SafetyLit December 3, 2017

A tailored counseling and home-based rehabilitation program to increase physical activity and improve mobility among community-dwelling older people after hospitalization: protocol of a randomized controlled trial

Turunen K, Aaltonen L, Kumpumäki J, Portegijs E, Keikkala S, Kinnunen ML, Finni T, Sipilä S, Nikander R.

BMC Musculoskelet. Disord. 2017; 18(1): e477.

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DOI 10.1186/s12891-017-1825-5 **PMID** 29162078

Abstract

BACKGROUND: Physical activity (PA) decreases during hospitalization. In particular, the amount of PA engaged in by older people who are hospitalized following musculoskeletal injury is likely to be limited for months after discharge home. Given the importance of an active lifestyle for their recovery and the prevention of future adverse outcomes, there is clearly a need for interventions to increase PA. This article describes the protocol of a randomized controlled trial set up to investigate the effects of a physical activity oriented home rehabilitation program (ProPA) on PA and the restoration of mobility in community-dwelling older people.

METHODS: Men and women aged 60 years or older hospitalized due to a musculoskeletal injury or disorder in the back or lower limbs are recruited. After discharge from hospital to home, participants are randomized into a six-month ProPA program or a standard care (control) group. The ProPA program consists of a motivational interview, goal attainment process, guidance for safe walking, a progressive home exercise program and physical activity counseling. In addition, frail participants who are not able to go outdoors alone receive support from volunteers. Primary outcomes are PA measured using a 3-dimentional accelerometer, and mobility assessed by the Short Physical Performance Battery and self-reports. Secondary outcomes are life space mobility, participation restriction, fear of falling, pain, mood, and grip strength. Information on barriers to and enablers of PA participation are also collected. Data on mortality and use of health services are collected from the national register. In this 6-month intervention, all participants are assessed in their homes at baseline and after three and six months, and at 12 months after randomization they will receive a follow-up questionnaire.

DISCUSSION: This study investigates the effects of a rehabilitation program on PA and mobility among older people at risk for increased sedentary time and mobility problems. If positive effects are observed, the program can be considered for incorporation into the health care system and thereby contribute to the rehabilitation of older people who have recently been discharged from hospital. TRIAL REGISTRATION: ISRCTN13461584. Registered 27 January 2016.

PDF Y Endnote Y

Antihypertensive medications and injurious falls in the elderly

Cai A, Calhoun DA.

Am. J. Hypertens. 2017; ePub(ePub): ePub.

Affiliation: Vascular Biology and Hypertension Program University of Alabama at Birmingham Birmingham, AL.

DOI 10.1093/ajh/hpx203 **PMID** 29186306
Abstract [Abstract unavailable]
PDF Endnote

Assessing the relationship between vitamin D status and impairments in cognitive and physical performance in older adults using a dual task physical performance test

Lopez J, Campa A, Lewis JE, Huffman FG, Liuzzi JP, Li T, Martinez AH, Ferris SM, Rasul A, Farooqi A, Lopez Medrano AM, Atlas SE, Tiozzo E, Konefal J, Woolger JM.
J. Prev. Alzheimers Dis. 2017; 4(1): 29-36.
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DOI 10.14283/jpad.2016.114 **PMID** 29188857
Abstract

BACKGROUND: Vitamin D deficiency has been associated with an increased risk of falls in older adults. Several studies have demonstrated an association between vitamin D deficiency and gait and cognitive impairments, which are two risk factors for falls in the elderly. There is lack of research about the role of vitamin D in cognitive function in the context of mobility.

OBJECTIVE: The purpose of this study was to evaluate the association between vitamin D status with the age-related changes in mobility through higher order cognitive function using a dual task physical performance test.

DESIGN: Cross-sectional.

SETTING: Community-dwelling older adult population located in Miami, Fl.

PARTICIPANTS: Healthy participants over the age of 55 (n=97) who participated in the parent interventional study.

MEASUREMENTS: Participants completed assessments that included serum levels of vitamin D, surveys, and dual task physical performance tests. Spearman's correlations, independent t-tests, repeated measures ANOVAs and multiple logistic regressions were used to examine the relationship between vitamin D insufficiency (25-hydroxyvitamin D <30 ng/ml) and sufficiency (≥30 ng/ml) and dual task physical performance variables. The significance level was set at α=0.05.

RESULTS: There were no significant associations between vitamin D insufficiency and gait velocity during either task. Using Spearman correlations, slower single (P=0.011) and dual task counting rates (P=0.006) were significantly associated with vitamin D insufficiency. Independent t-tests showed dual and single task counting rates were significantly lower in the vitamin D insufficient group compared to the sufficient group (P=0.018 and P=0.028, respectively). The results for the ANOVAs indicated that velocities and counting rates were not significantly different by vitamin D status (Wilk's Lambda =0.999; F (1, 95) =.11, P=.740) (Wilk's Lambda =.999, F(1,95)=.13, P=.718). Vitamin D status was not significantly associated with dual task physical performance (defined as the difference in dual and single task) in gait velocity (OR=1.00, 95% CI: 0.98; 1.02, P=0.772) and counting rate (OR=1.684, 95% CI: 0.15; 19.57, P=0.677), when controlling for confounders.

CONCLUSIONS: Since counting backward is a mental tracking task, which is a component of executive function, our results suggest a relationship between vitamin D insufficiency and executive dysfunction. Executive dysfunction has been previously associated with fall risks in the elderly, and

it could be a possible mediator between vitamin D and falls. Our data suggest that cognition may play a significant role in vitamin D's influence on falls, while motor function may play a lesser role.
PDF N Endnote Y

Associations between bicycling and fall related physical performance in older adults
Harvey S, Rissel C, Pijnappels M.
J. Aging Phys. Act. 2017; ePub(ePub): ePub.
Affiliation: MOVE Research Institute Amsterdam, Department of Human Movement Sciences, Vrije Universiteit Amsterdam, The Netherlands.

DOI 10.1123/japa.2017-0243 **PMID** 29182418
Abstract
Falls among older adults remains a significant public health issue. Bicycling positively influences falls risk factors including reduced balance, muscle weakness, and low self-perceived confidence in maintaining balance. However, this association has not been systematically examined. We recruited 107 community-dwelling participants aged 65 and over in the Netherlands to determine the relationship between bicycling and fall risk factors. Participants completed 3 questionnaires on cycling behaviour and balance confidence, and undertook 5 fall related physical performance tasks encompassing tests of balance, strength, gait and endurance. On average, current bicyclists showed significantly better scores in all physical tasks and confidence compared to non-riders ranging from a 10% difference in six metre walk time to a 141% difference in single leg balance time (all p=0.01).
PDF Y Endnote Y

Balance and mobility training with or without simultaneous cognitive training reduces attention demand but does not improve obstacle clearance in older adults
Jehu DAM, Paquet N, Lajoie Y.
Motor Control 2017; ePub(ePub): ePub.
Affiliation: University of Ottawa.

