SafetyLit March 27, 2016

Age-related decline in muscle mass and muscle function in Flemish Caucasians: a 10-year follow-up

Charlier R, Knaeps S, Mertens E, Van Roie E, Delecluse C, Lefevre J, Thomis M.

Age (Dordr) 2016; 38(2): 36.

Affiliation: Faculty of Kinesiology and Rehabilitation Sciences, Department of Kinesiology, Physical Activity, Sports and Health Research Group, KU Leuven, Tervuursevest 101, 3001, Leuven, Belgium. martine.thomis@faber.kuleuven.be.

DOI 10.1007/s11357-016-9900-7 **PMID** 26961694

Abstract

Aging is a complex process that is accompanied with changes in both muscle mass and muscle function (strength and performance). Therefore, the current longitudinal study aimed to provide a better insight in 10-year aging-related changes in whole-body muscle mass and strength performance of the leg extensors during the adult life span. Data were gathered within the framework of the first- (2002-2004: baseline) and third-generation Flemish Policy Research Center Sport (2012-2014: follow-up).

RESULTS are based on muscle characteristics data of 591 Flemish Caucasian adults (19-73 years, 381 men). Skeletal muscle mass (SMM) was determined with bioelectrical impedance analysis. Biodex Medical System 3® dynamometer was used to measure isometric (PTstatic120°) and isokinetic (PTdynamic60° and PTdynamic240°) strength, ballistic movement speed (S 20 %), and muscular endurance (work) of the knee extensors. Overall strength performance was higher at both evaluation moments in men compared to women ($p < 0.01$). But only S 20 % declined significantly faster in men compared to women ($p < 0.01$). Age and baseline strength performance were negatively related with the change in strength performance, even when corrected for SMM, protein intake, and energy expenditure during sports (E sport). In conclusion, strength performance was not associated with E sport in this study, but protein intake was associated with isometric strength in men, and with ballistic and isokinetic strength in women. Changes in S 20 % were significantly greater in men compared to women. Baseline values of strength performance and age were associated with changes in strength performance parameters, even after correction for SMM, protein intake, and E sport.

PDF Y Endnote Y

Biodex fall risk assessment in the elderly with ataxia: a new age-dependent derived index in rehabilitation: an observational study

Prometti P, Olivares A, Gaia G, Bonometti G, Comini L, Scalvini S.

Medicine (Baltimore) 2016; 95(10): e2977.

Affiliation: From the Unit of Recovery and Functional Rehabilitation (PP, GB); Laboratory of Cardiovascular Pathophysiology (AO); Laboratory of Clinical Biochemistry (GG); Health Directorate (LC); and Cardiac Rehabilitation Division and Telemedicine Service (SS), Scientific Institute of Lumezzane, Fondazione Salvatore Maugeri, IRCCS, Lumezzane, Brescia, Italy.

DOI 10.1097/MD.0000000000002977 **PMID** 26962804

Abstract

The aim of this study was to evaluate if the Biodex Fall Risk Assessment could provide an age-adjusted index useful for classifying patients at "risk of fall."This was a cohort study conducted on 61

chronic patients, in stable conditions, having a history of ataxia, difficulty in walking or loss of balance, and aged >64 years. These patients were coming from home to our Institute undergoing a period of in-hospital standard rehabilitation. Assessment of clinical parameters was performed at entry. Functional scales (Functional Independence Measure [FIM] for motor and cognitive function, Barthel G, Tinetti POMA), and the Biodex Fall Risk Index (FRI) were performed at entry and discharge. The Normalized FRI, obtained adjusting FRI to the reported maximum predictive FRI for the relevant age, identified 2 types of patients: those with a greater risk of fall than expected for that age, labeled Case 1 (Normalized FRI>1); and those with an equal or even lesser risk of fall than expected for that age, labeled Case 0 (Normalized FRI≤1).FRI, Normalized FRI as well as independent variables as age, sex, pathology group, FIM, BarthelG, were considered in a multiple regression analysis to predict the functional improvement (i.e., delta Tinetti Total score) after rehabilitation.Normalized FRI is useful in assessing patients at risk of falls both before and after rehabilitation. At admission, the Normalized FRI evidenced high fall risk in 46% of patients (Case 1) which decreased to 12% after rehabilitation, being greater than age-predicted in 7 patients (Case 1-1) despite the functional improvement observed after the rehabilitation treatment. Normalized FRI evidenced Case 1-1 patients as neurological, "very old" (86% in age-group 75-84 years), and with serious events at 18 to 24 months' follow-up. Normalized FRI, but not FRI, at admission was a predictor of improvement in Tinetti Total scores.The normalized FRI effectively indicated patients at higher risk of fall, in whom health deterioration, falls, or cognitive decline was later documented at follow-up. The normalized FRI could be a standardized measure for identifying frailer patients becoming a further criterium of discharge home and marker of fall risk at home.

