

SafetyLit September 23, 2018

Age and falls history effects on antagonist leg muscle coactivation during walking with balance perturbations

Thompson JD, Plummer P, Franz JR.

Clin. Biomech. 2018; 59: 94-100.

Affiliation: Joint Department of Biomedical Engineering, University of North Carolina at Chapel Hill and North Carolina State University, Chapel Hill, NC, USA. Electronic address: jrfranz@email.unc.edu.

(Copyright © 2018, Elsevier Publishing)

DOI 10.1016/j.clinbiomech.2018.09.011 **PMID** 30216784

Abstract

BACKGROUND: Inspired by a reliance on visual feedback for movement control in older age, optical flow perturbations provide a unique opportunity to study the neuromuscular mechanisms involved in walking balance control, including aging and falls history effects on the response to environmental balance challenges. Specifically, antagonist leg muscle coactivation, which increases with age during walking, is considered a neuromuscular defense against age-associated deficits in balance control. The purpose of this study was to investigate the effects of age and falls history on antagonist leg muscle coactivation during walking with and without optical flow perturbations of different amplitudes.

METHODS: Eleven young adults [mean (standard deviation) age: 24.8 (4.8) years], eleven older non-fallers [75.3 (5.4) years] and eleven older fallers [age: 78 (7.6) years] participated in this study. Participants completed 2-minute walking trials while watching a speed-matched virtual hallway that, in some conditions, included mediolateral optical flow perturbations designed to elicit the visual perception of imbalance.

FINDINGS: We first found that lower leg antagonist muscle coactivation during normal walking increased with age, independent of falls history. We also found that older but not young adults increased antagonist leg muscle coactivation in the presence of optical flow perturbations, with more pervasive effects in older adults with a history of falls.

INTERPRETATION: Our findings allude to a greater susceptibility to optical flow perturbations in older fallers during walking, which points to a higher potential for risk of instability in more complex and dynamic everyday environments. These findings may also have broader impacts related to the design of innovative training paradigms and neuromuscular targets for falls prevention.

Copyright © 2018. Published by Elsevier Ltd.

PDF Y Endnote Y

Age modifies the association between apathy and recurrent falling in Dutch ambulant older persons with a high fall risk: recurrent falling in Dutch outpatients, does apathy play a role?

Henstra MJ, Houbolt CM, Seppala LJ, de Rooij SE, Rhebergen D, Stek ML, van der Velde N.

Exp. Gerontol. 2018; 112: 54-62.

Affiliation: Department of Internal Medicine, Geriatrics, Academic Medical Centre Amsterdam, the Netherlands; Academic Medical Center, University of Amsterdam, Department of Clinical Epidemiology, Biostatistics and Bioinformatics, Amsterdam Public Health Research Institute, Amsterdam, the Netherlands.



(Copyright © 2018, Elsevier Publishing)

DOI 10.1016/j.exger.2018.09.002 PMID 30217662

Abstract

Apathy, a common and disabling behavioural syndrome in older persons, has been associated with impaired physical performance and executive dysfunction. Both are fall risk factors and they share pathophysiological pathway. We cross-sectionally examined the association between apathy and recurrent falling (≥ 2 falls in the past 12 months) and number of falls in the past 12 months in 243 outpatients aged ≥ 65 years with ≥ 3 fall risk-factors visiting a fall-clinic after a fall. We calculated Odds Ratio's (ORs), Incidence Rate Ratio's (IRRs) and their 95% Confidential Intervals (CI95) using multivariable regression and negative binomial regression analyses. We adjusted for cognitive functioning, depression, the use of fall risk increasing drugs, visual impairment, urine incontinence, comorbidity, smoking, use of alcohol, body mass index (BMI), and the number of months between assessment of fall risk and of apathy. We assessed effect modification by age and gender. In our study, apathy was independently associated with recurrent falling in patients aged 65-75 years: OR 2.8 (CI95 1.0-7.7). Overall, patients with apathy experienced 1.46 times as many falls in the past 12 months compared to patients without apathy (IRR 1.46 (CI95 1.0-2.1)). To conclude, in high fall-risk older outpatients, apathy was cross-sectionally associated with recurrent falling in patients aged 65-75 years and the number of falls. Apathy appeared to be especially relevant in relation to falling in this age group. Whether apathy predicts recurrent falling is yet to be determined.

Copyright © 2018 Elsevier Inc. All rights reserved.

PDF Y Endnote Y

Effects of pain and sleep quality on falls among nursing home residents in Turkey

Altintas HK, Aslan GK, Sisman NY, Kesgin MT.

Res. Gerontol. Nurs. 2018; 11(5): 257-264.

(Copyright © 2018, Healio)

DOI 10.3928/19404921-20180810-01 PMID 30230519

Abstract

The current study was conducted to detect the incidence of falls among individuals in nursing homes, as well as the impact of pain and sleep quality on falls. The sample for this cross-sectional study comprised 291 older adults. Pain was assessed using the Geriatric Pain Measure and insomnia was assessed using the Insomnia Severity Index. Incidence of falls within the past 1 year was 40.9%. Risk factors for falling were determined using logistic regression analysis. Based on the analysis, being single (odds ratio [OR] = 2.502, 95% confidence interval [CI] [1.155, 6.195]) and experiencing pain (OR = 2.841, 95% CI [1.195-6.754]) were risk factors for falling. In the current study, falling was seen as a common problem among older adults. Pain in particular should be addressed when planning the prevention of falls in nursing homes.

