SafetyLit May 7th 2017

Age-related differences in reorganization of functional connectivity for a dual task with increasing postural destabilization

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Front. Aging Neurosci. 2017; 9: e96.

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(Copyright © 2017, Frontiers Research Foundation)

DOI 10.3389/fnagi.2017.00096 **PMID** 28446874 **PMCID** PMC5388754

Abstract

The aged brain may not make good use of central resources, so dual task performance may be degraded. From the brain connectome perspective, this study investigated dual task deficits of older adults that lead to task failure of a suprapostural motor task with increasing postural destabilization. Twelve younger (mean age: 25.3 years) and 12 older (mean age: 65.8 years) adults executed a designated force-matching task from a level-surface or a stabilometer board. Force-matching error, stance sway, and event-related potential (ERP) in the preparatory period were measured. The force-matching accuracy and the size of postural sway of the older adults tended to be more vulnerable to stance configuration than that of the young adults, although both groups consistently showed greater attentional investment on the postural task as sway regularity increased in the stabilometer condition. In terms of the synchronization likelihood (SL) of the ERP, both younger and older adults had net increases in the strengths of the functional connectivity in the whole brain and in the fronto-sensorimotor network in the stabilometer condition. Also, the SL in the fronto-sensorimotor network of the older adults was greater than that of the young adults for both stance conditions. However, unlike the young adults, the older adults did not exhibit concurrent deactivation of the functional connectivity of the left temporal-parietal-occipital network for postural-suprapostural task with increasing postural load. In addition, the older adults potentiated functional connectivity of the right prefrontal area to cope with concurrent force-matching with increasing postural load. In conclusion, despite a universal negative effect on brain volume conduction, our preliminary results showed that the older adults were still capable of increasing allocation of neural sources, particularly via compensatory recruitment of the right prefrontal loop, for concurrent force-matching under the challenging postural condition. Nevertheless, dual-task performance of the older adults tended to be more vulnerable to postural load than that of the younger adults, in relation to inferior neural economy or a slow adaptation process to stance destabilization for scant dissociation of control hubs in the temporal-parietal-occipital cortex.

PDF Y Endnote Y

Assisting frail seniors with toileting in a home bathroom: approaches used by home care providers

King EC, Boscart VM, Weiss BM, Dutta T, Callaghan JP, Fernie GR.

J. Appl. Gerontol. 2017; ePub(ePub): ePub.

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DOI 10.1177/0733464817702477 **PMID** 28460561

Abstract
Home care providers experience high occupational injury rates. Improving safety is becoming increasingly urgent as this sector expands to support the aging population. Caregivers identify assisting with toileting as a particularly frequent and difficult activity. This mixed-methods observational study identified and analyzed the toileting subactivities that place care providers at the greatest risk of musculoskeletal injury. Eight personal support workers (home care aides) assisted a frail older adult (actor) in a simulated home bathroom. Overall technique and body postures were analyzed. Exposure to musculoskeletal injury risk factors (low back loads and time in extreme trunk postures) was greatest when removing/replacing clothing and providing posterior perineal care; high loads were also possible during transfers. Exposures can be reduced by lowering the pants only to knee level or squatting to raise them. A bidet seat or attachment can perform perineal cleaning, which accounted for 32% of time in severe trunk flexion.
PDF Y Endnote Y

Balance training in individuals with Parkinson's disease: therapist-supervised vs. home-based exercise programme
Atterbury EM, Welman KE.
Gait Posture 2017; 55: 138-144.
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(Copyright © 2017, Elsevier Publishing)
DOI 10.1016/j.gaitpost.2017.04.006 **PMID** 28445854
Abstract
BACKGROUND: Poor locomotion and balance in Parkinson's disease (PD) often diminishes independence. Accordingly, gait is considered one of the most relevant rehabilitation outcomes, and home-based balance exercises might be a viable mode of exercise delivery for individuals with PD. However, research on PD interventions rarely indicate best practices to deliver exercises. Therefore, this study endeavoured to compare the efficacy of a home-based and therapist-supervised balance programme on gait parameters, dynamic balance, balance confidence and motivation in individuals diagnosed with PD.
METHODS: An experimental study design, including a cluster randomized convenience sample, of 40 participants with idiopathic PD (Hoehn and Yahr stage I-III; age: 65.0±7.7years). Participants were divided into a therapist-supervised (n=24) and home-based group (n=16). Groups received either eight weeks of balance training with an exercise therapist or a DVD. Outcome measures include the instrumented Timed-Up-and-Go, Functional Gait Analysis (FGA), Activity-specific Balance confidence (ABC) scale and Intrinsic Motivation Inventory (IMI).
RESULTS: Both groups improved in stride length ($p<0.05$). Similar FGA improved by 9% and 16% in the therapist-supervised and home-based group, respectively ($p<0.01$). Only the therapist-supervised group showed improvements in ABC ($p=0.051$), stride velocity ($p=0.0006$) and cadence ($p=0.046$) over the intervention; the latter two were also better compared to home-based ($p<0.05$). Furthermore the therapist-supervised group were more motivated ($p=002$).
CONCLUSION: The home-based balance programme was effective in improving some aspects of gait, albeit the programme supervised by an exercise therapist included somewhat more benefits after

the intervention i.e. stride velocity and cadence in individuals with mild to moderate PD.
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Better than counting seconds: identifying fallers among healthy elderly using fusion of accelerometer features and dual-task timed up and go
Ponti M, Bet P, Oliveira CL, Castro PC.
PLoS One 2017; 12(4): e0175559.
Affiliation: DGero, Universidade Federal de São Carlos, São Carlos, SP, Brazil.
(Copyright © 2017, Public Library of Science)
DOI 10.1371/journal.pone.0175559 **PMID** 28448509
Abstract
Devices and sensors for identification of fallers can be used to implement actions to prevent falls and to allow the elderly to live an independent life while reducing the long-term care costs. In this study we aimed to investigate the accuracy of Timed Up and Go test, for fallers' identification, using fusion of features extracted from accelerometer data. Single and dual tasks TUG (manual and cognitive) were performed by a final sample (94% power) of 36 community dwelling healthy older persons (18 fallers paired with 18 non-fallers) while they wear a single triaxial accelerometer at waist with sampling rate of 200Hz. The segmentation of the TUG different trials and its comparative analysis allows to better discriminate fallers from non-fallers, while conventional functional tests fail to do so. In addition, we show that the fusion of features improve the discrimination power, achieving AUC of 0.84 (Sensitivity = Specificity = 0.83, 95% CI 0.62-0.91), and demonstrating the clinical relevance of the study. We concluded that features extracted from segmented TUG trials acquired with dual tasks has potential to improve performance when identifying fallers via accelerometer sensors, which can improve TUG accuracy for clinical and epidemiological applications.
PDF Y Endnote Y

