

**SafetyLit January 28, 2018****Daily bicycling in older adults may be effective to reduce fall risks - a case control study**

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*J. Aging Phys. Act.* 2018; ePub(ePub): ePub.

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**DOI** 10.1123/japa.2017-0263 **PMID** 29345533

**Abstract**

Older adults gain many health benefits from riding bicycles regularly. We aimed to explore whether older persons who ride bicycles regularly have better balance than controls. Balance control and voluntary stepping were assessed in 20 older adults aged 65 to 85 who live in an agricultural community village who regularly ride bicycles (BR), and 30 age- and gender-matched non-bicycle riders (NBR). Self-reported function and fear of fall were also assessed. Bicycle riders showed significantly better balance, faster voluntary stepping, and better self-reported advanced lower extremity function compared with NBR. The results might suggest that bicycling regularly preserves balance control and speed of voluntary stepping in older adults because bicycling might maintain specific balance coordination patterns. The results should be treated with caution since BR were older adults who selected an active life style (i.e., bicycling as well as living in an agricultural village) that may bias the results.

**PDF Y Endnote Y**

**Differential gait patterns by falls history and knee pain status in healthy older adults: results from the Baltimore Longitudinal Study of Aging**

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*J. Aging Phys. Act.* 2018; ePub(ePub): ePub.

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**Abstract**

Consideration of knee pain can be crucial for identifying fall-related gait patterns. Gait parameters while walking at usual speed were examined in persons with different falls and knee pain status. Study participants were 439 adults aged 60 to 92 years. Persons with a falls history had a wider stride width ( $p = 0.036$ ) and longer double support time ( $p = 0.034$ ) than non-fallers. In the absence of knee pain, fallers had longer double support time than non-fallers ( $p = 0.012$ ), but no differences in double support time by fall history was observed in participants with knee pain. With slower gait speed, fallers with knee pain have narrower stride width and larger hip range of motion ( $p = 0.027$ , and  $p = 0.001$ , respectively).

RESULTS suggest the importance of considering knee pain in fall studies for better understanding fall related differential gait mechanisms and for designing fall prevention intervention strategies.

**PDF Y Endnote Y**

**Exercise programmes to prevent falls among older adults: modelling health gain, cost-utility and equity impacts**

Deverall E, Kvizhinadze G, Pega F, Blakely T, Wilson N.

*Inj. Prev.* 2018; ePub(ePub): ePub.

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(Copyright © 2018, BMJ Publishing Group)

**DOI** 10.1136/injuryprev-2016-042309 **PMID** 29363590

## Abstract

**BACKGROUND:** Some falls prevention interventions for the older population appear cost-effective, but there is uncertainty about others. Therefore, we aimed to model three types of exercise programme each running for 25 years among 65+ year olds: (i) a peer-led group-based one; (ii) a home-based one and (iii) a commercial one.

**METHODS:** An established Markov model for studying falls prevention in New Zealand (NZ) was adapted to estimate incremental cost-effectiveness ratios (ICERs) in cost per quality-adjusted life-years (QALYs) gained. Detailed NZ experimental, epidemiological and cost data were used for the base year 2011. A health system perspective was taken and a discount rate of 3% applied.

Intervention effectiveness estimates came from a Cochrane Review.

**RESULTS:** The intervention generating the greatest health gain and costing the least was the home-based exercise programme intervention. Lifetime health gains were estimated at 47 100 QALYs (95% uncertainty interval (UI) 22 300 to 74 400). Cost-effectiveness was high (ICER: US\$4640 per QALY gained; (95% UI US\$996 to 10 500)), and probably more so than a home safety assessment and modification intervention using the same basic model (ICER: US\$6060). The peer-led group-based exercise programme was estimated to generate 42 000 QALYs with an ICER of US\$9490. The commercially provided group programme was more expensive and less cost-effective (ICER: US\$34 500). Further analyses by sex, age group and ethnicity (Indigenous Māori and non-Māori) for the peer-led group-intervention showed similar health gains and cost-effectiveness.

