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Clusters of functional domains to identify older persons at risk of disability

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DOI 10.1111/ggi.13226 **PMID** 29282845

Abstract

AIM: To date, there is no consensus on which set of variables should be used to identify older persons at risk of disability in activities of daily living. The present study aimed to: (i) evaluate how different deficits cluster in a population of community-dwelling older persons; and (ii) investigate whether the discriminative capacity of physical performance measures towards the development of disability might be improved by adding psychological, social and environmental indicators.

METHODS: Data are from 709 non-disabled older persons participating in the "Invecchiare in Chianti" study. We carried out a cluster analysis of 12 deficits in multiple functional domains, selected from the available frailty assessment instruments. Then, participants were assigned to a group, based on the obtained clusters of variables. For each group, we measured the prognostic capacity and the predictive ability for 6-year disability.

RESULTS: The analysis showed a "physical" cluster (including weight loss, reduced grip strength/gait speed/physical activity, impaired balance, environmental barriers) and a "psychosocial" cluster (e.g. living alone, depression, low income). Thus, participants were classified into four groups according to the presence of a physical and/or psychosocial cluster. Compared with the "fit" group, the relative risks of becoming disabled in the "physical," "psychosocial" and "mixed" deficit groups were 2.23 (95% CI 0.71-7.00), 1.52 (95% CI 0.62-3.75) and 6.37 (95% CI 2.83-14.33), respectively. The positive and negative predictive values for the "physical," "psychosocial" and "mixed" deficit groups were, respectively, 9% and 87%, 6% and 83%, and 27% and 94%.

CONCLUSIONS: As expected, physical and psychosocial deficits cluster predominantly into different groups. Even when both are considered simultaneously, the ability to predict incident disability is still insufficient. © 2017 Japan Geriatrics Society.

PDF Y Endnote Y

Comparison of walking, muscle strength, balance, and fear of falling between repeated fall group, one-time fall group, and nonfall group of the elderly receiving home care service

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Asian Nurs. Res. (Korean Soc. Nurs. Sci.) 2017; 11(4): 290-296.

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DOI 10.1016/j.anr.2017.11.003 **PMID** 29290277

Abstract

PURPOSE: The purpose of this study was to provide information to develop a program to prevent repeated falls by analyzing the difference in gait, muscle strength, balance, and fear of falling according to their fall experience.

METHODS: The study subjects were 110 elderly individuals aged over 60 years who agreed to their participation in this research. The study participants were categorized into a repeated fall group

(n = 40), a one-time fall group (n = 15), and a nonfall group (n = 46) of the elderly. Measurements of gait, muscle strength, balance, and fear of falling were taken in each group.
RESULTS: With regard to gait, there were significant differences among three groups in gait cycle (F = 3.50, p = .034), speed (F = 13.06, p < .001), and cadence (F = 5.59, p = .005). Regarding muscle strength in the upper and lower limbs, statistically significant differences were shown among three groups in muscle strength of upper (F = 16.98, p < .001) and lower (F = 10.55, p < .001) limbs. With regard to balance, the nonfall group had significantly greater results than the one-time fall group and repeated fall group in dynamic balance (F = 10.80, p < .001) and static balance (F = 8.20, p = .001). In the case of the fear of falling, the repeated fall group had significantly higher score than other two groups (F = 20.62, p < .001).
CONCLUSION: This study suggests that intervention program should be tailored to fall risk factors to enhance gait and balance and lower body muscle strength and reduce the fear of falling to prevent repeated incidences of falls in this population.

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Effect of whole-body vibration exercise in preventing falls and fractures: a systematic review and meta-analysis

