

**SafetyLit December 9, 2018**

**Bathing adaptations in the homes of older adults (BATH-OUT): results of a feasibility randomised controlled trial (RCT)**

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*BMC Public Health* 2018; 18(1): e1293.

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**DOI** 10.1186/s12889-018-6200-4 **PMID** 30477474

**Abstract**

**BACKGROUND:** Housing adaptations have been identified as an important environmental and prevention intervention for older adults, which may improve health and quality of life. The onset of disability in bathing can act as a warning for further disability in other activities and may therefore be a judicious time-point for intervention. The aim of this study was to determine the feasibility of conducting a Randomised Controlled Trial (RCT) of bathing adaptations, to evaluate whether they improve older adults' perceived health status and quality of life, prevent further functional deterioration, and reduce the use of other health and social care resources. This study was conducted in preparation for a powered RCT.

**METHOD:** Eligibility criteria were aged > 65 and referred to local authority housing adaptations service for an accessible flush-floor shower. Participants were randomised to either usual adaptations (3-4 month wait) or immediate adaptations (no wait). Outcomes were assessed at 3, 6 and 9 months and included perceived physical and mental health status, health and social care related quality of life, independence in activities of daily living (ADL) and bathing, and falls. Data on costs and the use of health and social care resources were collected during follow-up in order to inform a definitive health economic evaluation.

**RESULTS:** Sixty participants were recruited and randomised, 31 to immediate adaptations and 29 to waiting list control. Mean age was 77(SD8), 58% women and 58% living alone. Follow-ups were completed with 90, 85 and 72% at 3, 6 and 9 months respectively. Adaptations were delivered to 65% of participants within the requisite timescales as there were delays with some privately owned properties. There were improvements from baseline in both groups on all outcome measures following the completion of the adaptations.

**CONCLUSIONS:** This is the first RCT of housing adaptations in the UK. We demonstrated the feasibility of using a waiting list control, subject to minor alterations to the timescales for privately owned properties. A powered trial would evaluate the impact on older adults' quality of life and investigate the impact of waiting times on functional outcomes and health and care resource use.

**TRIAL REGISTRATION:** ISRCTN14876332 Registered 12 July 2016.

**PDF Y Endnote Y**

**Caring for the older person with cognitive impairment in hospital: qualitative analysis of nursing personnel reflections on fall events**

Grealish L, Chaboyer W, Darch J, Real B, Phelan M, Soltau D, Lunn M, Brandis S, Todd JA, Cooke M. *J. Clin. Nurs.* 2018; ePub(ePub): ePub.

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### Abstract

**AIMS AND OBJECTIVES:** To explore nurse and nursing assistant reflections on the care of older patients with cognitive impairment who have experienced a fall.

**BACKGROUND:** While there are evidence-based clinical guidelines for the prevention and management of falls and for the care of older people with cognitive impairment, the falls rates for older people with cognitive impairment is three times as high as those without.

**DESIGN:** Critical incident technique.

**METHODS:** Eleven registered and two enrolled nurses and four assistants in nursing working in one subacute and two acute wards within two hospitals of a tertiary level health service in south-east Queensland. Individual semi-structured interviews focused on two past events when a patient with cognitive impairment had fallen in hospital: one when there was minimal harm and the second when there was significant harm. Thematic analysis was undertaken. The COREQ checklist was followed.

**RESULTS:** Three themes emerged from 23 reflective accounts of fall events: 'direct observation is confounded by multiple observers' and 'knowing the person has cognitive impairment is not enough', and 'want to rely on the guideline but unsure how to enact it'. While participants were aware of the falls prevention policy and techniques available to prevent falls, the implementation of these was challenging due to the complexity of care required by the older person with cognitive impairment.

**CONCLUSIONS:** Falls prevention for older people with cognitive impairment is complex and belies the simple application of policy.

**RELEVANCE TO CLINICAL PRACTICE:** To reduce falls, nurses can involve the family to support 'knowing the patient' to enable prediction of impulsive actions; shift the focus of in-service from lectures to specific case presentations, with collaborative analysis on person-focused strategies to prevent falls in older people with cognitive impairment; and reconsider the sitter role from simple observer to assistant, focused on ambulation and supporting independence in activities of daily living. This article is protected by copyright. All rights reserved.

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### PDF Y Endnote Y

#### **Cognitive frailty is associated with fall-related fracture among older people**

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*J. Nutr. Health Aging* 2018; 22(10): 1216-1220.

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### Abstract



**OBJECTIVE:** Cognitive frailty refers to cognitive impairment and physical frailty. Both cognitive impairment and physical frailty include risks of falling. The purpose of the study is to examine cognitive frailty and falling with/without a fracture.

**DESIGN:** Cross-sectional observation study. **SETTING:** General communities in Japan. **PARTICIPANTS:** Data of 10,202 older adults aged  $\geq 65$  years were collected. **MEASUREMENTS:** Physical frailty was characterized as slow walking speed and/or muscle weakness. Assessment of cognitive function included word lists memory, attention, executive function, and processing speed. Cognitive impairment refers to one or more cognitive decline indicated by at least 1.5 standard deviations below the threshold after adjusting for age and education. We operationally defined cognitive frailty as having both cognitive impairment and physical frailty. Participants were interviewed about their falling, history of fall-related fractures, and several potentially confounding factors such as demographic characteristics.

**RESULTS:** Multinomial logistic regression analysis revealed that functional decline in all groups, as compared to the robust group, was significantly associated with falling without fractures, after adjusting for the covariates; cognitive impairment group ( $P = .017$ ), physical frailty group ( $P = .002$ ), and cognitive frailty group ( $P < .001$ ). Only the cognitive frailty group had a significant association with fall-related fracture after adjusting for the covariates (OR 1.92, 95% CI: 1.20-3.08,  $P = .007$ ).

**CONCLUSION:** Cognitive frailty is associated with not only falling but also fall-related fractures. Cognitive frailty may have a greater risk for fall-related fractures than cognitive impairment or physical frailty alone. Future research should examine causal the relationship between fall-related fractures and cognitive frailty.

