

SafetyLit September 11, 2016**An investigation into the bilateral functional differences of the lower limb muscles in standing and walking**

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Abstract

To date, most studies use surface electromyographic (sEMG) signals as the control source on active rehabilitation robots, and unilateral data are collected based on the gait symmetry hypothesis, which has caused much controversy. The purpose of this study is to quantitatively evaluate the sEMG activity asymmetry of bilateral muscles in lower extremities during functional tasks. Nine participants were instructed to perform static and dynamic steady state tests. sEMG signals from the tibialis anterior, soleus, medial gastrocnemius and lateral gastrocnemius muscles of bilateral lower extremities were recorded in the experiments. Muscle activities are quantified in terms of sEMG amplitude. We investigated whether characteristics of left limb and the one of the right limb have the same statistical characteristics during functional tasks using The Wilcoxon rank-sum test, and studied dynamic signal irregularity degree for sEMG activities via sample entropy. The total of muscle activities showed significant differences between left limb and right limb during the static steady state ($p = 0.000$). For dynamic steady states, there were significant differences for most muscle activities between left limb and right limb at different speeds ($p = 0.000$). Nevertheless, there was no difference between the lateral gastrocnemius for bilateral limb at 2.0 kilometers per hour ($p = 0.060$). For medial gastrocnemius, differences were not found between left limb and right limb at 1.0 and 3.0 kilometers per hours ($p = 0.390$ and $p = 0.085$, respectively). Similarly, there was no difference for soleus at 3.0 kilometers per hour ($p = 0.115$). The importance of the differences in muscle activities between left limb and right limb were found. These results can potentially be used for evaluating lower limb extremity function of special populations (elderly people or stroke patients) in an objective and simple method.

PDF Y Endnote Y**Clinical risk factors for head impact during falls in older adults: a prospective cohort study in long-term care**

Yang Y, Mackey DC, Liu-Ambrose T, Leung PM, Feldman F, Robinovitch SN.

J. Head Trauma Rehabil. 2016; ePub(ePub): ePub.

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Abstract

OBJECTIVE: To examine risk factors associated with head impact during falls in older adults in long-term care (LTC).

SETTING: Two LTC facilities in British Columbia, Canada.

PARTICIPANTS: 160 LTC residents.

DESIGN: Prospective cohort study.

MAIN MEASURES: Between 2007 and 2014, we video captured 520 falls experienced by participants. Each fall video was analyzed to determine whether impact occurred to the head. Using generalized estimating equation models, we examined how head impact was associated with other fall characteristics and health status prior to the fall.

RESULTS: Head impact occurred in 33% of falls. Individuals with mild cognitive impairment were at higher risk for head impact (odds ratio = 2.8; 95% confidence interval, 1.5-5.0) than those with more severe cognitive impairment. Impaired vision was associated with 2.0-fold (1.3-3.0) higher odds of head impact. Women were 2.2 times (1.4-3.3) more likely than men to impact their head during a fall.

CONCLUSION: Head impact is common during falls in LTC, with less cognitively impaired, female residents who suffered from visual impairment, being most likely to impact their head. Future research should focus on improving our ability to detect neural consequences of head impact and evaluating the effect of interventions for reducing the risk for fall-related head injuries in LTC.

PDF Y Endnote Y

Effects of indoor footwear on balance and gait patterns in community-dwelling older women

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Gerontology 2016; ePub(ePub): ePub.

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Abstract

BACKGROUND: Footwear worn indoors is generally less supportive than outdoor footwear and may increase the risk of falls.

OBJECTIVE: To evaluate balance ability and gait patterns in older women while wearing different styles of indoor footwear: a backless slipper and an enclosed slipper designed to optimise balance.

METHODS: Older women (n = 30) aged 65-83 years (mean 74.4, SD 5.6) performed a series of laboratory tests of balance ability (postural sway, limits of stability, and tandem walking, measured with the NeuroCom® Balance Master) and gait patterns (walking speed, cadence, and step length, measured with the GAITRite® walkway) while wearing (1) socks, (2) backless slippers with a soft sole, and (3) enclosed slippers with a firm sole and Velcro® fastening. Perceptions of the footwear were also documented using a structured questionnaire.

RESULTS: Significant overall effects of footwear were observed for postural sway, the limits of stability test (directional control), the tandem walk test (step width and end sway), and temporospatial gait patterns (walking speed, cadence, and step length). No footwear effects were observed for maximum excursion when performing the limits of stability test or for speed when performing the tandem walk test. Post hoc tests indicated that performances were best while wearing the enclosed slippers, intermediate with socks, and worst with backless slippers. The enclosed slippers were perceived to be more attractive, comfortable, and well fitted, but heavier than the backless slippers. Most participants (n = 23; 77%) reported that they would consider wearing the enclosed slippers to reduce their risk of falling.