**CONCLUSIONS:** Implementing any of these three types of exercise programme for falls prevention in older people could produce considerable health gain, but with the home-based version being likely to be the most cost-effective.

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## PDF Y Endnote Y

### Incidence and risk factors for falls in women with end-stage hip osteoarthritis

Ikutomo H, Nagai K, Tagomori K, Miura N, Nakagawa N, Masuhara K.

*J. Geriatr. Phys. Ther.* 2018; ePub(ePub): ePub.

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## Abstract

**BACKGROUND AND PURPOSE:** Fall-induced injuries and resulting deaths are a serious health problem among older adults. The most common risk factors for falls in older adults are muscle weakness, gait deficiencies, and balance deficits. Patients with end-stage hip osteoarthritis (OA) also have many hip dysfunctions, and these all have the potential to increase the risk of falls. However, the incidence and risk factors for falls in patients with end-stage hip OA remain unclear. The aim of this study was to determine the incidence of falls in women with end-stage hip OA and to identify risk factors for falls in this patient population.

**METHODS:** This study was a cross-sectional analysis. One hundred fifty-three women with end-stage hip OA (mean age = 64.0 years) and 112 age-matched healthy women (mean age = 64.1 years) were analyzed using available data. All participants were examined for the number and circumstances of falls in the past year. The circumstances of falls included the location, time, direction, cause, and injury. We examined the outcome of hip function, ambulatory ability, physical activity, and limping severity in women with end-stage hip OA. Multivariate logistic regression analysis was used to identify factors influencing falls in women with hip OA.

**RESULTS:** The incidence of at least 1 fall in the past year was significantly higher in women with end-stage hip OA (30.1%) than in healthy women (12.5%) ( $P < .001$ ). Falls in women with end-stage hip OA were most often caused by tripping and falling forward during the daytime. The majority of falls (65.2%) resulted in injuries and 13.0% resulted in fractures. The occurrence of a fall significantly

correlated with limping (odds ratio = 3.26, 95% confidence interval = 1.49-7.14, P =.003) and knee extensor muscle strength (odds ratio = 0.22, 95% confidence interval = 0.05-0.85, P =.029).

**CONCLUSIONS:** Women with end-stage hip OA have an increased risk of falls and fall-induced injuries. The prevention of falls in this vulnerable population should be a priority among health care practitioners. In particular, women who are limping and have reduced lower knee extensor strength should take care to avoid falls.

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

#### **Interprofessional client-centered reasoning processes in home modification practice**

Burns SP, Pickens ND, Smith RO.

*J. Housing Elder.* 2017; 31(3): 213-228.

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

**DOI** 10.1080/02763893.2017.1280579 **PMID** unavailable

#### **Abstract**

We investigated the complex reasoning processes of professional home evaluators involved with home safety assessments. Twenty evaluators with varied professional training engaged in in-depth qualitative interviews. Two primary themes emerged: integrating expertise and tailoring interventions. Within these themes, evaluators expressed differences and similarities in how they obtained information, developed interventions, and addressed professional-client interactive reasoning as they identified needs. We propose an adapted ecological model to describe best practices for personalizing home modifications through an interprofessional lens. Differences among professional home evaluators reveal unique, yet overlapping reasoning processes. Interprofessional teams may better meet the holistic needs of home modification consumers.

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

#### **Life satisfaction among home-dwelling older people who have experienced falls and have declined subjective health**

Fonad E, Ebbeskog B.

*J. Housing Elder.* 2017; 31(1): 57-73.

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

**DOI** 10.1080/02763893.2016.1268559 **PMID** unavailable

#### **Abstract**

This study investigated the reported life situations of home-dwelling older people who have experienced falls and have declined subjective health. Mixed method design was used and consisted of a quantitative study comprising questionnaires completed by 434 home-dwelling older people, and a qualitative study consisting of 30 interviews. The findings showed that declined physical function combined with limited health status was associated with falling. Despite limited physical condition, participants experienced well-being and life satisfaction in daily living. Insight obtained from these findings deepens our understanding of fallers and may provide a basis for future research leading to improvements within health care.