DOI 10.1123/mc.2017-0024 **PMID** 29182460
Abstract
The purpose of this study was to determine whether balance and mobility training (BMT) or balance and mobility plus cognitive training (BMT + C) would improve obstacle clearance and reaction time (RT); whether further improvements would be exposed in the BMT + C group relative to the BMT group; and whether possible improvements would be sustained at the follow-up. Healthy older adults were allocated to the BMT (n = 15; age: 70.2 ± 3.2), BMT + C (n = 14; age: 68.7 ± 5.5), or control group (n = 13; age: 66.7 ± 4.2). The BMT and BMT + C groups trained one-on-one, three times per week for 12 weeks on a balance obstacle course. The BMT + C group also completed cognitive training. Participants walked onto and over six obstacles of varying heights while completing no RT, simple RT, and choice RT tasks at baseline, posttraining, and at the 12-week follow-up. Both the BMT and BMT + C groups improved RT and maintained these improvements at the follow-up. No meaningful improvements in obstacle clearance emerged following training. Thus, dual-task balance training likely reduces attention demand.
PDF N Endnote Y

Balance control during gait initiation: state-of-the-art and research perspectives

Yiou E, Caderby T, Delafontaine A, Fourcade P, Honeine JL.

World J. Orthop. 2017; 8(11): 815-828.

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DOI 10.5312/wjo.v8.i11.815 **PMID** 29184756 **PMCID** PMC5696609

Abstract

It is well known that balance control is affected by aging, neurological and orthopedic conditions. Poor balance control during gait and postural maintenance are associated with disability, falls and increased mortality. Gait initiation - the transient period between the quiet standing posture and steady state walking - is a functional task that is classically used in the literature to investigate how the central nervous system (CNS) controls balance during a whole-body movement involving change in the base of support dimensions and center of mass progression. Understanding how the CNS in able-bodied subjects exerts this control during such a challenging task is a pre-requisite to identifying motor disorders in populations with specific impairments of the postural system. It may also provide clinicians with objective measures to assess the efficiency of rehabilitation programs and better target interventions according to individual impairments. The present review thus proposes a state-of-the-art analysis on: (1) the balance control mechanisms in play during gait initiation in able bodied subjects and in the case of some frail populations; and (2) the biomechanical parameters used in the literature to quantify dynamic stability during gait initiation. Balance control mechanisms reviewed in this article included anticipatory postural adjustments, stance leg stiffness, foot placement, lateral ankle strategy, swing foot strike pattern and vertical center of mass braking. Based on this review, the following viewpoints were put forward: (1) dynamic stability during gait initiation may share a principle of homeostatic regulation similar to most physiological variables, where separate mechanisms need to be coordinated to ensure stabilization of vital variables, and consequently; and (2) rehabilitation interventions which focus on separate or isolated components of posture, balance, or gait may limit the effectiveness of current clinical practices.

PDF Y Endnote Y

Benefits of resistance training in physically frail elderly: a systematic review

Lopez P, Pinto RS, Radaelli R, Rech A, Grazioli R, Izquierdo M, Cadore EL.

Aging Clin. Exp. Res. 2017; ePub(ePub): ePub.

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DOI 10.1007/s40520-017-0863-z **PMID** 29188577

Abstract

AIM: Exercise is one of the most important components in frailty prevention and treatment. Therefore, we systematically reviewed the effect of resistance training (RT) alone or combined with multimodal exercise intervention on muscle hypertrophy, maximal strength, power output, functional performance, and falls incidence in physically frail elderly.

METHODS: MEDLINE, Cochrane CENTRAL, PEDro, and SPORTDiscus databases were searched from 2005 to 2017. Studies must have mentioned the effects of RT (i.e., included or not in multimodal

training) on at least one of the following parameters: muscle mass, muscle strength, muscle power, functional capacity, and risk of falls in frail elderly.
RESULTS: The initial search identified 371 studies and 16 were used for qualitative analysis for describing the effect of strength training performed alone or in a multimodal exercise intervention. We observed that RT alone or in a multimodal training may induce increases of 6.6-37% in maximal strength; 3.4-7.5% in muscle mass, 8.2% in muscle power, 4.7-58.1% in functional capacity and risk of falls, although some studies did not show enhancements.
CONCLUSION: Frequency of 1-6 sessions per week, training volume of 1-3 sets of 6-15 repetitions and intensity of 30-70%1-RM promoted significant enhancements on muscle strength, muscle power, and functional outcomes. Therefore, in agreement with previous studies, we suggest that supervised and controlled RT represents an effective intervention in frailty treatment.
PDF Y Endnote Y

Cognitive functioning, subjective memory complaints and risky behaviour predict minor home injuries in elderly
Spano G, O Caffò A, Bosco A.
Aging Clin. Exp. Res. 2017; ePub(ePub): ePub.
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DOI 10.1007/s40520-017-0858-9 **PMID** 29181769
Abstract
INTRODUCTION: Home accidents are one of the major causes of death, particularly in older people, young children and women. AIMS: The first aim of this study was to explore the role of subjective memory complaints, cognitive functioning and risky behaviour as predictors of home injuries occurred in a year in a sample of healthy Italian older adults. The second aim was to investigate the role of risky behaviour as a mediator in the relationship between subjective and objective cognitive functioning and home injuries.
METHODS: One hundred thirty-three community-dwelling older people from southern Italy were administered a battery of tests to evaluate cognitive functioning, subjective memory complaints, and risky behaviour during home activities. Risky behaviour was evaluated using the Domestic Behaviour Questionnaire, created specifically for this purpose. The number of home injuries was recorded for a year throughout monthly telephone interviews. A path analysis was performed to test the following model: cognitive functioning and subjective memory complaints directly influence risky behaviour and number of accidents over a year; risky behaviour mediates the impact of cognitive functioning and subjective memory on number of accidents over a year.
RESULTS: Path analysis confirmed the model tested except the role of risky behaviour as a mediator between cognitive functioning and home accidents.
DISCUSSION: Risky behaviour could represent a further risk factor in cognitively intact older adults with subjective memory complaints.
CONCLUSIONS: The assessment of both cognition and behaviour in elderly can make a valuable contribution in preventing home accidents in elderly.
PDF Y Endnote Y

Epidemiology of fragility fractures and fall prevention in the elderly: a systematic review of the literature

Tsuda T.

Curr. Orthop. Pract. 2017; 28(6): 580-585.

Affiliation: Department of Orthopedic Surgery, Minoh City Hospital, Osaka, Japan.