**PDF Y Endnote Y**

### **Comparison of outcomes between hip fracture patients with concurrent upper limb injuries and patients with an isolated hip fracture**

Ng A, Mattin A, Seymour H, McKinnon E.

*ANZ J. Surg.* 2018; ePub(ePub): ePub.

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**DOI** 10.1111/ans.14942 **PMID** 30497096

#### **Abstract**

**BACKGROUND:** Concurrent upper limb injuries can occur with hip fractures, and its incidence and effect on outcomes are unclear. The objective of this study was to review the number and types of upper limb injuries sustained by patients with hip fractures, and investigate how acute hospital stay, rehabilitation and patient outcomes are affected.

**METHODS:** A retrospective study was performed on 820 patients with traumatic fracture of the hip over the age of 50. We reviewed the patients with concurrent upper limb injuries and compared patient outcomes - including mortality, acute length of stay in the orthopaedic ward, rehabilitation outcomes and rehabilitation length of stay.

**RESULTS:** Thirty-four patients (4.1%) with a hip fracture had a concurrent upper limb injury. Patients with and without concurrent upper limb injuries had similar acute length of stays on the orthopaedic ward (mean 5.2 versus 5.5 days,  $P = 0.4$ ), and no significant difference in mortality rates at time of discharge (0% versus 3.8%,  $P = 0.4$ ) and at 30 days (2.9% versus 9.1%,  $P = 0.2$ ). However, they also required significantly longer rehabilitation (mean 34.6 versus 19.9 days,  $P = 0.009$ ) even

after other demographic factors including upper limb injury, older age and dementia were taken into consideration (multivariate linear model: concurrent upper limb injury,  $P = 0.0003$ ; older age,  $P = 0.05$ ; dementia,  $P = 0.09$ ).

**CONCLUSION:** A concurrent upper limb injury is infrequent in the hip fracture population. Overall, these patients were previously higher functioning than the average hip fracture patient and required longer stays in inpatient rehabilitation than patients with isolated hip fractures.

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### **Dynamic walking stability of elderly people with various BMIs**

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*Gait Posture* 2018; 68: 168-173.

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**DOI** 10.1016/j.gaitpost.2018.11.027 **PMID** 30497036

#### **Abstract**

**BACKGROUND:** Falls are one of the major causes of injury in the elderly. Obesity may be related to the risk of falling. Understanding the dynamic stability mechanisms of obese elderly people during gait is important as it may be associated with fall protection.

**RESEARCH QUESTION:** Does obesity affect the dynamic walking stability of elderly people?

**METHODS:** This is a prospective study. Fifty-three elderly participants, aged 60-82 years, were categorized into body mass index (BMI) groups. In single-limb support experiments, the center of mass velocity (COMv), center of mass acceleration (COMa), region of velocity stability (ROsv) and region of acceleration stability (ROSa) were calculated using kinematic data sampled from a motion analysis system. In addition, all participants were assessed for the dynamic balance ability test scale (DBATS). Statistical analyses were performed by one-way ANOVA, Kruskal-Wallis/Wilcoxon nonparametric tests, or bivariate Pearson/Spearman correlation analysis.

**RESULTS:** During walking, peak COMv and COMa decreased with increasing BMI (Normal BMI:  $1.20 \pm 0.14$  m/s,  $1.66 \pm 0.36$  m/s<sup>2</sup>; High BMI:  $1.14 \pm 0.11$  m/s,  $1.56 \pm 0.30$  m/s<sup>2</sup>; Higher BMI:  $1.04 \pm 0.15$  m/s,  $1.47 \pm 0.25$  m/s<sup>2</sup>). At toe-off (TO), the normalized participants' center of mass (COM) is significantly more anterior in the Higher BMI group (Normal BMI:  $-0.30 \pm 0.09$ , High BMI:  $-0.23 \pm 0.07$ , Higher BMI:  $-0.16 \pm 0.10$ ), their normalized COMv and COMa (Normal BMI:  $1.40 \pm 0.16$ ,  $0.53 \pm 0.11$ ; High BMI:  $1.33 \pm 0.13$ ,  $0.49 \pm 0.11$ ; Higher BMI:  $1.21 \pm 0.16$ ,  $0.46 \pm 0.11$ ) are slower. The mean DBATS score of the Higher BMI group was the highest, indicating the weakest dynamic balance ability. **SIGNIFICANCE:** The COM dynamic stability parameters indicate that obesity may worsen balance, with the peak COMv and ROsv most affected. With increasing BMI, the dynamic stability and balance of elderly people both decreased.

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### **Effect of balance training after hip fracture surgery: a systematic review and meta-analysis of randomized controlled studies**

Lee SY, Jung SH, Lee SU, Ha YC, Lim JY.

*J. Gerontol. A Biol. Sci. Med. Sci.* 2018; ePub(ePub): ePub.

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#### **Abstract**

**BACKGROUND:** Although balance impairment after hip fracture surgery (HFS) can constitute a long-term problem of limiting mobility and increasing the risk of falls in older adults, little is known about the effect of balance training (BT) on physical functioning after HFS. Thus, we performed a meta-analysis to evaluate whether BT improved the overall physical functioning of patients after HFS.

**METHODS:** We searched the PubMed-Medline, Embase, and Cochrane Library databases in January 2018 and included all randomized controlled trials comparing BT with usual care after HFS. We performed a pairwise meta-analysis using fixed- and random-effects models.

**RESULTS:** Eight randomized controlled trials including a total of 752 participants were retrieved. The BT group showed significantly improved overall physical functioning after HFS compared with the usual care group (overall standardised mean difference [SMD]=0.390; 95% confidence interval [CI], 0.114-0.667;  $p=0.006$ ). Both balance and gait improved (SMD=0.570; 95% CI, 0.149-0.992;  $p=0.008$  and SMD=0.195; 95% CI, 0.043-0.347;  $p=0.012$ , respectively) in the BT group. Lower limb strength, performance task, activity of daily living, and health-related quality of life also improved significantly in the BT group.