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

#### **Novel sensing technology in fall risk assessment in older adults: a systematic review**

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*BMC Geriatr.* 2018; 18(1): e14.

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#### **Abstract**

**BACKGROUND:** Falls are a major health problem for older adults with significant physical and psychological consequences. A first step of successful fall prevention is to identify those at risk of falling. Recent advancement in sensing technology offers the possibility of objective, low-cost and easy-to-implement fall risk assessment. The objective of this systematic review is to assess the current state of sensing technology on providing objective fall risk assessment in older adults.

**METHODS:** A systematic review was conducted in accordance to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis statement (PRISMA).

**RESULTS:** Twenty-two studies out of 855 articles were systematically identified and included in this review. Pertinent methodological features (sensing technique, assessment activities, outcome variables, and fall discrimination/prediction models) were extracted from each article. Four major sensing technologies (inertial sensors, video/depth camera, pressure sensing platform and laser sensing) were reported to provide accurate fall risk diagnostic in older adults. Steady state walking, static/dynamic balance, and functional mobility were used as the assessment activity. A diverse range of diagnostic accuracy across studies (47.9% - 100%) were reported, due to variation in measured kinematic/kinetic parameters and modelling techniques.

**CONCLUSIONS:** A wide range of sensor technologies have been utilized in fall risk assessment in older adults. Overall, these devices have the potential to provide an accurate, inexpensive, and easy-to-implement fall risk assessment. However, the variation in measured parameters, assessment tools, sensor sites, movement tasks, and modelling techniques, precludes a firm conclusion on their ability to predict future falls. Future work is needed to determine a clinical meaningful and easy to interpret fall risk diagnosis utilizing sensing technology. Additionally, the gap between functional evaluation and user experience to technology should be addressed.

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### **Predictors of gait speed and its change over three years in community-dwelling older people**

Pinter D, Ritchie SJ, Gattringer T, Bastin ME, Hernández MDCV, Corley J, Maniega SM, Pattie A, Dickie DA, Gow AJ, Starr JM, Deary IJ, Enzinger C, Fazekas F, Wardlaw

*J. Aging (Albany NY)* 2018; ePub(ePub): ePub.

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**DOI** 10.18632/aging.101365 **PMID** 29356686

#### **Abstract**

We aimed to assess whether and how changes in brain volume and increases in white matter hyperintensity (WMH) volume over three years predict gait speed and its change independently of demographics, vascular risk factors and physical status. We analyzed 443 individuals from the Lothian Birth Cohort 1936, at mean age 73 and 76 years. Gait speed at age 76 was predicted by age, grip strength and body mass index at mean age 73, three-year brain volume decrease and WMH volume increase, explaining 26.1% of variance. Decline in gait speed to age 76 was predicted by the same five variables explaining 40.9% of variance. In both analyses, grip strength and body mass index explained the most variance. A clinically significant decline in gait speed ( $\geq 0.1$  m/s per year) occurred in 24.4%. These individuals had more structural brain changes. Brain volume and WMH changes were independent predictors of gait dysfunction and its three-year change, but the impact of malleable physical factors such as grip strength or body mass index was greater.

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### **Preferences and predictors of aging in place: longitudinal evidence from Melbourne, Australia**

Kendig H, Gong CH, Cannon L, Browning C.

*J. Housing Elder.* 2017; 31(3): 259-271.

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#### **Abstract**

This article reports older Australians' preferences for aging in place and predictors of their subsequent experiences drawing on a longitudinal study in Melbourne over 16 years. At baseline, 40% had lived in their homes for 30 or more years and the majority had preference for aging in place. However, the proportion continuing to do so was lower, with reducing independence being a major barrier. Women, renters, those not living with a partner, or those with depressive symptoms were most vulnerable, while home ownership, socioeconomic resources, neighborhood satisfaction, and home modifications were positively associated with aging in place.

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### **Serious fall injury history and adverse health outcomes after initiating hemodialysis among older U.S. adults**

Bowling CB, Hall R, Khakharia A, Franch HA, Plantinga LC.