DOI 10.1097/BCO.0000000000000563 **PMID** 29177024 **PMCID** PMC5671779

Abstract

Fragility fractures in the elderly is an ongoing concern for orthopaedic surgeons. A 50-year-old woman has a 40% chance of having a vertebral compression fracture in her lifetime. The incidence of vertebral fractures, reported to be more than 10 times higher than that of femoral fractures, is estimated as 1-1.5 million per year in Japan. Vertebral fractures often occur without a fall, whereas the majority of nonvertebral fractures are the consequence of falls; the site of the nonvertebral fracture appears to be dictated by the type of fall. Distal radial fractures commonly occur as a consequence of hand protection during the fall. In older patients, falling load tends to directly affect shoulder and hip joints and lead to proximal humeral and femoral fractures. The incidence of vertebral fractures is increased in women over 50 yr of age, following the same trend as osteoporosis prevalence. Conversely, the mean age for proximal femoral fractures is around 80 yr, and more than 75% of femoral fractures occur in individuals over the age of 75. The prognostic risk of aging is 11-fold greater than that of reduced bone mineral density, and age is another risk factor for femoral fractures. Prophylactic therapy for osteoporosis and femoral fractures was shown to more effective in women in their 70s than in those over the age of 80. Although several approaches, including exercise therapy, vitamin D administration, and environmental adjustment at home, have been reported to be effective in fall prevention, effective fracture prevention approaches in frail elderly individuals have not yet been well established.

PDF Y Endnote Y

Factors associated with the occurrence of a fall in subjects with primary open-angle glaucoma

Adachi S, Yuki K, Awano-Tanabe S, Ono T, Murata H, Asaoka R, Tsubota K.

BMC Ophthalmol. 2017; 17(1): e213.

Affiliation: Department of Ophthalmology, Keio University School of Medicine, Shinanomachi 35, Shinjuku-ku, Tokyo, Japan.

DOI 10.1186/s12886-017-0613-1 **PMID** 29178850

Abstract

BACKGROUND: The aim of the study is to investigate risk factors for future falls in subject with primary open angle glaucoma (POAG).

METHODS: All participants answered the following question at their baseline ophthalmic examination: Have you had any falls in the last year? (Yes/No). All study participants answered the same question every 12 months for 3 years. The means of total deviation values in the whole, superior peripheral, superior central, inferior central, and inferior peripheral visual fields (VF) were calculated. The relationship between these mean VF measurements, and various clinical factors against patients' future falls was analyzed using multiple linear regression.

RESULTS: Two-hundred ninety four POAG patients answered the baseline and follow-up fall questionnaires over a period of three years. Among 294 subjects, 69 patients experienced a fall

during the three-year follow-up. History of falls at baseline (coefficient = 1.22), history of fear of falling at baseline (0.53), best corrected visual acuity in the worse eye (7.37), prevalence of diabetes mellitus (0.60), prevalence of systemic hypertension (0.53) were selected in the optimal model. CONCLUSIONS: Visual acuity in the worse eye, history of falls, fear of falling, diabetes mellitus, and systemic hypertension are risk factors for falling in subjects with POAG.

PDF Y Endnote Y

Forging a frailty-ready healthcare system to meet population ageing

Wee Shiong Lim, Sweet Fun Wong, Ian Leong,Philip Choo and Weng Sun Pang

Int. J. Environ. Res. Public Health 2017; 14(12): e14121448.

DOI 10.3390/ijerph14121448 **PMID** 29186782

Abstract

The beginning of the 21st century has seen health systems worldwide struggling to deliver quality healthcare amidst challenges posed by ageing populations. The increasing prevalence of frailty with older age and accompanying complexities in physical, cognitive, social and psychological dimensions renders the present modus operandi of fragmented, facility-centric, doctor-based, and illness-centered care delivery as clearly unsustainable. In line with the public health framework for action in the World Health Organization's World Health and Ageing Report, meeting these challenges will require a systemic reform of healthcare delivery that is integrated, patient-centric, team-based, and health-centered. These reforms can be achieved through building partnerships and relationships that engage, empower, and activate patients and their support systems. To meet the challenges of population ageing, Singapore has reorganised its public healthcare into regional healthcare systems (RHSs) aimed at improving population health and the experience of care, and reducing costs. This paper will describe initiatives within the RHS frameworks of the National Health Group (NHG) and the Alexandra Health System (AHS) to forge a frailty-ready healthcare system across the spectrum, which includes the well healthy ("living well"), the well unhealthy ("living with illness"), the unwell unhealthy ("living with frailty"), and the end-of-life (EoL) ("dying well"). For instance, the AHS has adopted a community-centered population health management strategy in older housing estates such as Yishun to build a geographically-based care ecosystem to support the self-management of chronic disease through projects such as "wellness kampungs" and "share-a-pot". A joint initiative by the Lien Foundation and Khoo Teck Puat Hospital aims to launch dementia-friendly communities across the island by building a network comprising community partners, businesses, and members of the public. At the National Healthcare Group, innovative projects to address the needs of the frail elderly have been developed in the areas of: (a) admission avoidance through joint initiatives with long-term care facilities, nurse-led geriatric assessment at the emergency department and geriatric assessment clinics; (b) inpatient care, such as the Framework for Inpatient care of the Frail Elderly, orthogeriatric services, and geriatric surgical services; and (c) discharge to care, involving community transitional care teams and the development of community infrastructure for post-discharge support; and an appropriate transition to EoL care. In the area of EoL care, the National Strategy for Palliative Care has been developed to build an integrated system to: provide care for frail elderly with advance illnesses, develop advance care programmes that respect patients' choices, and equip healthcare professionals to cope with the challenges of EoL care.

PDF Y Endnote Y

Gait speed is not magic, but is prognostically important in older patients

Granacher U, Völler H.

Eur. J. Prev. Cardiol. 2017; ePub(ePub): ePub.

Affiliation: Centre of Rehabilitation Research, University of Potsdam, Germany.

DOI 10.1177/2047487317744053 **PMID**29164921

Abstract [Abstract unavailable]

PDF Y Endnote Y

Grip strength as an indicator of health-related quality of life in old age-a pilot study

Christina Musalek and Sylvia Kirchengast

Int. J. Environ. Res. Public Health 2017; 14(12): e14121447.

DOI 10.3390/ijerph14121447

PMID 29186762

Abstract Over the last century life expectancy has increased dramatically nearly all over the world. This dramatic absolute and relative increase of the old aged people component of the population has influenced not only population structure but also has dramatic implications for the individuals and public health services. The aim of the present pilot study was to examine the impact of physical well-being assessed by hand grip strength and social factors estimated by social contact frequency on health-related quality of life among 22 men and 41 women ranging in age between 60 and 94 years. Physical well-being was estimated by hand grip strength, data concerning subjective wellbeing and health related quality of life were collected by personal interviews based on the WHOQOL-BREF questionnaires. Number of offspring and intergenerational contacts were not related significantly to health-related quality of life, while social contacts with non-relatives and hand grip strength in contrast had a significant positive impact on health related quality of life among old aged men and women. Physical well-being and in particular muscle strength-estimated by grip strength-may increase health-related quality of life and is therefore an important source for well-being during old age. Grip strength may be used as an indicator of health-related quality of life.

