

**SafetyLit August 12<sup>th</sup> 2018****Analysis of cervical spine injuries in the elderly from 2001-2010 using a nationwide database: increasing incidence, overall mortality and inpatient hospital charges**

CAsemota AO, Ahmed AK, Purvis TE, Passias PG, Goodwin CR, Sciubba DM.

*World Neurosurg.* 2018; ePub(ePub): ePub.

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**DOI** 10.1016/j.wneu.2018.07.228 **PMID** 30077751

**Abstract**

**BACKGROUND:** Cervical spine (C-spine) injuries cause significant morbidity and mortality among the elderly. Although the population of older-adults  $\geq 65$  years in the US is expanding, estimates of the burden and outcome of C-spine injury are lacking.

**METHODS:** The Nationwide Inpatient Sample 2001-2010 was analyzed. International Classification of Diseases codes identified patients with isolated C-spine fractures (ICF) and C-spine fractures with spinal cord injury (CSCI). Annual admission and mortality rates were calculated using US-Census data.

**RESULTS:** A total of 167,278 older-adults were included. Median age was 81 years (IQR=74-86). Most patients were female (54.9%), had Medicare coverage (77.6%), treated in teaching hospitals (63.2%), and falls were the leading injury-mechanism (51.2%). ICF occurred in 91.3%, while CSCI occurred in 8.7% ( $p < 0.001$ ). ICF was more common in  $\geq 85$  year-olds and CSCI in 65-69 year-olds ( $p < 0.001$ ). The most common injured C-spine level in ICF was C2-level (47.6%,  $p < 0.001$ ), and in CSCI was C1-C4 level (4.5%,  $p < 0.001$ ). Overall, 15.8% underwent C-spine surgery. Hospitalization rates increased from 26/100,000 in 2001 to 68/100,000 in 2010 (~167% change,  $p < 0.001$ ). Correspondingly, overall mortality increased from 3/100,000 in 2001 to 6/100,000 in 2010,  $p < 0.001$ . In-hospital mortality was 11.3%, was strongly associated with increasing age and CSCI ( $p < 0.001$ ).

**CONCLUSIONS:** In summary, C-spine fractures among US older-adults constitute a significant healthcare burden. ICF occur commonly, C2-vertebra fractures are most frequent, while CSCI are linked to increased hospital-resource utilization and worse outcomes. The incidence of C-spine fractures and mortality more than doubled over the past decade; however, proportional in-hospital mortality is decreasing.

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**Can Wii balance? Evaluating a stepping game for older adults**

Deacon M, Parsons J, Mathieson S, Davies TC.

*IEEE Trans. Neural Syst. Rehabil. Eng.* 2018; ePub(ePub): ePub.

(Copyright © 2018, IEEE (Institute of Electrical and Electronics Engineers))

**DOI** 10.1109/TNSRE.2018.2862146 **PMID** 30072333

**Abstract**

Decline in balance control is an issue for older adults as it leads to an increased risk of falling which may result in serious injury. Mitigating this risk may be achieved through balance training and

exercise, but lack of adherence to an exercise program often occurs. Improvement in balance control may be difficult to quantify in an unbiased manner given the therapist providing the treatment also assesses the patient. We developed a gamified system using off-the-shelf technology through iterative feedback with therapists and clients to evaluate response time during stepping as a measure of balance control. The game was designed using serious game strategies to increase participant engagement. This game included two Nintendo Wii Balance Boards between which the individual was required to step while the times were recorded. To provide evidence that the system could be used in a clinical environment, we conducted a cross-sectional study collecting data for five minutes at the beginning of a physiotherapy assessment. One hundred and four individuals older than 50 years of age were recruited who were able to step forward with or without an aid. The response time for a step using the system was negatively correlated to the Berg Balance Score.

#### PDF Y Endnote Y

##### **Conscious postural control during standing on compliant surface by older adults**

Chu CKH, Wong TWL.

*J. Mot. Behav.* 2018; ePub(ePub): ePub.

