SafetyLit April 22, 2018

A viewpoint on considering physiological principles to study stress resistance and resilience with aging

Miller BF, Seals DR, Hamilton KL.

Ageing Res. Rev. 2017; 38: 1-5.

DOI 10.1016/j.arr.2017.06.004 **PMID** unavailable

Abstract

Adaptation to stress is identified as one of the seven pillars of aging research. Our viewpoint discusses the importance of the distinction between stress resistance and resilience, highlights how integration of physiological principles is critical for further understanding in vivo stress resistance and resilience, and advocates for the use of early warning signs to prevent a tipping point in stress resistance and resilience.

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Accidental injuries among older adults: an incidence study

Gudnadottir M, Thorsteinsdottir TK, Mogensen B, Aspelund T, Thordardottir EB.

Int. Emerg. Nurs. 2018; ePub(ePub): ePub.

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DOI 10.1016/j.ienj.2018.03.003 **PMID** 29661594

Abstract

BACKGROUND: To date, the majority of studies assessing accidental injuries among the elderly have focused on fall injuries, while studies of other mechanisms of injuries have been lacking. Therefore, the main objective of this study was to investigate all injury-related visits among older adults to an emergency department and risk factors for injuries.

METHODS: Data were collected on all registered visits of adults, ≥67 years old, living in the capital of Iceland, to the emergency department of Landspitali, the National University Hospital, in 2011 and 2012.

RESULTS: The yearly incidence rate for injuries was 106 per 1000 adults, ≥67 years old. Of all injuries (n = 4,469), falls were the most common mechanism of injury (78 per 1000), followed by being struck or hit (12 per 1000) and being crushed, cut or pierced (8 per 1000). Other mechanisms of injury, such as acute overexertion, foreign body in natural orifice, injuries caused by thermal and chemical effect and other and unspecified mechanism were less common (8 per 1000). Fractures were the most common consequences of injuries (36 per 1000). The most frequent place of injury was in or around homes (77 per 1000), with men being more likely than women to be injured outside of the home (60 per 1000 vs. 36 per 1000).

CONCLUSION: Results indicate that falls are the main cause of accidental injuries, followed by being struck and hit injuries but other causes contributed to the rest. Falls constitute a major public health problem and fall-related injuries can have a substantial impact on the lives of older adults. As life expectancy continues to increase, fall risk is expected to increase. Since falls constitute a major impact on the lives of older adults and can lead to not only declines in physical activity and

functional status, but to considerable health care costs, the health care system needs to intervene.

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An exploration of equine-assisted therapy to improve balance, functional capacity, and cognition in older adults with Alzheimer disease
de Araujo TB, Martins WR, Freitas MP, Camargos E, Mota J, Safons MP.
J. Geriatr. Phys. Ther. 2018; ePub(ePub): ePub.
Affiliation: Graduate Program in Physical Education, School of Physical Education, Universidade de Brasília, Brasília, DF, Bazil.

DOI 10.1519/JPT.0000000000000167 **PMID** 29630005
Abstract
BACKGROUND AND PURPOSE: Alzheimer disease (AD) is a chronic, progressive dementia syndrome that features cognitive and behavioral symptoms, as well as physical and functional limitations that develop over the course of the disease. As an activity that involves physical and cognitive aspects, equine-assisted therapy (EAT) could be a useful therapeutic approach in conditions that involve physical and cognitive decline. However, to date, there are no reports of the use of this therapy in participants with AD. Within this context, the objective of this case series was to describe the effects of EAT on balance, functional capacity, and cognition in older adults diagnosed with AD.
METHODS: We enrolled 9 subjects, of both sexes, with a mean age of 79.7 (7.8) years and a diagnosis of AD. The study intervention comprised 20 sessions of EAT. We evaluated participants at baseline and at the end of the intervention. Outcome measures were balance (force plate), functional capacity (Timed Up and Go test and 30-second chair stand test), and cognition (verbal fluency and Mini-Mental State Examination).
RESULTS: Comparison between the pre- and postintervention time points (Wilcoxon test) revealed significant improvements in balance (center of pressure in the anterior-posterior direction, P =.017) and functional capacity (Timed Up and Go test, P =.036, and 30-second chair stand test, P =.012).
CONCLUSION: These findings provide evidence of an association between EAT and improved balance and functional capacity in older adults with AD, with no significant impact on cognitive performance.
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Analysis of a smartphone-based architecture with multiple mobility sensors for fall detection with supervised learning
Santoyo-Ramón JA, Casilari E, Cano-García JM.
Sensors (Basel) 2018; 18(4): s18041155.
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DOI 10.3390/s18041155 **PMID** 29642638
Abstract

This paper describes a wearable Fall Detection System (FDS) based on a body-area network consisting of four nodes provided with inertial sensors and Bluetooth wireless interfaces. The signals captured by the nodes are sent to a smartphone which simultaneously acts as another sensing point. In contrast to many FDSs proposed by the literature (which only consider a single sensor), the multisensory nature of the prototype is utilized to investigate the impact of the number and the positions of the sensors on the effectiveness of the production of the fall detection decision. In particular, the study assesses the capability of four popular machine learning algorithms to discriminate the dynamics of the Activities of Daily Living (ADLs) and falls generated by a set of experimental subjects, when the combined use of the sensors located on different parts of the body is considered. Prior to this, the election of the statistics that optimize the characterization of the acceleration signals and the efficacy of the FDS is also investigated. As another important methodological novelty in this field, the statistical significance of all the results (an aspect which is usually neglected by other works) is validated by an analysis of variance (ANOVA).
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Balance disorders in older adults
Eibling D. Clin. Geriatr. Med. 2018; 34(2): 175-181.
Affiliation: Department of Otolaryngology-Head and Neck Surgery, VA Pittsburgh Healthcare System, University Drive C, Pittsburgh, PA 15240, USA. Electronic address: eiblingde@upmc.edu.

DOI 10.1016/j.cger.2018.01.002 **PMID** 29661330
Abstract
Balance disorders are common in the elderly and can lead to falls, with resultant severe morbidity and even mortality. Progressive loss of vestibular function begins in middle age and is affected by multiple disease processes. Polypharmacy impacts many disease processes in the elderly, with balance function being one of the most susceptible. Evaluation of the older patient with a balance disorder is critical for the well-being of these patients, as it may drive intervention. This article reviews balance disorders often encountered in older patients and makes recommendations regarding education of nonotolaryngologists.

