Safety Literature 11th February 2024

Characteristics and demography of low energy fall injuries in patients > 60 years of age: a population-based analysis over a decade with focus on undertriage

Aarsland MA, Weber C, Enoksen CH, Dalen I, Tjosevik KE, Oord P, Thorsen K. Eur. J. Trauma Emerg. Surg. 2024; ePub(ePub): ePub.

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DOI: 10.1007/s00068-024-02465-3 **PMID**: 38324199

Abstract

BACKGROUND: An increasing group of elderly patients is admitted after low energy falls. Several studies have shown that this patient group tends to be severely injured and is often undertriaged.

METHODS: Patients > 60 years with low energy fall (< 1 m) as mechanism of injury were identified from the Stavanger University Hospital trauma registry. The study period was between 01.01.11 and 31.12.20. Patient and injury variables as well as clinical outcome were described. Undertriage was defined as patients with a major trauma, i.e., Injury Severity Score (ISS) > 15, without trauma team activation. Statistical analysis was performed using the Chi-squared test for categorical variables and the Mann-Whitney U test for continuous variables.

RESULTS: Over the 10-year study period, 388 patients > 60 years with low energy fall as mechanism of injury were identified. Median age was 78 years (IQR 68-86), and 53% were males. The location of major injury was head injury in 41% of the patients, lower extremities in 19%, and thoracic injuries in 10%. Thirty-day mortality was 13%. Fifty percent were discharged to home, 31% to nursing home, 9% in hospital mortality, and the remaining 10% were transferred to other hospitals or rehabilitation facilities. Ninety patients had major trauma, and the undertriage was 48% (95% confidence interval, 38 to 58%).

CONCLUSIONS: Patients aged > 60 years with low energy falls are dominated by head injuries, and the 30-day mortality is 13%. Patients with major trauma are undertriaged in half the cases mandating increased awareness of this patient group.

Language: en

Keywords: Injury severity; Mortality; Trauma; Traumatic brain injury; Undertriage

Exploring the relationship between falls, fall-related psychological concerns, and personality traits in adults: a scoping review protocol

Adandom HC, Nwankwo HC, Adandom II, Akinrolie O, Odole AC, Scott DR, Awosoga OA. Health Sci. Rep. 2024; 7(2): e1848.

(Copyright © 2024, John Wiley and Sons)

DOI: 10.1002/hsr2.1848 **PMID**: 38299208 **PMCID**: PMC10826239

Abstract

BACKGROUND AND AIMS: Personality traits, such as neuroticism and extraversion, are emerging as important predictors of falls. Despite their significance, existing fall prevention programs often overlook these traits, creating a notable research gap. This study aims to conduct a comprehensive scoping review to explore the existing literature on the relationships among personality traits, falls, and fall-related psychological concerns (FrPCs).

METHODS: This scoping review will adhere to the framework established by Arksey and O'Malley, incorporating extensions recommended by the Joanna Briggs Institute and using the PRISMA-ScR checklist. A thorough search strategy will be employed, aligning with the population, concept, and context (PCC) selection criteria. Electronic databases, including MEDLINE, APA PsycINFO, Web of Science, CINAHL, and SPORTDiscus, will be searched from their inception to the present. Additionally, a manual search of the reference lists of identified and relevant full-text articles will be conducted. Two independent reviewers will screen titles and abstracts, perform full-text reviews, and extract data from pertinent articles.

DISCUSSION: Personality traits are increasingly recognized as influential predictors of falls and related psychological concerns. This review aims to make a substantial contribution to the existing literature by being the first to comprehensively explore and provide a descriptive synthesis of the relationship between personality traits and falls, as well as FrPCs in adults. It is hoped that the outcomes of this review will enhance our comprehension of the role of personality traits in falls, potentially informing future research and strategies for this critical area of study. SCOPING REVIEW REGISTRATION: This scoping review protocol was registered with Open Science Framework (https://doi.org/10.17605/OSF.IO/KR74X).

Language: en

Keywords: balance confidence; Big Five; falls; fear of falling; personality; self-efficacy

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Android obesity could be associated with a higher fall risk than gynoid obesity following a standing-slip: a simulation-based biomechanical analysis

Ahn J, Ban R, Simpkins C, Yang F. J. Biomech. 2024; 164: e111962.