PDF Y Endnote Y

Cognitive function and quality of life in community-dwelling seniors with mild cognitive impairment in Taiwan

Hsiao HT, Li SY, Yang YP, Lin LL, Lin SI, Wang JJ.

Community Ment. Health J. 2016; ePub(ePub): ePub.

Affiliation: Institute of Allied Health Science, College of Medicine, National Cheng Kung University, No. 1, Ta-Hsueh Rd., Tainan City, 70101, Taiwan, ROC. ns127@mail.ncku.edu.tw.

DOI 10.1007/s10597-016-9993-6 **PMID** 26993652

Abstract

The aims of this study were to examine the relationships between overall cognitive function and the quality of life (QOL) domains, and to compare the differences in these by age, gender, and educational level in community-dwelling seniors in Taiwan. A cross-sectional study was conducted, with the participants screened and recruited from Southern Tainan. The Saint Louis University Mental Status Examination was used to screen the cognitive status of the participants. A total of 144 seniors participated in this study were assessed using the Taiwanese version of WHOQOL-BREF. The results showed that the participants performed better in the cognitive domains of "figure identification" and "orientation" while they performed poor in "delayed recall" and "immediate paragraph recall". No significant relationship between cognitive function and overall QOL, but a positive relationship between cognitive function and the physical health domain of QOL was found. The findings of this study provide valuable information for community healthcare providers.

PDF Y Endnote Y

Disentangling cognitive-frailty: results from the gait and brain study

Montero-Odasso MM, Barnes B, Speechley M, Muir Hunter SW, Doherty TJ, Duque G, Gopaul K, Sposato LA, Casas-Herrero A, Borrie MJ, Camicioli R, Wells JL.

J. Gerontol. A Biol. Sci. Med. Sci. 2016; ePub(ePub): ePub.

Affiliation: Department of Medicine and Division of Geriatric Medicine, Schulich School of Medicine & Dentistry, University of Western Ontario, London, Canada.

DOI 10.1093/gerona/glw044 **PMID** 26984391

Abstract

BACKGROUND: Cognitive-frailty, defined as the presence of both frailty and cognitive impairment, is proposed as a distinctive entity that predicts dementia. However, it remains controversial whether frailty alone, cognitive-frailty, or the combination of cognitive impairment and slow gait pose different risks of incident dementia.

METHODS: Two hundred and fifty-two older adults free of dementia at baseline (mean age 76.6±8.6 years) were followed up to 5 years with bi-annual visits including medical, cognitive, and gait assessments. Incident all-cause of dementia and cognitive decline were the main outcomes. Frailty was defined using validated phenotypic criteria. Cognition was assessed using the Montreal Cognitive Assessment while gait was assessed using an electronic walkway. Cox Proportional Hazards models were used to estimate the risk of cognitive decline and dementia for frailty, cognitive-frailty, and gait and cognition models.

RESULTS: Fifty-three participants experienced cognitive decline and 27 progressed to dementia (incident rate: 73/1,000 person-years). Frailty participants had a higher prevalence of cognitive impairment compared with those without frailty (77% vs. 54%, p =.02) but not significant risk to incident dementia. Cognitive-frailty increased incident rate (80/1,000 person-years) but not risk for progression to dementia. The combination of slow gait and cognitive impairment posed the highest risk for progression to dementia (hazard ratio: 35.9, 95% confidence interval: 4.0-319.2; p = 0.001, incident rate: 130/1,000 person-years). None of the models explored significantly predicted cognitive decline.

CONCLUSIONS: Combining a simple motor test, such as gait velocity, with a reliable cognitive test like the Montreal Cognitive Assessment is superior than the cognitive-frailty construct to detect individuals at risk for dementia. Cognitive-frailty may embody two different manifestations, slow gait and low cognition, of a common underlying mechanism.

PDF Y Endnote Y

Effectiveness of the STOPP/START (Screening Tool of Older Persons' potentially inappropriate Prescriptions/Screening Tool to Alert doctors to the Right Treatment) criteria: systematic review and meta-analysis of randomized controlled studies

Hill-Taylor B, Walsh KA, Stewart S, Hayden J, Byrne S, Sketris IS.

J. Clin. Pharm. Ther. 2016; ePub(ePub): ePub.

Affiliation: College of Pharmacy, Faculty of Health Professions, Dalhousie University, Halifax, NS, Canada.

