

SafetyLit January 22, 2016**A longitudinal comparative study of falls in persons with knee arthroplasty and persons with or at high risk for knee osteoarthritis**

Riddle DL, Golladay GJ.

Age Ageing 2017; ePub(ePub): ePub.

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Abstract [Abstract unavailable]

PDF Endnote Y

A population-based study examining injury in older adults with and without dementia

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J. Am. Geriatr. Soc. 2017; ePub(ePub): ePub.

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(Copyright © 2017, John Wiley and Sons)

DOI 10.1111/jgs.14523 **PMID** 28102889

Abstract

OBJECTIVES: To estimate the incidence of and risk factors for injuries in older adults with and without dementia.

DESIGN: Retrospective, population-based cohort study.

SETTING: Western Australian Data Linkage System (WADLS).

PARTICIPANTS: Cases included 29,671 (47.9%) older adults aged 50 and older with an index hospital admission for dementia between 2001 and 2011. Comparison participants without dementia included a random sample of 32,277 (52.1%) older adults aged 50 and older from the state electoral roll.

MEASUREMENTS: Hospital admission to a metropolitan tertiary hospital for at least 24 hours with an injury.

RESULTS: Age-standardized all-cause injury rates for older adults with dementia (≥ 60) were 117 per 1,000 population and 24 per 1,000 population for older adults without dementia. Falls caused the majority of injuries for both groups (dementia, 94%; without dementia, 87%), followed by transport-related injuries and burns. Multivariate modeling found that older adults with a diagnosis of dementia had more than twice the risk of hospital admission for an injury than those without dementia (incidence rate ratio (IRR) = 2.05, 95% confidence interval (CI) = 1.96-2.15). Other significant risk factors for a hospital admission for injury were age 85 and older (IRR = 1.43, 95% CI = 1.13-1.81), being unmarried (IRR = 1.07, 95% CI = 1.03-1.12), and a history of falls (IRR = 1.03, 95% CI = 1.01-1.06). Women were at lower risk than men of a hospital admission due to an injury (IRR = 0.92, 95% CI = 0.87-0.97).

CONCLUSIONS: Older adults with dementia are at greater risk of a hospital admission for an injury. Multifactorial injury prevention programs would benefit older adults with and without dementia, especially those aged 85 and older, living alone, and with a history of previous falls.

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PDF Endnote

Clinical validation of the nursing outcome falls prevention behavior in people with stroke

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Appl. Nurs. Res. 2017; 33: 67-71.

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(Copyright © 2017, Elsevier Publishing)

DOI 10.1016/j.apnr.2016.10.003 **PMID** 28096026

Abstract

PURPOSE: To review the nursing outcome, Fall Prevention Behavior, and clinically validate its indicators in people with stroke.

METHODS: A methodological study performed with 106 patients in two outpatient clinics, from July to September of 2013. Two pairs of trained nurses applied the NOC scale, one with and one without the use of operational definitions. The internal consistency, stability and difference between the medians obtained by nurses were compared within and between pairs.

RESULTS: Most participants were men, elderly, with low education and income. Statistically significant differences were noted in twelve indicators. Five indicators had different means that were greater than the least significant difference.

CONCLUSIONS: The indicators were statistically significant; the internal consistency was similar between the pairs and the intraclass correlation coefficient was more satisfactory in the pair that used the definitions. Thus, the construction of empirical referents and the clinical validation process makes the nursing indicators and outcomes more adequate for specific populations and provides an effective means to better evaluate the nursing actions.

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Comparison of Revised Trauma Score, Injury Severity Score and Trauma and Injury Severity Score for mortality prediction in elderly trauma patients

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DOI unavailable **PMID** 28074459

Abstract

BACKGROUND: Trauma is the fifth leading cause of death in patients 65 years and older. This study is a comparison of results of Revised Trauma Score (RTS), Injury Severity Score (ISS), and Trauma and Injury Severity Score (TRISS) in prediction of mortality in cases of geriatric trauma.

METHODS: This is a cross-sectional study of records of 352 elderly trauma patients who were admitted to Pour-Sina Hospital in Rasht between 2010 and 2011. Injury scoring systems were compared in terms of specificity, sensitivity, and cut-off points using receiver operating characteristic curve of patient prognosis.

RESULTS: Mean age of patients was 71.5 years. Most common mechanism of injury was traffic

accident (53.7%). Of the total, 13.9% of patients died. Mean ISS was higher for patients who did not survive. Mean of TRISS and RTS scores in elderly survivors was higher than non-survivors and difference in all 3 scores was statistically significant ($p < 0.001$). Best cut-off points for predicting mortality in elderly trauma patients in RTS, ISS, and TRISS systems were ≤ 6 , ≥ 13.5 , and ≤ 2 , with sensitivity of 99%, 84%, and 95% and specificity of 62%, 62%, and 72%, respectively.

CONCLUSION: TRISS was the strongest predictor of mortality in elderly trauma patients as result of combination of both anatomical and physiological parameters.

PDF Endnote Y

Effect of aging on motor inhibition during action preparation under sensory conflict

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Front. Aging Neurosci. 2016; 8: e322.

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Abstract

Motor behaviors often require refraining from selecting options that may be part of the repertoire of natural response tendencies but that are in conflict with ongoing goals. The presence of sensory conflict has a behavioral cost but the latter can be attenuated in contexts where control processes are recruited because conflict is expected in advance, producing a behavioral gain compared to contexts where conflict occurs in a less predictable way. In the present study, we investigated the corticospinal correlates of these behavioral effects (both conflict-driven cost and context-related gain). To do so, we measured motor-evoked potentials (MEPs) elicited by transcranial magnetic stimulation (TMS) over the primary motor cortex (M1) of young and healthy older adults performing the Eriksen Flanker Task. Subjects performed button-presses according to a central arrow, flanked by irrelevant arrows pointing in the same (congruent trial) or opposite direction (incongruent trial). Conflict expectation was manipulated by changing the probability of congruent and incongruent trials in a given block. It was either high (mostly incongruent blocks, MIB, 80% incongruent trials) or low (mostly congruent blocks, MCB, 80% congruent). The MEP data indicate that the conflict-driven behavioral cost is associated with a strong increase in inappropriate motor activity regardless of the age of individuals, as revealed by larger MEPs in the non-responding muscle in incongruent than in congruent trials. However, this aberrant facilitation disappeared in both groups of subjects when conflict could be anticipated (i.e., in the MIBs) compared to when it occurred in a less predictably way (MCBs), probably allowing the behavioral gain observed in both the young and the older individuals. Hence, the ability to overcome and anticipate conflict was surprisingly preserved in the older adults. Nevertheless, some control processes are likely to evolve with age because the behavioral gain observed in the MIB context was associated with an attenuated suppression of MEPs at the time of the imperative signal (i.e., before conflict is actually detected) in older individuals, suggesting altered motor inhibition, compared to young individuals. In addition, the behavioral analysis suggests that young and older adults rely on different strategies to cope with conflict, including a change in speed-accuracy tradeoff.