**Affiliation:** School of Public Health, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong SAR, China.

(Copyright © 2018, Informa - Taylor and Francis Group) DOI 10.1080/00222895.2018.1481820

PMID 30081761

#### **Abstract**

This study examined the real-time objective measurement of conscious postural control ("reinvestment") in older adults when standing on a compliant surface using electroencephalogram (EEG) coherence. Twenty-nine older adults participated in the study and their Alpha2 T3-Fz and Alpha2 T4-Fz EEG coherence during standing at three different positions on foam including wide-base standing on foam (WBF), narrow-base standing on foam (NBF) and tandem standing on foam (TAF) were measured. Participants were also required to respond to a Visual Analog Scale (VAS) to determine their perceived task difficulty after each standing position. Three 2 × 3 (Groups[low reinvestor, high reinvestor] × Standing positions[WBF, NBF, TAF]) analysis of variance (ANOVA) with repeated measures were conducted to determine differences between high and low reinvestors in three standing positions (WBF, NBF, TAF) at the primary outcome measures. The main effects of standing positions at VAS and Alpha2 T3-Fz EEG coherence were discovered but without interaction. The results suggested that when standing task difficulty increased, older adults generally elevated their real-time conscious postural control together with perceived task difficulty. It implicates that Alpha2 T3-Fz EEG coherence can be considered as a real-time objective conscious postural control measurement during balance assessment and rehabilitation if further large-scale studies could find its discriminative power between high and low reinvestors.

#### PDF Y Endnote Y

##### **Environmental enrichment and successful aging**

Leon M, Woo C.

*Front. Behav. Neurosci.* 2018; 12: e155.

**Affiliation:** Department of Neurobiology and Behavior, University of California, Irvine, Irvine, CA, United States.

(Copyright © 2018, Frontiers Research Foundation)

**DOI** 10.3389/fnbeh.2018.00155 **PMID** 30083097 **PMCID** PMC6065351

#### **Abstract**

The human brain sustains a slow but progressive decline in function as it ages and these changes are particularly profound in cognitive processing. A potential contributor to this deterioration is the gradual decline in the functioning of multiple sensory systems and the effects they have on areas of the brain that mediate cognitive function. In older adults, diminished capacity is typically observed in the visual, auditory, masticatory, olfactory, and motor systems, and these age-related declines are associated with both a decline in cognitive proficiency, and a loss of neurons in regions of the brain. We will review how the loss of hearing, vision, mastication skills, olfactory impairment, and motoric decline accompany cognitive loss, and how improved functioning of these systems may aid in the restoration of the cognitive abilities in older adults. The human brain appears to require a great deal of stimulation to maintain its cognitive efficacy as people age and environmental enrichment may aid in its maintenance and recovery.

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#### **F3ALLS approach to preventing falls**

Morley JE.

*J. Nutr. Health Aging* 2018; 22(7): 748-750.

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**DOI** 10.1007/s12603-018-1046-0 **PMID** 30080214

**Abstract** [Abstract unavailable]

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#### **Individually-tailored multifactorial intervention to reduce falls in the Malaysian Falls Assessment and Intervention Trial (MyFAIT): a randomized controlled trial**

Tan PJ, Khoo EM, Chinna K, Saedon NI, Zakaria MI, Ahmad Zahedi AZ, Ramli N, Khalidin N, Mazlan M, Chee KH, Zainal Abidin I, Nalathamby N, Mat S, Jaafar MH, Khor HM, Khannas NM, Majid LA, Tan KM, Chin AV, Kamaruzzaman SB, Poi P, Morgan K, Hill KD, Mackenzie L, Tan MP.

*PLoS One* 2018; 13(8): e0199219.

**Affiliation:** Division of Geriatric Medicine, Department of Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia.

(Copyright © 2018, Public Library of Science)

**DOI** 10.1371/journal.pone.0199219 **PMID** 30074996

#### **Abstract**

**OBJECTIVE:** To determine the effectiveness of an individually-tailored multifactorial intervention in reducing falls among at risk older adult fallers in a multi-ethnic, middle-income nation in South-East

Asia.

DESIGN: Pragmatic, randomized-controlled trial.

SETTING: Emergency room, medical outpatient and primary care clinic in a teaching hospital in Kuala Lumpur, Malaysia.

PARTICIPANTS: Individuals aged 65 years and above with two or more falls or one injurious fall in the past 12 months.

INTERVENTION: Individually-tailored interventions, included a modified Otago exercise programme, HOMEFAST home hazards modification, visual intervention, cardiovascular intervention, medication review and falls education, was compared against a control group involving conventional treatment.

