

## SafetyLit May 1, 2016

### A decision model to predict the risk of the first fall onset

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#### Abstract

**BACKGROUND:** Miscellaneous features from various domains are accepted to be associated with the risk of falling in the elderly. However, only few studies have focused on establishing clinical tools to predict the risk of the first fall onset. A model that would objectively and easily evaluate the risk of a first fall occurrence in the coming year still needs to be built.

**OBJECTIVES:** We developed a model based on machine learning, which might help the medical staff predict the risk of the first fall onset in a one-year time window. **PARTICIPANTS/MEASUREMENTS:** Overall, 426 older adults who had never fallen were assessed on 73 variables, comprising medical, social and physical outcomes, at t0. Each fall was recorded at a prospective 1-year follow-up. A decision tree was built on a randomly selected training subset of the cohort (80% of the full-set) and validated on an independent test set.

**RESULTS:** 82 participants experienced a first fall during the follow-up. The machine learning process independently extracted 13 powerful parameters and built a model showing 89% of accuracy for the overall classification with 83%-82% of true positive fallers and 96%-61% of true negative non-fallers (training set vs. independent test set).

**CONCLUSION:** This study provides a pilot tool that could easily help the gerontologists refine the evaluation of the risk of the first fall onset and prioritize the effective prevention strategies. The study also offers a transparent framework for future, related investigation that would validate the clinical relevance of the established model by independently testing its accuracy on larger cohort.

**PDF Y Endnote Y**

### A systematic review of the association between lower urinary tract symptoms and falls, injuries, and fractures in community-dwelling older men

Noguchi N, Chan L, Cumming RG, Blyth FM, Naganathan V.

*Aging Male* 2016; ePub(ePub): ePub.

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#### Abstract

**BACKGROUND:** Lower urinary tract symptoms (LUTS) have been associated with falls in studies either exclusively or predominantly of women. It is, therefore, less clear if LUTS are risk factors for falls in men.

**METHODS:** We conducted a systematic review of the literature on the association between LUTS and falls, injuries, and fractures in community-dwelling older men. Medline, Embase, and Cinahl were searched for any type of observational study that has been published in a peer-reviewed journal in

English language. Studies were excluded if they did not report male-specific data or targeted specific patient populations. Results were summarized qualitatively.

**RESULTS:** Three prospective cohort studies and six cross-sectional studies were identified.

Incontinence, urgency, nocturia, and frequency were consistently shown to have weak to moderate association with falls (the point estimates of odds ratio and relative risk ranged from 1.31 to 1.67) in studies with low risk of bias for confounding. Only frequency was shown to be associated with fractures.

**CONCLUSIONS:** Urinary incontinence and lower urinary tract storage symptoms are associated with falls in community-dwelling older men. The circumstances of falls in men with LUTS need to be investigated to generate hypotheses about what types of interventions may be effective in reducing falls.

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#### **Antidepressant use and recurrent falls in community-dwelling older adults: findings from the Health ABC Study**

Marcum ZA, Perera S, Thorpe JM, Switzer GE, Castle NG, Strotmeyer ES, Simonsick EM, Ayonayon HN, Phillips CL, Rubin S, Zucker-Levin AR, Bauer DC, Shorr RI, Kang Y, Gray SL, Hanlon JT.

*Ann. Pharmacother.* 2016; ePub(ePub): ePub.

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**DOI** 10.1177/1060028016644466 **PMID** 27066988

#### **Abstract**

**BACKGROUND:** Few studies have compared the risk of recurrent falls across various antidepressant agents-using detailed dosage and duration data-among community-dwelling older adults, including those who have a history of a fall/fracture.

**OBJECTIVE:** To examine the association of antidepressant use with recurrent falls, including among those with a history of falls/fractures, in community-dwelling elders.

**METHODS:** This was a longitudinal analysis of 2948 participants with data collected via interview at year 1 from the Health, Aging and Body Composition study and followed through year 7 (1997-2004). Any antidepressant medication use was self-reported at years 1, 2, 3, 5, and 6 and further categorized as (1) selective serotonin reuptake inhibitors (SSRIs), (2) tricyclic antidepressants, and (3) others. Dosage and duration were examined. The outcome was recurrent falls ( $\geq 2$ ) in the ensuing 12-month period following each medication data collection.

**RESULTS:** Using multivariable generalized estimating equations models, we observed a 48% greater likelihood of recurrent falls in antidepressant users compared with nonusers (adjusted odds ratio [AOR] = 1.48; 95% CI = 1.12-1.96). Increased likelihood was also found among those taking SSRIs (AOR = 1.62; 95% CI = 1.15-2.28), with short duration of use (AOR = 1.47; 95% CI = 1.04-2.00), and taking moderate dosages (AOR = 1.59; 95% CI = 1.15-2.18), all compared with no antidepressant use. Stratified analysis revealed an increased likelihood among users with a baseline history of falls/fractures compared with nonusers (AOR = 1.83; 95% CI = 1.28-2.63).

**CONCLUSION:** Antidepressant use overall, SSRI use, short duration of use, and moderate dosage were associated with recurrent falls. Those with a history of falls/fractures also had an increased likelihood of recurrent falls.

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### **Association of reduced eGFR and albuminuria with serious fall injuries among older adults**

Bowling CB, Bromfield SG, Colantonio LD, Gutiérrez OM, Shimbo D, Reynolds K, Wright NC, Curtis JR, Judd SE, Franch H, Warnock DG, McClellan W, Muntner P.

