet.* 2016; ePub(ePub): ePub.

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(Copyright © 2016, John Wiley and Sons)

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#### **Abstract**

**BACKGROUND:** It has been suggested that vitamin D status or supplementation is important for maintaining or improving muscle strength and mobility in older adults. The study results, however, do not provide consistent results. We therefore aimed to summarise the available evidence systematically, including only studies conducted in community-dwelling older persons.

**METHODS:** A systematic search of the literature was performed in April of 2016. The systematic review includes studies that used vitamin D with or without calcium supplementation as the exposure variable and various measurements of muscle strength and mobility. The meta-analysis was limited to studies using hand grip strength (HGS) and timed-up-and-go test as the outcome variables.

**RESULTS:** A total of 15 studies out of 2408 articles from the literature search were included in the systematic review, providing 2866 participants above the age of 65 years. In the majority of studies, no improvement in muscle strength and mobility was observed after administration of vitamin D with or without calcium supplements. In the meta-analysis, we observed a nonsignificant change in HGS [+0.2 kg (95% confidence interval = -0.25 to 0.7 kg; seven studies)] and a small, significant increase in the timed-up-and-go test [0.3 s (95% confidence interval = 0.1 to 0.5 s; five studies)] after vitamin D supplementation. The meta-analyses showed a high degree of heterogeneity between the studies.

**CONCLUSIONS:** In conclusion, we observed no improvement in muscle strength after the administration of vitamin D with or without calcium supplements. We did find a small but significant deterioration of mobility. However, this is based on a limited number of studies and participants.

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#### PDF Y Endnote Y

#### What's the hospitalisation's impact on background treatments of patients over 65 years

Gasparini G, Molinier S, Marimoutou C, Denormandie P, Sanchez S.

*Geriatr. Psychol. Neuropsychiatr. Vieil.* 2016; ePub(ePub): ePub.

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(Copyright © 2016, John Libbey Eurotext)

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#### Abstract

As our population aging increases, it requires a particular attention from the health system. Indeed, elderly are often frail, with several diseases and presenting high risk of adverse drug accident. Prescribing appropriately to the elderly has become an important matter. Hospitalization and consultation with the general practitioner are key moments for drug prescription. However, their real impact on background treatments of this population has been barely evaluated. A retrospective descriptive study was conducted with 300 patients over 65 years old, hospitalized at the Laveran military hospital in Marseille. Treatment modifications, consecutive to hospitalization and to the first consultation with the general practitioner, were identified and analyzed. We found an average prescription of 5.93 drugs in prehospital period and 66% of the patients with polypharmacy. Drugs for cardiovascular system were the most prescribed and the most modified. Hospitalization generated a rate of modification by prescription of 28.5% and the consultation with the general practitioner following this hospitalization led to further change in 48% of cases. Beside the important prevalence of patients with polypharmacy, this study shows that hospitalization entails a significant change in background treatments in that population at risk. Therefore, it is important to have a consensus in the re-evaluation of these treatments, in order to prevent the iatrogenic risk.

#### PDF Endnote Y

#### Atrial fibrillation and fall risk: what are the treatment implications?

Hylek EM, Ko D.

*J. Am. Coll. Cardiol.* 2016; 68(11): 1179-1180.

**Affiliation:** Department of General Medicine, Boston University School of Medicine, Boston, Massachusetts.

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**DOI** 10.1016/j.jacc.2016.07.714 **PMID** 27609679

**Abstract** [Abstract unavailable]

#### PDF Y Endnote Y

#### Characteristics and adaptive strategies linked with falls in stroke survivors from analysis of laboratory-induced falls

Honeycutt CF, Nevisipour M, Grabiner MD.

*J. Biomech.* 2016; ePub(ePub): ePub.