PRIMARY AND SECONDARY OUTCOME MEASURES: The primary outcome was any fall recurrence at 12-month follow-up. Secondary outcomes were rate of fall and time to first fall.

RESULTS: Two hundred and sixty-eight participants (mean age  $75.3 \pm 7.2$  SD years, 67% women) were randomized to multifactorial intervention (n = 134) or convention treatment (n = 134). All participants in the intervention group received medication review and falls education, 92 (68%) were prescribed Otago exercises, 86 (64%) visual intervention, 64 (47%) home hazards modification and 51 (38%) cardiovascular intervention. Fall recurrence did not differ between intervention and control groups at 12-months [Risk Ratio, RR = 1.037 (95% CI 0.613-1.753)]. Rate of fall [RR = 1.155 (95% CI 0.846-1.576)], time to first fall [Hazard Ratio, HR = 0.948 (95% CI 0.782-1.522)] and mortality rate [RR = 0.896 (95% CI 0.335-2.400)] did not differ between groups.

CONCLUSION: Individually-tailored multifactorial intervention was ineffective as a strategy to reduce falls. Future research efforts are now required to develop culturally-appropriate and affordable methods of addressing this increasingly prominent public health issue in middle-income nations.

TRIAL REGISTRATION: ISRCTN Registry no. ISRCTN11674947.

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#### **Let's walk! Age reattribution and physical activity among older Hispanic/Latino adults: results from the ¡Caminemos! Randomized trial**

Piedra LM, Andrade FCD, Hernandez R, Trejo L, Prohaska TR, Sarkisian CA.

BMC Public Health 2018; 18(1): e964.

**Affiliation:** VA Greater Los Angeles Geriatric Research Education and Clinical Center, Los Angeles, CA, USA.

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**DOI** 10.1186/s12889-018-5850-6 **PMID** 30075709

#### **Abstract**

**BACKGROUND:** Many older Hispanics/Latinos are physically inactive and suffer the harmful health consequences associated with prolonged periods of inactivity. Negative age attributions that equate getting older with "slowing down" reinforce this inactive behavior. We implemented a community-based exercise intervention among insufficiently active older Hispanics/Latinos with a randomized trial of an attribution-retraining program, ¡Caminemos! (Let's Walk!), and measured the effect of the program on walking behavior.

**METHODS:** Five hundred and seventy-two older Hispanics/Latinos ( $\geq 60$  years) were enrolled in an exercise program that randomly assigned participants to the exercise class and one of two

conditions: (a) treatment (attribution retraining to dispel the notion that physical activity inevitably ceases with age) or (b) control (generic health education). Data were collected at baseline and follow-up (1, 12, and 24 months). Physical activity was determined through pedometer data and the Yale Physical Activity Survey. We also measured the intervention effects on age-expectations, self-efficacy expectations, and outcome expectations for physical activity. Mixed-effects regression models were used to determine intervention effects on prospective measures of physical activity and intrapersonal expectations.

**RESULTS:** The sample had a mean age of 73 years (SD = 6.8) and was 77% female, and 76% of the sample reported income <\$20,000. At baseline, control and treatment groups walked about 3000 steps/day. By 24 months, participants in both arms of the intervention maintained greater than 10,000 mean steps/day, but the difference between the groups was not statistically significant. In analyses adjusted for age, sex, education, income, health status, and acculturation, participants in both trial arms increased their mean numbers of steps at 12 and 24 months, with the treatment group showing a greater number of mean steps compared to the controls at 12 months.

**CONCLUSIONS:** In this group of physically inactive older Hispanics/Latinos, attribution retraining in combination with an exercise class was superior to the exercise class alone with regard to increasing walking behavior. This success was sustained at 12 months (the pre-defined primary study outcome) but not at 24 months. For older Hispanics/Latinos, enrollment in an attribution-retraining exercise program can improve an inactive lifestyle. **TRIAL REGISTRATION:** clinicaltrials.gov identifier: NCT00183014.

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#### **Making fall prevention routine in primary care practice: perspectives of allied health professionals**

Liddle J, Lovarini M, Clemson L, Mackenzie L, Tan A, Pit SW, Poulos R, Tiedemann A, Sherrington C, Roberts C, Willis K.