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Benzodiazepines withdrawal: initial outcomes and long-term impact on falls in a French nursing home
Javelot H, Marquis A, Antoine-Bernard E, Grandidier J, Weiner L, Javelot T, Michel B.
Pharmacy (Basel) 2018; 6(2): e6020030.
Affiliation: Service Pharmacie, CHU de Strasbourg, Faculté de Pharmacie, EA7396, 67091 Strasbourg, France. bruno.michel@chru-strasbourg.fr.

DOI 10.3390/pharmacy6020030 **PMID** 29642377
Abstract
Long-term use of benzodiazepines (BZDs) is known to induce tolerance and dependence, and increase the risk of falls-related injuries in older adults. We present a study carried out in a French

nursing home that concerns the implementation of a BZD withdrawal program reassessed at one year. BZD deprescription was achieved by gradual cessation of doses. A secondary benefit of this program was assessed by comparing the number of falls among residents before and after withdrawal. The number of falls was recorded over a six-month period prior to the onset of withdrawal (T1) and then over a six-month period after reassessment at one year (T2). At the beginning, 31 (28.7%) of the patients were under BZD. Total deprescription was obtained for 11 patients. The number of falls per patient over the T1 period was not different between the two groups (future non-withdrawn and withdrawn patients in BZD): 2.1 ± 1.3 and 2.3 ± 0.6 falls per resident, respectively. Conversely, the number of falls per patient was significantly decreased in the population completely withdrawn in BZD between the T1 and T2 periods (2.3 ± 0.6 vs. 0.5 ± 0.2 falls, $p = 0.01$). The results show that BZD deprescription, through a gradual reduction of doses, is possible to achieve.

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Characterization of fall patients: does age matter?

James MK, Victor MC, Saghir SM, Gentile PA.

J. Saf. Res. 2018; 64: 83-92.

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DOI 10.1016/j.jsr.2017.12.010 **PMID** 29636172

Abstract

INTRODUCTION: Evaluating age-specific fall characteristics is important for prevention programs. The aim was to characterize fallers who presented to our trauma center. We hypothesized that fall characteristics and outcomes would vary with age.

METHODS: Data were retrospectively collected from the trauma registry and electronic medical records during January 1st, 2014-December 31st, 2015. Data were analyzed by Chi-square test with Yates' continuity correction and one-way ANOVA with Bonferroni's multiple comparisons test.

RESULTS: There were 1541 fallers, 814 (52.8%) were male. Ages ranged from 11 months to 100years. The admission rate was high at 86%, with an average hospital stay of 5.7days. Patients in the 0-18 and 19-45age groups spent significantly less time in the hospital ($p<0.0001$). Elderly patients had the highest average injury severity score ($p<0.0001$). However, the youngest patients required surgery more often ($p=0.0004$). The overall mortality rate was 3.6% and 52.8% were male. The mortality rate increased with age, from 0% for the 0-18 age group to 6.9% for patients ≥65years of age. Remarkably, fallers in the 19-45 and 46-64age groups predominantly died from ground level falls even though the average fall height in these groups was the highest ($p<0.0001$). More fallers in the 19-45 and 46-64age groups tested positive for alcohol/drug use ($p<0.0001$). Middle-aged and elderly patients were more likely to be discharged to a skilled nursing or rehabilitation facility compared to younger patients who were discharged home.

CONCLUSIONS AND PRACTICAL APPLICATIONS: Fall characteristics and outcomes varied with age. Data on age-specific characteristics, outcomes, and risk factors of falls will help in developing targeted interventions and may lead to better approaches to treat patients.

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Delirium in elderly patients: association with educational attainment

Martins S, Paiva JA, Simões MR, Fernandes L.

Acta Neuropsyciatr. 2017; 29(2): 95-101.

DOI 10.1017/neu.2016.40 **PMID** unavailable

Abstract

OBJECTIVE: Among cognitive reserve markers, educational attainment is the most widely studied, with several studies establishing a strong association with risk of dementia. However, it has not yet been fully examined in delirium. This study aims to analyse the relationship between educational attainment and delirium.

METHODS: The study included elderly hospitalised patients admitted (≥48 h) into an intermediate care unit (IMCU) of Intensive Care Medicine Service. Exclusion criteria were as follows: Glasgow Coma Scale (total≤11), blindness/deafness, inability to communicate or to speak Portuguese. The European Portuguese Version of the Confusion Assessment Method (CAM) was used for delirium assessment.

RESULTS: The final sample (n=157) had a mean age of 78.8 (SD=7.6) the majority being female (52.2%), married (51.5%) and with low educational level (49%). According to CAM, 21% of the patients had delirium. The delirium group presented the fewest years of education (median 1 vs. 4), with statistical significance (p=0.003). Delirium was more frequent among male patients [odds ratio (OR) 0.32; 95% confidence interval (CI) 0.12-0.86; p=0.023], as well as those patients with lower education (OR 0.76; 95% CI 0.62-0.95; p=0.016), and with respiratory disease (OR 3.35; 95% CI 1.20-9.33; p=0.020), after controlling for age and medication.

CONCLUSION: Similar to previous studies, these findings point to a negative correlation between education and delirium. This study appears as an attempt to contribute to the knowledge about the role of cognitive reserve in risk of delirium, particularly because is the first one that has been carried out in an IMCU, with lower educated elderly patients. Further studies are needed to clarify this relationship considering other markers (e.g. cognitive activities), which can contribute to the definition of preventive strategies.

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Do depressive symptoms affect balance in older adults with mild cognitive impairment? Results from the "gait and brain study"

Pieruccini-Faria F, Muir-Hunter SW, Montero-Odasso M.

Exp. Gerontol. 2018; ePub(ePub): ePub.