PDF Y Endnote Y

Health-related quality of life, handgrip strength and falls during detraining in elderly habitual exercisers

Esain I, Rodriguez-Larrad A, Bidaurrazaga-Letona I, Gil SM.

Health Qual. Life Outcomes 2017; 15(1): e226.

Affiliation: Department of Physiology, Faculty of Medicine and Nursing, University of the Basque Country (UPV/EHU), Barrio Sarriena s/n, E-48940, Leioa, Bizkaia, Spain. susana.gil@ehu.eus.

DOI 10.1186/s12955-017-0800-z **PMID** 29162116

Abstract

BACKGROUND: The effects of regular exercise on physical functioning and health-related quality of life (HRQOL) have been thoroughly studied. In contrast, little is known about the changes which occur following cessation of activity (detraining). Here, we have investigated the effect of a 3 month detraining period on HRQOL and on handgrip strength in elderly people who had regularly exercised, and examined the association of these variables with falls.

METHODS: Thirty-eight women and 11 men (mean age, 75.5±5.7 years) took part in a supervised physical exercise program for 9 months, followed by a 3 month detraining period. Participants completed the SF-36 HRQOL questionnaire at the beginning of detraining (baseline) and 3 months later. Handgrip strength and number of falls were also recorded.
RESULTS: Participants had been exercising for 12.1±8.7 years. After the detraining period, we found a significant ($p < 0.001$--0.05) decline in all SF-36 dimensions, with the exception of handgrip strength. Women presented a larger decline ($p < 0.05$) in more items than men. During the detraining period, 18.4% participants had a fall incident. HRQOL declined in both fallers and non-fallers during detraining. Interestingly, fallers already had at baseline significantly lower values in physical functioning ($p < 0.05$), emotional role ($p < 0.05$) and mental health ($p < 0.01$), than non-fallers.
CONCLUSIONS: An important decline was found in most items of the SF-36 following a 3 month detraining period, particularly in women. In contrast, strength of the upper limb was not affected by the detraining. The prior lower HRQOL values of those who will subsequently fall suggest that this criterion should be studied as a candidate risk factor for falls. Efforts should be made to encourage the elderly to continue with exercise activities and/or to shorten holiday break periods, in order to maintain their quality of life. TRIAL REGISTRATION: The protocol was registered as a clinical trial in the ANZCTR (trial ID: ACTRN12617000716369).
PDF Y Endnote Y

Influence of sequential vs. Simultaneous dual-task exercise training on cognitive function in older adults

Tait JL, Duckham RL, Milte CM, Main LC, Daly RM.
Front. Aging Neurosci. 2017; 9: e368.
Affiliation: Institute for Physical Activity and Nutrition, School of Exercise and Nutrition Sciences, Deakin University, Geelong, VIC, Australia.

DOI 10.3389/fnagi.2017.00368 **PMID** 29163146 **PMCID** PMC5681915

Abstract

Emerging research indicates that exercise combined with cognitive training may improve cognitive function in older adults. Typically these programs have incorporated sequential training, where exercise and cognitive training are undertaken separately. However, simultaneous or dual-task training, where cognitive and/or motor training are performed simultaneously with exercise, may offer greater benefits. This review summary provides an overview of the effects of combined simultaneous vs. sequential training on cognitive function in older adults. Based on the available evidence, there are inconsistent findings with regard to the cognitive benefits of sequential training in comparison to cognitive or exercise training alone. In contrast, simultaneous training interventions, particularly multimodal exercise programs in combination with secondary tasks regulated by sensory cues, have significantly improved cognition in both healthy older and clinical populations. However, further research is needed to determine the optimal characteristics of a successful simultaneous training program for optimizing cognitive function in older people.
PDF Y Endnote y

Mortality trends for accidental falls in older people in Spain, 2000-2015

Padrón-Monedero A, Damián J, Pilar Martin M, Fernández-Cuenca R.

BMC Geriatr. 2017; 17(1): e276.

Affiliation: CIBERESP (Consortium for Biomedical Research in Epidemiology and Public Health, Madrid, Spain.

DOI 10.1186/s12877-017-0670-6 **PMID** 29183274

Abstract

BACKGROUND: Accidental falls in older people are a major public health problem but a relatively limited number of studies have analyzed the mortality trends from this cause. Effective public health interventions have been found to prevent the incidence of falls and their complications. Therefore, characterizing the mortality trends of falls for different subpopulations can help to identify their needs and contribute to develop more appropriate prevention programs for specific target groups.
METHODS: This study was based on a longitudinal analysis of death rates from accidental falls (2000-2015) stratified by sex for the population ≥ 65 years and by age groups (65-74, 75-84, ≥85). A joinpoint regression model was used to identify trend inflection points. The Annual Percent Change (APC) was estimated for each trend.
RESULTS: Mortality rates per 100,000 person-years increased from 20.6 to 30.1 for men and 13.8 to 20.8 for women between 2000 and 2015. Men presented a relevant trend increase between 2008 and 2015 (APC [95% CI] 7.2% [5.3;9.2]) and women between 2008 and 2013 (7.9% [4.1;11.8]) There were no trend differences between sexes. For 65-74 years old men we found a relevant increase in the last period (2011-2015) (7.8% [1.0;15.1]). Those aged 75-84 years showed a trend increase between 2007 and 2015 (6.4% [4.4;8.4]) and men ≥85 years presented a remarkably high trend between 2008 and 2015 (9.0% [5.2;13]). There were no relevant differences between age groups. Women aged 65-74 had no relevant trend through the period. Those aged 75-84 presented an uniform trend increase for the whole period, 2000-2015, (3.4% [2.3;4.4]) and women ≥85 had and important trend increase between 2008 and 2013 (11.1% [5.3;17.2]), that has reached an stable level in the last 2 years. There were no relevant differences between the 75-84 and ≥85 age groups.
CONCLUSIONS: Recent mortality trends from accidental falls increased in men ≥65 years and women ≥75 years. These results recommend the implementation of specific preventive programs.

PDF Y Endnote Y

Motor imagery of walking and walking while talking: a pilot randomized-controlled trial protocol for older adults

Blumen HM, Verghese J.

Neurodegener. Dis. Manag. 2017; ePub(ePub): ePub.

Affiliation: Departments of Medicine & Neurology, Albert Einstein College of Medicine, Bronx, NY 10461, USA.