*BMC Health Serv. Res.* 2018; 18(1): e598.

**Affiliation:** Melbourne Health, La Trobe University, Parkville, VIC, Australia.

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**DOI** 10.1186/s12913-018-3414-1 **PMID** 30075774

#### **Abstract**

**BACKGROUND:** While there is strong evidence that fall prevention interventions can prevent falls in people aged 65 and over, translating evidence into routine practice is challenging. Research regarding how allied health professionals (AHPs) respond to this challenge is limited. As part of the Integrated Solutions for Sustainable Fall Prevention (iSOLVE) project, this study aimed to explore how AHPs were making fall prevention practice routine in primary care and the factors that influenced their fall prevention practice.

**METHODS:** In-depth qualitative interviews were conducted with fifteen AHPs who had attended evidence-based workshops associated with the iSOLVE project. AHPs had backgrounds in physiotherapy, occupational therapy, exercise physiology and podiatry. Interviews explored how fall prevention was being incorporated into routine practice and the factors that influenced routinisation, including the project workshops. Thematic analysis was used to analyse the data.

**RESULTS:** We found fall prevention was valued in practice and recognised as complex. AHPs worked

through challenges relating to clients (multi-morbidity, complex living situations, client motivation), challenges working alongside other health professionals (understanding respective roles/overlapping roles, sense of competition, communication) and challenges associated with funding systems perceived as complicated and constantly changing. Despite these challenges, AHPs were adopting strategies for integrating fall prevention routinely. The iSOLVE workshops were perceived as important in supporting existing practice and in providing strategies to enhance practice.

**CONCLUSIONS:** Policy makers, program managers, educators and AHPs can adopt strategies identified in this research for routinising fall prevention such as being alert that falls are common, asking every client about falls, having processes for assessing clients for fall risk, and having structured and evidence-based programs to work with clients on fall prevention. Adapting and streamlining funding systems are also important for facilitating fall prevention work.

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

#### **Multifactorial screening tool for determining fall risk in community-dwelling adults aged 50 years or over (FallSensing): protocol for a prospective study**

Martins AC, Moreira J, Silva C, Silva J, Tonelo C, Baltazar D, Rocha C, Pereira T, Sousa I.

*JMIR Res. Protoc.* 2018; 7(8): e10304.

**Affiliation:** Fraunhofer Portugal AICOS, Porto, Portugal.

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**DOI** 10.2196/10304 **PMID** 30072360

#### **Abstract**

**BACKGROUND:** Falls are a major health problem among older adults. The risk of falling can be increased by polypharmacy, vision impairment, high blood pressure, environmental home hazards, fear of falling, and changes in the function of musculoskeletal and sensory systems that are associated with aging. Moreover, individuals who experienced previous falls are at higher risk. Nevertheless, falls can be prevented by screening for known risk factors.

**OBJECTIVE:** The objective of our study was to develop a multifactorial, instrumented, screening tool for fall risk, according to the key risk factors for falls, among Portuguese community-dwelling adults aged 50 years or over and to prospectively validate a risk prediction model for the risk of falling.

**METHODS:** This prospective study, following a convenience sample method, will recruit community-dwelling adults aged 50 years or over, who stand and walk independently with or without walking aids in parish councils, physical therapy clinics, senior's universities, and other facilities in different regions of continental Portugal. The FallSensing screening tool is a technological solution for fall risk screening that includes software, a pressure platform, and 2 inertial sensors. The screening includes questions about demographic and anthropometric data, health and lifestyle behaviors, a detailed explanation about procedures to accomplish 6 functional tests (grip strength, Timed Up and Go, 30 seconds sit to stand, step test, 4-Stage Balance test "modified," and 10-meter walking speed), 3 questionnaires concerning environmental home hazards, and an activity and participation profile related to mobility and self-efficacy for exercise.

**RESULTS:** The enrollment began in June 2016 and we anticipate study completion by the end of 2018.

**CONCLUSIONS:** The FallSensing screening tool is a multifactorial and evidence-based assessment

which identifies factors that contribute to fall risk. Establishing a risk prediction model will allow preventive strategies to be implemented, potentially decreasing fall rate. REGISTERED REPORT IDENTIFIER: RR1-10.2196/10304.