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BMJ Open 2017; 7(12): e018342.
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DOI 10.1136/bmjopen-2017-018342 **PMID** 29289937
Abstract
OBJECTIVE: To investigate the effect of whole-body vibration exercise (WBV) on fracture risk in adults ≥50 years of age.
DESIGN: A systematic review and meta-analysis calculating relative risk ratios, fall rate ratio and absolute weighted mean difference using random effects models. Heterogeneity was estimated using I2 statistics, and the Cochrane Collaboration's risk of bias tool and the GRADE approach were used to evaluate quality of evidence and summarise conclusions.
DATA SOURCES: The databases PubMed, Embase and the Cochrane Central Register from inception to April 2016 and reference lists of retrieved publications.
ELIGIBILITY CRITERIA FOR SELECTING STUDIES: Randomised controlled trials examining the effect of WBV on fracture risk in adults ≥50 years of age. The primary outcomes were fractures, fall rates and the proportion of participants who fell. Secondary outcomes were bone mineral density (BMD), bone microarchitecture, bone turnover markers and calcaneal broadband attenuation (BUA).
RESULTS: 15 papers (14 trials) met the inclusion criteria. Only one study had fracture data reporting a non-significant fracture reduction (risk ratio (RR)=0.47, 95% CI 0.14 to 1.57, P=0.22) (moderate quality of evidence). Four studies (n=746) showed that WBV reduced the rate of falls with a rate ratio of 0.67 (95% CI 0.50 to 0.89, P=0.0006; I2=19%) (moderate quality of evidence). Furthermore, data from three studies (n=805) found a trend towards falls reduction (RR=0.76, 95% CI 0.48 to 1.20, P=0.24; I2=24%) (low quality of evidence). Finally, moderate to low quality of evidence showed no overall effect on BMD and only sparse data were available regarding microarchitecture parameters, bone turnover markers and BUA.
CONCLUSIONS: WBV reduces fall rate but seems to have no overall effect on BMD or

microarchitecture. The impact of WBV on fractures requires further larger adequately powered studies. This meta-analysis suggests that WBV may prevent fractures by reducing falls. PROSPERO REGISTRATION NUMBER: CRD42016036320; Pre-results.

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Effects of different foot progression angles and platform settings on postural stability and fall risk in healthy and medial knee osteoarthritic adults
Khan SJ, Khan SS, Usman J, Mokhtar AH, Abu Osman NA.
Proc. Inst. Mech. Eng. Pt. H J. Eng. Med. 2017; ePub(ePub): ePub.
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DOI 10.1177/0954411917750409 **PMID**29283019
Abstract
This study aims to investigate the effects of varying toe angles at different platform settings on Overall Stability Index of postural stability and fall risk using Biodex Balance System in healthy participants and medial knee osteoarthritis patients. Biodex Balance System was employed to measure postural stability and fall risk at different foot progression angles (ranging from -20° to 40°, with 10° increments) on 20 healthy (control group) and 20 knee osteoarthritis patients (osteoarthritis group) randomly (age: 59.50 ± 7.33 years and 61.50 ± 8.63 years; body mass: 69.95 ± 9.86 kg and 70.45 ± 8.80 kg). Platform settings used were (1) static, (2) postural stability dynamic level 8 (PS8), (3) fall risk levels 12 to 8 (FR12) and (4) fall risk levels 8 to 2 (FR8). Data from the tests were analysed using three-way mixed repeated measures analysis of variance. The participant group, platform settings and toe angles all had a significant main effect on balance ($p \leq 0.02$). Platform settings had a significant interaction effect with participant group $F(3, 144) = 6.97$, $p < 0.01$ and toe angles $F(21, 798) = 2.83$, $p < 0.01$. Non-significant interactions were found for group × toe angles, $F(7, 266) = 0.89$, $p = 0.50$, and for group × toe angles × settings, $F(21, 798) = 1.07$, $p = 0.36$. The medial knee osteoarthritis group has a poorer postural stability and increased fall risk as compared to the healthy group. Changing platform settings has a more pronounced effect on balance in knee osteoarthritis group than in healthy participants. Changing toe angles produced similar effects in both the participant groups, with decreased stability and increased fall risk at extreme toe-in and toe-out angles.
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Falls risk prediction for older inpatients in acute care medical wards: is there an interest to combine an early nurse assessment and the artificial neural network analysis?
Beauchet O, Noublanche F, Simon R, Sekhon H, Chabot J, Levinoff EJ, Kabeshova A, Launay CP.
J. Nutr. Health Aging 2018; 22(1): 131-137.
Affiliation: Olivier Beauchet, MD, PhD; Department of Medicine, Division of Geriatric Medicine, Sir Mortimer B. Davis - Jewish General Hospital, McGill University, 3755 chemin de la Côte-Sainte-Catherine, Montréal, QC H3T 1E2, Canada; E-mail: olivier.beauchet@mcgill.ca; Phone: (+1) 514-340-8222, # 4741; Fax: (+1) 514-340-7547.

