

## SafetyLit June 5th 2016

### **A bayesian approach to identifying new risk factors for dementia: a nationwide population-based study**

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*Medicine (Baltimore)* 2016; 95(21): e3658.

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**DOI** 10.1097/MD.0000000000003658 **PMID** 27227925

#### **Abstract**

Dementia is one of the most disabling and burdensome health conditions worldwide. In this study, we identified new potential risk factors for dementia from nationwide longitudinal population-based data by using Bayesian statistics. We first tested the consistency of the results obtained using Bayesian statistics with those obtained using classical frequentist probability for 4 recognized risk factors for dementia, namely severe head injury, depression, diabetes mellitus, and vascular diseases. Then, we used Bayesian statistics to verify 2 new potential risk factors for dementia, namely hearing loss and senile cataract, determined from the Taiwan's National Health Insurance Research Database. We included a total of 6546 (6.0%) patients diagnosed with dementia. We observed older age, female sex, and lower income as independent risk factors for dementia. Moreover, we verified the 4 recognized risk factors for dementia in the older Taiwanese population; their odds ratios (ORs) ranged from 3.469 to 1.207. Furthermore, we observed that hearing loss (OR = 1.577) and senile cataract (OR = 1.549) were associated with an increased risk of dementia. We found that the results obtained using Bayesian statistics for assessing risk factors for dementia, such as head injury, depression, DM, and vascular diseases, were consistent with those obtained using classical frequentist probability. Moreover, hearing loss and senile cataract were found to be potential risk factors for dementia in the older Taiwanese population. Bayesian statistics could help clinicians explore other potential risk factors for dementia and for developing appropriate treatment strategies for these patients.

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

### **Biomechanical balance response during induced falls under dual task conditions in people with knee osteoarthritis**

Levinger P, Nagano H, Downie C, Hayes A, Sanders KM, Cicuttini F, Begg R.

*Gait Posture* 2016; 48: 106-112.

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**DOI** 10.1016/j.gaitpost.2016.04.031 **PMID** 27239773

#### **Abstract**

**OBJECTIVE:** People with knee osteoarthritis (OA) are at twice the risk of falling compared to older people without knee OA, however the mechanism for this is poorly understood. This study investigated the biomechanical response of the trunk and lower limb joints during a forward

induced fall under different task conditions in people with and without knee OA.

**METHOD:** Twenty-four participants with OA ( $68.6 \pm 6.2$  years) and 15 asymptomatic controls ( $72.4 \pm 4.8$  years) participated in the study. Forward fall was induced by releasing participants from a static forward leaning position. Participants were required to recover balance during three conditions: normal, physical (obstacle clearance) and cognitive dual tasks (counting backwards). Spatiotemporal parameters, lower limb joint kinematics and kinetics of the recovery limb were compared between the two groups and across the three task conditions.

**RESULTS:** The OA group demonstrated slower spatio-temporal characteristics and reduced hip and knee flexion angles, joint moments/powers and reduced muscle negative work at the knee and ankle ( $p < 0.05$ ). Cognitive dual task resulted in reduced centre of mass velocity and step length ( $p = 0.03$ ) compared to the physical dual task condition. Reduced knee ( $p = 0.02$ ) and hip joint powers ( $p = 0.03$ ) were demonstrated in the OA group in the physical task condition.

**CONCLUSION:** When simulating a forward fall, participants with OA demonstrated difficulty in absorbing the impact and slowing down the forward momentum of the body during a recovery step. Moreover, poor dynamic postural control was demonstrated as task complexity increased.

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### **Bridging the gap between real-life data and simulated data by providing a highly realistic fall dataset for evaluating camera-based fall detection algorithms**

Baldewijns G, Debard G, Mertes G, Vanrumste B, Croonenborghs T.

*Healthc. Technol. Lett.* 2016; 3(1): 6-11.