*Clin. J. Am. Soc. Nephrol.* 2016; ePub(ePub): ePub.

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**DOI** 10.2215/CJN.11111015 **PMID** 27091516

#### **Abstract**

**BACKGROUND AND OBJECTIVES:** Falls are common and associated with adverse outcomes in patients on dialysis. Limited data are available in earlier stages of CKD.

**DESIGN, SETTING, PARTICIPANTS, & MEASUREMENTS:** We analyzed data from 8744 Reasons for Geographic and Racial Differences in Stroke Study participants  $\geq 65$  years old with Medicare fee for service coverage. Serious fall injuries were defined as a fall-related fracture, brain injury, or joint dislocation using Medicare claims. Hazard ratios (HRs) for serious fall injuries were calculated by eGFR and albumin-to-creatinine ratio (ACR). Among 2590 participants with CKD (eGFR $<60$  ml/min per 1.73 m<sup>2</sup>) or ACR $\geq 30$  mg/g, cumulative mortality after a serious fall injury compared with age-matched controls without a fall injury was calculated.

**RESULTS:** Overall, 1103 (12.6%) participants had a serious fall injury over 9.9 years of follow-up. The incidence rates per 1000 person-years of serious fall injuries were 21.7 (95% confidence interval [95% CI], 20.3 to 23.2), 26.6 (95% CI, 22.6 to 31.3), and 38.3 (95% CI, 31.2 to 47.0) at eGFR levels  $\geq 60$ , 45-59, and  $<45$  ml/min per 1.73 m<sup>2</sup>, respectively, and 21.3 (95% CI, 20.0 to 22.8), 31.7 (95% CI, 27.5 to 36.5), and 42.2 (95% CI, 31.3 to 56.9) at ACR levels  $<30$ , 30-299, and  $\geq 300$  mg/g, respectively. Multivariable adjusted HRs for serious fall injuries were 0.91 (95% CI, 0.76 to 1.09) and 1.09 (95% CI, 0.86 to 1.37) for eGFR=45-59 and  $<45$  ml/min per 1.73 m<sup>2</sup>, respectively, versus eGFR $\geq 60$  ml/min per 1.73 m<sup>2</sup> and 1.31 (95% CI, 1.11 to 1.54) and 1.81 (95% CI, 1.30 to 2.50) for ACR=30-299 and  $\geq 300$  mg/g, respectively, versus ACR $<30$  mg/g. Among participants with CKD, cumulative 1-year mortality rates among patients with a serious fall and age-matched controls were 21.0% and 5.5%, respectively.

**CONCLUSIONS:** Elevated ACR but not lower eGFR was associated with serious fall injuries. Evaluation for fall risk factors and fall prevention strategies should be considered for older adults with elevated ACR.

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### **Effects of Ramadan fasting on postural balance and attentional capacities in elderly people**

Laatar R, Borji R, Baccouch R, Zahaf F, Rebai H, Sahli S.

*J. Nutr. Health Aging* 2016; 20(5): 553-560.

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**DOI** 10.1007/s12603-015-0620-y **PMID** 27102795

#### **Abstract**

**OBJECTIVE:** To evaluate the effects of Ramadan fasting on postural balance and attentional capacities in older adults.

**SETTING:** the Neurophysiology department of a University Hospital.

**PARTICIPANTS:** Fifteen males aged between 65 and 80 years were asked to perform a postural balance protocol and a simple reaction time (SRT) test in four testing phases: one week before Ramadan (BR), during the second (SWR) and the fourth week of Ramadan (FWR) and 3 weeks after Ramadan (AR).

**MEASUREMENTS:** Postural balance measurements were recorded in the bipedal stance in four different conditions: firm surface/eyes open (EO), firm surface/eyes closed (EC), foam surface/EO and foam surface/EC using a force platform.

**RESULTS:** Results of the present study demonstrated that center of pressure (CoP) mean velocity (CoPvm), medio-lateral length (CoPLX) and antero-posterior length (CoPLY) were significantly higher during the SWR than BR. Likewise, values of CoPvm and CoPLX increased significantly during the FWR compared to BR. The CoPLX decreased significantly in the FWR compared to the SWR. Values of CoPvm and CoPLX were significantly higher AR in comparison with BR. In addition, SRT values increased significantly during the SWR and the FWR than BR.

**CONCLUSION:** Ramadan fasting affects postural balance and attentional capacities in the elderly mainly in the SWR and it may, therefore, increase the risk of fall and fall-related injuries. More than three weeks are needed for older adults to recover postural balance impairment due to Ramadan fasting.

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### **Epidemiology and patho-anatomical pattern of 2,011 humeral fractures: data from the Swedish Fracture Register**

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*BMC Musculoskelet. Disord.* 2016; 17(1): e159.

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**DOI** 10.1186/s12891-016-1009-8 **PMID** 27072511 **PMCID** PMC4830043

#### **Abstract**

**BACKGROUND:** Humeral fractures are common, but the association between the patho-anatomical fracture pattern and patient characteristics has been inadequately studied and epidemiological knowledge is scarce. Following the introduction of the Swedish Fracture Register (SFR), risk factors for various fractures can be studied, as well as the outcome of different treatments. The objective of this study was to analyse adult humeral fractures in Gothenburg from a descriptive epidemiological perspective.