PDF N Endnote Y

Exposure to trips and slips with increasing unpredictability while walking can improve balance recovery responses with minimum predictive gait alterations

Okubo Y, Brodie MA, Sturnieks DL, Hicks C, Carter H, Toson B, Lord SR.

PLoS One 2018; 13(9): e0202913.



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

(Copyright © 2018, Public Library of Science)

DOI 10.1371/journal.pone.0202913 **PMID** 30226887

Abstract

INTRODUCTION: The primary study aim was to determine if repeated exposure to trips and slips with increasing unpredictability while walking can improve balance recovery responses when predictive gait alterations (e.g. slowing down) are minimised. The secondary aim was to determine if predictive gait alterations acquired through exposure to perturbations at a fixed condition would transfer to highly unpredictable conditions.

METHODS: Ten young adults were instructed to step on stepping tiles adjusted to their usual step length and to a metronome adjusted to their usual cadence on a 10-m walkway. Participants were exposed to a total of 12 slips, 12 trips and 6 non-perturbed trials in three conditions: 1) right leg fixed location, 2) left leg fixed location and 3) random leg and location. Kinematics during non-perturbed trials and pre- and post-perturbation steps were analysed.

RESULTS: Throughout the three conditions, participants walked with similar gait speed, step length and cadence ($p > 0.05$). Participants' extrapolated centre of mass (XCoM) was anteriorly shifted immediately before slips at the fixed location ($p < 0.01$), but this predictive gait alteration did not transfer to random perturbation locations. Improved balance recovery from trips in the random location was indicated by increased margin of stability and step length during recovery steps ($p < 0.05$). Changes in balance recovery from slips in the random location was shown by reduced backward XCoM displacement and reduced slip speed during recovery steps ($p < 0.05$).

CONCLUSIONS: Even in the absence of most predictive gait alterations, balance recovery responses to trips and slips were improved through exposure to repeated unpredictable perturbations. A common predictive gait alteration to lean forward immediately before a slip was not useful when the perturbation location was unpredictable. Training balance recovery with unpredictable perturbations may be beneficial to fall avoidance in everyday life.

PDF Y Endnote Y

Falls among elderly and its relation with their health problems and surrounding environmental factors in Riyadh

Thangaraj P.

J. Family Community Med. (2010) 2018; 25(3): 222-223.

Affiliation: Department of Community Medicine, Trichy SRM Medical College Hospital and Research Centre, Trichy, Tamil Nadu, India.

(Copyright © 2018, Saudi Society of Family and Community Medicine, Publisher Medknow Publications)

DOI 10.4103/jfcm.JFCM_56_18 **PMID** 30220857 **PMCID** PMC6130161

Abstract [Abstract unavailable]

PDF Y Endnote Y



Falls Efficacy Scale-International: exploring psychometric properties with adult day care users

Figueiredo D, Neves M.

Arch. Gerontol. Geriatr. 2018; 79: 145-150.

Affiliation: University of Aveiro, Agrads do Castro - Campus Universitário de Santiago, Edifício 30, 3810-193, Aveiro, Portugal. Electronic address: martinaneves@ua.pt.

(Copyright © 2018, Elsevier Publishing)

DOI 10.1016/j.archger.2018.09.001 **PMID** 30223237

Abstract

The majority of validation studies with the Falls Efficacy Scale-International (FES-I) are conducted with independent community-dwelling older people, which limits extrapolation to more vulnerable people, namely those receiving adult day care services. This study aimed to analyse the psychometric properties of the FES-I in terms of internal consistency, test-retest reliability, concurrent and convergent validity with users of adult day care centres. A cross-sectional study was conducted. Data collection included a socio-demographic questionnaire, the FES-I, the Activities-specific Balance Confidence Scale (ABC), the Hospital Anxiety and Depression Scale (HADS), the Timed Up and Go test (TUG) and the Five Times Sit to Stand Test (FTSST). Descriptive and inferential analyses were performed. A total of 100 users of adult day care centres (81.94 ± 6.43 years old; 77% female) have participated. The FES-I had excellent internal consistency ($\alpha = 0.970$) and test-retest reliability ($ICC_{2,1} = 0.979$). A significant negative correlation was found between the FES-I and the ABC ($r_s = -0.828$; $p < 0.001$), suggesting good concurrent validity. FES-I scores were significantly higher among those who were female, had less educational levels and reported having fear of falling. Significant correlations were found between FES-I and age ($r_s = 0.217$; $p < 0.05$), HADS-Anxiety ($r_s = 0.486$; $p < 0.001$), HADS-Depression ($r_s = 0.658$; $p < 0.001$), TUG ($r_s = 0.653$; $p < 0.001$) and FTSST ($r_s = 0.635$; $p < 0.001$), indicating acceptable convergent validity. The FES-I is a reliable and valid instrument to assess concern about falling among users of adult day care centres. The findings are highly comparable with those previously found for non-users. FES-I can be used to prevent risk of falls in this type of care settings.

