SafetyLit September 25, 2016

Computerized functional reach test to measure balance stability in elderly patients with neurological disorders

Scena S, Steindler R, Ceci M, Zuccaro SM, Carmeli E.

J. Clin. Med. Res. 2016; 8(10): 715-720.

Affiliation: Physical Therapy Department, Faculty of Social Welfare and Health, University of Haifa, 3498838, Israel.

DOI 10.14740/jocmr2652w **PMID** 27635176 **PMCID** PMC5012240

Abstract

BACKGROUND: The ability to maintain static and dynamic balance is a prerequisite for safe walking and for obtaining functional mobility. For this reason, a reliable and valid means of screening for risk of falls is needed. The functional reach test (FRT) is used in many countries, yet it does not provide some kinematic parameters such as shoulder or pelvic girdles translation. The purpose was to analyze video records measuring of distance, velocity, time length, arm direction and girdles translation while doing FRT.

METHODS: A cross-sectional, descriptive study was conducted where the above variables were correlated to the mini-mental state examination (MMSE) for mental status and the Tinetti balance assessment test, which have been validated, in order to computerize the FRT (cFRT) for elderly patients with neurological disorders. Eighty patients were tested and 54 were eligible to serve as experimental group. The patients underwent the MMSE, the Tinetti test and the FRT. LAB view software was used to record the FRT performances and to process the videos. The control group consisted of 51 healthy subjects who had been previously tested.

RESULTS: The experimental group was not able to perform the tests as well as the healthy control subjects. The video camera provided valuable kinematic results such as bending down while performing the forward reach test.

CONCLUSIONS: Instead of manual measurement, we proposed to use a cheap with fair resolution web camera to accurately estimate the FRT. The kinematic parameters were correlated with Tinetti and MMSE scores. The performance values established in this study indicate that the cFRT is a reliable and valid assessment, which provides more accurate data than "manual" test about functional reach.

PDF Y Endnote Y

Falls and fall injuries among adults aged ≥65 years - United States, 2014

Bergen G, Stevens MR, Burns ER.

MMWR Morb. Mortal. Wkly. Rep. 2016; 65(37): 993-998.

DOI 10.15585/mmwr.mm6537a2 **PMID** 27656914

Abstract

Falls are the leading cause of fatal and nonfatal injuries among adults aged ≥65 years (older adults). During 2014, approximately 27,000 older adults died because of falls; 2.8 million were treated in emergency departments for fall-related injuries, and approximately 800,000 of these patients were subsequently hospitalized.* To estimate the numbers, percentages, and rates of falls and fall injuries among older adults by selected characteristics and state, CDC analyzed data from the 2014 Behavioral Risk Factor Surveillance System (BRFSS) survey. In 2014, 28.7% of older adults reported

falling; the estimated 29.0 million falls resulted in 7.0 million injuries. Known effective strategies for reducing the number of older adult falls include a multifactorial clinical approach (e.g., gait and balance assessment, strength and balance exercises, and medication review). Health care providers can play an important role in fall prevention by screening older adults for fall risk, reviewing and managing medications linked to falls, and recommending vitamin D supplements to improve bone, muscle, and nerve health and reduce the risk for falls.
PDF Y Endnote Y

Hypertension treatment and concern about falling: baseline data from the Systolic Blood Pressure Intervention Trial
Berlowitz DR, Breaux-Shropshire T, Foy CG, Gren LH, Kazis L, Lerner AJ, Newman JC, Powell JR, Riley WT, Rosman R, Wadley VG, Williams JA.
J. Am. Geriatr. Soc. 2016; ePub(ePub): ePub.
Affiliation: Section on Gerontology and Geriatric Medicine, School of Medicine, Wake Forest University, Winston-Salem, North Carolina.

DOI 10.1111/jgs.14441 **PMID** 27640987
Abstract
OBJECTIVES: To determine the extent of concern about falling in older adults with hypertension, whether lower blood pressure (BP) and greater use of antihypertensive medications are associated with greater concern about falling, and whether lower BP has a greater effect on concern about falling in older and more functionally impaired individuals.
DESIGN: Secondary analysis involving cross-sectional study of baseline characteristics of participants enrolled in the Systolic Blood Pressure Intervention Trial (SPRINT).
SETTING: Approximately 100 outpatient sites.
PARTICIPANTS: SPRINT enrollees aged 50 and older (mean age 69) diagnosed with hypertension (N = 2,299). MEASUREMENTS: Concern about falling was determined using the shortened version of the Falls Efficacy Scale International as measured at the baseline examination.
RESULTS: Mild concern about falling was present in 29.3% of participants and moderate to severe concern in 17.9%. Neither low BP (systolic BP<120 mmHg, diastolic BP <70 mmHg) nor orthostatic hypotension was associated with concern about falling (P > .10). Participants with moderate to severe concern about falling were taking significantly more antihypertensive medications than those with mild or no concern. After adjusting for baseline characteristics, no associations were evident between BP, medications, and concern about falling. Results were similar in older and younger participants; interactions between BP and age and functional status were not significantly associated with concern about falling.
CONCLUSION: Although concern about falling is common in older adults with hypertension, it was not found to be associated with low BP or use of more antihypertensive medications in baseline data from SPRINT.