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

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**DOI** 10.1093/gerona/glx260 **PMID** 29346522

#### **Abstract**

**BACKGROUND:** Although older adults with pre-dialysis chronic kidney disease (CKD) are at higher risk for falls, the prognostic significance of a serious fall injury prior to dialysis initiation has not been well described in the end-stage renal disease population.

**METHODS:** We examined the association between a serious fall injury in the year prior to starting hemodialysis and adverse health outcomes in the year following dialysis initiation using a retrospective cohort study of U.S. Medicare beneficiaries  $\geq 67$  years old who initiated dialysis in 2010-2012. Serious fall injuries were defined using diagnostic codes for falls plus an injury (fracture, joint dislocation, or head injury). Health outcomes, defined as time-to-event variables within the first year of dialysis, included four outcomes: a subsequent serious fall injury, hospital admission, post-acute skilled nursing facility (SNF) utilization, and mortality.

**RESULTS:** Among this cohort of 81,653 initiating hemodialysis, 2,958 (3.6%) patients had a serious fall injury in the year prior to hemodialysis initiation. In the first year of dialysis, 7.6% had a subsequent serious fall injury, 67.6% a hospitalization, 30.7% a SNF claim and 26.1% died. Those with vs. without a serious fall injury in the year prior to hemodialysis initiation were at higher risk (hazard ratio, 95% confidence interval) for a subsequent serious fall injury (2.65, 2.41-2.91), hospitalization (1.11, 1.06-1.16), SNF claim (1.40, 1.30-1.50), and death (1.14, 1.06-1.22).

**CONCLUSIONS:** For older adults initiating dialysis, a history of a serious fall injury may provide prognostic information to support decision-making and establish expectations for life after dialysis initiation.

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### **The epidemiology of wrist fractures in older men: the Osteoporotic Fractures in Men (MrOS) study**

Wright NC, Hooker ER, Nielson CM, Ensrud KE, Harrison SL, Orwoll ES, Barrett-Connor E.

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

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#### **Abstract**

There is limited wrist fracture information on men. Our goal was to calculate frequency and identify risk factors for wrist fracture in the Osteoporotic Fractures in Men (MrOS) study. We confirmed that fracture history and certain medications are predictors, and identified novel predictors including markers of kidney function and physical performance.



**INTRODUCTION:** To calculate the incidence of wrist fractures and their risk factors in older community-dwelling men from the US Osteoporotic Fractures in Men (MrOS) study.

**METHODS:** Using triannual postcards, we identified incident wrist fractures (centrally confirmed by radiology) in men aged  $\geq 65$ . Potential risk factors included the following: demographics, lifestyle, bone mineral density (BMD), selected medications, biomarkers, and physical function and performance measures. Both baseline and time-varying models were adjusted for age, race/ethnicity, MrOS geographic location, and competing mortality risks.

**RESULTS:** We observed 97 incident wrist fractures among 5875 men followed for an average of 10.8 years. The incidence of wrist fracture was 1.6 per 1000 person-years overall and ranged from 1.0 among men aged 65-69 to 2.4 among men age  $\geq 80$ . Significant predictors included the following: fracture history after age 50 [hazard ratio (95% CI): 2.48 (1.65, 3.73)], high serum phosphate [1.25 (1.02, 1.53)], use of selective serotonin receptor inhibitor (SSRI) [3.60 (1.96, 6.63)], decreased right arm BMD [0.49 (0.37, 0.65) per SD increase], and inability to perform the grip strength test [3.38 (1.24, 9.25)]. We did not find associations with factors commonly associated with wrist and other osteoporosis fractures like falls, diabetes, calcium and vitamin D intake, and alcohol intake.

**CONCLUSIONS:** Among these older, community-dwelling men, we confirmed that fracture history is a strong predictor of wrist fractures in men. Medications such as SSRIs and corticosteroids also play a role in wrist fracture risk. We identified novel risk factors including kidney function and the inability to perform the grip strength test.

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### **The unmet travel needs of the older population: a review of the literature**

Liu C, Tight M, Burrow M.

*Transp. Rev.* 2017; 37(4): 488-506.