Copyright © 2018 Elsevier B.V. All rights reserved.

PDF Y Endnote Y

Freezing of Gait Boot Camp: feasibility, safety and preliminary efficacy of a community-based group intervention

Rawson KS, Creel P, Templin L, Horin AP, Duncan RP, Earhart GM.

Neurodegener. Dis. Manag. 2018; ePub(ePub): ePub.

Affiliation: Department of Neuroscience, Washington University School of Medicine in Saint Louis, Saint Louis, MO 63110, USA.

(Copyright © 2018, Future Medicine)

DOI 10.2217/nmt-2018-0022 **PMID** 30223709

Abstract

AIM: In this pilot study, we evaluated the feasibility, safety and preliminary efficacy of a 6-week, community-based group intervention designed to reduce freezing of gait (FOG) for people with Parkinson's disease (PD).

METHODS: Seven people with PD completed 'FOG Boot Camp' provided by the St. Louis Chapter of



the American Parkinson Disease Association. We recorded attendance, participant's acceptance of the intervention and adverse events during classes. Pre and post-tests included measures of freezing, balance, motor severity, quality-of-life and gait speed.

RESULTS: No falls or injuries occurred and attendance was high. Participants had favorable feedback and showed reduced freezing and improvements in balance and gait.

CONCLUSION: Preliminary data suggest the FOG boot camp was feasible, safe and effective.

PDF N Endnote Y

Interventions to prevent falls and fractures in community-dwelling older adults

Fan T, Erickson EA.

Am. Fam. Physician 2018; 98(4): 253-255.

Affiliation: Uniformed Services University of the Health Sciences, USA.

(Copyright © 2018, American Academy of Family Physicians)

DOI unavailable **PMID** 30215980

Abstract [Abstract unavailable] Case Study CME points

PDF Y Endnote Y

One-legged stance sway of older adults with and without falls

Oliveira MR, Vieira ER, Gil AWO, Fernandes KBP, Teixeira DC, Amorim CF, da Silva RA.

PLoS One 2018; 13(9): e0203887.

Affiliation: Département des Sciences de la Santé, Programme de physiothérapie de l'université McGill offert en extension à l'Université du Québec à Chicoutimi (UQAC), et Laboratoire de recherche BioNR, Saguenay, Québec, Canada.

(Copyright © 2018, Public Library of Science)

DOI 10.1371/journal.pone.0203887 **PMID** 30222769

Abstract

Postural instability is a common problem among older people, and it is associated with mobility impairments, activity limitation and fear of falling. The evaluation of postural control can contribute to the early detection of balance deficits and help health professionals to manage this problem to prevent falls in older adults. The aim of this study was to identify center of pressure cut-offs to differentiate between older adults with and without falls in the past 12 months. The participants were 170 older adults (mean age 67 years, 50 fallers and 120 non-fallers). Center of pressure area and sway velocity in the anterior-posterior and medio-lateral directions were assessed using a force platform during three 30s one-legged stance trials with eyes open. The mean across trials was used for analysis. The time-limit (how long the participant was able to stay in one-legged stance, up to 30s) was also assessed. Fallers had poorer postural control than non-fallers (effect size ≥ 0.52 , $P < 0.05$). The cut-offs identified were 10.3 cm² for Center of pressure area, 2.9 cm/s for velocity in the anterior-posterior, and 3.4 cm/s for medio-lateral velocity. The force platform parameters obtained an area under the curve of 0.72, with sensitivity of 78% and specificity of 68%. There were no significant differences between non-fallers and fallers for time-limit variable (17 seconds vs. 18 seconds). Force platform parameters during one-legged stance were associated with history of falls in older adults. The cut-offs obtained acceptable area under curve, sensitivity and specificity, with

center of pressure area presenting the best performance to differentiate between fallers and non-fallers.

PDF Y Endnote Y

Patient-reported and performance outcomes significantly improved in elderly patients with vestibular impairment following rehabilitation: a retrospective study

Verdecchia DH, Monzón AM, Urbina Jaimes V, Oliveira FR, Paiva LDS, de Carvalho TD.

J. Aging Res. 2018; 2018: e5093501.

Affiliation: Departamento de Ciencias de la Salud, Kinesiología y Fisiatría, Universidad Nacional de La Matanza, San Justo, Buenos Aires, Argentina.

(Copyright © 2018, Sage Hindawi)

DOI 10.1155/2018/5093501 **PMID** 30225142 **PMCID** PMC6129357

Abstract

OBJECTIVE: To describe the results of a vestibular rehabilitation (VR) program in the timed up and go (TUG), gait speed (GS), and dizziness handicap inventory (DHI) scores for elderly vestibular patients in a developing country.

METHODS: Descriptive study with retrospective data collected from the clinical records of vestibular patients. The following information was recorded: sex, age, type of vestibular disorder, DHI score, and performance in TUG and GS, before and after participation in a VR program taking place from January 1 to August 30, 2017. The VR program consisted of 10 twice weekly sessions in the clinic and daily exercises at the patient's home. We used Student's *t*-test for paired and Wilcoxon's test according to the data distribution. The level of significance was 5%.