CONCLUSION: Indoor footwear with an enclosed heel, Velcro® fastening, and a firm sole optimises

balance and gait compared to backless slippers, and is therefore recommended to reduce the risk of falling.

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Experiences of general practitioners, home care nurses, physiotherapists and seniors involved in a multidisciplinary home-based fall prevention programme: a mixed method study

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BMC Health Serv. Res. 2016; 16: e469.

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Abstract

BACKGROUND: The feasibility of effective fall prevention programmes (FPPs) for use in daily clinical practice needs to be assessed in the specific healthcare settings. The aim of this study was to explore the perceived benefits and barriers of an evidence-based, home-based pilot FPP among the involved seniors, general practitioners (GPs), home care nurses (HCNs) and physiotherapists (PTs), in order to develop tailored implementation strategies.

METHODS: The study was a mixed method study using an 'exploratory sequential design'. In the initial qualitative sequence, semi-structured interviews were performed with four participants from each group and analysed using a deductive content analysis. In the successive quantitative sequence, target group specific postal surveys were conducted with all participants. The triangulation of both steps allowed merging the in-depth experiences from the interviews with the general findings from the survey.

RESULTS: In this evaluation study participated 17 seniors (mean age 79.7 (SD +/-6.2) years). 40 GPs, 12 HCNs and four PTs. All were satisfied with the organization and processes of the FPP. The main benefit, perceived by each target group, was the usefulness of the FPP in detecting risk of falling at the senior's home. A low number of recruiting GPs and HCNs, divergent opinions of the health professionals towards the aim of the FPP as well as no perceived need for changes by the seniors were the most important barriers to the participation of (more) seniors.

CONCLUSIONS: Multidisciplinary home-based fall prevention is a useful approach to detect the risk of falling in seniors. The barriers identified need to be resolved through tailored strategies to facilitate the successful nationwide implementation of this pilot FPP.

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Fear of falling reduced by a lay led home-based program in frail community-dwelling older adults: A randomised controlled trial

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Arch. Gerontol. Geriatr. 2016; 68: 25-32.

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DOI 10.1016/j.archger.2016.08.009 **PMID** 27588891

Abstract

BACKGROUND: In older adults, fear of falling (FOF) leads to a decline in daily physical activity quality of life and an increased risk of falling. The aim of this randomised controlled trial was to assess the effects of a 12-week home-based intervention program carried out by lay volunteers on FOF in frail older adults.

METHODS: Thirty-nine participants were randomised to a physical training and nutrition (PTN) group and 41 participants to a social support (SOSU) group. In the PTN group, strength training and conversation about optimising nutrition were performed twice weekly, and the SOSU group received home visits without intervention. FOF and change of FOF were assessed using the Falls Efficacy Scale - International (FES-I). The Short Physical Performance Battery (SPPB), the Physical Activity Scale for the Elderly (PASE) and maximum handgrip strength and their changes were also assessed.

RESULTS: The mean FES-I score at baseline was 42.7 points and was significantly associated with the SPPB and PASE scores. The FES-I score significantly changed in the PTN group from 44.1 to 39.9 points over the course of the intervention. Twenty-seven percent of the participants showed a decreased FES-I score of at least 4 points. This decrease was associated with an increase in the SPPB score and an increase in handgrip strength **CONCLUSION:** A 12-week structured physical training and nutrition intervention carried out by lay volunteers, which leads to an increase in physical activity and improved physical performance, can reduce FOF by about 10%.

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Intraindividual stepping reaction time variability predicts falls in older adults with mild cognitive impairment

Bunce D, Haynes BI, Lord SR, Gschwind YJ, Kochan NA, Reppermund S, Brodaty H, Sachdev PS, Delbaere K.

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

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Abstract

BACKGROUND: Reaction time measures have considerable potential to aid neuropsychological assessment in a variety of health care settings. One such measure, the intraindividual reaction time variability (IIV), is of particular interest as it is thought to reflect neurobiological disturbance. IIV is associated with a variety of age-related neurological disorders, as well as gait impairment and future falls in older adults. However, although persons diagnosed with Mild Cognitive Impairment (MCI) are at high risk of falling, the association between IIV and prospective falls is unknown.

METHODS: We conducted a longitudinal cohort study in cognitively intact (n = 271) and MCI (n = 154) community-dwelling adults aged 70-90 years. IIV was assessed through a variety of measures including simple and choice hand reaction time and choice stepping reaction time tasks (CSRT), the latter administered as a single task and also with a secondary working memory task.

RESULTS: Logistic regression did not show an association between IIV on the hand-held tasks and falls. Greater IIV in both CSRT tasks, however, did significantly increase the risk of future falls. This effect was specific to the MCI group, with a stronger effect in persons exhibiting gait, posture, or physiological impairment.