**METHODS:** All humeral fractures registered in the SFR at Sahlgrenska University Hospital in 2011-2013 in patients aged  $\geq 16$  years were included. The fractures were divided into humeral segments (proximal, shaft and distal humerus) and analysed according to patient characteristics and patho-anatomical pattern. Furthermore, overall and age-specific incidence rates were calculated.

**RESULTS:** A total of 2,011 humeral fractures were registered in the SFR, of which 79 % were proximal, 13 % shaft and 8 % distal humeral fractures. The mean age was 66.8 years and women ran a higher risk of humeral fractures than men (female/male ratio 2.4:1). On average, women were older than men at the time of fracture (mean age 70.1 years for women vs. 58.9 years for men). The overall incidence of humeral fractures was 104.7 per 100,000 inhabitants per year, with a segment-specific incidence of 83.0 for proximal fractures, 13.4 for shaft fractures and 8.3 per 100,000 person-

years for distal fractures. There was a distinct increase in the age-specific incidence from the fifth decade and onwards, regardless of fracture site. Most fractures occurred in older patients (83 % > 50 years) as a result of a simple or an unspecified fall (79 % > 50 years). Only 1.2 % of all fractures were open injuries and 1.3 % were pathological.

**CONCLUSION:** This population-based study provides updated epidemiological data on humeral fractures in a Western-European setting. Most humeral fractures occur as the result of low-energy falls in the elderly population, indicating the influence of age-related risk factors in these fractures. The SFR will be a useful tool for providing continuous information on fracture epidemiology, risk factors and treatment outcome and these population-based data are essential in the planning of future fracture prevention and management.

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### **Exercise for reducing fear of falling in older people living in the community: Cochrane systematic review and meta-analysis**

Kumar A, Delbaere K, Zijlstra GA, Carpenter H, Iliffe S, Masud T, Skelton D, Morris R, Kendrick D. *Age Ageing* 2016; 45(3): 345-352.

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**DOI** 10.1093/ageing/afw036 **PMID** 27121683

#### **Abstract**

**OBJECTIVE:** to determine the effect of exercise interventions on fear of falling in community-living people aged ≥65.

**DESIGN:** systematic review and meta-analysis. Bibliographic databases, trial registers and other sources were searched for randomised or quasi-randomised trials. Data were independently extracted by pairs of reviewers using a standard form.

**RESULTS:** thirty trials (2,878 participants) reported 36 interventions (Tai Chi and yoga (n = 9); balance training (n = 19); strength and resistance training (n = 8)). The risk of bias was low in few trials. Most studies were from high-income countries (Australia = 8, USA = 7). Intervention periods (<12 weeks = 22; 13-26 weeks = 7; >26 weeks = 7) and exercise frequency (1-3 times/week = 32; ≥4 times/week = 4) varied between studies. Fear of falling was measured by single-item questions (7) and scales measuring falls efficacy (14), balance confidence (9) and concern or worry about falling (2). Meta-analyses showed a small to moderate effect of exercise interventions on reducing fear of falling immediately post-intervention (standardised mean difference (SMD) 0.37, 95% CI 0.18, 0.56; 24 studies; low-quality evidence). There was a small, but not statistically significant effect in the longer term (<6 months (SMD 0.17, 95% CI -0.05, 0.38 (four studies) and ≥6 months post-intervention SMD 0.20, 95% CI -0.01, 0.41 (three studies)).

**CONCLUSIONS:** exercise interventions probably reduce fear of falling to a small to moderate degree immediately post-intervention in community-living older people. The high risk of bias in most included trials suggests findings should be interpreted with caution. High-quality trials are needed to strengthen the evidence base in this area.

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### **Factors affect stability of intertrochanteric fractures when elderly patients fall**

Chen PH, Wu CC, Chen WJ.

*Biomed. J.* 2016; 39(1): 67-71.

**Affiliation:** Department of Orthopedic Surgery, Chang Gung Memorial Hospital at Linkou, Chang Gung University College of Medicine, Taoyuan, Taiwan.

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**DOI** 10.1016/j.bj.2015.08.007 **PMID** 27105600

#### **Abstract**

**BACKGROUND:** Factors affecting the stability of intertrochanteric fractures when elderly patients fall are few to be reported. In this retrospective study, possible factors were investigated.

**METHODS:** Two hundred and twenty-three consecutive elderly patients ( $\geq 65$  years) with intertrochanteric fractures due to low energy injuries were studied. Patient age, gender, body mass index (BMI), body weight and height were compared between fractures with stable (AO/OTA type A1, intact lesser trochanter, 80 patients) and unstable (AO/OTA types A2, A3, displaced lesser trochanter or reverse obliquity fractures, 143 patients) types. Statistical approaches with univariate and multivariate analyses were performed.

**RESULTS:** There was no statistical difference in patient gender, age, body weight or height between patients with stable and unstable fractures in both univariate and multivariate analysis. However, BMI was statistically higher in patients with unstable fractures (22.7 vs 21.4,  $p = 0.01$ ) in univariate analysis, but without a difference in multivariate analysis ( $p = 0.07$ ).

**CONCLUSIONS:** Stability of intertrochanteric fractures may be not associated with gender, age, body weight and height or BMI when elderly patients fall. Bone mineral density or impact direction may be other possible contributing factors but requires further proofs.

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#### **Factors associated with injurious falls in residential care facilities**

Towne SD, Cho J, Smith ML, Ory MG.

*J. Aging Health* 2016; ePub(ePub): ePub.