DOI 10.1007/s12603-017-0950-z **PMID** 29300432

Abstract
BACKGROUND: Identification of the risk of falls is important among older inpatients. This study aims to examine performance criteria (i.e.; sensitivity, specificity, positive predictive value, negative predictive value and accuracy) for fall prediction resulting from a nurse assessment and an artificial neural networks (ANNs) analysis in older inpatients hospitalized in acute care medical wards.
METHODS: A total of 848 older inpatients (mean age, 83.0±7.2 years; 41.8% female) admitted to acute care medical wards in Angers University hospital (France) were included in this study using an observational prospective cohort design. Within 24 hours after admission of older inpatients, nurses performed a bedside clinical assessment. Participants were separated into non-fallers and fallers (i.e.; ≥1 fall during hospitalization stay). The analysis was conducted using three feed forward ANNs (multilayer perceptron [MLP], averaged neural network, and neuroevolution of augmenting topologies [NEAT]).
RESULTS: Seventy-three (8.6%) participants fell at least once during their hospital stay. ANNs showed a high specificity, regardless of which ANN was used, and the highest value reported was with MLP (99.8%). In contrast, sensitivity was lower, with values ranging between 98.4 to 14.8%. MLP had the highest accuracy (99.7).
CONCLUSIONS: Performance criteria for fall prediction resulting from a bedside nursing assessment and an ANNs analysis was associated with a high specificity but a low sensitivity, suggesting that this combined approach should be used more as a diagnostic test than a screening test when considering older inpatients in acute care medical ward.
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Fear of falling and cognitive impairments in elderly people with hip fractures
Kasai M, Meguro K, Ozawa H, Kumai K, Imaizumi H, Minegishi H, Oi H, Oizumi A, Yamashiro M, Matsuda M, Tanaka M, Itoi E.
Dement. Geriatr. Cogn. Dis. Extra 2017; 7(3): 386-394.
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DOI 10.1159/000480497 **PMID** 29282411 **PMCID** PMC5731173
Abstract
BACKGROUND/AIM: The purpose of this study was to investigate the estimated prevalence of dementia and the relationship between cognitive impairment and fear of falling in patients with hip fractures.
METHODS: Analysis 1 included 100 patients with hip fractures. Analysis 2 included a subgroup of subjects with ≥75 years of functional independence: 46 patients with hip fractures and 46 control subjects without hip fractures, and presence or absence of dementia. We used an informant-rated questionnaire including the AD8 for screening for dementia, the Barthel Index for assessing activities of daily living, and the Short Falls Efficacy Scale-International (FES-I) for assessing fear of falling.
RESULTS: The estimated prevalence of dementia was 66% in patients with hip fractures. There were significant fracture and dementia effects, with significant covariate effects of age and gender on the Short FES-I scores.
CONCLUSION: Our results suggested that more than two-thirds of patients with hip fractures had dementia. Fear of falling may reflect not only physical functions but also cognitive impairments.
PDF Y Endnote Y

Feasibility, acceptability and effects of a home-based exercise program using a gerontechnology on physical capacities after a minor injury in community-living older adults: a pilot study

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J. Nutr. Health Aging 2018; 22(1): 16-25.

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DOI 10.1007/s12603-017-0938-8 **PMID** 29300417

Abstract

CONTEXT: Several studies have demonstrated that physical activity can help limit decline in functional capacities of older adults. Nevertheless, many adults aged 65 and over are inactive.

OBJECTIVE: To explore the feasibility, the acceptability and the effects of a home-based exercise program (HEP) using a motion capture gerontechnology in independent community-living older adults at risk of function decline.

DESIGN: Interventionnal clinical trial. PARTICIPANTS: Sixteen previously independent individuals aged 65 and older recruited at the Emergency Department after being treated for a minor injury and discharged home were assigned to a home-based exercise program group (HEP=8) or to a control group (CONTR=8). Twelve participants completed the study, 6 in each group Setting: Canadian Community-dwelling in Montreal area. INTERVENTION: The HEP group engaged in a twelve-week physical activity intervention using a gerontechnology while the CONTR group continued with discharge plan from ED. MEASUREMENTS: Participants were evaluated for functional status using validated questionnaires and objective physical measures at baseline, three and six months later. Feasibility and acceptability of the HEP was assessed using data reports from the gerontechnology and from self-reported assessments.