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DOI 10.1016/j.exger.2018.04.004 **PMID** 29653157

Abstract

ACKGROUND: Mild cognitive impairment (MCI) and depression independently affect balance control in older adults. However, it is uncertain whether depressive symptoms would amplify balance problems in older adults with MCI.
AIM: To evaluate if the presence of significant depressive symptoms affects postural sway under somatosensory challenges in a MCI population.
METHODS: Eighty two participants (mean of 75.3 ± 6.4 years of age; 46% women) with MCI completed cognitive and balance assessments. Participants were grouped by severity of depressive symptoms using the Geriatric Depression Scale-15, as MCI with depressive symptoms (MCI-D = 14, score ≥ 5) and MCI without depressive symptoms (MCI = 68, score < 5). Postural sway area was evaluated during eyes open (EO) and eyes closed (EC) while standing on a rigid flat force plate platform, and compared across groups. Analyses were controlled for age, sex, comorbidities, anti-depressant medication use, executive function, and baseline sway.
RESULTS: MCI-D showed larger postural sway area when compared with MCI irrespective of visual feedback conditions (p = 0.03). This difference remained significant after adjusting for anti-depressant use and executive function performance. The lack of interaction between groups and visual condition was associated with group differences in postural sway during EO condition (Beta = 0.08, CI -257.5-621.9; p = 0.41) and by comparable sway increase from EO to EC in both groups.
CONCLUSION: Depressive symptoms in individuals with MCI worsened postural stability during both eyes open and eyes closed conditions independently of cognitive function. Significant depressive symptoms may affect balance in MCI populations, potentially increasing the risk of falls.

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Dual-task as a predictor of falls in older people with mild cognitive impairment and mild Alzheimer's disease: a prospective cohort study
Gonçalves J, Ansai JH, Masse FAA, Vale FAC, Takahashi ACM, Andrade LP.
Rev. Bras. Fisioter. 2018; ePub(ePub): ePub.
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DOI 10.1016/j.bjpt.2018.03.011 **PMID** 29636306
Abstract
BACKGROUND: A dual-task tool with a challenging and daily secondary task, which involves executive functions, could facilitate the screening for risk of falls in older people with mild cognitive impairment or mild Alzheimer's disease.
OBJECTIVE: To verify if a motor-cognitive dual-task test could predict falls in older people with mild cognitive impairment or mild Alzheimer's disease, and to establish cutoff scores for the tool for both groups.
METHODS: A prospective study was conducted with community-dwelling older adults, including 40 with mild cognitive impairment and 38 with mild Alzheimer's disease. The dual-task test consisted of the Timed up and Go Test associated with a motor-cognitive task using a phone to call. Falls were recorded during six months by calendar and monthly telephone calls and the participants were

categorized as fallers or non-fallers.
RESULTS: In the Mild cognitive impairment Group, fallers presented higher values in time (35.2s), number of steps (33.7 steps) and motor task cost (116%) on dual-task compared to non-fallers. Time, number of steps and motor task cost were significantly associated with falls in people with mild cognitive impairment. Multivariate analysis identified higher number of steps spent on the test to be independently associated with falls. A time greater than 23.88s (sensitivity=80%; specificity=61%) and a number of steps over 29.50 (sensitivity=65%; specificity=83%) indicated prediction of risk of falls in the Mild cognitive impairment Group. Among people with Alzheimer's disease, no differences in dual-task between fallers and non-fallers were found and no variable of the tool was able to predict falls.
CONCLUSION: The dual-task predicts falls only in older people with mild cognitive impairment.

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Effect of interactive cognitive motor training on gait and balance among older adults: a randomized controlled trial
Kao CC, Chiu HL, Liu D, Chan PT, Tseng IJ, Chen R, Niu SF, Chou KR.
Int. J. Nurs. Stud. 2018; 82: 121-128.
Affiliation: School of Nursing, College of Nursing, Taipei Medical University, Taipei, Taiwan; Psychiatric Research Center, Taipei Medical University Hospital, Taipei, Taiwan; Department of Nursing, Taipei Medical University-Shuang Ho Hospital, Taipei, Taiwan. Electronic address: kueiru@tmu.edu.tw.

DOI 10.1016/j.ijnurstu.2018.03.015 **PMID** 29627750
Abstract
BACKGROUND: Aging is a normal degenerative process that results in a decline in the gait and balance performance of older adults. Interactive cognitive motor training is an intervention that integrates cognitive and motor tasks to promote individuals' physical and cognitive fall risk factors. However, the additive effects of the interactive cognitive motor training on objective quantitative data and comprehensive descriptions of gait and balance warrants further investigation.
OBJECTIVES: To investigate the effect of interactive cognitive motor training on older adults' gait and balance from immediate to long-term time points.
DESIGN: A double-blind randomized control trial. SETTINGS: Four senior service centers and community service centers in Taiwan. PARTICIPANTS: 62 older adults who met the inclusion criteria.
METHODS: The study participants were older adults without cognitive impairment, and they were randomly allocated to the experimental group or active control group. In both groups, older adults participated in three sessions of 30-min training per week for a total of 8 weeks, with the total number of training sessions being 24. The primary outcome was gait performance, which was measured using objective and subjective indicators. iWALK was used as an objective indicator to measure pace and dynamic stability; the Functional Gait Assessment was employed as a subjective indicator. The secondary outcome was balance performance, which was measured using iSWAY. A generalized estimating equation was used to identify whether the results of the two groups differ

after receiving different intervention measures; the results were obtained from immediate to long-term posttests.
RESULTS: Stride length in the pace category of the experimental group improved significantly in immediate posttest (p = 0.01), 3-month follow-up (p = 0.01), and 6-month follow-up (p = 0.04). The range of motion of the leg exhibited significant improvement in immediate posttest (p = 0.04) and 3-month follow-up (p = 0.04). The Functional Gait Assessment result indicated that statistically significant improvement was observed in immediate posttest (p = 0.02) and 12-month follow-up (p = 0.01). The results of balance performance showed that the experimental group attained statistically significant improvement in centroid frequency in the immediate posttest (p = 0.02).
CONCLUSIONS: The research results validated that the 24 sessions of the interactive cognitive motor training intervention significantly improved gait and balance performance. Future studies should extend the sample to communities to promote the gait and balance performance of community-dwelling older adults without cognitive impairment and reduce their risk of falling and developing gait-related diseases.

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Effectiveness of complex falls prevention interventions in residential aged care settings: a systematic review
Francis-Coad J, Etherton-Beer C, Burton E, Naseri C, Hill AM.
JBI Database Syst. Rev Implement. Rep. 2018; 16(4): 973-1002.
Affiliation: The Western Australian Group for Evidence Informed Healthcare Practice: a Joanna Briggs Institute Centre of Excellence.