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**DOI** 10.1049/htl.2015.0047 **PMID** 27222726

#### **Abstract**

Fall incidents are an important health hazard for older adults. Automatic fall detection systems can reduce the consequences of a fall incident by assuring that timely aid is given. The development of these systems is therefore getting a lot of research attention. Real-life data which can help evaluate the results of this research is however sparse. Moreover, research groups that have this type of data are not at liberty to share it. Most research groups thus use simulated datasets. These simulation datasets, however, often do not incorporate the challenges the fall detection system will face when implemented in real-life. In this Letter, a more realistic simulation dataset is presented to fill this gap between real-life data and currently available datasets. It was recorded while re-enacting real-life falls recorded during previous studies. It incorporates the challenges faced by fall detection algorithms in real life. A fall detection algorithm from Debard et al. was evaluated on this dataset. This evaluation showed that the dataset possesses extra challenges compared with other publicly available datasets. In this Letter, the dataset is discussed as well as the results of this preliminary evaluation of the fall detection algorithm. The dataset can be downloaded from [www.kuleuven.be/advise/datasets](http://www.kuleuven.be/advise/datasets).

**PDF Endnote Y**

### **Cognition and gait in older people**

Cohen JA, Verghese J, Zwerling JL.

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

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#### **Abstract**

Cognitive difficulties and gait abnormalities both increase with age. We review normal and pathologic changes in both gait and cognition in older adults. Gait performance in older individuals is linked to specific cognitive changes, in particular in executive function. Structural and functional assays highlight the shared anatomic control of cognitive and gait function, mostly in the prefrontal cortices. Cognitive impairment can be used to predict incident gait difficulties. Changes in gait, especially decreased gait velocity, may be a harbinger of impending cognitive decline. The combination of slow gait and cognitive complaints (the Motoric Cognitive Risk syndrome) is a powerful new clinical tool to identify those at high risk of developing dementia and therefore may be used to target interventions. Evidence is limited, but cognitive training and targeted physical activity may be useful to mitigate or prevent gait and cognitive decline with age.

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

### **Creating an IOT that notifies concerned people for the falls of geriatric patients**

Turkeli S, Kurt KK, Catamak A, Sonmez RY, Atay HT.

*Stud. Health Technol. Inform.* 2016; 224: 105-107.

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(Copyright © 2016, IOS Press)

**DOI** unavailable **PMID** 27225562

#### **Abstract**

A fall is a multifactorial phenomenon which cause an increase in both mortality and injury rates. The cause of a fall is mostly related to loss in reflexes especially in older ages. A number of large prospective studies shows that elderly patients have significant fractures and injuries even sometimes in some cases a fall can be concluded with deaths. However, in case of fall, if the situation is noticed and aided quickly, the life quality can be increased significantly in older people. With implementation of preventive strategies or premonitory devices, this devastating problem can be solved. The IOT project is a prototype with two versions which are needed and attached versions and accomplishes basic functions such as information about falls and send it through the internet. By this way, the falls are transmitted to concerned people or patient's relatives with position information.

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

### **Depressive symptoms and orthostatic hypotension are risk factors for unexplained falls in community-living older people**

Menant JC, Wong AK, Trollor JN, Close JC, Lord SR.

*J. Am. Geriatr. Soc.* 2016; 64(5): 1073-1078.

**Affiliation:** School of Public Health and Community Medicine, University of New South Wales, Sydney, Australia.

(Copyright © 2016, John Wiley and Sons)

**DOI** 10.1111/jgs.14104 **PMID** 27225359

### **Abstract**

**OBJECTIVES:** To investigate risk factors for unexplained falls in older community-dwelling individuals.

**DESIGN:** Prospective cohort study.

**SETTING:** Community population, Sydney, Australia.

**PARTICIPANTS:** Older adults (N = 529; mean age 79.8 ± 4.4, 52.2% female).

**MEASUREMENTS:** Participants provided information demographic, medical, and medication characteristics and completed cardiovascular (tilt table test, pulse wave velocity), cognitive, and sensorimotor assessments at baseline. Falls were then recorded in monthly fall diaries for 12 months. Unexplained fallers (UFs) were those who reported falls due to a blackout, dizziness, feeling faint, or "found themselves suddenly on the ground."

**RESULTS:** Of the 523 participants available at follow-up, 238 (45.5%) reported one or more falls; 35 participants fulfilled the definition of UFs. UFs were more likely than balance-related fallers (BFs) (n = 203) and nonfallers (n = 291) to have orthostatic hypotension (39.4%, 20.5% and 22.4%, respectively) and depressive symptoms (24.2%, 10.1%, and 7.9% respectively). More UFs (88.6%) than BFs (70.9%) had injurious falls. A multivariate logistic regression model revealed that depressive symptoms and orthostatic hypotension were significant and independent determinants of UF status.