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Effect of training and structured medication review on medication appropriateness in nursing home residents and on cooperation between health care professionals: the InTherAKT study protocol

Mahlknecht A, Nestler N, Bauer U, Schüßler N, Schuler J, Scharer S, Becker R, Waltering I, Hempel G, Schwalbe O, Flamm M, Osterbrink J.

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DOI 10.1186/s12877-017-0418-3 **PMID** 28100176

Abstract

BACKGROUND: Pharmacotherapy in residents of nursing homes is critical due to the special vulnerability of this population. Medical care and interprofessional communication in nursing homes are often uncoordinated. As a consequence, polypharmacy and inappropriate medication use are common and may lead to hospitalizations and health hazards. The aim of this study is to optimize communication between the involved professional groups by specific training and by establishing a structured medication review process, and to improve medication appropriateness and patient-relevant health outcomes for residents of nursing homes.

METHODS/DESIGN: The trial is designed as single-arm study. It involves 300 nursing home residents aged ≥ 65 years and the members of the different professional groups practising in nursing home care (15-20 general practitioners, nurses, pharmacists). The intervention consists of interprofessional education on safe medication use in geriatric patients, and a systematic interprofessional therapy check (recording, reviewing and adapting the medication of the participating residents by means of a specific online platform). The intervention period is divided into two phases; total project period is 3 years. Primary outcome measure is the change in medication appropriateness according to the Medication Appropriateness Index. Secondary outcomes are cognitive performance, occurrence of delirium, agitation, tendency of falls, total number of drugs, number of potentially dangerous drug-drug interactions and appropriateness of recorded analgesic therapy regimens according to the Medication Appropriateness Index. Data are collected at t0 (before the start of the intervention), t1 (after the first intervention period) and t2 (after the second intervention period). Cooperation and communication between the professional groups are investigated twice by qualitative interviews.

DISCUSSION: The project aims to establish a structured system for monitoring of drug therapy in nursing home residents. The newly developed online platform is designed to systematize and to improve the communication between the professional groups and, thus, to enhance quality and safety of drug therapy. Limitations of the study are the lack of a control group and the non-randomly recruited study sample. **TRIAL REGISTRATION:** DRKS Data Management, DRKS-ID: DRKS00007900.

PDF Y Endnote Y

Evaluation of an outpatient rehabilitative program to address mobility limitations among older adults

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Abstract

Live Long Walk Strong is a clinical demonstration program for community-dwelling older patients. It was designed to be consistent with current fall prevention guidelines and reimbursed under the Medicare model. Patients were screened within primary care and referred to a physiatrist followed by systematic assessment and treatment within an outpatient rehabilitative care setting. The treatment included behavioral modification, fall prevention education, community/home exercise integration, and exercise targeting strength, power, flexibility, balance, and endurance. Treatment duration and frequency varied with each patient based on baseline presentation, clinical judgment, and patient preference. Program feasibility and preliminary effectiveness were evaluated by assessing participation and changes in physical performance, respectively. There were 266 patients referred to the program, and 147 were willing to participate. Of these, 116 patients completed all scheduled visits (10.8 ± 3.9 visits). The noncompleters ($n = 31$) had a higher rate of falls in the previous 6 months and lower baseline Short Physical Performance Battery composite score. At the completion of care, the adjusted mean change in Short Physical Performance Battery was 1.66 units, surpassing a large clinically meaningful threshold (1 unit). The Live Long Walk Strong program appears to be feasible to implement and demonstrates preliminary effectiveness in enhancing mobility among older adults. This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

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Excess mortality after hip fracture in elderly persons from Europe and the USA: the CHANCES project

Katsoulis M, Benetou V, Karapetyan T, Feskanich D, Grodstein F, Pettersson-Kymmer U, Eriksson S, Wilsgaard T, Jørgensen L, Ahmed LA, Schöttker B, Brenner H, Bellavia A, Wolk A, Kubinova R, Stegeman B, Bobak M, Boffetta P, Trichopoulos A.

J. Intern. Med. 2017; ePub(ePub): ePub.

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Abstract

BACKGROUND: Hip fractures are associated with diminished quality of life and survival especially amongst the elderly.

OBJECTIVE: All-cause mortality after hip fracture was investigated to assess its magnitude.

METHODS: A total of 122 808 participants from eight cohorts in Europe and the USA were followed up for a mean of 12.6 years, accumulating 4273 incident hip fractures and 27 999 deaths. Incident hip fractures were assessed through telephone interviews/questionnaires or national inpatient/fracture registries, and causes of death were verified with death certificates. Cox proportional hazards models and the time-dependent variable methodology were used to assess the

association between hip fracture and mortality and its magnitude at different time intervals after the injury in each cohort. We obtained the effect estimates through a random-effects meta-analysis. RESULTS: Hip fracture was positively associated with increased all-cause mortality; the hazard ratio (HR) in the fully adjusted model was 2.12, 95% confidence interval (CI) 1.76-2.57, after adjusting for potential confounders. This association was stronger amongst men [HR: 2.39, 95% CI: 1.72-3.31] than amongst women [HR: 1.92, 95% CI: 1.54-2.39], although this difference was not significant. Mortality was higher during the first year after the hip fracture [HR: 2.78, 95% CI: 2.12-3.64], but it remained elevated without major fluctuations after longer time since hip fracture [HR (95% CI): 1.89 (1.50-2.37) after 1-4 years; 2.15 (1.81-2.55) after 4-8 years; 1.79 (1.57-2.05) after 8 or more years]. CONCLUSION: In this large population-based sample of older persons across eight cohorts, hip fracture was associated with excess short- and long-term all-cause mortality in both sexes.

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PDF Endnote

Fall risk and anticoagulation for atrial fibrillation in the elderly: a delicate balance

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(Copyright © 2017, Cleveland Clinic Educational Foundation)

DOI 10.3949/ccjm.84a.16016 PMID 28084982

Abstract

Guidelines for managing atrial fibrillation recommend systemic anticoagulation for almost all patients age 65 and older, but in practice up to 50% of older patients do not receive maintenance anticoagulation therapy. The most common reason physicians cite for withholding anticoagulation in older patients with atrial fibrillation is a perception of a high risk of falling and associated bleeding, especially intracranial hemorrhage.