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

**DOI** 10.1080/01441647.2016.1252447 **PMID** unavailable

#### **Abstract**

Unmet travel needs can be defined as trips and activities that people need or would like to do more, but for a variety of reasons they are prevented from doing so. This paper provides a critical evaluation of the literature focused on unmet travel needs, with the aim of assessing the scope of existing studies on this topic and better understanding the full context of older people's mobility. This narrative review identifies how travel needs in later life have been assessed, and the barriers that affect the ability of older people to fulfil these needs. Due to the heterogeneity of older people and differences in research approaches, the analysis of the literature is not conclusive in terms of identifying the real impact of the analysed variables and measures on unrealised mobility. Nevertheless, of the studies analysed, on average at least one-third of older people report unmet travel needs. This situation was found to worsen with age, and women were reported to be more affected than men. The pursuit of leisure, and in particular visiting friends and family, was found to be the activity most associated with unmet travel needs.

**PDF Y Endnote Y**

### **Validation of a falls risk screening tool derived from InterRAI Acute Care Assessment**

Peel NM, Jones LV, Berg K, Gray LC.

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**DOI** 10.1097/PTS.0000000000000462 **PMID** 29360675

#### **Abstract**

**OBJECTIVES:** This study aimed to develop and validate a falls risk screening tool derived from interRAI Acute Care (AC) Assessment.

**METHODS:** For derivation and validation, two prospective cohorts were recruited from AC hospitals

in Australia. The derivation cohort comprised 1418 patients from 11 hospitals. In the validation cohort, 393 patients were recruited from four hospitals. The interRAI AC tool was used to collect comprehensive geriatric assessment data at admission. In-hospital falls were documented from medical records. A falls risk score was calculated using logistic regression. Predictive ability was compared with St. Thomas Risk Assessment Tool In Falling elderly (STRATIFY), using area under curve (AUC). The validation cohort provided external validity.

**RESULTS:** Complete data in the derivation cohort were available for 1288 patients (91%), with 75 (5.8%) having an in-hospital fall. The derived interRAI AC falls risk score (range = 0-6) had significantly better predictive ability (AUC = 0.70, 95% confidence interval [CI] = 0.63-0.76) compared with St. Thomas Risk Assessment Tool In Falling elderly (AUC = 0.64, 95% CI = 0.58-0.70) (P = 0.033). At a cut point of three, 54 of 75 falls were correctly predicted by the falls risk score derived from interRAI AC (sensitivity = 0.72 [95% CI = 0.60-0.82] and specificity = 0.60 [95% CI = 0.57-0.62]). The falls risk score performed similarly in the validation cohort.

**CONCLUSIONS:** The falls risk tool developed from interRAI AC is a valid measure to screen for in-hospital falls. Reduction in assessment burden without loss of fidelity can be achieved through integrating the risk screener within the interRAI hospital system, which automatically triggers protocols for falls prevention based on identified risk.

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### **Discussion about visual dependence in balance control: European Society for Clinical Evaluation of Balance Disorders**

Maire R, Mallinson A, Ceyte H, Caudron S, Van Nechel C, Bisdorff A, Magnusson M, Petersen H, Kingma H, Perrin P. J. Int. Adv. Otol. 2017; 13(3): 404-406.

**Affiliation:** Department of Pediatric Otolaryngology, University Hospital of Nancy, Vandoeuvre-lès-Nancy, France.

(Copyright © 2017, Mediterranean Society of Otolology and Audiology)

**DOI** 10.5152/iao.2017.4344 **PMID** 29360093

#### **Abstract**

The executive committee of the European Society for the clinical evaluation of balance disorders meets annually to address equilibrium problems that are not well understood. This is a review paper on discussions in the latest meeting we held.

**MATERIALS AND METHODS:** Seeing patients with vestibular disorders who end up depending on visual information as part of their compensation process is a common clinical occurrence. However, this "visual dependence" can generate symptoms, which include nausea, sensations of imbalance, and anxiety. It is unclear how this develops, as symptoms can be widely variable from patient to patient. There are several triggering factors to this symptom set, and quantifying it in a given patient is extremely difficult. **Results:** The committee agreed that the presence of this symptom set can be suggestive of vestibular pathology, but the pathology does not have to be present. As a result, there is no correlation between symptom severity and test results.