DOI 10.1111/jcpt.12372 **PMID** 26990017

Abstract
WHAT IS KNOWN AND OBJECTIVE: STOPP/START are explicit screening tools that identify potentially inappropriate prescribing in older adults. Our objective was to update our 2013 systematic review that showed limited evidence of impact, using new evidence from randomized controlled trials (RCTs) assessing clinical, humanistic and economic outcomes in older adults.
METHODS: We performed a search of PubMed, EMBASE, CINAHL, Web of Science and grey literature for RCTs published in English since the previous review through June 2014. The Cochrane Risk of Bias Tool was used. We performed a meta-analysis on the effect of STOPP on potentially inappropriate medication (PIM) rates and a narrative synthesis on other outcomes.
RESULTS AND DISCUSSION: Four RCTs (n = 1925 adults) from four countries were included, reporting both acute (n = 2) and long-term care (n = 2) patients. Studies differed in implementation. Two studies were judged to have low risk, and two to have moderate-to-high risk of bias in key domains. Meta-analysis found that the STOPP criteria reduced PIM rates in all four studies, but study heterogeneity (I(2) = 86·7%) prevented the calculation of a meaningful statistical summary. We found evidence that use of the criteria reduces falls, delirium episodes, hospital length-of-stay, care visits (primary and emergency) and medication costs, but no evidence of improvements in quality of life or mortality.
WHAT IS NEW AND CONCLUSION: STOPP/START may be effective in improving prescribing quality, clinical, humanistic and economic outcomes. Additional research investigating these tools is needed, especially in frail elderly and community-living patients receiving primary care.
PDF Y Endnote Y

Effort to reduce postural sway affects both cognitive and motor performances in individuals with Parkinson's disease
Sciadas R, Dalton C, Nantel J.
Hum. Mov. Sci. 2016; 47: 135-140.
Affiliation: School of Human Kinetics, Faculty of Health Sciences, Ottawa University, Canada. Electronic address: jnantel@uottawa.ca.

DOI 10.1016/j.humov.2016.03.003 **PMID** 26986766
Abstract
OBJECTIVES: To assess the effects of voluntarily reducing postural sway on postural control and to determine the attention level needed to do so in healthy adults (n=16, 65.9±9.7) and persons with PD (n=25, 65.8±9.5years).
TASKS: quiet and still standing conditions with and without a category task. Cognitive performance, center of pressure (CoP) displacement variability (RMSCoP) and velocity (VCoP) were assessed in the anterior-posterior (AP) and medial-lateral (ML) directions. Controls showed larger RMSCoP (AP) and VCoP (AP and ML) during still versus quiet standing ($p<0.01$), while the PD group demonstrated no changes. In the PD group, RMSCoP and VCoP (ML) increased in still standing when performed with the cognitive task ($p<0.05$). In both groups, cognitive responses decreased in still standing ($p<0.05$). In PD, attempting to reduce postural sway did not affect postural control under single task conditions, however ML CoP variability and velocity did increase as a dual task. In older adults, increased displacement and velocity in both AP and ML directions was observed during single, but not dual task conditions. Therefore standing still might not be an adequate postural strategy as it

increases the attentional demand and affects motor performance, putting persons with PD at greater risk for falls.
PDF Y Endnote Y

Functional fitness norms for community-dwelling older adults in Hong Kong
Chung PK, Zhao Y, Liu JD, Quach B.
Arch. Gerontol. Geriatr. 2016; 65: 54-62.
Affiliation: Department of Physical Education, Hong Kong Baptist University, Kowloon Tong, Hong Kong.

DOI 10.1016/j.archger.2016.03.006 **PMID** 26987081
Abstract
OBJECTIVE: This study aimed to establish normative data for older adults in Hong Kong and explore age and sex differences in functional fitness.
METHODS: A sample of 944 independent community-dwellers, aged 65-74 years, was evaluated using the Senior Fitness Test battery in addition to hand grip and single leg stance tests. Normative data were reported for the 10th, 25th, 50th, 75th, and 90th percentiles in 5-year age groups.
RESULTS: Except for upper extremity muscle strength in women and body mass index (BMI) in both sexes, ageing-associated degradation was observed in all testing parameters especially in flexibility, balance, and agility. Significant sex differences were found in all testing parameters with the exception of BMI and static balance with eyes open. Moreover, men demonstrated higher capacities for muscle strength, agility, balance, and aerobic endurance, whereas women showed superior flexibility.
CONCLUSION: The normative values enable the evaluation of individual performance regarding the fitness status of older adults in Hong Kong.
PDF Y Endnote Y

Individual differences in reasoning and visuospatial attention are associated with prefrontal and parietal white matter tracts in healthy older adults
Monge ZA, Greenwood PM, Parasuraman R, Strenziok M.
Neuropsychology 2016; ePub(ePub): ePub.