**CONCLUSION:** Approximately 15% of fallers had unexplained falls, which were more likely to result in injuries. Depressive symptoms and orthostatic hypotension increased the risk of unexplained falls, whereas cognitive deficits and sensorimotor and balance impairments did not. Future research should investigate whether psychotherapy and physical exercise to improve mood and medication reviews and nonpharmacological therapies for the treatment of orthostatic hypotension and depression are effective at reducing the risk of unexplained falls in older people.

### **PDF Y Endnote Y**

### **Development and evaluation of an online fall-risk questionnaire for nonfrail community-dwelling elderly persons: a pilot study**

Obrist S, Rogan S, Hilfiker R.

*Curr. Gerontol. Geriatr. Res.* 2016; 2016: 1520932.

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**DOI** 10.1155/2016/1520932 **PMID** 27247571

### **Abstract**

**INTRODUCTION:** Falls are frequent in older adults and may have serious consequences but awareness of fall-risk is often low. A questionnaire might raise awareness of fall-risk; therefore we set out to construct and test such a questionnaire.

**METHODS:** Fall-risk factors and their odds ratios were extracted from meta-analyses and a questionnaire was devised to cover these risk factors. A formula to estimate the probability of future falls was set up using the extracted odds ratios. The understandability of the questionnaire

and discrimination and calibration of the prediction formula were tested in a cohort study with a six-month follow-up. Community-dwelling persons over 60 years were recruited by an e-mail snowball-sampling method.

**RESULTS and DISCUSSION:** We included 134 persons. Response rates for the monthly fall-related follow-up varied between the months and ranged from low 38% to high 90%. The proportion of present risk factors was low. Twenty-five participants reported falls. Discrimination was moderate (AUC: 0.67, 95% CI 0.54 to 0.81). The understandability, with the exception of five questions, was good. The wording of the questions needs to be improved and measures to increase the monthly response rates are needed before test-retest reliability and final predictive value can be assessed.

**PDF Y Endnote Y**

### **Development of home-based frailty detection device using wireless sensor networks**

Lin CC, Chen CC, Lin PS, Lee RG, Huang JS, Tsai TH, Chang YC.

*J. Med. Biol. Eng.* 2016; 36: 168-177.

**Affiliation:** Department of Computer Science and Information Engineering, Healthy Aging Research Center, College of Engineering, Chang Gung University, 259 Wen-Hwa 1st Road, Kwei-Shan, Tao-Yuan, 333 Taiwan, ROC.

(Copyright © 2016, Biomedical Engineering Society of ROC)

**DOI** 10.1007/s40846-016-0127-y **PMID** 27231464 **PMCID** PMC4853458

#### **Abstract**

This study develops a home-based frailty detection device that uses embedded systems and wireless sensing technology. This system helps monitor the impact of aging among the elderly through wireless automatic detection. The detection system consists of four devices. The first device, called eScale, simulates the traditional falling ruler test to measure reaction time. Another device, called eChair, measures the pressure exerted by a test subject through a pressure sensor. It is used to test three symptoms of frailty, namely slowness of movement, physical weakness, and body weight. The third device, called ePad, consists of a soft membrane switch placed on the ground to detect footsteps and is used to test balance. The fourth device, called eReach, measures displacement through ultrasound sensors. It is used to carry out the functional reach test. The sampling rate of each device is the main factor that determines system performance. When the test distance was set to 5 m for Home-Gateway, a 1-Hz sampling rate showed the best performance (98 %). Up to eight devices can be connected simultaneously to the gateway. The proposed system was compared with conventional approaches through testing with test subjects (n = 8). The results of the five tests were as follows: standing forward bend (r = 0.929), balance (r = 0.996), slowness of movement (r = 0.976), and physical weakness (r = 0.991), with p < 0.01. In the reaction time test, r = 0.871, with p < 0.1. All results suggest high correlations. Tests of aging symptoms were performed on 309 people aged over 65 years. Among males, degradation of over 20 % was found in the areas of physical weakness, slowness of movement, and functional reach. Among females, a degradation of 75 % was found in the balance test.