PDF Y Endnote Y

Identification of stair climbing ability levels in community-dwelling older adults based on the geometric mean of stair ascent and descent speed: the GeMSS classifier

Mayagoitia RE, Harding J, Kitchen S.

Appl. Ergon. 2017; 58: 81-88.

Affiliation: Division of Health and Social Care Research, King's College London, Guy's Campus, London SE1 1UL, United Kingdom. Electronic address: Sheila.Kitchen@kcl.ac.uk.

DOI 10.1016/j.apergo.2016.05.014 **PMID** 27633200

Abstract

The aim was to develop a quantitative approach to identify three stair-climbing ability levels of older adults: no, somewhat and considerable difficulty. Timed-up-and-go test, six-minute-walk test, and Berg balance scale were used for statistical comparison to a new stair climbing ability classifier based on the geometric mean of stair speeds (GeMSS) in ascent and descent on a flight of eight stairs with a 28° pitch in the housing unit where the participants, 28 (16 women) urban older adults (62-94 years), lived. Ordinal logistic regression revealed the thresholds between the three ability levels for each functional test were more stringent than thresholds found in the literature to classify walking ability levels. Though a small study, the intermediate classifier shows promise of early identification of difficulties with stairs, in order to make timely preventative interventions. Further studies are necessary to obtain scaling factors for stairs with other pitches.

PDF Y Endnote Y

Implementing an evidence-based fall prevention intervention in community senior centers

Li F, Harmer P, Fitzgerald K.

Am. J. Public Health 2016; ePub(ePub): epub.

Affiliation: Fuzhong Li is with Oregon Research Institute, Eugene. Peter Harmer is with the Department of Exercise Science, Willamette University, Salem, OR. Kathleen Fitzgerald is with Oregon Medical Group, Eugene.

DOI 10.2105/AJPH.2016.303386 **PMID** 27631751

Abstract

OBJECTIVES: To evaluate the impact of implementing an evidence-based fall prevention intervention in community senior centers.

METHODS: We used a single-group design to evaluate the Tai Ji Quan: Moving for Better Balance (TJQMBB) program's adoption, population reach, implementation, effectiveness, and maintenance among 36 senior centers in 4 Oregon counties between 2012 and 2016. The primary outcome measure, as part of the effectiveness evaluation, was number of falls as ascertained by self-report. Trained TJQMBB instructors delivered the program to community-dwelling older adults for 48 weeks, with a 6-month postintervention follow-up.

RESULTS: TJQMBB was adopted by 89% of the senior centers approached and reached 90% of the target population. The program resulted in a 49% reduction in the total number of falls and improved physical performance. Participation was well maintained after the program's completion. The average cost-effectiveness ratio for the 48-week program implementation was $917 per fall prevented and $676 per fall prevented for multiple falls.

CONCLUSIONS: TJQMBB is an effective public health program that can be broadly implemented in community senior centers for primary prevention of falls among community-dwelling older adults. (Am J Public Health. Published online ahead of print September 15, 2016: e1-e6. doi:10.2105/AJPH.2016.303386).

PDF Y Endnote Y

Individual and neighborhood factors associated with functional mobility and falls in elderly residents of São Paulo, Brazil: a multilevel analysis

Nascimento CF, Duarte YA, Lebrao ML, Chiavegatto Filho AD.

J. Aging Health 2016; ePub(ePub): ePub.

Affiliation: University of São Paulo, Brazil.

DOI 10.1177/0898264316669229 **PMID** 27634837

Abstract

OBJECTIVE: To identify socioeconomic and contextual factors associated with functional mobility and falls in elderly residents of São Paulo, Brazil.

METHOD: We used data from the Health, Well-Being, and Aging (Saúde, Bem-estare Envelhecimento [SABE]) Study. The dependent variables were falling in the last year and functional mobility impairment. Individual (marital status, race, education, and perception of income sufficiency) and contextual (green area and violence) factors were analyzed by multilevel logistic models.

RESULTS: Having 8 or more years of schooling was a protective factor for mobility impairment. Neighborhoods with moderate homicide rate were associated with higher odds of falling. Moderate green spaces were associated with higher odds of falling and lower odds to have mobility impairment for individuals 80 years and older.

DISCUSSION: Our findings support the concern that neighborhood characteristics are associated with falls and mobility impairment. Strategies to prevent these outcomes should consider contextual aspects.

PDF Y Endnote Y

Orthostatic hypotension in middle-age and risk of falls

Juraschek SP, Daya N, Appel LJ, Miller ER, Windham BG, Pompeii L, Griswold ME, Kucharska-Newton A, Selvin E.

Am. J. Hypertens. 2016; ePub(ePub): ePub.