RESULTS: There was no differences between groups at baseline except for the fallrelated self-efficacy: HEP=8.33/28±1.51 vs CONTR=7/28±0 p=0.022. The HEP was found to be feasible and acceptable (adherence rate at 86% and average quality of movements at 87.5%). Significant improvement in walking speed on 4m was observed three months after baseline for HEP vs CONTR group (+0.25 vs +0.05 m/sec, p=0.025). Effects remained at follow-up. Only CONTR group resulted in a significant increase in SF-36 global score.

ONCLUSION: This twelve-week HEP intervention using the Jintronix® gerontechnology is feasible, acceptable and safe for community-living older adults who sustained a minor injury. This intervention could increase walking speed, the most important predictor of adverse events in the elderly population, and that the improvement could be maintained over time.

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Functional reach, depression scores and number of medications are associated with number of falls in people with chronic stroke

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PM R 2017; ePub(ePub): ePub.

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DOI 10.1016/j.pmrj.2017.12.005 **PMID** 29288141

Abstract

BACKGROUND: Falls are a common adverse event among people with stroke. Previous studies investigating risk of falls after stroke have relied primarily on retrospective fall history ranging from 6-12 months recall, with inconsistent findings.

OBJECTIVES: To identify factors and balance assessment tools that are associated with number of falls in individuals with chronic stroke.

DESIGN: Secondary analysis of a randomized clinical trial. SETTING: Multisite academic and clinical institutions. PARTICIPANTS: Data from 181 participants with stroke (age 60.67 ± 11.77 years, post stroke 4.51 ± 4.78 years) were included.

METHODS: Study participants completed baseline testing and were prospectively asked about falls. A multivariate negative binomial regression was used to identify baseline predictive factors predicting falls: age, endurance (6 minute walk test), number of medications, motor control (Fugl-Meyer lower extremity score), depression (Patient Health Questionnaire-9), physical activity (number of steps per week), and cognition (Mini Mental Status Exam score). A second negative binomial regression analysis was used to identify baseline balance assessment scores predicting falls: gait velocity (comfortable10 Meter Walk), Berg Balance Scale (BBS), Timed Up and Go (TUG), and Functional Reach Test (FRT). Receiver operating characteristic (ROC) and the area under the curve (AUC) were utilized to determine the cutoff scores for significant predictors of recurrent falls. MAIN OUTCOME MEASUREMENT: The number of falls during 42-week follow up period.

RESULTS: Baseline measures that significantly predicted number of falls included increased number of medications, higher depression scores and decreased FRT. Cutoff scores for number of medications were 8.5 with AUC of 0.68. Depression scores differentiated recurrent fallers at a threshold of 2.5 scores with AUC of 0.62. FRT differentiated recurrent fallers at a threshold of 18.150 cm with an AUC of 0.66.

CONCLUSIONS: Number of medications, depression scores and decreased FRT distance at baseline were associated with increased number of falls. Increased medications might indicate multiple comorbidities or polypharmacy effect, increased depression scores may indicate psychological status, and decreased functional reach distance could indicate dynamic balance impairments.

LEVEL OF EVIDENCE: Level II.

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Inability to perform the repeated chair stand task predicts fall-related injury in older primary care patients

Shea CA, Ward RE, Welch SA, Kiely DK, Goldstein R, Bean JF.

Am. J. Phys. Med. Rehabil. 2018; ePub(ePub): ePub.

DOI 10.1097/PHM.0000000000000889 **PMID** 29300193

Abstract

OBJECTIVE: To examine whether the chair stand component of the Short Physical Performance Battery (SPPB) predicts fall-related injury among older adult primary care patients.

DESIGN: 2-year longitudinal cohort study of 430 Boston-area primary care patients aged ≥65 years screened to be at risk for mobility decline. The three components of the SPPB (balance time, gait

speed, and chair stand time) were measured at baseline. Participants reported incidence of fall-related injuries quarterly for two years. Complementary log-log discrete time hazard models were constructed to examine the hazard of fall-related injury across SPPB scores, adjusting for age, gender, race, Digit Symbol Substitution Test score, and fall history.
RESULTS: Participants were 68% female and 83% white, with a mean age of 76.6 (SD=7.0). A total of 137 (32%) reported a fall-related injury during the follow-up period. Overall, inability to perform the chair stand task was a significant predictor of fall-related injury (HR [hazard ratio]=2.11, 95% CI=1.23-3.62, p=0.01). Total SPPB score, gait component score, and balance component score were not predictive of fall-related injury.
CONCLUSION: Inability to perform the repeated chair stand task was associated with increased hazard of an injurious fall over 2 years among a cohort of older adult primary care patients.
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Injury mechanisms, patterns and outcomes of older polytrauma patients-An analysis of the Dutch Trauma Registry
de Vries R, Reininga IHF, Pieske O, Lefering R, El Moumni M, Wendt K.
PLoS One 2018; 13(1): e0190587.
Affiliation: Emergency Care Network Northern Netherlands (AZNN), Northern Netherlands Trauma Registry, Groningen, The Netherlands.