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DOI: 10.1016/j.jbiomech.2024.111962 **PMID**: 38306779

Abstract

It is well recognized that overall obesity increases fall risk. However, it remains unknown if the obesity-induced increase in the fall risk depends upon the adipose distribution (or obesity type: android vs. gynoid). This pilot study examined the effects of fat deposition region on fall risk following a standing-slip trial in young adults with simulated android or gynoid adiposity. Appropriate external weights were attached to two groups of healthy young lean adults at either the abdomen or upper thigh region to simulate android or gynoid adiposity, respectively, with a targeted body mass index of 32 kg/m(2). Under the protection of a safety harness, both groups were exposed to an identical standing-slip on a treadmill with a maximum slip distance of 0.36 m. The primary (dynamic gait stability) and secondary (latency, length, duration, and speed of the recovery step, slip distance, and trunk velocity) outcome variables on the slip trial were compared between groups. The results revealed that the android group was more unstable with a longer slip distance and a slower trunk flexion velocity than the gynoid group at the recovery foot liftoff after the slip onset. The android group initiated the recovery step later but executed the step faster than the gynoid group. Biomechanically, the android adipose tissue may be associated with a higher fall risk than the gynoid fat tissue. Our findings could provide preliminary evidence for considering fat distribution as an additional fall risk factor to identify older adults with obesity at a high fall risk.

Language: en

Keywords: Biomechanics; Dynamic gait stability; Fall risk; Fat mass distribution

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Maintaining independence in individuals with dementia at home after a fall: a protocol for the UK pilot cluster randomised controlled trial MAINTAIN

Greene L, Barber R, Bingham A, Connors J, Conroy S, Elkhafer K, Fox C, Goodwin V, Gordon A, Hall AJ, Harwood RH, Hulme C, Jackson T, Litherland R, Morgan-Trimmer S, Pankiewicz S, Parry SW, Sharma A, Ukoumunne O, Whale B, Allan L. BMJ Open 2024; 14(2): e083494.

(Copyright © 2024, BMJ Publishing Group)

DOI: 10.1136/bmjopen-2023-083494 **PMID**: 38307534

Abstract

INTRODUCTION: Individuals with dementia face an increased risk of falls. Falls can cause a decline in the individual's overall functionality. All types of falls, including those that do not result in injury, can lead to psychosocial consequences, such as diminished confidence and a fear of falling. Projections indicate a rising trend in dementia diagnoses, implying an increase in fall incidents. Yet, there is a lack of evidence to support interventions for people living with dementia who have fallen. Our objective is to test the feasibility of a falls intervention trial for people with dementia.

METHOD AND ANALYSIS: This is a UK-based two-arm pilot cluster randomised controlled trial. In this study, six collaborating sites, which form the clusters, will be randomly allocated to either the intervention arm or the control arm (receiving treatment as usual) at a 1:1 ratio. During the 6 month recruitment phase, each cluster will enrol 10 dyads, comprising 10 individuals with dementia and their respective carers, leading to a total sample size of 60 dyads. The primary outcomes are the feasibility parameters for a full trial (ie, percentage consented, follow-up rate and cost framework). Secondary outcomes include activities of daily living, quality of life, fall efficacy, mobility, goal attainment, cognitive status, occurrence of falls, carer burden and healthcare service utilisation. Outcome measures will be collected at baseline and 28 weeks, with an additional assessment scheduled at 12 weeks for the healthcare service utilisation questionnaire. An embedded process evaluation, consisting of interviews and observations with participants and healthcare professionals, will explore how the intervention operates and the fidelity of study processes.

ETHICS AND DISSEMINATION: The study was approved by the NHS and local authority research governance and research ethics committees (NHS REC reference: 23/WA/0126). The results will be shared at meetings and conferences and will be published in peer-reviewed journals. TRIAL REGISTRATION NUMBER: ISRCTN16413728.

Language: en

Keywords: Aging; Clinical trials; Dementia; Patient-Centered Care; Quality of Life

NSW Fall Prevention & Healthy Ageing Network

Action observation with motor simulation improves reactive stepping responses following strong backward balance perturbations in healthy young individuals

Hagedoorn L, Ruiz Rodríguez A, van Asseldonk E, Weerdesteyn V. Gait Posture 2024; 109: 126-132.

