

## **A one-year proprioceptive exercise programme reduces the incidence of falls in community-dwelling elderly people: a before-after non-randomised intervention study**

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### **Abstract**

**BACKGROUND:** The risk of falls increases with age. Balance alteration and polypharmacy are independent contributors to an increased risk of falls.

**OBJECTIVE:** The primary aim was to assess whether a proprioceptive exercise programme reduces the incidence of falls. A secondary aim was to assess the association between drugs and falls.

**DESIGN:** This was a before-after non-randomised intervention study.

**PARTICIPANTS:** The study recruited independent and cognitively intact community-dwelling people aged over 69 years, from December 2012 to May 2014.

**METHODS:** The intervention was done by a nurse and consisted of a monthly supervised group session of proprioceptive training for 1 year, supplemented by a home diary exercise. Daily medication was reviewed.

**RESULTS:** We included 572 subjects (63.3% women), mean age 76.1±3.9 years. The mean number of drugs prescribed at the start of the study was 4.7±3.0 and 353 of the participants (61.7%) were taking four or more drugs a day. The elderly who fell were more dependent in their activities of daily living (Barthel index), and their balance was worse (determined using the Tinetti scale), as were their results on a cognitive scale (the MEC). After the intervention, an increase in self-perceived quality of life (EQ5D) was reported. The incidence of falls was reduced from 37.5% in the 12 months prior to the intervention to 25.7% in the 12 months after the intervention. During the follow-up, beta-blocker use was associated with an increased incidence of falls (OR=2.05; 95%IC: 1.24-3.39; p=0.005). In contrast, antiplatelet/anticoagulation drugs were associated with a lower risk of falls (OR=0.7; 95%IC: 0.55-0.88; p=0.003).

**CONCLUSIONS:** The proprioceptive exercise programme reduced the incidence of falls in community-dwelling older people. Multiple drug use was an independent predictor of an increased risk of falls, and specific drug groups were associated with falls.

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### **PDF Y Endnote Y**

## **Characteristics of tasks utilized for evaluation of judgment errors in the elderly**

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*J. Phys. Ther. Sci.* 2016; 28(10): 2877-2882.

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### **Abstract**

**PURPOSE:** The present study compared assessments utilized to evaluate judgment errors in the elderly.

**SUBJECTS AND METHODS:** A total of 94 community-dwelling elderly participants in an examination of physical fitness for health promotion and health guidance in a rural area in Japan were included. Spatially and temporally predictive tasks were used to evaluate judgment errors. Distances measured on the Functional Reach and upward reaching tests were used to assess spatial prediction, and times measured on the Timed Up and Go test and Standardized Walking Obstacle Course were used to assess temporal prediction. Differences between the self-predicted values and actual results were deemed judgment errors.

**RESULTS:** Significant differences were observed between self-predicted abilities and the patients' performances. Participants underestimated their abilities in spatially predictive tasks and overestimated them in temporally predictive tasks. On comparing the four tasks, there were significant differences in judgment error ratios between them. Statistical analysis indicated a significant difference in the judgment error ratio for the Standardized Walking Obstacle Course correlated with a history of falls.

**CONCLUSION:** Judgment errors were identified using both spatially and temporally predictive tasks. A temporally predictive task like the Standardized Walking Obstacle Course might better evaluate judgment errors in the elderly.

#### **PDF Y Endnote Y**

#### **Cognitive remediation to enhance mobility in older adults: the CREM study**

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*Neurodegener. Dis. Manag.* 2016; ePub(ePub): ePub.

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(Copyright © 2016, Future Medicine)

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#### **Abstract**

Mobility disabilities represent the most prevalent disability among seniors. Emerging evidence indicates that executive functions play an important role in maintaining mobility. However, the use of cognitive remediation programs to enhance mobility has not been investigated in a full-scale randomized control trial. The CREM study is a single-blind randomized control trial to examine the effect of computerized cognitive remediation versus computer-based health education training on mobility in 420 seniors. The primary outcome is change in gait speed during normal walking and walking-while-talking conditions from baseline to postintervention. Secondary outcomes are change in mobility, mobility-related cognitive processes and neuroplasticity.

**RESULTS** of this study will fill an important gap in the efficacy and feasibility of cognitive remediation to improve mobility in seniors.

#### **PDF Endnote Y**

#### **Comparable cerebral oxygenation patterns in younger and older adults during dual-task walking with increasing load**

*Fraser SA, Dupuy O, Pouliot P, Lesage F, Bherer L.*

*Front. Aging Neurosci.* 2016; 8: 240.

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## Abstract

The neuroimaging literature on dual-task gait clearly demonstrates increased prefrontal cortex (PFC) involvement when performing a cognitive task while walking. However, findings from direct comparisons of the cerebral oxygenation patterns of younger (YA) and older (OA) adults during dual-task walking are mixed and it is unclear how YA and OA respond to increasing cognitive load (difficulty) while walking. This functional near infra-red (fNIRS) study examined cerebral oxygenation of YA and OA during self-paced dual-task treadmill walking at two different levels of cognitive load (auditory n-back). Changes in accuracy (%) as well as oxygenated (HbO) and deoxygenated (HbR) hemoglobin were examined. For the HbO and HbR measures, eight regions of interest (ROIs) were assessed: the anterior and posterior dorsolateral and ventrolateral PFC (aDLPFC, pDLPFC, aVLPFC, pVLPFC) in each hemisphere. Nineteen YA (M = 21.83 years) and 14 OA (M = 66.85 years) walked at a self-selected pace while performing auditory 1-back and 2-back tasks. Walking alone (single motor: SM) and performing the cognitive tasks alone (single cognitive: SC) were compared to dual-task walking (DT = SM + SC). In the behavioural data, participants were more accurate in the lowest level of load (1-back) compared to the highest (2-back;  $p < 0.001$ ). YA were more accurate than OA overall ( $p = 0.009$ ), and particularly in the 2-back task ( $p = 0.048$ ). In the fNIRS data, both younger and older adults had task effects (SM < DT) in specific ROIs for  $\Delta$ HbO (three YA, one OA) and  $\Delta$ HbR (seven YA, eight OA). After controlling for walk speed differences, direct comparisons between YA and OA did not reveal significant age differences, but did reveal a difficulty effect in HbO in the left aDLPFC ( $p = 0.028$ ) and significant task effects (SM < DT) in HbR for six of the eight ROIs. FINDINGS suggest that YA and OA respond similarly to manipulations of cognitive load when walking on a treadmill at a self-selected pace.