DOI 10.11124/JBISRIR-2017-003485 **PMID** 29634516
Abstract
OBJECTIVE: The objective of this review was to synthesize the best available evidence for the effectiveness of complex falls prevention interventions delivered at two or more of the following levels: resident, facility or organization, on fall rates in the residential aged care (RAC) population.
INTRODUCTION: Preventing falls in the high risk RAC population is a common global goal with acknowledged complexity. Previous meta-analyses have not specifically addressed complexity, described as falls prevention intervention delivery at multiple levels of a RAC organization, to determine its effect on fall outcomes. INCLUSION CRITERIA: The current review considered studies that included participants who were aged 65 years and over residing in long-term care settings providing 24-hour supervision and/or care assistance.Studies that evaluated complex falls prevention interventions delivered by single discipline or multidisciplinary teams across at least two or all of the following levels: residents, RAC facility and RAC organization were eligible. Experimental study designs including randomized controlled trials, controlled clinical trials and quasi-experimental trials that reported on measures related to fall incidence were considered, namely, rate of falls (expressed as the number of falls per 1000 occupied bed days), the number of participants who became fallers (expressed as the number of participants who fell once or more) and the rate of injurious falls (expressed as the number of falls with injury per 1000 occupied bed days).
METHODS: A three-step search strategy was undertaken, commencing with an initial scoping search

of MEDLINE and CINAHL databases prior to an extensive search of all relevant published literature, clinical trial registries and gray literature. Two independent reviewers assessed selected studies for methodological validity using the standardized critical appraisal instrument from the Joanna Briggs Institute System for the Unified Management, Assessment and Review of Information (JBI SUMARI). Data were extracted from the selected studies using the standardized data extraction tool from JBI SUMARI. Quantitative data were pooled in statistical meta-analysis for rate of falls, the number of participants who became fallers and the rate of injurious falls. Meta-analysis was conducted using a random-effect model with heterogeneity assessed using the standard Chi-squared and I index. Where statistical pooling was not possible, study findings were presented in narrative form.
RESULTS: Twelve studies were included in this review with seven being eligible for meta-analysis. Complex falls prevention interventions delivered at multiple levels in RAC populations did not show a significant effect in reducing fall rates (MD = -1.29; 95% CI [-3.01, 0.43]), or the proportion of residents who fell (OR = 0.76; 95% CI [0.42, 1.38]). However, a sensitivity analysis suggested complex falls prevention interventions delivered with additional resources at multiple levels had a significant positive effect in reducing fall rates (MD = -2.26; 95% CI [-3.72, -0.80]).
CONCLUSIONS: Complex falls prevention interventions delivered at multiple levels in the RAC population may reduce fall rates when additional staffing, expertise or resources are provided. Organizations may need to determine how resources can be allocated to best address falls prevention management. Future research should continue to investigate which combinations of multifactorial interventions are effective.
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Efficacy of the Otago Exercise Programme to reduce falls in community-dwelling adults aged 65-80 years old when delivered as group or individual training
Albornos-Muñoz L, Moreno-Casbas T, Sánchez-Pablo C, Bays-Moneo A, Fernández-Domínguez JC, Rich-Ruiz M, Gea-Sánchez M.
J. Adv. Nurs. 2018; ePub(ePub): ePub.
Affiliation: Grupo de Estudios Sociedad, Salud, Educación y Cultura, GESEC. Departament d'Infermeria i Fisioteràpia, Facultat d'Infermeria i Fisioteràpia, Universitat de Lleida. Montserrat Roig, 2, 25198, Lleida, Spain.

DOI 10.1111/jan.13583 **PMID** 29633328
Abstract
AIM: This study will compare how falls can be reduced in non-institutionalized older Spanish adults aged 65-80 years by providing group or individual exercise sessions using the Otago Exercise Programme.
BACKGROUND: The Otago Exercise Programme is a progressive home-based exercise programme, where trained health professionals help people engage in strength, balance and endurance exercises. Its format is based on the evidence from four clinical trials. The benefits of the Otago Exercise Programme are the same for people who have and have not suffered falls and it can also be used for visually impaired people.
DESIGN: A multicentre, simply blinded, randomized, non-inferiority clinical trial, with two arms - group training and individual training - that started in January 2017 and will continue until December

2019.
METHODS: Each study group has 364 subjects, who will take part in four individual or group sessions delivered mainly by nurses over an eight-week period, with a reinforcement session six months later. Data will be collected at baseline and after six and 12 months. The fall percentage will be the most relevant clinical variable and we will also consider safety, viability, compliance, economic analysis and therapeutic value. Approval and funding was granted in December 2016 for this 3-year study by the Spanish Health Research Fund (PI16/01316).
DISCUSSION: Older people from 65-80 years old tend to be more isolated and tackling worries about falls can improve social activities and independence. It has been shown that group training provides better adherence to exercise than individual training and this study will test that hypothesis for the Otago Exercise Programme. This article is protected by copyright. All rights reserved.

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Exercise interventions in healthy older adults with sarcopenia: a systematic review and meta-analysis
Vlietstra L, Hendrickx W, Waters DL.
Australas. J. Ageing 2018; ePub(ePub): ePub.
Affiliation: School of Physiotherapy, University of Otago, Dunedin, New Zealand.

DOI 10.1111/ajag.12521 **PMID** 29638028
Abstract
OBJECTIVE: To systematically assess the effects of exercise interventions on body composition and functional outcomes in older adults with sarcopenia.
METHODS: PubMed/Medline, Embase and Cochrane Library were searched from 2006 to 2017 for exercise randomised controlled trials and controlled clinical trials in adults 60 years and older with sarcopenia. Preferred Reporting Items for Systematic Review and Meta-Analysis protocol (PRISMA-P) and Physiotherapy Evidence Database (PEDro) scale assessed internal validity. Meta-analysis and sensitivity analysis were performed.
RESULTS: Searches retrieved 1512 titles. Thirty-two full texts were evaluated, and six trials were included.
Methodological quality was 5.5 (0-10). Meta-analysis revealed that knee-extension strength ($P \leq 0.01$), timed up and go ($P < 0.0001$), appendicular muscle mass ($P = 0.04$) and leg muscle mass ($P = 0.04$) significantly improved in response to exercise interventions.
CONCLUSIONS: Exercise interventions significantly improved strength, balance and muscle mass. However, the number of trials was small and the training effect was inconsistent due to heterogeneity in exercise mode, duration and intensity. Lack of detailed description makes it impossible to reflect on the progressive resistance training approaches used. More research is needed to confirm these findings.

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Exploration of older people's perceptions of behavioural factors associated with falls

Robson K, Coyle J, Pope R.

Age Ageing 2018; ePub(ePub): ePub.