**CONCLUSION:** Our meta-analysis revealed that BT after HFS improved overall physical functioning. Positive effects on balance, gait, lower limb strength, performance task, activity of daily living, and health-related quality of life were evident. Therefore, BT should be specifically included in postoperative rehabilitation programs and balance must be thoroughly checked in elderly patients with hip fractures.

**PDF Y Endnote Y**

### **Effect of flamingo exercises on balance in patients with balance impairment due to senile osteoarthritis**

Uzunkulaoglu A, Yildirim IB, Güneş Aytakin M, Ay S.

*Arch. Gerontol. Geriatr.* 2018; 81: 48-52.

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**DOI** 10.1016/j.archger.2018.10.012 **PMID** 30502569

#### **Abstract**

**OBJECTIVE:** To investigate the effect of flamingo exercise with or without KAT 2000 device on the balance problems due to senile OA.

**PARTICIPANTS:** Ninety elderly osteoarthritic patients with balance impairment.

**INTERVENTIONS:** Participants were randomly assigned into three groups; Kinesthetic ability trainer (KAT 2000) training group (Group 1) (n = 30), Flamingo training group (Group 2) (n = 30), Combined



training group (Group 3) (n = 30) group. 45 minutes individualized training sessions as three times a week for 4 weeks were given to all participants.

**MAIN OUTCOME MEASURES:** Patients were evaluated with Berg balance scale (BBS), kinesthetic ability trainer (KAT 2000) static and dynamic scores, timed up and go test (TUGT), walking speed (WS), Activities Specific Balance Confidence (ABC) Scale and Functional Reach Test (FRT) at the baseline and at the end of 4 weeks.

**RESULTS:** At the end of the therapy, there were statistically significant improvements in KAT 2000 static and dynamic scores, TUGT scores, WS and ABC Scale in all groups ( $p < 0.05$ ). At the end of the therapy there were statistically significant differences in Group 3 for KAT 2000 static and dynamic scores, TUGT scores, WS and ABC Scale than the other groups ( $p < 0.05$ ). But there were no statistical difference in BBS and FRT score between the groups ( $p > 0.05$ ).

**CONCLUSIONS:** Both flamingo and KAT2000 exercises device have positive effects on the balance problems due to senile OA. Combined with the KAT2000 device, the effects of flamingo exercises on balance disorder in senile osteoarthritis patients are more pronounced.

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### **Evaluation of frailty status among older people living in urban communities by Edmonton Frail Scale in Wuhu, China: a cross-sectional study**

Yang L, Jiang Y, Xu S, Bao L, Parker D, Xu X, Li

*J. Contemp. Nurse* 2018; ePub(ePub): 1-22.

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**DOI** 10.1080/10376178.2018.1552525 **PMID** 30479179

#### **Abstract**

**BACKGROUND:** There are few studies that have explored the factors that are associated with frailty among older people in China.

**OBJECTIVE:** To investigate the frailty status of older people living in urban communities and to examine the sociodemographic factors that are associated with their frailty status in China.

**DESIGN:** Cross-sectional study.

**METHODS:** We used convenience sampling to recruit the participants (aged 60 and above) from four communities in an urban area of Wuhu City, Anhui Province, China. Participants completed a questionnaire which included the Edmonton Frail Scale (EFS) and sociodemographic factors. Logistic regression models were used to examine the association between sociodemographic factors and frailty status among older Chinese people.

**RESULTS:** Of 306 participants, the percentage of participants with a robust score (0-4) on the EFS was 71.9%, 14.1% had an apparently vulnerable score (5-6), and 14.0% had a frail score (7-17). Among all participants, 64.4% had adequate social support and 54.9% self-reported having a good health status. Age, chronic disease status and marital status were significantly associated with frailty. However, no significant associations were observed according to gender, education level, smoking, alcohol drinking and medication use.

**CONCLUSIONS:** There are high percentage of frail older Chinese adults in urban area. The present study findings could provide better understanding of the factors associated with frailty status of this population. Early screening for frailty using a simple scale such as the Edmonton Frail Scale should

be undertaken in health settings in China. Impact statement: Nurses should be encouraged to undertake early screening for frailty using the EFS in clinical practice in China.

**PDF Y Endnote Y**

**Examining the complicated relationship between depressive symptoms and cognitive impairment in preclinical alzheimer disease**

Javaherian K, Newman BM, Weng H, Hassenstab J, Xiong C, Coble D, Fagan AM, Benzinger T, Morris JC.

*Alzheimer Dis. Assoc. Disord.* 2018; ePub(ePub): ePub.

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**DOI** 10.1097/WAD.0000000000000284 **PMID** 30489279

**Abstract**

**INTRODUCTION:** The relationships between Alzheimer disease (AD), cognitive performance, and depression are poorly understood. It is unclear whether depressive features are a prodrome of AD. In addition, some studies of aging exclude depressed individuals, which may inappropriately limit generalizability. The aim of the present study was to determine whether depressive symptoms affect cognitive function in the context of preclinical AD.

**METHODS:** Cross-sectional multivariate analysis of participants in a longitudinal study of aging (n=356) that evaluates the influence of depressive symptoms on cognitive function in cognitively normal adults.

**RESULTS:** There is no relationship between the presence of depressive symptoms and cognitive function in those with either no evidence of preclinical AD or biomarker evidence of early-stage preclinical AD. However, in later stages of preclinical AD, the presence of depressive symptoms demonstrated interactive effects, including in episodic memory (0.96; 95% confidence interval, 0.31-1.62) and global cognitive function (0.46; 95% confidence interval, 0.028-0.89).

**CONCLUSIONS:** The presence of depressive symptoms may be a late prodrome of AD. In addition, studies investigating cognitive function in older adults may not need to exclude participants with depressive symptomatology, but may still consider depressive symptoms as a potential confounder in the context of more extensive neuronal injury.

**PDF Y Endnote Y**

**Falls in frontotemporal dementia and related syndromes**

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*Handb. Clin. Neurol.* 2018; 159: 195-203.