Affiliation: The Johns Hopkins School of Medicine Department of Medicine, The Johns Hopkins Bloomberg School of Public Health Department of Epidemiology, The Welch Center for Prevention, Epidemiology and Clinical Research, and Johns Hopkins Medical Institutions, Baltimore, Maryland, USA; lselvin@jhsph.edu.

DOI 10.1093/ajh/hpw108 **PMID** 27638848

Abstract

BACKGROUND: One-third of older adults fall each year. Orthostatic hypotension (OH) has been hypothesized as an important risk factor for falls, but findings from prior studies have been inconsistent.

METHODS: We conducted a prospective study of the association between baseline OH (1987-1989) and risk of falls in the Atherosclerosis Risk in Communities (ARIC) Study. Falls were ascertained during follow-up via ICD-9 hospital discharge codes or Centers for Medicare & Medicaid Services claims data. OH was defined as a drop in systolic blood pressure (SBP) ≥20mm Hg or diastolic blood pressure (DBP) ≥10mm Hg within 2 minutes of moving from the supine to standing position. Changes in SBP or DBP during OH assessments were also examined as continuous variables.
RESULTS: During a median follow-up of 23 years, there were 2,384 falls among 12,661 participants (mean age 54 years, 55% women, 26% black). OH was associated with risk of falls even after adjustment for demographic characteristics and other risk factors (hazard ratio (HR): 1.30; 95% confidence interval (CI): 1.10, 1.54; P = 0.002). Postural change in DBP was more significantly associated with risk of falls (HR 1.09 per -5mm Hg change in DBP; 95% CI: 1.05, 1.13; P < 0.001) than postural change in SBP (HR 1.03 per -5mm Hg change in SBP; 95% CI: 1.01, 1.05; P = 0.002).
CONCLUSIONS: In a community-based, middle-aged population, OH, and in particular, postural change in DBP, were independent risk factors for falls over 2 decades of follow-up. Future studies are needed to examine OH thresholds associated with increased risk of falls.

PDF Y Endnote Y

Outcomes of trauma admission for falls: influence of race and age on inhospital and post-discharge mortality

Strong BL, Torain JM, Greene CR, Smith GS.
Am. J. Surg. 2016; ePub(ePub): ePub.
Affiliation: Department of Epidemiology and Public Health, University of Maryland School of Medicine, 601 West Lombard Street, Baltimore, MD 21201, USA.

DOI 10.1016/j.amjsurg.2016.06.002 **PMID** 27640909
Abstract
BACKGROUND: Racial disparities in trauma outcomes occur, but disparities in fall mortality are unknown. The objective of this study was to determine inhospital and 1-year fall mortality among patients discharged from an urban trauma center.
METHODS: We conducted a retrospective analysis of fall patients in our trauma registry (1997 to 2008) linked to the National Death Index to determine postdischarge mortality. Statistical analysis included chi-square tests, multivariable logistic regression, and Cox proportional hazards models.
RESULTS: There were 7,541 fall admissions. There was no clinically significant difference in inhospital mortality between blacks and whites with age stratification. One year after discharge, blacks younger than 65 years were more likely to die of disease (hazard ratio, 1.37; 95% confidence interval, 1.14 to 1.62).
CONCLUSIONS: Although rates of inhospital mortality are similar, blacks younger than 65 years have a higher risk of dying after discharge due to disease when stratified by age highlighting the need for continued medical follow-up and prevention efforts.

PDF Y Endnote Y

Relationships between intramuscular fat, muscle strength and gait independence in older women: A cross-sectional study

Akazawa N, Okawa N, Tamura K, Moriyama H.

Geriatr. Gerontol. Int. 2016; ePub(ePub): ePub.

Affiliation: Department of Rehabilitation Science, Graduate School of Health Sciences, Kobe University, Kobe, Japan.

DOI 10.1111/ggi.12869 **PMID** 27506895

Abstract

AIM: The objectives of the present study were to examine the relationships between intramuscular fat, muscle strength and gait independence, as well as to clarify the intramuscular fat characteristics of dependent older women.

METHODS: A total of 25 older women who were unable to walk with or without assistance (dependent group), 22 frail older women (frail group) and 22 healthy older women (healthy group) participated in the present study. The frail participants could walk independently, but showed three or more of the following characteristics: slowness, weakness, weight loss, exhaustion and low physical activity. Outcome measures were quadriceps intramuscular fat determined by ultrasound echo intensity, and quadriceps muscle strength of the dependent, frail and healthy groups. In addition, the degree of gait independence (functional independence measures gait score) was assessed in the dependent and frail groups.

RESULTS: Echo intensity in the dependent group was significantly negatively correlated with muscle strength and the functional independence measure gait score (correlation coefficients -0.635 and -0.344, respectively). Furthermore, echo intensity in the dependent group was significantly higher than in the healthy group. There was no significant difference in echo intensity between the dependent and frail groups.