DOI 10.2217/nmt-2017-0024 **PMID** 29165011

Abstract

Over a third of community-residing elderly have clinical gait abnormalities, and gait impairment is associated with morbidity, mortality and dementia. Motor imagery - envisioning motor actions without actual execution - has been used to improve gait in Parkinson's disease and poststroke, but the efficacy of motor imagery in healthy elderly is unknown. This single-blind pilot randomized-

controlled trial aims to establish feasibility and explore the efficacy of a 3-month, telephone-based motor imagery intervention - that involves imagined walking, imagined talking and imagined walking while talking for improving gait in 48 healthy elderly. The primary outcomes will be gait speed during actual walking and walking while talking. Secondary outcomes will include cognitive performance during actual talking and walking while talking, and functional neuroplasticity during imagined walking and walking while talking. This clinical trial has been registered on clinicaltrials.gov (identifier NCT02762604).

PDF N Endnote Y

Obstacle circumvention and eye coordination during walking to least and most affected side in people with Parkinson's disease

Barbieri FA, Polastri PF, Gobbi LTB, Simieli L, Pereira VIA, Baptista AM, Moretto GF, Fiorelli CM, Imaizumi LFI, Rodrigues ST.

Behav. Brain Res. 2017; ePub(ePub): ePub.

Affiliation: São Paulo State University (Unesp) - Campus Bauru, Scholl of Science, Human Movement Research Laboratory (MOVI-LAB) and Laboratory of Information, Vision and Action (LIVIA), Department of Physical Education, Bauru, SP, Brazil.

DOI 10.1016/j.bbr.2017.11.032 **PMID** 29180136

Abstract

BACKGROUND: The mechanisms that contribute to gait asymmetry in people with Parkinson's disease (PD) are unclear, mainly during gait with greater environmental demand, such as when an obstacle is circumvented while walking.

OBJECTIVE: The aim of this study was to investigate the effects of obstacle circumvention of the least and most affected side on motor and gaze behavior in people with PD under/without the effects of dopaminergic medication.

METHODS: Fifteen people with PD and 15 matched-control individuals were instructed to walk along a pathway, at a self-selected velocity, and to circumvent an obstacle, avoiding contact with it. Each participant performed five trials for each side. Kinematic parameters, mediolateral and horizontal body clearance to the obstacle, strategy to circumvent the obstacle, and gaze behavior were calculated. Parameters were grouped according to the side that the obstacle was circumvented and compared by three-way ANOVAs.

RESULTS: Both people with PD and the control group presented asymmetry to circumvent an obstacle during walking, however this was exacerbated in people with PD. Individuals with PD presented safe strategies (largest mediolateral and horizontal body clearance to the obstacle, "lead-out" strategy, and higher number and time of fixations on the obstacle) during obstacle circumvention for the least affected side compared to the most affected side. In addition, positive effects of dopaminergic medication on body clearance, spatial-temporal parameters, and gaze behavior were evidenced only when the obstacle was circumvented to the least affected side.

CONCLUSIONS: The obstacle circumvention to the most affected side is risky for people with PD.

PDF Y Endnote Y

Post-stroke fatigue and depressive symptoms are differentially related to mobility and cognitive performance

MacIntosh BJ, Edwards JD, Kang M, Cogo-Moreira H, Chen JL, Mochizuki G, Herrmann N, Swardfager W.

Front. Aging Neurosci. 2017; 9: e343.

Affiliation: University Health Network Toronto Rehabilitation Institute, Toronto, ON, Canada.

DOI 10.3389/fnagi.2017.00343 **PMID** 29163127 **PMCID** PMC5671553

Abstract

BACKGROUND: Fatigue and depressive symptoms are common and often inter-related stroke sequelae. This study investigates how they are related, directly or indirectly, to mobility and cognitive outcomes within 6 months of stroke.

METHODS: Participants were recruited from 4 stroke centers in Ontario, Canada. Post-stroke fatigue was assessed using the Fatigue Assessment Scale (FAS). Depressive symptoms were screened using the Center for Epidemiological Studies Scale for Depression (CES-D). Factor analyses were used to construct scores from mobility (distance traveled during a 2-min walk test, Chedoke-McMaster Stroke Assessment leg score, and Berg Balance Scale total score) and cognitive (Montreal Cognitive Assessment, Trail-Making Tests A and B, and five-word free recall) tests. Direct associations were assessed in linear regression models and indirect effects were assessed in path models. Covariates were age, sex, education, antidepressant use, days since stroke, and stroke severity (National Institute of Health Stroke Severity Scale score).

RESULTS: Fatigue and depressive symptoms were highly correlated ($r > 0.51$, $p < 0.0001$). Depressive symptoms were associated with cognition ($\beta = -0.184$, $p = 0.04$) and indirectly with mobility, mediated by fatigue (indirect effect = -0.0142, 95% CI: -0.0277 to -0.0033). Fatigue was associated with mobility ($\beta = -0.253$, $p = 0.01$), and indirectly with cognition, mediated by depressive symptoms (indirect effect = -0.0113, 95% CI: -0.0242 to -0.0023).

CONCLUSIONS: Fatigue and depressive symptoms are related distinctly to cognitive and mobility impairments post-stroke. Fatigue was associated with poorer lower limb motor function, and with cognition indirectly via depressive symptoms.

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Relationship of serum carnitine level with falls and gait disturbance in the elderly

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J. Frailty Aging 2017; 6(4): 178-182.

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DOI 10.14283/jfa.2017.36 **PMID** 29165532

Abstract

BACKGROUND: Gait disturbance and falls are serious events that can impair activities of daily living (ADL) in the elderly. On the other hand, carnitine plays essential roles in energy production, and carnitine deficiency leads to low activity levels.

OBJECTIVES: We examined whether a lower serum carnitine concentration was correlated with falls and gait disturbances in the elderly.

DESIGN, SETTING, AND PARTICIPANTS: We performed a cross-sectional study. One hundred and ninety-eight elderly patients (male, 83; female, 115; 81 ± 6 years old) were enrolled in this study.
MEASUREMENTS: Physical performance (hand grip strength, leg strength, walking speed, one-leg standing time, and tandem gait steps) and frailty status (The Edmonton Frail Scale: EFS) were evaluated. The serum total, free, and acylated carnitine levels were measured using an enzyme cycling method. We then investigated the associations between the serum carnitine level, history of falls, and the results of these physical examinations.
RESULTS: Of the 198 subjects, 56 (28%) had a history of falls within the past one year. The patients with a history of falls had lower serum total carnitine and free carnitine levels than those without a history of falls. Regarding the physical performance results, the patients with a history of falls had higher EFS scores, a weaker hand grip strength, a slower walking speed, a shorter one-leg standing time, and a smaller number of tandem gait steps than those without a history of falls. A logistic regression analysis showed that the low serum total carnitine concentration was identified as an independent factor associated with a history of falls, a slow walking speed after adjustments for age, sex and modified EFS.
CONCLUSIONS: A low serum carnitine level is associated with a history of falls and gait disturbances in elderly people.
PDF N Endnote Y