(Copyright © 2024, Elsevier Publishing)

DOI: 10.1016/j.gaitpost.2024.01.023 **PMID**: 38306781

Abstract

BACKGROUND AND OBJECTIVE: Adequate reactive steps are critical for preventing falls following balance perturbations. Perturbation-based balance training was shown to improve reactive stepping in various clinical populations, but its delivery is labor-intensive and generally uses expensive equipment. Action observation of reactive steps with either motor imagery (AOMI) or motor simulation (AOMS) are potential alternative training modalities. We here aimed to study their effects on reactive stepping performance.

METHODS: Sixty healthy young subjects were subjected to forward platform translations that elicited backward reactive steps. The AOMI group (n = 20) was tested after AOMI of an actor's reactive steps, while the AOMS group (n = 20) additionally stepped along with the actor. The control group (n = 20) was tested without any prior observation. Our primary outcome was the step quality of the first trial response, as this best represents a real-life loss-of-balance. Step quality was quantified as the leg angle with respect to the vertical at stepping-foot contact. We also studied single step success rates and reactive step quality across repeated trials.

RESULTS: Reactive step quality was significantly better in the AOMI and AOMS groups than in the control group, which differences coincided with a twofold higher single step success rate. Reactive step quality improved upon repeated trials in all groups, yet the AOMS group needed the fewest repetitions to reach plateau performance. SIGNIFICANCE: The present results demonstrate that both AOMI and AOMS improved first and repeated trial reactive stepping performance. These findings point at the potential applicability of these concepts for home-based reactive balance training, for instance in serious games, with overt movements (AOMS) possibly having some benefits over mental imaginations (AOMI). Whether similar beneficial effects also emerge in the target populations of balance-impaired individuals remains to be investigated.

Language: en

Keywords: Action observation with motor imagery; Action observation with motor simulation; Balance perturbations; Falls; First trial effect; Reactive stepping

NSW Fall Prevention & Healthy Ageing Network

Preliminary gait analysis of frail versus older adults

Hirano Y, Yamada Y, Akiyama Y, Nakamura H, Matsui Y. J. Phys. Ther. Sci. 2024; 36(2): 87-93.

(Copyright © 2024, Society of Physical Therapy Science)

DOI: 10.1589/jpts.36.87 **PMID**: 38304149 **PMCID**: PMC10830157

Abstract

[Purpose] This study aimed to verify the usefulness of an inertial measurement unit and compare the gait of frail and robust older adults.

[Participants and Methods] Six participants (three males and three females) in their 80s were diagnosed as frail or robust according to Japanese Cardiovascular Health Study criteria. Using an inertial measurement unit, we measured parameters associated with the sole clearance and center of gravity shift. We then calculated the margin of stability in two directions.

[Results] The gait analysis of both groups was reliable, as intraclass correlation coefficient values were comparable to the measurement accuracy of the inertial measurement unit achieved in a previous study of young participants. The results revealed that the sole clearance during the swing phase tended to be lower in frail than robust participants; moreover, the center of mass shift tended to be small and step width wide in frail participants, whereas the center of mass shift tended to be large in robust participants.

[Conclusion] Our findings are expected to contribute to gait training in rehabilitation programs for older frail adults, the development of welfare equipment such as walking aids for frail elderly individuals, and the establishment of the reliability of inertial measurement unit use.

Language: en

Keywords: Frailty; Gait analysis; Margin of stability

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A judo-based exercise program to reduce falls and frailty risk in community-dwelling older adults: a feasibility study

Jadczak AD, Verma M, Headland M, Tucker G, Visvanathan R. J. Frailty Aging 2024; 13(1): 1-9.

(Copyright © 2024, Journal of frailty and aging)

DOI: 10.14283/jfa.2023.17 **PMID**: 38305437

Abstract

OBJECTIVES: This study aimed to explore the feasibility (including recruitment, safety and adherence) and the effects of a twice weekly supervised Judo-based exercise program over eight weeks on mobility, balance, physical performance, quality of life, fear of falling and physical activity (including by frailty status) in community-dwelling older people aged ≥65 years.

DESIGN: Pre-post study.

PARTICIPANTS: A total of 17 participants (mean age 74.3±6.2; range 66-87 years; 76.5% female).

INTERVENTION: A Judo-based exercise program conducted twice weekly for 60 minutes per session over eight weeks. MEASUREMENTS: Pre and post assessments included the Timed Up and Go (TUG); the Berg Balance Scale (BBS); the Short Physical Performance Battery (SPPB); the Short Form Health Survey-36 (SF-36); the Falls Efficiency Scale International (FES-I); and an ActivPal accelerometer to measure participants' physical activity.

