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A longitudinal comparative study of falls in persons with knee arthroplasty and persons with or at high risk for knee osteoarthritis

L Riddle D, J Golladay G.

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Affiliation: Virginia Commonwealth University School of Medicine - Orthopaedic Surgery, Richmond, VA, United States.

(Copyright © 2016, Oxford University Press)

DOI 10.1093/ageing/afw126 **PMID** 27496934

Abstract

OBJECTIVES: we determined the yearly prevalence of single and multiple falls in persons with or at risk of knee osteoarthritis (OA) and persons undergoing knee arthroplasty over an 8-year period. We also compared annual fall rates among persons with and without knee arthroplasty to determine if fall rates are associated with knee arthroplasty.

METHODS: we studied 4,200 persons from the Osteoarthritis Initiative (OAI), a National Institutes of Health funded prospective study of persons 45-79 years and conducted from 2004 to 2012. All either had knee OA or were at risk of developing knee OA but did not have knee arthroplasty. The surgical group comprised 413 persons who underwent knee arthroplasty. Key fall risk factors were assessed at yearly study visits. Graphical depictions illustrated single and multiple fall trajectories.

Multinomial regression adjusted for potential confounders compared fall rates for those with and without knee arthroplasty.

RESULTS: fall rate trajectories for the two samples were generally flat and fall rates were similar. For the arthroplasty sample, fall rates did not increase in the immediate perioperative period relative to earlier and later periods. No differences in fall rates were found among the arthroplasty and non-arthroplasty samples after adjustment for potential confounding ($P > 0.05$).

CONCLUSIONS: fall rates were generally stable and similar over an 8-year period among persons with and without knee arthroplasty. Clinicians should not assume that persons undergoing knee arthroplasty are at greater risk for falls either before or after surgery as compared to persons with or at risk for knee OA.

PDF Y Endnote Y

Analysis of altered complexity of gait dynamics with aging and Parkinson's disease using ternary Lempel-Ziv complexity

Kamath C.

Cogent Eng. 2016; 3(1): e1177924.

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Abstract

Fluctuations in stride interval series show complex dynamical behavior in healthy young adults. Hypothesizing that these stride interval complexity changes would be altered by changes in neurological function associated with aging and certain disease states, we aimed to develop a tool to facilitate clinical judgments to assess the complex dynamical behavior in the stride series in discerning young, elderly, and Parkinson's disease (PD) classes. This novel approach, which employs a new variant of coarse-graining in conjunction with Lempel-Ziv complexity measure, yields useful, reliable, and predictive results. We also show the presence of nonlinear deterministic structures in

the stride time series and appropriateness of the application of our nonlinear approach through surrogate data analysis. The findings show that the fluctuations are more complex/random in elderly and PD classes than those in young class. These findings may add to the growing body of literature supporting the clinical utility of this new approach to stride time series.

PDF Y Endnote Y

Analysis of the hip fracture records of a central training and research hospital by selected characteristics

Çankaya D, Yoldaş B, Çankaya E, Çakir Y, Aydın C, Tabak AY.

Turk. J. Med. Sci. 2016; 46(1): 35-41.

Affiliation: Department of Orthopedics and Traumatology, Ankara Numune Training and Research Hospital, Ankara, Turkey.

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DOI 10.3906/sag-1406-150 **PMID** 27511330

Abstract

BACKGROUND/AIM: Despite the importance of hip fractures, very few studies have assessed their epidemiological characteristics in Turkey. The aim of this study was to evaluate the frequency and demography of hip fractures from the recent data of a central training and research hospital.

MATERIALS AND METHODS: In this descriptive study, we identified hip fracture cases between 2009 and 2013. The age, sex, region, injury pattern, and calendar year for all patients were evaluated.

RESULTS: Among the 687 patients (488 women, 199 men) described in our clinic's records, 122, 131, 144, 138, and 154 patients applied with hip fractures from the years 2009 to 2013, respectively. The mean ages of the women and men were 74.8 and 68.5 years, respectively. There were 220 patients who had femoral neck fracture (32%), 419 who had intertrochanteric fracture (61%), and 48 who had subtrochanteric fracture (7%).

CONCLUSION: The female geriatric population may have an increasing and distinct hip fracture risk, mainly in the trochanteric region. Furthermore, recent studies that show variations in the frequency and demography of hip fractures highlight the importance of meticulous recording of patients' information. A nationwide survey of different categories of hospitals and various geographic regions of Turkey is also needed to inform effective prevention strategies.

PDF Y Endnote Y

Balance tests in healthy older people: reliability, validity and ability to identify fall status of the BESTest, Mini-BESTest and Brief-BESTest in older people living in the community

Marques A, Almeida S, Carvalho J, Cruz J, Oliveira A, Jácome C.

Arch. Phys. Med. Rehabil. 2016; ePub(ePub): ePub.

Affiliation: Lab 3R - Respiratory Research and Rehabilitation Laboratory, School of Health Sciences, University of Aveiro (ESSUA), Aveiro, Portugal.

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Abstract

OBJECTIVE: The reliability, validity and ability to identify fall status of the Balance Evaluation Systems Test (BESTest), Mini-BESTest and Brief-BESTest with the Berg Balance Scale (BBS) in older people living in the community was assessed.