Chronic health conditions as a risk factor for falls among the community-dwelling US older adults: a zero-inflated regression modeling approach
Paliwal Y, Slattum PW, Ratliff SM.
Biomed. Res. Int. 2017; 2017: e5146378.
Affiliation: Division of Epidemiology, Virginia Commonwealth University, Richmond, VA 23219, USA.
(Copyright © 2017, Hindawi Publishing)
DOI 10.1155/2017/5146378 **PMID** 28459060 **PMCID** PMC5387801
Abstract
Falls are an important health concern among older adults due to age-related changes in the body. Having a medical history of chronic health condition may pose even higher risk of falling. Only few studies have assessed a number of chronic health conditions as risk factor for falls over a large nationally representative sample of US older adults. In this study, Behavioral Risk Factor Surveillance System (BRFSS) 2014 participants aged 65 years and older (n = 159,336) were evaluated. It was found that 29.7% (n = 44,550) of the sample experienced at least one fall and 16.3% (n = 20,444) experienced more than one fall in the past 12 months. According to the study findings, having a medical history of stroke, CKD, arthritis, depression, and diabetes independently predict the risk of first-time falling as well as the risk of recurrent falling in older adult population while controlling for other factors. On the other hand, having a medical history of the heart attack, angina, asthma, and

COPD did not predict the risk of first-time falling, but did predict the risk of recurrent falling after experiencing the first fall in this population.
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Circumstances of fall-related injuries by age and gender among community-dwelling adults in the United States
Timsina LR, Willetts JL, Brennan MJ, Marucci-Wellman H, Lombardi DA, Courtney TK, Verma SK.
PLoS One 2017; 12(5): e0176561.
Affiliation: Department of Family Medicine and Community Health, University of Massachusetts Medical School, Worcester, Massachusetts, United States of America.
(Copyright © 2017, Public Library of Science)
DOI 10.1371/journal.pone.0176561 **PMID** 28472065
Abstract
INTRODUCTION: Falls are the leading cause of injury in almost all age-strata in the U.S. However, fall-related injuries (FI) and their circumstances are under-studied at the population level, particularly among young and middle-aged adults. This study examined the circumstances of FI among community-dwelling U.S. adults, by age and gender.
METHODS: Narrative texts of FI from the National Health Interview Survey (1997-2010) were coded using a customized taxonomy to assess place, activity, initiating event, hazards, contributing factors, fall height, and work-relatedness of FI. Weighted proportions and incidence rates of FI were calculated across six age-gender groups (18-44, 45-64, 65+ years; women, men).
RESULTS: The proportion of FI occurring indoors increased with age in both genders (22%, 30%, and 48% among men, and 40%, 49% and 62% among women for 18-44, 45-64, 65+ age-groups, respectively). In each age group the proportion of indoor FI was higher among women as compared to men. Among women, using the stairs was the second leading activity (after walking) at the time of FI (19%, 14% and 10% for women in 18-44, 45-64, 65+ age groups, respectively). FI associated with tripping increased with age among both genders, and women were more likely to trip than men in every age group. Of all age-gender groups, the rate of FI while using ladders was the highest among middle-aged men (3.3 per 1000 person-year, 95% CI 2.0, 4.5). Large objects, stairs and steps, and surface contamination were the three most common hazards noted for 15%, 14% and 13% of fall-related injuries, respectively.
CONCLUSIONS: The rate and the circumstances of FI differ by age and gender. Understanding these differences and obtaining information about circumstances could be vital for developing effective interventions to prevent falls and FI.
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Clinical differences among the elderly admitted to the emergency department for accidental or unexplained falls and syncope
Pasqualetti G, Calsolaro V, Bini G, Dell'Agnello U, Tuccori M, Marino A, Capogrosso-Sansone A, Rafanelli M, Santini M, Orsitto E, Ungar A, Blandizzi C, Monzani F.
Clin. Interv. Aging 2017; 12: 687-695.
Affiliation: Geriatrics Unit.
(Copyright © 2017, Dove Medical Press)
DOI 10.2147/CIA.S127824 **PMID** 28450779 **PMCID** PMC5399985

Abstract
It is difficult to distinguish unexplained falls (UFs) from accidental falls (AFs) or syncope in older people. This study was designed to compare patients referred to the emergency department (ED) for AFs, UFs or syncope. Data from a longitudinal study on adverse drug events diagnosed at the ED (ANCESTRAL-ED) in older people were analyzed in order to select cases of AF, syncope, or UF. A total of 724 patients (median age: 81.0 [65-105] years, 66.3% female) were consecutively admitted to the ED (403 AF, 210 syncope, and 111 UF). The number of psychotropic drugs was the only significant difference in patients with AF versus those with UF (odds ratio [OR] 1.44; 95% confidence interval 1.17-1.77). When comparing AF with syncope, female gender, musculoskeletal diseases, dementia, and systolic blood pressure >110 mmHg emerged as significantly associated with AF (OR 0.40 [0.27-0.58], 0.40 [0.24-0.68], 0.35 [0.14-0.82], and 0.31 [0.20-0.49], respectively), while valvulopathy and the number of antihypertensive drugs were significantly related to syncope (OR 2.51 [1.07-5.90] and 1.24 [1.07-1.44], respectively). Upon comparison of UF and syncope, the number of central nervous system drugs, female gender, musculoskeletal diseases, and SBP >110 mmHg were associated with UF (OR 0.65 [0.50-0.84], 0.52 [0.30-0.89], 0.40 [0.20-0.77], and 0.26 [0.13-0.55]), respectively. These results indicate specific differences, in terms of demographics, medical/pharmacological history, and vital signs, among older patients admitted to the ED for AF and syncope. UF was associated with higher use of psychotropic drugs than AF. Our findings could be helpful in supporting a proper diagnostic process when evaluating older patients after a fall.
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Cognitive dysfunction is associated with greater imbalance and falls in essential tremor
Louis ED, Kellner S, Morgan S, Collins K, Rohl B, Huey ED, Cosentino S.
Front. Neurol. 2017; 8: e154.
Affiliation: Taub Institute for Research on Alzheimer's Disease and the Aging Brain, College of Physicians and Surgeons, Columbia University, New York, NY, USA.
(Copyright © 2017, Frontiers Research Foundation)
DOI 10.3389/fneur.2017.00154 **PMID** 28469597 **PMCID** PMC5395979
Abstract
BACKGROUND: Essential tremor (ET) is not exclusively a tremor disorder; it is also associated with cognitive and gait dysfunction. However, a gap in knowledge is that the relationship between cognitive and gait dysfunction has not been studied in detail in ET. We examined the relationship between cognition and balance and falls in ET and hypothesized that cognitive dysfunction in ET patients would be associated with greater problems with balance and more falls.
METHODS: ET cases were recruited into the Clinical-pathological Study of Cognition in ET. A comprehensive cognitive assessment was performed. This included the Montreal Cognitive Assessment (MoCA) to measure global cognition, multiple motor-free tests comprehensively assessing performance in each cognitive domain, and an assignment of Clinical Dementia Rating (CDR) scores. We collected data on the number of reported falls in the past year, and balance confidence was assessed using the 6-item Activities of Balance Confidence Scale. These cross-sectional analyses utilized baseline data.
RESULTS: There were 199 ET cases (mean age 78.6 years). In linear regression models that considered the effects of numerous confounding variables, lower global cognition (poorer cognition) was associated with greater number of falls and reduced balance confidence ($p < 0.05$). In similar adjusted linear regression models, higher CDR score (poorer functional cognition) was associated