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### **Effectiveness of exercise interventions to improve postural control in older adults: a systematic review and meta-analyses of centre of pressure measurements**

Low DC, Walsh GS, Arkesteijn M.

*Sports Med.* 2016; ePub(ePub): ePub.

**Affiliation:** Institute of Biological, Environmental and Rural Sciences (IBERS), Aberystwyth University, Carwyn James Building, Penglais Campus, Aberystwyth, SY23 3FD, UK.

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**DOI** 10.1007/s40279-016-0559-0 **PMID** 27245061

### **Abstract**

**BACKGROUND:** Previous reviews have shown balance in older adults to be improved with exercise. However, it is currently unclear whether postural control, indicated by centre of pressure (COP) measurement, can be improved in older adults and thus whether postural control could be a mechanism to improve balance.

**OBJECTIVES:** The purpose of this systematic review was to assess the effectiveness of force platform COP variables to identify changes in postural control following exercise interventions in older adults. In addition, a secondary purpose was to determine whether the exercise types (balance, resistance or multi-component exercise interventions) are equally effective to improve postural control.

**METHODS:** Randomised controlled trials were identified using searches of databases and reference lists (PROSPERO registration number CRD42014010617). Trials performing exercise interventions, reporting force platform COP measurements, in participants with a mean age of  $\geq 60$  years were included. Risk of bias assessments were performed following the Cochrane guidelines. Data were pooled in meta-analyses, and standardised mean differences (SMDs) with 95 % confidence intervals (CIs) were calculated.

**RESULTS:** Twenty-three trials met the inclusion criteria for the systematic review. Twenty-two trials could be defined as either utilising a balance, resistance or multi-component exercise intervention. These 22 trials were used in the meta-analyses. All trials reported measurements of double leg stance; eight trials reported additional stance conditions. The meta-analyses of double leg stance showed that balance exercise interventions significantly decreased total sway path length/velocity [SMD -1.13, 95 % CI -1.75 to -0.51 (eyes open); SMD -0.79, 95 % CI -1.33 to -0.26 (eyes closed)] and anterior-posterior sway path length/velocity [SMD -1.02, 95 % CI -2.01 to -0.02 (eyes open); SMD -0.82, 95 % CI -1.46 to -0.17 (eyes closed)] in both eyes open and eyes closed conditions. Balance exercise interventions also decreased sway area in eyes closed conditions (SMD -0.57, 95 % CI -1.01 to -0.13) and medio-lateral sway path length/velocity in eyes open conditions (SMD -0.8, 95 % CI -1.48 to -0.12). In contrast, neither resistance nor multi-component exercise interventions affected any of the included COP measurements.

**CONCLUSIONS:** Postural control is improved by balance exercise interventions. In contrast, strength or multi-component exercise interventions did not influence postural control measurements in older adults. In addition, a lack of standardisation in collection protocol and COP variables calculated across trials was identified.

### **PDF Y Endnote Y**

**Erratum to: Effectiveness of a home-based cognitive behavioral program to manage concerns about falls in community-dwelling, frail older people: results of a randomized controlled trial**

Dorresteijn TA, Zijlstra GA, Ambergen AW, Delbaere K, Vlaeyen JW, Kempen GI.

*BMC Geriatr.* 2016; 16(1): 108.

**Affiliation:** Department of Health Services Research - Focusing on Chronic Care and Ageing, CAPHRI School for Public Health and Primary Care, Maastricht University, P.O. Box 616, Maastricht, MD, 6200, The Netherlands.

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DOI 10.1186/s12877-016-0278-2 PMID 27220990 PMCID PMC4879725

**Abstract** [Abstract unavailable]

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### **Fall and fracture risk in nursing home residents with moderate-to-severe behavioral symptoms of alzheimer's disease and related dementias initiating antidepressants or antipsychotics**

Wei YJ, Simoni-Wastila L, Lucas JA, Brandt N.

*J. Gerontol. A Biol. Sci. Med. Sci.* 2016; ePub(ePub): ePub.