RESULTS: Data from 57 patients (49 females; 78 ± 5.8 years old) were used. There were statistically significant differences in TUG (12.52 versus 11.56), GS (0.81 versus 0.90 m/s), DHI total handicap (46 versus 24), physical (14 versus 8), emotional (14 versus 6), and functional (18 versus 12) domains.

CONCLUSION: The functional outcome measures reported, including TUG, gait speed, and DHI, reflect statistically significant improvements in elderly patients after vestibular rehabilitation; the DHI improvements are clinically relevant.

PDF Y Endnote Y

Physical Activity Scale for the elderly: translation, cultural adaptation, and validation of the Italian version

Covotta A, Gagliardi M, Berardi A, Maggi G, Pierelli F, Mollica R, Sansoni J, Galeoto G.

Curr. Gerontol. Geriatr. Res. 2018; 2018: e8294568.

Affiliation: Department of Public Health, Sapienza University of Rome, Italy.

(Copyright © 2018, Hindawi Publishing)

DOI 10.1155/2018/8294568 **PMID** 30224917 **PMCID** PMC6129314

Abstract

OBJECTIVE: The aim of the study was to translate and culturally adapt the Physical Activity Scale for the Elderly into Italian (PASE-I) and to evaluate its psychometric properties in the Italian older adults healthy population.

METHODS: For translation and cultural adaptation, the "Translation and Cultural Adaptation of Patient-Reported Outcomes Measures" guidelines have been followed. Participants included healthy



individuals between 55 and 75 years old. The reliability and validity were assessed following the "Consensus-Based Standards for the Selection of Health Status Measurement Instruments" checklist. To evaluate internal consistency and test-retest reliability, Cronbach's α and Intraclass Correlation Coefficient (ICC) were, respectively, calculated. The Berg Balance Score (BBS) and the PASE-I were administered together, and Pearson's correlation coefficient was calculated for validity.

RESULTS: All the PASE-I items were identical or similar to the original version. The scale was administered twice within a week to 94 Italian healthy older people. The mean PASE-I score in this study was 159 ± 77.88 . Cronbach's α was 0.815 ($p < 0.01$) and ICC was 0.977 ($p < 0.01$). The correlation with the BBS was 0.817 ($p < 0.01$).

CONCLUSIONS: The PASE-I showed positive results for reliability and validity. This scale will be of great use to clinicians and researchers in evaluating and managing physical activities in the Italian older adults population.

PDF Y Endnote Y

Promoting safe walking among older people: the effects of a physical and cognitive training intervention vs. physical training alone on mobility and falls among older community-dwelling men and women (the PASSWORD study): design and methods of a randomized controlled trial

Sipilä S, Tirkkonen A, Hänninen T, Laukkanen P, Alén M, Fielding RA, Kivipelto M, Kokko K, Kulmala J, Rantanen T, Sihvonen SE, Sillanpää E, Stigsdotter-Neely A, Tormakangas T.

BMC Geriatr. 2018; 18(1): e215.

Affiliation: Gerontology Research Center and Faculty of Sport and Health Sciences, University of Jyväskylä, Jyväskylä, Finland.

(Copyright © 2018, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1186/s12877-018-0906-0 **PMID** 30219032

Abstract

BACKGROUND: Safe and stable walking is a complex process involving the interaction of neuromuscular, sensory and cognitive functions. As physical and cognitive functions deteriorate with ageing, training of both functions may have more beneficial effects on walking and falls prevention than either alone. This article describes the study design, recruitment strategies and interventions of the PASSWORD study investigating whether a combination of physical and cognitive training (PTCT) has greater effects on walking speed, dual-task cost in walking speed, fall incidence and executive functions compared to physical training (PT) alone among 70-85-year-old community-dwelling sedentary or at most moderately physically active men and women.

METHODS: Community-dwelling sedentary or at most moderately physically active, men and women living in the city of Jyväskylä will be recruited and randomized into physical training (PT) and physical and cognitive training (PTCT). The 12-month interventions include supervised training sessions and home exercises. Both groups attend physical training intervention, which follows the current physical activity guidelines. The PTCT group performs also a web-based computer program targeting executive functions. Outcomes will be assessed at baseline and at 6 and 12 months thereafter. Falls data are collected during the interventions and the subsequent one-year follow-up. The primary outcome is 10-m walking speed. Secondary outcomes include 6-min walking distance, dual-task cost in walking speed, fall incidence and executive function assessed with color Stroop and Trail Making A and B tests. Explanatory outcomes include e.g. body composition and bone

characteristics, physical performance, physical activity, life-space mobility, fall-related self-efficacy, emotional well-being and personality characteristics.

DISCUSSION: The study is designed to capture the additive and possible synergistic effects of physical and cognitive training. When completed, the study will provide new knowledge on the effects of physical and cognitive training on the prevention of walking limitations and rate of falls in older people. The expected results will be of value in informing strategies designed to promote safe walking among older people and may have a significant health and socio-economic impact. **TRIAL REGISTRATION:** ISRCTN52388040.

PDF Y Endnote Y

Promoting well-being and independence in older adults

Olivari BS, Baumgart M, Lock SL, Whiting CG, Taylor CA, Iskander J, Thorpe P, McGuire LC.