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**DOI** 10.1016/B978-0-444-63916-5.00012-4 **PMID** 30482314

**Abstract**

Frontotemporal dementia (FTD) and related diseases are important causes of younger-onset dementia. Falls may be a source of morbidity and mortality in FTD, but remain underreported, and very few high-quality studies have been performed. In this chapter, we briefly review the clinical features of FTD and related syndromes such as motor neuron disease (MND) and atypical parkinsonian syndromes, such as progressive supranuclear palsy (PSP) and corticobasal syndrome

(CBS). Falls are frequently encountered in patients who present with FTD syndromes. Although cognitive impairment is associated with falls generally, motor symptoms and signs, as seen in FTD cases that overlap with atypical parkinsonian disorders such as PSP or CBS, or MND, appear to pose the greatest risk. At present, very few systematic studies have been performed to determine the precise frequency, timing, diagnostic implications, and complications of falls in FTD. Further studies are required to understand the scope of this problem, and to develop effective treatments and management strategies.

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### **Gait, balance, and falls in Huntington disease**

Vuong K, Canning CG, Menant JC, Loy CT.

*Handb. Clin. Neurol.* 2018; 159: 251-260.

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#### **Abstract**

Huntington disease (HD) is an autosomal-dominant, progressive, neurodegenerative disorder, characterized by involuntary movements and other motor impairments, cognitive/behavioral symptoms, and psychiatric disorders. Gait and balance impairments and falls greatly impact on the quality of life among people with HD, and being fall-prone is one of the strongest predictors of nursing-home placement. Gait impairment in HD is characterized by bradykinesia, reduced velocity, and increased variability in spatiotemporal features. Detrimental changes in symmetry, step length, stride time, balance measures, gait adaptability (external cues, dual tasking), and hypo/hyperkinesia have also been observed. Balance impairment is characterized by impairments of anticipatory balance without a change in base of support, anticipatory balance with a change in base of support, and reactive balance. In addition to gait and balance impairment, people with HD have a range of intrinsic and extrinsic factors that increase fall risk, including reduced cognitive reserve for dual tasking. Currently there is some evidence to suggest exercise interventions can address some HD-specific gait and balance deficits. However, no intervention studies to date have specifically targeted falls. Large, well-designed, randomized controlled trials are needed to guide future fall prevention interventions in people with HD.

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### **Interprofessional education model for geriatric falls risk assessment and prevention**

Brown DK, Fosnight S, Whitford M, Hazelett S, Mcquown C, Drost JC, Kropp DJ, Hovland CA,

Niederriter JE, Patton R, Morgan A, Fleming E, Steiner RP, Scott ED, Ortiz-Figueroa F.

*BMJ Open Qual.* 2018; 7(4): e000417.

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#### **Abstract**





**BACKGROUND:** One in three people over the age of 65 fall every year, with 1/3 sustaining at least moderate injury. Falls risk reduction requires an interprofessional health team approach. The literature is lacking in effective models to teach students how to work collaboratively in interprofessional teams for geriatric falls prevention. The purpose of this paper is to describe the development, administration and outcome measures of an education programme to teach principles of interprofessional care for older adults in the context of falls prevention.

**METHODS:** Students from three academic institutions representing 12 health disciplines took part in the education programme over 18 months (n=237). A mixed method one-group pretest and post-test experimental design was implemented to measure the impact of a multistep education model on progression in interprofessional collaboration competencies and satisfaction.

**RESULTS:** Paired *t*-tests of pre-education to posteducation measures of Interprofessional Socialization and Valuing Scale scores (n=136) demonstrated statistically significant increase in subscales and total scores ( $p < 0.001$ ). Qualitative satisfaction results were strongly positive.

**DISCUSSION:** Results of this study indicate that active interprofessional education can result in positive student attitude regarding interprofessional team-based care, and satisfaction with learning. Lessons learnt in a rapid cycle plan-do-study-act approach are shared to guide replication efforts for other educators.

**CONCLUSION:** Effective models to teach falls prevention interventions and interprofessional practice are not yet established. This education model is easily replicable and can be used to teach interprofessional teamwork competency skills in falls and other geriatric syndromes.

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### Perceptions of neighborhood environment, sense of community, and self-rated health: an age-friendly city project in Hong Kong

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*J. Urban Health* 2018; ePub(ePub): ePub.

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#### Abstract

To examine the relationships between perceptions of neighborhood environment, sense of community, and self-rated health, we recruited 1798 people aged 60 years and older living in Hong Kong. With reference to the checklist of the essential features of age-friendly cities developed by the World Health Organization, perceptions of neighborhood environment were assessed using a questionnaire covering physical and social environmental domains, which mapped onto "outdoor spaces and buildings," "transportation," "housing," "social participation," "respect and social inclusion," "civic participation and employment," "communication and information," and "community support and health services." Sense of community was measured by the Brief Sense of Community Scale. Self-rated health was assessed by a single question. The relationships between these measures were analyzed using partial correlations, multivariate regression models, and path analyses. The mean age of the participants was 71.7 years; of which 54.3% were women. In multivariate regression models, perceived neighborhood environments were positively associated with sense of community and self-rated health. Among the domains of perceived neighborhood

environment, "transportation" and "respect and social inclusion" were the physical and the social environmental domains most strongly associated with sense of community, respectively. In addition, sense of community accounted for part of the relationship between perceived neighborhood environments and self-rated health. The results of this study support the importance of perceived neighborhood environments for the sense that older person has of one's community, and self-rated health of older people which may be enhanced through the improvement of neighborhood environments.

**PDF Y Endnote Y**

**Proprioceptive deficits in inactive older adults are not reflected in fast targeted reaching movements**

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*Exp. Brain Res.* 2018; ePub(ePub): ePub.