CONCLUSIONS: The findings suggest that increased stepping IIV may indicate compromised neural

circuitry involved in executive function, gait, and posture in persons with MCI increasing their risk of falling. IIV measures have potential to assess neurobiological disturbance underlying physical and cognitive dysfunction in old age, and aid fall risk assessment and routine care in community and health care settings.

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Predictive performance of a Fall Risk Assessment Tool (FRAT-up) for community-dwelling older people in 4 European cohorts

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DOI 10.1016/j.jamda.2016.07.015 **PMID** 27594522

Abstract

BACKGROUND AND OBJECTIVE: The fall risk assessment tool (FRAT-up) is a tool for predicting falls in community-dwelling older people based on a meta-analysis of fall risk factors. Based on the fall risk factor profile, this tool calculates the individual risk of falling over the next year. The objective of this study is to evaluate the performance of FRAT-up in predicting future falls in multiple cohorts.

METHODS: Information about fall risk factors in 4 European cohorts of older people [Activity and Function in the Elderly (ActiFE), Germany; English Longitudinal Study of Aging (ELSA), England; Invecchiare nel Chianti (InCHIANTI), Italy; Irish Longitudinal Study on Aging (TILDA), Ireland] was used to calculate the FRAT-up risk score in individual participants. Information about falls that occurred after the assessment of the risk factors was collected from subsequent longitudinal follow-ups. We compared the performance of FRAT-up against those of other prediction models specifically fitted in each cohort by calculation of the area under the receiver operating characteristic curve (AUC).

RESULTS: The AUC attained by FRAT-up is 0.562 [95% confidence interval (CI) 0.530-0.594] for ActiFE, 0.699 (95% CI 0.680-0.718) for ELSA, 0.636 (95% CI 0.594-0.681) for InCHIANTI, and 0.685 (95% CI 0.660-0.709) for TILDA. Mean FRAT-up AUC as estimated from meta-analysis is 0.646 (95% CI 0.584-0.708), with substantial heterogeneity between studies. In each cohort, FRAT-up discriminant ability is surpassed, at most, by the cohort-specific risk model fitted on that same cohort.

CONCLUSIONS: We conclude that FRAT-up is a valid approach to estimate risk of falls in populations of community-dwelling older people. However, further studies should be performed to better understand the reasons for the observed heterogeneity across studies and to refine a tool that performs homogeneously with higher accuracy measures across different populations.

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Prevalence of and factors related to mild and substantial dizziness in community-dwelling older adults: a cross-sectional study

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BMC Geriatr. 2016; 16: e159.

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(Copyright © 2016, BioMed Central)

DOI 10.1186/s12877-016-0335-x **PMID** 27590725 **PMCID** PMC5010717

Abstract

BACKGROUND: Dizziness is highly prevalent among older people and associated with many health factors. The aim of the study was to determine the prevalence of and factors related to dizziness among community-dwelling older adults in Sweden. In contrast to previous studies, the subjects with dizziness were divided into two groups, mild and substantial dizziness, according to the frequency and intensity of dizziness.

METHODS: A sample of 305 older persons between 75 and 90 years of age (mean age 81 years) were interviewed and examined. Subjects with dizziness answered the University of California Los Angeles Dizziness Questionnaire and questions about provoking movements. The groups with substantial, mild, or no dizziness were compared with regard to age, sex, diseases, drugs, blood pressure, physical activity, exercises, falls, fear of falling, quality of life, general health, mobility aids, and physical performance.

RESULTS: In this sample, 79 subjects experienced substantial and 46 mild dizziness. Subjects with substantial dizziness were less physically active, reported more fear of falling, falls, depression/anxiety, diabetes, stroke/TIA, heart disease, a higher total number of drugs and antihypertensive drugs, lower quality of life and general health, and performed worse physically.

CONCLUSIONS: There are many and complex associations between dizziness and factors like falls, diseases, drugs, physical performance, and activity. For most of these factors, the associations are stronger in subjects with substantial dizziness compared with subjects with mild or no dizziness; therefore, it is relevant to differ between mild and substantial dizziness symptoms in research and clinical practice in the future.

PDF Y Endnote Y

Quality of life and gait in elderly group

Taguchi CK, Teixeira JP, Alves LV, Oliveira PF, Raposo OF.

Int. Arch. Otorhinolaryngol. 2016; 20(3): 235-240.

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(Copyright © 2016, Fundação Otorrinolaringologia, Publisher Georg Thieme Verlag)

DOI 10.1055/s-0035-1570313 **PMID** 27413405

Abstract

INTRODUCTION: The process of aging could lead to seniors being more prone to falls, which affects their quality of life.