DESIGN: Cross-sectional.

SETTING: Community centers.

PARTICIPANTS: 122 older adults (76±9 years) participated.

INTERVENTIONS: Not applicable.

MAIN OUTCOME MEASURES: Participants reported on falls history in the preceding year and completed the Activities-specific Balance Confidence (ABC) Scale. BBS, BESTest and the Five times sit-to-stand test were administered. Interrater (two physiotherapists) and test-retest relative (48-72h) and absolute reliability were explored with the Intraclass correlation coefficient (ICC) equation (2,1) and the Bland and Altman method. Minimal detectable changes at the 95% confidence level (MDC95) were established. Validity was assessed by correlating the balance tests with each other and with the ABC Scale (Spearman correlation coefficients - rho). Receiver operating characteristics assessed the ability of each balance test to differentiate between people with and without a history of falls.

RESULTS: All balance tests presented good to excellent interrater (ICC 0.71-0.93) and test-retest (ICC 0.50-0.82) relative reliability, with no evidence of bias. MDC95 values were 4.6, 9, 3.8 and 4.1 points for the BBS, BESTest, Mini-BESTest and Brief-BESTest, respectively. All tests were significantly correlated with each other (rho=0.83-0.96) and with the ABC Scale (rho=0.46-0.61). Acceptable ability to identify fall status (areas under the curve 0.71-0.78) was found for all tests. Cut-off points were 48.5, 82, 19.5 and 12.5 points for BBS, BESTest, Mini-BESTest and Brief-BESTest, respectively.

CONCLUSIONS: All balance tests are reliable, valid and able to identify fall status in older people living in the community therefore, the choice of which test to use will depend on the level of balance impairment, purpose and time availability.

PDF Y Endnote Y

Corrigendum to "Generalization of treadmill perturbation to overground slip during gait: Effect of different perturbation distances on slip recovery" [J. Biomech. 49/2 (Jan. 2016) 149-154]

Lee A, Bhatt T, Pai YC.

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

Affiliation: University of Illinois, Chicago. Electronic address: cpai@uic.edu.

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Abstract [Abstract unavailable]

PDF Y Endnote Y

Cost-effective (gaming) motion and balance devices for functional assessment: need or hype?

Bonnechère B, Jansen B, Van Sint Jan S.

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

Affiliation: Laboratory of Anatomy, Biomechanics and Organogenesis (LABO), Université Libre de Bruxelles, Brussels, Belgium; Center for Functional Evaluation, Faculty of Medicine, Erasme Hospital, Université Libre de Bruxelles, Brussels, Belgium. Electronic address: sintjans@ulb.ac.be.

(Copyright © 2016, Elsevier Publishing)

DOI 10.1016/j.jbiomech.2016.07.011 **PMID** 27497500

Abstract

In the last decade, technological advances in the gaming industry have allowed the marketing of hardware for motion and balance control that is based on technological concepts similar to scientific and clinical equipment. Such hardware is attractive to researchers and clinicians for specific

applications. However, some questions concerning their scientific value and the range of future potential applications have yet to be answered. This article attempts to present an objective analysis about the pros and cons of using such hardware for scientific and clinical purposes and calls for a constructive discussion based on scientific facts and practical clinical requests that are emerging from application fields.

PDF Y Endnote Y

Does a falls prevention program impact perceived participation in everyday occupations? A pilot randomized controlled trial

Johansson E, Dahlberg R, Jonsson H, Patomella AH.

OTJR 2015; 35(4): 204-212.

Affiliation: Karolinska Institutet, Huddinge, Sweden.

(Copyright © 2015, Slack Publishing)

DOI 10.1177/1539449215589728 **PMID** 27505900

Abstract

This study aimed to evaluate the effectiveness of a multi-disciplinary, client-centered, fall prevention program on the experiences of participation and autonomy in everyday occupations among community-dwelling older adults. In total, 131 older adults (65+) were included and randomly allocated into two groups. Intention-to-treat analysis was used.

RESULTS of this pilot study showed that the program had a limited effect on the subjective experiences of participation and autonomy in everyday occupations among the participants. However, a trend of increased perceived participation and a decrease in the experience of perceived problems with participation among the participants in the intervention group was shown. Perceived participation and autonomy seem to be subjective experiences, and they seem to vary depending on the individual. To properly understand the impact of fall prevention interventions on participation and autonomy, measurements that capture both subjective and objective experiences are essential to use.

PDF Y Endnote Y

Effects of WiiActive exercises on fear of falling and functional outcomes in community-dwelling older adults: a randomised control trial

Kwok BC, Pua YH.

Age Ageing 2016; ePub(ePub): ePub.

Affiliation: Department of Physiotherapy, Singapore General Hospital, Singapore.

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Abstract

BACKGROUND: the study compares the effects of a Nintendo Wii exercise programme and a standard Gym-based exercise intervention on fear of falling, knee strength, physical function and falls rate in older adults.

METHODS: eighty community-dwelling adults aged 60 years and above with short physical performance battery score of 5-9 points and modified falls efficacy scale (MFES) score of ≤ 9 points participated in the parallel-group randomised trial. Each intervention arm involved an hour of intervention per week, totalling 12 sessions over 12 weeks. Besides 1-year fall incidence, the participants were evaluated on MFES, knee extensor strength (KES), timed-up-and-go test, gait

speed, 6-minute walk test and narrow corridor walk test at weeks 13 and 24.