MMWR Morb. Mortal. Wkly. Rep. 2018; 67(37): 1036-1039.

Copyright © 2018, (in public domain), Publisher U.S. Centers for Disease Control and Prevention)

DOI 10.15585/mmwr.mm6737a4 **PMID** 30235185

Abstract

Healthy aging is not merely the absence of disease or disability, but requires physical and mental health and ongoing social engagement (1). As the average U.S. life expectancy increases, recognition that public health can play a vital role in promoting healthy, successful aging even in the face of increased prevalence of chronic diseases, including types of dementia, among older adults (i.e., aged ≥65 years) has grown. Furthermore, actively engaging adults in prevention and wellness along with involving their caregivers (i.e., the family and friends of older adults who provide them with unpaid and informal support and services) can serve to prevent or delay the onset of physical disabilities and cognitive decline. Adults often are reluctant to discuss their concerns about worsening memory with their health care providers although such discussions can lead to earlier diagnosis and better care, planning, and support. As advances in public health and health care have helped increase life expectancy, public health professionals and health care providers have the opportunity to improve the quality of life for older adults and their caregivers and reduce the burdens associated with aging.

PDF Y Endnote Y

The associations between physical activity, including physical activity intensity, and fear of falling differs by fear severity in older adults living in the community

Sawa R, Asai T, Doi T, Misu S, Murata S, Ono R.

J. Gerontol. B Psychol. Sci. Soc. Sci. 2018; ePub(ePub): ePub.

Affiliation: Department of Community Health Sciences, Kobe University Graduate School of Health Sciences, Kobe-city, Hyogo, Japan.

(Copyright © 2018, Gerontological Society of America, Publisher Oxford University Press)

DOI 10.1093/geronb/gby103 **PMID** 30219902

Abstract

OBJECTIVES: Fear of falling (FoF) is common in older adults. Physical activity decreases as FoF increases. However, this association between physical activity and FoF may vary depending on activity intensity. The current study was performed to explore the associations between FoF and step count, light-intensity physical activity (LPA), and moderate/vigorous-intensity physical activity



(MVPA), in community-dwelling older adults.

METHODS: This cross-sectional observational study was held at a local community association center, with 242 older adults living independently in the community (mean age: 75.1 ± 5.4 years). FoF was defined using the Falls Efficacy Scale-International and categorized into three levels (low, moderate, and high). Physical activity was measured using a uniaxial accelerometer worn for 7 consecutive days, and by calculating daily step count, LPA, and MVPA, over this period.

RESULTS: Step count and physical activity intensity showed significant linear trends across FoF severity ($p < 0.01$, respectively). High FoF decreased step count by approximately 2000 steps/day. Further, high FoF was significantly associated with short durations of both LPA and MVPA. Additionally, moderate FoF was associated with decreased LPA duration, even after adjustment for confounding variables.

DISCUSSIONS: Physical activity decreased concomitantly with a rise in FoF severity. Moreover, the association between physical activity and FoF differed by physical activity intensity level in community-dwelling older adults. Further studies are needed to investigate the causal relationship between FoF and objective physical activity in this population.

PDF Y Endnote Y

The effects of leisure-time physical activity for optimism, life satisfaction, psychological well-being, and positive affect among older adults with loneliness

Kim J, Lee S, Chun S, Han A, Heo J.

Ann. Leis. Res. 2017; 20(4): 406-415.

(Copyright © 2017, Australian and New Zealand Association for Leisure Studies, Publisher Informa - Taylor and Francis Group)

DOI 10.1080/11745398.2016.1238308 **PMID** unavailable

Abstract

The purpose of this study was to examine the effects of leisure-time physical activity (LTPA) involvement among older adults suffering from loneliness. Using data released from the Health and Retirement Study in 2008, this study investigated how participation in LTPA leads to well-being such as optimism, life satisfaction, psychological well-being, and positive affect among older adults with loneliness.

RESULTS indicated that the LTPA involvement was a significant predictor of optimism, life satisfaction, positive affect, and psychological well-being for older adults with a high level of loneliness. The interesting findings of this study were that LTPA enhanced positive emotions for older adults with loneliness and that positive emotions are one of the important factors in protecting individuals from illnesses.

PDF Y Endnote Y

The use of the Gait Variability Index for the evaluation of individuals after a stroke

Guzik A, Drużbicki M, Przystała G, Szczepanik M, Bazarnik-Mucha K, Kwolek A.

Acta Bioeng. Biomech. 2018; 20(2): 171-177.

Affiliation: Institute of Physiotherapy, University of Rzeszów, Rzeszów, Poland.

(Copyright © 2018, Oficyna Wydawnicza Politechniki Wrocławskiej)

DOI unavailable **PMID** 30220716



Abstract

PURPOSE: The Gait Variability Index (GVI) summarizes overall gait quality, taking into account spatiotemporal parameters from a 3-dimensional gait analysis. However, there are no studies evaluating changes in gait patterns after stroke, based on the GVI. The study was designed to assess usefulness of the GVI for evaluation of gait pathology in subjects with stroke, compared to healthy individuals.