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**DOI** 10.1177/0898264316641083 **PMID** 27107006

#### **Abstract**

**OBJECTIVE:** Despite a growing literature on the epidemiology of falls, little is known about injurious falls in residential care facilities (RCFs). Addressing this gap, this study examined demographic, interpersonal, institutional, and community factors associated with injurious falls in RCFs.

**METHOD:** We conducted analyses using a nationally representative sample ( $n = 733,309$ ) of RCF residents (2010) examining whether or not a resident experienced a fall that resulted in any injury (past year).

**RESULTS:** Overall, 15% of RCF residents experienced an injurious fall. Residents needing assistance with activities of daily living were more likely to experience injurious falls (adjusted-OR = 1.85), whereas males (adjusted-OR = 0.74) and those residing in smaller facilities (adjusted-OR = 0.68) were less likely. Other resident sociodemographic characteristics, payment status, social connectedness, and rurality were not significant independent predictors.

**DISCUSSION:** Research further exploring multifactorial fall prevention screening and treatment programs in RCFs is recommended for reducing injurious falls in this understudied setting.

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### **Falls in elderly adults-an analysis of injuries and sociodemographic conditions**

Anjos RE, de Lima Saintrain MV, Pinheiro SS, de Carvalho Pádua Cardoso L, Filho MA, de Almeida MI, Santos ZM.

*J. Am. Geriatr. Soc.* 2016; 64(4): 891-893.

**Affiliation:** Collective Health Master's Degree Program, University of Fortaleza, Fortaleza, Brazil.

(Copyright © 2016, John Wiley and Sons)

**DOI** 10.1111/jgs.14058 **PMID** 27100591

**Abstract** Letter to editor [Abstract unavailable]

**PDF Y Endnote Y**

### **Feasibility of external rhythmic cueing with the Google Glass for improving gait in people with Parkinson's disease**

Zhao Y, Nonnekes J, Storcken EJ, Janssen S, van Wegen EE, Bloem BR, Dorresteyn LD, van Vugt JP, Heida T, van Wezel RJ.

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

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**DOI** 10.1007/s00415-016-8115-2 **PMID** 27113598

#### **Abstract**

New mobile technologies like smartglasses can deliver external cues that may improve gait in people with Parkinson's disease in their natural environment. However, the potential of these devices must first be assessed in controlled experiments. Therefore, we evaluated rhythmic visual and auditory cueing in a laboratory setting with a custom-made application for the Google Glass. Twelve participants (mean age = 66.8; mean disease duration = 13.6 years) were tested at end of dose. We compared several key gait parameters (walking speed, cadence, stride length, and stride length variability) and freezing of gait for three types of external cues (metronome, flashing light, and optic flow) and a control condition (no-cue). For all cueing conditions, the subjects completed several walking tasks of varying complexity. Seven inertial sensors attached to the feet, legs and pelvis captured motion data for gait analysis. Two experienced raters scored the presence and severity of freezing of gait using video recordings. User experience was evaluated through a semi-open interview. During cueing, a more stable gait pattern emerged, particularly on complicated walking courses; however, freezing of gait did not significantly decrease. The metronome was more effective than rhythmic visual cues and most preferred by the participants. Participants were overall positive about the usability of the Google Glass and willing to use it at home. Thus, smartglasses like the Google Glass could be used to provide personalized mobile cueing to support gait; however, in its current form, auditory cues seemed more effective than rhythmic visual cues.

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### **Frailty index and its relation to falls and overnight hospitalizations in elderly Chinese people: a population-based study**

Liu Z, Wang Q, Zhi T, Zhu Y, Wang Y, Wang Z, Shi J, Xie X, Chu X, Wang X, Jiang X.

*J. Nutr. Health Aging* 2016; 20(5): 561-568.

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**DOI** 10.1007/s12603-015-0625-6 **PMID** 27102796

### **Abstract**

**OBJECTIVES:** To investigate current status of frailty index (FI) defined as deficit accumulation and its relations to falls and overnight hospitalizations in an elderly Chinese population.

**DESIGN:** A cross-sectional cohort study.

**SETTING:** All of the 31 villages in Jiang'an township, a typical medium-sized township in Rugao city, China.

**PARTICIPANTS:** Overall 1773 participants aged 70-84 years were randomly recruited.

**MEASUREMENTS:** A FI including symptoms, activities of daily living, co-morbidities, cognitive and psychological function was constructed using 45 health deficits.

**RESULTS:** The mean of FI was 0.14 in men and 0.19 in women. According to a usual FI cut-point of 0.25, 8.2% of men and 23.2% of women were classified as frail. Literate participants had lower levels of FI than their illiterate counterpart. In men, the FI was positively related to age ( $r = 0.186$ ,  $p < .001$ ), with a mean rate of deficit accumulation of 0.032 (on a log scale) per year. Each increment of 0.01 on the FI was associated with significantly increased risks of falls and overnight hospitalizations, with odds ratios of 1.05 (95% CI: 1.03, 1.07) and 1.05 (95% CI: 1.03, 1.08). Similarly, the aforementioned associations were observed in women. Education level moderated the associations of FI with falls in men and women.

**CONCLUSION:** Elderly Chinese women were more frail than men. The FI significantly increased with chronological age and was significantly associated with falls and overnight hospitalizations, and education level may play an important role. This study provides preliminary but crucial evidences for future researches on frailty in China.