RESULTS: at week 13, between interventions, the effect of MFES changes did not reach statistical significance (difference = -0.07 point, 95% CI -0.56 to 0.42, $P = 0.78$); at week 24, the Wii group showed statistically significant effects over the Gym group (difference = 0.8 point, 95% CI 0.27 to 1.29, $P < 0.01$). For KES, the two groups did not differ statistically at week 13 (difference = -2.0%, 95% CI -5.6 to -1.7, $P = 0.29$); at week 24, the Gym group had greater strength gains than the Wii group (difference = -5.1%, 95% CI -8.7 to -1.5, $P < 0.01$). No between-group differences were observed for other outcome measures.

CONCLUSION: on completion of a 12-week Nintendo Wii exercise programme, there was no significant benefit seen on fear of falling when compared to a standard Gym-based exercise intervention; however, post-intervention there was an apparent reduction in fear of falling in the group allocated to Wii training, despite knee strength apparently improving more in those allocated to the Gym. It is possible that long-term gains after using the Wii might be due to a carry-over effect.

TRIAL REGISTRATION: Australian New Zealand Clinical Trials Registry, ACTRN12610000576022.

PDF Y Endnote Y

Establishment of an appropriate fall prevention program: a community-based study

Otaka Y, Morita M, Mimura T, Uzawa M, Liu M.

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

Affiliation: Department of Rehabilitation Medicine, Keio University School of Medicine, Tokyo, Japan.

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DOI 10.1111/ggi.12831 **PMID** 27492888

Abstract

AIM: To identify an appropriate community-based fall prevention program

METHODS: We introduced two programs to 24 senior centers, "community salons," in a Japanese city, and carried out a prospective controlled trial between 2004 and 2005. Eight salons (185 participants aged 72.0 ± 7.1 years) received a single-visit program consisting of one multidisciplinary team visit that included fall risk assessment with feedback and a fall prevention lecture. A total of 16 salons (418 participants aged 73.6 ± 7.4 years) received a year-round comprehensive program, with visits carried out every 3 months. We compared the fall rates for 1 year between the two programs. Based on the results, we implemented a modified program until 2014 and examined the long-term consequences.

RESULTS: In the prospective controlled trial, fall rates did not differ significantly between programs ($P = 0.449$). Instead, fall rates for both programs decreased significantly by 0.89 (95% CI 0.84-0.94) times each month. Therefore, we implemented a modified version of the single-visit program. By March 2014, the programs had been delivered to 1863 individuals, and the total number of attendees was 6622. The average attendance frequency per participant was 0.62 times per year. The majority (85.3%) of salons requested the program every year. Overall, the risk of falling (fall rates in the preceding year) decreased significantly as the number of program attendances increased (incident rate ratio = 0.89, 95% CI 0.85-0.92) irrespective of initial program types.

CONCLUSIONS: The programs including fall risk assessment with feedback and a fall prevention lecture reduced falls when embedded into the community, and they were accepted well over the course of 10 years.

PDF Y Endnote Y

Fall-related activities of daily living and behaviour disturbances in dementia

Okamura T, Hayashi A, Matsuo S, Shinoda K, Konishi I, Makio H, Tsuji M.

J. Hum. Ergol. (Tokyo) 2015; 44(2): 51-59.

(Copyright © 2015, Human Ergology Research Association, Publisher University of Tokyo Press)

DOI unavailable **PMID** 27501537

Abstract

The purpose of this study is to clarify the activities of daily living and behaviour disturbances related to inpatients and outpatients with dementia experiencing falls. Patients diagnosed with dementia belonging to 18 facilities which consented to the study were subjected. The study involved "whether or not the patient has fallen in the past 12 months", "Barthel Index (B.I)", and "Dementia Behaviour Disturbance Scale (DBD)" and other data from 325 people in 18 facilities who had been diagnosed with dementia. The ratio of subjects who had fallen to those who had not was 113:212. The results of multiple logistic regression analysis showed that the study items related to falls including the DBD item of "making unwarranted accusations" had an OR = 1.445, 95% CI (1.133-1.843), the DBD item of "refusing to eat" had an OR = 0.699, 95% CI (0.521- 0.938), the B.I item of "feeding" had OR = 1.115, 95% CI (1.032-1.204) and the B.I item of "bathing" had OR = 0.782, 95% CI (0.671-0.912). Integral characteristics of dementia patients who have fallen are assumed to be making unwarranted accusations, having a low rate of refusing to eat, being able to eat alone and requiring attention when bathing.

PDF N Endnote Y

Feasibility of repeated self-measurements of maximum step length and gait speed by community-dwelling older persons

Bongers KT, Schoon Y, Olde Rikkert MG.

BMJ Open 2016; 6(8): e011538.

Affiliation: Department of Geriatric Medicine, Radboud University Medical Center, Radboud Institute for Health Sciences, Nijmegen, The Netherlands.

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DOI 10.1136/bmjopen-2016-011538 **PMID** 27496235

Abstract

OBJECTIVES: Self-management of mobility and fall risk can be important in fall prevention; however, it remains unstudied. Therefore, the current study assessed whether community-dwelling older persons were able to repeatedly self-assess maximum step length (MSL) and gait speed (GS) in their own home for a 6-month period, how these tests changed during this period and if these changes were related to falling.