**Affiliation:** Department of Pharmacy Practice and Science, University of Maryland School of Pharmacy, Baltimore.

(Copyright © 2016, Gerontological Society of America)

DOI 10.1093/gerona/glw095 PMID 27247274

#### **Abstract**

**BACKGROUND:** Both antidepressants and antipsychotics are used in older adults with behavioral symptoms of Alzheimer's disease and related dementias. Despite the prevalent use of these agents, little is known about their comparative risks for falls and fractures.

**METHODS:** Using 2007-2009 Medicare claims data linked to Minimum Data Set 2.0, we identified new users of antidepressants and antipsychotics among nursing home residents with Alzheimer's disease and related dementias who had moderate-to-severe behavioral symptoms. Separate discrete-time survival models were used to estimate risks of falls, fractures, and a composite of both among antidepressant group versus antipsychotic group.

**RESULTS:** Compared to antipsychotic users, antidepressant users experienced significantly higher risk for fractures (adjusted hazard ratio = 1.35, 95% confidence interval = 1.10-1.66). The overall risk of falls or fractures remained significant in the antidepressant versus antipsychotic group (adjusted hazard ratio = 1.16, 95% confidence interval = 1.02-1.32).

**CONCLUSIONS:** Antidepressants are associated with higher fall and fracture risk compared to antipsychotics in the management of older adults with Alzheimer's disease and related dementias who experience moderate-to-severe behavioral symptoms. Clinicians need to assess the ongoing risks/benefits of antidepressants for these symptoms especially in light of the increasingly prevalent use of these agents.

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### **Fall efficacy and influencing factors among Chinese community-dwelling elders with knee osteoarthritis**

Zheng X, Wan Q, Jin X, Huang H, Chen J, Li Y, Zou B, Shang S.

*Int. J. Nurs. Pract.* 2016; ePub(ePub): ePub.

**Affiliation:** School of Nursing, Peking University, Beijing, China.

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DOI 10.1111/ijn.12423 PMID 27245265

#### **Abstract**

Low fall efficacy can lead to activity restriction and loss of independence, which may cause severe adverse consequences. The purpose of this study was to explore fall efficacy among elders with knee osteoarthritis and influential factors in three communities in Beijing, China. A correlational descriptive study design was used with a sample of 117 participants from July 2014 to November 2014.

RESULTS showed that participants had low fall efficacy and that fall efficacy correlated with age, gender, body mass index, marital status, education, disease duration, frequency of falls, number of co-morbidities, pain, stiffness, physical function, depression, lower-extremity muscle strength and balance ( $r = -0.594$  to  $0.234$ ,  $P < 0.05$  to  $0.001$ ). Multiple regression analysis revealed that 52% of variance in fall efficacy was explained by fall frequency, age, body mass index, gender, pain and balance function.

FINDINGS suggest that strategies to prevent falls, reduce body weight, improve effective pain management and enhance balance function may improve fall efficacy in this population.

**PDF Y Endnote Y**

### **Gait, falls, and dementia**

Morley JE.

*J. Am. Med. Dir. Assoc.* 2016; 17(6): 467-470.

**Affiliation:** Divisions of Geriatric Medicine and Endocrinology, Saint Louis University School of Medicine, St. Louis, Missouri. Electronic address: morley@slu.edu.

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**DOI** 10.1016/j.jamda.2016.03.024 **PMID** 27235759

**Abstract** [Abstract unavailable] Editorial

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### **High risk of fall, poor physical function, and low grip strength in men with fracture-the STRAMBO study**

Szulc P, Feyt C, Chapurlat R.

*J. Cachexia Sarcopenia Muscle* 2015; ePub(ePub): ePub.

**Affiliation:** INSERM UMR 1033 Hôpital Edouard Herriot University of Lyon Lyon France.

(Copyright © 2015, Springer Science+Business Media)

**DOI** 10.1002/jcsm.12066 **PMID** 27239407 **PMCID** PMC4864191

#### **Abstract**

**BACKGROUND:** Several studies assessed the association of prevalent fractures with muscle mass, strength, and physical capacity in men. Clinical impact of these associations is not clear, and they could be influenced by confounders. Our aim was to assess the association of the prevalent fractures with muscle strength, physical function, and the risk of subsequent falls in older men after adjustment for muscle mass and potential confounders.