DOI 10.1371/journal.pone.0190587 **PMID** 29304054
Abstract
BACKGROUND: Polytrauma patients nowadays tend to be older due to the growth of the elderly population and its improved mobility. The aim of this study was to compare demographics, injury patterns, injury mechanisms and outcomes between younger and older polytrauma patients.
METHODS: Data from polytrauma (ISS≥16) patients between 2009 and 2014 were extracted from the Dutch trauma registry (DTR). Younger (Group A: ages 18-59) and older (Group B: ages ≥60) polytrauma patients were compared. Differences in injury severity, trauma mechanism (only data for the year 2014), vital signs, injury patterns, ICU characteristics and hospital mortality were analyzed.
RESULTS: Data of 25,304 polytrauma patients were analyzed. The older patients represented 47.8% of the polytrauma population. Trauma mechanism in the older patients was more likely to be a bicycle accident (A: 17%; B: 21%) or a low-energy fall (A: 13%; B: 43%). Younger polytrauma patients were more likely to have the worst scores on the Glasgow coma scale (EMV = 3, A: 20%, B: 13%). However, serious head injuries were seen more often in the older patients (A: 53%; B: 69%). The hospital mortality was doubled for the older polytrauma patients (19.8% vs. 9.6%).
CONCLUSION: Elderly are involved more often in polytrauma. Although injury severity did not differ between groups, the older polytrauma patients were at a higher risk of dying than their younger counterparts despite sustaining less high-energy accidents.
PDF Y Endnote Y

Physical frailty is associated with longitudinal decline in global cognitive function in non-demented older adults: a prospective study
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J. Nutr. Health Aging 2018; 22(1): 82-88.

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DOI 10.1007/s12603-017-0924-1 **PMID** 29300426
Abstract

OBJECTIVES: To assess the relationship between physical frailty and subsequent decline in global cognitive function in the non-demented elderly.

DESIGN AND SETTING: A prospective population-based study in a west Japanese suburban town, with two-year follow-up.

PARTICIPANTS: Community-dwellers aged 65 and older without placement in long-term care, and not having a history of dementia, Parkinson's disease and depression at baseline, who participated in the cohort of the Sasaguri Genkimon Study and underwent follow-up assessments two years later (N = 1,045).

MEASUREMENTS: Global cognitive function was assessed using the Montreal Cognitive Assessment (MoCA). Physical frailty was identified according to the following five components: weight loss, low grip strength, exhaustion, slow gait speed and low physical activities. Linear regression models were used to examine associations between baseline frailty status and the MoCA scores at follow-up. Logistic regression models were used to estimate the risk of cognitive decline (defined as at least two points decrease of MoCA score) according to baseline frailty status.

RESULTS: Seven hundred and eight non-demented older adults were included in the final analyses (mean age: 72.6 ± 5.5 years, male 40.3%); 5.8% were frail, and 40.8% were prefrail at baseline. One hundred and fifty nine (22.5%) participants experienced cognitive decline over two years. After adjustment for baseline MoCA scores and all confounders, being frail at baseline was significantly associated with a decline of 1.48 points (95% confidence interval [CI], -2.37 to -0.59) in MoCA scores, as compared with non-frailty. Frail persons were over two times more likely to experience cognitive decline (adjusted odds ratio 2.28; 95% CI, 1.02 to 5.08), compared to non-frail persons.

CONCLUSION: Physical frailty is associated with longitudinal decline in global cognitive function in the non-demented older adults over a period of two years. Physically frail older community-dwellers should be closely monitored for cognitive decline that can be sensitively captured by using the MoCA.
PDF Y Endnote Y

Predicting use of outdoor fall prevention strategies: considerations for prevention practices

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J. Appl. Gerontol. 2018; ePub(ePub): ePub.
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DOI 10.1177/0733464817751199 **PMID**29291679
Abstract

PURPOSE: Outdoor falls are just as common as indoor falls, but have received less attention in research and practice. Behavioral strategies play an important role in outdoor fall prevention. The purpose of this study was to examine predictors of strategy use.