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Fatal incidents in Australia's older farmers (2001-2015)

Monaghan N, Lower T, Rolfe M.

J. Agromed. 2017; ePub(ePub): ePub.

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(Copyright © 2017, Informa - Taylor and Francis Group)

DOI 10.1080/1059924X.2017.1282907 PMID 28095210

Abstract

OBJECTIVES: This study assesses non-intentional injury deaths of older farmers and the causal agents associated with these fatalities in Australia (2001-2015). It also explores approaches based on the hierarchy of risk controls to reduce fatalities and injuries in this cohort Methods: Data on farm-related incidents were sourced from the National Coroners Information System (NCIS) for the study period and coded. Rates were calculated and regression analyses completed to assess trends over time.

RESULTS: Those in the 50+ years category (n=610), accounted for 49.8% of all on-farm non-

intentional injury deaths, with males (n=566) dominating the cases. The annual mean was 40.66 cases (sd 8.08) and the average rate 36/100,000. Trend analysis revealed a non-statistically significant ($p < 0.05$) increase in cases over the period. Farm vehicles and machinery were responsible for almost two thirds of the fatal cases.

CONCLUSION: Non-intentional fatality rates for older farmers have remained relatively unchanged for a significant period in Australia. There is a need to examine additional approaches that not only maintain the benefits of work activity for older farmers, but also balance this against a safety perspective.

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Functioning and health-related quality of life following injury in older people: a systematic review

Brown K, Cameron ID, Keay L, Coxon K, Ivers R.

Inj. Prev. 2017; ePub(ePub): ePub.

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(Copyright © 2017, BMJ Publishing Group)

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Abstract

AIM AND BACKGROUND: There is growing evidence around the impact of injury and recovery trajectories but little focuses on older people, despite rising burden. The aim of this review was to describe the evidence for postinjury functioning and health-related quality of life (HRQoL) in older people.

METHOD: A systematic search of three databases and an extensive search of the grey literature was carried out on prospective injury outcome studies in older people (age ≥ 65 years) that used a generic health status outcome measure. The search results were reported using PRISMA reporting guidelines, and risk of bias was assessed using a modification of the Quality in Prognosis Studies tool.

RESULTS: There was limited evidence on functioning and HRQoL postinjury in older people. There were 367 studies identified, with 13 eligible for inclusion. Most focused on hip fracture or traumatic brain injury. Older people appeared to have poorer postinjury functioning and HRQoL compared with younger adults or preinjury levels. Poor preinjury function, pre-existing conditions and increasing age were associated with poorer outcomes, whereas preinjury-independent living was associated with better outcomes.

DISCUSSION: The studies were heterogeneous, limiting synthesis. There was a lack of evidence around the impact of injury on older people in terms of paid work and unpaid work. It was unclear if existing injury outcome guidelines are appropriate for older people.

CONCLUSIONS: Further research is required on older people's postinjury course, outcomes and determinants. This will require standardised methodologies and qualitative studies. The findings will inform clinical care, policy development, health and compensation systems.

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Influence of focus of attention, reinvestment and fall history on elderly gait stability

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Physiol. Rep. 2017; 5(1): e13061.

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Abstract

Falls represent a substantial risk in the elderly. Previous studies have found that a focus on the outcome or effect of the movement (external focus of attention) leads to improved balance performance, whereas a focus on the movement execution itself (internal focus of attention) impairs balance performance in elderly. A shift toward more conscious, explicit forms of motor control occurs when existing declarative knowledge is recruited in motor control, a phenomenon called reinvestment. We investigated the effects of attentional focus and reinvestment on gait stability in elderly fallers and nonfallers. Full body kinematics was collected from twenty-eight healthy older adults walking on a treadmill, while focus of attention was manipulated through instruction. Participants also filled out the Movement Specific Reinvestment Scale (MSRS) and the Falls Efficacy Scale International (FES-I), and provided details about their fall history. Coefficients of Variation (CV) of spatiotemporal gait parameters and Local Divergence Exponents (LDE) were calculated as measures of gait variability and gait stability, respectively. Larger stance time CV and LDE (decreased gait stability) were found for fallers compared to nonfallers. No significant effect of attentional focus was found for the gait parameters, and no significant relation between MSRS score (reinvestment) and fall history was found. We conclude that external attention to the walking surface does not lead to improved gait stability in elderly. Potential benefits of an external focus of attention might not apply to gait, because walking movements are not geared toward achieving a distinct environmental effect.

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PDF Y Endnote Y

Influences of age, obesity, and adverse drug effects on balance and mobility testing scores in ambulatory older adults

Anson E, Thompson E, Odle BL, Jeka J, Walls ZF, Panus PC.

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Abstract

BACKGROUND AND PURPOSE: The adverse effects of drugs may influence results on tests of mobility and balance, but the drug-specific impact is not identified when using these tests. We propose that a quantitative drug index (QDI) will assist in assessing fall risk based on these tests, when combined with other fall risk variables.

METHODS: Fifty-seven community-dwelling older adults who could walk independently on a

treadmill and had Mini-Mental State Examination (MMSE) scores equal to or greater than 24 participated. Mobility and balance outcome measures included the Balance Evaluation Systems Test (BESTest), Berg Balance Scale (BBS), Timed Up and Go (TUG) and cognitive dual task TUG (TUGc). Fall history, current drug list, and Activity-Specific Balance Confidence (ABC) scale scores were also collected. Body mass index (BMI) was calculated. The QDI was derived from the drug list for each individual, and based on fall-related drug adverse effects. Multiple linear regression analyses were conducted using age, BMI, and QDI as predictor variables for determining mobility and balance test scores, and ABC scale scores. Subsequently, participants were divided into (QDI = 0) low-impact drug group (LIDG) and (QDI > 0) high-impact drug group (HIDG) for Mann-Whitney 2-group comparisons. RESULTS: Age, BMI, and QDI were all significant ($P < .001$) independent variables in multiple regression analyses for mobility and balance test scores, but not for the ABC scale. Separately, the 2 group comparisons for the BESTest, BBS, TUG, and TUGc demonstrated that HIDG scored significantly ($P < .05$) worse on these tests compared with the LIDG. Drug counts were also significantly higher for the HIDG than for the LIDG. In contrast, age, BMI, MMSE, and reported falls in the last 12 months were not significantly different between groups.

CONCLUSION: Age, BMI, and QDI-all contributed independently to the mobility and balance test scores examined, and may provide health care professionals a screening tool to determine whether additional mobility and balance testing is required. In addition, the QDI is a more precise marker of adverse effects of drugs compared with drug counts, as the latter does not quantitate the influence of drugs on physiologic function.

PDF Endnote Y

Insights about fall prevention of older adults in the state of Hawai'i

Yamazaki Y, Hayashida CT, Yontz V.