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### **Head trauma from falling increases subsequent emergency department visits more than other fall-related injuries in older adults**

Southerland LT, Stephens JA, Robinson S, Falk J, Phieffer L, Rosenthal JA, Caterino JM.

*J. Am. Geriatr. Soc.* 2016; 64(4): 870-874.

**Affiliation:** Department of Emergency Medicine, The Ohio State University, Columbus, Ohio.

(Copyright © 2016, John Wiley and Sons)

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### **Abstract**

**OBJECTIVES:** To determine whether fall-related injuries affect return to the ED after the initial visit.

**DESIGN:** Retrospective chart review.

**SETTING:** Academic Level 1 trauma center ED.

**PARTICIPANTS:** Individuals aged 65 and older evaluated for a fall from standing height or less and discharged (N = 263, average age 77, 70% female).

**MEASUREMENTS:** After institutional review board approval, electronic medical record data were queried. Univariate and multivariable logistic regression models were used to determine factors associated with risk of returning to the ED within 90 days.

**RESULTS:** Injuries included fractures (45%, n = 117); head trauma (22%, n = 58); abrasions,



lacerations, or contusions (34%, n = 88); and none (22%, n = 57). Emergency care was frequently required, with 13 (5%, 95% confidence interval (CI) = 2.3-7.6%) returning within 72 hours, 35 (13%, 95% CI = 9.2-17%) within 30 days, and 57 (22%, 95% CI = 17-27%) within 90 days. Univariately, the odds of returning to the ED within 90 days was more than two times as high for those with head trauma as for those without (odds ratio = 2.66). This remained significant in the multivariable model, which controlled for Charlson Comorbidity Index, fractures, soft tissue injuries, and ED observation unit use.

**CONCLUSION:** More than one-third of older adults with minor head trauma from a fall will need to return to the ED in the following 90 days. These individuals should receive close attention from primary care providers. The link between minor head trauma and ED recidivism is a new finding.

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### **Hearing impairment and physical function and falls in the atherosclerosis risk in communities hearing pilot study**

Deal JA, Richey Sharrett A, Bandeen-Roche K, Kritchevsky SB, Pompeii LA, Gwen Windham B, Lin FR. *J. Am. Geriatr. Soc.* 2016; 64(4): 906-908.

**Affiliation:** Department of Otolaryngology Head and Neck Surgery, School of Medicine, Johns Hopkins University, Baltimore, Maryland.

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**DOI** 10.1111/jgs.14075 **PMID** 27100600

**Abstract** [Abstract unavailable]

**PDF Y Endnote Y**

### **National survey of geriatricians to define functional decline in elderly people with minor trauma**

Abdulaziz K, Perry JJ, Taljaard M, Emond M, Lee JS, Wilding L, Sirois MJ, Brehaut J.

*Can. Geriatr. J.* 2016; 19(1): 2-8.

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(Copyright © 2016, Canadian Geriatrics Society)

**DOI** 10.5770/cgj.19.192 **PMID** 27076859 **PMCID** PMC4815935

**Abstract**

**BACKGROUND:** This study was designed to determine a clinically significant point drop in function to define functional decline and the required sensitivity for a clinical decision tool to identify elderly patients at high risk of functional decline following a minor injury.

**METHODS:** After a rigorous development process, a survey questionnaire was administered to a random sample of 178 geriatricians selected from those registered in a national medical directory. The surveys were distributed using a modified Dillman technique.

**RESULTS:** We obtained a satisfactory response rate of 70.5%. Ninety percent of the geriatricians required a sensitivity of 90% or less for a clinical decision tool to identify injured seniors at high risk of functional decline 6 months post injury. Our results indicate that 90% of the respondents considered a drop in function of at least 2 points in activities of daily living (ADL) as clinically significant when considering all 14 ADL items. Considering only the 7 basic ADL items, 90% of physicians considered a 1 point drop as clinically significant.

**CONCLUSIONS:** A tool with a sensitivity of 90% to detect patients at risk of functional decline at 6 months post minor injury would meet or exceed the sensitivity required by 90% of geriatric

specialists. These findings clearly define what is a clinically significant decline following a "minor injury."

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#### Physical functioning in older persons with dizziness: a population-based study

Kollén L, Hörder H, Möller C, Frandin K.

*Aging Clin. Exp. Res.* 2016; ePub(ePub): ePub.

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**DOI** 10.1007/s40520-016-0567-9 **PMID** 27086001

#### Abstract

**BACKGROUND:** Dizziness is one of the most prevalent symptoms in old age and tends to increase with age. **AIMS:** To report physical functioning, health-related aspects and gender differences in elderly persons with and without dizziness in a population-based sample of 75-year-olds.

**METHODS:** A cross-sectional sample of 75-year-olds from Gothenburg, Sweden (n = 675, 398 women and 277 men) was examined by means of questionnaires and functional tests. The questions concerned dizziness/imbalance, physical activity level, walking habits, falls efficacy, number of falls, subjective health or general fatigue and medication. The tests included were self-selected and maximum gait speed, stair climbing capacity, one leg stance and grip strength.