Study of the association between gait variability and physical activity
Ciprandi D, Bertozzi F, Zago M, Ferreira CLP, Boari G, Sforza C, Galvani C.
Eur. Rev. Aging Phys. Activ. 2017; 14: e19.
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DOI 10.1186/s11556-017-0188-0 **PMID** 29177018 **PMCID** PMC5688736
Abstract
BACKGROUND: Gait variability can be considered an indirect measure of gait stability, in particular regarding temporal or spatial variability assessment. Physical activity, such as walking, is advised for the elderly and can be improved by gait stability. The aim of this study was to investigate the associations between gait stability and physical activity in women of different age ranges.
METHODS: Forty-two healthy women of different age ranges (18-40 yrs. and 65-75 yrs.) were recruited in the study. To assess physical activity, the subjects wore a multi-sensor activity monitor for a whole week, inferring the time spent in moderate to vigorous physical activity (MVPA). MVPA were analysed in bouts of at least 10 subsequent minutes (MVPAbouts) and in overall minutes (MVPAtot). A kinematic analysis was performed with an optoelectronic system to calculate gait variability - expressed as standard deviation (SD) and coefficient of variability (CV) of step width, stride length, stance and swing time (during treadmill walking at different speeds).
RESULTS: Elderly women, with high walking speed (5 km/h), and moderate step width variability (CV = 8-27%), met the recommended levels of physical activity (MVPAtot and MVPAbouts). Furthermore, gait variability, adjusted for age and number of falls, was significantly and negatively associated with MVPAtot only at 3.5 km/h, and with MVPAbouts only at 4 km/h.
CONCLUSIONS: In a population of healthy elderly women, gait variability was significantly and negatively associated with the level of physical activity. Healthy elderly women, with moderate gait

variability (step width variability), and high preferred walking speed, seem to be able to meet the recommended levels of physical activity.

PDF Endnote

The effect of primary total knee arthroplasty on the incidence of falls and balance-related functions in patients with osteoarthritis

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Sci. Rep. 2017; 7(1): e16583.

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DOI 10.1038/s41598-017-16867-4 **PMID** 29185496

Abstract

Knee osteoarthritis (OA) is an established risk factor for falls and balance impairment. This study investigated the incidence of falls, balance-related outcomes and risk factors for falls before and after primary total knee arthroplasty (TKA). Three hundred seventy-six OA patients scheduled to undergo TKA were included. Falls data within the preoperative, first postoperative and second postoperative years were collected, balance-related functions were assessed using the Assessment of Quality of Life (AQoL), WOMAC, Falls Efficacy Scale International (FES-I), Activities-specific Balance Confidence (ABC), knee extension strength, Berg Balance Scale (BBS) and Timed Up and Go (TUG) before surgery and 1 and 2 years after surgery. Compared with preoperative values, the incidence of falls significantly decreased (14.89%, 6.23% and 3.14% within the preoperative, first postoperative and second postoperative years, respectively) and the AQoL, WOMAC, FES-I, ABC, knee extension strength, BBS and TUG significantly improved after TKA. Logistic regression analysis revealed that Kellgren-Lawrence grade ≥ 3 of the contralateral knee was an independent risk factor for falls before and after TKA. Conclusively, primary TKA is associated with a reduced incidence of falls and improved balance-related functions, and the contralateral knee should be considered in the design of fall-prevention strategies in patients with OA.

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Timed up and go test combined with self-rated multifactorial questionnaire on falls risk and sociodemographic factors predicts falls among community-dwelling older adults better than the timed up and go test on its own

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J. Multidiscip. Healthc. 2017; 10: 409-416.

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DOI 10.2147/JMDH.S142520 **PMID** 29138571 **PMCID** PMC5667639

Abstract

BACKGROUND: Early detection of falls risk among older adults using simple tools may assist in fall prevention strategies. The aim of this study was to identify the best parameters associated with previous falls, either the timed up and go (TUG) test combined with sociodemographic factors and a self-rated multifactorial questionnaire (SRMQ) on falls risk or the TUG on its own. Falls risk was determined based on parameters associated with previous falls.

DESIGN: This was a retrospective cohort study. SETTING: The study was conducted in a community setting. PARTICIPANTS: The participants were 1,086 community-dwelling older adults, with mean age of 69.6±5.6 years. Participants were categorized into fallers and nonfallers based on their history of falls in the past 12 months.
METHOD: Participants' sociodemographic data was taken, and SRMQ consisting of five falls-related questions was administered. Participants performed the TUG test twice, and the mean was taken as the result.
RESULTS: A total of 161 participants were categorized as fallers (14.8%). Multivariate logistic regression analysis showed that the model ($\chi(2)(6)=61.0$, $p<0.001$, Nagelkerke $R(2)=0.10$) consisting of the TUG test, sociodemographic factors (gender, cataract/glaucoma and joint pain), as well as the SRMQ items "previous falls history" (Q1) and "worried of falls" (Q5), was more robust in terms of falls risk association compared to that with TUG on its own ($\chi(2)(1)=10.3$, $p<0.001$, Nagelkerke $R(2)=0.02$).
CONCLUSION: Combination of sociodemographic factors and SRMQ with TUG is more favorable as an initial falls risk screening tool among community-dwelling older adults. Subsequently, further comprehensive falls risk assessment may be performed in clinical settings to identify the specific impairments for effective management.
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User-oriented evaluation of a robotic rollator that provides navigation assistance in frail older adults with and without cognitive impairment
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Gerontology 2017; ePub(ePub): ePub.
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DOI 10.1159/000484663 **PMID** 29183035
BACKGROUND: Navigational skills decline with age, and this decline is even more pronounced in cognitively impaired (CI) older adults. Navigation assistance is an emerging functionality of robotic rollators (RRs). The evidence on the effectiveness of RR-integrated navigation systems in potential end-users is, however, scarce.
OBJECTIVE: To determine whether RR-provided navigation assistance improves navigation within a real-life environment in the intended user group of frail older adults with and without cognitive impairment currently using a rollator in daily life.
METHODS: A randomized, between-subject, 2 × 2 factorial design was conducted to test the effects of navigation assistance and cognitive status on participants' navigation performance. Twenty CI (Mini-Mental State Examination [MMSE] 17-26) and 22 not cognitively impaired (NCI; MMSE >26) older rollator users (age 82.5 ± 8.7 years) were included. Participants were matched for cognitive status (CI vs. NCI) and randomized to one of two conditions: RR (1) with or (2) without activated navigation system. All participants had to complete a two-section navigation path with the RR in an unfamiliar, real-life environment. Participants with RR-assisted navigation were supported in wayfinding by directional audio cues of the RR-integrated navigation system. Participants without RR-assisted navigation had to complete the sections by orienting themselves along conventional signposts. Outcomes were success rate, completion and stopping time, number of stops, walking distance, and gait speed.