DOI 10.1037/neu0000264 **PMID** 26986750
Abstract
OBJECTIVE: Although reasoning and attention are 2 cognitive processes necessary for ensuring the efficiency of many everyday activities in older adults, the role of white matter integrity in these processes has been little studied. This is an important question due to the role of white matter integrity as a neural substrate of cognitive aging. Here, we sought to examine the white matter tracts subserving reasoning and visuospatial attention in healthy older adults.
METHOD: Sixty-one adults ages 60 and older completed a battery of cognitive tests to assess reasoning and visuospatial attention. In addition, diffusion tensor images were collected to assess fractional anisotropy (FA), a measure of white matter integrity. A principle components analysis of the test scores yielded 2 components: reasoning and visuospatial attention. Whole-brain correlations between FA and the cognitive components were submitted to probabilistic tractography analyses for visualization of cortical targets of tracts.

RESULTS: For reasoning, bilateral thalamo-anterior prefrontal, anterior corpus callosum, and corpus callosum body tracts interconnecting the superior frontal cortices and right cingulum bundle were found. For visuospatial attention, a right inferior fronto-parietal tract and bilateral parietal and temporal connections were found.
CONCLUSIONS: We conclude that in older adults, prefrontal cortex white matter tracts and interhemispheric communication are important in higher order cognitive functioning. On the other hand, right-sided fronto-parietal tracts appear to be critical for supporting control of cognitive processes, such as redirecting attention. Researchers may use our results to develop neuroscience-based interventions for older adults targeting brain mechanisms involved in cognitive plasticity.
PDF Y Endnote Y

Polypharmacy of medications and fall-related fractures in older people in Japan: a comparison between driving-prohibited and driving-cautioned medications
Iihara N, Bando Y, Ohara M, Yoshida T, Nishio T, Okada T, Kirino Y.
J. Clin. Pharm. Ther. 2016; ePub(ePub): ePub.
Affiliation: Kagawa School of Pharmaceutical Sciences, Tokushima Bunri University, Sanuki-City, Kagawa, Japan.

DOI 10.1111/jcpt.12381 **PMID** 26990125
Abstract
WHAT IS KNOWN AND OBJECTIVE: Polypharmacy is a risk factor for fall-related fractures. However, it is unclear whether polypharmacy itself is a direct risk factor. The aim of this study was to assess the association between the risk of fall-related fractures and polypharmacy of driving-prohibited and driving-cautioned medications in older outpatients.
METHODS: We conducted a cross-sectional study of outpatients aged ≥65 years receiving any medication, using two sampling data sets from the October 2011 and October 2012 national insurance claims in Japan. Using logistic regression models, we analysed the association between the numbers of driving-prohibited or driving-cautioned medications administered or dispensed to patients and the occurrence of fall-related fractures.
RESULTS AND DISCUSSION: In both analysis populations (n = 303 311 and n = 326 219), the adjusted odds ratio of driving-prohibited medications for the occurrence of fall-related fractures significantly increased as the number of these medications per patient increased (95% confidence interval: 0, 1-2, 3-4, 5-6, 7-8 and ≥9 medications; reference, 0·95-1·24, 1·18-1·79, 1·47-2·96, 1·26-5·21 and 1·50-15·2 in October 2011 and reference, 1·11-1·42, 1·39-2·03, 1·33-2·72, 1·53-5·49 and 1·30-13·0 in October 2012). The association was maintained even for sensitivity analyses restricted to medications administered orally or orally and by injection. However, a similar association was not observed for driving-cautioned medications.
WHAT IS NEW AND CONCLUSION: Medication class is a more important risk factor for fall-related fractures rather than polypharmacy alone with no regard to medication class.
PDF Y Endnote Y

Sagittal plane momentum control during walking in elderly fallers
Fujimoto M, Chou LS.
Gait Posture 2016; 45: 121-126.

Affiliation: Department of Human Physiology, University of Oregon, Eugene, OR 97403, USA. Electronic address: chou@uoregon.edu.

DOI 10.1016/j.gaitpost.2016.01.009 **PMID** 26979893
Abstract

OBJECTIVE: The purpose of this study was to examine sagittal plane momentum control during walking with the use of center of mass (COM) velocity and acceleration.

METHODS: COM control in the antero-posterior direction during walking of healthy young and elderly adults, and elderly fallers (n=15/group) was examined. Using a single-link-plus-foot inverted pendulum model, boundaries for the region of stability were determined based on the COM position at toe-off and its instantaneous velocity or the peak acceleration prior to toe-off (ROSv or ROSa, respectively).

RESULTS: Although no significant difference in forward COM velocity was detected between healthy young and elderly subjects, the peak forward COM acceleration differed significantly, suggesting age-related differences in momentum control during walking. Elderly fallers demonstrated significantly slower forward COM velocities and accelerations and placed their COM significantly more anterior than healthy young and elderly subjects at toe-off, which resulted in their COM position-velocity combination located within the ROSv. Similar results were obtained in the ROSa, where elderly fallers demonstrated a larger stability margin than healthy young and elderly subjects.