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**Abstract**

During normal healthy ageing there is a decline in the ability to control simple movements, characterised by increased reaction times, movement durations and variability. There is also growing evidence of age-related proprioceptive loss which may contribute to these impairments. However, this relationship has not been studied in detail for the upper limb. We recruited 20 younger adults (YAs) and 31 older adults (OAs) who each performed 2 tasks on a 2D robotic manipulandum. The first assessed dynamic proprioceptive acuity using active, multi-joint movements constrained by the robot to a pre-defined path. Participants made perceptual judgements of the lateral position of the unseen arm. The second task required fast, accurate and discrete movements to the same targets in the absence of visual feedback of the hand, and without robotic intervention. We predicted that the variable proprioceptive error (uncertainty range) assessed in Task 1 would be increased in physically inactive OAs and would predict increased movement variability in Task 2. Instead we found that physically inactive OAs had larger systematic proprioceptive errors (bias) than YAs ( $t[33] = 2.8, p = 0.009$ ), and neither proprioceptive uncertainty nor bias was related to motor performance in either age group (all regression model  $R^2 \leq 0.06$ ). We suggest that previously reported estimates of proprioceptive decline with ageing may be exaggerated by task demands and that the extent of these deficits is unrelated to control of discrete, rapid movement. The relationship between dynamic proprioceptive acuity and movement control in other tasks with greater emphasis on online feedback is still unclear and warrants further investigation.

**PDF Y Endnote Y**

**Protein intake and risk of falls: a prospective analysis in older adults**

Sandoval-Insausti H, Pérez-Tasigchana RF, López-García E, Banegas JR, Rodríguez-Artalejo F, Guallar-Castillón P.

*J. Am. Geriatr. Soc.* 2018; ePub(ePub): ePub.

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### Abstract

**BACKGROUND:** The prospective association between protein intake and falls has been little studied. We assessed this association in a Spanish community-dwelling cohort.

**METHODS:** We performed a prospective cohort study of 2464 men and women 60 years or older who were recruited in 2008-2010 and followed up through 2012. At baseline, the habitual protein intake was determined with a validated dietary history. At the end of follow-up, participants reported the number of falls experienced in the preceding year. Participants were stratified by an unintentional weight loss of 4.5 kg or more. Logistic regression was used after adjustment for the main confounders.

**RESULTS:** A total of 522 participants (21.2%) experienced at least one fall. The odds ratios (ORs) and 95% confidence intervals (CIs) of falling for the three increasing tertiles of total protein intake were 1.00, 0.86 (0.66-1.11), and 0.93 (0.70-1.24) ( $p$  for trend = 0.14). However, a statistically significant interaction with unintentional weight loss was observed for the association between protein intake and fall risk ( $p$  for interaction = 0.004). Among 163 participants (6.6%) who experienced unintentional weight loss, the ORs (95% CI) of falling for the three increasing tertiles of total protein intake were 1.00, 0.68 (0.21-2.23), and 0.23 (0.05-1.08) ( $p$  for trend = 0.01).

**CONCLUSION:** No protective association between protein intake and fall risk in older adults was found. However, high total protein intake tended to confer substantial benefits to participants who experienced an unintentional weight loss of 4.5 kg or more in the preceding year.

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#### Risk factors for injurious falls in older adults: the role of sex and length of follow-up

Ek S, Rizzuto D, Fratiglioni L, Calderón-Larrañaga A, Johnell K, Sjöberg L, Xu W, Welmer AK.

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### Abstract

**OBJECTIVES:** To identify sex-specific associations between risk factors and injurious falls over the short (<4 years) and long (4-10 years) term.

**DESIGN:** Longitudinal cohort study between 2001 and 2011. **SETTING:** Swedish National Study on Aging and Care, Kungsholmen, Sweden. **PARTICIPANTS:** Community-dwelling adults aged 60 and older (N = 3,112). **MEASUREMENTS:** An injurious fall was defined as a fall that required inpatient or outpatient care. Information was collected on participant and exposure characteristics using structured interviews, clinical examinations, and physical function tests at baseline.

**RESULTS:** The multivariate model showed that, in the short term, living alone (hazard ratio (HR)=1.83, 95% confidence interval (CI)=1.13-2.96), dependency in instrumental activities of daily living (IADLs) (HR=2.59, 95% CI=1.73-3.87), and previous falls (HR=1.71, 95% CI=1.08-2.72) were independently associated with injurious falls in women. Low systolic blood pressure (HR=1.96, 95% CI=1.04-3.71), impaired chair stands (HR=3.00, 95% CI=1.52-5.93), and previous falls (HR=2.81, 95%



CI=1.32-5.97) were associated with injurious falls in men. Long-term risk factors were underweight (HR=2.03, 95% CI=1.40-2.95), cognitive impairment (HR=1.49, 95% CI=1.08-2.06), fall-risk increasing drugs (HR=1.67, 95% CI=1.27-2.20 for  $\geq 2$  drugs), and IADL dependency (HR=1.58, 95% CI=1.32-5.97) for women and smoking (HR=1.71, 95% CI=1.03-2.84), heart disease (HR=2.20, 95% CI=1.5-3.24), impaired balance (HR=1.68, 95% CI=1.08-2.62), and a previous fall (HR=3.61, 95% CI=1.98-6.61) for men.

**CONCLUSION:** Men and women have different fall risk profiles, and these differences should be considered when developing preventive strategies. Some risk factors were more strongly predictive of injurious falls over shorter than longer periods and vice versa, suggesting that it may be possible to identify older men and women at short- and long-term risk of injurious falls.

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**PDF Y Endnote Y**

### **Short-Physical Performance Battery (SPPB) score is associated with falls in older outpatients**

Lauretani F, Ticinesi A, Gionti L, Prati B, Nouvenne A, Tana C, Meschi T, Maggio M.

*Aging Clin. Exp. Res.* 2018; ePub(ePub): ePub.

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#### **Abstract**

**BACKGROUND:** The capacity of Short-Physical Performance Battery (SPPB) test to discriminate between fallers and non-fallers is controversial, and has never been compared with fall risk assessment-specific tools, such as Performance-Oriented Mobility Assessment (POMA).