Affiliation: Charles Sturt University, School of Community Health, Albury, New South Wales 2640, Australia.

DOI 10.1093/ageing/afy051 **PMID** 29659667

Abstract

BACKGROUND: falls rates in older people continue to rise despite concerted efforts to manage falls risks. As more effective strategies to reduce falls in older people may arise from better understanding their perspectives on falls risk, this study aimed to explore perceptions and behavioural decisions that may affect risk of falling among older people living in regional Australia. METHOD: this qualitative research, informed by hermeneutics, explored older people's perspectives on decisions they made that could affect their falls risk. The study involved 26 participants (21 females) aged 65-84 years, residing in regional Australia. In total, 13 participated in semi-structured focus groups and 13 in semi-structured, in-depth interviews.

RESULTS: six key themes illuminated the challenges older people faced in relation to falls risk. These were: the role that independence played in decision making regarding risk; the influence of previous falls experience; older people's level of understanding of risks; ability and willingness to engage with support; the need or desire to cover up a fall history; and the influence of finances in managing risk. Older people's accounts demonstrated they experienced competing influences that impacted upon decisions they made with respect to falls risks. Most significantly, the complex interplay of these influences drove the decisions older people made, sometimes placing them at greater risk of falling. CONCLUSION: consideration of the multifaceted issues older people face when managing falls risk, and the influence these factors have on their behaviours, is vital to successfully reducing rates of fall related injuries in this population.

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Frailty and sarcopenia: the potential role of an aged immune system

Wilson D, Jackson T, Sapey E, Lord JM.

Ageing Res. Rev. 2017; 36: 1-10.

DOI 10.1016/j.arr.2017.01.006 **PMID** unavailable

Abstract

Frailty is a common negative consequence of ageing. Sarcopenia, the syndrome of loss of muscle mass, quality and strength, is more common in older adults and has been considered a precursor syndrome or the physical manifestation of frailty. The pathophysiology of both syndromes is incompletely described with multiple causes, inter-relationships and complex pathways proposed. Age-associated changes to the immune system (both immunesenescence, the decline in immune function with ageing, and inflammageing, a state of chronic inflammation) have been suggested as contributors to sarcopenia and frailty but a direct causative role remains to be established. Frailty, sarcopenia and immunesenescence are commonly described in older adults but are not ubiquitous

to ageing. There is evidence that all three conditions are reversible and all three appear to share common inflammatory drivers. It is unclear whether frailty, sarcopenia and immunesenescence are separate entities that co-occur due to coincidental or potentially confounding factors, or whether they are more intimately linked by the same underlying cellular mechanisms. This review explores these possibilities focusing on innate immunity, and in particular associations with neutrophil dysfunction, inflammation and known mechanisms described to date. Furthermore, we consider whether the age-related decline in immune cell function (such as neutrophil migration), increased inflammation and the dysregulation of the phosphoinositide 3-kinase (PI3K)-Akt pathway in neutrophils could contribute pathogenically to sarcopenia and frailty.
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Health related quality of life and fall risk associated with age related body composition changes; sarcopenia, obesity and sarcopenic obesity
Oztürk ZA, Türkbeyler IH, Abiyev A, Kul S, Edizer B, Yakaryılmaz FD, Soylu G.
Intern. Med. J. 2018; ePub(ePub): ePub.
Affiliation: Gaziantep University, Faculty of Medicine, Department of Internal Medicine, Division of Geriatric Medicine, 27100 Sahinbey, Gaziantep, Turkey.

DOI 10.1111/imj.13935 **PMID** 29665258
Abstract
BACKGROUND: Sarcopenia, obesity, and sarcopenic obesity are various features of the aging process that can cause important health issues. The present study was undertaken to investigate the interrelationship between those body composition changes including their clinical components and the quality of life variables.
METHODS: 423 individuals aged 65 years or more were included in this cross-sectional study. Sarcopenia was diagnosed according to The European Working Group on Sarcopenia in Older People criteria. Body composition parameters were measured with a bioelectrical impedance analyser and Turkish population based cut-off points were preferred for diagnosis of sarcopenia. Comprehensive geriatric assessment was performed on all patients. A logistic regression analysis was performed to identify important factors for sarcopenia and sarcopenic obesity.
RESULTS: The prevalence of sarcopenic, obese, and sarcopenic obese subjects was 14% , 35%, and 11%, respectively. The lowest mean gait speed and hand grip strength values were seen in the sarcopenic obese group (0.6±0.3 m/s and 19.7±9.8 kg, respectively). Sarcopenic obese participants were associated with the highest rate for fall risk. The scores for domains of health related quality of life were worse in both obesity and sarcopenic obesity when compared to others. BMI, number of drugs used, total body fat ratio, and Geriatric Depression Scale-Short Form scores were negatively correlated with all dimensions of SF-36 quality of life scale.
CONCLUSIONS: Sarcopenia, obesity, and sarcopenic obesity are associated with many negative health outcomes such as high fall risk and low health related quality of life in geriatric population.

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Relationship between muscle strength and fall episodes among the elderly: the Yilan study, Taiwan

Yang NP, Hsu NW, Lin CH, Chen HC, Tsao HM, Lo SS, Chou P.

BMC Geriatr. 2018; 18(1): e90.

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DOI 10.1186/s12877-018-0779-2 **PMID** 29653515

Abstract

BACKGROUND: Fall episodes are not unusual among community residents, especially the elderly, and lower muscle strength is an important issue to address in order to prevent falls.

METHODS: A community health survey was conducted in a suburban area of Taiwan, and 1067 older adults were selected for enrollment in the present study. All the enrolled subjects had been visited at their homes; the subjects' strength of both hands and muscle mass of both legs were measured and well-established questionnaires were finished by certificated paramedic staffs.

RESULTS: The incidence of fall episodes in the previous 1 year in the Yilan elderly population was 15.1%, and the female predominance was significant. A significantly higher prevalence of cataracts was found in group who experienced a fall in the past year (64% vs. 54.9% in the non-fall group). Mild or more severe dementia was much more prevalent in the group who experienced a recent fall (33.8% vs. 25.7% in the non-fall group). The strength of both hands tested as the physical function was 17.6 ± 8.0 kg in the recent fall group, significantly weaker than that in the non-fall group (20.7 ± 8.7 kg). Multivariate regression analysis revealed a greater weekly exercise duration and greater strength of both hands reduced the occurrence of falls among the whole and the female population. The standardized effect sizes of hand grip strength between both groups, not trivial, were 0.29 and 0.37 for the total population and the female subpopulation respectively.