with greater number of falls and reduced balance confidence ($p < 0.05$). We also assessed whether number of falls and balance confidence was associated with performance in specific cognitive domains. Number of falls was most closely linked with performance on tests of executive function, and balance confidence, with executive function, attention, and memory.
CONCLUSION: These data indicate that a correlate of poorer cognition in ET is greater number of falls and lower balance confidence. Cognition should enter the dialog with ET patients as an issue of clinical significance.
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Cognitive resources necessary for motor control in older adults are reduced by walking and coordination training
Godde B, Voelcker-Rehage C.
Front. Hum. Neurosci. 2017; 11: e156.
Affiliation: Institute of Human Movement Science and Health, Technische Universität ChemnitzChemnitz, Germany.
(Copyright © 2017, Frontiers Research Foundation)
DOI 10.3389/fnhum.2017.00156 **PMID** 28443006 **PMCID** PMC5387041
Abstract
We examined if physical exercise interventions were effective to reduce cognitive brain resources recruited while performing motor control tasks in older adults. Forty-three older adults (63-79 years of age) participated in either a walking (n = 17) or a motor coordination (n = 15) intervention (1 year, 3 times per week) or were assigned to a control group (n = 11) doing relaxation and stretching exercises. Pre and post the intervention period, we applied functional MRI to assess brain activation during imagery of forward and backward walking and during counting backwards from 100 as control task. In both experimental groups, activation in the right dorsolateral prefrontal cortex (DLPFC) during imagery of forward walking decreased from pre- to post-test (Effect size: -1.55 and -1.16 for coordination and walking training, respectively; Cohen's d). Regression analysis revealed a significant positive association between initial motor status and activation change in the right DLPFC ($R(2) = 0.243$, $F(3,39) = 4.18$, $p = 0.012$). Participants with lowest motor status at pretest profited most from the interventions. Data suggest that physical training in older adults is effective to free up cognitive resources otherwise needed for the control of locomotion. Training benefits may become particularly apparent in so-called dual-task situations where subjects must perform motor and cognitive tasks concurrently.
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Effect of monthly high-dose vitamin D supplementation on falls and non-vertebral fractures: secondary and post-hoc outcomes from the randomised, double-blind, placebo-controlled ViDA trial
Khaw KT, Stewart AW, Waayer D, Lawes CMM, Toop L, Camargo CA, Scragg R.
Lancet Diabetes Endocrinol. 2017; ePub(ePub): ePub.
Affiliation: School of Population Health, University of Auckland, Auckland, New Zealand.
(Copyright © 2017, Elsevier Publishers)
DOI 10.1016/S2213-8587(17)30103-1 **PMID** 28461159
Abstract

BACKGROUND: Adults with low concentrations of 25-hydroxyvitamin D (25[OH]D) in blood have an increased risk of falls and fractures, but randomised trials of vitamin D supplementation have had inconsistent results. We aimed to assess the effect of high-dose vitamin D supplementation on fractures and falls.
METHODS: The Vitamin D Assessment (ViDA) Study was a randomised, double-blind, placebo-controlled trial of healthy volunteers aged 50-84 years conducted at one centre in Auckland, New Zealand. Participants were randomly assigned to receive either an initial oral dose of 200 000 IU (5·0 mg) colecalciferol (vitamin D3) followed by monthly 100 000 IU (2·5 mg) colecalciferol or equivalent placebo dosing. The prespecified primary outcome was cardiovascular disease and secondary outcomes were respiratory illness and fractures. Here, we report secondary outcome data for fractures and post-hoc outcome data for falls. Cox proportional hazards models were used to estimate hazard ratios (HRs) for time to first fracture or time to first fall in individuals allocated vitamin D compared with placebo. The analysis of fractures included all participants who gave consent and was by intention-to-treat; the analysis of falls included all individuals who returned one or more questionnaires. This trial is registered with the Australian New Zealand Clinical Trials Registry, number ACTRN12611000402943.
FINDINGS: Between April 5, 2011, and Nov 6, 2012, 5110 participants were recruited and randomly assigned either colecalciferol (n=2558) or placebo (n=2552). Two participants allocated placebo withdrew consent after randomisation; thus, a total of 5108 individuals were included in the analysis of fractures. The mean age of participants was 65·9 years (SD 8·3) and 2971 (58%) were men. The mean concentration of 25(OH)D in blood was 63 nmol/L (SD 24) at baseline, with 1534 (30%) having 25(OH)D concentrations lower than 50 nmol/L. Follow-up was until July 31, 2015, with a mean treatment duration of 3·4 years (SD 0·4, range 2·5-4·2). During follow-up, 2638 participants reported having a fall, 1312 (52%) of 2539 in the vitamin D group compared with 1326 (53%) of 2517 in the placebo group. The HR for falls-adjusted for age, sex, ethnic origin, history of recent fall, physical activity, and baseline 25(OH)D-was 0·99 (95% CI 0·92-1·07; p=0·82) for vitamin D compared with placebo. Non-vertebral fractures were reported in 292 individuals, 156 (6%) of 2558 in the vitamin D group and 136 (5%) of 2550 in the placebo group. The adjusted HR for fractures was 1·19 (95% CI 0·94-1·50; p=0·15) for vitamin D compared with placebo. 123 (2%) people died during the trial, 65 assigned vitamin D and 58 allocated placebo; the difference between treatment groups was not significant.
INTERPRETATION: High-dose bolus vitamin D supplementation of 100 000 IU colecalciferol monthly over 2·5-4·2 years did not prevent falls or fractures in this healthy, ambulatory, adult population. Further research is needed to ascertain the effects of daily vitamin D dosing, with or without calcium. FUNDING: Health Research Council of New Zealand and Accident Compensation Corporation of New Zealand.
PDF (will get ILL) Endnote Y