DESIGN: This is a prospective study.

SETTING: This study was conducted at home.

PARTICIPANTS: A total of 56 community-dwelling older adults (24 women (43%), mean age 76.2 (SD 3.9) years) entered the study; of which, 45 completed the study.

METHODS: Participants performed MSL and GS once a week in their own home during a 6-month period.

PRIMARY AND SECONDARY OUTCOMES: Repeated MSL and GS measurements were the primary outcomes. Falls, self-management and mobility were the secondary outcomes.

RESULTS: Self-assessment of MSL and GS by older persons is feasible. Compliance of repeatedly self-measuring MSL and GS was good; the median number of weekly measurements was 23.0 (88%) and

21.0 (81%) for MSL and GS, respectively. Drop-outs showed less self-management abilities compared to the participants who completed the study ($p=0.049$). Linear mixed models showed a small significant improvement in MSL and GS over time ($p<0.001$), without an influence on falling.

CONCLUSIONS: Most community-dwelling older persons are able and willing to repeatedly assess their MSL and GS. Self-managing mobility and fall risk did not increase fall occurrence. The fact that older persons can be actively involved in their own healthcare is clinically relevant. Further studies are needed to examine the (cost-)effectiveness of self-management in fall prevention interventions.

PDF Y Endnote Y

Gender differences in mobility device use among U.S. older adults

Peterson LJ, Meng H, Dobbs D, Hyer K.

J. Gerontol. B Psychol. Sci. Soc. Sci. 2016; ePub(ePub): ePub.

Affiliation: Florida Policy Exchange Center on Aging, School of Aging Studies, University of South Florida, Tampa.

(Copyright © 2016, Gerontological Society of America, Publisher Oxford University Press)

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Abstract

OBJECTIVES: Research has shown greater mobility limitations among women than men. We aimed to examine (a) gender differences in the use of canes for mobility and (b) what factors contribute to these differences under the frameworks of the disablement model and the Theory of Planned Behavior.

METHOD: Using National Health and Aging Trends Study data, we estimated hierarchical logistic regression models to predict the likelihood of cane use among older adults who completed performance-based measures ($n = 5,503$). We tested the interactions between gender and selected variables to further understand gender difference.

RESULTS: In unadjusted analysis, 22% of women and 16% of men used canes. In models adjusted in steps for sociodemographics, health, physical impairments, capacity, psychosocial, and social environment factors, women were progressively less likely to use canes, significantly so at the last step. Suppression effect analyses showed the influence of living alone and receiving mobility help variables. Interaction analyses showed that women reporting poor health or balance were less likely to use canes; obese women were more likely.

DISCUSSION: Significant gender differences exist in cane use among older community-living adults.

FINDINGS suggest that health and function partly account for these differences. Future research is needed to understand social/cultural factors involved.

PDF Y Endnote Y

High-speed cycling intervention improves rate-dependent mobility in older adults

Bellumori M, Uygur M, Knight CA.

Med. Sci. Sports Exerc. 2016; ePub(ePub): ePub.

Affiliation:Department of Kinesiology, California State University, Monterey Bay, Seaside, CA; 2Department of Health and Exercise Sciences, Rowan University, Glassboro, NJ; 3Department of Kinesiology and Applied Physiology, University of Delaware, Newark, DE.

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DOI 10.1249/MSS.0000000000001069 **PMID** 27501360

Abstract

PURPOSE: The aim was to determine the feasibility of a six-week speed-based exercise program that could be used to initiate new exercise behaviors and improve rapid movement in older adults approaching frailty.

METHODS: The intervention group included 14 older adults (3 males, 11 females, mean (SD) age: 70 (7.6) years, height: 1.6 (.11) m, mass: 76.8 (12.0) kg, BMI: 27.7(4.7)). The control group included 12 older adults (6 males, 6 females, mean (SD) age: 69.2 (6.9) years, height: 1.7 (.09) m, mass: 78.2 (10.9) kg, BMI: 25.3 (2.7)). Subjects included active older adults, including regular exercisers, but none were engaged in sports or exercises with an emphasis on speed (e.g. cycling spin classes or tennis). Stationary recumbent cycling was selected to minimize fall risk and low pedaling resistance reduced musculoskeletal and cardiovascular load. Two weekly 30-minute exercise sessions consisted of interval training in which subjects pedaled at preferred cadence and performed ten 20-s fast cadence intervals separated by 40-s of active recovery at preferred cadence.

RESULTS: Significant Group by Time interactions ($p < .05$) supported a 2-s improvement in the timed up and go test and a 34% improvement in rapid isometric knee extension contractions in the exercise group but not in controls. Central neural adaptations are suggested because this lower extremity exercise program also elicited significant improvements in the untrained upper extremities of the exercise group (elbow extension RFD-SF and 9-Hole Peg Test, $p < .05$).

CONCLUSION: These results demonstrate that a relatively low dose of speed-based exercise can improve neuromuscular function and tests of mobility in older adults. Such a program serves as a sensible precursor to subsequent, more vigorous training or as an adjunct to a program where a velocity emphasis is lacking.