**RESULTS:** More women than men reported dizziness/imbalance (40 vs 30 %, p < 0.001). Persons with dizziness, compared to those without dizziness, less often regularly exercised at a moderate intensity level (summer: 62 vs 74 %, p < 0.001; winter: 41 vs 51 %, p < 0.001), less often took a daily walk (p < 0.05), had lower scores on the FES(S) (p < 0.001), more often reported general fatigue (p < 0.001), more often had fallen in the previous year (40 vs 23 %, p < 0.001) and had a higher intake of medical drugs (4.6 vs 3.3, p < 0.001). They also performed worse regarding gait speed, stair climbing and one leg stance (p < 0.001), but there was no difference in grip strength.

**CONCLUSION:** Older persons with dizziness are less physically active, have worse lower extremity function, are more often fallers and report lower self-rated health than persons without dizziness.

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#### Psychotropic drugs and the risk of fall injuries, hospitalisations and mortality among older adults

Johnell K, Jonasdottir Bergman G, Fastbom J, Danielsson B, Borg N, Salmi P.

*Int. J. Geriatr. Psychiatry* 2016; ePub(ePub): ePub.

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**DOI** 10.1002/gps.4483 **PMID** 27113813

#### Abstract

**OBJECTIVE:** To investigate whether psychotropics are associated with an increased risk of fall injuries, hospitalizations, and mortality in a large general population of older adults.

**METHODS:** We performed a nationwide matched (age, sex, and case event day) case-control study between 1 January and 31 December 2011 based on several Swedish registers (n = 1,288,875 persons aged ≥65 years). We used multivariate conditional logistic regression adjusted for education, number of inpatient days, Charlson co-morbidity index, dementia and number of other drugs.

**RESULTS:** Antidepressants were the psychotropic most strongly related to fall injuries (OR adjusted:

1.42; 95% CI: 1.38-1.45) and antipsychotics to hospitalizations (OR adjusted : 1.22; 95% CI: 1.19-1.24) and death (OR adjusted : 2.10; 95% CI: 2.02-2.17). Number of psychotropics was associated with increased the risk of fall injuries, (4 psychotropics vs 0: OR adjusted: 1.53; 95% CI: 1.39-1.68), hospitalization (4 psychotropics vs 0: OR adjusted: 1.27; 95% CI: 1.22-1.33) and death (4 psychotropics vs 0: OR adjusted: 2.50; 95% CI: 2.33-2.69) in a dose-response manner. Among persons with dementia (n = 58,984), a dose-response relationship was found between number of psychotropics and mortality risk (4 psychotropics vs 0: OR adjusted: 1.99; 95% CI: 1.76-2.25).  
CONCLUSIONS: Our findings support a cautious prescribing of multiple psychotropic drugs to older patients.

#### PDF Y Endnote Y

### Role of depression in outcomes of low-energy distal radius fractures in patients older than 55 years

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*J. Orthop. Trauma* 2016; 30(5): 228-233.

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#### Abstract

**OBJECTIVES:** This study examines depression and outcomes in patients older than 55 years with distal radius fracture.

**DESIGN:** Prospective data collection included patient characteristics, treatment, general and limb symptoms and disability, and complications at baseline, 3 months, and 1 year. Bivariate analysis and multivariable linear regression were used to assess relationships between depression and outcome measures, specifically the Short Form-36 (SF-36), Disability of the Arm, Shoulder, and Hand (DASH) scores, and the Centre of Epidemiologic Studies Depression (CES-D) scale.

**SETTING:** The study was conducted in a level-1 trauma center.

**PARTICIPANTS:** All patients older than 55 years with isolated distal radius fracture were recruited (2007-2011).

**INTERVENTION:** Patients were treated operatively or nonoperatively. **MAIN OUTCOME MEASURES:** The SF-36 and DASH scores measured general and upper extremity status. Depression was measured using CES-D scale. All complications were recorded.

**RESULTS:** Of 228 patients, 25% were depressed at baseline, 32% at 3 months, and 26% after 1 year. Thirty-two patients (14%) had complications. There was no relationship between depression at baseline and complications; however, there was a statistically significant relationship at 3 months ( $P = 0.021$ ). There was a statistically significant association between baseline depression and the worse 1-year SF-36. Patients with baseline depression had poorer 1-year DASH scores ( $20 \pm 2.3$ ) than nondepressed patients ( $11 \pm 1.3$ ) ( $P = 0.0031$ ), and less improvement in DASH scores over the first year ( $P = 0.023$ ). Multivariable linear regression demonstrated that baseline depression is the strongest predictor of poorer 1-year DASH scores (3.7,  $P = 0.0078$ ) and change in DASH scores over the first year (2.9,  $P = 0.026$ ).

**CONCLUSIONS:** Baseline depression predicts worse function and disability outcomes 1 year from injury. Depression (CES-D  $\geq 16$ ) is the strongest predictor of worse 1-year DASH scores and SF-36 outcome measures, after controlling for other potential predictors.

LEVEL OF EVIDENCE: Prognostic Level I. See Instructions for Authors for a complete description of levels of evidence.

**PDF Y Endnote Y**

**Socioeconomic disparities in gait speed and associated characteristics in early old age**

Plouvier S, Carton M, Cyr D, Sabia S, Leclerc A, Zins M, Descatha A.

*BMC Musculoskelet. Disord.* 2016; 17(1): e178.

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**Abstract**

**BACKGROUND:** A few studies have documented associations between socioeconomic position and gait speed, but the knowledge about factors from various domains (personal factors, lifestyle, occupation...) which contribute to these disparities is limited. Our objective was to assess socioeconomic disparities in usual gait speed in a general population in early old age in France, and to identify potential contributors to the observed disparities, including occupational factors.