**AIM:** To verify the association of SPPB and POMA scores with falls in older outpatients.

**METHODS:** 451 older subjects (150 males, mean age  $82.1 \pm 6.8$ ) evaluated in a geriatric outpatient clinic for suspected frailty were enrolled in this cross-sectional study. Self-reported history of falls and medication history were carefully assessed. Each participant underwent comprehensive geriatric assessment, including SPPB, POMA, Geriatric Depression Scale (GDS), mini-mental state examination (MMSE) and mini-nutritional assessment-short form (MNA-SF). Multivariate logistic regression and receiver-operating characteristic (ROC) analyses were performed to determine the factors associated with the status of faller.

**RESULTS:** 245 (54.3%) subjects were identified as fallers. They were older and had lower SPPB and POMA test scores than non-fallers. At ROC analysis, SPPB (AUC 0.676, 95% CI 0.627-0.728,  $p < 0.001$ ) and POMA (AUC 0.677, 95% CI 0.627-0.726,  $p < 0.001$ ) scores were both associated with falls. At multivariate logistic regression models, SPPB total score (OR 0.83, 95% CI 0.76-0.92,  $p < 0.001$ ), POMA total score (OR 0.94, 95% CI 0.91-0.98,  $p = 0.002$ ) and SPPB balance score alteration (OR 2.88, 95% CI 1.42-5.85,  $p = 0.004$ ), but not POMA balance subscale score alteration, were independently associated with recorded falls, as also GDS, MMSE and MNA-SF scores.

**CONCLUSIONS:** SPPB total score was independently associated with reported falls in older outpatients, resulting non-inferior to POMA scale. The use of SPPB for fall risk assessment should be implemented.

**PDF Y Endnote Y**

### **The effect of group exercises on balance, mobility, and depressive symptoms in older adults with mild cognitive impairment: a randomized controlled trial**

Langoni CDS, Resende TL, Barcellos AB, Cecchele B, da Rosa JN, Knob MS, Silva TDN, Diogo TS, da Silva IG, Schwanke CHA.

*Clin. Rehabil.* 2018; ePub(ePub): ePub.

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#### **Abstract**

**OBJECTIVE:** To determine the effects of group exercises on balance, mobility, and depressive symptoms in community-dwelling older adults with mild cognitive impairment.

**DESIGN:** Single blinded, randomized, matched pairs clinical trial. **SETTING::** Four primary healthcare units. **SUBJECTS::** Fifty-two sedentary subjects with mild cognitive impairment were paired (age, sex, body mass index, and Addenbrooke's Cognitive Examination Revised score), tested, and then randomized into an intervention group ( n = 26) and a control group ( n = 26). **INTERVENTION::** The intervention group performed strength (ankle weights, elastic bands, and dumbbells) and aerobic exercises (walking) in their communities' public spaces, twice a week (60 minutes each), during 24 weeks. The control group maintained its usual routine. **MAIN MEASURES::** Balance (Berg Balance Scale (BBS)), mobility (Timed Up and Go Test (TUG)), and depressive symptoms (Geriatric Depression Scale-15) were assessed before and after the intervention.

**RESULTS:** Before the intervention, the two groups did not differ statistically. After, the intervention group showed significant improvement ( P < 0.05) in balance (before: 53 ± 3; after: 55.1 ± 1.1 points), mobility (before: 10.7 ± 2.9 seconds; after: 8.3 ± 2 seconds), and depressive symptoms (median punctuation (interquartile range) before: 4 (1.8-6); after: 2.5 (1-4)). The control group presented a significant increase in their depressive symptoms (median before: 3.5 (2-7.3); after: 4 (2-5.3)), while their balance and mobility showed no significant modification. Small effect sizes were observed in the intervention group and control group depressive symptoms, as well as in the control group's mobility and balance. Large effect sizes were observed the intervention group's mobility and balance.

**CONCLUSION:** Group exercises improved balance, mobility, and depressive symptoms in community-dwelling older adults with mild cognitive impairment.

**PDF Y Endnote Y**

### **What are the perceptions and experiences of falls amongst people with stroke who live in the community?**

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*Disabil. Rehabil.* 2018; ePub(ePub): ePub.

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#### **Abstract**

**PURPOSE:** To explore the perceptions and experiences of people with stroke living in the community with regard to the perceived causes, impact and solutions to minimise falls.





**METHODS:** A qualitative research approach underpinned by a constructivist paradigm utilising a phenomenological methodology. Twelve people with stroke participated in focus groups; the data were analysed using thematic analysis.

**RESULTS:** Three themes and one foundation theme were identified. (1) Trips and triggers: falls were perceived to be linked to external triggers, one of which was walking aids. (2) Blame and burden: self-blame and worry about being a burden may be associated with underreporting of falls. (3) Restrict and reduce: people with stroke restrict activity and reduce participation to manage falls. The underpinning theme of self-efficacy highlights the apparent diminished falls self-efficacy, and the perception amongst the participants that falls are inevitable.

**CONCLUSIONS:** This study highlights the perceived negative consequences of falls amongst people with stroke, and the potential contribution of falls to the reduced levels of physical activity often seen following a stroke. Our findings emphasise the need to address falls and balance related self-efficacy alongside strategies to promote safe mobility. A paradigm shift may be needed to highlight potentially modifiable intrinsic risk factors and emphasise the relevance and value of proactive fall prevention to people with stroke. Implications for rehabilitation People with stroke may not report falls or may minimise their significance, using alternative terms such as trips and stumbles.

Rehabilitation staff need to approach falls in a way that emphasises the positive value of reporting and addressing falls management proactively. People with stroke may focus on extrinsic rather than intrinsic factors, so it is important to identify and highlight potentially modifiable intrinsic falls risks during assessment and treatment. Falls are associated with the use of mobility aids, and people frequently report using multiple aids obtained from a range of sources. Our study findings suggest that assessment and education about the appropriate use of mobility aids should be integral to stroke-specific falls interventions. Falls are often associated with activity reduction and avoidance, which could contribute to reduced participation and increased secondary issues. Approaches to encourage physical activity after stroke need to include recognition of falls risk and methods to optimise safe mobility. The relationship between self-efficacy and people's attitudes and responses to falling is an important consideration.