**PDF Y Endnote Y**

**Originally published in JMIR Research Protocols (<http://www.researchprotocols.org>), 02.08.2018.**

**Risk factors and quality of life for the occurrence of hip fracture in postmenopausal women**

Chen FP, Fu TS, Lin YC, Fan CM.

*Biomed. J.* 2018; 41(3): 202-208.

**Affiliation:** Department of Radiology, Chang Gung Memorial Hospital, Keelung, Taiwan; College of Medicine, Chang Gung University, Taoyuan, Taiwan.

(Copyright © 2018, Medknow Publications)

**DOI** 10.1016/j.bj.2018.04.001 **PMID** 30080660

**Abstract**

**BACKGROUND:** To identify the risk factors and changes of quality of life in the first occurrence of hip fracture in Taiwanese postmenopausal women.

**METHODS:** In this case-control study, we enrolled 100 postmenopausal women with accidental first-incident hip fracture and 100 women without hip fracture. The control group was matched to the study group according to age. Evaluation consisted of a questionnaire, an interview to both assess quality of life via a 36-item Short Form Health Survey and document risk factors, a physical examination to record height and body weight, and bone mineral density (BMD) of the hip and spine using dual-energy X-ray absorptiometry (DXA).

**RESULTS:** The mean age of the patients was 77.9 years old. Compared with the controls, the patients with first-incident hip fracture had a lower level of education, increased body height, higher parity, no experience of estrogen therapy, prior history of diabetes mellitus and rheumatoid arthritis, walking aid use, less weight-bearing exercise, and steroid use. Total hip BMD was a stronger predictor than BMD at different sites. Quality of life was significantly higher in the control group at the baseline and 4-month follow-up.

**CONCLUSIONS:** Quality of life was related to the first-incident hip fracture. The increased risk of falls, lower level of education, and total hip BMD are the strongest predictors of first-incident hip fracture in Asian elderly postmenopausal women.

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**Should prevention of falls start earlier? Co-ordinated analyses of harmonised data on falls in middle-aged adults across four population-based cohort studies**

Peeters G, van Schoor NM, Cooper R, Tooth L, Kenny RA.

*PLoS One* 2018; 13(8): e0201989.

**Affiliation:** The Irish Longitudinal Study on Ageing, Trinity College, Dublin, Ireland.

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**DOI** 10.1371/journal.pone.0201989 **PMID** 30086149

**Abstract**



The prevalence of risk factors for falls increases during middle-age, but the prevalence of falls in this age-range is often overlooked and understudied. The aim was to calculate the prevalence of falls in middle-aged adults (aged 40-64 years) from four countries. Data were from four population-based cohort studies from Australia (Australian Longitudinal Study on Women's Health, n = 10556, 100% women, 51-58 years in 2004), Ireland (The Irish Longitudinal Study on Ageing, n = 4968, 57.5% women, 40-64 years in 2010), the Netherlands (Longitudinal Aging Study Amsterdam, n = 862, 51.6% women, 55-64 years in 2012-13) and Great Britain (MRC National Survey of Health and Development, n = 2821, 50.9% women, 53 years in 1999). In each study, falls assessment was based on recall of any falls in the past year. The prevalence of falls was calculated for the total group, for each country, for men and women separately, and for 5-year age-bands. The prevalence was higher in Australia (27.8%, women only) and the Netherlands (25.1%) than in Ireland (17.6%) and Great Britain (17.8%,  $p < 0.001$ ). Women (27.0%) had higher prevalences than men (15.2%,  $p < 0.001$ ). The prevalence increased from 8.7% in 40-44 year olds to 29.9% in 60-64 year olds in women, and from 14.7% in 45-49 year olds to 15.7% in 60-64 year olds in men. Even within 5-year age-bands, there was substantial variation in prevalence between the four cohorts. Weighting for age, sex and education changed the prevalence estimates by less than 2 percentage points. The sharp increase in prevalence of falls in middle-age, particularly among women supports the notion that falls are not just a problem of old age, and that middle-age may be a critical life stage for preventive interventions.

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#### Choosing wisely to mobilize patients in reducing falls and injury

Cho HJ, Dunn AS, Sakai Y, Israilov S, Raja A, Race J, Leipzig RM.

*Jt. Comm. J. Qual. Patient Saf.* 2018; 44(8): 500-501.