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(Copyright © 2016, Elsevier Publishing)

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### Abstract

Falls are the most common and expensive medical complication in stroke survivors. There is remarkably little information about what factors lead to a fall in stroke survivors. With few exceptions, the falls literature in stroke has focused on relating metrics of static balance and impairment to fall outcomes in the acute care setting or in community. While informative, these studies provide little information about what specific impairments in a stroke-survivor's response to dynamic balance challenges lead to a fall. We identified the key kinematic characteristics of stroke survivors' stepping responses following a balance disturbance that are associated with a fall following dynamic balance challenges. Stroke survivors were exposed to posteriorly-directed translations of a treadmill belt that elicited a stepping response. Kinematics were compared between successful and failed recovery attempts (i.e. a fall). We found that the ability to arrest and reverse trunk flexion and the ability to perform an appropriate initial compensatory step were the most critical response contributors to a successful recovery. We also identified 2 compensatory strategies utilized by stroke survivors to avoid a fall. Despite significant post-stroke functional impairments, the biomechanical causes of trip-related falls by stroke survivors appear to be similar to those of unimpaired older adults and lower extremity amputees. However, compensatory strategies (pivot, hopping) were observed.

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### Effects of game-based constraint-induced movement therapy on balance in patients with stroke: a single-blind randomized controlled trial

Choi HS, Shin WS, Bang DH, Choi SJ.

*Am. J. Phys. Med. Rehabil.* 2016; ePub(ePub): ePub.

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DOI 10.1097/PHM.0000000000000567 PMID 27386814

### Abstract

**OBJECTIVE:** The aims of this work were to determine whether game-based constraint-induced movement therapy (CIMT) is effective at improving balance ability in patients with stroke, and to provide clinical knowledge of game-based training that allows application of CIMT to the lower extremities.

**DESIGN:** Thirty-six patients with chronic stroke were randomly assigned to game-based CIMT (n = 12), general game-based training (n = 12), and conventional (n = 12) groups. All interventions were conducted 3 times a week for 4 weeks. The static balance control and weight-bearing symmetry were assessed, and the Functional Reach Test (FRT), modified Functional Reach Test (mFRT), and Timed Up and Go (TUG) test were performed to evaluate balance ability.

**RESULTS:** All 3 groups showed significant improvement in anterior-posterior axis (AP-axis) distance, sway area, weight-bearing symmetry, FRT, mFRT, and TUG test after the intervention ( $P < 0.05$ ). Post hoc analysis revealed significant differences in AP-axis, and sway area, weight-bearing symmetry of the game-based CIMT group compared with the other group ( $P < 0.05$ ).

**CONCLUSIONS:** Although the general game-based training and the game-based CIMT both improved on static and dynamic balance ability, game-based CIMT had a larger effect on static balance control, weight-bearing symmetry, and side-to-side weight shift.

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### **Human gait modeling and analysis using a semi-Markov process with ground reaction forces**

Ma H, Liao WH.

*IEEE Trans. Neural Syst. Rehabil. Eng.* 2016; ePub(ePub): ePub.

(Copyright © 2016, IEEE (Institute of Electrical and Electronics Engineers))

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#### **Abstract**

Modeling and evaluation of patients' gait patterns is the basis for both gait assessment and gait rehabilitation. This paper presents a convenient and real-time gait modeling, analysis, and evaluation method based on ground reaction forces (GRFs) measured by a pair of smart insoles. Gait states are defined based on the foot-ground contact forms of both legs. From the obtained gait state sequence and the duration of each state, the human gait is modeled as a semi-Markov process (SMP). Four groups of gait features derived from the SMP gait model are used for characterizing individual gait patterns. With this model, both the normal gaits of healthy people and the abnormal gaits of patients with impaired mobility are analyzed. Abnormal evaluation indices (AEI) are further proposed for gait abnormality assessment. Gait analysis experiments are conducted on 23 subjects with different ages and health conditions. The results show that gait patterns are successfully obtained and evaluated for normal, age-related, and pathological gaits. The effectiveness of the proposed AEI for gait assessment is verified through comparison with a video-based gait abnormality rating scale.