RESULTS: Most participants had low (≤3) Charlson's Comorbidity Index scores (n=17, 100%), were well nourished (n=16, 94.1%), not sarcopenic (n=16, 94.1%), and not cognitively impaired (n=13, 76.5%), anxious or depressed (n=14, 82.4%). Ten participants (58.8%) were non-frail and seven were pre-frail (41.2%). Significant improvements ($p<0.05$) were seen for mobility (TUG), balance (BBS) and physical performance (SPPB). Pre-frail participants showed greater improvement in mobility (TUG) than non-frail participants ($p=0.020$). No changes ($p\geq0.05$) were seen in quality of life, fear of falling, or physical activity. Participants' adherence (i.e., attending sessions) was high (i.e., ≥81.2%). No serious adverse events or withdrawals were reported.

CONCLUSION: Findings suggest that the eight week Judo-based exercise program can be delivered safely to older adults aged ≥65 years, including those at-risk of frailty, as long as there is close supervision with individualisation of the program in response to emergent health symptoms and the program is conducted on requisite Judo mats. This Judo-based exercise program is effective in improving physical function with potential to prevent falls and frailty risk.

Language: en

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Keywords: falls; frailty; Judo; older adults; physical function

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Using nonlinear measures to evaluate postural control in healthy adults during bipedal standing on an unstable surface

Kędziorek J, Błażkiewicz M, Kaczmarczyk K. Acta Bioeng. Biomech. 2022; 24(1): 9-17.

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DOI: unavailable **PMID**: 38314480

Abstract

PURPOSE: This study examined the use of nonlinear measures - sample entropy (SampEn), fractal dimension (FD), and the Lyapunov exponent (LyE) - to evaluate postural control in adults during standing on an unstable surface, with and without visual feedback.

METHODS: 14 healthy young adults (24.07 ± 7.32 years) completed bipedal standing trials on an unstable-plate Biodex Balance System (BBS) connected to a Vicon system, with eyes open and closed. Each trial lasted 20 sec. Analysis was performed based on the center of mass (CoM), for which the three nonlinear measures were calculated.

RESULTS: Excluding visual feedback was found to cause a significant increase in linear and nonlinear parameters. Moreover, SampEn and FD values were found to be significantly higher in the PD direction, compared to AP or ML, whereas LyE values in this direction were minimal.

CONCLUSIONS: Results show that the three nonlinear measures provide a useful way of evaluating postural control in healthy adults. Moreover, it seems that introducing an unstable surface meant that the projection of the CoM was not perpendicular to the surface, but rather set at a certain continually changing angle, forcing the whole system to adapt to chaotic and unpredictable conditions. Such refined changes in conditions can be evaluated in a precise way only by using nonlinear measures.

Language: en

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Effects of physical exercise interventions on balance, postural stability and general mobility in Parkinson's disease: a network meta-analysis

Lorenzo-García P, Cavero-Redondo I, Núñez de Arenas-Arroyo S, Guzmán-Pavón MJ, Priego-Jiménez S, Álvarez-Bueno C. J. Rehabil. Med. 2024; 56: jrm10329.

(Copyright © 2024, Foundation for Rehabilitation Information)

DOI: 10.2340/jrm.v56.10329 **PMID**: 38298133

Abstract

OBJECTIVE: To assess which type of physical exercise intervention has the most beneficial effects on balance, postural stability and general mobility in patients with Parkinson's disease. These parameters were assessed using the Activities-specific Balance Confidence (ABC) scale, Berg Balance Scale (BBS), Mini-Balance Evaluation Systems Test (MiniBESTest) and Timed Up and Go Test (TUG).

DESIGN: Network meta-analysis.

METHODS: The PubMed, Cochrane Central Register of Controlled Trials, and Web of Science databases were searched up to August 2022 to identify randomized controlled trials on the effects of physical exercise interventions on balance, postural stability, and general mobility. The network meta-analysis included pairwise and indirect comparisons of results on the ABC scale, BBS, MiniBESTest, and TUG across 8 categories of physical exercise.