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DOI 10.1016/j.jcjq.2018.03.003 PMID 30071970

**Abstract** [Abstract unavailable]

#### PDF Will get ILL Endnote Y

#### Indirect measurement of ground reaction forces and moments by means of wearable inertial sensors: a systematic review

Ancillao A, Tedesco S, Barton J, O'Flynn B.

*Sensors (Basel)* 2018; 18(8): s18082564.

**Affiliation:** Tyndall National Institute, University College Cork, Lee Maltings Complex, Dyke Parade, T12R5CP Cork, Ireland. brendan.oflynn@tyndall.ie.

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DOI 10.3390/s18082564 PMID 30081607

#### Abstract

In the last few years, estimating ground reaction forces by means of wearable sensors has come to be a challenging research topic paving the way to kinetic analysis and sport performance testing outside of labs. One possible approach involves estimating the ground reaction forces from kinematic data obtained by inertial measurement units (IMUs) worn by the subject. As estimating



kinetic quantities from kinematic data is not an easy task, several models and protocols have been developed over the years. Non-wearable sensors, such as optoelectronic systems along with force platforms, remain the most accurate systems to record motion. In this review, we identified, selected and categorized the methodologies for estimating the ground reaction forces from IMUs as proposed across the years. Scopus, Google Scholar, IEEE Xplore, and PubMed databases were interrogated on the topic of Ground Reaction Forces estimation based on kinematic data obtained by IMUs. The identified papers were classified according to the methodology proposed: (i) methods based on direct modelling; (ii) methods based on machine learning. The methods based on direct modelling were further classified according to the task studied (walking, running, jumping, etc.). Finally, we comparatively examined the methods in order to identify the most reliable approaches for the implementation of a ground reaction force estimator based on IMU data.

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##### **Newborn falls in a large tertiary academic center over 13 years**

Loyal J, Pettker CM, Raab CA, O'Mara E, Lipkind HS.

*Hosp. Pediatr.* 2018; ePub(ePub): ePub.

**Affiliation:** Obstetrics, Gynecology, and Reproductive Sciences, Yale University School of Medicine, New Haven, Connecticut; and.

(Copyright © 2018, American Academy of Pediatrics Section on Hospital Medicine)

**DOI** 10.1542/hpeds.2018-0021 **PMID** 30068526

#### **Abstract**

**OBJECTIVES:** We sought to report the frequency of, circumstances surrounding, and outcomes of newborn falls in our hospital. We evaluated the impact of specific interventions on the frequency of newborn falls and the time between falls.

**METHODS:** We performed a retrospective study of newborn falls reported on our postpartum unit over a 13-year period. Demographic information and circumstances of falls were collected via an electronic event reporting system and medical record review.

**RESULTS:** There were 63 633 births and 29 newborn falls, yielding an average of 4.6 falls per 10 000 live births (median: 2 per year; range 0-5 per year). Newborns who sustained a fall were exclusively breastfeeding (75.9%), 24 to 48 hours of age at the time of the fall (58.6%), and had first-time parents (62.1%). At the time of the fall, most newborns were with the mother compared with being with the father or both parents (65.5% vs 34.5%); in the mother's bed compared with being elsewhere, such as on a couch or chair, with a parent, or in the parent's arms (62.1% vs 37.9%); and feeding at the time of the fall versus not (79.3% vs 20.7%). All newborns were monitored after the fall, with no adverse outcomes. Despite interventions, we continued to see cases of newborn falls, although the overall trend revealed decreasing falls per 10 000 patient-days and longer time between falls over the study period.

**CONCLUSIONS:** Newborn falls in our hospital are infrequent but continue to occur despite preventive efforts, highlighting the importance of continuous awareness and education.

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#### PDF Y Endnote Y

### Preventing newborn falls and improving care for postpartum women and their newborns

Seashore C, Tully KP.

*Hosp. Pediatr.* 2018; ePub(ePub): ePub.

**Affiliation:** Carolina Global Breastfeeding Institute, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.

(Copyright © 2018, American Academy of Pediatrics Section on Hospital Medicine)

**DOI** 10.1542/hpeds.2018-0121 **PMID** 30068525

**Abstract** [Abstract unavailable]

**PDF Y Endnote Y**

### Serotonin - a new potential risk factor for falls, low BMD and fracture

Vestergaard P.