INTERPRETATIONS: Significantly slower peak COM accelerations could be indicative of a poor momentum control ability, which was more pronounced in elderly fallers. Examining COM acceleration, in addition to its velocity, would provide a greater understanding of person's momentum control, which would allow us to better reveal underlying mechanisms of gait imbalance or falls.

PDF Y Endnote Y

The effects of tai chi practice with asynchronous music on compliance and fall-related risk factors in middle-aged and older women: a pilot study

Du Y, Roberts P, Xu Q.
J Holist Nurs 2016; ePub(ePub): ePub.
Affiliation: Tulane University, New Orleans.

DOI 10.1177/0898010116636972 **PMID** 26951578
Abstract

PURPOSE: This study examined whether practicing Tai Chi (TC) along with music can maximize the effects of TC on compliance and fall-related risk factors (Dynamic Gait Index and fear of falling).

DESIGN: A convenient sample was recruited in a community senior center. Eighteen women aged 50 to 84 years (9 White, 9 Black) were block randomly assigned to a TC in silence (TC + S; n = 6) or a TC with music (TC + M; n = 12) class.

METHOD: Thirteen participants (4 in TC + S group, 9 in TC + M group) with completed pre- and posttests were included in the final analysis. Paired t tests were conducted to examine changes within groups over time and analysis of covariance was used to assess group differences.

FINDINGS: After 15 weeks of intervention, balance increased in both groups with significantly higher benefits in the TC + M group ($p < .05$). Fear of falling scores improved in TC + M group and compliance rate was higher in this group.

CONCLUSIONS: Practicing TC + M may help increase adherence in White and Black middle-aged and older women, and maximize the effects of TC on fall-related risk factors. Studies with more rigorous study design, including musical considerations, are warranted.
PDF Y Endnote Y

The validity of three fall risk screening tools in an acute geriatric inpatient population
Latt MD, Loh KF, Ge L, Hepworth A.
Australas. J. Ageing 2016; ePub(ePub): ePub.
Affiliation: Department of Aged Chronic Care and Rehabilitation, Sydney Local Health District, Sydney, New South Wales, Australia.

DOI 10.1111/ajag.12256 **PMID** 26991034
Abstract
AIM: We examined the validity of the Ontario Modified STRATIFY (OM) (St Thomas's Risk Assessment Tool in Falling Elderly Inpatients), The Northern Hospital Modified STRATIFY (TNH) and STRATIFY in predicting falls in an acute aged care unit.
METHOD: Data were collected prospectively from 217 people presenting consecutively and falls identified during hospitalisation.
RESULTS: Sensitivities of OM (80.0, 95% confidence interval (CI) 58.4 to 91.9%), TNH (85, CI 64.0 to 94.8%) and STRATIFY (80.0, CI 58.4 to 91.0%) were similar. The STRATIFY had higher specificity (61.4, CI 54.5 to 67.9%) than OM (37.1, CI 30.6 to 44.0%) and TNH (51.3, CI 44.3 to 58.2%). Accuracy (percentage of patients correctly classified as 'faller' or 'non-faller') was higher using STRATIFY (63.1, CI 56.5 to 69.3%) and TNH (54.4, CI 47.8 to 61.0%) than with OM (41.0, CI 34.7 to 47.7%, $P < 0.0001$).
CONCLUSION: Screening tools have limited accuracy in identifying patients at high risk of falls.
PDF Y Endnote Y

Updating the evidence for physical activity: summative reviews of the epidemiological evidence, prevalence, and interventions to promote "active aging"
Bauman A, Merom D, Bull FC, Buchner DM, Fiatarone Singh MA.
Gerontologist 2016; 56(Suppl 2): S268-S280.
Affiliation: Exercise, Health and Performance, Faculty of Health Sciences, Sydney University, New South Wales, Australia.

DOI 10.1093/geront/gnw031 **PMID** 26994266
Abstract
PURPOSE OF THE STUDY: There is a global imperative to increase awareness of the emerging evidence on physical activity (PA) among older adults. "Healthy aging" has traditionally focused on preventing chronic disease, but greater efforts are required to reduce frailty and dependency and to maintain independent physical and cognitive function and mental health and well-being.
DESIGN AND METHODS: This integrated review updates the epidemiological data on PA, summarizes the existing evidence-based PA guidelines, describes the global magnitude of inactivity, and finally describes the rationale for action. The first section updates the epidemiological evidence for reduced cardiometabolic risk, reduced risks of falls, the burgeoning new evidence on improved cognitive function and functional capacity, and reduced risk of depression, anxiety, and dementia. This is followed by a summary of population prevalence studies among older adults. Finally, we present a