METHODS: Spatiotemporal gait parameters were examined in a group of 50 subjects at a chronic stage post-stroke and in 50 healthy controls. The GVI was calculated based on the 9 spatiotemporal data.

RESULTS: The findings show statistically significant differences between the values of the GVI for paretic and non-paretic limbs ($p < 0.001$). Higher values of the index were identified in the case of non-paretic limb: 80.74 vs. 76.32. The GVI scores were decreased for both paretic and non-paretic limbs, compared to the controls - $p < 0.001$.

CONCLUSIONS: The GDI score seems to be a viable tool for quantifying changes in gait pattern during evaluation of subjects with chronic post-stroke hemiparesis. Further studies should be conducted to validate the use of GVI in the post-stroke population.

PDF Y Endnote Y

Transitional status and modifiable risk of frailty in Japanese older adults: a prospective cohort study

Doi T, Makizako H, Tsutsumimoto K, Nakakubo S, Kim MJ, Kurita S, Hotta R, Shimada H. *Geriatr. Gerontol. Int.* 2018; ePub(ePub): ePub.

Affiliation: Department of Preventive Gerontology, Center for Gerontology and Social Science, National Center for Geriatrics and Gerontology, Obu, Japan.

(Copyright © 2018, Japan Geriatrics Society, Publisher John Wiley and Sons)

DOI 10.1111/ggi.13525 **PMID** 30225955

Abstract

AIM: The purpose of the present study was to identify risk factors for physical frailty and to understand the transitional status of frailty.

METHODS: The participants were 4676 older adults in the National Center for Geriatrics and Gerontology - Study of Geriatric Syndromes. Physical frailty status was classified as robust, pre-frail and frail at baseline and 4-year follow up (mean follow up 47.9 ± 1.8 months). Data for demographic variables, medical conditions, fall, depressive symptoms and cognitive function were also collected. Multiple imputation was used to reduce selection bias and loss of information.

RESULTS: Progression occurred from a robust to frail status in 52 participants (2.6%) and from pre-frailty to frailty in 281 participants (12.0%). Mortality increased with frailty status at baseline: robust 46 (2.3%), pre-frail 112 (4.8%) and frail 54 (15.6%). In logistic regression analysis, age (OR 1.10, 95% CI 1.06-1.13), sex (men; OR 0.67, 95% CI 0.46-0.95), body mass index (OR 1.06, 95% CI 1.01-1.12), fall (OR 1.92, 95% CI 1.31-2.81), Geriatric Depression Scale (OR 1.15, 95% CI 1.08-1.22), Mini-Mental State Examination (OR 0.87, 95% CI 0.82-0.93) and education (OR 0.91, 95% CI 0.85-0.98), were related with new incident frailty. Among participants in the pre-frail class at baseline, exhaustion (OR 3.24, 95% CI 1.97-5.34), physical inactivity (OR 3.09, 95% CI 1.94-4.93), lower muscle strength (OR 3.77, 95% CI 2.35-6.03) and lower mobility (OR 2.54, 95% CI 1.57-4.10) were related to progression

to frailty (all $P < 0.05$).

CONCLUSIONS: The results of the present prospective study provide key information on the transitional status of frailty and the risk factors for progression to frailty. A further study is required to determine the pathophysiological changes that underlie the transition to frailty© 2018 Japan Geriatrics Society.

PDF Y Endnote Y

Characteristics of outpatient falls that occurred in hospital

Kobayashi K, Ando K, Suzuki Y, Inagaki Y, Nagao Y, Ishiguro N, Imagama S.

Nagoya J. Med. Sci. 2018; 80(3): 417-422.

Affiliation: Department of Orthopaedic Surgery, Nagoya University Graduate School of Medicine, Nagoya, Japan.

(Copyright © 2018, Nagoya University School of Medicine)

DOI unavailable **PMID** 30214091 **PMCID** PMC6125662

Abstract

A fall may cause trauma and bone fracture, which can affect ADL and QOL. Therefore, countermeasures to prevent falls are important. There are many reports on falls in hospitalized patients, but few for outpatients. Therefore, the purpose of this study is to report the characteristics of outpatient falls that occurred in hospital over five years to identify factors associated with fall in these patients. From April 2012 to March 2017, we investigated fall cases in outpatients using a hospital database. Fall that led to fracture or a life-threatening injury was defined as an adverse event. A total of 3,758 patients had falls in the hospital, and this included 146 outpatients, giving an incidence of 3.9% (146/3,758). Most falls involved outpatients in their 70s, and most occurred in operating rooms (15%), followed by examination rooms (13%), escalators (10%), and waiting rooms (7%). Falls in neurology patients accounted for 12%, followed by neurosurgery (10%), and ophthalmology (8%). Among all falls, 5% occurred in patients wearing slippers, and 54% and 46% occurred in patients without and with a need for assistance with mobility, respectively. There were 6 adverse events (4%) due to fall in outpatients: 4 femoral neck fractures, 1 teeth injury, and 1 pubic bone fracture. In conclusion, a fall accident occurs most commonly in outpatients suffering from a neurological disease and in ophthalmologic outpatients aged about 70 years old, and is likely to occur in the operating room, examination room, escalator and waiting room. Our findings suggest that countermeasures for each location are necessary.