It is likely that that self-efficacy strategies could positively contribute to the effectiveness of stroke falls management interventions.

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

#### **Acute effects of core stability exercises on balance control**

Szafraniec R, Barańska J, Kuczyński M.

*Acta Bioeng. Biomech.* 2018; 20(4): 145-151.

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#### **Abstract**

**PURPOSE:** The aim of this study was to investigate whether a single bout of core stability exercises improves body balance immediately after the bout of exercise and during a retention test.

**METHODS:** The study involved 16 women (age 22-25 years, body weight  $60.5 \pm 5.2$  kg, height  $166 \pm 5.4$  cm). Postural stability was assessed in the mediolateral (ML) and anteroposterior (AP) planes separately on a force plate (Kistler 9286 AA) during quiet standing on a soft support surface with the eyes closed. Subjects were measured 4 times: just before (T0), 1 minutes after (T1 m), 30 minutes



after (T30 m), and 24 hours after the workout (T24 h). Postural balance was evaluated by five parameters based on the center of pressure (COP) signal: variability (VAR), mean velocity (VEL), sample entropy (ENT), frequency (FRE), and fractal dimension (FRA).

**RESULTS:** We observed a decrease in VAR and VEL in the ML plane at T30 m and T24 h, compared to T0. The COP entropy significantly increased in the ML plane at T24 h, compared to T0.

**CONCLUSIONS:** A single bout of core stability exercises improved the control of the mediolateral body balance. This effect was evident within 30 minutes after exercise, and remained for at least 24 hours. In addition, 24 hours after exercise we observed an increased automaticity in the strategy to maintain a stable upright stance.

**PDF Y Endnote Y**

**Balance, gait, and falls in multiple sclerosis**

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*Handb. Clin. Neurol.* 2018; 159: 237-250.

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**Abstract**

Multiple sclerosis (MS) is a chronic disease of the central nervous system (CNS) and the most widespread nontraumatic cause of disability in young adults around the world. MS occurs in people of all ages, races, and ethnicities. MS is characterized by clinical symptoms resulting from lesions in the brain, spinal cord, or optic nerves that can affect balance, gait, and fall risk. Lesions accumulate over time and occur in different areas of the CNS causing symptoms that include weakness, spasticity, and fatigue, as well as changes in sensation, coordination, vision, cognition, and bladder function. Thus, it is not surprising that imbalance, gait dysfunction, and falls are common in people with MS. The overwhelming majority have abnormalities of postural control and gait even early in the disease course. In all, 50-80% have balance and gait dysfunction and over 50% fall at least once each year. Balance dysfunction in MS is conceptualized as three interrelated problems: decreased ability to maintain position, limited and slowed movement towards limits of stability, and delayed responses to postural displacements and perturbations. In addition, functional balance performance may be affected by impaired dual-task integration. Walking changes in MS include reduced gait speed, impaired walking balance, and reduced walking-related physical activity. Falls in people with MS are associated with injuries, reduced participation, and increased fear of falling. A wide and growing range of rehabilitation and medical interventions are available to address the changes in balance, gait, and fall risk associated with MS.

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**PDF Y Endnote Y**

**Baroreflex function, haemodynamic responses to an orthostatic challenge, and falls in haemodialysis patients**

Zanotto T, Mercer TH, van der Linden ML, Traynor JP, Petrie CJ, Doyle A, Chalmers K, Allan N, Price J, Oun H, Shilliday I, Koufaki P.

*PLoS One* 2018; 13(12): e0208127.



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### Abstract

**BACKGROUND:** Stage 5 chronic kidney disease patients on haemodialysis (HD) often present with dizziness and pre-syncope events as a result of the combined effect of HD therapy and cardiovascular disease. The dysregulation of blood pressure (BP) during orthostasis may be implicated in the aetiology of falls in these patients. Therefore, we explored the relationship between baroreflex function, the haemodynamic responses to a passive orthostatic challenge, and falls in HD patients.

**METHODS:** Seventy-six HD patients were enrolled in this cross-sectional study. Participants were classified as "fallers" and "non-fallers" and completed a passive head up tilting to 60° (HUT-60°) test on an automated tilt table. ECG signals, continuous and oscillometric BP measurements and impedance cardiography were recorded. The following variables were derived from these measurements: heart rate (HR) stroke volume (SV), cardiac output (CO), total peripheral resistance (TPR), number of baroreceptor events, and baroreceptor effectiveness index (BEI).

**RESULTS:** The forty-four participants who were classified as fallers (57.9%) had a lower number of baroreceptor events ( $6.5 \pm 8.5$  vs  $14 \pm 16.7$ ,  $p = .027$ ) and BEI ( $20.8 \pm 24.2\%$  vs  $33.4 \pm 23.3\%$ ,  $p = .025$ ). In addition, fallers experienced a significantly larger drop in systolic ( $-6.4 \pm 10.9$  vs  $-0.4 \pm 7.7$  mmHg,  $p = .011$ ) and diastolic ( $-2.7 \pm 7.3$  vs  $1.8 \pm 6$  mmHg,  $p = .027$ ) oscillometric BP from supine to HUT-60° compared with non-fallers. None of the variables taken for the analysis were significantly associated with falls in multivariate logistic regression analysis.

**CONCLUSIONS:** This cross-sectional comparison indicates that, at rest, HD patients with a positive history of falls present with a lower count of baroreceptor sequences and BEI. Short-term BP regulation warrants further investigation as BP drops during a passive orthostatic challenge may be implicated in the aetiology of falls in HD.

**PDF Y Endnote Y**

### Ecology of falls

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*Handb. Clin. Neurol.* 2018; 159: 147-154.