## PDF Y Endnote Y

### Concurrent validity of the Swedish version of the life-space assessment questionnaire

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*BMC Geriatr.* 2016; 16(1): 181.

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## Abstract

**BACKGROUND:** The Life-Space Assessment (LSA), developed in the USA, is an instrument focusing on mobility with respect to reaching different areas defined as life-spaces, extending from the room where the person sleeps to mobility outside one's hometown. A newly translated Swedish version of the LSA (LSA-S) has been tested for test-retest reliability, but the validity remains to be tested. The purpose of the present study was to examine the concurrent validity of the LSA-S, by comparing and correlating the LSA scores to other measures of mobility.

**METHOD:** The LSA was included in a population-based study of health, functioning and mobility among older persons in Sweden, and the present analysis comprised 312 community-dwelling participants. To test the concurrent validity, the LSA scores were compared to a number of other mobility-related variables, including the Short Physical Performance Battery (SPPB) as well as "stair climbing", "transfers", "transportation", "food shopping", "travel for pleasure" and "community activities". The LSA total mean scores for different levels of the other mobility-related variables, and measures of correlation were calculated.

**RESULTS:** Higher LSA total mean scores were observed with higher levels of all the other mobility related variables. Most of the correlations between the LSA and the other mobility variables were large ( $r = 0.5-1.0$ ) and significant at the 0.01 level. The LSA total score, as well as independent life-space and assistive life-space correlated with transportation (0.63, 0.66, 0.64) and food shopping (0.55, 0.58, 0.55). Assistive life-space also correlated with SPPB (0.47). With respect to maximal life-space, the correlations with the mobility-related variables were generally lower (below 0.5), probably since this aspect of life-space mobility is highly influenced by social support and is not so dependent on the individual's own physical function.

**CONCLUSION:** LSA was shown to be a valid measure of mobility when using the LSA total, independent LS or assistive LSA.

#### PDF Y Endnote Y

#### **Cost-utility of medication withdrawal in older fallers: results from the improving medication prescribing to reduce risk of FALLs (IMPROveFALL) trial**

Polinder S, Boyé ND, Mattace-Raso FU, van der Velde N, Hartholt KA, de Vries OJ, Lips P, van der Cammen TJ, Patka P, Van Beeck EF, van Lieshout EM.

*BMC Geriatr.* 2016; 16(1): e179.

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#### **Abstract**

**BACKGROUND:** The use of Fall-Risk-Increasing-Drugs (FRIDs) has been associated with increased risk of falls and associated injuries. This study investigates the effect of withdrawal of FRIDs versus 'care as usual' on health-related quality of life (HRQoL), costs, and cost-utility in community-dwelling older fallers.

**METHODS:** In a prospective multicenter randomized controlled trial FRIDs assessment combined with FRIDs-withdrawal or modification was compared with 'care as usual' in older persons, who visited the emergency department after experiencing a fall. For the calculation of costs the direct medical costs (intramural and extramural) and indirect costs (travel costs) were collected for a 12 month period. HRQoL was measured at baseline and at 12 months follow-up using the EuroQol-5D and Short Form-12 version 2. The change in EuroQol-5D and Short Form-12 scores over 12 months follow-up within the control and intervention groups was compared using the Wilcoxon Signed Rank test for continuous variables and the McNemar test for dichotomous variables. The change in scores between the control and intervention groups were compared using a two-way analysis of variance.

**RESULTS:** We included 612 older persons who visited an emergency department because of a fall. The mean cost of the FRIDs intervention was €120 per patient. The total fall-related healthcare costs (without the intervention costs) did not differ significantly between the intervention group and the control group (€2204 versus €2285). However, the withdrawal of FRIDs reduced medication costs with a mean of €38 per participant. Furthermore, the control group had a greater decline in EuroQol-5D utility score during the 12-months follow-up than the intervention group ( $p = 0.02$ ). The change in the Short Form-12 Physical Component Summary and Mental Component Summary scores did not differ significantly between the two groups.

**CONCLUSIONS:** Withdrawal of FRID's in older persons who visited an emergency department due to a fall, did not lead to reduction of total health-care costs. However, the withdrawal of FRIDs reduced medication costs with a mean of €38 per participant in combination with less decline in HRQoL is an important result. **TRIAL REGISTRATION:** The trial is registered in the Netherlands Trial Register ( NTR1593 - October 1(st) 2008).

**PDF Y Endnote Y**

### **Cross-cultural validation of the Falls Efficacy Scale-International (FES-I) in Portuguese community-dwelling older adults**

Figueiredo D, Santos S.

*Arch. Gerontol. Geriatr.* 2016; 68: 168-173.

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#### **Abstract**

The Falls Efficacy Scale-International (FES-I) is a highly reliable instrument to assess fear of falling among older population. This study aimed to develop a European Portuguese version of the FES-I (FES-I(P)) and analyse its psychometric properties in terms of internal consistency, test-retest reliability, concurrent and convergent validity. A cross-sectional study was conducted. Data collection integrated a socio-demographic questionnaire which included falls history and presence/absence of fear of falling, the Activities-specific Balance Confidence Scale (ABC), the Hospital Anxiety and Depression Scale (HADS), the Timed Up and Go (TUG) and the Five Times Sit to Stand Test (FTSST). Descriptive and inferential statistical analyses were performed. A total of 100 Portuguese community-dwelling older people (74.27±8.7years old) have participated in the study. From these, 82 have participated in the reliability study. The FES-I(P) had excellent internal consistency ( $\alpha=0,978$ ) and test-retest reliability ( $ICC_{2,1}=0,999$ ). A significant negative correlation was found between the FES-I(P) and the ABC ( $r_s=-0.85$ ;  $p<0.001$ ), indicating good concurrent validity. FES-I(P) scores were significantly higher among those who were female, had  $\geq 1$  falls in the last year and reported having fear of falling. Significant correlations were found between the FES-I(P) and age ( $r_s=0.337$ ;  $p<0.01$ ), HADS ( $r_s=0.488$ ;  $p<0.01$ ), TUG ( $r_s=0.500$ ;  $p<0.01$ ) and FTSST ( $r_s=0.545$ ;  $p<0.01$ ), indicating acceptable convergent validity. FES-I(P) is a reliable and valid measure of fear of falling for Portuguese community-living older people. Future studies should explore the FES-I(P) responsiveness to change over time and analyse its psychometric properties in samples of both non-community-dwelling and community-dwelling older adults with different health conditions.