**METHODS:** In a cohort of 890 men aged 50 and older, we assessed appendicular skeletal muscle mass (ASM) by DXA, grip strength, physical function (chair stands, static, and dynamic balance). Relative ASM (RASM) was calculated as  $ASM / (height)^2$ . Then, 813 men aged 60 and over were followed up prospectively for 5 years and 144 sustained >1 incident falls. All the analyses were adjusted for lifestyle factors, co-morbidities, and hormones known to influence muscle and physical function.

**RESULTS:** Low leisure physical activity, very high occupational physical activity, Parkinson's disease, diabetes mellitus, low apparent free testosterone concentration (AFTC), as well as Grade 2 and 3 vertebral fractures and multiple fractures were associated with lower grip strength when adjusted for confounders including upper limb RASM. Low leisure physical activity, very high occupational physical activity, diabetes mellitus, prior stroke, low AFTC and 25-hydroxycholecalciferol, high C-



reactive protein, vertebral fractures, and non-vertebral fractures were associated with poor physical function (lowest quintile of the score of tests) when adjusted for confounders including lower limb RASM. Grade 2 and 3 and multiple vertebral fractures were associated with twofold higher risk of multiple falls after adjustment for confounders. Men having multiple fractures had a twofold higher risk of multiple falls after adjusting for confounders. In multivariable models, risk of falls increased proportionally to the increasing severity and number of vertebral fractures as well as to the increasing number of all fractures.

**CONCLUSIONS:** In older men, Grade 2 and 3 vertebral fractures and multiple vertebral and non-vertebral fractures are associated with lower grip strength, poor physical function, and higher risk of multiple falls after adjustment for multiple confounders. This suggests a real direct association. One fracture can initiate a vicious circle leading to another fracture; thus, patients with fractures need physical therapy regardless of their general health status.

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### **Home safety assessment and modification to reduce injurious falls in community-dwelling older adults: cost-utility and equity analysis**

Pega F, Kvizhinadze G, Blakely T, Atkinson J, Wilson N.

*Inj. Prev.* 2016; ePub(ePub): ePub.

**Affiliation:** Burden of Disease Epidemiology, Equity and Cost-Effectiveness Programme (BODE), Department of Public Health, University of Otago, Wellington, New Zealand.

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**DOI** 10.1136/injuryprev-2016-041999 **PMID** 27222247

#### **Abstract**

**BACKGROUND:** This study aimed to improve on previous modelling work to determine the health gain, cost-utility and health equity impacts from home safety assessment and modification (HSAM) for reducing injurious falls in older people.

**METHODS:** The model was a Markov macrosimulation one that estimated quality-adjusted life-years (QALYs) gained. The setting was a country with detailed epidemiological and cost data (New Zealand (NZ)) for 2011. A health system perspective was taken and a discount rate of 3% was used (for both health gain and costs). Intervention effectiveness estimates came from a Cochrane systematic review and NZ-specific intervention costs were from a randomised controlled trial.

**RESULTS:** In the 65 years and above age group, the HSAM programme cost a total of US\$98 million (95% uncertainty interval (UI) US\$65 to US\$139 million) to implement nationally and the accrued net health system costs were US\$74 million (95% UI: cost saving to US\$132 million). Health gains were 34 000 QALYs (95% UI: 5000 to 65 000). The incremental cost-effectiveness ratio (ICER) was US\$6000 (95% UI: cost saving to US\$13 000), suggesting that HSAM is highly cost-effective.

Targeting HSAM only to older people with previous injurious falls and to older people aged 75 years and above were also cost-effective (ICERs=US\$1000 and US\$11 000, respectively). There was no evidence for differential cost-effectiveness by gender or by ethnicity (Indigenous New Zealanders: Māori vs non-Māori).

**CONCLUSIONS:** As per other studies, this modelling study indicates that the provision of an HSAM intervention produces considerable health gain and is highly cost-effective among older people.

Targeting this intervention to older people with previous injurious falls is a promising initial approach before any scale up. TRIAL REGISTRATION NUMBER: ACTRN12609000779279.

**PDF Y Endnote Y**

### **Kinematic and behavioral analyses of protective stepping strategies and risk for falls among community living older adults**

Bair WN, Prettyman MG, Beamer BA, Rogers MW.

*Clin. Biomech.* 2016; 36: 74-82.