Hawaii J. Med. Public Health 2017; 76(1): 3-8.

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(Copyright © 2017, University Clinical, Education and Research Associates (UCERA))

DOI unavailable **PMID** 28090397

Abstract

The senior population in Hawai'i is growing at a dramatic pace. In the older population, falls and fall-related injuries are leading causes of morbidity and mortality. Moreover, the health care costs for falls are very high. The State of Hawai'i has taken measures to prevent falls through the promotion of medication reviews, vision checks, home assessments, and exercise. However, current published examinations of fall preventive measures have been insufficient, and more research is needed to confirm risk factors, effectiveness of preventive measures, and to explore future objectives. This paper examined the validity of fall risk factors and fall preventive measures for Hawai'i's seniors by conducting mail questionnaire surveys to a sample of seniors using medical alert services from one company in Hawai'i. The results of chi-square analysis suggest that having reduced ability to perform Activities of Daily Living (ADL) and reduced Instrumental Activities of Daily Living (IADL) were associated with a greater risk of falls ($P < .01$). In addition, those who fell were more likely to talk about fall preventions with their family members or friends and health providers compared with those who did not ($P = .048$ and $.003$, respectively). Evidence-based exercise programs for strengthening muscles and controlling physical balance may be needed to improve ADL and IADL. Furthermore, the results suggest that seniors do not accept that they are at risk of falling before

they actually fall. Public health providers should consider how they approach seniors, and how they inform them of the importance of fall prevention across the life span.

PDF Y Endnote Y

Interaction of obstructive sleep apnoea and cognitive impairment with slow gait speed in middle-aged and older adults

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Age Ageing 2017; ePub(ePub): ePub.

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Abstract

OBJECTIVE: to investigate whether slow gait speed is associated with cognitive impairment and further whether the association is modified by obstructive sleep apnoea (OSA).

METHODS: in total, 2,222 adults aged 49-80 years, free from dementia, stroke and head injury were asked to walk a 4-m course at fast and usual gait speeds. The time taken to walk was measured. All participants completed the Korean Mini-Mental State Examination, which was validated in the Korean language, to assess cognitive function. Additionally, the participants completed a polysomnography test to ascertain OSA (defined as an apnoea-hypopnoea index ≥ 15). Multivariable linear regression models were utilised to test the associations.

RESULTS: time taken to walk 4 m showed significant inverse associations with cognitive scores (P value = 0.001 at fast gait speed and P = 0.002 at usual gait speed). Furthermore, a significant interaction according to OSA on the association between time to walk and cognitive impairment was found (P value for interaction = 0.003 at fast gait speed and P value for interaction = 0.007 at usual gait speed).

CONCLUSION: we found that the inverse association between the time taken to walk 4 m and a cognitive score became significantly stronger, if an individual had OSA.

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PDF Y Endnote Y

Pilot test of a new personal health system integrating environmental and wearable sensors for telemonitoring and care of elderly people at home (SMARTA project)

Pigini L, Bovi G, Panzarino C, Gower V, Ferratini M, Andreoni G, Sassi R, Rivolta MW, Ferrarin M. *Gerontology* 2017; ePub(ePub): ePub.

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Abstract

BACKGROUND: The increase in life expectancy is accompanied by a growing number of elderly subjects affected by chronic comorbidities, a health issue which also implies important socioeconomic consequences. Shifting from hospital or community dwelling care towards a home personalized healthcare paradigm would promote active aging with a better quality of life, along with a reduction in healthcare-related costs.

OBJECTIVE: The aim of the SMARTA project was to develop and test an innovative personal health system integrating standard sensors as well as innovative wearable and environmental sensors to allow home telemonitoring of vital parameters and detection of anomalies in daily activities, thus supporting active aging through remote healthcare.

METHODS: A first phase of the project consisted in the definition of the health and environmental parameters to be monitored (electrocardiography and actigraphy, blood pressure and oxygen saturation, weight, ear temperature, glycemia, home interaction monitoring - water tap, refrigerator, and dishwasher), the feedbacks for the clinicians, and the reminders for the patients. It was followed by a technical feasibility analysis leading to an iterative process of prototype development, sensor integration, and testing. Once the prototype had reached an advanced stage of development, a group of 32 volunteers - including 15 healthy adult subjects, 13 elderly people with cardiac diseases, and 4 clinical operators - was recruited to test the system in a real home setting, in order to evaluate both technical reliability and user perception of the system in terms of effectiveness, usability, acceptance, and attractiveness.

RESULTS: The testing in a real home setting showed a good perception of the SMARTA system and its functionalities both by the patients and by the clinicians, who appreciated the user interface and the clinical governance system. The moderate system reliability of 65-70% evidenced some technical issues, mainly related to sensor integration, while the patient's user interface showed excellent reliability (100%).

CONCLUSIONS: Both elderly people and clinical operators considered the SMARTA system a promising and attractive tool for improving patients' healthcare while reducing related costs and preserving quality of life. However, the moderate reliability of the system should prompt further technical developments in terms of sensor integration and usability of the clinical operator's user interface.

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Predictors of outcomes following reablement in community-dwelling older adults

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Clin. Interv. Aging 2017; 12: 55-63.

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DOI 10.2147/CIA.S125762 **PMID** 28096664

Abstract

BACKGROUND: Reablement is a rehabilitation intervention for community-dwelling older adults, which has recently been implemented in several countries. Its purpose is to improve functional ability in daily occupations (everyday activities) perceived as important by the older person. Performance and satisfaction with performance in everyday life are the major outcomes of reablement. However, the evidence base concerning which factors predict better outcomes and who receives the greatest benefit in reablement is lacking.

OBJECTIVE: The objective of this study was to determine the potential factors that predict occupational performance and satisfaction with that performance at 10 weeks follow-up.

METHODS: The sample in this study was derived from a nationwide clinical controlled trial evaluating the effects of reablement in Norway and consisted of 712 participants living in 34 municipalities.

Multiple linear regression was used to investigate possible predictors of occupational performance (COPM-P) and satisfaction with that performance (COPM-S) at 10 weeks follow-up based on the Canadian Occupational Performance Measure (COPM).

RESULTS: The results indicate that the factors that significantly predicted better COPM-P and COPM-S outcomes at 10 weeks follow-up were higher baseline scores of COPM-P and COPM-S respectively, female sex, having a fracture as the major health condition and high motivation for rehabilitation. Conversely, the factors that significantly predicted poorer COPM-P and COPM-S outcomes were having a neurological disease other than stroke, having dizziness/balance problems as the major health condition and having pain/discomfort. In addition, having anxiety/depression was a predictor of poorer COPM-P outcomes. The two regression models explained 38.3% and 38.8% of the total variance of the dependent variables of occupational performance and satisfaction with that performance, respectively.