Effectiveness of a clinical pharmacist medication therapy management program in discontinuation of drugs to avoid in the elderly

Caffiero N, Delate T, Ehizuelen MD, Vogel K.
J. Manag. Care Spec. Pharm. 2017; 23(5): 525-531.
Affiliation: Pharmacy Department, Kaiser Permanente Colorado, Aurora.
(Copyright © 2017, Academy of Managed Care Pharmacy)
DOI 10.18553/jmcp.2017.23.5.525 **PMID** 28448783

Abstract
BACKGROUND: Despite evidence of fall risk associated with some drugs to avoid in the elderly (DAEs), many aged patients continue to receive them.
OBJECTIVE: To assess the effectiveness of a clinical pharmacist medication therapy management program (MTM) on discontinuation of prescribed DAEs.
METHODS: This was a retrospective cohort study conducted at an integrated health care delivery system. Kaiser Permanente Colorado beneficiaries aged ≥65 years who were MTM-eligible and targeted for a DAE dispensing between 01/01/2015 and 09/30/2015 were included in the observation group. Medicare beneficiaries who were not eligible for MTM but had a targeted DAE dispensing during the same time period were included in the control group. The percentage of patients with another DAE dispensing of the same specified medication (no matter the strength) during the 100 days following index DAE dispensing was assessed. Univariate and multivariable logistic regression analyses were conducted.
RESULTS: A total of 9,059 Medicare beneficiaries were included, with 226 beneficiaries in the MTM group and 8,833 beneficiaries in the non-MTM group. Beneficiaries were primarily female and white and had a high burden of chronic disease. The percentages of patients with another dispensing of the specified DAE were 7.1% (95% CI = 3.7%-10.4%) for the MTM beneficiaries and 35.3% (95% CI 34.2%-36.2%) for the non-MTM beneficiaries (P < 0.001). The OR for the MTM group to have received another dispensing of the specified DAE was 0.12 (95% CI = 0.08-0.22) with adjustment for potential confounders.
CONCLUSIONS: A clinical pharmacist-provided MTM intervention was associated with decreased DAE dispensing in Medicare beneficiaries. Future studies should evaluate means to further decrease DAE use in the aged. DISCLOSURES: This study was funded by the Kaiser Permanente Colorado Pharmacy Department. The funder had no role in the study design, collection, analysis and interpretation of data, writing of the report, or the decision to submit the manuscript for publication. Delate has received grant funding from Janssen Pharmaceutical Companies of Johnson & Johnson outside of this study. The authors report no other disclosures.
PDF Y Endnote Y

Executive network activation is linked to walking speed in older adults: functional MRI and TCD ultrasound evidence from the MOBILIZE Boston Study
Jor'dan AJ, Poole VN, Iloputaife I, Milberg W, Manor B, Esterman M, Lipsitz LA.
J. Gerontol. A Biol. Sci. Med. Sci. 2017; ePub(ePub): ePub.
Affiliation: Division of Gerontology, Beth Israel Deaconess Medical Center, Boston, Massachusetts.
(Copyright © 2017, Gerontological Society of America)
DOI 10.1093/gerona/glx063 **PMID** 28449077
Abstract
BACKGROUND: Changes in cerebral blood flow velocity (CBF) in response to a cognitive task (task-related ΔCBF) have been shown by Transcranial Doppler ultrasonography (TCD) to be reduced in slow walkers. However, it is unknown whether reduced task-related ΔCBF is associated with reduced neural activity in specific brain regions, as measured by blood-oxygen-level dependent (BOLD) functional magnetic resonance imaging (fMRI).
METHODS: We assessed the regional changes in neural activity associated with reduced middle cerebral artery (MCA) task-related ΔCBF to an executive task and slow walking speed in 67 community-dwelling older adults from the MOBILIZE Boston Study. Participants underwent walking

assessments and TCD ultrasonography measures of MCA ΔCBF during the n-back task of executive function. A subset of participants (n = 27) completed the same task during fMRI. Individual BOLD activation maps for the n-back task were correlated with TCD measures and network-level averages were associated with TCD and preferred walking speed.
RESULTS: Participants with diminished task-related ΔCBF walked more slowly (β =.39, p =.001). fMRI revealed significant associations between task-related ΔCBF and regional BOLD activation in several brain regions/networks supplied by the MCA. Of these regions and networks, those within the executive network were most strongly associated with walking speed (β =.36, p =.01).
CONCLUSIONS: Task-related ΔCBF during an executive function task is related to activation in several neural networks and impairment in the ability to recruit the executive network in particular is associated with slow walking speed in older adults.
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Falls suffered by elderly people from the perspective of health care personnel: a qualitative study
López-Soto PJ, García-Arcos A, Fabbian F, Manfredini R, Rodríguez-Borrego MA.
Clin. Nurs. Res. 2017; ePub(ePub): 1054773817705532.
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(Copyright © 2017, Sage Publications)
DOI 10.1177/1054773817705532 **PMID** 28446035
Abstract
An exploratory interpretative study was carried out to recognize the factors regarded by health care professionals as potential obstacles to the evaluation, prevention, and documentation of falls in persons above 65 years of age. Focus groups and questionnaires were carried out. Audio recordings were made, and these were subsequently transcribed and analyzed in accordance with the Bardin's thematic content analysis. Four focus groups of four persons were set up, and 16 questionnaires were returned. Four thematic categories were obtained. The analysis showed a lack of data in records of falls, perhaps for reasons of overwork, lack of motivation, awareness, or consistency in the registration systems in use. Health care professionals document two types of fall, depending on the elderly person's ability to carry out everyday tasks. There is not a rigorous and systematic approach for recording falls. Perspectives from health care professionals could help in analyzing the causes of falls and suggesting comprehensive preventive measures.
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Gait, dual task and history of falls in elderly with preserved cognition, mild cognitive impairment, and mild Alzheimer's disease
Ansai JH, Andrade LP, Rossi PG, Takahashi ACM, Vale FAC, Rebelatto JR.
Rev. Bras. Fisioter. 2017; 21(2): 144-151.
Affiliation: Departamento de Fisioterapia, Universidade Federal de São Carlos (UFSCar), São Carlos, SP, Brazil.
(Copyright © 2017, Departamento de Fisioterapia da Universidade Federal de São Carlos)
DOI 10.1016/j.bjpt.2017.03.010 **PMID** 28460713
Abstract
BACKGROUND: Studies with functional and applicable methods and new cognitive demands involving executive function are needed to improve screening, prevention and rehabilitation of