CONCLUSIONS: Less weekly exercise duration and weaker muscle strength were f ound to be independent risk factors of fall episode(s) in an elderly Taiwanese population, especially in the female sub-population. Muscle strength, measured by average of both hands grip strength, was the most significantly factor of one-year fall episode(s) accessed retrospectively.

PDF Y Endnote Y

The effect of a VR exercise program on falls and depression in the elderly with mild depression in the local community

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J. Phys. Ther. Sci. 2017; 29(12): 2157-2159.

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DOI 10.1589/jpts.29.2157 **PMID** 29643594 **PMCID** PMC5890220

Abstract

PURPOSE: The purpose of this study is to explore the effect of a VR exercise program on falls and depression in the elderly with mild depression who reside in the local community.

SUBJECTS AND METHODS: This study was performed by targeting 15 elderly subjects with mild depression who resided in the local community. The targeted subjects voluntarily selected 3 VR exercise programs (each lasting 10 minutes) among 4 activities, and a resting time of 5 minutes was given for an interval after each activity. The VR exercise program was performed for total 12 weeks (36 times), 3 times a week, 45 minutes per session.
RESULTS: After exercise, scores of static balance test (anteroposterior), Falls Efficacy Scale, and the Activities-specific Balance Confidence Scale in the test subjects were improved and depression and internal stress scores were significantly decreased after the intervention.
CONCLUSION: It can be concluded that the VR exercise program exerts a positive effect not only on the physical factor but also on the mental factor of the elderly subjects with mild depression who reside in the local community. It is expected that based on the VR exercise program, diversified home programs for the elderly should be developed in the future.
PDF Y Endnote Y

The effect of balance exercises and computerized cognitive training on psychomotor performance in elderly
Taheri M, Irandoust K.
J. Phys. Ther. Sci. 2017; 29(12): 2097-2099.
Affiliation: Department of Sport Sciences, Imam Khomeini International University: Qazvin, Iran.

DOI 10.1589/jpts.29.2097 **PMID** 29643582 **PMCID** PMC5890208
Abstract
PURPOSE: The purpose of this study was to investigate the effect of balance and computerized cognitive training on psychomotor performance in elderly females.
SUBJECTS AND METHODS: Twentynine elderly females with the mean age of 63-71 years old were applied voluntarily and randomly allocated to four groups: balance training (3 d/wk for 12 wk), balance training with computerized cognitive training (3 d/wk for 12 wk), computerized cognitive training group and control group. Psychomotor performance of all subjects was measured by Vienna Test System which was a computerized psychological assessment tool. Determination test (DT) and Visual Pursuit Test (VPT) were used as indexes of psychomotor performance.
RESULTS: The results suggested that DT and VPT were significantly improved in all experimental groups with greater improvement in the balance supplemented with computerized cognitive training group.
CONCLUSION: Balance training and computerized cognitive are highly recommended in elderly with the aim of increasing cognitive performance.
PDF Y Endnote Y

The feasibility and positive effects of a customised videogame rehabilitation programme for freezing of gait and falls in Parkinson's disease patients: a pilot study
Nuic D, Vinti M, Karachi C, Foulon P, Van Hamme A, Welter ML.
J. Neuroengineering Rehabil. 2018; 15(1): e31.
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DOI 10.1186/s12984-018-0375-x **PMID** 29636105

Abstract

BACKGROUND: Freezing of gait and falls represent a major burden in patients with advanced forms of Parkinson's disease (PD). These axial motor signs are not fully alleviated by drug treatment or deep-brain stimulation. Recently, virtual reality has emerged as a rehabilitation option for these patients. In this pilot study, we aim to determine the feasibility and acceptability of rehabilitation with a customised videogame to treat gait and balance disorders in PD patients, and assess its effects on these disabling motor signs.

METHODS: We developed a customised videogame displayed on a screen using the Kinect system. To play, the patient had to perform large amplitude and fast movements of all four limbs, pelvis and trunk, in response to visual and auditory cueing, to displace an avatar to collect coins and avoid obstacles to gain points. We tested ten patients with advanced forms of PD (median disease duration = 16.5 years) suffering from freezing of gait and/or falls (Hoehn&Yahr score ≥ 3) resistant to antiparkinsonian treatment and deep brain stimulation. Patients performed 18 training sessions during a 6-9 week period. We measured the feasibility and acceptability of our rehabilitation programme and its effects on parkinsonian disability, gait and balance disorders (with clinical scales and kinematics recordings), positive and negative affects, and quality of life, after the 9th and 18th training sessions and 3 months later.

RESULTS: All patients completed the 18 training sessions with high feasibility, acceptability and satisfaction scores. After training, the freezing-of-gait questionnaire, gait-and-balance scale and axial score significantly decreased by 39, 38 and 41%, respectively, and the activity-balance confidence scale increased by 35%. Kinematic gait parameters also significantly improved with increased step length and gait velocity and decreased double-stance time. Three months after the final session, no significant change persisted except decreased axial score and increased step length and velocity.

CONCLUSIONS: This study suggests that rehabilitation with a customised videogame to treat gait and balance disorders is feasible, well accepted, and effective in parkinsonian patients. These data serve as preliminary evidence for further larger and controlled studies to propose this customised videogame rehabilitation programme at home. TRIAL REGISTRATION: ClinicalTrials.gov NCT02469350.

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The role of previous falls in major osteoporotic fracture prediction in conjunction with FRAX in older Chinese men and women: the Mr. OS and Ms. OS cohort study in Hong Kong

Su Y, Leung J, Kwok T.

Osteoporos. Int. 2018; ePub(ePub): ePub.