METHOD: Backward stepwise regression was used to study factors associated with use of outdoor fall prevention strategies among a random sample (N = 120) of community-dwelling seniors.
RESULTS: Significant negative predictors of strategy use included higher education levels (p <.01) and living in an urban versus a suburban environment (p <.01). Concern about falls and number of identified risks were positive predictors (ps <.05). Differences were found between outdoor fallers and nonfallers in the use of three different types of strategies (ps <.05).
CONCLUSION: There are some differences in the profiles of people who use and do not use outdoor fall prevention strategies. Further study of additional factors is warranted.
PDF Y Endnote Y

Reference data on reaction time and aging using the Nintendo Wii Balance Board: a cross-sectional study of 354 subjects from 20 to 99 years of age
Blomkvist AW, Eika F, Rahbek MT, Eikhof KD, Hansen MD, Søndergaard M, Ryg J, Andersen S, Jørgensen MG.
PLoS One 2017; 12(12): e0189598.
Affiliation: Department of Geriatric and Internal Medicine, Aalborg University Hospital, Aalborg, Denmark.

DOI 10.1371/journal.pone.0189598 **PMID** 29287063
Abstract
BACKGROUND: Falls among older adults is one of the major public health challenges facing the rapidly changing demography. The valid assessment of reaction time (RT) and other well-documented risk factors for falls are mainly restricted to specialized clinics due to the equipment needed. The Nintendo Wii Balance Board has the potential to be a multi-modal test and intervention instrument for these risk factors, however, reference data are lacking.
OBJECTIVE: To provide RT reference data and to characterize the age-related changes in RT measured by the Nintendo Wii Balance Board.
METHOD: Healthy participants were recruited at various locations and their RT in hands and feet were tested by six assessors using the Nintendo Wii Balance Board. Reference data were analysed and presented in age-groups, while the age-related change in RT was tested and characterized with linear regression models.
RESULTS: 354 participants between 20 and 99 years of age were tested. For both hands and feet, mean RT and its variation increased with age. There was a statistically significant non-linear increase in RT with age. The averaged difference between male and female was significant, with males being faster than females for both hands and feet. The averaged difference between dominant and non-dominant side was non-significant.
CONCLUSION: This study reported reference data with percentiles for a new promising method for reliably testing RT. The RT data were consistent with previously known effects of age and gender on RT.
PDF Y Endnote Y

Supervised balance training and Wii Fit-based exercises lower falls risk in older adults with type 2 diabetes
Morrison S, Simmons R, Colberg SR, Parson HK, Vinik AI.
J. Am. Med. Dir. Assoc. 2017; ePub(ePub): ePub.

Affiliation: Strelitz Diabetes Center, Eastern Virginia Medical School, Norfolk, VA.

DOI 10.1016/j.jamda.2017.11.004 **PMID** 29289541

Abstract

OBJECTIVES: This study examined the benefits of and differences between 12 weeks of thrice-weekly supervised balance training and an unsupervised at-home balance activity (using the Nintendo Wii Fit) for improving balance and reaction time and lowering falls risk in older individuals with type 2 diabetes mellitus (T2DM).

DESIGN: Before-after trial.

SETTING: University research laboratory, home environment.

PARTICIPANTS: Sixty-five older adults with type 2 diabetes were recruited for this study. Participants were randomly allocated to either supervised balance training (mean age 67.8 ± 5.2) or unsupervised training using the Nintendo Wii Fit balance board (mean age 66.1 ± 5.6).

INTERVENTION: The training period for both groups lasted for 12 weeks. Individuals were required to complete three 40-minute sessions per week for a total of 36 sessions.

MEASUREMENT: The primary outcome measure was falls risk, which was as derived from the physiological profile assessment. In addition, measures of simple reaction time, lower limb proprioception, postural sway, knee flexion, and knee extension strength were also collected. Persons also self-reported any falls in the previous 6 months.

RESULTS: Both training programs resulted in a significant lowering of falls risk ($P < .05$). The reduced risk was attributable to significant changes in reaction times for the hand ($P < .05$), foot ($P < .01$), lower-limb proprioception ($P < .01$), and postural sway ($P < .05$).