CONCLUSION: The results indicate that diagnosis, functional level, sex and motivation are significant predictors of outcomes following reablement.

PDF Y Endnote Y

Seasonal ambient changes influence inpatient falls

Magota C, Sawatari H, Ando SI, Nishizaka MK, Tanaka K, Horikoshi K, Hoashi I, Nobuko H, Ohkusa T, Chishaki A.

Age Ageing 2017; ePub(ePub): ePub.

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(Copyright © 2017, Oxford University Press)

DOI 10.1093/ageing/afw254 **PMID** 28057622

Abstract

BACKGROUND: falls by inpatients often result in serious injuries and deterioration in a patient's physical abilities and quality of life, especially among older individuals. Although various factors have been found to be associated with falls, the combined effects of behavioural and ambient factors are not fully evaluated.

OBJECTIVE: we investigated the influence of both behavioural and ambient factors on inpatient falls, focusing on seasonal and diurnal variations.

DESIGN: retrospective study.

METHODS: we surveyed the incident reports related to falls from April 2010 to March 2014 and examined the relationship between the incidents and seasonal and diurnal variations in behavioural and ambient factors, including the sunrise time, the night-time length and temperature.

RESULTS: we identified 464 fallers from 3,037 incident reports. The average fall-rate of the study population was $1.4 \pm 0.5/1,000$ occupied bed-days. The seasonal and diurnal variations in falls were compared. The number of falls around dawn in October-February was higher than that in April-September. Toileting was the behaviour most frequently related to the falls (56.9%, $n = 264$), and 57.1% of the falls occurred at night. A multivariate analysis showed that the night-time length was significantly related to an increase in night-time falls ($P = 0.047$).

CONCLUSION: these results suggested that the inpatient falls increased in the early morning from November to March and tended to be related to toileting activities. Considering these results, additional attention and support during the higher risk hours and seasons, especially in relation to toileting activities, might help to reduce the incidence of falls. CLINICAL TRIAL NAME, URL AND

REGISTRATION NUMBER: N/A (Because of retrospective nature).

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PDF Y Endnote Y

Specific balance training included in an endurance-resistance exercise program improves postural balance in elderly patients undergoing haemodialysis

Frih B, Mkacher W, Jaafar H, Frih A, Ben Salah Z, El May M, Hammami M.

Disabil. Rehabil. 2017; ePub(ePub): ePub.

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(Copyright © 2017, Informa - Taylor and Francis Group)

DOI 10.1080/09638288.2016.1276971 **PMID** 28084833

Abstract

PURPOSE: The purpose of this study was to evaluate the effects of 6 months of specific balance training included in endurance-resistance program on postural balance in haemodialysis (HD) patients.

METHODS: Forty-nine male patients undergoing HD were randomly assigned to an intervention group (balance training included in an endurance-resistance training, n = 26) or a control group (resistance-endurance training only, n = 23). Postural control was assessed using six clinical tests; Timed Up and Go test, Tinetti Mobility Test, Berg Balance Scale, Unipedal Stance test, Mini-Balance Evaluation Systems Test and Activities Balance Confidence scale.

RESULTS: All balance measures increased significantly after the period of rehabilitation training in the intervention group. Only the Timed Up and Go, Berg Balance Scale, Mini-Balance Evaluation Systems Test and Activities Balance Confidence scores were improved in the control group. The ranges of change in these tests were greater in the balance training group.

CONCLUSIONS: In HD patients, specific balance training included in a usual endurance-resistance training program improves static and dynamic balance better than endurance-resistance training only. Implications for rehabilitation Rehabilitation using exercise in haemodialysis patients improved global mobility and functional abilities. Specific balance training included in usual endurance resistance training program could lead to improved static and dynamic balance.

PDF Y Endnote Y

Supervised versus home exercise training programs on functional balance in older subjects

Youssef EF, Shanb AA.

Malays. J. Med. Sci. 2016; 23(6): 83-93.

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DOI 10.21315/mjms2016.23.6.9 **PMID** 28090182

Abstract

BACKGROUND: Aging is associated with a progressive decline in physical capabilities and a disturbance of both postural control and daily living activities. The aim of this study was to evaluate the effects of supervised versus home exercise programs on muscle strength, balance and functional activities in older participants.

METHODS: Forty older participants were equally assigned to a supervised exercise program (group-I) or a home exercise program (group-II). Each participant performed the exercise program for 35-45 minutes, two times per week for four months. Balance indices and isometric muscle strength were measured with the Biodex Balance System and Hand-Held Dynamometer. Functional activities were evaluated by the Berg Balance Scale (BBS) and the timed get-up-and-go test (TUG).

RESULTS: The mean values of the Biodex balance indices and the BBS improved significantly after both the supervised and home exercise programs ($P < 0.05$). However, the mean values of the TUG and muscle strength at the ankle, knee and hip improved significantly only after the supervised program. A comparison between the supervised and home exercise programs revealed there were only significant differences in the BBS, TUG and muscle strength.

CONCLUSIONS: Both the supervised and home exercise training programs significantly increased balance performance. The supervised program was superior to the home program in restoring functional activities and isometric muscle strength in older participants.

PDF Y Endnote Y

Taiji train the trainers curriculum: increasing the work force to decrease falls in the elderly

Bartimole L, A Fristad M.

Explore (NY) 2016; ePub(ePub): ePub.

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(Copyright © 2016, Elsevier Publishing)

DOI 10.1016/j.explore.2016.12.009 **PMID**28089440

Abstract [Abstract unavailable] Research Letter

PDF Y Endnote Y

The effect of ongoing feedback on physical activity levels following an exercise intervention in older adults: a randomised controlled trial protocol

Brickwood KJ, Smith ST, Watson G, Williams AD.

BMC Sports Sci. Med. Rehabil. 2017; 9: e1.

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(Copyright © 2017, BioMed Central)

DOI 10.1186/s13102-016-0066-5 **PMID** 28078090

Abstract

BACKGROUND: Physical inactivity ranks as a major contributing factor in the development and progression of chronic disease. Lifestyle interventions reduce the progression of chronic disease, however, compliance decreases over time and health effects only persist as long as the new lifestyle is maintained. Telephone counselling (TC) is an effective way to provide individuals with ongoing support to maintain lifestyle changes. Remote physical activity monitoring and feedback (RAMF) via interactive technologies such as activity trackers and smartphones may be a cost-effective alternative to TC, however, this comparison has not been made. This study, therefore, aims to determine the effect of ongoing feedback (TC vs. RAMF) on the maintenance of physical activity following a 12-week individualised lifestyle program, and the effect of this on health risk factors and health services usage.