"review of reviews" of PA interventions delivered from community or population settings, followed by a consideration of interventions among the "oldest-old," where efforts are needed to increase resistance (strength) training and balance.
RESULTS: This review identifies the global importance of considering "active aging" beyond the established benefits attributed to noncommunicable disease prevention alone.
IMPLICATIONS: Innovative population-level efforts are required to address physical inactivity, prevent loss of muscle strength, and maintain balance in older adults. Specific investment in healthy aging requires global policy support from the World Health Organization and is implemented at the national and regional levels, in order to reduce the burden of disease and disability among older adults.
PDF Y Endnote Y

What are the main physical functioning factors associated with falls among older people with different perceived fall risk?
Moreira MN, Bilton TL, Dias RC, Ferriolli E, Perracini MR.
Physiother. Res. Int. 2016; ePub(ePub): ePub.
Affiliation: Master's and Doctoral Programs in Physical Therapy, Universidade Cidade de São Paulo - UNICID, São Paulo, Brazil. (Copyright © 2016, John Wiley and Sons)
DOI 10.1002/pri.1664 **PMID** 26949232
Abstract
BACKGROUND AND PURPOSE: Fall risk perceptions may influence the judgement over physical and functional competencies to avoid falls. However, few studies have explored the physical functioning characteristics associated with falls among older people with low perceived fall risk. This study aimed to identify the prevalence of falls and physical functioning factors associated with falling among community-dwelling older adults with low and high perceived fall risk.
METHODS: We conducted a cross-sectional population based study with 773 community-dwelling elders. Perceived fall risk was investigated using Falls Efficacy Scale International. We considered fallers those who reported at least one fall in the previous 12 months. Physical functioning measures used were grip strength, usual gait speed, sit-to-stand test, five step test, timed up and go test, one-legged stance test, anterior and lateral functional reach test.
RESULTS: At least one fall was reported by 103 (30%) participants with low perceived fall risk and by 196 (46%) participants with high perceived fall risk. The odds of falling were lower among those with greater grip strength and with a greater stance time in one-legged test, and the odds of falling among elders with high perceived fall risk were higher among those who took more time in performing the five step test.
DISCUSSION: We believe that our results highlight the need of not neglecting the risk of falls among active older adults with low perceived fall risk, particularly in those elders that show reduced stability in a small base of support and a lower leg strength. In addition, we suggest that elders with high perceived fall risk should be assessed using anticipatory postural adjustment tests. Particularly, our results may help physiotherapists to identify eligible elders with different perceptions of fall risk for tailored interventions aimed at reducing falls. Copyright © 2016 John Wiley & Sons, Ltd.
PDF Y Endnote Y

A quality improvement project in balance and vestibular rehabilitation and its effect on clinical outcomes

ALMohiza MA, Sparto PJ, Marchetti GF, Delitto A, Furman JM, Miller DL, Whitney SL.

J. Neurol. Phys. Ther. 2016; 40(2): 90-99.

Affiliation: School of Health and Rehabilitation Sciences (M.A.A., P.J.S, A.D., D.L.M., S.L.W.), University of Pittsburgh, Pittsburgh, Pennsylvania; College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia (M.A.A); Rangos School of Health Sciences (G.F.M), Duquesne University, Pittsburgh, Pennsylvania; and School of Medicine (J.M.F.), University of Pittsburgh, Pittsburgh, Pennsylvania Rehabilitation Research Chair (S.L.W.), Department of Rehabilitation Sciences, King Saud University, Saudi Arabia, Riyadh.

DOI 10.1097/NPT.0000000000000125 **PMID** 26985911

Abstract

BACKGROUND AND PURPOSE: Unwarranted variation in practice is among the principal contributors of suboptimal outcomes in health care. This variation can be minimized via quality improvement initiatives. However, quality improvement projects focus mostly on assessing processes, and less attention is given to the effect of the variation on clinical outcomes. An effective implementation of a clinical treatment algorithm (CTA) could improve care for individuals with balance and vestibular disorders. The first aim of this quality improvement project was to examine adherence to a CTA developed by physical therapists who treat persons with balance and vestibular disorders. The second aim was to examine the effect of adherence on patient outcomes.

METHODS: Twenty-three physical therapists who provided rehabilitation for individuals with balance and vestibular disorders participated in the quality improvement project. All physical therapists worked for the same health care provider, and developed the minimum data set and CTA. The physical therapists were cluster randomized into 2 groups; both groups received educational training and reminders regarding adherence to the CTA. The first group received the training and reminders after an 8-week baseline period (initial group), and the second group (delayed group) after a 12-week baseline period. The prescribed interventions were classified as being adherent or nonadherent to the CTA. Clinical outcomes, including the Activities-Specific Balance Confidence (ABC) scale, Dizziness Handicap Inventory (DHI), and the Global Rating of Change (GRC), were recorded at the initial evaluation and discharge for 454 individual with balance or vestibular disorders.