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### **Editorial: The aging decision-maker: advances in understanding the impact of cognitive change on decision-making**

Ward EV, Dhani MK.

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**Abstract** [Abstract unavailable]

**PDF Y Endnote Y**

**Evaluating the impact of medication safety alerts on prescribing of potentially inappropriate medications for older veterans in an ambulatory care setting**

Vanderman AJ, Moss JM, Bryan WE, Sloane R, Jackson GL, Hastings SN.

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(Copyright © 2016, Sage Publications)

**DOI** 10.1177/0897190015621803 **PMID** unavailable

**Abstract**

Potentially inappropriate medications (PIMs) have been associated with poor outcomes in older adults. Electronic health record (EHR)-based interventions may be an effective way to reduce PIM prescribing. The main objective of this study was to evaluate changes in PIM prescribing to older adult veterans  $\geq 65$  years old in the ambulatory care setting preimplementation and postimplementation of medication alert messages at the point of computerized provider order entry (CPOE). Additional exploratory objectives included evaluating provider type and patient-provider relationship as a factor for change in PIM prescribing. A total of 1539 patients prealert and 1490 patients postalert were prescribed 1952 and 1897 PIMs, respectively. End points were reported as the proportion of new PIM orders of total new prescriptions. There was no significant difference in the rate of new PIMs prealert and postalert overall, 12.6% to 12.0% ( $P = .13$ ). However, there was a significant reduction in the rate of the top 10 most common newly prescribed PIMs, 9.0% to 8.3% ( $P = .016$ ), and resident providers prescribed fewer PIMs during both time periods. A simple, age-specific medication alert message during CPOE decreased the incidence of the most frequently prescribed PIMs in older adults receiving care in an ambulatory care setting.

**PDF Y Endnote Y**

**Exercise prescription to reverse frailty**

Bray NW, Smart RR, Jakobi JM, Jones GR.

*Appl. Physiol. Nutr. Metab.* 2016; 41(10): 1112-1116.

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(Copyright © 2016, National Research Council of Canada)

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**Abstract**

Frailty is a clinical geriatric syndrome caused by physiological deficits across multiple systems. These deficits make it challenging to sustain homeostasis required for the demands of everyday life. Exercise is likely the best therapy to reverse frailty status. Literature to date suggests that pre-frail older adults, those with 1-2 deficits on the Cardiovascular Health Study-Frailty Phenotype (CHS-frailty phenotype), should exercise 2-3 times a week, for 45-60 min. Aerobic, resistance, flexibility, and balance training components should be incorporated but resistance and balance activities should be emphasized. On the other hand, frail (CHS-frailty phenotype  $\geq 3$  physical deficits) older adults should exercise 3 times per week, for 30-45 min for each session with an emphasis on aerobic training. During aerobic, balance, and flexibility training, both frail and pre-frail older adults should work at an intensity equivalent to a rating of perceived exertion of 3-4 ("somewhat hard") on the Borg CR10 scale. Resistance-training intensity should be based on a percentage of 1-repetition

estimated maximum (1RM). Program onset should occur at 55% of 1RM (endurance) and progress to higher intensities of 80% of 1RM (strength) to maximize functional gains. Exercise is the medicine to reverse or mitigate frailty, preserve quality of life, and restore independent functioning in older adults at risk of frailty.

#### **PDF Y Endnote Y**

### **Exergame technology and interactive interventions for elderly fall prevention: a systematic literature review**

Choi SD, Guo L, Kang D, Xiong S.

*Appl. Ergon.* 2016; ePub(ePub): ePub.

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Electronic address: shupingx@kaist.ac.kr.

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#### **Abstract**

Training balance and promoting physical activities in the elderly can contribute to fall-prevention. Due to the low adherence of conventional physical therapy, fall interventions through exergame technologies are emerging. The purpose of this review study is to synthesize the available research reported on exergame technology and interactive interventions for fall prevention in the older population. Twenty-five relevant papers retrieved from five major databases were critically reviewed and analyzed.

RESULTS showed that the most common exergaming device for fall intervention was Nintendo Wii, followed by Xbox Kinect. Even though the exergame intervention protocols and outcome measures for assessing intervention effectiveness varied, the accumulated evidences revealed that exergame interventions improved physical or cognitive functions in the elderly. However, it remains inconclusive whether or not the exergame-based intervention for the elderly fall prevention is superior to conventional physical therapy and the effect mechanism of the exergaming on elderly's balance ability is still unclear.

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#### **PDF Y Endnote Y**

### **Fall- and BBS-related differences in muscle strength and postural balance of the elderly**

Choi JS, Kang DW, Seo JW, Kim DH, Yang ST, Tack GR.

*J. Phys. Ther. Sci.* 2016; 28(9): 2629-2633.

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(Copyright © 2016, Society of Physical Therapy Science)

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#### **Abstract**

**PURPOSE:** The purpose of this study was to compare the differences in muscle strength and postural balance between fallers and non-fallers. We also compared the difference between normal and impaired balance groups using the same subjects and the same variables.

**SUBJECTS AND METHODS:** Seventy-one healthy elderly females (age:  $75.1 \pm 75$  years; weight:  $57.3 \pm 57$  kg; height:  $150.1 \pm 15$  cm) who had high levels of physical activity participated [25 fallers (FG) vs.

46 non-fallers (NG); and 52 healthy balance group (HBG) and 19 impaired balance group (IBG) subjects]. To compare the groups, the muscle strengths of 9 muscle groups, and 20 variables of the instrumented standing balance assessment (2 area variables, 9 time-domain variables, and 9 frequency-domain variables) were assessed.

Results: The FG and NG could only be categorized based on the frequency-domain variables of the instrumented standing balance assessment. On the other hand, there were significant differences between HBG and IBG in height, 6 muscle strength, and 2 time-domain variables of the instrumented standing balance assessment.

Conclusion: These results suggest that muscle strength and standing balance are reflected in physical balance ability (i.e., BBS); however they are insufficient for determining the actual occurrence of falls.

**PDF Y Endnote Y**

### **Falls as adverse events in psychosocial treatment of depression: findings from a clinical trial in nursing homes**

Meeks S, Ludwin BM, Looney SW.