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### **Long-term chemotherapy-induced peripheral neuropathy among breast cancer survivors: prevalence, risk factors, and fall risk**

Bao T, Basal C, Seluzicki C, Li SQ, Seidman AD, Mao JJ.

*Breast Cancer Res. Treat.* 2016; ePub(ePub): ePub.

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(Copyright © 2016, Springer Science+Business Media)

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#### **Abstract**

Chemotherapy-induced peripheral neuropathy (CIPN) is a common toxicity associated with chemotherapy, but researchers rarely study its risk factors, fall risk, and prevalence in long-term breast cancer survivors. We aimed to determine CIPN prevalence, risk factors, and association with psychological distress and falls among long-term breast cancer survivors. We conducted Cross-sectional analyses among postmenopausal women with a history of stage I-III breast cancer who received taxane-based chemotherapy. Participants reported neuropathic symptoms of tingling/numbness in hands and/or feet on a 0-10 numerical rating scale. We conducted multivariate logistic regression analyses to evaluate risk factors associated with the presence of CIPN and the relationship between CIPN and anxiety, depression, insomnia, and patient-reported falls. Among 296 participants, 173 (58.4 %) reported CIPN symptoms, 91 (30.7 %) rated their symptoms as mild, and 82 (27.7 %) rated them moderate to severe. Compared with women of normal weight, being obese

was associated with increased risk of CIPN (adjusted OR 1.94, 95 % CI: 1.03-3.65). Patients with CIPN reported greater insomnia severity, anxiety, and depression than those without (all  $p < 0.05$ ). Severity of CIPN was associated with higher rates of falls, with 23.8, 31.9, and 41.5 % in the "no CIPN," "mild," and "moderate-to-severe" groups, respectively, experiencing falls ( $p = 0.028$ ). The majority of long-term breast cancer survivors who received taxane-based chemotherapy reported CIPN symptoms; obesity was a significant risk factor. Those with CIPN also reported increased psychological distress and falls. Interventions need to target CIPN and comorbid psychological symptoms, and incorporate fall prevention strategies for aging breast cancer survivors.

**PDF Y Endnote Y**

### **Postural instability and gait are associated with severity and prognosis of Parkinson disease**

van der Heeden JF, Marinus J, Martinez-Martin P, Rodríguez-Blázquez C, Geraedts VJ, van Hilten JJ. *Neurology* 2016; 86(24): 2243-2250.

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**DOI** 10.1212/WNL.0000000000002768 **PMID** 27178702

#### **Abstract**

**OBJECTIVE:** Differences in disease progression in Parkinson disease (PD) have variously been attributed to 2 motor subtypes: tremor-dominant (TD) and postural instability and gait difficulty (PIGD)-dominant (PG). We evaluated the role of these phenotypic variants in severity and progression of nondopaminergic manifestations of PD and motor complications.

**METHODS:** Linear mixed models were applied to data from the Profiling Parkinson's disease (PROPARK) cohort ( $n = 396$ ) to evaluate the effect of motor subtype on severity and progression of cognitive impairment (Scales for Outcomes in Parkinson's disease [SCOPA]-Cognition [SCOPA-COG]), depression (Hospital Anxiety and Depression Scale [HADS]), autonomic dysfunction (SCOPA-Autonomic [SCOPA-AUT]), excessive daytime sleepiness, psychotic symptoms (SCOPA-Psychiatric Complications [SCOPA-PC]), and motor complications. In first analyses, subtype as determined by the commonly used ratio of tremor over PIGD score was entered as a factor, whereas in second analyses separate tremor and PIGD scores were used. Results were verified in an independent cohort (Estudio Longitudinal de Pacientes con Enfermedad de Parkinson [ELEP];  $n = 365$ ).