RESULTS: Eighty-six studies with a total of 4,693 patients were included. For the ABC scale, the indirect comparison showed that the highest effect size was observed for balance vs sensorimotor training without including endurance interventions (0.62; 95% confidence interval (95% CI) 0.06, 1.17). The highest effect sizes for BBS were observed for alternative exercises (1.21; 95% CI 0.62, 1.81), body-weight supported (BWS) interventions (1.31; 95% CI 0.57, 2.05), dance (1.18; 95% CI 0.33, 2.03) and sensorimotor training, including endurance interventions (1.10; 95% CI 0.46, 1.75) vs control groups. Indirect comparisons showed that the highest effect size for the MiniBESTest were observed for balance (0.75; 95% CI 0.46, 1.04) and resistance (0.58; 95% CI 0.10, 1.07) vs control groups. For the TUG, comparisons showed a significant effect size for alternative exercises (-0.54; 95% CI -0.82, -0.26), balance (-0.42; 95% CI -0.75, -0.08), resistance (-0.60; 95% CI -0.89, -0.31), and sensorimotor training including endurance interventions (-0.61; 95% CI -0.95, -0.27) vs control comparisons.

CONCLUSION: Balance interventions improve balance, postural stability, and general mobility in people with Parkinson's disease. Moreover, alternative exercises, dance, BWS interventions, resistance, and sensorimotor training, including and not including endurance interventions, are also effective.

Language: en

NSW Fall Prevention & Healthy Ageing Network

Keywords: Humans; Postural Balance; *Parkinson Disease; Exercise Therapy/methods; Gait; Network Meta-Analysis; Time and Motion Studies

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ICNP® terminological subset for preventing falls in the elderly in primary care

Santos PHFD, Stival MM, Lima LR, Volpe CRG, Funghetto SS. Rev. Esc. Enferm. USP 2024; 57: e20220483.

(Copyright © 2024, Universidade de São Paulo, Escola de Enfermagem)

DOI: 10.1590/1980-220X-REEUSP-2022-0483en **PMID**: 38315801

Abstract

OBJECTIVE: Build and validate a terminological subset of ICNP® for the prevention of falls in the elderly in the context of primary health care, in light of the Self-Care Deficit Theory.

METHOD: Methodological study developed in accordance with ICN recommendations and the Brazilian method for constructing terminological subsets, in two stages: 1) construction of ICNP® statements of nursing diagnoses, outcomes, and interventions; 2) content validation of statements by specialist nurses.

RESULTS: A total of 182 diagnoses/outcomes and 321 nursing interventions were constructed, which were subjected to content validation by 28 experts, being validated with a Content Validity Index ≥ 0.80. After validation, the statements were organized according to self-care requirements and the majority of diagnoses/outcomes (51.6%) and interventions (52.7%) were classified under health deviation requirements.

CONCLUSION: It was possible to construct and validate a terminological subset of ICNP® with a predominance of statements related to health deviation requirements, standing out for being the first terminological subset for the prevention of falls in the elderly in the context of primary care.

Language: pt

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Valid indicators for predicting falls in community-dwelling older adults under ongoing exercise intervention to prevent care requirement

Sato M, Yamashita T, Okazaki D, Asada H, Yamashita K. Gerontol. Geriatr. Med. 2024; 10: e23337214241229328.

(Copyright © 2024, The Author(s), Publisher SAGE Publishing)

DOI: 10.1177/23337214241229328 **PMID**: 38304864 **PMCID**: PMC10832412

Abstract

Physical exercise interventions to prevent falls for older adults at risk of falling are widespread in many countries; however, there is insufficient knowledge of the impact of long-term exercise on the fall discriminating ability of existing fall-prediction indicators. This study measured physical and cognitive indicators of the fall risk, including the timed up and go (TUG), walking speed (WS), and plantar tactile threshold (PTT), in 124 community-dwelling older adults with care needs who were continuing an exercise program. Logistic regression analyses were used to determine factors associated with falls in the 87 participants who could adhere to the exercise continuously for 12 months. The PTT was significantly higher in fallers, while the TUG and WS did not differ significantly between fallers and non-fallers. The only index significantly associated with falls was the PTT (OR = 1.20). The fall identification ability was better for PTT (AUC = 0.63), whereas TUG (AUC = 0.57) and WS (AUC = 0.52) were lower than previously reported scores. In conclusion, long-term exercise was found to improve scores on the fallprediction indicators by physical performance, but to decrease their ability to identify future falls. PTT may complement the ability to identify falls in such elderly populations.