RESULTS: Across the 16-week project, adherence rates improved significantly by 9% and 12% for the initial and delayed groups, respectively (P = 0.008), but there was no difference between groups related to the timing of the educational training and adherence reminders. Clinical outcomes improved for individuals, with balance or vestibular disorders but there was no differences in the change in ABC, DHI, and GRC scores based on whether the interventions were or were not adherent to the CTA.

DISCUSSION AND CONCLUSIONS: This quality improvement project was effective in increasing the adherence to the CTA in both groups. Although on average individuals with balance and vestibular disorders showed improvement on the clinical outcomes, there was no additional benefit in the clinical outcome for adherent interventions.Video abstract is available for more insights from the authors (see Supplemental Digital Content 1, http://links.lww.com/JNPT/A125).

PDF Y Endnote Y

A simple test of choice stepping reaction time for assessing fall risk in people with multiple sclerosis

Tijsma M, Vister E, Hoang P, Lord SR.

Disabil. Rehabil. 2016; ePub(ePub): ePub.

Affiliation: Neuroscience Research Australia , University of New South Wales , Sydney , Australia ;

DOI 10.3109/09638288.2016.1148784 **PMID** 26987546

Abstract

PURPOSE To determine (a) the discriminant validity for established fall risk factors and (b) the predictive validity for falls of a simple test of choice stepping reaction time (CSRT) in people with multiple sclerosis (MS).

METHOD People with MS (n = 210, 21-74y) performed the CSRT, sensorimotor, balance and neuropsychological tests in a single session. They were then followed up for falls using monthly fall diaries for 6 months.

RESULTS The CSRT test had excellent discriminant validity with respect to established fall risk factors. Frequent fallers (≥3 falls) performed significantly worse in the CSRT test than non-frequent fallers (0-2 falls). With the odds of suffering frequent falls increasing 69% with each SD increase in CSRT (OR = 1.69, 95% CI: 1.27-2.26, p = <0.001). In regression analysis, CSRT was best explained by sway, time to complete the 9-Hole Peg test, knee extension strength of the weaker leg, proprioception and the time to complete the Trails B test (multiple R(2)= ( )0.449, p < 0.001).

CONCLUSIONS A simple low tech CSRT test has excellent discriminative and predictive validity in relation to falls in people with MS. This test may prove useful in documenting longitudinal changes in fall risk in relation to MS disease progression and effects of interventions. Implications for rehabilitation Good choice stepping reaction time (CSRT) is required for maintaining balance. A simple low-tech CSRT test has excellent discriminative and predictive validity in relation to falls in people with MS. This test may prove useful documenting longitudinal changes in fall risk in relation to MS disease progression and effects of interventions.

PDF Y Endnote Y

Center of mass velocity based predictions in balance recovery following pelvis perturbations during human walking

Vlutters M, Van Asseldonk EH, van der Kooij H.

J. Exp. Biol. 2016; ePub(ePub): ePub.

Affiliation: Department of Biomechanical Engineering, University of Twente, Netherlands Department of Biomechanical Engineering, Delft University of Technology, Netherlands.

DOI 10.1242/jeb.129338 **PMID** 26994171

Abstract

In many simple walking models foot placement dictates the center of pressure location and ground reaction force components, whereas humans can modulate these aspects after foot contact. Because of the differences, it is unclear to what extend predictions made by models are valid for human walking. Yet, both model simulations and human experimental data have previously indicated that the center of mass (COM) velocity plays an important role in regulating stable walking.Here, perturbed human walking was studied for the relation of the horizontal COM velocity at heel strike and toe-off with the foot placement location relative to the COM, the forthcoming

center of pressure location relative to the COM, and the ground reaction forces. Ten healthy subjects received various magnitude mediolateral and anteroposterior pelvis perturbations at toe-off, during 0.63 and 1.25 m s(-1) treadmill walking.At heel strike after the perturbation, recovery from mediolateral perturbations involved mediolateral foot placement adjustments proportional to the mediolateral COM velocity. In contrast, for anteroposterior perturbations no significant anteroposterior foot placement adjustment occurred at this heel strike. However, in both directions the COM velocity at heel strike related linearly to the center of pressure location at the subsequent toe-off. This relation was affected by the walking speed and was, for the slow speed, in line with a COM velocity based control strategy previously applied by others in a linear inverted pendulum model. Finally, changes in gait phase durations suggest that the timing of actions could play an important role during the perturbation recovery.

PDF Y Endnote Y

Epidemiology and short-term mortality in traumatic patients admitted to Shariati Hospital in Iran between 2012 and 2013

Sheikhghomi S, Rahimi-Movaghar V, Jafarpour S, Saadat S.

Chin. J. Traumatol. 2015; 18(5): 275-278.