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DOI 10.1007/s00198-017-4373-9 **PMID** 29651509

Abstract

Falls are a major concern in terms of fracture risk. Although awareness rising for the absence of falls in the FRAX algorithm, our study only identified the independent predictive role of previous

recurrent falls and their better conjunction use with FRAX for major osteoporotic fracture prediction in older Chinese men.
PDF Y Endnote Y

The Warrior Wellness study: a randomized controlled exercise trial for older veterans with PTSD
Hall KS, Morey MC, Beckham JC, Bosworth HB, Pebole MM, Pieper CF, Sloane R.
Transl. J. Am. Coll. Sports Med. 2018; 3(6): 43-51.
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DOI 10.1249/TJX.0000000000000056 **PMID** 29632895 **PMCID** PMC5889111
Abstract
Posttraumatic stress disorder (PTSD) affects up to 30% of military veterans. Older veterans, many of whom have lived with PTSD symptoms for several decades, report a number of negative health outcomes. Despite the demonstrated benefits of regular exercise on physical and psychological health, no studies have explored the impact of exercise in older veterans with PTSD. This paper describes the development, design, and implementation of the Warrior Wellness exercise pilot study for older veterans with PTSD. Veterans aged ≥60 with a Diagnostic and Statistical Manual of Mental Disorders (DSM-V) diagnosis of PTSD will be recruited and randomized to (a) Warrior Wellness, a 12-week supervised, facility-based exercise intervention, or (b) usual care for 12 weeks. Warrior Wellness is a theory- and evidence-based behavioral intervention that involves 3 sessions per week of multi-component exercise training that targets strength, endurance, balance, and flexibility. Warrior Wellness focuses on satisfaction with outcomes, self-efficacy, self-monitoring, and autonomy. Factors associated with program adherence, defined as the number of sessions attended during the 12 weeks, will be explored. Primary outcomes include PTSD symptoms and cardiovascular endurance, assessed at baseline and 12 weeks. Compared to those in usual care, it is hypothesized that those in the Warrior Wellness condition will improve on these efficacy outcomes. The Warrior Wellness study will provide evidence on whether a short-term exercise intervention is feasible, acceptable, and effective among older veterans with PTSD, and explore factors associated with program adherence. ClinicalTrials.gov *Identifier*: NCT02295995.
PDF Not yet available Endnote Y

Awareness and functional outcome of hip fracture-related falls among patients with a history of recurrent falling
Aizen E, Nixon H, Shugaev I.
Isr. Med. Assoc. J. 2018; 20(1): 38-42.
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DOI unavailable **PMID** 29658206
Abstract
BACKGROUND: There is little evidence about awareness and functional outcome of hip fracture-related falls among patients with a history of recurrent falling.
OBJECTIVES: To measure the awareness of recurrent falling in patients and to compare their functional outcomes with those who suffered hip fracture after a sporadic isolated fall.

METHODS: A prospective comparative study of patients after a hip fracture-related fall was conducted. Awareness of falls was measured and functional outcome was assessed by total and motor Functional Independence Measure (FIM) score changes and efficiency and scores at admission and on discharge.
RESULTS: Of 97 eligible participants, 49 (50.5%) were recurrent fallers. Of these recurrent falls, 19 (38.8%) were not reported, 16 (32.7%) were reported but no action was taken, and 7 (14.3%) were reported and a partial assessment performed. A full assessment was performed in only 7 cases (14.3%). FIM scores on admission and discharge were significantly higher in once-fallers. A multiple linear regression analysis showed that being a once-faller was independently associated with higher total FIM at admission (β coefficient = 0.290, P = 0.004), higher motor FIM at admission (β coefficient = 0.295, P = 0.003), higher total FIM at discharge (β Coefficient = 0.264, P = 0.009), and higher motor FIM at discharge (β coefficient = 0.230, P = 0.023).
CONCLUSIONS: Awareness of the syndrome of recurrent falling is extremely low. Recurrent falls before a hip fracture-related fall is associated with substantial loss of functional independence.
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Being a recurrent faller adversely affects rehabilitation outcome of hip fracture patients.

Balance disturbances coefficient as a new value to assess ability to maintain balance on the basis of FFT curves

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Acta Bioeng. Biomech. 2018; 20(1): 143-151.
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DOI unavailable **PMID** 29658517

Abstract

PURPOSE: The aim of this study was to formulate a new balance disturbances coefficient enabling objective balance assessment on the basis of fast Fourier transform curves. The article presents the method of coefficient calculation and possible ways of its interpretation.
METHODS: 11 healthy participants took part in the experiment. There were four measurements: two in real environment with eyes open and eyes closed as well as two in virtual environment with scenery (surroundings) oscillating with frequency 0.7 Hz and 1.4 Hz. Scenery was displayed by means of the Oculus Rift system, whereas position of centre of pressure was measured with the use of Zebris FDM-S platform. Obtained centre of pressure positions were used to calculate fast Fourier transform, and then balance disturbances coefficient.
RESULTS: Comparisons of coefficient values obtained for the whole group and two selected participants were presented in order to explain how to interpret and use the coefficient. For better explanation of coefficient interpretation the most popular time domain stabilometric quantities and fast Fourier transform curves were presented as well.
CONCLUSIONS: The balance disturbances coefficient makes it possible to quantitatively and objectively determine, on the basis of fast Fourier transform curves, the influence of the oscillating scenery on the tested person as well as show how the overall equilibrium of that person was disturbed.
PDF Y Endnote Y

Coffee and tea drinking in relation to risk of hip fracture in the Singapore Chinese Health Study
Dai Z, Jin A, Soh AZ, Ang LW, Yuan JM, Koh WP.
Bone 2018; ePub(ePub): ePub.
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DOI 10.1016/j.bone.2018.04.010 **PMID** 29660426
Abstract
Meta-analyses of studies conducted among Western populations suggest that coffee consumption does not affect osteoporotic fracture risk. However, experimental studies have shown that the effect of caffeine on bone health may depend on dosage. We examined the associations between consumption of coffee, tea and caffeine and risk of hip fracture in an Asian cohort. In a population-based prospective cohort of 63,257 Chinese men and women aged 45-74 years in Singapore, a validated semi-quantitative food frequency questionnaire was used to assess habitual consumption of coffee and tea at baseline. Cox proportional hazards regression models were used to estimate hazard ratio (HR) and 95% confidence interval (CI) for risk of hip fracture with adjustment for potential confounders. During a mean follow-up of 16.7 years, 2502 incident hip fracture cases were identified. Compared to coffee drinkers <1 cup/week, those who drank ≥4 cups/day had a statistically significant higher risk to develop hip fractures, the HR (95% CI) was 1.32 (1.07, 1.63) in the whole cohort analysis, 1.46 (1.01, 2.10) for men and 1.33 (1.02, 1.72) for women. Among postmenopausal women, compared to those who drank coffee <1 cup/week, drinking 2-3 cups/day was associated with the lowest risk [HR: 0.88 (0.76, 1.01)] and drinking ≥4 cups/d was associated with the highest risk [HR: 1.31 (1.00, 1.71)]. Similar associations with caffeine intake were found among postmenopausal women. Restricted spline analyses suggested a non-linear association between coffee/caffeine consumption and hip fracture risk in postmenopausal women (p for non-linearity ≤ 0.05). No association was found with tea consumption in either sex. These data suggest that drinking coffee ≥4 cups/day is associated with a higher hip fracture risk, while a moderate intake may alleviate risk in postmenopausal women. Future studies should corroborate these results to determine levels of optimal coffee consumption in relation to bone health.