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**DOI** 10.1016/j.clinbiomech.2016.04.015 **PMID** 27228075

#### **Abstract**

**BACKGROUND:** Protective stepping evoked by externally applied lateral perturbations reveals balance deficits underlying falls. However, a lack of comprehensive information about the control of different stepping strategies in relation to the magnitude of perturbation limits understanding of balance control in relation to age and fall status. The aim of this study was to investigate different protective stepping strategies and their kinematic and behavioral control characteristics in response to different magnitudes of lateral waist-pulls between older fallers and non-fallers.

**METHODS:** Fifty-two community-dwelling older adults (16 fallers) reacted naturally to maintain balance in response to five magnitudes of lateral waist-pulls. The balance tolerance limit (BTL, waist-pull magnitude where protective steps transitioned from single to multiple steps), first step control characteristics (stepping frequency and counts, spatial-temporal kinematic, and trunk position at landing) of four naturally selected protective step types were compared between fallers and non-fallers at- and above-BTL.

**FINDINGS:** Fallers took medial-steps most frequently while non-fallers most often took crossover-back-steps. Only non-fallers varied their step count and first step control parameters by step type at the instants of step initiation (onset time) and termination (trunk position), while both groups modulated step execution parameters (single stance duration and step length) by step type. Group differences were generally better demonstrated above-BTL.

**INTERPRETATION:** Fallers primarily used a biomechanically less effective medial-stepping strategy that may be partially explained by reduced somato-sensation. Fallers did not modulate their step parameters by step type at first step initiation and termination, instances particularly vulnerable to instability, reflecting their limitations in balance control during protective stepping.

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

### **Sarcopenia and mortality among a population-based sample of community-dwelling older adults**

Brown JC, Harhay MO, Harhay MN.

*J. Cachexia Sarcopenia Muscle* 2015; ePub(ePub): ePub.

**Affiliation:** Division of Nephrology, Department of Medicine Drexel University College of Medicine Philadelphia PA USA.

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**DOI** 10.1002/jcsm.12073 **PMID** 27239410 **PMCID** PMC4864252

#### **Abstract**

**BACKGROUND:** Sarcopenia is a risk-factor for all-cause mortality among older adults, but it is unknown if sarcopenia predisposes older adults to specific causes of death. Further, it is unknown if the prognostic role of sarcopenia differs between males and females, and obese and non-obese individuals.

**METHODS:** A population-based cohort study among 4425 older adults from the Third National Health and Nutrition Survey (1988-1994). Muscle mass was quantified using bioimpedance analysis, and muscle function was quantified using gait speed. Multivariable-adjusted Cox regression analysis examined the relationship between sarcopenia and mortality outcomes.

**RESULTS:** The mean age of study participants was 70.1 years. The prevalence of sarcopenia was 36.5%. Sarcopenia associated with an increased risk of all-cause mortality [hazard ratio (HR): 1.29 (95% confidence interval (95% CI): 1.13-1.47);  $P < 0.001$ ] among males and females. Sarcopenia associated with an increased risk of cardiovascular-specific mortality among females [HR: 1.61 (95% CI: 1.22-2.12);  $P = 0.001$ ], but not among males [HR: 1.07 (95% CI: 0.81-1.40);  $P = .643$ ];  $P$  interaction = 0.079]. Sarcopenia was not associated with cancer-specific mortality among males and females [HR: 1.07 (95% CI: 0.78-1.89);  $P = 0.672$ ]. Sarcopenia associated with an increased risk of mortality from other causes (i.e. non-cardiovascular and non-cancer) among males and females [HR: 1.32 (95% CI: 1.07-1.62);  $P = 0.008$ ]. Obesity, defined using body mass index ( $P$  interaction = 0.817) or waist circumference ( $P$  interaction = 0.219) did not modify the relationship between sarcopenia and all-cause mortality.

**CONCLUSIONS:** Sarcopenia is a prevalent syndrome that is associated with premature mortality among community-dwelling older adults. The prognostic value of sarcopenia may vary by cause-specific mortality and differ between males and females.

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#### **The association between glucose metabolism status, diabetes severity and a history of fractures and recent falls in participants of 50 years and older-the Maastricht Study**

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#### **Abstract**

In this cohort of relatively young and well-treated participants with type 2 diabetes, we found no association between diabetes status and a history of previous fractures and recent falls.