CONCLUSIONS: The present results suggest negative relationships between intramuscular fat and muscle strength, and intramuscular fat and degree of gait independence in dependent older women. In addition, dependent older women have more intramuscular fat than healthy older women.

PDF Y Endnote Y

Role of trauma team activation in poor outcomes of elderly patients

St John AE, Rowhani-Rahbar A, Arbabi S, Bulger EM.

J. Surg. Res. 2016; 203(1): 95-102.

Affiliation: Division of Trauma, Department of Surgery, University of Washington, Seattle, Washington.

DOI 10.1016/j.jss.2016.01.036 **PMID** 27338540

Abstract

INTRODUCTION: Elderly trauma patients suffer worse outcomes than younger patients. Trauma team activation (TTA) improves outcomes in younger patients. It is unclear whether decreased TTA effectiveness or under-activation in elderly patients could contribute to their poor outcomes.

MATERIAL AND METHODS: This retrospective registry study examined all adult trauma patients admitted to a level 1 trauma center over 2 y. Analyses tested (1) whether age modifies the effect of TTA on poor outcomes, (2) whether elderly patients with severe injury were less likely to receive TTA

than younger patients, and (3) which early variables were associated with poor outcomes among elderly patients who did not receive TTA.
RESULTS: The study included 10,033 patients. The adjusted relative risk from TTA for all ages was 0.48 (95% confidence interval (CI) = 0.34-0.68, P < 0.001), and there was no effect modification by age (interaction term P value, 0.171). The adjusted odds ratio for the young was 0.49 (95% CI = 0.26-0.91, P = 0.024) and for the elderly was 0.80 (95% CI = 0.53-1.20, P = 0.282). The adjusted odds ratio for lack of TTA associated with old age was 1.37 (95% CI = 1.12-1.69, P = 0.003). The strongest associations with poor outcomes were seen with low heart rate, low minimum blood pressure, high injury severity score, and high Glasgow coma score.
CONCLUSIONS: Lack of TTA could contribute to elderly patients' poor outcomes. Clinicians should not be reassured by normal heart rates and should be wary of even transiently lower blood pressures in the elderly. A large cohort study is needed to identify which additional elderly patients could benefit from TTA.

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Sarcopenia and its associated factors in Iranian older individuals: results of SARIR study
Hashemi R, Shafiee G, Motlagh AD, Pasalar P, Esmailzadeh A, Siassi F, Larijani B, Heshmat R.
Arch. Gerontol. Geriatr. 2016; 66: 18-22.
Affiliation: Chronic Diseases Research Center (CDRC), Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, No 111, 19th St., North Kargar Ave., Tehran 14114, Iran. Electronic address: rheshmat@tums.ac.ir.

DOI 10.1016/j.archger.2016.04.016 **PMID** 27176487
Abstract
BACKGROUND: Sarcopenia, an age- related loss of muscle mass, is a significant associating factor for functional impairment among older adults. The aim of this study was to investigate the prevalence of and associated factors for sarcopenia and severe sarcopenia among older adults in Iran.
METHODS: A total of 300 individuals aged over 55 years were randomly selected from the 6th district of Tehran, Iran, in 2011. Sarcopenia was defined according to the European Working Group on Sarcopenia in Older People (EWGSOP) algorithm. The skeletal muscle mass was assessed using DXA. Muscle strength and muscle performance were assessed according to hand grip strength and 4-m usual walking gait speed test. A logistic regression analysis was performed.
RESULTS: The prevalence values of presarcopenia, sarcopenia, and severe sarcopenia were 52.7%, 20.7%, and 6%, in men and 25.3%, 15.3%, and 5.3% in women, respectively. The prevalence of sarcopenia was higher in men older than 75 years than women in the same age range (36.7% versus 20%, respectively). Using multiple logistic regression models, age, sex, smoking, and body mass index (BMI) were independently associated with different stages of sarcopenia.
CONCLUSIONS: The prevalence of sarcopenia is high in Iranian older adults. The older age, male sex, smoking and lower BMI were independently associated with presarcopenia, sarcopenia and severe sarcopenia.

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Seniors' self-preservation by maintaining established self and defying deterioration - a grounded theory

Eriksson JK, Hildingh C, Buer N, Thulesius H.

Int. J. Qual. Stud. Health Well-Being 2016; 11: e30265.

Affiliation: FoU Kronoberg, Växjö, Sweden.

DOI unavailable **PMID** 27172511

Abstract

The purpose of this classic grounded theory study was to understand how seniors who are living independently resolve issues influenced by visual impairment and high fall risk. We interviewed and observed 13 seniors with visual impairment in their homes. We also interviewed six visual instructors with experience from many hundreds of relevant incidents from the same group of seniors. We found that the seniors are resolving their main concern of "remaining themselves as who they used to be" by self-preservation. Within this category, the strategies maintaining the established self and defying deterioration emerged as the most prominent in our data. The theme maintaining the established self is mostly guided by change inertia and includes living the past (retaining past activities, reminiscing, and keeping the home intact) and facading (hiding impairment, leading to avoidance of becoming a burden and to risk juggling). Defying deterioration is a proactive scheme and involves moving (by exercising, adapting activities, using walking aids, driving), adapting (by finding new ways), and networking by sustaining old support networks or finding new networks. Self-preservation is generic human behavior and modifying this theory to other fields may therefore be worthwhile. In addition, health care providers may have use for the theory in fall preventive planning.