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### Abstract

In this chapter, we consider how falls result from interactions between humans and their environment, and the implications of these interactions on the prevention of falls and fall-related injuries. We take a lifespan approach, and examine the human behaviors that create risk for falls and injuries in various environments, and the social and biologic factors that shape those behaviors. While not always stated explicitly, we draw on our experience in collecting and analyzing video footage of hundreds of falls. We consider that most falls do not result in significant injury, and issues of self-autonomy for pursuing a lifestyle that may create risk for falls. To help guide falls



management, we propose a mechanism for classifying falls as "acceptable" versus "unacceptable." We also provide an ecology of falls checklist to guide stakeholders in identifying ecologic aspects of falls that may be useful targets for intervention.

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**PDF Y Endnote Y**

**Medication status and dual-tasking on turning strategies in Parkinson disease**

Adamson MB, Gilmore G, Stratton TW, Baktash N, Jog MS.

*J. Neurol. Sci.* 2018; 396: 206-212.

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**Abstract**

**BACKGROUND:** Parkinson disease (PD) patients have turning impairments that may increase fall risk. Clinics lack specialized kinematic equipment used in gait and turn analysis and require a simple method to evaluate fall risk and advise patients in turning strategy selection.

**OBJECTIVES:** To enhance understanding of PD turning strategies and determine if turning can be assessed using a video-recording and categorization method, we compared 180-degree and 90-degree turns as a function of medication status and dual-tasking (DT).

**METHODS:** 21 PD participants (H&Y stage 1-3) in PD-ON and PD-OFF medication states and 16 controls completed 180-degree and 90-degree turn-tasks with and without DT. Video-recordings of tasks permitted classification of 180-degree turns into Few-Step turns (FST) vs. Multi-Step turns (MST) and 90-degree turns into Step vs. Spin-turns. FST were further sub-classified into Twisting vs. Sideways turns and MST into Backward, Festination, Forward or Wheeling turns. Percentages of subtypes were analyzed across groups by task.

**RESULTS:** IN 180-degree tasks, there was an effect of group: FST vs. MST  $F(2,55) = 9.578$ ,  $p < .001$ . PD participants in the off-medication state (PD-OFF) produced significantly more MST with a larger number of different turning subtypes vs. controls or PD on medication (PD-ON). In 90-degree tasks, controls significantly increased their proportion of Step-turns while DT ( $p < .001$ ), an adaptation not observed in PD-ON or PD-OFF.

**CONCLUSIONS:** PD turning impairments may stem from an inability to select a unified turning strategy and to adapt to the turning environment, which may be exacerbated in PD-OFF. Video-analysis may prove beneficial in predicting a clinical course for PD patients by revealing features of turning dysfunction.

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**PDF Y Endnote Y**

**Neighborhood risk factors for pediatric fall-related injuries: a retrospective analysis of a state-wide hospital network**

Veras Y, Rogers ML, Smego R, Zonfrillo MR, Mello MJ, Vivier PM.

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#### **Abstract**

**BACKGROUND:** Falls represent the leading cause of nonfatal unintentional injuries among children in the U.S. While unintentional injury risks have been studied, neighborhood impact on falls remains underexplored. This study examined the association of neighborhood attributes with rates of fall-related injuries.

**METHODS:** This is a retrospective study of children who presented to Emergency Departments (EDs) within a state-wide hospital network for fall-related injuries between 2005-2014. Patients' home addresses were geocoded to identify Census block groups (BG). Average annual fall rates were computed for each BG. A neighborhood risk index was constructed using eight socioeconomic BG measures (education, crowding, vacancy, renter-occupancy, poverty, family structure, race/ethnicity, and housing age). Public outdoor recreational facilities in each BG were enumerated. Linear regression analysis was used to assess the association of neighborhood risk and recreational facilities with fall rates.

**RESULTS:** From 2005-2014, there were 139,986 unintentional injury ED visits; 42,365 (30%) were for falls. The largest proportion of falls were among males (58%), children aged 1-4 years (39%), non-Hispanic whites (59%), and children with public health insurance (53%). Higher quintiles of neighborhood risk were associated with higher annual fall rates (compared to the lowest quintile of risk, Quintile 2  $\beta=0.44$ ; CI 0.20-0.68, Quintile 3  $\beta=0.85$ ; CI 0.61-1.10, Quintile 4  $\beta=1.11$ ; CI 0.85-1.37, Quintile 5  $\beta=1.57$ ; CI 1.29-1.85). The presence of public outdoor recreational facilities was not associated with fall rates ( $\beta=0.01$ ; CI -0.14-0.15).

**CONCLUSION:** Neighborhood-level socioeconomic characteristics are associated with higher fall-related injuries. Injury prevention programs could be tailored to address these neighborhood risks.

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#### **Risk of fall injury in patients taking proton pump inhibitors: a meta-analysis (Reply letter to editor)**

Lapumnuaypol K, Thongprayoon C, Wijarnpreecha K, Tiu A, Cheungpasitporn W.

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**Abstract** [Abstract unavailable]

**PDF Y Endnote Y**



**Sensorimotor anatomy of gait, balance, and falls**

MacKinnon CD. *Handb. Clin. Neurol.* 2018; 159: 3-26.

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**Abstract**

The review demonstrates that control of posture and locomotion is provided by systems across the caudal-to-rostral extent of the neuraxis. A common feature of the neuroanatomic organization of the postural and locomotor control systems is the presence of key nodes for convergent input of multisensory feedback in conjunction with efferent copies of the motor command. These nodes include the vestibular and reticular nuclei and interneurons in the intermediate zone of the spinal cord (Rexed's laminae VI-VIII). This organization provides both spatial and temporal coordination of the various goals of the system and ensures that the large repertoire of voluntary movements is appropriately coupled to either anticipatory or reactive postural adjustments that ensure stability and provide the framework to support the intended action. Redundancies in the system allow adaptation and compensation when sensory modalities are impaired. These alterations in behavior are learned through reward- and error-based learning processes implemented through basal ganglia and cerebellar pathways respectively. However, neurodegenerative processes or lesions of these systems can greatly compromise the capacity to sufficiently adapt and sometimes leads to maladaptive changes that impair movement control. When these impairments occur, the risk of falls can be significantly increased and interventions are required to reduce morbidity.

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