cognitive impairment and falls.
OBJECTIVE: to identify differences in gait, dual task performances, and history of falls between elderly people with preserved cognition, mild cognitive impairment and mild Alzheimer's disease.
METHOD: A cross-sectional study was conducted. The sample consisted of 40 community-dwelling older adults with preserved cognition, 40 older adults with mild cognitive impairment, and 38 older adults with mild Alzheimer's disease. The assessment consisted of anamneses, gait (measured by the 10-meter walk test), dual task (measured by the Timed Up and Go Test associated with the motor-cognitive task of calling a phone number), and history of falls in the past year.
RESULTS: There were no differences among all groups for all variables. However, the Alzheimer's disease Group performed significantly worse in the dual task than the other groups. No item of dual task could distinguish people with preserved cognition from those with mild cognitive impairment. The groups with cognitive impairment included more fallers, and specific characteristics in history of falls between groups were identified.
CONCLUSION: Dual task could distinguish Alzheimer's disease patients specifically from other cognitive profiles.
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Hyponatremia is associated with worse outcomes from fall injuries in the elderly
Kuo SCH, Kuo PJ, Rau CS, Wu SC, Hsu SY, Hsieh CH.
Int. J. Environ. Res. Public Health 2017; 14(5): e14050460.
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(Copyright © 2017, Multidisciplinary Digital Publishing Institute)
DOI 10.3390/ijerph14050460 **PMID** 28445418
Abstract
BACKGROUND: Hyponatremia has been proposed as a contributor to falls in the elderly, which have become a major global issue with the aging of the population. This study aimed to assess the clinical presentation and outcomes of elderly patients with hyponatremia admitted due to fall injuries in a Level I trauma center.
METHODS: We retrospectively reviewed data obtained from the Trauma Registry System for trauma admissions from January 2009 through December 2014. Hyponatremia was defined as a serum sodium level <135 mEq/L, and only patients who had sustained a fall at ground level (<1 m) were included. We used Chi-square tests, Student t-tests, and Mann-Whitney U tests to compare elderly patients (age ≥65 years) with hyponatremia (n = 492) to those without (n = 2002), and to adult patients (age 20-64 years) with hyponatremia (n = 125).
RESULTS: Significantly more elderly patients with hyponatremia presented to the emergency department (ED) due to falls compared to elderly patients without hyponatremia (73.7% vs. 52.6%; OR: 2.5, 95% CI: 2.10-3.02; p < 0.001). Elderly patients with hyponatremia presented with a worse outcome, measured by significantly higher odds of intubation (OR: 2.4, 95% CI: 1.15-4.83; p = 0.025), a longer in-hospital length of stay (LOS) (11 days vs. 9 days; p < 0.001), higher proportion of intensive care unit (ICU) admission (20.9% vs. 16.2%; OR: 1.4, 95% CI: 1.07-1.76; p = 0.013), and higher mortality (OR: 2.5, 95% CI: 1.53-3.96; p < 0.001), regardless of adjustment by Injury Severity Scores

(ISS) (AOR: 2.4, 95% CI: 1.42-4.21; p = 0.001).
CONCLUSIONS: Our results show that hyponatremia is associated with worse outcome from fall-related injuries in the elderly, with an increased ISS, longer LOS, and a higher risk of death.
PDF Y Endnote Y

Neuroimaging of human balance control: a systematic review
Wittenberg E, Thompson J, Nam CS, Franz JR.
Front. Hum. Neurosci. 2017; 11: e170.
Affiliation: Joint Department of Biomedical Engineering, University of North Carolina at Chapel Hill and North Carolina State UniversityChapel Hill, NC, USA.
(Copyright © 2017, Frontiers Research Foundation)
DOI 10.3389/fnhum.2017.00170 **PMID** 28443007 **PMCID** PMC5385364
Abstract
This review examined 83 articles using neuroimaging modalities to investigate the neural correlates underlying static and dynamic human balance control, with aims to support future mobile neuroimaging research in the balance control domain. Furthermore, this review analyzed the mobility of the neuroimaging hardware and research paradigms as well as the analytical methodology to identify and remove movement artifact in the acquired brain signal. We found that the majority of static balance control tasks utilized mechanical perturbations to invoke feet-in-place responses (27 out of 38 studies), while cognitive dual-task conditions were commonly used to challenge balance in dynamic balance control tasks (20 out of 32 studies). While frequency analysis and event related potential characteristics supported enhanced brain activation during static balance control, that in dynamic balance control studies was supported by spatial and frequency analysis. Twenty-three of the 50 studies utilizing EEG utilized independent component analysis to remove movement artifacts from the acquired brain signals. Lastly, only eight studies used truly mobile neuroimaging hardware systems. This review provides evidence to support an increase in brain activation in balance control tasks, regardless of mechanical, cognitive, or sensory challenges. Furthermore, the current body of literature demonstrates the use of advanced signal processing methodologies to analyze brain activity during movement. However, the static nature of neuroimaging hardware and conventional balance control paradigms prevent full mobility and limit our knowledge of neural mechanisms underlying balance control.
PDF Y Endnote Y

Patients' experience after a fall and their perceptions of fall prevention: a qualitative study
Lim ML, Ang SGM, Teo KY, Wee YHC, Yee SP, Lim SH, Ang SY.
J. Nurs. Care Qual. 2017; ePub(ePub): ePub.
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(Copyright © 2017, Lippincott Williams and Wilkins)
DOI 10.1097/NCQ.0000000000000261 **PMID** 28448301
Abstract
An exploratory descriptive study was conducted to explore the perspectives of patients who had fallen in the hospital; 100 patients were interviewed. An inductive content analysis approach was adopted. Six themes emerged: Apathetic toward falls, self-blame behavior, reluctance to impose on