CONCLUSIONS: Overall, training led to a decrease in falls risk, which was driven by improvements in reaction times, lower limb proprioception, and general balance ability. Interestingly, the reduced falls risk occurred without significant changes in leg strength, suggesting that interventions to reduce falls risk that target intrinsic risk factors related to balance control (over muscle strength) may have positive benefits for the older adult with T2DM at risk for falls.

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Sway regularity and sway activity in older adults' upright stance are differentially affected by dual task

Drozdova-Statkevičienė M, Česnaitienė VJ, Pukėnas K, Levin O, Masiulis N.

Neurosci. Lett. 2017; 666: 153-157.

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DOI 10.1016/j.neulet.2017.12.054 **PMID** 29288047

Abstract

Age-related changes in postural control are attributed to visual, vestibular and proprioceptive dysfunctions, muscle weakness, and reduced availability of neural resources required for efficient balance control. Concurrent performance of complex cognitive tasks while standing or walking is expected to increase balance instability due to under-recruitment of brain resources and insufficient allocation of attention to the postural task. Both balance instability and attentional control of

movements can, nonetheless, be determined from the center of pressure (CoP) measurements by examining the effects of dual-task on the amount of sway activity (as measured by CoP velocity - Vcop) and the statistical regularity of the CoP trajectory (the wavelet entropy of the signal - WEcop). The abovementioned characteristics were examined in the present study in a group of 13 healthy older adults. The task involved maintaining Romberg stance for 25 s with or without performing an attention demanding cognitive tasks (word memorization or mathematical counting). A linear mixed-model study was designed to analyze the extent to which sway activity can predict sway regularity.

FINDINGS from the present study showed that, on average, Vcop and WEcop were positively correlated ($p = 0.014$), suggesting that older individuals who exhibited greater amounts of sway (i.e., higher Vcop) also increased sway irregularity of the posturogram - as evidenced by a higher level of wavelet entropy of the CoP trajectory. Nevertheless, results of the linear mixed model showed that significant positive associations between Vcop and WEcop were found only in dual task ($R \geq 0.67$, $p \leq 0.012$). Furthermore, dual-task effects (% change in performance) on both sway characteristics were not significant ($p > 0.1$), suggesting that none of the attention demanding cognitive tasks used in the present study was sufficient to divert a critical amount of attentional resources from the postural task. Finally, performance of the mathematical counting (but not the word memorization) task was deteriorated from sitting to standing, however this effect was marginal ($p = 0.075$). Taken together, we proposed that while dual task could hinder balance control, postural stability may still be maintained by allocating more attentional resources to the postural task and reducing automatized control.

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The association between anemia and falls in community-living women and men aged 65 years and older from the fifth Tromsø Study 2001-02: a replication study

Hopstock LA, Utne EB, Horsch A, Skjelbakken T.

BMC Geriatr. 2017; 17(1): e292.

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DOI 10.1186/s12877-017-0689-8 **PMID** 29282000

Abstract

BACKGROUND: Falls are common among elderly people, and the risk increase with age. Falls are associated with both health and social consequences for the patient, and major societal costs. Identification of risk factors should be investigated to prevent falls. Previous studies have shown anemia to be associated with increased risk of falling, but the results are inconsistent. The aim of this study was to investigate the association between anemia and self-reported falls among community-living elderly people. The study is a replication of the study by Thaler-Kall and colleagues from 2014, who studied the association between anemia and self-reported falls among 967 women and men 65 years and older in the KORA-Age study from 2009.

METHODS: We included 2441 participants (54% women) 65 years and older from the population-based Tromsø 5 Study 2001-2002. Logistic regression models were used to investigate the association between anemia (hemoglobin <12 g/dL in women and <13 g/dL in men) or hemoglobin level and self-reported falls last year, adjusted for sex, age, medication use and disability. Further, associations between combinations of anemia and frailty or disability, and falls, were investigated.