PDF Y Endnote Y

History of falling and visual ability among independently living elderly in Sweden

Källstrand-Eriksson J, Hildingh C, Bengtsson B.

Clin. Ophthalmol. 2016; 10: 1265-1273.

Affiliation: Department of Clinical Sciences in Malmö, Ophthalmology, Lund University, Malmö, Sweden.

(Copyright © 2016, Dove Medical Press)

DOI 10.2147/OPHTH.S101060 **PMID** 27468223

Abstract

PURPOSE: The aim of this study was to assess the performance-based visual ability among independently living elderly subjects and to investigate whether there was any association between visual ability and falls.

SUBJECTS AND METHODS: A total of 298 randomly selected subjects aged 70-85 years were invited for an examination including monocular and binocular visual acuity (VA), contrast sensitivity (CS), stereoscopic vision, and monocular visual fields (VFs), which were integrated to estimate the binocular VFs. Type of lenses used in their habitual correction was noted.

RESULTS: Out of the 212 subjects who were examined, 38% reported at least one fall and 48% of these reported at least two falls during the last 2 years. Most subjects had normal results; 90% had normal binocular VA, 85% had normal binocular CS, and ~80% had positive stereopsis. Twenty-nine subjects had VF defects in the lower quadrants of the binocular VF, and 14 of these reported at least one fall. A significant association was seen between one fall or more and VA better eye, the odds ratio (OR) was 2.26, $P=0.013$, and between recurrent falls and lack of stereoscopic vision, the OR was 3.23, $P=0.002$; no other functional test showed any significant association with recurrent falls. The

ORs were 1.58 for worse binocular VA, 0.60 for worse binocular CS, and 0.71 for non-normal stereoscopic vision for at least one fall, but wide confidence intervals made it difficult to draw firm conclusions about any association. Bifocal or progressive spectacles were worn by 71% with no significant difference between fallers and nonfallers ($P=0.078$).

CONCLUSION: Even though ~40% of the total sample had experienced one or more falls, the only visual function test significantly associated with falls were VA better eye, lack of stereoscopic vision, and recurrent falls. Our results suggest that there may be more powerful predictors of falling than decreased visual ability.

PDF Y Endnote Y

Low self-awareness of osteoporosis and fracture risk among postmenopausal women

Langer FW, da Silveira Codevilla AA, Bringham R, Dal Osto LC, Campos TR, Martins TT, Barin AE, Rigo PH, Boufleuer ND, Santinon SF, Kipper K, Rodrigues J, Premaor MO.

Arch. Osteoporos. 2016; 11(1): 27.

Affiliation: Grupo de Pesquisa em Doenças Endócrino-Metabólicas Prevalentes, Departamento de Clínica Médica, Centro de Ciências da Saúde (CCS), Universidade Federal de Santa Maria (UFSM), Sala 1337, Prédio 26 - CCS, Avenida Roraima 1000, Campus UFSM, Santa Maria, RS, Brazil.

premaor@ufsm.br.

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DOI 10.1007/s11657-016-0266-3 **PMID** 27503622

Abstract

Postmenopausal women with a high risk of fractures may not perceive their risk. This study showed no concordance between the perceived and calculated risk of fracture. Almost 80 % of the women identified as a high risk of fracture by the FRAX algorithm tool perceived themselves to have little risk.

PURPOSE: This study aimed to assess the concordance between self-perception of osteoporosis and fracture risk and the 10-year risk of fractures calculated by the FRAX algorithm.

METHODS: A cross-sectional study was conducted in Santa Maria, RS, Brazil, between March 1 and August 31, 2013. Postmenopausal women over 55 years of age who have had at least one appointment at primary care in the 2 years prior to the enrolment were recruited. We excluded women with cognitive impairment. A standardized questionnaire regarding the perception of personal risk of osteoporosis and fractures was used. We also evaluated previous fractures, family history of fracture, smoking, alcohol consumption, use of glucocorticoids, and secondary causes of osteoporosis. Weight and height of the participants were measured. The risk of fractures of each participant was calculated using the FRAX algorithm (Fracture Risk Assessment Tool).

RESULTS: Of the 1301 invited women, 1057 completed the survey. The average (mean [SD]) age and BMI were 67.2 (7.6) years and 29.3 (5.5) kg/m², respectively. Only 16.9 and 19.9 % participants believed themselves to be at a high risk of osteoporosis and fractures, respectively. There was no agreement between the perceived risk of fractures and the calculated FRAX risk of fractures.

Moreover, almost 79.3 % of the women identified with a high risk of fractures by the FRAX algorithm perceived themselves as having little risk.

CONCLUSION: These results show that postmenopausal women underestimate their risk of osteoporotic fractures when compared with their 10-year fracture risk according to FRAX algorithm.

PDF Y Endnote Y

Mobility-related consequences of reduced lower-extremity peripheral nerve function with age: a systematic review

Ward RE, Caserotti P, Cauley JA, Boudreau RM, Goodpaster BH, Vinik AI, Newman AB, Strotmeyer ES. *Aging Dis.* 2016; 7(4): 466-478.

Affiliation: Department of Epidemiology, Graduate School of Public Health, University of Pittsburgh, Pittsburgh, PA 15213, USA.