**RESULTS:** The first analyses showed that PG subtype patients had worse SCOPA-COG, HADS, SCOPA-AUT, SCOPA-PC, and motor complications scores, and exhibited faster progression on the SCOPA-COG. The second analyses showed that only higher PIGD scores were associated with worse scores for these variables; tremor score was not associated with severity or progression of any symptom. Analyses in the independent cohort yielded similar results.

**CONCLUSIONS:** In contrast to PIGD, which consistently was associated with greater severity of nondopaminergic symptoms, there was no evidence of a benign effect of tremor. Our findings do not support the use of the TD subtype as a prognostic trait in PD. The results showed that severity of PIGD is a useful indicator of severity and prognosis in PD by itself.

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### **The addition of stripes (a version of the 'horizontal-vertical illusion') increases foot clearance when crossing low-height obstacles**

Foster RJ, Buckley JG, Whitaker D, Elliott DB.

*Ergonomics* 2016; 59(7): 884-889.

**Affiliation:** Bradford School of Optometry and Vision Science , University of Bradford , Bradford , UK.

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#### **Abstract**

Trips over obstacles are one of the main causes of falling in older adults, with vision playing an important role in successful obstacle negotiation. We determined whether a horizontal-vertical illusion, superimposed onto low-height obstacles to create a perceived increase in obstacle height, increased foot clearances during obstacle negotiation thus reducing the likelihood of tripping. Eleven adults (mean  $\pm$  1 SD: age  $27.3 \pm 5.1$  years) negotiated obstacles of varying heights (3, 5, 7 cm) with four different appearance conditions; two were obstacles with a horizontal-vertical illusion (vertical stripes of different thickness) superimposed on the front, one was a plain obstacle and the fourth a plain obstacle with a horizontal black line painted on the top edge. Foot clearance parameters were compared across conditions. Both illusions led to a significant increase in foot clearance when crossing the obstacle, compared to the plain condition, irrespective of obstacle height.

Superimposing a horizontal-vertical illusion onto low-height obstacles can increase foot clearance, and its use on the floor section of a double-glazing door frame for example may reduce the incidence of tripping in the home. Practitioner Summary: Low-height obstacles such as the floor section of a double-glazing door frame are potential tripping hazards. In a gait lab-based study we found that a horizontal-vertical illusion superimposed onto low-height obstacles led to significantly higher foot clearances; indicating their potential as a useful safety measure.

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

### **The use of commercial video games in rehabilitation: a systematic review**

Bonnechere B, Jansen B, Omelina L, Van Sint Jan S.

*Int. J. Rehabil. Res.* 2016; ePub(ePub): ePub.

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#### **Abstract**

The aim of this paper was to investigate the effect of commercial video games (VGs) in physical rehabilitation of motor functions. Several databases were screened (Medline, SAGE Journals Online, and ScienceDirect) using combinations of the following free-text terms: commercial games, video games, exergames, serious gaming, rehabilitation games, PlayStation, Nintendo, Wii, Wii Fit, Xbox, and Kinect. The search was limited to peer-reviewed English journals. The beginning of the search time frame was not restricted and the end of the search time frame was 31 December 2015. Only randomized controlled trial, cohort, and observational studies evaluating the effect of VGs on physical rehabilitation were included in the review. A total of 4728 abstracts were screened, 275 were fully reviewed, and 126 papers were eventually included. The following information was

extracted from the selected studies: device type, number and type of patients, intervention, and main outcomes. The integration of VGs into physical rehabilitation has been tested for various pathological conditions, including stroke, cerebral palsy, Parkinson's disease, balance training, weight loss, and aging. There was large variability in the protocols used (e.g. number of sessions, intervention duration, outcome measures, and sample size). The results of this review show that in most cases, the introduction of VG training in physical rehabilitation offered similar results as conventional therapy. Therefore, VGs could be added as an adjunct treatment in rehabilitation for various pathologies to stimulate patient motivation. VGs could also be used at home to maintain rehabilitation benefits.

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