busy nurses, negative feelings toward nurses, overestimating own ability, and poor retention of information. Patients often downplayed the risks of falls and were reluctant to call for help.
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Prospective study on the impact of fear of falling on functional decline among community dwelling elderly women
Choi K, Jeon GS, Cho SI.
Int. J. Environ. Res. Public Health 2017; 14(5): e10450469.
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(Copyright © 2017, Multidisciplinary Digital Publishing Institute)
DOI 10.3390/ijerph14050469 **PMID** 28448461
Abstract
Fear of falling (FOF) is expected to have effects on functional decline in the elderly. In this study, we examined over 2 years the effect of change in FOF on functional decline in community dwelling elderly. We conducted a secondary analysis using data from elderly women, 70 years of age and older, who participated in the Korean Longitudinal Study of Aging (KLoSA). Participants were divided into four categories according to change in FOF between the 2010 and 2012 surveys. Multiple logistic regression analysis was conducted regarding the effects of changes in FOF on functional decline after controlling for variables as known risk factors for functional decline. Rates of functional decline were highest in the "consistently having FOF" group, whereas they were lowest in the "consistently no FOF" group in both 2010 and 2012. Characteristics independently associated with functional decline were change in FOF, depressive symptoms, low frequency of meeting friends, and fear-induced activity avoidance. Longer exposure to FOF was associated with an increased risk of functional decline. FOF is an important health problem that deserves attention in its own right. Public health approaches for elderly persons should address early detection, prevention, and intervention programs for FOF.
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Reliability and fall risk detection for the BESTest and Mini-BESTest in older adults
Anson E, Thompson E, Ma L, Jeka J.
J. Geriatr. Phys. Ther. 2017; ePub(ePub): ePub.
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(Copyright © 2017, American Physical Therapy Association)
DOI 10.1519/JPT.0000000000000123 **PMID** 28448278
Abstract
BACKGROUND & PURPOSE: Test stability and test-retest reliability have not previously been reported for either the Balance Evaluation Systems Test (BESTest) or mini-BESTest (mBEST) in a population of older adults with nonspecific balance limitations. Furthermore, no criterion for identifying change greater than chance has been reported in older adults with nonspecific balance problems using either BESTest or mBEST scores. The purposes of this study were to determine test stability over time, test-retest reliability, to identify minimum detectable change for the BESTest and mBEST in a population of older adults with nonspecific balance problems. In addition, the ability of

the BESTest and mBEST to identify past fallers was characterized.
METHODS: This was an observational study with 58 adults 65 years or older with a history of falls or self-reported balance problem. The BESTest and mBEST were administered to all participants at the beginning and end of 4 weeks. Test-retest reliability was calculated with intraclass correlations, and minimum detectable change was calculated at the 95% confidence level (MDC95). Receiver operating characteristics were used to characterize the sensitivity and specificity of the BESTest and mBEST to identify older adults who had previously fallen.
RESULTS: Balance scores did not significantly change over a 4-week period. Test-retest reliability for the BESTest (0.86) and mBEST (0.84) was good to excellent. MDC95 scores were identified for the BESTest (8.9) and mBEST (4).
CONCLUSIONS: The BESTest and mBEST scores were stable and reliable over a period of 4 weeks for a population of older adults with self-reported balance problems or a history of falling. MDC95 scores allow interpretation of change in BESTest and mBEST scores following rehabilitation.
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Reliability, validity, and minimal detectable change of four-step stair climb power test in community-dwelling older adults
Ni M, Brown LG, Lawler D, Bean JF.
Phys. Ther. 2017; ePub(ePub): ePub.
(Copyright © 2017, American Physical Therapy Association)
DOI 10.1093/ptj/pzx039 **PMID** 28444350
Abstract
BACKGROUND: Stair climb power is an important clinical measure of lower-extremity power. The stair climb power test (SCPT) was validated by requiring individuals to climb a full flight of stairs. A four-step SCPT (4SCPT) would be more clinically feasible and easier to perform, yet its reliability and validity is unknown.
OBJECTIVE: To evaluate reliability, validity, and minimal detectable change of 4SCPT among community-dwelling older adults. DESIGN.: A cross-sectional analysis of baseline data from a clinical trial.
METHODS: Fifty older adults ≥ 65 years, at risk for mobility decline, were consented to participate in this ancillary study. Test-retest reliability was derived from two measurements within each participant measured by a single assessor. Pearson correlation analyses among leg power measures (4SCPT, SCPT, single leg press power at 40% and 70% of the one-repetition maximum (SLP40, SLP70) were performed. Separate multivariate linear regressions were conducted evaluating the associations between each leg power measure and two mobility outcomes, the Short Physical Performance Battery (SPPB) and habitual gait speed (HGS). Minimal detectable change was based on a 90% confidence interval (MDC 90).
RESULTS: The 4SCPT had excellent test-retest reliability (ICC(2,1) = 0.951), and strong correlation with SCPT, SLP40 and SLP70 (r = 0.85-0.96). The 4SCPT explained a greater amount of variance in the SPPB (R 2 = 0.31) than other leg power measurements (R 2 = 0.23-0.25). The 4SCPT (R 2 = 0.41) and SCPT (R 2 = 0.42) described equivalent amounts of variance in HGS, and greater than that with SLP40 (R 2 = 0.28) and SLP70 (R 2 = 0.30). The MDC 90 for 4SCPT was 44.0 watts. LIMITATIONS.: This was a cross-sectional analysis within a small, non-representative sample. Inter-rater reliability was not evaluated.