*Contemp. Clin. Trials Commun.* 2016; 3: 139-141.

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(Copyright © 2016, Elsevier Publishing)

**DOI** 10.1016/j.conctc.2016.05.006 **PMID** 27822570

#### **Abstract**

Falls pose a significant health risk for nursing home residents and are associated with depression and medical treatments for depression. Data on falls as an adverse event to psychosocial treatments are lacking. We examined risk of falls as an adverse event in a clinical trial of a behavioral treatment for depression. Participants were 82 depressed nursing home residents. Adverse events were recorded at each research contact. We used the rate ratio based on the respective incidence densities in the treatment and control groups to measure association between fall rate and treatment. The treatment group had almost six times higher risk of falls than the control group, a statistically significant association.

FINDINGS suggest that it may be of value to include statistical analysis of falls as adverse events in trials of behavioral interventions for depression.

**PDF Y Endnote Y**

### **Hypnotics use and falls in hospital inpatients stratified by age**

Zaitso M, Kurita Y, Iwahana M, Akiyama H, Watanabe F, Higashikawa A, Kaneko R, Konishi R, Itoh M, Kobayashi Y.

*Glob. J. Health Sci.* 2016; 9(4): e60903.

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#### **Abstract**

BACKGROUND: Little is known about the association between hypnotics use and falls among inpatients in young and middle-aged populations. We aimed to determine whether the use of hypnotics elevated the fall risk in adult inpatients aged 20 and above.



**METHODS:** Patients admitted to the Kanto Rosai Hospital, Kanagawa, Japan, between April 1, 2013 and January 31, 2014 were followed up until discharge. We estimated the incidence rate ratio (IRR) and 95% confidence intervals (CI) of falls for the use of hypnotic drugs with a Poisson regression model, adjusted for sex, age, activities of daily living, and comorbidities.

**RESULTS:** For the 6,949 inpatients whose medical records were examined, the incidence of falls was significantly higher in hypnotics' users than in non-users. The IRR was 1.52 (95% CI, 1.10-2.11). When stratified by age, the risk of hypnotics use in the patients aged 65 and above was statistically elevated (IRR, 1.48; 95% CI, 1.02-2.13); the risk in the patients aged 25-64 was elevated but not significant (IRR, 1.33; 95% CI, 0.63-2.81).

**CONCLUSION:** Usage of hypnotics elevated fall risk in the older inpatients, though this association was not significant in the young and middle-aged inpatients. Further studies are needed.

#### **PDF Y Endnote Y**

### **Influences of resistance training on physical function in older, obese men and women with sarcopenia**

Stoeber K, Heber A, Eichberg S, Brixius K.

*J. Geriatr. Phys. Ther.* 2016; ePub(ePub): ePub.

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#### **Abstract**

**BACKGROUND AND PURPOSE:** Sarcopenic obesity is associated with disability, gait problems, and falls. Activities of daily living such as walking and climbing stairs are physically difficult or impossible for the individual with severe obesity. These aspects also limit participation in recreational activities or exercise programs. However, good muscle function is crucial to maintain functional independence. The objective of this study was to investigate the influence of resistance training on physical function in older, obese persons with sarcopenia. The study was conducted in a pre-test/post-test design with 2 intervention groups.

**METHODS:** The participants were physically inactive and obese older adults ( $\geq 65$  years, BMI  $\geq 30$  kg/m<sup>2</sup>), without severe diseases. They were divided into a group with sarcopenia (SAR, n = 28) and a group with no or presarcopenia (NSAR, n = 20). The intervention consisted of progressive resistance training, undertaken twice a week for 16 weeks, increasing to 80% to 85% of maximum strength with 3 sets of 8 to 12 repetitions. Sarcopenia was assessed using the Short Physical Performance Battery (SPPB), hand-grip strength, and skeletal muscle mass index (SMI). In addition, the modified Physical Performance Test (PPT) and the Functional Reach Test were used for determining physical function.

**RESULTS AND DISCUSSION:** After training, participants in the SAR group were able to significantly increase their performance in hand-grip strength (by 9%), gait speed (by 5%), SPPB score (by 13%), and modified PPT score (by 11%). In SPPB and modified PPT, they could reach the values of the NSAR group's baseline performance. The NSAR group participants were also able to improve their already good performance at baseline in the 2 tests of physical function after training (SPPB score by 10%, modified PPT score by 7%). However, the participants of both groups could not increase the results of the SMI and the Functional Reach Test.

**CONCLUSIONS:** The participants of both groups improved their physical performance in several parameters after training. The results also showed that older, obese adults with sarcopenia benefitted from resistance training. The increase in muscle function can support them having a life with functional independence, and this can help reduce the risk of disability and falls.

#### **PDF N Endnote Y**

#### **Older adults' falls take high toll**

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**Abstract** News from CDC [Abstract unavailable]

#### **PDF Endnote**

#### **Performance on physical function tests and the risk of fractures and admissions: findings from a national health screening of 557,648 community-dwelling older adults**

Chun SH, Cho B, Yang HK, Ahn E, Han MK, Oh B, Shin DW, Son KY.

*Arch. Gerontol. Geriatr.* 2016; 68: 174-180.

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#### **Abstract**

**OBJECTIVE:** Falls and fractures in older adults are often preventable, yet remain major health concerns as comprehensive physical function assessment may not be readily available. This study investigated whether simple timed up and go test (TUG) and unipedal stance test (UST) are effective in identifying people with an increased risk of fractures, femoral fractures, or admissions due to femoral fractures.

**METHODS:** Community-dwelling Korean older adults aged 66 years participated in the Korean National Screening Program for the Transitional Ages (n=557,648) between 2007 and 2010. Overall fractures, femoral fractures, and admissions due to femoral fracture during this period were outcome measures. The outcome measures were overall fractures, femoral fractures, and admissions due to femoral fracture after the health screening. The associations between inferior physical function test results and outcome measures were evaluated.

**RESULTS:** A total of 523,502 subjects were followed-up for a mean period of 1.42 years, which resulted in 12,965 subjects with any fractures. Fracture data were retrieved from medical claims record. Subjects who performed poorly on one or both of the two physical function tests experienced higher number of overall fractures (aHR 1.21, 95% CI: 1.16-1.26), femoral fractures (aHR 1.80, 95% CI: 1.59-2.17), and admissions due to femoral fractures (aHR 1.85, 95% CI: 1.55-2.22) as compared to subjects with normal results on both tests. Combining TUG and UST was not superior to performing UST alone in predicting the increased risk of overall fractures (p=0.347), femoral fractures (p=0.402) or admissions due to femoral fractures (p=0.774).