METHODS AND DESIGN: A randomised controlled trial with a parallel groups design. A total of 150

adults (≥ 60 years) who participate in a 12-week face-to-face individualised lifestyle program will be randomised to twelve months of RAMF ($n = 50$), TC ($n = 50$), or usual care ($n = 50$). Participants randomised to RAMF will use a smartphone activity tracker app, synced to a wrist worn activity tracker, to provide them with automated feedback regarding compliance to prescribed activity targets. Telephone counselling involves a follow-up phone call every fortnight for the first three months and a monthly call for the remaining nine months of the follow-up period. The primary outcome measures are physical activity compliance (accelerometry and Active Australia survey). Secondary outcome measures include cardiorespiratory fitness, muscle strength, dynamic balance, quality of life, blood pressure, body composition, and health services usage. Measures will be made before and after the individualised lifestyle program, and at three, six and twelve months during the intervention.

DISCUSSION: The results of this study will help to determine the efficacy of RAMF devices on compliance to prescribed physical activity compared to the current gold standard of TC. If the remote monitoring proves effective, it may provide a cost efficient alternative method of assisting maintenance of behaviour change from lifestyle interventions. **TRIAL REGISTRATION:**

ACTRN12615001104549. Retrospectively Registered 20/10/2015.

PDF Y Endnote Y

Traumatic brain injuries in older adults-6 years of data for one UK trauma centre: retrospective analysis of prospectively collected data

Hawley C, Sakr M, Scapinello S, Salvo J, Wrenn P.

Emerg. Med. J. 2017; ePub(ePub): ePub.

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(Copyright © 2017, BMJ Publishing Group)

DOI 10.1136/emered-2016-206506 **PMID** 28052919

Abstract

OBJECTIVES: Our aim was to determine the incidence of traumatic brain injury (TBI) in older adults and investigate the relationship between injury characteristics and outcomes.

METHODS: Retrospective analysis of prospectively collected data submitted to Trauma Audit and Research Network (TARN) database for a major trauma centre in the West Midlands, UK, from 2008 to 2014. The Mayo Scale was used to categorise TBI. All patients were aged ≥ 65 years and were admitted with head or brain injuries meeting TARN inclusion criteria: injury resulting in immediate admission to hospital for 3 days, admitted to a high dependency area or death following trauma. We determined age, gender, mechanism of injury, Injury Severity Score, presenting Glasgow Coma Scale (GCS) and Mayo Score, and the association of outcome (Glasgow Outcome Scale (GOS)) with age and clinical presentation.

RESULTS: 4413 patients were admitted with trauma meeting TARN criteria: 1389 were ≥ 65 years and 45% (624) had TBI. For patients ≥ 65 years with TBI, mean age was 79 (range 65-99); 56% were men. Falls accounted for 85% of all TBIs. Most TBIs were moderate/severe (80%) by the Mayo criteria. Of the 279 patients with subdural haematoma, 28% had neurosurgery. Most patients survived TBI (78%); 57% had a good outcome on GOS at discharge (not requiring care package). Mortality was associated with increased age (17% in ages 65-74 years, 19% in 75-84 years, 30% in ≥ 85 years, $p=0.03$). Outcome was significantly associated with injury severity ($p=0.0001$).

CONCLUSIONS: Patients with TBI represented 45% of all trauma cases meeting TARN inclusion

criteria. Falls at home accounted for most TBIs. Most had moderate/severe TBI, yet over half made a good recovery on GOS. Our data indicate that injury prevention initiatives should focus on home safety. Further research is needed to examine rehabilitation and follow-up after hospital discharge. Published by the BMJ Publishing Group Limited. For permission to use (where not already granted under a licence) please go to <http://www.bmj.com/company/products-services/rights-and-licensing/>.

PDF Y Endnote Y

Using the Centers for Disease Control and Prevention's Stay Independent Checklist to engage a community of American Indians and raise awareness about risk of falls, 2016

Popp J, Waters DL, Leekity K, Ghahate D, Bobelu J, Tsikewa R, Herman CJ, Shah V. *Prev. Chronic Dis.* 2017; 14: E05.

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DOI 10.5888/pcd14.160395 **PMID** 28103184

Abstract

BACKGROUND: The unintentional death rate from falls is higher among American Indians from the US Southwest than from other regions in the country. The Zuni Pueblo is a geographically isolated, rural American Indian community located in western New Mexico. Education and screening for falls risk is lacking in this community and may be needed to reduce falls and falls-related illness and death. **COMMUNITY CONTEXT:** Building on a 17-year relationship with the Zuni Health Initiative, meetings were held with Zuni tribal leadership, staff from the Zuni Senior Center and Zuni Home Health Services, members of the Zuni Comprehensive Community Health Center, Indian Health Service, and Zuni community health representatives (CHRs) to discuss elder falls in the community. Existing infrastructure, including CHRs who were already trained and certified in diabetes education and prevention, provided support for the study.

METHODS: Tribal leadership agreed that CHRs would be trained to administer the Centers for Disease Control and Prevention's (CDC's) Stay Independent checklist to assess falls risk. They administered the checklist during one-on-one interviews in Shiwi (Zuni native language), English, or both to a convenience sample of 50 Zuni elders. **OUTCOMES:** Mean age of participants was 72 (standard deviation, 7.4) years, and 78% were women. Fifty-two percent reported at least 1 fall during the past year; 66% scored 4 or more on the CDC Stay Independent checklist, indicating elevated risk for falls. CHRs reported that the checklist was easy to administer and culturally accepted by the elder participants.

INTERPRETATION: This study broadened the Zuni Health Initiative to include falls risk screening. Self-reported falls were common in this small sample, and the incidence was significantly higher than the national rate. These results highlight the need for community engagement, using culturally acceptable falls screening, to promote falls education and implement falls prevention programs.

PDF Y Endnote Y

Walking through apertures in individuals with stroke

Muroi D, Hiroi Y, Koshiba T, Suzuki Y, Kawaki M, Higuchi T.

PLoS One 2017; 12(1): e0170119.

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(Copyright © 2017, Public Library of Science)

DOI 10.1371/journal.pone.0170119 **PMID** 28103299

Abstract

OBJECTIVE: Walking through a narrow aperture requires unique postural configurations, i.e., body rotation in the yaw dimension. Stroke individuals may have difficulty performing the body rotations due to motor paralysis on one side of their body. The present study was therefore designed to investigate how successfully such individuals walk through apertures and how they perform body rotation behavior.