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

**Affiliation:** Department of Endocrinology, Aalborg University Hospital, Denmark.

(Copyright © 2018, American Society for Bone and Mineral Research)

**DOI** 10.1002/jbmr.3560 **PMID** 30075050

#### Abstract

Serotonin is a neurotransmitter present in the central nervous system (CNS) and intestine. It binds to the 5-HT (hydroxytryptamine)-receptor, and regulates gastrointestinal (GI) movements, CNS signaling resulting in changes in mood and memory as well as cardiovascular effects, including vasoconstriction and blood flow. The 5-HT receptors are mainly G-protein coupled receptors that may mediate excitatory and inhibitory signaling. This article is protected by copyright. All rights reserved.

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### Should prevention of falls start earlier? Co-ordinated analyses of harmonised data on falls in middle-aged adults across four population-based cohort studies

Peeters G, van Schoor NM, Cooper R, Tooth L, Kenny RA.

*PLoS One* 2018; 13(8): e0201989.

**Affiliation:** The Irish Longitudinal Study on Ageing, Trinity College, Dublin, Ireland.

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**DOI** 10.1371/journal.pone.0201989 **PMID** 30086149

#### Abstract

The prevalence of risk factors for falls increases during middle-age, but the prevalence of falls in this age-range is often overlooked and understudied. The aim was to calculate the prevalence of falls in middle-aged adults (aged 40-64 years) from four countries. Data were from four population-based cohort studies from Australia (Australian Longitudinal Study on Women's Health, n = 10556, 100% women, 51-58 years in 2004), Ireland (The Irish Longitudinal Study on Ageing, n = 4968, 57.5% women, 40-64 years in 2010), the Netherlands (Longitudinal Aging Study Amsterdam, n = 862, 51.6% women, 55-64 years in 2012-13) and Great Britain (MRC National Survey of Health and Development, n = 2821, 50.9% women, 53 years in 1999). In each study, falls assessment was based

on recall of any falls in the past year. The prevalence of falls was calculated for the total group, for each country, for men and women separately, and for 5-year age-bands. The prevalence was higher in Australia (27.8%, women only) and the Netherlands (25.1%) than in Ireland (17.6%) and Great Britain (17.8%,  $p < 0.001$ ). Women (27.0%) had higher prevalences than men (15.2%,  $p < 0.001$ ). The prevalence increased from 8.7% in 40-44 year olds to 29.9% in 60-64 year olds in women, and from 14.7% in 45-49 year olds to 15.7% in 60-64 year olds in men. Even within 5-year age-bands, there was substantial variation in prevalence between the four cohorts. Weighting for age, sex and education changed the prevalence estimates by less than 2 percentage points. The sharp increase in prevalence of falls in middle-age, particularly among women supports the notion that falls are not just a problem of old age, and that middle-age may be a critical life stage for preventive interventions.

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##### **System for automatic gait analysis based on a single RGB-D camera**

Rocha AP, Choupina HMP, Vilas-Boas MDC, Fernandes JM, Cunha JPS.

*PLoS One* 2018; 13(8): e0201728.

**Affiliation:** Institute for Systems Engineering and Computers - Technology and Science (INESC TEC), and Faculty of Engineering (FEUP), University of Porto, Porto, Portugal.

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**DOI** 10.1371/journal.pone.0201728 **PMID** 30075023

##### **Abstract**

Human gait analysis provides valuable information regarding the way of walking of a given subject. Low-cost RGB-D cameras, such as the Microsoft Kinect, are able to estimate the 3-D position of several body joints without requiring the use of markers. This 3-D information can be used to perform objective gait analysis in an affordable, portable, and non-intrusive way. In this contribution, we present a system for fully automatic gait analysis using a single RGB-D camera, namely the second version of the Kinect. Our system does not require any manual intervention (except for starting/stopping the data acquisition), since it firstly recognizes whether the subject is walking or not, and identifies the different gait cycles only when walking is detected. For each gait cycle, it then computes several gait parameters, which can provide useful information in various contexts, such as sports, healthcare, and biometric identification. The activity recognition is performed by a predictive model that distinguishes between three activities (walking, standing and marching), and between two postures of the subject (facing the sensor, and facing away from it). The model was built using a multilayer perceptron algorithm and several measures extracted from 3-D joint data, achieving an overall accuracy and F1 score of 98%. For gait cycle detection, we implemented an algorithm that estimates the instants corresponding to left and right heel strikes, relying on the distance between ankles, and the velocity of left and right ankles. The algorithm achieved errors for heel strike instant and stride duration estimation of  $15 \pm 25$  ms and  $1 \pm 29$  ms (walking towards the sensor), and  $12 \pm 23$  ms and  $2 \pm 24$  ms (walking away from the sensor). Our gait cycle detection solution can be used with any other RGB-D camera that provides the 3-D position of the main body joints.