**CONCLUSIONS:** Poor performance on physical performance tests is associated with a higher risk of overall fractures, femoral fractures and admissions due to femoral fractures. The TUG and UST can be used to identify community-dwelling older individuals who are more vulnerable to fractures.

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**PDF Y Endnote Y**

**Psychotropic drug prescription and the risk of falls in nursing home residents**

Cox CA, van Jaarsveld HJ, Houterman S, van der Stegen JC, Wasylewicz AT, Grouls RJ, van der Linden CM.

*J. Am. Med. Dir. Assoc.* 2016; ePub(ePub): ePub.

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**DOI** 10.1016/j.jamda.2016.07.004 **PMID** 27650670

**Abstract**

**BACKGROUND:** Falling is a common and serious problem in the elderly. Previous studies suggest that the use of psychotropic drugs increases the risk of falling. However, the contribution of these drugs on fall risk has not been quantified on a daily basis among the general population of nursing homes until now.

**OBJECTIVE:** To assess the association between fall incidence and the prescription of psychotropic drugs and different categories of psychotropic drugs (antipsychotics, antidepressants, and benzodiazepines) among a general nursing home population.

**DESIGN:** Retrospective observational study, data collection per person-day. **SETTING:** 9 nursing homes in Eindhoven, the Netherlands. **PARTICIPANTS:** 2368 nursing home residents, resulting in 538,575 person-days. **MAIN OUTCOME MEASURE:** Association between the prescription of psychotropic drugs and falls.

**RESULTS:** A total of 2368 nursing home residents were included, which resulted in a data set of 538,575 person-days. Prescription of at least 1 psychotropic drug per day occurred during a total of 318,128 person-days (59.1%). Scheduled prescriptions with or without an as-needed prescription were involved in a total of 270,781 person-days (50.3%). The prescription of psychotropic drugs on a scheduled basis was found to be associated with almost a 3-fold increase in fall incidence (OR 2.88; 95% CI 1.52-5.44). An increase in fall incidence was found following the prescription of antipsychotics (OR 1.97; 95% CI 1.51-2.59) and antidepressants (OR 2.26; 95% CI 1.73-2.95). This increased fall risk was found for prescriptions on a scheduled basis as well as for prescriptions on an as-needed basis.

**CONCLUSION:** The prescription of psychotropic drugs is associated with a strongly increased risk of falling among nursing home residents. To our knowledge, this is the first study among the general nursing home population in which the association between daily falls and daily prescriptions of psychotropic drugs and groups of psychotropic drugs was specified.

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**PDF Y Endnote Y**

**Reduced sensitivity for visual textures affects judgments of shape-from-shading and step-climbing behaviour in older adults**

Schofield AJ, Curzon-Jones B, Hollands MA.

*Exp. Brain Res.* 2016; ePub(ePub): ePub.

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**DOI** 10.1007/s00221-016-4816-0 **PMID** 27817106

#### **Abstract**

Falls on stairs are a major hazard for older adults. Visual decline in normal ageing can affect step-climbing ability, altering gait and reducing toe clearance. Here we show that a loss of fine-grained visual information associated with age can affect the perception of surface undulations in patterned surfaces. We go on to show that such cues affect the limb trajectories of young adults, but due to their lack of sensitivity, not that of older adults. Interestingly neither the perceived height of a step nor conscious awareness is altered by our visual manipulation, but stepping behaviour is, suggesting that the influence of shape perception on stepping behaviour is via the unconscious, action-centred, dorsal visual pathway.

**PDF Y Endnote Y**

#### **The effectiveness of Pilates on balance and falls in community dwelling older adults**

Josephs S, Pratt ML, Calk Meadows E, Thurmond S, Wagner A.

*J. Bodyw. Mov. Ther.* 2016; 20(4): 815-823.

**Affiliation:** School of Physical Therapy, University of the Incarnate Word, USA.

(Copyright © 2016, Elsevier Publishing)

**DOI** 10.1016/j.jbmt.2016.02.003 **PMID** 27814862

#### **Abstract**

**PURPOSE:** The purpose of this study was to determine whether Pilates is more effective than traditional strength and balance exercises for improving balance measures, balance confidence and reducing falls in community dwelling older adults with fall risk.

**METHOD:** Thirty-one participants with fall risk were randomly assigned to the Pilates group (PG) or the traditional exercise group (TG). Both groups participated in 12 weeks of exercise, 2 times/week for 1 h.

**RESULTS:** There was significant improvement in the Fullerton Advanced Balance Scale for both the PG (mean difference = 6.31,  $p < .05$ ) and the TG (mean difference = 7.45,  $p = .01$ ). The PG also showed significant improvement in the Activities-Specific Balance Confidence Scale (mean difference = 10.57,  $p = .008$ ).

**CONCLUSION:** Both Pilates and traditional balance programs are effective at improving balance measures in community dwelling older adults with fall risk, with the Pilates group showing improved balance confidence.

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**PDF Y Endnote Y**

#### **The FARSEEING real-world fall repository: a large-scale collaborative database to collect and share sensor signals from real-world falls**

Klenk J, Schwickert L, Palmerini L, Mellone S, Bourke A, Ihlen EA, Kerse N, Hauer K, Pijnappels M, Synofzik M, Srujijes K, Maetzler W, Helbostad JL, Zijlstra W, Aminian K, Todd C, Chiari L, Becker C. *Eur. Rev. Aging Phys. Activ.* 2016; 13: e8.

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DOI 10.1186/s11556-016-0168-9 PMID 27807468 PMCID PMC5086409

### Abstract

**BACKGROUND:** Real-world fall events objectively measured by body-worn sensors can improve the understanding of fall events in older people. However, these events are rare and hence challenging to capture. Therefore, the FARSEEING (FALL Repository for the design of Smart and self-adaptive Environments prolonging Independent livinG) consortium and associated partners started to build up a meta-database of real-world falls.