OBJECTIVE: The objective of this study is to investigate the relationship between quality of life and gait in the elderly.

METHODS: We used World Health Organization Quality of Life-Brief (WHOQOL-Brief) Brazilian version and the Dynamic Gait Index to assess fifty-six volunteers from the northeast of Brazil. Ages ranged from 60 to 85 years.

RESULTS: The Dynamic Gait Index, which indicates the probability of falls, resulted in 36.3% of the

sample presenting abnormal results. There was correlation between domain 2 (psychological) and domain 4 (environment) with domain 1(Physical) and domain 3 (Social); a negative correlation between age and Domain 2; correlation between Question 1 (How would you rate your quality of life?) and domains 1, 2, and 4 and no correlation between questions 1 and 2 (How satisfied are you with your health?). Question 2 was correlated with all of the domains. There was negative association between question 1 and falls, and a slight correlation between the Dynamic Gait Index scores and Question 1.

CONCLUSION: The self-perception of the study group about their quality of life was either good or very good, even though a considerable percentage of individuals had suffered falls or reported gait disturbances.

PDF Y Endnote Y

Rapid stepping test towards virtual visual objects: feasibility and convergent validity in older adults

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Technol. Health Care 2016; ePub(ePub): ePub.

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DOI 10.3233/THC-161251 **PMID** 27589506

Abstract

BACKGROUND: Rapid voluntary stepping has been recognized as an important measure of balance control.

OBJECTIVE: The purpose of this study was to assess the feasibility and convergent validity of a Rapid Stepping Test protocol utilizing a virtual reality SeeMe™ system (VR-RST) in elderly ambulatory and independent individuals living in a community residential home.

METHODS: Associations between step execution times determined by the system and the Activities-specific Balance Confidence (ABC) Questionnaire, and clinical measures of balance performance in the MiniBESTest and Timed Up and Go (TUG) test, were established in 60 participants (mean age 88.2 + 5.0 years). All participants completed the study.

RESULTS: The correlations of the ABC questionnaire and the clinical tests with VR-RST forward and backward stepping were moderate (ρ range 0.42-0.52), and weak to moderate with sideward stepping (ρ range 0.32-0.52). Moderate to strong correlations were found across stepping directions (ρ range 0.45-0.87).

CONCLUSION: Findings support the test's feasibility and validity and confirm the utility of the VR-RST as an assessment tool in an elderly population.

PDF N Endnote Y

Relationships of community and individual level social capital with activities of daily living and death by gender

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Int. J. Environ. Res. Public Health 2016; 13(9): ePub.

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Abstract

This study determined whether there is an association between social capital and a composite outcome of decline in Activities of Daily Living (ADL) and death by gender. A prospective 3.5 year cohort study was conducted in a rural town in Japan. The study participants were 984 individuals aged 65 years and older with not impaired on ADL at 2010 baseline survey. Social participation and generalized trust were measured as social capital. The individual level responses were dichotomized and aggregated into the community level (eight areas). Multilevel logistic regression adjusting for covariates revealed that social participation at the individual level was significantly associated with higher odds of composite outcome (OR of "not participate" = 1.97, 95% CI = 1.38-2.81). Regarding generalized trust, only in men, there was an inverse association at the community level (OR of "low" = 0.55, 95% CI = 0.32-0.96), and a positive association at the individual level (OR of "tend to be careful" = 2.22, 95% CI = 1.27-3.90). These results suggest that social capital were associated with a decline in ADL and death and that the association may differ by gender.

PDF Y Endnote Y

Screening for cognitive impairment as a part of falls risk assessment in physical therapist practice

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J. Geriatr. Phys. Ther. 2016; ePub(ePub): ePub.

Affiliation: Physical Therapy Department, The University of Michigan-Flint.

(Copyright © 2016, American Physical Therapy Association)

DOI 10.1519/JPT.000000000000098 PMID 27341323

Abstract

BACKGROUND AND PURPOSE: Older adults with impaired cognition are more than twice as likely to fall as compared with age-matched cognitively intact peers. Physical therapists play a key role in falls screening and prevention efforts; however, it is unknown how often or in what capacity cognitive screenings are performed within falls risk assessments. The purpose of this study was to describe the cognitive screening practice patterns of physical therapists (PTs) as a part of falls risk assessments.

SUBJECTS: An electronic survey was sent to a random selection of 500 licensed PTs from 1 state.

METHODS: Factors associated with cognitive screening practices and respondents' demographic information were gathered. Group comparisons between those who screened and did not screen cognition were completed.

RESULTS: Our response rate was 42.8% (n = 214). Only 32.7% (n = 70) of respondents reported screening cognition as a part of falls risk assessments. When performed, orientation was most commonly screened (80.0%, n = 56) followed by a dementia screen using the Mini-Mental State Examination (64.3%, n = 45). Significant differences between groups on cognitive screening practices were found on the basis of work setting, practice time spent with older adults, and practice time spent examining falls risk.