Language: en

Keywords: aging; falls; long-term care; physical fitness

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Fear of falling in older adults living in a community-dwelling facility: prevalence and its impact on activity behavior and physical function

Sebastião E, Siqueira V, Bakare J, Bohn L, Gallo LH. J. Appl. Gerontol. 2024; ePub(ePub): ePub.

(Copyright © 2024, SAGE Publishing)

DOI: 10.1177/07334648241230403 **PMID**: 38323893

Abstract

This study examined the prevalence and the impact of fear of falling (FOF) on physical activity (PA), sedentary behavior (PA), and physical function in older adults living in a continuing care retirement community (CCRC). Ninety-three older adults were included and self-reported assessed on PA and SB. Further, participants' physical function was assessed using a collection of measures of valid objective tests. Independent t test was used to compare the dependent variables between FOF groups, and analysis of covariance (ANCOVA) was used to control for assistive device usage. FOF was prevalent in 47.3% of the sample and PA and SB did not differ between FOF groups ($p > .05$). ANCOVA revealed that performance on several physical function tests remained significantly better ($p < .05$) for the no FOF group compared to the yes group. Our findings demonstrated similar levels of PA and SB between FOF groups, but worse physical function for older adults reporting FOF.

Language: en

Keywords: elderly; falls; institutionalized elderly; risk factors; sedentary time

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Scale development to evaluate differences between concern about falling and fear of falling: the concern and fear of falling evaluation

Takla TN, Matsuda PN, Herring TE, Daugherty AM, Fritz NE. Front. Psychol. 2024; 15: e1336078.

(Copyright © 2024, Frontiers Research Foundation)

DOI: 10.3389/fpsyg.2024.1336078 **PMID**: 38318081 **PMCID**: PMC10839088

Abstract

PURPOSE: Individuals with multiple sclerosis (MS) experience fear of falling (FOF), which is associated with negative health and quality-of-life consequences. Prior research has used FOF and concern about falling (CAF) interchangeably, but persons with MS report that CAF and FOF represent separate constructs that lie on a continuum. Unfortunately, no scale exists to understand the differences between CAF and FOF. Therefore, we developed a novel questionnaire, the Concern and Fear of Falling Evaluation (CAFFE), in which respondents rank their CAF and FOF on a continuum across various activities. This study aims to describe the scale development process and examine its psychometric properties.

METHODS: In a single online survey, MS participants responded to demographic questionnaires, indicated whether they experience CAF and FOF, and completed the CAFFE. Psychometric evaluation of the CAFFE involved internal consistency, split-half cross validation, exploratory factor analysis (EFA), and confirmatory factor analysis (CFA).

RESULTS: Out of 1,025 respondents, 64.6% reported CAF and 47.2% reported FOF. The EFA yielded a two-factor solution encompassing activities in open (factor 1) and closed environments (factor 2). The CFA replicated this two-factor solution and the CAFFE demonstrated excellent internal consistency ($\alpha = 0.98$).

CONCLUSION: The 27-item CAFFE is a highly reliable and valid measure capturing the tipping point at which point CAF moves to FOF. Future research should seek to define the tipping point from the MS community, as CAF may be an adaptive mechanism, whereas FOF may be a maladaptive behavior.

Language: en

Keywords: concern about falling; fall; fear of falling; multiple sclerosis; scale development

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The relationship between acceleration in sit-to-stand and falls in community-dwelling older adults: cross-sectional study

Tateoka K, Tsuji T, Shoji T, Tokunaga S, Okura T. J. Phys. Ther. Sci. 2024; 36(2): 74-80.

(Copyright © 2024, Society of Physical Therapy Science)

DOI: 10.1589/jpts.36.74 **PMID**: 38304148 **PMCID**: PMC10830154

Abstract

[Purpose] This study aimed to determine the relationship between acceleration parameters in the sit-to-stand (STS) movement and falls, and the strength of the association between acceleration in STS movements and falls in older adults.

[Participants and Methods] In total, 330 older adults were included. Four acceleration parameters were measured in STS movement: maximum acceleration (MA), velocity (MV), power (MP), and stand-up time (ST). For the conventional STS tests, 5 times STS test (5xSTS) and ground reaction force (maximal rate of force development per body weight: RFD/w, peak reaction force per body weight: F/w, chair-rise time: T) were measured. Poisson regression analysis adjusted for confounding factors was used.