**RESULTS:** Between January 2012 and December 2015 more than 300 real-world fall events have been recorded. This is currently the largest collection of real-world fall data recorded with inertial sensors. A signal processing and fall verification procedure has been developed and applied to the data. Since the end of 2015, 208 verified real-world fall events are available for analyses. The fall events have been recorded within several studies, with different methods, and in different populations. All sensor signals include at least accelerometer measurements and 58 % additionally include gyroscope and magnetometer measurements. The collection of data is ongoing and open to further partners contributing with fall signals. The FARSEEING consortium also aims to share the collected real-world falls data with other researchers on request.

**CONCLUSIONS:** The FARSEEING meta-database will help to improve the understanding of falls and enable new approaches in fall risk assessment, fall prevention, and fall detection in both aging and disease.

### PDF Y Endnote Y

#### **The relative temporal sequence of decline in mobility and cognition among initially unimpaired older adults: results from the Baltimore Longitudinal Study of Aging**

Tian Q, An Y, Resnick SM, Studenski S.

*Age Ageing* 2016; ePub(ePub): ePub.

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(Copyright © 2016, Oxford University Press)

DOI 10.1093/ageing/afw185 PMID 27744302

### Abstract

**BACKGROUND:** most older individuals who experience mobility decline, also show cognitive decline, but whether cognitive decline precedes or follows mobility limitation is not well understood.

**OBJECTIVE:** examine the temporal sequence of mobility and cognition among initially unimpaired older adults.

**METHODS:** mobility and cognition were assessed every 2 years for 6 years in 412 participants aged  $\geq 60$  with initially unimpaired cognition and gait speed. Using autoregressive models, accounting for the dependent variable from the prior assessment, baseline age, sex, body mass index and education, we examine the temporal sequence of change in mobility (6 m usual gait speed, 400 m fast walk time) and executive function (visuoperceptual speed: Digit Symbol Substitution Test (DSST); cognitive flexibility: Trail Making Test part B (TMT-B)) or memory (California Verbal Learning Test (CVLT) immediate, short-delay, long-delay).

**RESULTS:** there was a bidirectional relationship over time between slower usual gait speed and both poorer DSST and TMT-B scores (Bonferroni-corrected  $P < 0.005$ ). In contrast, slower 400 m fast walk time predicted subsequent poorer DSST, TMT-B, CVLT immediate recall and CVLT short-delay scores

( $P < 0.005$ ), while these measures did not predict subsequent 400 m fast walk time ( $P > 0.005$ ).

**CONCLUSIONS:** among initially unimpaired older adults, the temporal relationship between usual gait speed and executive function is bidirectional, with each predicting change in the other, while poor fast walking performance predicts future executive function and memory changes but not vice versa. Challenging tasks like the 400 m walk appear superior to usual gait speed for predicting executive function and memory change in unimpaired older adults.

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**PDF Y Endnote Y**

### **Type 2 diabetes and risk of hip fractures and non-skeletal fall injuries in the elderly - a study from the Fractures and Fall Injuries in the Elderly Cohort (FRAILCO)**

Wallander M, Axelsson K, Nilsson AG, Lundh D, Lorentzon M.

*J. Bone Miner. Res.* 2016; ePub(ePub): ePub.

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(Copyright © 2016, American Society for Bone and Mineral Research)

**DOI** 10.1002/jbmr.3002 **PMID** 27664946

#### **Abstract**

Questions remain about whether the increased risk of fractures in patients with type 2 diabetes (T2DM) is related mainly to increased risk of falling or to bone-specific properties. The primary aim of this study was to investigate the risk of hip fractures and non-skeletal fall injuries in older men and women with and without T2DM. We included 429,313 individuals ( $80.8 \pm 8.2$  years (mean  $\pm$  SD), 58% women) from the Swedish registry "Senior Alert" and linked the data to several nation-wide registers. We identified 79,159 individuals with T2DM (45% with insulin (T2DM-I), 41% with oral antidiabetics (T2DM-O), and 14% with no antidiabetic treatment (T2DM-none)), and 343,603 individuals without diabetes. During a follow-up of approximately 670,000 person-years we identified in total 36,132 fractures (15,572 hip fractures) and 20,019 non-skeletal fall injuries. In multivariable Cox-regression models where the reference group was patients without diabetes and the outcome was hip fracture, T2DM-I was associated with increased risk (adjusted Hazard Ratio (HR) [95% CI] 1.24 [1.16-1.32]), T2DM-O with unaffected risk (1.03 [0.97-1.11]) and T2DM-none with reduced risk (0.88 [0.79-0.98]). Both the diagnosis of T2DM-I (HR 1.22 [1.16-1.29]) and T2DM-O (HR 1.12 [1.06-1.18]) but not T2DM-none (1.07 [0.98-1.16]) predicted non-skeletal fall injury. The same pattern was seen regarding other fractures (any, upper arm, ankle and major osteoporotic fracture) but not for wrist fracture. Subset-analyses revealed that in men, the risk of hip fracture was only increased in those with T2DM-I but in women, both the diagnosis of T2DM-O and T2DM-I were related to increased hip fracture risk. In conclusion, the risk of fractures differs substantially among patients with T2DM and an increased risk of hip fracture was primarily seen in insulin-treated patients, while the risk of non-skeletal fall injury was consistently increased in T2DM with any diabetes medication. This article is protected by copyright. All rights reserved.

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**PDF Y Endnote Y**

## Validity and relative ability of 4 balance tests to identify fall status of older adults with type 2 diabetes

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*J. Geriatr. Phys. Ther.* 2016; ePub(ePub): ePub.

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**DOI** 10.1519/JPT.000000000000109 **PMID** 27824659

### Abstract

**BACKGROUND AND PURPOSE:** The Berg Balance Scale (BBS), the Balance Evaluation Systems Test (BESTest), the Mini-BESTest, and the Brief-BESTest are useful tests to assess balance; however, their psychometric properties have not been studied well in older adults with type 2 diabetes (T2D). This study compared the validity and relative ability of the BBS, BESTest, Mini-BESTest, and Brief-BESTest to identify fall status in older adults with T2D.

**METHODS:** This study was a cross-sectional design. Sixty-six older adults with T2D ( $75 \pm 7.6$  years) were included and asked to report the number of falls during the previous 12 months and to complete the Activities-specific Balance Confidence scale. The BBS and the BESTest were administered, and the Mini-BESTest and Brief-BESTest scores were computed based on the BESTest performance. Receiver operating characteristics were used to assess the ability of each balance test to differentiate between participants with and without a history of falls.

**RESULTS:** The 4 balance tests were able to identify fall status (areas under the curve = 0.74-0.76), with similar sensitivity (60%-67%) and specificity (71%-76%).