RESULTS: No statistical significant associations were found between anemia and falls (OR 95% CI: 0.83, 0.50-1.37) or hemoglobin level and falls (OR, 95% CI: 0.94, 0.81-1.09), or with combinations of anemia and frailty or disability, and falls (OR, 95%: CI: 0.94, 0.40-2.22 and 0.78, 0.34-1.81, respectively).
CONCLUSIONS: In this replication analysis, in accordance with the results from the original study, no statistically significant association between anemia or hemoglobin and falls was found among community-living women and men aged 65 years or older.
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The role of gender in the association between personality and task priority in older adults' dual-tasking while walking
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BMC Geriatr. 2018; 18(1): e1.
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Abstract
BACKGROUND: Falls are a major problem for older adults. Many falls occur when a person's attention is divided between two tasks, such as a dual task (DT) involving walking. Most recently, the role of personality in walking performance was addressed; however, its association with DT performance remains to be determined.
METHODS: This cross-sectional study of 73 older, community-dwelling adults explores the association between personality and DT walking and the role of gender in this relationship. Personality was evaluated using the five-factor model. Single-task (ST) and DT assessment of walking-cognitive DT performance comprised a 1-min walking task and an arithmetic task performed separately (ST) and concurrently (DT). Dual-task costs (DTCs), reflecting the proportional difference between ST and DT performance, were also calculated.
RESULTS: Gender plays a role in the relationship between personality and DT. Extraversion was negatively associated with DTC-motor for men ($\Delta R2 = 0.06$, $p < 0.05$). Conscientiousness was positively associated with DTC-cognition for women ($\Delta R2 = 0.08$, $p < 0.01$).
CONCLUSION: These findings may lead to effective personality-based early detection and intervention for fall prevention.
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A retrospective review of fall risk factors in the bone marrow transplant inpatient service
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J. Oncol. Pharm. Pract. 2017; ePub(ePub): ePub.
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Abstract

PURPOSE The purpose of this study was to compare medications and potential risk factors between patients who experienced a fall during hospitalization compared to those who did not fall while admitted to the Blood and Marrow Transplant inpatient setting at The James Cancer Hospital. Secondary objectives included evaluation of transplant-related disease states and medications in the post-transplant setting that may lead to an increased risk of falls, post-fall variables, and number of tests ordered after a fall.
METHODS This retrospective, case-control study matched patients in a 2:1 ratio of nonfallers to fallers. Data from The Ohio State University Wexner Medical Center (OSUWMC) reported fall events and patient electronic medical records were utilized. A total of 168 adult Blood and Marrow Transplant inpatients with a hematological malignancy diagnosis were evaluated from 1 January 2010 to 30 September 2012.
RESULTS Univariable and multivariable conditional logistic regression models were used to assess the relationship between potential predictor variables of interest and falls. Variables that were found to be significant predictors of falls from the univariable models include age group, incontinence, benzodiazepines, corticosteroids, anticonvulsants and antidepressants, and number of days status-post transplant. When considered for a multivariable model age group, corticosteroids, and a cancer diagnosis of leukemia were significant in the final model.
CONCLUSION Recent medication utilization such as benzodiazepines, anticonvulsants, corticosteroids, and antidepressants placed patients at a higher risk of experiencing a fall. Other significant factors identified from a multivariable analysis found were patients older than age 65, patients with recent corticosteroid administration and a cancer diagnosis of leukemia.
PDF Endnote

Dancing with gravity-why the sense of balance is (the) fundamental
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Abstract
The sense of balance, which is usually barely noticeable in the background of each of our movements, only becomes manifest in its function during intense stimulation or in the event of illness, which may quite literally turn your world upside down. While it is true that balance is becoming a bigger issue, that is mainly because people are losing it more frequently. So why is balance not as commonly talked about in psychology, medicine or the arts as the other five traditional senses? This is partly due to its unusual multi-modal nature, whereby three sensory inputs are coordinated and integrated by the central nervous system. Without it, however, we might not have much use for the other senses. The sense of balance encompasses the bodily experience in its entirety. Not only do we act with the body, we may also think and feel through it and with it. Bodily states are not simply effects of cognition; they cause it as well. Equilibrioception is an essential sense and it is interconnected with a wide range of other areas, including cognition, perception, embodiment, the autonomic nervous system, aesthetics, the arts, and education.
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Gait disorders

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Abstract

Walking is an extraordinarily complex task requiring integration of the entire nervous system, making gait susceptible to a variety of underlying neurological abnormalities. Gait disorders are particularly prevalent in the elderly and increase fall risk. In this review, we discuss an approach to the examination of gait, and highlight key features of common gait disorders and their underlying causes. We review gaits due to lesions of motor systems (spasticity and neuromuscular weakness), the cerebellum and sensory systems (ataxia), parkinsonism, and frontal lobes and discuss the remarkably diverse phenomenology of functional (psychogenic) gait disorders. We offer a pragmatic approach to the diagnosis and management and neurological gait disorders, as prompt recognition and intervention may improve quality of life in affected individuals.

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