[Results] In the model adjusted for confounders, significant associations were observed among MV (Prevalence ratio (PR): 0.75; 95% confidence interval (CI): 0.58-0.98), MP (PR: 0.67; 95% Cl: 0.68-0.93), RFD/w (PR: 0.70; 95% Cl: 0.56-0.87), and T (PR: 1.14; 95% Cl: 1.05-1.24).

[Conclusion] Among the acceleration parameters, MP was most strongly associated with falls and was considered the most useful parameter for evaluation. In addition, comparisons with the conventional chair rise tests suggested that MP was stronger than the 5xSTS test and may be equally related to the RFD/w.

Language: en

Keywords: Acceleration parameter; Chair-rise; Fall history

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Exploring communication about fall risk and prevention between internal medicine residents and geriatric patients: a needs assessment

Thomas ML, Anunobi U, Jackson CD. South. Med. J. 2024; 117(2): 102-105.

(Copyright © 2024, Southern Medical Association)

DOI: 10.14423/SMJ.0000000000001652 **PMID**: 38307507

Abstract

OBJECTIVES: In the United States, falls are the leading cause of fatal and nonfatal injuries for geriatric patients. With a growing aging population, medical trainees must gain experience with geriatric assessments, including fall risk and prevention. To the authors' knowledge, no prior studies have explored who most often initiates fall discussions between Internal Medicine (IM) residents and geriatric (age 65 years and older) patients. Our objective was to determine who most often initiates fall discussions between IM residents and geriatric patients and the barriers to having these discussions.

METHODS: This 2023 quantitative needs assessment used surveys distributed to ambulatory geriatric patients, IM residents, and attending physicians within an urban IM resident continuity clinic. We used the Stopping Elderly Accidents, Death & Injuries assessment from the Centers for Disease Control and Prevention to determine patient fall risk.

RESULTS: Response rates were 46%, 51%, and 67% for patients, residents, and attendings, respectively. Of the 39 patients who were assessed, 51% were at risk of falling. Eighty-seven percent of patients have had a fall discussion with their residents, and 59% reported these were resident initiated; however, 75% of 28 residents reported initiating fall conversations rarely, and all 4 attendings said that they started these discussions most of the time while staffing patients with residents. Modifiable resident-identified barriers to discussing falls included forgetfulness and lack of knowledge regarding completing a fall risk assessment.

CONCLUSIONS: Most patients have conversations about falling with their physicians, but discrepancies exist regarding who initiates them. Data from this study suggest that attendings may be instrumental in starting these conversations. Reminder systems and fall risk didactic curricula may increase resident-initiated fall discussions.

Language: en

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Identifying sensors-based parameters associated with fall risk in community-dwelling older adults: an investigation and interpretation of discriminatory parameters

Wang X, Cao J, Zhao Q, Chen M, Luo J, Wang H, Yu L, Tsui KL, Zhao Y. BMC Geriatr. 2024; 24(1): e125.

(Copyright © 2024, Holtzbrinck Springer Nature Publishing Group - BMC)

DOI: 10.1186/s12877-024-04723-w **PMID**: 38302872

Abstract

BACKGROUND: Falls pose a severe threat to the health of older adults worldwide. Determining gait and kinematic parameters that are related to an increased risk of falls is essential for developing effective intervention and fall prevention strategies. This study aimed to investigate the discriminatory parameter, which lay an important basis for developing effective clinical screening tools for identifying high-fall-risk older adults.

METHODS: Forty-one individuals aged 65 years and above living in the community participated in this study. The older adults were classified as high-fall-risk and low-fall-risk individuals based on their BBS scores. The participants wore an inertial measurement unit (IMU) while conducting the Timed Up and Go (TUG) test. Simultaneously, a depth camera acquired images of the participants' movements during the experiment. After segmenting the data according to subtasks, 142 parameters were extracted from the sensor-based data. A t-test or Mann-Whitney U test was performed on the parameters for distinguishing older adults at high risk of falling. The logistic regression was used to further quantify the role of different parameters in identifying high-fall-risk individuals. Furthermore, we conducted an ablation experiment to explore the complementary information offered by the two sensors.