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Serotonin-norepinephrine reuptake inhibitor and selective serotonin reuptake inhibitor use and risk of fractures: a new-user cohort study among US adults aged 50 years and older

Lanteigne A, Sheu YH, Stürmer T, Pate V, Azrael D, Swanson SA, Miller M.

CNS Drugs 2015; 29(3): 245-252.

Affiliation: Department of Social and Behavioral Sciences, Harvard University, Harvard School of Public Health, 677 Huntington Ave, Boston, MA, 02115, USA.

DOI 10.1007/s40263-015-0231-5 **PMID** 25708711 **PMCID** PMC4380622

Abstract

BACKGROUND: Antidepressants may increase the risk of fractures by disrupting sensory-motor function, thereby increasing the risk of falls, and by decreasing bone mineral density and consequently increasing the fall- or impact-related risk of fracture. Selective serotonin reuptake inhibitor (SSRI) antidepressants appear to increase fracture risk relative to no treatment, while less is known about the effect of serotonin-norepinephrine reuptake inhibitor (SNRI) antidepressants, despite SNRIs being prescribed with increasing frequency. No prior study has directly examined how fracture risk differs among patients initiating SNRIs versus those initiating SSRIs.

OBJECTIVE: The objective of this study was to assess the effect of SNRI versus SSRI initiation on fracture rates. DATA SOURCE: Data were derived from a PharMetrics claims database, 1998-2010, which is comprised of commercial health plan information obtained from managed care plans throughout the US.

METHODS: We constructed a cohort of patients aged 50 years or older initiating either of the two drug classes (SSRI, N = 335,146; SNRI, N = 61,612). Standardized mortality weighting and Cox proportional hazards regression were used to estimate hazard ratios (HRs) for fractures by antidepressant class.
RESULTS: In weighted analyses, the fracture rates were approximately equal in SNRI and SSRI initiators: HRs for the first 1- and 5-year periods following initiation were 1.11 [95 % confidence interval (CI) 0.92-1.36] and 1.06 (95 % CI 0.90-1.26), respectively. For the subgroup of patients with depression who initiated on either SNRIs or SSRIs, those initiating SNRIs had a modestly, but not significantly, elevated fracture risk compared with those who initiated on SSRIs [HR 1.31 (95 % CI 0.95-1.79)].
CONCLUSIONS: We found no evidence that initiating SNRIs rather than SSRIs materially influenced fracture risk among a cohort of middle-aged and older adults.
PDF Y Endnote Y

SIMON: assisted mobility for older and impaired users
Muñoz E, Serrano M, Vivó M, Marqués A, Ferreras A, Solaz J.
Transp. Res. Proc. 2016; 14: 4420-4429.

DOI 10.1016/j.trpro.2016.05.364 **PMID** unavailable
Abstract
SIMON is a demonstration project with three large scale pilots in Madrid, Lisbon and Parma aiming to use ICT services to promote the independent living and societal participation of mobility impaired people in the context of on-street public parking areas and multiple transport modes.
The project tackles two main challenges:-
Reduction of fraud by demonstrating the use of an ICT - enhanced European Disable Badge for public parking, both on the basis of physical - i.e. smartcards - and virtual access right tokens - i.e. e-access through mobile devices.
Proposal of specific multimodal navigation solutions for elderly and disabled people, using opendata hubs and preexisting toolsets that will be populated and exploited with specific information - e.g. elevators located near sub-way stations.
An additional challenge is the instantiation of a proven methodology for data privacy preservation and authentication of users.
SIMON builds on existing mobility services, using the current infrastructure of the cities, and adds the required integration work to provide a seamless services integration layer which can be instantiated in different cities according to the specific context and the services available. Thus, from an ICT point of view, SIMON services are adaptable to heterogeneous environment, with different capabilities.
The SIMON system platform supports some services that feed different applications, all of them accessible through different mobile devices. A backoffice also provides the access through a web application to let the public authority manage the whole system.
PDF Y Endnote Y

Spatiotemporal and variability gait data in community-dwelling elderly women from Brazil

Kirkwood RN, Gomes HA, Sampaio RF, Furtado SR, Moreira BS.

Rev. Bras. Fisioter. 2016; 20(3): 258-266.

Affiliation: Programa de Pós-graduação em Ciências da Reabilitação, Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, MG, Brazil.

DOI 10.1590/bjpt-rbf.2014.0157 **PMID** 27437717

Abstract

BACKGROUND: Gait is an extremely complex motor task; therefore, gait data should encompass as many gait parameters as possible.