**METHODS:** The study population comprised 397 men and 339 women, aged 55 to 69, recruited throughout France for the field pilot of the CONSTANCES cohort. Gait speed was measured in meters/second. Socioeconomic position was based on self-reported occupational class. Information on personal characteristics, lifestyle, comorbidities and past or current occupational physical exposure came either from the health examination, from interview or from self-administered questionnaire. Four groups were considered according to sex-specific distributions of speed (the two slowest thirds versus the fastest third, for each gender). Logistic regression models adjusted for health screening center and age allowed to the study of cross-sectional associations between: 1- slower speed and occupational class; 2- slower speed and each potential contributor; 3- occupational class and selected potential contributors. The association between speed and occupational class was then further adjusted for the factors significantly associated both with speed and occupational class, in order to assess the potential contribution of these factors to disparities.

**RESULTS:** With reference to managers/executives, gait speed was reduced in less skilled categories among men (OR 1.21 [0.72-2.05] for Intermediate/Tradesmen, 1.95 [0.80-4.76] for Clerks, Sale/service workers, 2.09 [1.14-3.82] for Blue collar/Craftsmen) and among women (OR 1.12 [0.55-2.28] for Intermediate/Tradesmen, 2.33 [1.09-4.97] for Clerks, 2.48 [1.18-5.24] for Sale/service workers/Blue collar/Craftsmen). Among men, occupational exposure to carrying heavy loads explained a large part of socioeconomic disparities. Among women, obesity and occupational exposure to repetitive work contributed independently to the disparities.

**CONCLUSIONS:** This study suggests that some potentially modifiable occupational and personal factors explain at least part of the differences in gait speed between occupational classes, and that these factors differ between men and women. Longitudinal studies are needed to confirm and complement these findings.

**PDF Y Endnote Y**

### **The influence of sense of community on the perceived value of physical activity: a cross-context analysis**

Pickett AC, Goldsmith A, Damon Z, Walker M.

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#### **Abstract**

As the physical activity marketplace becomes increasingly diversified, strategies for recruiting and maintaining participants have become especially salient. Accordingly, the current study examined the use of a commonly reported outcome of fitness participation, sense of community (SOC), as an antecedent in generating both value and the perception of progress for participants. Three fitness contexts, CrossFit, traditional group fitness activities, and individual gym goers, were chosen based on varying levels of explicit commitment to community building. SOC was first measured in three contexts to explore differences among settings. After establishing differences between groups, multiple regression analysis was employed to understand the ways in which SOC affected dimensions of value.

RESULTS indicated that an explicit commitment to community building was positively associated with higher value of the fitness product and perceptions of individual progress. Strategy and benefits for encouraging the development of SOC in a fitness context are discussed.

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

### **Voluntary muscle activation improves with power training and is associated with changes in gait speed in mobility-limited older adults: a randomized controlled trial**

Hvid LG, Strotmeyer ES, Skjødt M, Magnussen LV, Andersen M, Caserotti P.

*Exp. Gerontol.* 2016; ePub(ePub): ePub.

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#### **Abstract**

Incomplete voluntary muscle activation may contribute to impaired muscle mechanical function and physical function in older adults. Exercise interventions have been shown to increase voluntary muscle activation, although the evidence is sparse for mobility-limited older adults, particularly in association with physical function. This study examined the effects of 12 weeks of power training on outcomes of voluntary muscle activation and gait speed in mobility-limited older adults from the Healthy Aging Network of Competence (HANC) study. We included 37 older men and women with a usual gait speed of <0.9m/s in the per-protocol analysis: n=16 in the training group (TG: 12 weeks of progressive high-load power training, 2 sessions per week; age: 82.3±1.3 years, 56% women) and n=21 in the control group (CG: no interventions; age: 81.6±1.1 years, 67% women). Knee extensor muscle thickness (ultrasonography), strength (isokinetic dynamometry), voluntary activation (interpolated twitch technique), and gait speed (2-min maximal walking test) were assessed at baseline and post-intervention. At baseline, TG and CG were comparable for all measures. Post-intervention, significant between-group changes (TG vs. CG; p<0.05) were observed for voluntary muscle activation (+6.2%), muscle strength (+13.4Nm), and gait speed (+0.12m/s), whereas the between-group change in muscle thickness was non-significant (+0.08cm). Improvements in

voluntary muscle activation were associated with improvements in gait speed in TG ( $r=0.67$ ,  $p<0.05$ ). Importantly, voluntary muscle activation is improved in mobility-limited older adults following 12-weeks of progressive power training, and is associated with improved maximal gait speed. Incomplete voluntary muscle activation should be considered one of the key mechanisms influencing muscle mechanical function and gait speed in older adults.

#### PDF Y Endnote Y

#### **A comparison of accuracy of fall detection algorithms (threshold-based vs. machine learning) using waist-mounted tri-axial accelerometer signals from a comprehensive set of falls and non-fall trials**

Aziz O, Musngi M, Park EJ, Mori G, Robinovitch SN.

Med. Biol. Eng. Comput. 2016; ePub(ePub): ePub.