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DOI 10.14336/AD.2015.1127 **PMID** 27493833 **PMCID** PMC4963190

Abstract

The objective of this study is to systematically review the relationship between lower-extremity peripheral nerve function and mobility in older adults. The National Library of Medicine (PubMed) was searched on March 23, 2015 with no limits on publication dates. One reviewer selected original research studies of older adults (≥ 65 years) that assessed the relationship between lower-extremity peripheral nerve function and mobility-related outcomes. Participants, study design and methods of assessing peripheral nerve impairment were evaluated and results were reported and synthesized. Eight articles were identified, including 6 cross-sectional and 2 longitudinal studies. These articles investigated 6 elderly cohorts (4 from the U.S. and 2 from Italy): 3 community-dwelling (including 1 with only disabled women and 1 without mobility limitations at baseline), 1 with both community-dwelling and institutionalized residents, 1 from a range of residential locations, and 1 of patients with peripheral arterial disease. Mean ages ranged from 71-82 years. Nerve function was assessed by vibration threshold ($n=2$); sensory measures and clinical signs and symptoms of neuropathy ($n=2$); motor nerve conduction ($n=1$); and a combination of both sensory measures and motor nerve conduction ($n=3$). Each study found that worse peripheral nerve function was related to poor mobility, although relationships varied based on the nerve function measure and mobility domain assessed. Six studies found that the association between nerve function and mobility persisted despite adjustment for diabetes. Evidence suggests that peripheral nerve function impairment at various levels of severity is related to poor mobility independent of diabetes. Relationships varied depending on peripheral nerve measure, which may be particularly important when investigating specific biological mechanisms. Future research needs to identify risk factors for peripheral nerve decline beyond diabetes, especially those common in late-life and modifiable. Interventions to preserve nerve function should be investigated with regard to their effect on postponing or preventing disability in older adults.

PDF Y Endnote Y

Neurocardiovascular instability and cognition

O'Callaghan S, Kenny RA.

Yale J. Biol. Med. 2016; 89(1): 59-71.

Affiliation: Professor of Medical Gerontology, Mercer's Institute for Successful Ageing, St. James' Hospital, Hospital 4 Top Floor, Dublin 8, Ireland.

(Copyright © 2016, Yale Journal of Biology and Medicine)

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Abstract

Neurocardiovascular instability (NCVI) refers to abnormal neural control of the cardiovascular system affecting blood pressure and heart rate behavior. Autonomic dysfunction and impaired cerebral autoregulation in aging contribute to this phenomenon characterized by hypotension and

bradyarrhythmia. Ultimately, this increases the risk of falls and syncope in older people. NCVI is common in patients with neurodegenerative disorders including dementia. This review discusses the various syndromes that characterize NCVI including hypotension, carotid sinus hypersensitivity, postprandial hypotension and vasovagal syncope and how they may contribute to the aetiology of cognitive decline. Conversely, they may also be a consequence of a common neurodegenerative process. Regardless, recognition of their association is paramount in optimizing management of these patients.

PDF Y Endnote Y

Older people remain on blood pressure agents despite being hypotensive resulting in increased mortality and hospital admission

Morrissey Y, Bedford M, Irving J, Farmer CK.

Age Ageing 2016; ePub(ePub): ePub.

Affiliation: Renal Medicine, East Kent Hospitals University NHS Foundation Trust, Canterbury, Kent CT1 3NG, UK.

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Abstract

BACKGROUND: the use of antihypertensive medication in older people in order to prevent cardiovascular events is well established. The use of such agents has been encouraged by incentive schemes in the United Kingdom including the Quality and Outcomes Framework. In addition, many guidelines recommend good blood pressure (BP) control in the elderly. However, in older people antihypertensives can cause adverse effects related to hypotension.

AIM: the aim of this study was to assess the prevalence of low BP and impact on outcomes, particularly in the presence of antihypertensive treatment, in a primary care population of older people.

DESIGN: a retrospective observational cohort study in people over the age of 70 years registered with primary care providers in Kent.

RESULTS: a total of 11,167 patients over 70 years old were analysed, 6,373 female (57%). Systolic blood pressure (SBP) was below 120 mmHg in 1,297 people (844 on antihypertensives), below 110 mmHg in 474 (313 on antihypertensives) and below 100 mmHg in 128 (89 on antihypertensives). Hypotension was independently associated with mortality, acute kidney injury and hospital admission.

CONCLUSIONS: the results demonstrate that low SBP is associated with adverse events, it is possible that the pursuit of BP control at a population level may lead to over-treatment in certain groups of patients. This may result in an increased incidence of adverse events particularly in older people.

PDF Y Endnote Y

Postural stability in the cognitively impaired elderly: a systematic review of the literature

Cieřlik B, Jaworska L, Szczepańska-Gierach J.

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Affiliation: Institute of Physical Education, Tourism and Physiotherapy, Faculty of Pedagogy, Jan Długosz University, Czestochowa, Poland; University School of Physical Education, Poland
blaze.cieslik@gmail.com.

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Abstract

INTRODUCTION: The aim of this study was to review the literature and critically analyse publications connecting cognitive impairment with postural stability.

METHODS: Four electronic databases were searched. The inclusion criteria comprised the relation between the process of maintaining balance and cognitive impairment.