DISCUSSION: Screening for mild deficits in cognitive function is limited within physical therapy practice, which likely influences the detection of early cognitive declines associated with functional limitations.

CONCLUSIONS: Considering the number of older adults at risk for falling and the likelihood of undiagnosed cognitive impairment, PTs should screen for cognitive deficits as a part of falls risk assessments.

PDF Endnote Y



Syncope in older adults

Goyal P, Maurer MS.

J. Geriatr. Cardiol. 2016; 13(5): 380-386.

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(Copyright © 2016, Institute of Geriatric Cardiology, Chinese PLA General Hospital)

DOI 10.11909/j.issn.1671-5411.2016.05.002 **PMID** 27594863

Abstract [Abstract unavailable]

PDF Endnote Y

The impact of frailty on failure-to-rescue in geriatric trauma patients: A prospective study

Joseph B, Phelan H, Hassan A, Jokar TO, O'Keeffe T, Azim A, Gries L, Kulvatunyou N, Latifi R, Rhee P.

J. Trauma Acute Care Surg. 2016; ePub(ePub): ePub.

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DOI 10.1097/TA.0000000000001250 **PMID** 27602908

Abstract

INTRODUCTION: Failure-to-rescue (FTR) (defined as death from a major complication) is considered as an index of hospital quality in trauma patients. However, the role of frailty in FTR events remains unclear. We hypothesized that FTR rate is higher in elderly frail trauma patients.

METHODS: We performed a prospective cohort study of all elderly (age ≥ 65 yrs.) trauma patients presenting at our level one trauma center. Patient's frailty status was calculated utilizing the Trauma Specific Frailty Index (TSFI) within 24 hours of admission. Patients were stratified into: non-frail, pre-frail, and frail. FTR was defined as death from a major complication (respiratory, infectious, cardiac, and renal). Binary logistic regression analysis was performed after adjusting for age, gender, injury severity (ISS), and vital parameters to assess the relationship between frailty status and FTR.

RESULTS: A total of 368 elderly trauma patients were evaluated of which 25% (n=93) were non-frail, 38% (n=139) pre-frail, and 37% (n=136) frail. Overall 30% of the patients developed in-hospital complications of them mortality occurred in 26% of the patients (FTR group). In the FTR group 69% of the patients were frail compared to 17% pre-frail and 14% non-frail ($p=0.002$). On multivariate regression analysis for predictors of FTR, frail status was an independent predictor of FTR (OR, 95% [CI] = 2.67[1.37 - 5.20]; $p=0.004$). On sensitivity analysis, positive predictive value of TSFI for FTR was 69% and negative predictive value for FTR was 67%.

CONCLUSION: In elderly trauma patients, the presence of frailty increased the odds of FTR almost three-fold as compared to non-frail. Although FTR has been considered as an indicator of health care quality, the findings of this study suggest that frailty status independently contributes to FTR. This needs to be considered in the future development of quality metrics, particularly in the case of geriatric trauma patients.

LEVEL OF EVIDENCE: Level II, Prognostic Studies - Investigating the Effect of a Patient Characteristic on the Outcome of Disease.

PDF Y Endnote Y

Validity of the shuttle walk test as a functional assessment of walking ability in individuals with polyneuropathy

Erdmann PG, Teunissen LL, van den Berg LH, Notermans NC, Schröder CD, Bongers BC, van Meeteren NL.

Disabil. Rehabil. 2016; ePub(ePub): ePub.

Affiliation: Topsector Life Sciences and Health , the Hague , the Netherlands.

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DOI 10.1080/09638288.2016.1217083 **PMID** 27599252

Abstract

PURPOSE: This study assessed the validity of the shuttle walk test (SWT) to evaluate walking ability in patients with polyneuropathy.

METHODS: Forty-one patients with chronic idiopathic axonal polyneuropathy (CIAP) and 49 patients with multifocal motor neuropathy (MMN) performed both the 10-meter walk test (10MWT) and the SWT. Face validity was assessed by evaluating whether patients considered both tests to reflect their walking ability (Likert scale: 1 = not at all, 10 = very well). Concurrent validity was determined by Spearman rank-correlation analyses performed on the outcomes of both tests.

RESULTS: Mean (SD) scores for how well the 10MWT and SWT reflected daily walking ability were 6.8 (1.3) and 7.4 (1.6) ($p = 0.117$) in patients with CIAP and 6.9 (1.2) and 7.9 (1.0) ($p = 0.001$) in patients with MMN, respectively. Correlation scores between both tests ranged from -0.70 to -0.82, except for 18 patients with MMN with a "normal" walking speed at the 10MWT (-0.21).