METHOD: Stroke fallers (n = 10), stroke non-fallers (n = 13), and healthy controls (n = 23) participated. In the main task, participants walked for 4 m and passed through apertures of various widths (0.9-1.3 times the participant's shoulder width). Accidental contact with the frame of an aperture and kinematic characteristics at the moment of aperture crossing were measured. Participants also performed a perceptual judgment task to measure the accuracy of their perceived aperture passability.

RESULTS AND DISCUSSION: Stroke fallers made frequent contacts on their paretic side; however, the contacts were not frequent when they penetrated apertures from their paretic side. Stroke fallers and non-fallers rotated their body with multiple steps, rather than a single step, to deal with their motor paralysis. Although the minimum passable width was greater for stroke fallers, the body rotation angle was comparable among groups. This suggests that frequent contact in stroke fallers was due to insufficient body rotation. The fact that there was no significant group difference in the perceived aperture passability suggested that contact occurred mainly due to locomotor factors rather than perceptual factors. Two possible explanations (availability of vision and/or attention) were provided as to why accidental contact on the paretic side did not occur frequently when stroke fallers penetrated the apertures from their paretic side.

PDF Y Endnote Y

Changes on walking during street crossing situations and on dorsiflexion strength of older Caribbean Americans after an exercise program: a pilot study

Vieira ER, Tappen R, Gropper SS, Severi MT, Engström G, de Oliveira MR, Barbosa AC, da Silva RA. *J. Aging Phys. Act.* 2017; ePub(ePub): ePub.

Affiliation: Department of Physical Therapy - North Parana University, Brazil.

(Copyright © 2017, Human Kinetics Publishers)

DOI 10.1123/japa.2016-0231 **PMID** 28095084

Abstract

The objective of this pilot study was to evaluate a 6-month exercise program completed by 10 older Caribbean Americans. Assessments were done at baseline, 3 and 6 months and included walks on an instrumented mat at preferred speed, and during street crossing simulations with regular (10s) and with reduced time (5s). There were no significant differences on preferred walking speed overtime. Differences between the street crossing conditions were found only at 6 months. Significant changes overtime among the assessments were found only during street crossing with reduced time. Street crossing with reduced time was the only walking condition sensitive to capture changes associated with participating in the exercise program. There was a significant increase in dorsiflexion strength overtime. At 6 months it was significantly higher than at baseline and 3 months. The program was

feasible, acceptable, and had some positive effects on walking, knee flexion, and dorsiflexion strength.

PDF Y Endnote Y

Dizziness and falls in obese inpatients undergoing metabolic rehabilitation

Corna S, Aspesi V, Cau N, Scarpina F, Gattini Valdés N, Brugliera L, Cimolin V, Capodaglio P. *PLoS One* 2017; 12(1): e0169322.

Affiliation: Rehabilitation Unit and Clinical Lab for Gait Analysis and Posture, Ospedale San Giuseppe, Istituto Auxologico Italiano, IRCCS, Piancavallo (Verbania), Italy.

(Copyright © 2017, Public Library of Science)

DOI 10.1371/journal.pone.0169322 **PMID** 28076370

Abstract

AIM: The relationship between dizziness and falls in the obese population is a relatively unexplored issue. The aims of the present study were to define the 1-year prevalence of dizziness in an obese inpatient population undergoing metabolic rehabilitation and to investigate possible correlations with fall events.

MATERIALS AND METHODS: We recruited 329 obese subjects: 203 female (BMI 43,74 kg/m² ± 0.5 SE; age 17-83 years, 58.33 ± 0.9 SE) and 126 male (BMI 44,27kg/m² ± 0.7 DE age 27-79 years, 58.84 ± 1 SE). To assess dizziness we used the validated Italian version (38) of the Dizziness Handicap Inventory (DHI).

RESULTS: Out of the experimental sample, 100 subjects did not complain of dizziness and felt confident about their balance control, while 69.6% reported some degree of dizziness. Their mean DHI score was 22.3, which corresponds to mild dizziness. Twenty-one percent reported more severe dizziness (DHI score > 40). The majority of our sample reported minor dizziness and its perception appears to be independent from BMI: DHI scores were consistent across classes of obesity.

DISCUSSION: The rate of dizziness and falls (30.1%) in an this obese population was higher than that previously reported in a general matched population. However, obese subjects, in our sample, seem to underestimate their risk of fall and DHI score does not appear a reliable predictor of falls. Since complications associated with falls in obese persons generally require longer treatments than in lean individuals, our findings should be taken into account in order to identify other predictors, including cognitive and perceptual, of risk of fall and to implement fall prevention programs.

PDF Y Endnote Y

High incidence of falls and fall-related injuries in wheelchair users with spinal cord injury: a prospective study of risk indicators

Forslund EB, Jørgensen V, Franzén E, Opheim A, Seiger Å, Ståhle A, Hultling C, Stanghelle JK, Roaldsen KS, Wahman K.

J. Rehabil. Med. 2017; ePub(ePub): ePub.

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(Copyright © 2017, Foundation for Rehabilitation Information)

DOI 10.2340/16501977-2177 **PMID** 28101557

Abstract

OBJECTIVE: To identify risk indicators for, and incidence of, recurrent falls and fall-related injuries in wheelchair users with traumatic spinal cord injury.

DESIGN: Prospective multi-centre study.

SUBJECTS: One hundred and forty-nine wheelchair users with spinal cord injury attending follow-up in Sweden and Norway.

METHODS: Inclusion criteria: wheelchair users ≥ 18 years old with traumatic spinal cord injury ≥ 1 year post-injury.

EXCLUSION CRITERIA: individuals with motor complete injuries above C5. Falls were prospectively reported by text message every second week for one year and were followed-up by telephone interviews. Outcomes were: fall incidence, risk indicators for recurrent (> 2) falls and fall-related injuries. Independent variables were: demographic data, quality of life, risk willingness, functional independence, and exercise habits.

RESULTS: Of the total sample ($n = 149$), 96 (64%) participants fell, 45 (32%) fell recurrently, 50 (34%) were injured, and 7 (5%) severely injured. Multivariate logistic regression analysis showed that reporting recurrent falls the previous year increased the odds ratio (OR) of recurrent falls (OR 10.2, $p < 0.001$). Higher quality of life reduced the OR of fall-related injuries (OR 0.86, $p = 0.037$).

CONCLUSION: Previous recurrent falls was a strong predictor of future falls. The incidence of falls, recurrent falls and fall-related injuries was high. Hence, prevention of falls and fall-related injuries is important.

PDF Y Endnote Y

Subjective assessments of floor slipperiness before and after walk under two lighting conditions

Li KW, Zhao C, Peng L, Liu AQ.

Int. J. Occup. Safety Ergonomics 2017; ePub(ePub): ePub.