OBJECTIVE: To provide reference values for gait measurements obtained from a Brazilian group of community-dwelling elderly females between the ages of 65 and 89 years and to apply the PCA-biplot to yield insight into different walking strategies that might occur during the aging process.

METHOD: 305 elderly community-dwelling females living in Brazil were stratified into four age groups: 65-69 years (N=103); 70-74 years (N=95); 75-79 years (N=77); and ≥80 years (N=30). Age, height, and BMI were assessed to describe the characteristics of the groups. Gait spatiotemporal and variability data were obtained using the GAITRite® system. Principal component analysis, followed by MANOVA and the PCA-biplot approach were used to analyze the data.

RESULTS: 95% CI showed that only three components - rhythm, variability, and support - together explained 74.2% of the total variance in gait that were different among the groups. The older groups (75-79 and ≥80 years) walked with lower than average velocity, cadence, and step length and were above average for the variables stance, step, swing, and double support time and the ≥80 year old group presented the highest gait variability compared to the other groups.

CONCLUSION: Aging is associated with decreased gait velocity and cadence and increased stance, step time, and variability, but not associated with changes in base of support. In addition, the PCA-biplot indicates a decline towards decreased rhythm and increased variability with aging.

PDF Y Endnote Y

Standing balance and spatiotemporal aspects of gait are impaired upon nocturnal awakening in healthy late middle-aged and older adults

McBean AL, Najjar RP, Schuchard RA, Hall CD, Wang CA, Ku B, Zeitzer JM.

J. Clin. Sleep Med. 2016; ePub(ePub): ePub.

DOI unavailable **PMID** 27448415

Abstract

STUDY OBJECTIVES: Nocturnal awakenings may constitute a unique risk for falls among older adults. We describe differences in gait and balance between presleep and midsleep testing, and whether changes in the lighting environment during the midsleep testing further affect gait and balance.

METHODS: Twenty-one healthy, late middle-aged and older (64.7 ± 8.0 y) adults participated in this repeated-measures design consisting of four overnight laboratory stays. Each night, participants completed baseline visual acuity, gait, and balance testing. After a 2-h sleep opportunity, they were awakened for 13 min into one of four lighting conditions: very dim white light (<0.5 lux); dim white light (~28.0 lux); dim orange light (~28.0 lux); and white room-level light (~200 lux). During this awakening, participants completed the same sequence of testing as at baseline.

RESULTS: Low-contrast visual acuity significantly decreased with decreasing illuminance conditions ($F(3,45)=98.26$, $p < 0.001$). Our a priori hypothesis was confirmed in that variation in stride velocity and center of pressure path length were significantly worse during the mid-sleep awakening compared to presleep baseline. Lighting conditions during the awakening, however, did not influence these parameters. In exploratory analyses, we found that over one-third of the tested gait and balance parameters were significantly worse at the midsleep awakening as compared to baseline ($p < 0.05$), and nearly one-quarter had medium to large effect sizes (Cohen $d \geq 0.5$; $r \geq 0.3$). CONCLUSIONS: Balance and gait are impaired during midsleep awakenings among healthy, late middle-aged and older adults. This impairment is not ameliorated by exposure to room lighting, when compared to dim lights.

PDF N Endnote Y

The effect of brisk walking on postural stability, bone mineral density, body weight and composition in women over 50 years with a sedentary occupation: a randomized controlled trial
Gába A, Cuberek R, Svoboda Z, Chmelík F, Pelclová J, Lehnert M, Frömel K.
BMC Womens Health 2016; 16(1): e63.
Affiliation: Faculty of Physical Culture, Palacký University Olomouc, třída Míru 117, Olomouc, 771 11, Czech Republic.

DOI 10.1186/s12905-016-0343-1 **PMID** 27653632
Abstract
BACKGROUND: To assess the effect of brisk walking on postural stability, bone mineral density (BMD) and body composition in women over 50 years of age with a sedentary occupation.
METHODS: A 10-week walking intervention based on self-regulated brisk walking (BW) to or from work of 30-35 min at least 5 times per week. The research included a total of 104 women (58 women in intervention group). The mean center of pressure (COP) velocity in medial-lateral and anterior-posterior directions, mean total COP velocity with eyes open and closed, BMD of the distal forearm and the calcaneus, body weight, fat mass, and lean body mass were assessed.
RESULTS: The BW intervention was completed by 76 % of participants. A significant effect (time × group interaction) was confirmed only in the mean COP velocity in the anterior-posterior direction with eyes closed ($F = 7.41$, $P = 0.008$). The effect of BW was not confirmed in BMD, body weight, or body composition. The results indicate that the effect of the intervention is influenced by baseline body mass index in body weight, fat mass and visceral adipose tissue.
CONCLUSIONS: BW prevents the deterioration of postural stability with eyes closed, which can have a direct effect on reducing the risk of falls under worse spatial orientation and visibility. The presented intervention model is insufficient for weight loss, changes in BMD, or body composition, and its effect should be assessed during a longer period of time. TRIAL REGISTRATION: German Clinical Trials Register DRKS00007638 , registered March 10, 2015 (retrospectively registered).
PDF Y Endnote Y

The role of geriatric assessment tests and anthropometric measurements in identifying the risk of falls in elderly nursing home residents

Yardimci B, Aran SN, Ozkaya I, Aksoy SM, Demir T, Tezcan G, Kaptanoglu AY.