PDF Y Endnote Y

Effects of mirror therapy on walking ability, balance and lower limb motor recovery after stroke: a systematic review and meta-analysis of randomized controlled trials
Li Y, Wei Q, Gou W, He C.
Clin. Rehabil. 2018; ePub(ePub): ePub.
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DOI 10.1177/0269215518766642 **PMID** 29644880
Abstract

OBJECTIVE: To investigate the effects of mirror therapy on walking ability, balance and lower limb motor recovery in patients with stroke.
METHOD: MEDLINE, EMBASE, Web of Science, CENTRAL, PEDro Database, CNKI, VIP, Wan Fang, ClinicalTrials.gov, Current controlled trials and Open Grey were searched for randomized controlled trials that investigated the effects of mirror therapy on lower limb function through January 2018. The primary outcomes included were walking speed, mobility and balance function. Secondary outcomes included lower limb motor recovery, spasticity and range of motion. Quality assessments were performed with the PEDro scale.
ESULTS: A total of 13 studies (n = 572) met the inclusion criteria. A meta-analysis demonstrated a significant effect of mirror therapy on walking speed (mean difference (MD) 0.1 m/s, 95% confidence interval (CI): 0.08 to 0.12, P < 0.00001), balance function (standard mean difference (SMD) 0.66, 95% CI: 0.43 to 0.88, P < 0.00001), lower limb motor recovery (SMD 0.83, 95% CI: 0.62 to 1.05, P < 0.00001) and passive range of motion of ankle dorsiflexion (MD 2.07°, 95% CI: 082 to 3.32, P = 0.001), without improving mobility (SMD 0.43, 95% CI: -0.12 to 0.98, P = 0.12) or spasticity of ankle muscles (MD -0.14, 95% CI: -0.43 to 0.15, P = 0.35).
CONCLUSION: The systematic review demonstrates that the use of mirror therapy in addition to some form of rehabilitation appears promising for some areas of lower limb function, but there is not enough evidence yet to suggest when and how to approach this therapy.
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Evaluating the effects of delivering integrated kinesthetic and tactile cues to individuals with unilateral hemiparetic stroke during overground walking

Afzal MR, Pyo S, Oh MK, Park YS, Yoon J.
J. Neuroengineering Rehabil. 2018; 15(1): 33.
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DOI 10.1186/s12984-018-0372-0 **PMID** 29661237
Abstract
BACKGROUND: Integration of kinesthetic and tactile cues for application to post-stroke gait rehabilitation is a novel concept which needs to be explored. The combined provision of haptic cues may result in collective improvement of gait parameters such as symmetry, balance and muscle activation patterns. Our proposed integrated cue system can offer a cost-effective and voluntary gait training experience for rehabilitation of subjects with unilateral hemiparetic stroke.
METHODS: Ten post-stroke ambulatory subjects participated in a 10 m walking trial while utilizing the haptic cues (either alone or integrated application), at their preferred and increased gait speeds. In the system a haptic cane device (HCD) provided kinesthetic perception and a vibrotactile feedback device (VFD) provided tactile cue on the paretic leg for gait modification. Balance, gait symmetry and muscle activity were analyzed to identify the benefits of utilizing the proposed system.
RESULTS: When using kinesthetic cues, either alone or integrated with a tactile cue, an increase in the percentage of non-paretic peak activity in the paretic muscles was observed at the preferred gait speed (vastus medialis obliquus: $p < 0.001$, partial eta squared (η^2) = 0.954; semitendinosus $p < 0.001$, partial $\eta^2 = 0.793$) and increased gait speeds (vastus medialis obliquus: $p < 0.001$, partial

$\eta^2 = 0.881$; semitendinosus $p = 0.028$, partial $\eta^2 = 0.399$). While using HCD and VFD (individual and integrated applications), subjects could walk at their preferred and increased gait speeds without disrupting trunk balance in the mediolateral direction. The temporal stance symmetry ratio was improved when using tactile cues, either alone or integrated with a kinesthetic cue, at their preferred gait speed ($p < 0.001$, partial $\eta^2 = 0.702$).
CONCLUSIONS: When combining haptic cues, the subjects walked at their preferred gait speed with increased temporal stance symmetry and paretic muscle activity affecting their balance. Similar improvements were observed at higher gait speeds. The efficacy of the proposed system is influenced by gait speed. Improvements were observed at a 20% increased gait speed, whereas, a plateau effect was observed at a 40% increased gait speed. These results imply that integration of haptic cues may benefit post-stroke gait rehabilitation by inducing simultaneous improvements in gait symmetry and muscle activity.
PDF Y Endnote Y

Visual search load effects on age-related cognitive decline: evidence from the Yakumo Longitudinal Study
Hatta T, Kato K, Hotta C, Higashikawa M, Iwahara A, Hatta T, Hatta J, Fujiwara K, Nagahara N, Ito E, Hamajima N.
Am. J. Psychol. 2017; 130(1): 73-82.

DOI 10.5406/amerjpsyc.130.1.0073 **PMID** unavailable
Abstract
The validity of Bucur and Madden's (2010) proposal that an age-related decline is particularly pronounced in executive function measures rather than in elementary perceptual speed measures was examined via the Yakumo Study longitudinal database. Their proposal suggests that cognitive load differentially affects cognitive abilities in older adults. To address their proposal, linear regression coefficients of 104 participants were calculated individually for the digit cancellation task 1 (D-CAT1), where participants search for a given single digit, and the D-CAT3, where they search for 3 digits simultaneously. Therefore, it can be conjectured that the D-CAT1 represents primarily elementary perceptual speed and low-visual search load task, whereas the D-CAT3 represents primarily executive function and high-visual search load task. Regression coefficients from age 65 to 75 for the D-CAT3 showed a significantly steeper decline than that for the D-CAT1, and a large number of participants showed this tendency. These results support the proposal by Bucur and Madden (2010) and suggest that the degree of cognitive load affects age-related cognitive decline.
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