**CONCLUSION:** Visual dependence can often be present in a patient, although little, if any, measurable pathology is present. It is important to emphasize that although we cannot accurately measure this with either standardized testing or pertinent questionnaires, "hypersensitive" patients have a genuine disease and their symptoms are not of psychiatric origin.

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### **Fall rates in urban and rural nursing units: does location matter?**

Baernholdt M, Hinton ID, Yan G, Xin W, Cramer E, Dunton N.

*J. Nurs. Care Qual.* 2018; ePub(ePub): ePub.

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DOI 10.1097/NCQ.0000000000000319 PMID 29346186

#### Abstract

Patient falls remain a leading adverse event in hospitals. In a study of 65 rural hospitals with 222 nursing units and 560 urban hospitals with 4274 nursing units, we found that geographic region, unit type, and nurse staffing, education, experience, and outcomes were associated with fall rates. Implications include specific attention to fall prevention in rehabilitation units, creating better work environments that promote nurse retention, and provide RN-BSN educational opportunities.

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#### Falls and resulting fractures in myotonic dystrophy: results from a multinational retrospective survey

Jiménez-Moreno AC, Raaphorst J, Babačić H, Wood L, van Engelen B, Lochmüller H, Schoser B, Wenninger S.

*Neuromuscul. Disord.* 2017; ePub(ePub): ePub.

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#### Abstract

Myotonic Dystrophy type 1 multisystem involvement leads to functional impairment with an increased risk of falling. This multinational study estimates the prevalence of falls and fall-associated fractures. A web-based survey among disease-specific registries (Germany, UK and The Netherlands) was carried out among DM1 ambulant adults with a total of 573 responses retrieved.

RESULTS provided a risk ratio estimation of 30%-72% for falls and of 11%-17% for associated fractures. There was no significant difference for falls between male and female, but there was for fall-related fractures with a higher prevalence in women. Balance and leg weakness were the most commonly reported causes for falling. This study is based on a voluntary retrospective survey with naturally inherent limitations; however, the sample size allows for robust comparisons. The estimated risk of falls in this cohort with a mean age of 46 years compares to a previous estimation for a healthy population of over 65 years of age. These results suggest a premature-ageing DM1 phenotype with an increased risk of falling depending on age and disease severity that, so far, might have been underestimated. This may have clinical implications for the development of care guidelines and when testing new interventions in this population.

PDF Y Endnote Y

#### The relationship between gait variability and cognitive functions differs between fallers and non-fallers in MS

Kalron A, Aloni R, Dolev M, Frid L, Givon U, Menascu S.

*J. Neural. Transm.* 2018; ePub(ePub): ePub.

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DOI 10.1007/s00702-018-1843-y PMID 29350300

#### Abstract

The objective of the study was to determine if cognitive function is associated with step time variability in people with multiple sclerosis (PwMS). The study included 355 PwMS (218 women), average age 41.1 (SD = 13.5), disease duration 5.9 (SD = 7.3) years, and a median expanded disability status scale score of 2.5. We separately analyzed the sample group of fallers and non-fallers based on their fall history. Gait variability was measured by an electronic walkway and all participants completed a computerized cognitive test battery designed to evaluate multiple cognitive domains. Fallers (43.7%) demonstrated elevated step time variability (%CV), 5.0 (SD = 3.4) vs. 3.5 (SD = 1.6),  $P < 0.001$  compared to the non-faller subjects. According to the regression analysis in the non-fallers'



group, step time variability was found significantly associated with the global cognitive score ( $P = 0.001$ ), executive function subcategory ( $P = 0.038$ ), and motor skills subcategory ( $P < 0.001$ ). No relationship between step time variability and any cognitive domain was demonstrated in the faller group. This study illustrated that the association between gait variability and cognition occurs only in PwMS without a fall history. From a clinical standpoint, these findings might help medical professionals to create improved assessment tests and rehabilitation strategies in the MS population.

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