RESULTS: Fifteen participants were defined as high-fall-risk individuals, while twenty-six were defined as low-fall-risk individuals. 17 parameters were tested for significance with p-values less than 0.05. Some of these parameters, such as the usage of walking assistance, maximum angular velocity around the yaw axis during turn-to-sit, and step length, exhibit the greatest discriminatory abilities in identifying high-fall-risk individuals. Additionally, combining features from both devices for fall risk assessment resulted in a higher AUC of 0.882 compared to using each device separately

CONCLUSIONS: Utilizing different types of sensors can offer more comprehensive information. Interpreting parameters to physiology provides deeper insights into the identification of high-fall-risk individuals. High-fall-risk individuals typically exhibited a cautious gait, such as larger step width and shorter step length during walking. Besides, we identified some abnormal gait patterns of high-fall-risk individuals compared to low-fall-risk individuals, such as less knee flexion and a tendency to tilt the pelvis forward during turning.

Language: en

Keywords: Older adults; Depth camera; Fall risk; Inertial measurement unit; Timed up and go test

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Effectiveness and cost of integrated cognitive and balance training for balance and falls in cerebellar ataxia: a blinded two-arm parallel group RCT

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Abstract

BACKGROUND: In patients with cerebellar ataxia (CA), dual-tasking deteriorates the performance of one or both tasks.

OBJECTIVE: Evaluate the effects of 4 weeks of cognitive-coupled intensive balance training (CIBT) on dual-task cost, dynamic balance, disease severity, number of falls, quality of life, cognition and cost among patients with CA.

METHODS: This RCT compared CIBT (Group 1) to single-task training (Group 2) among 32 patients with CA. The intervention included either dual-task (CIBT) or single-task training for 4 weeks followed by 6 months of unsupervised home exercises. Dual-task timed up-and-go test (D-TUG) assessed dual-task cost of the physical and cognitive tasks. Assessment time points included baseline 1 (Week 0:T1), baseline 2 (Week 6:T2), post-intervention (Week 10:T3), and follow-up (Week 34:T4).

RESULTS: Compared to single-task training CIBT improved the dual-task cost of physical task [MD -8.36 95% CI (-14.47 to -2.36, $p < 0.01$), dual-tasking ability [-6.93 (-13.16 to -0.70); $p = 0.03$] assessed using D-TUG, balance assessed using the scale for the assessment and rating of ataxia (SARAbal) [-2.03 (-4.04 to -0.19); $p = 0.04$], visual scores of the SOT (SOT-VIS) [-18.53 (-25.81 to -11.24, $p \leq 0.01$] and maximal excursion [13.84 (4.65 to 23.03; $p \leq 0.01$] of the Limits of Stability (LOS) in the forward direction and reaction time in both forward [-1.11 (-1.42 to -0.78); $p < 0.01$] and right [-0.18 (0.05 to 0.31); $p < 0.01$] directions following 4 weeks of training. CIBT did not have any additional benefits in reducing the number of falls, or improving disease severity, quality of life and cognition. The mean cost of intervention and healthcare costs for 7 months was HKD 33,380 for CIBT group and HKD 38,571 for single-task training group.

CONCLUSION: We found some evidence to support the use of CIBT for improving the dual-tasking ability, dual-task cost of physical task and dynamic balance in CA. Future large fully-powered studies are needed to confirm this claim. CLINICAL TRIAL REGISTRATION: https://clinicaltrials.gov/study/NCT04648501, identifier [Ref: NCT04648501].

Language: en

Keywords: cerebellar ataxia; cost; dual-task; dynamic balance; falls; postural stability

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Influence of feet's position on maximum forward lean using a new estimate of functional balance

Wysogląd MA, Michalska J, Nowakowski, Słomka K. Acta Bioeng. Biomech. 2022; 24(3): 49-55.

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Abstract

Functional stability is crucial to the daily activity of an independent person. Functional balance testing is widely used in laboratories and has proven to be a reliable indicator of fall risk. So far, only few studies have paid attention to the impact of foot positioning on the results of functional balance measurements. Thirty healthy adults took part in experiment. LOS test was performed for four stance positions: preferred width, wide stance (feet parallel, 28 cm apart), narrow stance (feet together) and angle stance (heels together, toes pointing outside, 90° angle between them) with eyes opened and closed. The results of the study show significant differences between angle and narrow stance according to wide and preferred width stances - angle and narrow positions didn't allow participants to lean as far as other positions. Vision had stabilizing influence on maximum forward lean in all tested positions.

Language: en

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