RESULTS: Of the 153 selected articles, 15 met the inclusion criteria. In 83% of publications, cognitive status was determined with the use of the Mini-Mental State Examination. In eight publications, postural stability was examined using force plates. Other methods used to test the balance were functional tests, i.e. the Berg Balance Scale or the Balance Evaluation Systems Test.

CONCLUSION: As the choice of methodology varies significantly, it is difficult to attempt an objective comparison between different studies. There is a clear need for the normalisation of methods used to assess the degree of dementia and to assess postural stability among this group of people.

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Prevalence and risk factors for falls in older men and women: the English Longitudinal Study of Ageing

Gale CR, Cooper C, Aihie Sayer A.

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Affiliation: MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK.

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Abstract

BACKGROUND: falls are a major cause of disability and death in older people. Women are more likely to fall than men, but little is known about whether risk factors for falls differ between the sexes. We used data from the English Longitudinal Study of Ageing to investigate the prevalence of falls by sex and to examine cross-sectionally sex-specific associations between a range of potential risk factors and likelihood of falling.

METHODS: participants were 4,301 men and women aged 60 and over who had taken part in the 2012-13 survey of the English Longitudinal Study of Ageing. They provided information about sociodemographic, lifestyle and behavioural and medical factors, had their physical and cognitive function assessed and responded to a question about whether they had fallen down in the last two years.

RESULTS: in multivariable logistic regression models, severe pain and diagnosis of at least one chronic disease were independently associated with falls in both sexes. Sex-specific risk factors were incontinence (odds ratio (OR), 1.48; 95% CI, 1.19, 1.85) and frailty (OR 1.69, 95% CI 1.06, 2.69) in women, and older age (OR 1.02, 95% CI 1.04, 1.07), high levels of depressive symptoms (OR 1.33, 95% CI 1.05, 1.68), and being unable to perform a standing balance test (OR 3.32, 95% CI 2.09, 5.29) in men.

CONCLUSION: although we found some homogeneity between the sexes in the risk factors that were associated with falls, the existence of several sex-specific risk factors suggests that gender should be taken into account in designing fall-prevention strategies.

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Smallest worthwhile effect of exercise programs to prevent falls among older people: estimates from benefit-harm trade-off and discrete choice methods

Franco MR, Howard K, Sherrington C, Rose J, Ferreira PH, Ferreira ML.

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Affiliation: The George Institute for Global Health & Institute of Bone and Joint Research, The Kolling Institute, Sydney Medical School, The University of Sydney, Sydney, New South Wales, Australia.

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Abstract

BACKGROUND: the smallest worthwhile effect (SWE) of an intervention is the smallest treatment effect that justifies the costs, risks and inconveniences associated with that health intervention.

OBJECTIVE: to estimate the SWE of exercise programs designed to prevent falls among older people and to compare estimates derived by two methodological approaches.

STUDY DESIGN AND SETTING: discrete choice experiment (n = 220) and benefit-harm trade-off (subsample n = 66) methods were used.

PARTICIPANTS: community-dwelling older people who reported a past fall or a mobility limitation answered online or face-to-face questionnaires.

RESULTS: a substantial proportion of participants (82% in the discrete choice experiment and 50% in the benefit-harm trade-off study) did not consider that participation in the proposed exercise programs would be worthwhile, even if it reduced their risk of falling to 0%. Among remaining participants, the average SWE of participation in an exercise program was an absolute reduction in the risk of falling of 35% (standard deviation [SD] = 13) in the discrete choice experiment and 16% (SD = 11) in the benefit-harm trade-off study.

CONCLUSIONS: many participants did not consider the hypothetical falls' risk reduction of the proposed exercise programs to be worth the associated costs and inconveniences. Greater community awareness of the fall prevention effects of exercise for older people is required.

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The aging neuromuscular system and motor performance

Hunter SK, Pereira HM, Keenan KG.

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Abstract

Age-related changes in the basic functional unit of the neuromuscular system, the motor unit, and its neural inputs have a profound impact on motor function, especially among the expanding number of old (>~60 years) and very old adults (>~80 years). This review presents evidence that age-related changes in motor unit morphology and properties leads to impaired motor performance that includes: 1) reduced maximal strength and power, slower contractile velocity, and increased fatigability; and 2) increased variability during and between motor tasks, including decreased force steadiness and increased variability of contraction velocity and torque over repeat contractions. The age-related increase in variability of motor performance with aging appears to involve reduced and more variable synaptic inputs that drive motor neuron activation, fewer and larger motor units, less stable neuromuscular junctions, lower and more variable motor unit action potential discharge rates, and smaller and slower skeletal muscle fibers that co-express different myosin heavy chain

isoforms in the muscle of older adults. Physical activity may modify motor unit properties and function in old men and women, although the effects on variability of motor performance are largely unknown. Many studies are of cross-sectional design, so there is a tremendous opportunity to perform high-impact and longitudinal studies along the continuum of aging that determine: 1) the influence and cause of the increased variability with aging on functional performance tasks, and 2) whether lifestyle factors such as physical exercise can minimize this age-related variability in motor performance in the rapidly expanding numbers of very old adults.

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The effects of gait time and trunk acceleration ratio during stair climbing in old-old adult females

Shin SS, Yoo WG.