RESULTS: The navigation assistance condition had no significant effect on the success rate in the CI, NCI, or total group. We found significant interactions between navigation assistance and cognitive status for both sections (p = 0.002-0.040), such that RR-assisted navigation reduced the completion time (both sections), stopping time (section 1), and number of stops (section 2) in the CI (p ≤ 0.001-0.014) but not in the NCI group. On the more complex section 2, RR-assisted navigation led to a reduced stopping time and walking distance in the total group (p = 0.014-0.016).
CONCLUSION: The RR-integrated navigation system was effective for improving navigation within a real-life environment in potential end-users, especially in those with cognitive impairment. This is the first study to provide statistical evidence on the effectiveness of an RR-integrated navigation system in the intended user group.

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Various diagnostic measures of frailty as predictors for falls, weight change, quality of life, and mortality among older Finnish men

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J. Fraility Aging 2017; 6(4): 188-194.
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DOI 10.14283/jfa.2017.26 **PMID** 29165534
Abstract
BACKGROUND: Frailty predisposes individuals to a variety of complications. However, there is no consensus on the definition of frailty.
OBJECTIVES: To examine whether various frailty measures are equivalent in identifying the same individuals as being frail and whether the measures also predict similar outcomes.
DESIGN, SETTING AND PARTICIPANTS: The Helsinki Businessmen Study cohort, which is a long-term observational study of men born in 1919-1934, was used as the population. We investigated these men by their postal questionnaire responses in 2000 and 2005. The mean age of the men (N=480) was 73 years at the start of follow-up.
MEASUREMENTS: We compared two phenotypic frailty measures, the Helsinki Businessmen Study measure (HBS), the modified Women's Health Initiative Observational Study (WHI-OS), and the Frailty Index (FI) comprising 20 items. All three measurements were applied to Helsinki Businessmen Study cohort data collected via simple postal questionnaire from 480 men. We investigated how effectively these three measures distinguished between the not frail, prefrail, and frail individuals, and predicted mortality, falls, weight change, and health-related quality of life (HRQoL, 15D instrument) during a 5-year follow-up.
RESULTS: The HBS and the modified WHI-OS identified 35 persons (7.3%) each as frail but their respective sets comprised different groupings of individuals that partly overlapped. The FI identified 86 persons (17.9%) as frail. One-hundred-and-two (21.3%) men were classified as frail by at least one of the measures. All three measures significantly predicted higher mortality, higher number of fallers, and lower HRQoL for frail participants. None of the measures showed different results for weight change between the frailty groups or frailty stages.

CONCLUSIONS: All three measures identified somewhat different sets of participants as frail. They all predicted increased mortality, falls and reduced HRQoL for the frail groups.

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Vitamin D and the mechanisms, circumstances and consequences of falls in older adults: a case-control study

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J. Nutr. Health Aging 2017; 21(10): 1307-1313.

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DOI 10.1007/s12603-016-0857-0 **PMID** 29188894

Abstract

OBJECTIVES: To determine i) whether cases of elderly fallers had lower serum 25-hydroxyvitamin D (25OHD) concentration than controls without history of falls; and ii) whether serum 25OHD concentration was associated with specific mechanisms, circumstances and consequences of falls.

DESIGN: Case-control study with a 1:2 ratio.

SETTING: Geriatric ward of the University Hospital of Angers, France, between February 2012 and March 2014.

PARTICIPANTS: 216 inpatients (72 cases and 144 age- and gender-matched controls).

MEASUREMENT: Falls were defined as involuntary events causing the person to the ground or other lower level. The main mechanisms, circumstances and consequences of falls were identified using standardized questionnaires. Vitamin D deficiency was defined as serum 25OHD concentration ≤25nmol/L. Age, gender, body mass index, polypharmacy, use antihypertensive drugs, use psychoactive drugs, disability, cognitive performance, serum concentrations of parathyroid hormone, creatinine and albumin, and season of evaluation were used as potential confounders.

RESULTS: 216 participants (72 cases and 144 controls) were included in the study. There was no between-group difference in the prevalence of vitamin D deficiency (P=0.176). After adjusting for confounding factors, vitamin D deficiency was positively associated with falls (OR=4.03, P=0.014). Finally, the fallers with vitamin D deficiency exhibited more often orthostatic hypotension (68.8% against 33.3%, P=0.039) and a history of recurrent falls (85% against 50%, P=0.002) than those without vitamin D deficiency.

CONCLUSION: This case-control study reported that vitamin D deficiency was associated with falls in older inpatients. There was a greater prevalence of orthostatic hypotension and of the reccurrence of falls among fallers with vitamin D deficiency, suggesting that vitamin D may influence the conditions predisposing to falls rather than the fall by itself.

PDF Y Endnote Y

Association between slip severity and muscle synergies of slipping

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Front. Hum. Neurosci. 2017; 11: e536.

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DOI 10.3389/fnhum.2017.00536 **PMID** 29163111 **PMCID** PMC5674011

Abstract

Falls impose significant negative impacts to the US population and economy. A significant number of falls may be prevented via appropriate slip-responses since a strong relation exists between slips and falls. More importantly, as severe slips are more prone to result in a fall, identifying severe slippers along with the responsible factors for their adverse motor control and severe slipping should be the highest priority in fall prevention process. Previous studies have suggested that muscle synergies may be building blocks of the central nervous system in controlling motor tasks. Muscle synergies observed during slipping ('post-slip-initiation synergies' or 'just briefly,' 'slipping muscle synergies'), may represent the fundamental blocks of the neural control during slipping. Hence, studying the differences in slipping muscle synergies of mild and severe slippers can potentially reveal the differences in their neural control and subsequently, indicate the responsible factors for the adverse post-slip response in severe slippers. Even though the slipping muscle synergies have been investigated before, it still remains unclear on how the slip severity is associated with the slipping muscle synergies. More importantly, muscle synergies can be interpreted not only as neural blocks but also as physical sub-tasks of the main motor task. Hence, studying the differences of slipping synergies of mild and severe slippers would reveal the discrepancies in sub-tasks of their post-slip response. These discrepancies help pinpoint the malfunctioning sub-function associated with inadequate motor response seen in severe slippers. Twenty healthy subjects were recruited and underwent an unexpected slip (to extract their slipping synergies). Subjects were classified into mild and severe slippers based on their Peak Heel Speed. An independent t-test revealed several significant inter-group differences for muscle synergies of mild and severe slippers indicating differences in their neural control of slipping. A forward dynamic simulation was utilized to reveal the functionality of each synergy. Decomposition of slipping into sub-tasks (synergies), and finding the malfunctioning sub-task in severe slippers is important as it results in a novel targeted motor-rehabilitation technique that only aims to re-establish the impaired sub-task responsible for the adverse motor-response in severe slippers.