CONCLUSIONS: The 4SCPT shows scientific promise as a valid and reliable leg power measurement among community-dwelling older adults.
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Sit-to-stand transition reveals acute fall risk in activities of daily living
Pozaic T, Lindemann U, Grebe AK, Stork W.
IEEE J. Transl. Eng. Health Med. 2016; 4: e2700211.
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(Copyright © 2016, Institute of Electrical and Electronics Engineers)
DOI 10.1109/JTEHM.2016.2620177 **PMID** 28439481 **PMCID** PMC5396921
Abstract
The focus of this paper was on finding wrist sensor-derived features for detecting highly acute fall risk from the sit-to-stand transitions performed in a non-ambulatory environment. Furthermore, the influence of the dominant and non-dominant hand on these features was investigated. A cohort of 174 older subjects was monitored for seven consecutive days in their home setting by using inertial sensors attached at the wrist. Based on the reported falls during a one-month follow-up phase, two groups were defined. Twenty-one time and frequency domain features were implemented for the quantitative assessment of extracted sit-to-stand transitions. The statistical analysis yielded two features that could convincingly distinguish fallers from non-fallers for the dominant hand, and six for the non-dominant hand. A novel feature, energy of the applied support during standing up, showed statistically good performance independently of on which hand the sensor node was worn, as well as for the dominant and non-dominant hand ([Formula: see text], [Formula: see text], and [Formula: see text], respectively). This paper overcomes limitations of clinical tests and shows a reliable application of wrist-worn bands in terms of assessment of highly acute fall risk. In addition, it reveals the sit-to-stand transition as a potential assessment source for the wrist-worn devices in the elderly population. Early assessment of the risk of falling in a widely accepted and non-stigmatized manner has the ability to bring crucial changes in fall prevention strategies, reducing the number of falls and the fall rate.
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The association between generalized anxiety disorder, subthreshold anxiety symptoms and fear of falling among older adults: preliminary results from a pilot study
Payette MC, Belanger C, Benyebdri F, Filiatrault J, Bherer L, Bertrand JA, Nadeau A, Bruneau MA, Clerc D, Saint-Martin M, Cruz-Santiago D, Menard C, Nguyen P, Vu TTM, Comte F, Bobeuf F, Grenier S.
Clin. Gerontol. 2017; 40(3): 197-206.
Affiliation: Université de Montréal , Montreal , Quebec , Canada.
(Copyright © 2017, Informa - Taylor and Francis Group)
DOI 10.1080/07317115.2017.1296523 **PMID** 28452660
Abstract
OBJECTIVE: A relationship between generalized anxiety disorder (GAD) and fear of falling (FOF) has long been proposed but never specifically studied. This study aimed at analyzing the relationship between FOF and GAD or anxiety symptoms, while controlling for major depressive episodes (MDE), depressive symptoms, fall risk, and sociodemographic variables.
METHODS: Twenty-five older adults participated in this pilot study. Assessments included the

following: Anxiety Disorder Interview Schedule, Geriatric Anxiety Inventory, Geriatric Depression Scale, Falls-Efficacy Scale-International. A multidisciplinary team evaluated fall risk.
RESULTS: FOF was significantly correlated with GAD, MDE, anxiety and depressive symptoms, and fall risk, but not with sociodemographic variables. Multiple regression analyses indicated that GAD and anxiety symptoms were significantly and independently associated with FOF.
CONCLUSION: Although the results of this pilot study should be replicated with larger samples, they suggest that FOF is associated with GAD and anxiety symptoms even when considering physical factors that increase the risk of falling. CLINICAL IMPLICATIONS: Treatment of FOF in patients with GAD may present a particular challenge because of the central role of intolerance of uncertainty, which may prevent patients from regaining confidence despite the reduction of fall risk. Clinicians should screen for GAD and anxiety symptoms in patients with FOF to improve detection and treatment.
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The association between lower urinary tract symptoms and falls: forming a theoretical model for a research agenda
Gibson W, Hunter KF, Camicioli R, Booth J, Skelton DA, Dumoulin C, Paul L, Wagg A.
Neurourol. Urodyn. 2017; ePub(ePub): ePub.
Affiliation: Division of Geriatric Medicine, University of Alberta, Edmonton, Alberta, Canada.
(Copyright © 2017, John Wiley and Sons)
DOI 10.1002/nau.23295 **PMID** 28471525
Abstract
BACKGROUND: There is a well-recognised association between falls and lower urinary tract symptoms (LUTS) in older adults, with estimates of odd ratios for falls in the presence of LUTS ranging between 1.5 and 2.3. Falls and LUTS are both highly prevalent among older people and both are markers of frailty, with significant associated morbidity, mortality, and healthcare resource cost. This association is not well examined or explained in the literature. AIMS: We aimed to outline current knowledge of the association between falls and lower urinary tract symptoms and suggest a research program to further investigate this.
MATERIALS AND METHODS: A consensus conference of experts in the field was convened to review the current literature and brainstorm potential future investigative avenues.
RESULTS AND DISCUSSION: Despite the recognition of this association, there has been little research to examine its potential causes, and no intervention trial has established if reducing LUTS or urinary incontinence can reduce the risk of falls. The commonly held assumption that urgency causes falls through rushing to the toilet is likely incorrect. Falls and LUTS are both symptoms of frailty and have many common causes. Gait, balance, and continence are all processes requiring cognitive input, and the concept of dual tasking may be a further link.
CONCLUSION: The significant association between lower urinary tract symptoms and falls is currently unexplained, and further research into the potential causes of this association is needed.
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The association of orthostatic hypotension with falls-an end to the debate?
Frith J.
Age Ageing 2017; ePub(ePub): ePub.
Affiliation: The Newcastle upon Tyne Hospitals NHS Foundation Trust-Falls and Syncope Service, UK.
(Copyright © 2017, Oxford University Press)
DOI 10.1093/ageing/afx053 **PMID** 28444110
Abstract [Abstract unavailable] Editorial
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Can vitamin D prevent falls and fractures?
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Lancet Diabetes Endocrinol. 2017; ePub(ePub): ePub.
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(Copyright © 2017, Elsevier Publishers)
DOI 10.1016/S2213-8587(17)30140-7 **PMID** 28461160
Abstract [Abstract unavailable]
PDF Will get ILL Endnote Y

Components of standing postural control evaluated in pediatric balance measures: a scoping review
Sibley KM, Beauchamp MK, Van Ooteghem K, Paterson M, Wittmeier KD.
Arch. Phys. Med. Rehabil. 2017; ePub(ePub): ePub.
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(Copyright © 2017, Elsevier Publishing)
DOI 10.1016/j.apmr.2017.02.032 **PMID** 28438514
Abstract
OBJECTIVE: To identify measures of standing balance validated in pediatric populations and determine the components of postural control captured in each tool.
DATA SOURCES: Electronic searches of Medline, Embase, and CINAHL databases using key word combinations of postural balance/ equilibrium, psychometrics/ reproducibility of results/ predictive value of tests, child/ pediatrics; grey literature; and hand searches.
STUDY SELECTION: Inclusion criteria were measures with a stated objective to assess balance, pediatric (<=18 years) populations, at least one psychometric evaluation, one standing task, standardized protocol and evaluation criteria, and published in English. Two reviewers independently identified studies for inclusion. 21 measures were included.
DATA EXTRACTION: Two reviewers extracted descriptive characteristics and two investigators independently coded components of balance in each measure using a systems perspective for postural control, an established framework for balance in pediatric populations.
DATA SYNTHESIS: Components of balance evaluated in measures were underlying motor systems (100% of measures), anticipatory postural control (72%), static stability (62%), sensory integration (52%), dynamic stability (48%), functional stability limits (24%), cognitive influences (24%), verticality (9%), and reactive postural control (0%).