DOI 10.1016/j.cjtee.2014.06.002 **PMID** unavailable

Abstract

PURPOSE: Trauma is an inevitable part of the health burden in every country. Both the preventive and rehabilitative aspects of traumatic injuries are expensive. Since most of the injuries happen in low- and middle-income developing countries, a judicious allocation of the limited resources to the most cost-efficient strategies is necessary. The present study was designed to report the causes of trauma, injured body regions, trauma severity scores and the one year survival rate of a randomly selected sample of trauma patients in a major referral hospital in Tehran, Iran.

METHODS: We chose and analyzed a random subgroup of traumatic patients admitted during the one-year period of May 2012 to May 2013 to Shariati Hospital, a major University Teaching Hospital in Tehran, Iran. Patients who stayed at the hospital for less than 24 h were excluded. In total, 73 traumatic patients were registered. The mean age was (40.19 ± 20.34) years and 67.1% of them were male.

RESULTS: In general, the most common cause of injury was falls (47.9%), followed by road traffic crashes (RTCs, 40.8%). Assault and exposure to inanimate mechanical forces each were only associated with 5.6% of all injuries. The only cause of injury in ages of more than 65 years was fall. The most common cause of injury in ages between 15 and 45 years was RTCs. During the study, two deaths occurred: one was at ICU and the other was at home. The most commonly injured body region was the head (23.8%), followed by the elbow and forearm (19%), hip and thigh (15.9%), and multiple body regions (14.3%). The mean abbreviated injury score was 2.23 ± 1.02; injury severity index was 7.26 ± 7.06; and revised trauma score was 7.84, calculated for 38 patients.

CONCLUSION: Prevention strategy of traumatic injury should focus on falls and RTCs, which are respectively the most common cause of trauma in older aged people and young males.

PDF Y Endnote Y

Postural instability and falls in Parkinson's disease

Crouse JJ, Phillips JR, Jahanshahi M, Moustafa AA.

Rev. Neurosci. 2016; ePub(ePub): ePub.

DOI 10.1515/revneuro-2016-0002 **PMID** 26966928

Abstract

Postural instability (PI) is one of the most debilitating motor symptoms of Parkinson's disease (PD), as it is associated with an increased risk of falls and subsequent medical complications (e.g. fractures), fear of falling, decreased mobility, self-restricted physical activity, social isolation, and decreased quality of life. The pathophysiological mechanisms underlying PI in PD remain elusive. This short review provides a critical summary of the literature on PI in PD, covering the clinical features, the neural and cognitive substrates, and the effects of dopaminergic medications and deep brain stimulation. The delayed effect of dopaminergic medication combined with the success of extrastriatal deep brain stimulation suggests that PI involves neurotransmitter systems other than dopamine and brain regions extending beyond the basal ganglia, further challenging the traditional view of PD as a predominantly single-system neurodegenerative disease.

PDF N Endnote Y

The effects of attractive vs. repulsive instructional cuing on balance performance

Kinnaird C, Lee J, Carender WJ, Kabeto M, Martin B, Sienko KH.

J. Neuroengineering Rehabil. 2016; 13(1): 29.

Affiliation: Department of Mechanical Engineering, University of Michigan, G.G. Brown Laboratory, 2350 Hayward St., 48109, Ann Arbor, MI, USA. sienko@umich.edu.

DOI 10.1186/s12984-016-0131-z **PMID** 26983996 **PMCID** PMC4793655

Abstract

BACKGROUND: Torso-based vibrotactile feedback has been shown to improve postural performance during quiet and perturbed stance in healthy young and older adults and individuals with balance impairments. These systems typically include tactors distributed around the torso that are activated when body motion exceeds a predefined threshold. Users are instructed to "move away from the vibration". However, recent studies have shown that in the absence of instructions, vibrotactile stimulation induces small (~1°) non-volitional responses in the direction of its application location. It was hypothesized that an attractive cuing strategy (i.e., "move toward the vibration") could improve postural performance by leveraging this natural tendency.

FINDINGS: Eight healthy older adults participated in two non-consecutive days of computerized dynamic posturography testing while wearing a vibrotactile feedback system comprised of an inertial measurement unit and four tactors that were activated in pairs when body motion exceeded 1° anteriorly or posteriorly. A crossover design was used. On each day participants performed 24 repetitions of Sensory Organization Test condition 5 (SOT5), three repetitions each of SOT 1-6, three repetitions of the Motor Control Test, and five repetitions of the Adaptation Test. Performance metrics included A/P RMS, Time-in-zone and 95 % CI Ellipse. Performance improved with both cuing strategies but participants performed better when using repulsive cues. However, the rate of improvement was greater for attractive versus repulsive cuing.

CONCLUSIONS: The results suggest that when the cutaneous signal is interpreted as an alarm, cognition overrides sensory information. Furthermore, although repulsive cues resulted in better

performance, attractive cues may be as good, if not better, than repulsive cues following extended training.

PDF Y Endnote Y