**CONCLUSIONS:** The 4 balance tests were able to differentiate between older adults with T2D with and without a history of falls. As the BBS and the BESTest require longer application time, the Brief-BESTest may be an appropriate choice to use in clinical practice to detect fall risk.

**PDF Will get ILL Endnote Y**

## While we waited: incidence and predictors of falls in older adults with cataract

Palagyi A, McCluskey P, White A, Rogers K, Meuleners L, Ng JQ, Morlet N, Keay L.

*Invest. Ophthalmol. Vis. Sci.* 2016; 57(14): 6003-6010.

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(Copyright © 2016, Association for Research in Vision and Ophthalmology)

**DOI** 10.1167/iovs.16-20582 **PMID** 27820872

### Abstract

**PURPOSE:** Strong evidence indicates an increased fall risk associated with cataract. Although cataract surgery can restore sight, lengthy wait times are common for public patients in many high-income countries. This study reports incidence and predictors of falls in older people with cataract during their surgical wait.

**METHODS:** Data from a prospective study of falls in adults aged  $\geq 65$  years who were awaiting cataract surgery in public hospitals in Australia were analyzed. Participants underwent assessment of vision, health status, and physical function, and recalled falls in the previous 12 months. Falls were self-reported prospectively during the surgical wait.

**RESULTS:** Of 329 participants, mean age was 75.7 years; 55.2% were female. A total of 267 falls were

reported by 101 (30.7%) participants during the surgical wait (median observation time, 176 days): an incidence of 1.2 falls per person-year (95% confidence interval [CI] 1.0-1.3). Greater walking activity (incidence rate ratio [IRR] 1.06, 95% CI 1.01-1.10;  $P = 0.02$ , per additional hour/week), poorer health-related quality of life (IRR 1.12, 95% CI 1.05-1.20;  $P$  RESULTS:  $< 0.001$ , per 5-unit decrease), and a fall in the prior 12 months (IRR 2.48, 95% CI 1.57-3.93;  $P$  RESULTS:  $< 0.001$ ) were associated with incident falls. No visual measure independently predicted fall risk. More than one-half (51.7%) of falls were injurious.

**CONCLUSIONS:** We found a substantial rate of falls and fall injury in older adults with cataract who were awaiting surgery. Within this relatively homogenous cohort, measures of visual function alone inadequately predicted fall risk. Assessment of exposure to falls through physical activity frequency may prove valuable in identifying those more likely to fall during the surgical wait.

**PDF Y Endnote Y**

### **Alternative measures of toe trajectory more accurately predict the probability of tripping than minimum toe clearance**

Byju AG, Nussbaum MA, Madigan ML.

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

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#### **Abstract**

Tripping is responsible for a large percentage of falls. Minimum toe clearance (MTC) during the swing phase of gait is commonly used to infer the probability of tripping (POT). However, there is limited empirical evidence to support the relationship between these two variables, and other measures of toe trajectory may better predict POT than MTC. The goals of this study were to: 1) quantify the relationship between MTC and POT; and 2) explore alternative measures of toe trajectory that may predict POT more accurately than MTC. POT was estimated by comparing the distribution of tripping obstacles measured along heavily-used, paved sidewalks on a university campus, to the toe trajectory of 40 young adults obtained while walking over an obstacle-free walkway in a research laboratory. POT exhibited a curvilinear relationship with MTC, and regression equations were established to predict POT from MTC. POT was more accurately predicted when using virtual points on the bottom of the anterior edge of the shoe to determine MTC, compared to using a physical marker located on top of the toes to determine MTC. POT was also more accurately predicted when using a new measure of toe trajectory (the area below 40mm and above the toe trajectory, normalized by the swing length), compared to just MTC. These are the first empirical results supporting a direct, quantitative relationship between MTC and POT. These results may improve the ability to identify risk factors that influence POT, and aid in developing interventions to reduce POT.

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**PDF Y Endnote Y**



## **Are falls prevention programs effective at reducing the risk factors for falls in people with type-2 diabetes mellitus and peripheral neuropathy: a systematic review with narrative synthesis**

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*J. Diabetes Complications* 2016; ePub(ePub): ePub.

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**DOI** 10.1016/j.jdiacomp.2016.10.004 **PMID** 27825536

### **Abstract**

**BACKGROUND:** Diabetic peripheral neuropathy (DPN) is a common complication of type-2 diabetes mellitus (T2DM) that predisposes the elderly to a higher falls risk. Falls prevention programs with a component of weight-bearing exercises are effective in decreasing future falls in the elderly. However, weight-bearing exercise was only recently recommended in guidelines for exercise for people with T2DM and DPN. Since then, there have been an increasing number of studies to evaluate the effectiveness of falls prevention programs on this targeted population.

**OBJECTIVES:** A systematic literature review was undertaken to determine the effectiveness of falls prevention programs for people with T2DM and DPN. **MAJOR FINDINGS:** Nine published studies that investigated the effect of exercise training on falls risk among people with T2DM and DPN were included in the review. Interventions included lower limb strengthening, balance practice, aerobic exercise, walking programs, and Tai Chi.

**CONCLUSIONS:** The preliminary evidence presented in this review suggests that people with T2DM and DPN can improve their balance and walking after a targeted multicomponent program without risk of serious adverse events. There is insufficient long-term follow-up data to determine whether the improvements in balance or strength resulted in a decrease falls risk in the community setting. Copyright © 2016 Elsevier Inc. All rights reserved.

### **PDF Endnote**

## **Are triage questions sufficient to assign fall risk precautions in the ED?**

Southerland LT, Slattery L, Rosenthal JA, Kegelmeyer D, Kloos A.

*Am. J. Emerg. Med.* 2016; ePub(ePub): ePub.

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**DOI** 10.1016/j.ajem.2016.10.035 **PMID** 27823938

### **Abstract**

**OBJECTIVES:** The American College of Emergency Physicians Geriatric Emergency Department (ED) Guidelines and the Center for Disease Control recommend that older adults be assessed for risk of falls. The standard ED assessment is a verbal query of fall risk factors, which may be inadequate. We hypothesized that the addition of a functional balance test endorsed by the Center for Disease Control Stop Elderly Accidents, Deaths, and Injuries Falls Prevention Guidelines, the 4-Stage Balance Test (4SBT), would improve the detection of patients at risk for falls.