PDF Endnote

Evaluating the effectiveness of the translated "A matter of balance" fall prevention program materials for non-English-speaking participants

Wolfe ES, Arabian SS, Breeze JL, Bugaev N.

J. Trauma Nurs. 2018; 25(5): 311-317.

Affiliation: Division of Trauma and Acute Care Surgery, Tufts University School of Medicine, Tufts Medical Center, Boston, Massachusetts (Drs Wolfe and Bugaev and Arabian); and Tufts Clinical and Translational Science Institute, Tufts University, and Institute for Clinical Research and Health Policy Studies, Boston, Massachusetts (Ms Breeze).

(Copyright © 2018, Society of Trauma Nurses)



DOI 10.1097/JTN.0000000000000394 PMID 30216262

Abstract

A Matter of Balance (MOB) is an evidence-based fall prevention program shown to reduce fear of falling (FOF) in English-speaking participants. The effectiveness of translated (Chinese and Spanish) MOB materials in reducing FOF is unknown. The objective of this study was to evaluate whether MOB was associated with reduced FOF in Chinese- and Spanish-speaking participants and included an English-speaking comparison group. Participants were recruited from MOB classes in Massachusetts and Illinois. Investigators used the Falls Efficacy Scale-International (FES-I) and a demographic questionnaire to survey the participants at the first class (baseline), the last class, and 6 months after the MOB course. Of the 90 participants who enrolled, 77 (85.6%) completed the course (Chinese: n = 37; Spanish: n = 19; and English: n = 21) and 54 (60%) completed the 6-month survey (Chinese: n = 33; English: n = 21). Chinese FES-I scores significantly increased (FOF worsened) at the end of the course (+7.1, p = .009), and 6-month survey scores were also significantly above the baseline score (+6.7, p = .0088). FES-I scores decreased (FOF declined) in both the Spanish (-6.6, p = .016) and English groups (-2.7, p = .14) at the last class, and English 6-month FES-I scores were slightly lower than baseline scores (-0.4, p = .8). Participation in the MOB program did not reduce FOF in the Chinese population, but MOB did show promise in reducing FOF in both the Spanish and English groups. Future studies are warranted to explore the cultural, social, and education-related factors that may influence effectiveness of the MOB program.

PDF Endnote

Inpatient fall prevention from the patient's perspective: a qualitative study

Radecki B, Reynolds S, Kara A.

Appl. Nurs. Res. 2018; 43: 114-119.

Affiliation: Indiana University Health Methodist Hospital, 1701 North Senate Blvd, Indianapolis, IN 46202, USA. Electronic address: akara@iuhealth.org.

(Copyright © 2018, Elsevier Publishing)

DOI 10.1016/j.apnr.2018.08.001 PMID 30220357

Abstract

AIM: The aim of this study was to describe the patient's perspective of fall prevention in an acute care setting to aid in the design of patient centered strategies.

BACKGROUND: Falls are one of the most common adverse events in hospitals and can lead to preventable patient harm, increased length of stay, and increased healthcare costs. There is a need to understand fall risk and prevention from the patients' perspectives; however, research in this area is limited.

METHODS: To understand the patient perspective, semi-structured interviews were conducted with twelve patients at an academic healthcare center.

RESULTS: Qualitative analysis revealed three major themes: (1) how I see myself, (2) how I see the interventions; and (3) how I see us. The theme "How I see myself" describes patients' beliefs of their own fall risk and includes the sub-themes of awareness, acceptance/rejection, implications, emotions, and personal plan. Interventions, such as fall alarms, are illustrated in the theme "How I see the interventions" and includes the subthemes what I see and hear and usefulness of equipment. Finally, "How I see us" describes barriers to participating in the fall prevention plan.



CONCLUSIONS: Most fall prevention programs favor clinician-led plan development and implementation. Patient fall assessments needs to shift from being clinician-centric to patient-centric. Nurses must develop relationships with patients to facilitate understanding of their needs. Developing these truly patient-centered programs may reduce the over-reliance on bed alarms and allow for implementation of strategies aimed to mitigate modifiable risk factors leading to falls. Copyright © 2018 Elsevier Inc. All rights reserved.

PDF Y Endnote Y

QuickStats: percentage of residential care community residents with a fall, by census region - United States, 2016

MMWR Morb. Mortal. Wkly. Rep. 2018; 67(37): 1042.

(Copyright © 2018, (in public domain), Publisher U.S. Centers for Disease Control and Prevention)

DOI 10.15585/mmwr.mm6737a6 PMID 30235183

Abstract [Abstract unavailable]

PDF Y Endnote Y

The effect of virtual reality-based balance training on motor learning and postural control in healthy adults: a randomized preliminary study

Prasertsakul T, Kaimuk P, Chinjenpradit W, Limroongreungrat W, Charoensuk W.

Biomed. Eng. Online 2018; 17(1): e124.

Affiliation: Department of Electrical Engineering, Faculty of Engineering, Mahidol University, Phuttamonthon 4 Road., Nakhon Pathom, 73170, Thailand. warakorn.cha@mahidol.ac.th.