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**DOI** 10.1007/s11517-016-1504-y **PMID** 27106749

#### **Abstract**

Falls are the leading cause of injury-related morbidity and mortality among older adults. Over 90 % of hip and wrist fractures and 60 % of traumatic brain injuries in older adults are due to falls. Another serious consequence of falls among older adults is the 'long lie' experienced by individuals who are unable to get up and remain on the ground for an extended period of time after a fall. Considerable research has been conducted over the past decade on the design of wearable sensor systems that can automatically detect falls and send an alert to care providers to reduce the frequency and severity of long lies. While most systems described to date incorporate threshold-based algorithms, machine learning algorithms may offer increased accuracy in detecting falls. In the current study, we compared the accuracy of these two approaches in detecting falls by conducting a comprehensive set of falling experiments with 10 young participants. Participants wore waist-mounted tri-axial accelerometers and simulated the most common causes of falls observed in older adults, along with near-falls and activities of daily living. The overall performance of five machine learning algorithms was greater than the performance of five threshold-based algorithms described in the literature, with support vector machines providing the highest combination of sensitivity and specificity.

#### PDF Y Endnote Y

#### **Comparison of neuropsychological and balance performance validity testing**

Armistead-Jehle P, Lange BJ, Green P.

*Appl. Neuropsychol. Adult* 2016; ePub(ePub): 1-8.

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#### **Abstract**

Performance validity testing in the context of neuropsychological assessment is well established. While such measures are also available with balance testing, little research has investigated these two domains in concert. The purpose of this study was to compare scores on two measures of performance validity across cognitive and balance modalities. Seventy-eight subjects independently evaluated by a neuropsychologist and an otolaryngologist in the context of disability evaluations



were administered the Word Memory Test and Computerized Dynamic Posturography. RESULTS of the measures were significantly correlated ( $r\phi = 0.35$ ,  $p = .002$ ) and demonstrated 70.5% agreement. These data suggest that if symptom exaggeration occurs within one modality, other modalities may also be exaggerated and should be independently evaluated.

#### PDF Y Endnote Y

#### **Stride time variability as a marker for higher level of gait control in multiple sclerosis: its association with fear of falling**

Allali G, Laidet M, Armand S, Elsworth-Edelsten C, Assal F, Lalive PH.

*J. Neural. Transm.* 2016; ePub(ePub): ePub.

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#### **Abstract**

Fear of falling (FOF) and gait disorders represent both prevalent symptoms in patients with multiple sclerosis (MS); however, the association between FOF and higher level of gait control (HLGC) has not been studied in MS. This study aims to assess the association between FOF and HLGC in patients with MS. HLGC was assessed by stride time variability (STV) during single and dual-tasks (forward counting, backward counting, categorical verbal fluency and literal verbal fluency) and FOF was quantified by the falls efficacy scale-international (FES-I). Seventy-one patients (age:  $39.27 \pm 9.77$  years; 63 % female) were included in this cross-sectional study (Expanded Disability Status Scale (median): 2.00) with a low prevalence of FOF (FES-I:  $21.52 \pm 8.37$ ). The mean gait speed was  $1.19 \pm 0.23$  m/s with a STV of  $2.35 \pm 1.68$  % during single walking task. STV during single task and the dual tasks of forward counting and backward counting were associated with the FES-I in the univariable linear regression models ( $p \leq 0.001$ ), but only STV while backward counting ( $\beta$ : 0.42, [0.18;0.66]) was associated with FOF in the multivariable model (adjusted for age, gender, previous fall, Expanded Disability Status Scale and gait speed). These findings indicate that FOF is associated with STV while backward counting, a marker of HLGC in relationship with working memory in a MS population including a majority of low disabled patients.

#### PDF Y Endnote Y

#### **The impact of falls on motor and cognitive recovery after discharge from in-patient stroke rehabilitation**

Wong JS, Brooks D, Inness EL, Mansfield A.

*J. Stroke Cerebrovasc. Dis.* 2016; ePub(ePub): ePub.

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**DOI** 10.1016/j.jstrokecerebrovasdis.2016.03.017 **PMID** 27062418

#### **Abstract**

**BACKGROUND:** Falls are common among community-dwelling stroke survivors. The aims of this study were (1) to compare motor and cognitive outcomes between individuals who fell in the 6 months' postdischarge from in-patient stroke rehabilitation and those who did not fall, and (2) to explore potential mechanisms underlying the relationship between falls and recovery of motor and cognitive function.

**METHODS:** Secondary analysis of a prospective cohort study of individuals discharged home from in-patient rehabilitation was conducted. Participants were recruited at discharge and completed a 6-month falls monitoring period using postcards with follow-up. Nonfallers and fallers were compared at the 6-month follow-up assessment on the Berg Balance Scale (BBS), the Chedoke-McMaster Stroke Assessment (CMSA), gait speed, and the Montreal Cognitive Assessment (MoCA). Measures of balance confidence and physical activity were also assessed.

**RESULTS:** Twenty-three fallers were matched to 23 nonfallers on age and functional balance scores at discharge. A total of 43 falls were reported during the study period (8 participants fell more than once). At follow-up, BBS scores ( $P = .0066$ ) and CMSA foot scores ( $P = .0033$ ) were significantly lower for fallers than for nonfallers. The 2 groups did not differ on CMSA leg scores ( $P = .049$ ), gait speed ( $P = .47$ ), or MoCA score ( $P = .23$ ). There was no significant association between change in balance confidence scores and change in physical activity levels among all participants from the first and third questionnaire ( $r = .27$ ,  $P = .08$ ).

**CONCLUSIONS:** Performance in balance and motor recovery of the foot were compromised in fallers when compared to nonfallers at 6 months post discharge from in-patient stroke rehabilitation.

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