**METHODS:** Prospective pilot study of a convenience sample of ambulatory adults 65 years and older in the ED. All participants received the standard nursing triage fall risk assessment. After patients were stabilized in their ED room, the 4SBT was administered.

**RESULTS:** The 58 participants had an average age of 74.1 years (range, 65-94), 40.0% were women,

and 98% were community dwelling. Five (8.6%) presented to the ED for a fall-related chief complaint. The nursing triage screen identified 39.7% (n=23) as at risk for falls, whereas the 4SBT identified 43% (n=25). Combining triage questions with the 4SBT identified 60.3% (n=35) as at high risk for falls, as compared with 39.7% (n=23) with triage questions alone ( $P<.01$ ). Ten (17%) of the patients at high risk by 4SBT and missed by triage questions were inpatients unaware that they were at risk for falls (new diagnoses).

**CONCLUSIONS:** Incorporating a quick functional test of balance into the ED assessment for fall risk is feasible and significantly increases the detection of older adults at risk for falls.

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#### **PDF Y Endnote Y**

#### **Effects of ankle exercises on balance ability when using shoe height insoles**

Lee D, Han S, Lee S.

*J. Phys. Ther. Sci.* 2016; 28(9): 2601-2603.

**Affiliation:** Department of Physical Therapy, U1 University, Republic of Korea.

(Copyright © 2016, Society of Physical Therapy Science)

**DOI** 10.1589/jpts.28.2601 **PMID** 27799702

#### **Abstract**

**PURPOSE:** The purpose of this study was to examine the effects of ankle exercises on balance ability when using shoe height insoles.

**SUBJECTS AND METHODS:** Thirty adults in their 20s, who were students, were randomly divided into an experimental group and a control group (n=15/group). Individuals in the experimental group wore height-adjustable silicon insoles measuring 3, 5, and 7 cm three times per week for four weeks. The ankle exercise program consisted of stretching exercises, resistance training, and a balance exercise.

**RESULTS:** There was a significant improvement in the balance ability of the experimental group for all height insoles (3, 5, and 7 cm) following the exercise program, as compared with before the exercise program. There was no significant improvement in the balance ability of the control group for all height insoles following the exercise program as compared with before the exercise program. The experimental group exhibited a significant improvement in balance ability following the exercise program for all the height insoles as compared with the control group.

**CONCLUSION:** According to the results of this study, active ankle exercises are helpful in preventing ankle joint damage, as they improve balance ability.

#### **PDF Y Endnote Y**

#### **Effects of functional electrical stimulation on reducing falls and improving gait parameters in multiple sclerosis and stroke**

Gervasoni E, Parelli R, Uszynski M, Crippa A, Marzegani A, Montesano A, Cattaneo D.

*PM R* 2016; ePub(ePub): ePub.

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**DOI** 10.1016/j.pmrj.2016.10.019 **PMID** 27825837

## Abstract

**BACKGROUND:** Loss of neuromuscular control of the ankle joint is a common impairment in neurological conditions, leading to abnormal gait and a higher risk of falling. However, limited information is available on the effectiveness of Functional Electrical Stimulation (FES) on reducing falls, and no studies have investigated its usefulness in improving lower limbs kinematics related to foot clearance and energy recovery.

**SETTING:** Clinical setting.

**STUDY DESIGN:** Longitudinal study.

**PARTICIPANTS:** Twenty-four subjects, 14 people with multiple sclerosis (mean age  $\pm$  standard deviation  $50.93 \pm 8.72$  years) and 10 people with stroke ( $55.38 \pm 14.55$  years).

**METHODS:** The number of falls was assessed at baseline and after 8 weeks, and a clinical assessment was assessed at the baseline, 4-week and 8-week time points. A subsample of the 24 subjects comprised of 5 people with multiple sclerosis, and five people with stroke performed a gait analysis assessment at baseline and after 4-weeks. After receiving the equipment and the training schedule, subjects performed daily home walking training using FES for 8 weeks.

**MAIN OUTCOME MEASUREMENTS:** The main outcomes were 1) the number of falls, 2) foot clearance, and 3) energy recovery.

**RESULTS:** A reduction in the number of falls was observed from baseline ( $n=10$ ) to the 8-week assessment ( $n=2$ ),  $p=.02$ . Foot clearance increased ( $+ 5.26$  mm,  $p=.04$ ) between the baseline without FES and at 4 weeks with FES (total effect). No statistically significant differences were found in energy recovery between baseline and 4 weeks.

**CONCLUSIONS:** The use of FES had an impact on gait, specifically reducing the number of falls and improving walking. A specific effect at the ankle joint was observed, increasing foot clearance during the swing phase of gait. This effect was not accompanied with a reduction in the energetic expenditure during walking in subjects with multiple sclerosis and stroke.

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## PDF Y Endnote Y

### Task oriented training improves the balance outcome and reducing fall risk in diabetic population

Ghazal J, Malik AN, Amjad I.

*Pak. J. Med. Sci. Q.* 2016; 32(4): 983-987.

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**DOI** 10.12669/pjms.324.10092 **PMID** 27648053

## Abstract

**OBJECTIVES:** The objective was to determine the balance impairments and to compare task oriented versus traditional balance training in fall reduction among diabetic patients.

**METHODS:** The randomized control trial with descriptive survey and 196 diabetic patients were recruited to assess balance impairments through purposive sampling technique. Eighteen patients were randomly allocated into two groups; task oriented balance training group TOB ( $n=8$ ) and traditional balance training group TBT ( $n=10$ ). The inclusion criteria were 30-50 years age bracket and diagnosed cases of Diabetes Mellitus with neuropathy. The demographics were taken through standardized & valid assessment tools include Berg Balance Scale and Functional Reach Test. The

measurements were obtained at baseline, after 04 and 08 weeks of training.

**RESULTS:** The mean age of the participants was  $49 \pm 6.79$ . The result shows that 165(84%) were at moderate risk of fall and 31(15%) were at mild risk of fall among total 196 diabetic patients. There was significant improvement ( $p < 0.05$ ) in task oriented balance training group for dynamic balance, anticipatory balance and reactive balance after 8 weeks of training as compare to traditional balance training.

**CONCLUSION:** Task oriented balance training is effective in improving the dynamic, anticipator and reactive balance. The task oriented training reduces the risk of falling through enhancing balance outcome.

**PDF Y Endnote Y**