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Affiliation: Department of Physical Therapy, College of Biomedical Science and Engineering, Inje University, Republic of Korea.

(Copyright © 2016, Society of Physical Therapy Science)

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Abstract

PURPOSE: This study investigated the effects of gait time and trunk acceleration ratio in old-old adult females during stair climbing.

SUBJECTS AND METHODS: Twenty-five older adult females who were able to walk independently volunteered for this study and were categorized into two age groups (older adults or old-old adults). Gait time and trunk acceleration ratio were measured using an accelerometer during stair climbing.

RESULTS: Gait time and trunk acceleration ratio when climbing stairs were significantly higher in the old-old age group than in the older adults group.

CONCLUSIONS: These findings suggest that old-old females have decreased upper trunk control. In addition, gait time and the trunk acceleration ratio during stair climbing are useful clinical markers for predicting function and balance control ability in old-old elderly populations.

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Vitamin D and falls - the dosage conundrum

Gallagher JC.

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Affiliation: Bone Metabolism Unit, Division of Endocrinology, Creighton University School of Medicine, 601 North 30th Street, Omaha, Nebraska 68131, USA.

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Abstract

Falls are a major health problem in elderly individuals. Although intensive physical therapy and management of hazards in the home can reduce falls by 25%, long-term practicality limits their use. Interest in vitamin D as a medical therapy has led to many trials; however, results using daily oral doses of vitamin D have been inconsistent. In the past 5 years, studies on the effect of bolus doses of vitamin D have produced surprising results. Bolus doses of vitamin D, given annually (at a dose of 300,000 IU or 500,000 IU) or monthly (at a dose of 24,000 IU or 60,000 IU) - equivalent to approximate daily doses of 800 IU, 1400 IU and 2,000 IU - result in a significant increase in the number of falls and fractures associated with serum levels of 25-hydroxyvitamin D greater than 40-

45 ng/ml (equivalent to 100-112 nmol/l). These unexpected results show increased falls and fractures are adverse events related to vitamin D administration. Until further safety data is available, bolus dosing or daily doses should not exceed 3,000 IU and serum levels of 25-hydroxyvitamin D should not exceed 40-45 ng/ml (equivalent to 100-112 nmol/l) in elderly individuals.

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Feedback and feedforward control during walking in individuals with chronic ankle instability

Yen SC, Corkery MB, Donohoe A, Grogan M, Wu YN.

J. Orthop. Sports Phys. Ther. 2016; ePub(ePub): ePub.

Affiliation: Department of Physical Therapy, College of Health Sciences, University of Massachusetts Lowell, Lowell, MA.

(Copyright © 2016, Orthopaedic Section and Sports Physical Therapy Section of the American Physical Therapy Association)

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Abstract

STUDY DESIGN: Controlled laboratory study. **Background** Recurrent ankle sprains associated with chronic ankle instability (CAI) occur not only in challenging sports but also in daily walking. Understanding whether and how CAI alters feedback and feedforward controls during walking may be important for developing interventions for CAI prevention or treatment.

OBJECTIVE: To understand whether CAI is associated with changes in feedback and feedforward control when subjected to experimental perturbation during walking.

METHODS: Twelve subjects with CAI and 12 control subjects walked on a treadmill while adapting to external loading generating inversion perturbation at the ankle joint. Ankle kinematics around heel contact during and after the adaptation were compared between the two groups.

RESULTS: Both healthy and CAI groups showed an increase in eversion around heel contact in early adaptation to the external loading. However, the CAI group adapted back towards the baseline while the healthy controls showed further increase in eversion in late adaptation. When the external loading was removed in the post adaptation period, healthy controls showed an aftereffect consisting of an increase in eversion around heel contact but the CAI group showed no aftereffect.

CONCLUSION: The results provide preliminary evidence that CAI may alter individuals' feedback and feedforward control during walking. *J Orthop Sports Phys Ther*, Epub 5 Aug 2016.

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Machine learning for large-scale wearable sensor data in Parkinson's disease: concepts, promises, pitfalls, and futures

Kubota KJ, Chen JA, Little MA.

Mov. Disord. 2016; ePub(ePub): ePub.

Affiliation: Media Lab, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA.

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Abstract

For the treatment and monitoring of Parkinson's disease (PD) to be scientific, a key requirement is that measurement of disease stages and severity is quantitative, reliable, and repeatable. The last 50

years in PD research have been dominated by qualitative, subjective ratings obtained by human interpretation of the presentation of disease signs and symptoms at clinical visits. More recently, "wearable," sensor-based, quantitative, objective, and easy-to-use systems for quantifying PD signs for large numbers of participants over extended durations have been developed. This technology has the potential to significantly improve both clinical diagnosis and management in PD and the conduct of clinical studies. However, the large-scale, high-dimensional character of the data captured by these wearable sensors requires sophisticated signal processing and machine-learning algorithms to transform it into scientifically and clinically meaningful information. Such algorithms that "learn" from data have shown remarkable success in making accurate predictions for complex problems in which human skill has been required to date, but they are challenging to evaluate and apply without a basic understanding of the underlying logic on which they are based. This article contains a nontechnical tutorial review of relevant machine-learning algorithms, also describing their limitations and how these can be overcome. It discusses implications of this technology and a practical road map for realizing the full potential of this technology in PD research and practice.

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