(Copyright © 2018, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1186/s12938-018-0550-0 PMID 30227884

Abstract

BACKGROUND: Adults with sedentary lifestyles seem to face a higher risk of falling in their later years. Several causes, such as impairment of strength, coordination, and cognitive function, influence worsening health conditions, including balancing ability. Many modalities can be applied to improve the balance function and prevent falling. Several studies have also recorded the effects of balance training in elderly adults for fall prevention. Accordingly, the aim of this study is to define the effect of virtual reality-based balance training on motor learning and postural control abilities in healthy adults.

METHODS: For this study, ten subjects were randomly allocated into either the conventional exercise (CON) or the virtual reality (VR) group. The CON group underwent physical balance training, while the VR group used the virtual reality system 4 weeks. In the VR group, the scores from three game modes were utilized to describe the effect of motor learning and define the learning curves that were derived with the power law function. Wilcoxon Signed Ranks Test was performed to analyze the postural control in five standing tasks, and data were collected with the help of a force plate.

RESULTS: The average score was used to describe the effect of motor learning by deriving the mathematical models for determining the learning curve. Additionally, the models were classified into two exponential functions that relied on the aim and requirement skills. A negative exponential function was observed in the game mode, which requires the cognitive-motor function. In contrast,



a positive exponential function was found in the game with use of only the motor skill. Moreover, this curve and its model were also used to describe the effect of learning in the long term and the ratio of difficulty in each game. In the balance performance, there was a significant decrease in the center of pressure parameters in the VR group, while in the CON group, there was a significant increase in the parameters during some foot placements, especially in the medio-lateral direction. CONCLUSION: The proposed VR-based training relies on the effect of motor learning in long-term training through different kinds of task training. In postural analysis, both exercise programs are emphasized to improve the balance ability in healthy adults. However, the virtual reality system can promote better outcomes to improve postural control post exercising. Trial registration Retrospectively registered on 25 April 2018. Trial number TCTR20180430005.

PDF Y Endnote Y

The effectiveness of backward walking as a treatment for people with gait impairments: a systematic review and meta-analysis

Balasukumaran T, Olivier B, Ntsiea MV.

Clin. Rehabil. 2018; ePub(ePub): ePub.

Affiliation: Department of Physiotherapy, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa.

(Copyright © 2018, Sage Publications)

DOI 10.1177/0269215518801430 **PMID** 30229667

Abstract

OBJECTIVE: To investigate the effectiveness of backward walking in the treatment of people with gait impairments related to neurological and musculoskeletal disorders.

DESIGN: Systematic review and meta-analysis of randomized and quasi-randomized control studies.

DATA SOURCES: Searched from the date of inception to March 2018, and included PubMed, Scopus, Cochrane Library, PEDro, CINAHL, and the MEDLINE databases.

METHODS: Investigating the effects of backward walking on pain, functional disability, muscle strength, gait parameters, balance, stability, and plantar pressure in people with gait impairments. The PEDro scale was used to assess the quality. Similar outcomes were pooled by calculating the standardized mean difference.

RESULTS: Of the 21 studies (neurological 11 and musculoskeletal 10), 635 participants were included. The average PEDro score was 5.4/10. The meta-analysis demonstrated significant standardized mean difference values in favour of backward walking, with conventional physiotherapy treatment for two to four weeks to reduce pain (-0.87) and functional disability (-1.19) and to improve quadriceps strength (1.22) in patients suffering from knee osteoarthritis. The balance and stability in cases of juvenile rheumatoid arthritis, and gait parameters and muscle strength in anterior cruciate ligament injury improved significantly when backward walking was included as an exercise. There was no significant evidence in favour of backward walking in any of the other conditions.

CONCLUSION: The systematic review and meta-analysis suggests that backward walking with conventional physiotherapy treatment is effective and clinically worthwhile in patients with knee osteoarthritis. Insufficient evidence was available for the remaining gait impairment conditions and no conclusions could be drawn.



PDF Y Endnote Y**Use of functional movement screen scores to predict dynamic balance in physically active men and women**

Scudamore EM, Stevens SL, Fuller DK, Coons JM, Morgan DW.

J. Strength Cond. Res. 2018; ePub(ePub): ePub.

Affiliation: Department of Health and Human Performance, Middle Tennessee State University, Murfreesboro, Tennessee.

(Copyright © 2018, National Strength and Conditioning Association)

DOI 10.1519/JSC.0000000000002829 **PMID** 30216249

Abstract

The primary focus of this study was to determine whether scores obtained from the Functional Movement Screen (FMS) can predict dynamic balance in young, healthy adults. Thirty-four physically active participants completed the FMS, and balance was assessed using measures of composite reach (CR) distance and overall stability indices (OSI) derived from Y Balance and Biodex Balance System testing, respectively.

RESULTS indicated that higher overall FMS scores were associated with better CR and OSI, and participants with FMS composite scores greater than 14 exhibited better CR compared to those with composite scores less than or equal to 14. In addition, lasso penalized regression demonstrated that (a) scores of 2 on the deep squat and 3 on the trunk stability push-up movements predicted a greater CR and (b) higher shoulder mobility scores and a rotary stability score of 3 predicted better OSI. We conclude that dynamic balance in young, active men and women can be predicted by specific FMS item scores.

PDF Y Endnote Y