Saudi Med. J. 2016; 37(10): 1101-1108.

Affiliation: Department of Internal Medicine, Division of General Internal Medicine, Faculty of Medicine, Istanbul Bilim University, Istanbul, Turkey. E-mail. bulentyardimci@yahoo.com.

DOI 10.15537/smj.2016.10.15205 **PMID** 27652361

Abstract

OBJECTIVES: To determine the relation among the risk of falls, geriatric assessment, and anthropometric measurements, including the mini mental state examination, geriatric depression scale, handgrip test, and key pinch test.

METHODS: This prospective study included 89 residents hospitalized between May 2014 and September 2015 in the geriatric care unit of the Istanbul Balikli Rum Hospital, Istanbul, Turkey. Patients were followed-up for one year, and their falls were recorded. Medical records of the included patients were retrieved and analyzed.

RESULTS: A total of 89 patients, comprising 37 men and 52 women with an average age of 75.8 +/- 8.2 years were included in the study. The residents' annual falling averages were 1.0 +/- 1.5. The most significant factors were identified to be predicted muscle mass, skeletal muscle index, whole body bioimpedance, dominant arm muscle strength, dominant arm bioimpedance, and free fat mass.

CONCLUSIONS: The mini mental test, geriatric depression scale and lawton-brody scale combined with the handgrip, 6-meters walking, and bioimpedance tests are favorable for detecting the risk of falls and recurrent falls in vulnerable elderly nursing home residents.

PDF Y Endnote Y

Adaptive gait responses to awareness of an impending slip during treadmill walking

Yang F, Kim J, Munoz J.

Gait Posture 2016; 50: 175-179.

Affiliation: Department of Kinesiology, University of Texas at El Paso, El Paso, TX 79968, USA.

DOI 10.1016/j.gaitpost.2016.09.005 **PMID** 27632061

Abstract

The awareness of potential slip risk has been shown to cause protective changes to human gait during overground walking. It remains unknown if such adaptations to walking pattern also exist when ambulating on a treadmill. This study sought to determine whether and to what extent individuals, when being aware of a potential slip risk during treadmill walking, could adjust their gait pattern to improve their dynamic stability against backward balance loss in response to the impending slip hazard. Fifty-four healthy young subjects (age: 23.9±4.7years) participated in this study. Subjects' gait pattern was measured under two conditions: walking on a treadmill without (or normal walking) and with (or aware walking) the awareness of the potential slip perturbation. During both walking conditions, subjects' full body kinematics were gathered by using a motion capture system. Spatial gait parameters and the dynamic gait stability against backward balance were compared between the two walking conditions. The results revealed that subjects proactively adopted a "cautious gait" during aware walking compared with the normal walking. The cautious

gait, which was achieved by taking a shorter step and a more flatfoot landing, positioned the body center of mass closer to the base of support, improving participants' dynamic stability and increasing their resistance against a possible slip-related fall. The finding from this study could provide insights into the dynamic stability control when individuals anticipate potential slip risk during treadmill walking.

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Implementing measures to minimize the global incidence of falls and its associated complications

Shrivastava SR, Shrivastava PS, Ramasamy J.

Indian J. Crit. Care Med. 2016; 20(8): 489-490.

Affiliation: Department of Community Medicine, Shri Sathya Sai Medical College and Research Institute, Kancheepuram, Tamil Nadu, India.

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Abstract [Abstract unavailable]

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Is there such a thing as a mechanical fall?

Sri-On J, Tirrell GP, Lipsitz LA, Liu SW. Am. J. Emerg. Med. 2016; 34(3): 582-585.

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Abstract

OBJECTIVE: The term mechanical falls is commonly used in the emergency department (ED), yet its definition and clinical implications are not established. It may be used to attribute falls to extrinsic factors in the environment exonerating clinicians from conducting a thorough assessment of the fall's underlying intrinsic causes. We conducted this study to determine how clinicians assess "mechanical" and "nonmechanical" falls; we explored conditions, fall evaluation, and outcomes associated with these diagnoses.

METHODS: This study was a secondary analysis of a retrospective study at 1 urban ED. Data were obtained from medical records of patients aged 65 years and older who presented to the ED for a fall. We compared the associated conditions/causes, the ED fall evaluation, mortality, ED revisits, subsequent hospitalizations, and recurrent falls between the 2 terms.