LIMITATIONS: The review did not consider difficulty of items or non-standing postural tasks.
CONCLUSIONS: Assessing children's balance with valid and comprehensive measures is important for ensuring development of safe mobility and independence with functional tasks. Balance measures validated in pediatric populations to date do not comprehensively assess standing postural control and omit some key components for safe mobility and independence. Existing balance measures, which have been validated in adult populations and address some of the existing gaps in pediatric measures, warrant consideration for validation in children.
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Educating Emergency Department Registered Nurses (EDRNs) in screening, brief intervention, and referral to treatment (SBIRT): Changes in attitudes and knowledge over time
Mitchell AM, Kane I, Lindsay DL, Hagle H, Puskar K, Aiello J, Boucek L, Knapp E.
Int. Emerg. Nurs. 2017; ePub(ePub): ePub.
Affiliation: University of Pittsburgh School of Nursing, Pittsburgh, PA, United States.
(Copyright © 2017, Elsevier Publishing)
DOI 10.1016/j.ienj.2016.12.003 **PMID** 28438480
Abstract
Alcohol and other drug (AOD) diagnoses in the ED co-occur with injury-related presenting conditions including: falls, motor vehicle accidents, poisonings, and both intentional and unintentional injuries. Clinical attention to ED admissions resulting from hazardous AOD use can significantly improve patient care and reduce high cost utilization of ED visits and treatment. The EDRN-SBIRT project is designed to improve the knowledge and attitudes of ED nurses working in a large academic medical center to identify and address risky AOD use as it relates to an ED visit. ED nurses' knowledge and attitudes toward patients with AOD use can be improved through SBIRT education. SBIRT education can establish an evidence-based standard of nursing practice to improve healthcare outcomes, but it must be reinforced with ongoing ED review and supportive educational sessions until practice is firmly established.
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Exergames for women with fibromyalgia: a randomised controlled trial to evaluate the effects on mobility skills, balance and fear of falling
Collado-Mateo D, Dominguez-Muñoz FJ, Adsuar JC, Merellano-Navarro E, Gusi N.
PeerJ 2017; 5: e3211.
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(Copyright © 2017, PeerJ)
DOI 10.7717/peerj.3211 **PMID** 28439471 **PMCID** PMC5401622
Abstract
BACKGROUND: Exergames are a new form of rehabilitation that combine the characteristics of physical exercise and the benefits of non-immersive virtual reality (VR). Effects of this novel therapy in women fibromyalgia are still unknown. The objective was to evaluate the effects of exergame-based intervention on mobility skills, balance and fear of falling in women with fibromyalgia.

METHODS: This study was a randomized controlled trial with concealed allocation. Seventy-six women with fibromyalgia were divided into two groups: the exercise group received an eight week intervention based on exergames, while the control group continued their usual activities. Mobility skills were evaluated using the timed up and go test, while balance was assessed using the functional reach test, and the CTSIB protocol. Fear of falling was evaluated on a scale of 0-100 (0, no fear; 100, extreme fear). Measurements were performed before and after the intervention. A repeated-measures linear mixed model was used to compare the effects of the intervention between the two groups.
RESULTS: The exercise group was significantly quicker than the control group in the timed up and go test (MD, -0.71; 95% CI [-1.09-0.32]; $p < 0.001$). There were also significant improvements in functional reach and a reduced fear of falling (MD, 4.34; 95% CI [1.39-7.30]; $p = 0.005$ and MD, -9.85; 95% CI [-0.19--0.08]; $p = 0.048$, respectively).
DISCUSSION: The improved TUG observed herein was better than the smallest real difference. Based on the results on mobility skills, balance and fear of falling, exergames may be an effective tool as a therapy for women with fibromyalgia.
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Fear of falling in people with multiple sclerosis: which clinical characteristics are important?
Khalil H, Al-Shorman A, El-Salem K, Abdo N, Alghwiri AA, Aburub A, Shalabi S, Al-Mustafa F.
Phys. Ther. 2017; ePub(ePub): ePub.
(Copyright © 2017, American Physical Therapy Association)
DOI 10.1093/ptj/pzx044 **PMID** 28444253
Abstract
BACKGROUND: Fear of falling (FOF) is an important risk indicator for health related outcomes and quality of life in patients with multiple sclerosis (MS). However, factors associated with FOF in MS are not well investigated.
OBJECTIVES: This study was done to explore predictors of FOF in this population.
METHODS: Seventy relapsing remitting patients with MS were evaluated. FOF was assessed using Fall Efficacy Scale-International (FES-I). Motor outcomes included: 30-second chair stand test (30s-CST), Berg Balance Scale, 10-Meter Walk Test (10-MWT) and 6-Minute Walk Test (6-MWT). Cognitive status was determined using Montréal Cognitive Assessment (MOCA) and Symbol Digit Modalities Test (SDMT). Affective factors including depression; fatigue and sleep were also assessed using Beck Depression Inventory (BDI), Modified Fatigue Impact Scale (MFIS), and Pittsburgh Sleep Quality Index (PSQI) respectively.
RESULTS: FOF was significantly correlated with all motor and affective measures used. However., a stepwise regression found that only BBS from motor measures, MOCA from cognitive measures, and sleep disorders from affective factors were significantly predictive of the FOF.
CONCLUSIONS: FOF in patients with MS is multifactorial and includes motor and non-motor factors. Thus, therapies that aim to reduce risk of falling in this population should address motor functions, cognitive abilities, and sleep quality.
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Unravelling the contributions of motor experience and conceptual knowledge in action perception: a training study

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Sci. Rep. 2017; 7: e46761.

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DOI 10.1038/srep46761 **PMID** 28440338

Abstract

Prior knowledge affects how we perceive the world and the sensorimotor system actively guides our perception. An ongoing dispute regards the extent to which prior motor knowledge versus conceptual knowledge modulates the observation of others' actions. Research indicates that motor experience increases motor activation during action perception. Other research, however, has shown that conceptual familiarity with actions also modulates motor activation, i.e., increased motor activation during observation of unfamiliar, compared to conceptually familiar, actions. To begin to disentangle motor from conceptual contributions to action perception, we uniquely combined motoric and conceptual interventions into one design. We experimentally manipulated participants' experience with both motoric skills and conceptual knowledge, via motor training of kinematically challenging actions and contextual information about the action, respectively, in a week-long training session. Measurements of the effects on motor activity measured via electroencephalography (EEG) during pre- and post-training action observation were compared. We found distinct, non-interacting effects of both manipulations: Motor training increased motor activation, whereas additional conceptual knowledge decreased motor activation. The findings indicate that both factors influence action perception in a distinct and parallel manner. This research speaks to previously irreconcilable findings and provides novel insights about the distinct roles of motor and conceptual contributions to action perception.

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