CONCLUSION: The SWT seems a valid instrument for assessing walking ability in individuals with CIAP and MMN. Moreover, the SWT seems to be useful for investigating the symptoms elicited by walking long distances and may be more sensitive to changes when compared to the 10MWT. Implications for Rehabilitation Patients with polyneuropathy mainly experience problems when walking long distances. The 10-meter walk test does not possess sufficient psychometrics to diagnose walking abilities in these circumstances. The shuttle walk test is a valid instrument for assessing walking ability in individuals with polyneuropathy and might be the preferred instrument of choice when compared to the 10-meter walk test.

PDF Y Endnote Y

A critical review of the long-term disability outcomes following hip fracture

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BMC Geriatr. 2016; 16: e158.

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DOI 10.1186/s12877-016-0332-0 **PMID** 27590604 **PMCID** PMC5010762

Abstract

BACKGROUND: Hip fractures are an increasingly common consequence of falls in older people that are associated with a high risk of death and reduced function. This review aims to quantify the impact of hip fracture on older people's abilities and quality of life over the long term.

METHODS: Studies were identified through PubMed and Scopus searches and contact with experts. Cohort studies of hip fracture patients reporting outcomes 3 months post-fracture or longer were included for review. Outcomes of mobility, participation in domestic and community activities, health, accommodation or quality of life were categorised according to the World Health

Organization's International Classification of Functioning and synthesised narratively. Risk of bias was assessed according to four items from the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement.

RESULTS: Thirty-eight studies from 42 publications were included for review. Most followed a clearly defined sample from the time of fracture. Hip fracture survivors experienced significantly worse mobility, independence in function, health, quality of life and higher rates of institutionalisation than age matched controls. The bulk of recovery of walking ability and activities for daily living occurred within 6 months after fracture. Between 40 and 60 % of study participants recovered their pre-fracture level of mobility and ability to perform instrumental activities of daily living, while 40-70 % regained their level of independence for basic activities of daily living. For people independent in self-care pre-fracture, 20-60 % required assistance for various tasks 1 and 2 years after fracture. Fewer people living in residential care recovered their level of function than those living in the community. In Western nations, 10-20 % of hip fracture patients are institutionalised following fracture. Few studies reported impact on participation in domestic, community, social and civic life.

CONCLUSIONS: Hip fracture has a substantial impact on older peoples' medium- to longer-term abilities, function, quality of life and accommodation. These studies indicate the range of current outcomes rather than potential improvements with different interventional approaches. Future studies should measure impact on life participation and determine the proportion of people that regain their pre-fracture level of functioning to investigate strategies for improving these important outcomes.

PDF Y Endnote Y

Effect of heel heights on female postural control during standing on a dynamic support surface with sinusoidal oscillations

Sun D, Gu Y, Mei Q, Shao Y, Sun J, Fernandez J.

J. Mot. Behav. 2016; ePub(ePub): ePub.

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DOI 10.1080/00222895.2016.1191423 **PMID** 27588676

Abstract

The authors aimed to investigate female balance or stability control with comparative analysis of the center of pressure trajectory and plantar pressure distribution with different high-heeled shoes while standing on a dynamic surface with multidirectional perturbations. College females with at least 2 years' history of wearing high-heel shoes voluntarily participated in the test with a Novel Pedar insole (Novel, GmbH, Munich, Germany. With heels height increasing, the pressure time integral obviously transfer to the medial forefoot region, with center of pressure trajectory medially deviated significantly, either under anteroposterior or mediolateral perturbations. The passive plantarflexion position of ankle incurred by high heel increased the range of motion in the frontal plane but decreased ankle stability, thus increasing the challenge of body balance maintenance.

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Effects of depression and antidepressant medications on hip fracture: a population-based cohort study in Taiwan

Cheng BH, Chen PC, Yang YH, Lee CP, Huang KE, Chen VC. *Medicine (Baltimore)* 2016; 95(36): e4655.

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Abstract

This study was conducted to investigate the effects of depression and antidepressant medications on hip fracture. The database of the Taiwan National Health Insurance with medical records of more than 1,000,000 individuals was searched for patients who had hip fracture with or without depression from 1998 to 2009. Patients with the following conditions were excluded: hip fracture due to cancer or traffic accidents, hip fracture that occurred before the diagnosis of depression, and use of antidepressants before the diagnosis of depression. A matched cohort of 139,110 patients was investigated, including 27,822 (17,309 females; 10,513 males) with depression and 111,288 (69,236 females; 42,052 males) without depression (1:4 randomly matched with age, sex, and index date). Among these patients, 232 (158 females and 74 males) had both hip fracture and depression, and 690 (473 females and 217 males) had hip fracture only. The Cox proportional-hazards regression method was used to determine the effect of depression on hip fracture. The hazard ratio (HR) for each clinical parameter was calculated after adjusting for confounders including sex, age, Charlson comorbidity index, urbanization, osteoporosis, and antidepressants.