#### PDF Endnote

### **The contribution of counter-rotation movements during fall recovery: A validation study**

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

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**DOI** 10.1016/j.jbiomech.2018.07.025 **PMID** 30075953

#### **Abstract**

Three mechanisms of maintaining standing stability include  $M_1$  - moving the COP within the base of support,  $M_2$  - segment counter-rotation, and  $M_3$  - applying an external force. To date, the contributions of these mechanisms have not been quantified for the response to an external postural disturbance. The purpose of this study was to evaluate the construct validity of measures that quantify the  $M_2$  contribution to anteroposterior fall recovery. We evaluated the whole-body rotation contribution, as well as a measure specific to arm motion ( $M_{ARMS}$ ). With segment counter-rotation as the main focus of this study, we examined standing feet-in-place responses to treadmill-induced falls. The treatment validity of our measures was assessed by comparing unconstrained responses to those with constrained arm motion. The convergent validity of our measures was assessed by correlating peak shoulder flexion and extension velocities with counter-rotation contributions. Eleven unimpaired participants responded to anteroposterior belt accelerations from a treadmill, and the  $M_2$  and  $M_{ARMS}$  contributions were quantified from three-dimensional segment motion. The treatment validity of these measures was partially supported. Constraining the arms reduced  $M_2$  for anterior, but not posterior falls. Conversely,  $M_{ARMS}$  was reduced for posterior, but not anterior falls. Convergent validity was supported for  $M_{ARMS}$  ( $r = 0.64-0.78$ ), but not  $M_2$  ( $r = -0.40$  to  $-0.15$ ). These results support the use of  $M_{ARMS}$  over  $M_2$  when interested in the role of arm motion. Given that arm constraints did not change the contribution of  $M_{ARMS}$  during a forward fall, unimpaired participants may not necessarily rely on arm motion as part of their recovery strategy in this context.

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### **The relationship between depression, anxiety and cognition and its paradoxical impact on falls in multiple sclerosis patients**

Kalron A, Aloni R, Allali G. *Mult. Scler. Relat. Disord.* 2018; 25: 167-172.

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**DOI** 10.1016/j.msard.2018.07.029 **PMID** 30086536

#### **Abstract**

Although falls, cognitive impairments and mood disorders are very common in people with MS (PwMS) the relationship between these conditions has received scant attention. Therefore, the

purpose of the study was to investigate the specific involvement of depression and anxiety on cognition and falls in PwMS. The study included 122 PwMS (75 women) divided into four subgroups according to their manifestation of depression and anxiety assessed by the Hospital Anxiety and Depression Scale (HADS) (i.e. no depression/no anxiety, depression/no anxiety, no depression/anxiety and depression/anxiety). Cognitive performance was evaluated via a computerized cognitive battery of tests. Participants were defined as "fallers" and "non-fallers" based on their fall history recorded during a clinical interview. Thirty-eight PwMS (31.1%) were classified as depressed (mean HADS 11.1, SD = 3.4); 52 (42.6%) were classified as anxious (mean HADS 11.1, S.D = 3.1) and 56 (45.9%) were neither depressed nor anxious. PwMS categorized in the anxiety/non-depressed subgroup were 6 times less likely to fall than PwMS without depression or anxiety (OR = 0.160, 95%CI = 0.040-0.646; P-value = 0.010). In terms of global cognitive status, depressed PwMS with anxiety were almost 4 times more likely to experience cognitive impairments compared to PwMS who were not depressed or anxious. Anxiety without comorbid depression is associated with less risk of falling, even when comparing MS patients without depression or anxiety. Future longitudinal investigations should confirm if this phenotype of MS patients with anxiety and without depression fall less compared with other mood groups.

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