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Distinguishing among multiple sclerosis fallers, near-fallers and non-fallers

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Mult. Scler. Relat. Disord. 2017; 19: 99-104.

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DOI 10.1016/j.msard.2017.11.019 **PMID** 29182996

Abstract

BACKGROUND: Fall rates among adults with multiple sclerosis are consistently greater than 50%, but near-falls (i.e. a trip or stumble) are often undocumented. Furthermore, little is known about the circumstances surrounding fall and near-fall events. The purpose of this study was to examine the similarities and differences among non-fallers, near-fallers and fallers with multiple sclerosis, including the circumstances that surround falls and near-falls.

METHODS: In a single visit, 135 multiple sclerosis participants completed the Hopkins Falls Grading

Scale, a custom questionnaire investigating circumstances surrounding falls and near-falls, and performed the Timed Up and Go and Timed 25-Foot Walk tests. Mann-Whitney tests were used to examine differences between fallers, near-fallers and non-fallers. Multiple logistic regression with AIC criterion was used to examine associations of circumstances with the odds of falling vs. near-falling. Cumulative odds ordinal logistic regression was used to analyze the association between each of the walking tests and the susceptibility of the individual for falls or near-falls.
RESULTS: 30% of individuals reported falls, while 44% reported near-falls over a 1-year period. Non-fallers completed the walking tests more quickly than near-fallers ($p < 0.0045$), and fallers ($p < 0.0001$); near-fallers and fallers demonstrated similar motor profiles. Individuals were more likely to sustain a fall rather than a near-fall under the following circumstances: transferring outside the home ($p = 0.015$) and tripping over an obstacle ($p = 0.025$). Performing 1-second slower on the walking tests increased the odds of a history of a fall by 6-20%.
CONCLUSION: Near-falls occur commonly in individuals with MS; near-fallers and fallers reported similar circumstances surrounding fall events and demonstrated similar performance on standard timed walking tests. Clinicians monitoring individuals with MS should consider evaluation of the circumstances surrounding falls in combination with quantitative walking measures to improve determination of fall risk and appropriate rehabilitation interventions.

PDF Y Endnote Y

Traumatic fractures of the cervical spine: analysis of changes in incidence, etiology, concurrent injuries and complications among 488,262 patients from 2005-2013
Passias PG, Poorman GW, Segreto FA, Jalai CM, Horn SR, Bortz CA, Vasquez-Montes D, Diebo BG, Vira S, Bono OJ, De La Garza-Ramos R, Moon JY, Wang C, Hirsch BP, Zhou PL, Gerling M, Koller H, Lafage V.
World Neurosurg. 2017; ePub(ePub): ePub.
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DOI 10.1016/j.wneu.2017.11.011 **PMID**29138069
Abstract
OBJECTIVE: The etiologies and epidemiology of traumatic cervical spine fracture have not been described with sufficient power or recency. Our goal is to describe demographics, incidence, etiology, spinal cord injuries (SCIs), concurrent injuries, treatments, and complications of traumatic cervical spine fractures.
METHODS: Retrospective review of the Nationwide Inpatient Sample. ICD-9 E-Codes identified trauma cases from 2005-2013. Patients with cervical fracture were isolated. Demographics, incidence, etiology, fracture levels, concurrent injuries, surgical procedures, and complications were analyzed. T-tests elucidated significance for continuous variables, chi-square for categorical variables. Level of significance $P<0.05$.
RESULTS: 488,262 patients isolated (age:55.96, male:60.0%, white:77.5%). Incidence (2005:4.1% vs 2013:5.4%), Charlson-Comorbidity-Index (2005:0.6150 vs. 2013:1.1178), and total charges (2005:$71,228.60 vs. 2013:$108,119.29) have increased since 2005, while length of stay (LOS) decreased (2005:9.22 vs. 2013:7.86) (all $P<0.05$). Most common etiologies were MVA (29.3%), falls (23.7%) and pedestrian accidents (15.7%). Most frequent fracture types were closed at C2 (32.0%)

and C7 (20.9%). Concurrent injury rates have significantly increased since 2005 (2005:62.3% vs. 2013:67.6%). Common concurrent injuries included fractures to the rib/sternum/larynx/trachea (19.6%). Overall fusion rates have increased since 2005 (2005:15.7% vs 2013:18.0%), while decompressions and halo insertion rates have decreased (all P<0.05). SCIs have significantly decreased since 2005, except for upper-cervical central cord syndrome. Complication rates have significantly increased since 2005 (2005:31.6% vs. 2013:36.2%). Common complications included Anemia (7.7%), Mortality (6.6%), and ARDS (6.6%).
CONCLUSION: Incidence, complications, concurrent injuries, and fusions have increased since 2005. LOS, SCIs, decompressions and halo insertions have decreased. Indicated trends should guide future research in management guidelines.

PDF Endnote

Variations in static force control and motor unit behavior with error amplification feedback in the elderly

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Front. Hum. Neurosci. 2017; 11: e538.
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DOI 10.3389/fnhum.2017.00538 **PMID** 29167637 **PMCID** PMC5682334
Abstract
Error amplification (EA) feedback is a promising approach to advance visuomotor skill. As error detection and visuomotor processing at short time scales decline with age, this study examined whether older adults could benefit from EA feedback that included higher-frequency information to guide a force-tracking task. Fourteen young and 14 older adults performed low-level static isometric force-tracking with visual guidance of typical visual feedback and EA feedback containing augmented high-frequency errors. Stabilogram diffusion analysis was used to characterize force fluctuation dynamics. Also, the discharge behaviors of motor units and pooled motor unit coherence were assessed following the decomposition of multi-channel surface electromyography (EMG). EA produced different behavioral and neurophysiological impacts on young and older adults. Older adults exhibited inferior task accuracy with EA feedback than with typical visual feedback, but not young adults. Although stabilogram diffusion analysis revealed that EA led to a significant decrease in critical time points for both groups, EA potentiated the critical point of force fluctuations [Formula: see text], short-term effective diffusion coefficients (Ds), and short-term exponent scaling only for the older adults. Moreover, in older adults, EA added to the size of discharge variability of motor units and discharge regularity of cumulative discharge rate, but suppressed the pooled motor unit coherence in the 13-35 Hz band. Virtual EA alters the strategic balance between open-loop and closed-loop controls for force-tracking. Contrary to expectations, the prevailing use of closed-loop control with EA that contained high-frequency error information enhanced the motor unit discharge variability and undermined the force steadiness in the older group, concerning declines in physiological complexity in the neurobehavioral system and the common drive to the motoneuronal pool against force destabilization.
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