RESULTS showed that patients with major depressive disorder had a 61% higher incidence of hip fracture than those without depression (HR 1.61, 95% confidence interval [CI] 1.19-2.18, $P = 0.002$). The risk of hip fracture for patients with less severe depressive disorder (dysthymia or depressive disorder, not otherwise specified) was not statistically higher than that of patients with no depression (HR 1.10, 95% CI = 0.91-1.34, $P = 0.327$). Among the patients with depression, females had a 49% higher incidence for hip fracture than males (HR 1.49, 95% CI 1.30-1.72, $P < 0.001$). The incidence of hip fracture also increased with age and Charlson comorbidity index scores. Analyses of both all (139,110) patients and only patients (27,822) with depression revealed that antidepressants had no negative impact on the incidence of hip fracture. In conclusion, major depression was found to be a risk factor for hip fracture and that use of antidepressants had no adverse effect on hip fracture in the Taiwanese population.

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EMBalance - validation of a decision support system in the early diagnostic evaluation and management plan formulation of balance disorders in primary care: study protocol of a feasibility randomised controlled trial

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Abstract

BACKGROUND: Balance problems are caused by multiple factors and often lead to falls and related fractures, bringing large socio-economic costs. The complexity of balance control mechanisms, the lack of medical expertise, and the absence of specialised equipment contribute to the delayed or incorrect diagnosis and management of these patients. Advances in computer science have allowed the development of computer systems that support clinical diagnosis and treatment decisions based on individualised patient data. The aim of the EMBalance decision support system (DSS) is to support doctors facing this clinical challenge, to make a definitive diagnosis and implement an effective management plan. The EMBalance study will determine the accuracy of this supportive tool when used by non-specialist doctors. This study is funded by the European Union's Seventh Framework Programme.

METHODS/DESIGN: EMBalance is a proof-of-concept study designed as a non-commercial, international, multi-centre, single-blind, parallel-group randomised controlled trial to be carried out at four clinical sites in the United Kingdom, Germany, Greece and Belgium. The study is comprised of three stages: internal pilot, phase I (diagnosis) and stage II (management). For this purpose, 200 patients presenting with persistent dizziness (>3 months' duration) to primary care services will be randomised to either the intervention group (diagnostic assessment with the DSS) or a control group (diagnostic assessment without the DSS). Patients allocated to the intervention group will be assessed by a doctor with the support of the EMBalance DSS, while patients allocated to the control group will receive a visit as per standard practice. Ultimately, all patients' diagnoses and management plans will be certified by a consultant in neuro-otology.

DISCUSSION: EMBalance is the first trial to test the accuracy of a DSS in both the diagnosis of and the management plan for vestibular disorders across the healthcare systems of four different countries. The EMBalance study is the result of a combined effort of engineers and physicians to develop an accurate tool to support non-specialist doctors, with no risk for the patient. This trial will provide reliable information about the benefits of implementing DSSs in primary care while supporting the feasibility of testing the EMBalance algorithms in further research. **TRIAL REGISTRATION:** ClinicalTrials.gov NCT02704819. Registered 29 February 2016.

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Objectively assessed physical activity and its association with balance, physical function and dyskinesia in Parkinson's disease

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Abstract

BACKGROUND: The desirable effects of physical activity in individuals with Parkinson's disease are well-known, although according to results from previous studies factors associated with objectively assessed physical activity are not fully investigated.

OBJECTIVE: To investigate demographic, disease-related and mobility-related factors that associate with objectively measured physical activity, in a sample of older adults with mild to moderate Parkinson's disease.

METHODS: Demographic, disease-related and mobility-related factors were gathered by interview from a total of 91 older adults with Parkinson's disease, followed by an evaluation of balance control

using the Mini-BESTest. After initial testing, participants wore a tri-axial accelerometer during a week of free-living. Correlation analysis and multiple linear regression was used to investigate factors associated with total PA, represented by total activity counts, and time in brisk walking. RESULTS: Motor impairment, physical function, body mass index and dyskinesia contributed to the variance of total physical activity, explaining 34 % of the variance, while physical function and balance control were significant factors associated with brisk walking, explaining 22 %. CONCLUSIONS: This study identified factors that have not been shown to associate with objectively measured physical activity previously, such as dyskinesia, balance control and self-rated physical function. The findings also demonstrated that associated factors differ, depending on the activity behavior being investigated. However, other factors than those included in this study may also be of importance.