Furthermore, no association between diabetes severity and previous fractures or recent falls was found.

**INTRODUCTION:** In this study, we examined the association between glucose metabolism status and historical fractures or recent falls and the effect of diabetes severity (glucose control, insulin use, and diabetes duration) on falls and fractures in the participants with type 2 diabetes.

**METHODS:** Cross-sectional data from 2005 participants of the Maastricht Study. Falls in the past 6 months and fractures  $\geq$ age 50 were assessed by questionnaire. Glucose metabolism status (normal glucose metabolism, impaired glucose metabolism, or type 2 diabetes) was based on the oral glucose tolerance test and medication use.

**RESULTS:** In the completely adjusted model, the odds for a fall were not significantly higher in those with impaired glucose metabolism status (OR (95%CI) 1.28 (0.93-1.77)) or with type 2 diabetes (OR (95%CI) 1.21 (0.80-1.81)) compared with the group with normal glucose metabolism. Within the group with type 2 diabetes, there were no significant differences with regard to reported falls

between participants with HbA1c >7 % (53 mmol/mol) versus HbA1c ≤7 % (OR (95%CI) 1.05 (0.58-1.90)), insulin users versus non-insulin users (OR (95%CI) 1.51 (0.79-2.89)), and with a diabetes duration >5 versus ≤5 years (OR (95%CI) 0.52 (0.46-1.47)). Similarly, neither glucose metabolism status nor diabetes severity was associated with prior fractures.

**CONCLUSIONS:** Glucose metabolism status was not significantly associated with previous fractures and recent falls. In addition, in this cohort of relatively young and well-treated participants with type 2 diabetes, diabetes severity was not associated with previous fractures and recent falls.

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### **The Penrod score: a prognostic instrument to balance an increasing geriatric fracture caseload with diminishing health care resources?**

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#### **Abstract**

**INTRODUCTION:** Geriatric hip fracture patients are a highly heterogeneous collective, what distinctly aggravates the best possible treatment. Consequently, it is becoming more important to identify selection criteria that can distinguish those patients who can benefit the most from treatment in a geriatric fracture center. In our pilot study, we assessed the 2007 published Penrod score for its utility as a useful selection tool by prospectively comparing our own patient's outcome with the Penrod study.

**METHODS:** 77 patients treated for geriatric hip fracture were preoperatively classified according to the Penrod score. Patients were divided into three clusters by age (1: <75 years, 2: 75-84 years, 3: ≥85 years). Clusters 2 and 3 were then classified according to their ability to perform activities of daily living (ADL's) and cognitive status (presence or absence of dementia). In 51 out of these 77 patients, the ability to perform ADLs could be assessed 6 months postoperatively and was compared with the Penrod scores.

**RESULTS:** 58 % of cluster 1 patients were able to perform 4 ADLs independently 6 months postoperatively (52.9 % Penrod study). In clusters 2A and 3A, 48 and 50 %, respectively, were able to perform 4 ADLs independently, compared with 40.6 and 31.5 % (Penrod collective). 22 % of our patients in 2B performed all ADLs independently (3.6 % Penrod) and 25 % in cluster 3B (9.4 % Penrod).

**CONCLUSION:** Our preliminary results support the prognostic value of the Penrod score in the treatment of geriatric hip fracture patients. With the help of the Penrod score, it may be possible to identify patients, who are expected to significantly profit from an intensified treatment in a geriatric fracture center (clusters 2B, 3A, and 3B). By utilizing this score, improved outcomes and simultaneously a more effective utilization of valuable health care resources could be achieved.

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### **Estimating normal and abnormal activities using smartphones**

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### **Abstract**

The main objective of this study is to propose a computational pipeline for the recognition of normal and abnormal activities based on smartphone accelerometer data.

METHODS and techniques that have been previously evaluated are further evolved and applied for the recognition of a large set of separate activities as well as a sequence of activities simulating a common scenario of daily living as a more realistic approach. For these purposes, the MobiAct dataset which encompass a set of normal activities of daily living (ADLs) and abnormal activities (falls) was used. The results show a classification accuracy of 99% for the recognition of separate ADLs, while a reduction of 5% is observed for the recognition of the scenarios.

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