Affiliation: School of Safety & Environmental Engineering , Hunan Institute of Technology , Hengyang , PRC.

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DOI 10.1080/10803548.2017.1279436 **PMID** 28058998

Abstract

A gait experiment was performed. The participants were tested under shoes, floors, surface, and lighting conditions. They gave floor slipperiness ratings before and after a gait trial. The perceived sense of slip (PSOS) was collected. It was found that the perceived floor slipperiness (PFS) before walking was affected significantly by the lighting, floor, and surface conditions. Relative low PFS values were recorded under wet and detergent contaminated conditions at normal daylight condition as compared to those in the dimmed condition. The perceived floor slipperiness after the gait was significantly affected by the floor and surface conditions. The PSOS was highly correlated with the PFS after trial. The regression analyses results indicated that both the coefficient of friction (COF) of the floor and lighting were primary predictors of the PFS before a gait. The COF and walking speed were the primary predictors of the PFS after a gait.

PDF Y Endnote Y

Systematic review of genetic risk factors for sustaining a mild traumatic brain injury

Panenska W, Gardner A, Dretsch M, Crynen G, Crawford FC, Iverson GL.

J. Neurotrauma 2017; ePub(ePub): ePub.

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(Copyright © 2017, Mary Ann Liebert Publishers)

DOI 10.1089/neu.2016.4833 **PMID** 28100103

Abstract

INTRODUCTION: This systematic review examined the association between genetics and risk for sustaining a traumatic brain injury.

METHODS: Articles published in English from 1980 to July 2016 obtained from the online databases PubMed, PsycINFO®, MEDLINE®, EMBASE, and Web of Science.

RESULTS: 5,903 articles were identified, 77 underwent full-text screening, and six were included in this review. Five studies examined the risk of concussion associated with Apolipoprotein E alleles (APOE-ε2, ε3, ε4), and polymorphisms of the APOE promoter (rs405509), Brain Derived Neurotrophic Factor (BDNF, rs6265), and Dopamine Receptor D2 (DRD2, rs1800497) were each considered in two studies. Microtubule Associated Protein Tau [TAU exon 6 polymorphisms His47Tyr (rs2258689) and Ser53Pro (rs10445337)], and Neurofilament Heavy (NEFH, rs165602) genotypic variants, were the focus of single studies. No study showed an increased risk associated solely with the presence of the APOE-ε4 allele, nor were there any significant findings for the NEFH, TAU, or DRD2 genotypic variants. Two studies examined the APOE promoter -219G/T polymorphism in athletes, and both found an association with concussion. Both BDNF studies also found a significant association with concussion incidence; U.S. soldiers with the Met/Met genotype were more likely to report a history of concussion prior to deployment and to sustain a concussion during deployment.

DISCUSSION: The APOE promoter -219 G/T polymorphism and the BDNF Met/Met genotype might confer risk for sustaining a TBI. Based on research to date, the APOE-ε4 allele does not appear to influence risk. More research is needed to determine if these findings replicate.

PDF Y Endnote Y

Up, down, near, far: an online vestibular contribution to distance judgement

Török Á, Ferrè ER, Kokkinara E, Csépe V, Swapp D, Haggard P.

PLoS One 2017; 12(1): e0169990.

Affiliation: Institute of Cognitive Neuroscience, University College London, London, United Kingdom. (Copyright © 2017, Public Library of Science)

DOI 10.1371/journal.pone.0169990 **PMID** 28085939

Abstract

Whether a visual stimulus seems near or far away depends partly on its vertical elevation. Contrasting theories suggest either that perception of distance could vary with elevation, because of memory of previous upwards efforts in climbing to overcome gravity, or because of fear of falling associated with the downwards direction. The vestibular system provides a fundamental signal for the downward direction of gravity, but the relation between this signal and depth perception remains unexplored. Here we report an experiment on vestibular contributions to depth perception, using Virtual Reality. We asked participants to judge the absolute distance of an object presented on a plane at different elevations during brief artificial vestibular inputs. Relative to distance estimates collected with the object at the level of horizon, participants tended to overestimate distances when the object was presented above the level of horizon and the head was tilted upward and underestimate them when the object was presented below the level of horizon. Interestingly, adding artificial vestibular inputs strengthened these distance biases, showing that online multisensory

signals, and not only stored information, contribute to such distance illusions. Our results support the gravity theory of depth perception, and show that vestibular signals make an on-line contribution to the perception of effort, and thus of distance.

PDF Y Endnote Y

When a step is not a step! Specificity analysis of five physical activity monitors

O'Connell S, O'laighin G, Quinlan LR.

PLoS One 2017; 12(1): e0169616.

Affiliation: CÚRAM - Centre for Research in Medical Devices, NUI Galway, Galway, Ireland.

(Copyright © 2017, Public Library of Science)

DOI 10.1371/journal.pone.0169616 **PMID** 28085918

Abstract

INTRODUCTION: Physical activity is an essential aspect of a healthy lifestyle for both physical and mental health states. As step count is one of the most utilized measures for quantifying physical activity it is important that activity-monitoring devices be both sensitive and specific in recording actual steps taken and disregard non-stepping body movements. The objective of this study was to assess the specificity of five activity monitors during a variety of prescribed non-stepping activities. **METHODS:** Participants wore five activity monitors simultaneously for a variety of prescribed activities including deskwork, taking an elevator, taking a bus journey, automobile driving, washing and drying dishes; functional reaching task; indoor cycling; outdoor cycling; and indoor rowing. Each task was carried out for either a specific duration of time or over a specific distance. Activity monitors tested were the ActivPAL micro™, NL-2000™ pedometer, Withings Smart Activity Monitor Tracker (Pulse O2)™, Fitbit One™ and Jawbone UP™. Participants were video-recorded while carrying out the prescribed activities and the false positive step count registered on each activity monitor was obtained and compared to the video.

RESULTS: All activity monitors registered a significant number of false positive steps per minute during one or more of the prescribed activities. The Withings™ activity performed best, registering a significant number of false positive steps per minute during the outdoor cycling activity only ($P = 0.025$). The Jawbone™ registered a significant number of false positive steps during the functional reaching task and while washing and drying dishes, which involved arm and hand movement ($P < 0.01$ for both). The ActivPAL™ registered a significant number of false positive steps during the cycling exercises ($P < 0.001$ for both).

CONCLUSION: As a number of false positive steps were registered on the activity monitors during the non-stepping activities, the authors conclude that non-stepping physical activities can result in the false detection of steps. This can negatively affect the quantification of physical activity with regard to step count as an output. The Withings™ activity monitor performed best with regard to specificity during the activities of daily living tested.

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