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Risk of fracture amongst patients with Parkinson's disease and other forms of Parkinsonism

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Abstract

INTRODUCTION: Postural instability, a core feature of parkinsonism, leads to an increased risk of falls and fractures. However, the risk of fracture has not been assessed in an incident cohort of Parkinson's disease and atypical parkinsonism.

OBJECTIVES: We determined the absolute and relative fracture risk and predictive variables in a prospective incident cohort of parkinsonian patients and controls.

METHODS: Fracture data for 326 incident parkinsonian cases (198 Parkinson's disease, 128 atypical parkinsonism) and 261 controls was recorded annually in the Parkinsonism Incidence in North-East Scotland study. Incidence rates were determined for all fractures and major fractures. Kaplan-Meier curves were used to determine time to first fracture for each group. Stepwise, multivariate Cox regression analysis was used to identify risk factors for fracture in parkinsonian patients.

RESULTS: Mean age at recruitment was 74.5 years in all parkinsonian patients (age at diagnosis) and 75 years in controls. The incidence of any fracture was 5.5 (95% CI 4.3-7.0) and 2.0 (1.3-2.9)/100 participant-years for the parkinsonian and control groups respectively, whilst for major fractures due to falls it was 4.2 (3.2-5.5) and 1.4 (0.9-2.2)/100 participant-years respectively. Independent predictors for fractures in parkinsonian patients were osteoporosis, female gender and falling during the follow up period. There was no difference in fracture rates between those with Parkinson's disease and atypical parkinsonism.

CONCLUSION: The fracture rate in parkinsonism from the time of diagnosis (about 5% per year) is over three times greater than controls. Fracture risk should be routinely assessed in all parkinsonian patients.

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Safe landing strategies during a fall: systemic review and meta-analysis

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Abstract

OBJECTIVE: To systematically synthesize information on safe landing strategies for a fall and quantitatively examine the effects of the strategies to reduce risk of injury from a fall.

DATA SOURCES: PubMed, Web of science, Cumulative Index to Nursing and Allied Health Literature, and Cochrane Library

STUDY SELECTION: Databases were searched using the combinations of keywords of "falls", "strategy", "impact" and "load". Randomized control trials, cohort studies, pre-post studies, or cross-sectional studies were included.

DATA EXTRACTION: The fall strategies were extracted and categorized by falling direction. Measurements of impact loads that reflect the risk of injuries were extracted (e.g. impact velocity, impact force, fall duration, and impact angle). Hedges g was used as effect size to quantify effect of a protective landing strategy to reduce the impact load.

DATA SYNTHESIS: A total of seven landing strategies (squatting, elbow flexion, forward rotation, martial arts rolling, martial arts slapping, relaxed muscle, and stepping) in 13 studies were examined. In general, all strategies, except for the martial arts slapping technique, significantly reduced impact load (g 's=0.73 to 2.70). Squatting was an efficient strategy to reduce impact in backward falling (g =1.77) while elbow flexion with outstretched arms was effective in forward falling (g =0.82). Also, in sideways falling strategies, martial arts rolling (g =2.70) and forward rotation (g =0.82) were the most efficient strategies to reduce impact load.

CONCLUSIONS: The result showed that landing strategies have significant effect on reducing impact load during a fall and might be effective to reduce impact load of falling. The current study also highlighted limitations of the previous studies which focused on a young population and self-initiated falls. Further investigation with elderly individuals and unexpected falls is necessary to verify effectiveness and suitability of the strategies to at-risk population in real-life falls.

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Sleep quality is associated with walking under dual-task, but not single-task performance

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Abstract

OBJECTIVES: The objective of this study was to assess the relationship between sleep behavior and gait performance under single-task (ST) and dual-task (DT) walking conditions in community-dwelling older adults.

METHODS: Walking under ST and DT conditions was evaluated in 34 community-dwelling older adults, 64.7% women, mean age 71.5 (SD±5.8). Gait-speed and gait-variability data were collected using the OPAL wearable sensors of the Mobility Lab. Sleep behavior (sleep efficiency [SE] and sleep latency [SL]) was assessed using actigraphy, over 5 consecutive nights.

RESULTS: Lower SE was associated with decreased gait speed and increased stride-length variability during DT ($r_s=0.35$; $p=0.04$; $r_s=-0.36$; $p=0.03$, respectively), whereas longer SL was associated with increased stride-length variability during DT ($r_s=0.38$; $p=.03$). After controlling for age and cognition, SE accounted for 24% and 33% of the variability in stride length and stride time. No associations were found between sleep and gait measures under ST walking.

CONCLUSIONS: Lower SE is associated with decreased gait speed and increased gait variability under DT conditions that are indicative of an increased risk for falls in older adults. Our findings support clinical recommendations to incorporate the evaluation of sleep quality in the context of risk assessment for falls.

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