RESULTS: We had a sample size of 350 patients: 218 (62.3%) with "mechanical falls" and 132 (37.7%) with nonmechanical falls. There was little difference among associated conditions between the 2 fall labels other than mechanical falls had more associated environmental causes but fewer syncope causes. However, more than a quarter of nonmechanical falls had associated environmental factors as well. Similarly, there was little difference in the fall evaluation, ED revisit rates, recurrent falls, subsequent hospitalizations, and death between the 2 groups.

CONCLUSIONS: The term mechanical fall is unclear, inconsistently used, and not associated with a discrete fall evaluation and does not predict outcomes. We propose eliminating the term because it inaccurately implies that a benign etiology for an older person's fall exists.

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Measuring the effects of a visual or auditory Stroop task on dual-task costs during obstacle crossing

Worden TA, Mendes M, Singh P, Vallis LA.

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Affiliation: Department of Human Health and Nutritional Sciences, University of Guelph, Guelph, ON, Canada. Electronic address: lvallis@uoguelph.ca.

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Abstract

Successful planning and execution of motor strategies while concurrently performing a cognitive task has been previously examined, but unfortunately the varied and numerous cognitive tasks studied has limited our fundamental understanding of how the central nervous system successfully integrates and executes these tasks simultaneously. To gain a better understanding of these mechanisms we used a set of cognitive tasks requiring similar central executive function processes and response outputs but requiring different perceptual mechanisms to perform the motor task. Thirteen healthy young adults (20.6±1.6years old) were instrumented with kinematic markers (60Hz) and completed 5 practice, 10 single-task obstacle walking trials and two 40 trial experimental blocks. Each block contained 20 trials of seated (single-task) trials followed by 20 cognitive and obstacle (30% lower leg length) crossing trials (dual-task). Blocks were randomly presented and included either an auditory Stroop task (AST; central interference only) or a visual Stroop task (VST; combined central and structural interference). Higher accuracy rates and shorter response times were observed for the VST versus AST single-task trials ($p<0.05$). Conversely, for the obstacle stepping performance, larger dual task costs were observed for the VST as compared to the AST for clearance measures (the VST induced larger clearance values for both the leading and trailing feet), indicating VST tasks caused greater interference for obstacle crossing ($p<0.05$). These results supported the hypothesis that structural interference has a larger effect on motor performance in a dual-task situation compared to cognitive tasks that pose interference at only the central processing stage.

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Standardizing methodology for research with uneven terrains focused on dynamic balance during gait

Coleman TD, Lawrence HJ, Childers WL.

J. Appl. Biomech. 2016; ePub(ePub): ePub.

Affiliation: Department of Physical Therapy, Alabama State University, Montgomery, AL.

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Abstract

This research tested a reproducible uneven walkway designed to destabilize human gait. Ten participants walked thirty times over even and uneven (7.3x.08m, sequentially placed wooden blocks in a rotating pattern, 1 cm thick rubber mat) walkways.. A full-body marker set and eight-camera motion capture system recorded limb kinematics. Matlab 2013b was used to calculate measures of gait stability: angular momentum, margin of stability, step width variability, CoM height, toe clearance, lateral arm swing. The minimum number of strides necessary to minimize intra-participant variability was calculated via the interquartile range/median ratio (IMR) at 25 and 10%

thresholds for each measure. A paired t-test tested for significance between terrains ($P < 0.05$). The uneven walkway significantly destabilized gait as seen by increases in: coronal and sagittal plane angular momentum, step width variability, and toe clearance. We found no significant difference with the margin of stability between the two terrains possibly due to compensatory strategies (e.g. lateral arm swing, trunk sway, step width). Recording a minimum of ten strides per subject will keep each variable between the 25% and 10% IMR thresholds. In conclusion, the uneven walkway design significantly destabilizes human gait and at least ten strides should be collected per subject.
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Static balance in patients with vestibular impairments: a preliminary study
Talebi H, Karimi MT, Abtahi SH, Fereshtenejad N.
Scientifica (Cairo) 2016; 2016: e6539858.
Affiliation: Musculoskeletal Research Center, Faculty of Rehabilitation, Isfahan University of Medical Sciences, Isfahan 81746-73461, Iran.

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Abstract
AIMS: Vestibular system is indicated as one of the most important sensors responsible for static and dynamic postural control. In this study, we evaluated static balance in patients with unilateral vestibular impairments.
MATERIALS AND METHODS: We compared static balance control using Kistler force plate platform between 10 patients with unilateral vestibular impairments and 20 normal counterparts in the same sex ratio and age limits (50 ± 7). We evaluated excursion and velocity of center of pressure (COP) and path length in anteroposterior (AP) and mediolateral (ML) planes with eyes open and with eyes closed.
RESULTS: There was no significant difference between COP excursions in ML and AP planes between both groups with eyes open and eyes closed (p value > 0.05). In contrast, the difference between velocity and path length of COP in the mentioned planes was significant between both groups with eyes open and eyes closed (p value < 0.05).
CONCLUSIONS: The present study showed the static instability and balance of patients with vestibular impairments indicated by the abnormal characteristics of body balance.
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