

Neurological Conditions

This document contains all abstracts for publications relating to neurological conditions and falls from 2021 so far and will be updated quarterly. These abstracts have been sourced from [SafetyLit.org](https://www.safetylit.org) and include only those relevant to falls prevention.

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Parkinson's Disease

Extrinsic and behavioral fall risk factors in people with Parkinson's disease: an integrative review

Kuljeerung O, Lach HW. Rehabil. Nurs. 2021; 46(1): 3-10.

(Copyright © 2021, Association of Rehabilitation Nursing, Publisher John Wiley and Sons)

DOI 10.1097/rnj.0000000000000265 PMID unavailable

Abstract

AIM: The aim of the study was to explore extrinsic and behavioral risks for falls in older adults with Parkinson's disease (PD).

BACKGROUND: Falls that cause injury and disability in people with PD are common. Understanding the role of extrinsic and behavioral factors is important for fall prevention.

DESIGN: Integrative literature review with search of CINAHL, MEDLINE, and SCOPUS and ancestry searching was performed.

METHODS: The methodology of Whittemore and Knafl guided the review; ten studies were included.

FINDINGS: Falls occur indoors and outdoors, commonly during daily activities in familiar home environments, but also when out in the community. Common challenges include uneven and unfamiliar environments and risky behavior like hurrying.

CONCLUSION: Extrinsic risk factors combined with behavioral and intrinsic factors contribute to falls in people with PD both at home and in the community.

CLINICAL RELEVANCE: Rehabilitation of people with PD should include assessment of falls, function, extrinsic risk factors, and fit with their environment to develop fall prevention plans.

Language: en

Effectiveness of non-pharmacological falls prevention interventions for people with Multiple Sclerosis, Parkinson's Disease and stroke: protocol for an umbrella review

O'Malley N, Clifford AM, Comber L, Coote S. HRB Open Res 2020; 3: e17.

(Copyright © 2020, Health Research Board ; F1000 Research Limited)

DOI 10.12688/hrbopenres.13023.2 PMID unavailable

Abstract

BACKGROUND: Falls are common among people with neurological diseases and have many negative physical, psychosocial and economic consequences. Implementation of single-diagnosis falls prevention interventions is currently problematic due to lack of participants and resources. Given the similarities in falls risk factors across stroke, Parkinson's Disease (PD) and Multiple Sclerosis (MS), the development of an intervention designed for mixed neurological populations seems plausible and may provide a pragmatic solution to current implementation challenges. This umbrella review aims to summarise the totality of evidence regarding the effectiveness of non-pharmacological falls prevention interventions for people with MS, PD and stroke and identify the commonalities and differences between effective interventions for each disease to inform the development of an evidence-based intervention that can be tailored for people with mixed diagnoses.

METHODS: This umbrella review will be conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. 15 electronic databases and grey literature will be searched. Systematic reviews of randomised controlled trials and studies investigating the effects of non-pharmacological falls prevention interventions on falls outcomes among people with MS, PD and stroke will be included.

METHODological quality of included reviews will be assessed using the Assessment of Multiple Systematic Reviews 2 tool. The Grading of Recommendations Assessments, Development and Evaluation framework will be used to rate the quality of evidence. A summary of evidence table and narrative synthesis will be utilised to clearly indicate the findings

DISCUSSION: This umbrella review presents a novel and timely approach to synthesise existing falls literature to identify effective non-pharmacological interventions for people with MS, PD and stroke. Of importance, a robust methodology will be used to explore the differences and similarities in effective interventions for individuals with these neurological conditions to facilitate the development of an intervention for these mixed neurological groups.

Language: en

Keywords

Falls; Intervention; Multiple Sclerosis; Parkinson's Disease; Stroke; Umbrella Review

A scoping review of the nature of physiotherapists' role to avoid fall in people with Parkinsonism

Alatawi SF. *Neurol. Sci.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s10072-020-05015-y **PMID** unavailable

Abstract

BACKGROUND: Parkinson's disease (PD) is considered a neurological disease with a high prevalence rate among population. One of its main problems is recurrent fall which has numerous contributing factors such as history of fall, fear of falling, gait deficits, impaired balance, poor functional mobility, and muscle weakness.

OBJECTIVE: To review and explore the focus/nature of interventions which target the role of physiotherapy preventing fall in patients with PD.

METHOD: A scoping review was led dependent on Arksey and O'Malley as discussed by Wood et al. (2002). This paper based on this structure to perceive intervention studies have been embraced in physiotherapy to prevent fall after Parkinson's disease. The search included various databases. The referencing arrangements of every pertinent paper were additionally filtered for more studies.

FINDINGS: A total of 173 articles were included, 39 of which met the eligibility criteria. Fifteen studies reported on the direct impact of physiotherapy on fall, while the rest examined the impacts of physiotherapy on factors that are associated with fall. Different outcomes, interventions types, and duration were used in these studies.

FINDINGS showed a favorable result of physiotherapy on fall and near fall incidence, balance, gait, functional mobility, muscle strength, and fear of falling.

CONCLUSION: Physiotherapy has the possibility to decrease fall incidence and fall risk in people with PD. However, the heterogeneity in the patients' selection, intervention studies, outcome measures chosen, time since the onset of disease, variation in intensity, and duration of treatment between included studies make the comparisons difficult. Consequently, more studies are needed on best intervention.

Language: en

Keywords

Risk factors; Falls; Exercise; Rehabilitation; Parkinson's disease; Physiotherapy

Do kinematic gait parameters help to discriminate between fallers and non-fallers with Parkinson's disease?

Delval A, Betrouni N, Tard C, Devos D, Dujardin K, Defebvre L, Labidi J, Moreau C. Clin. Neurophysiol. 2020; 132(2): 536-541.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.clinph.2020.11.027 PMID unavailable

Abstract

OBJECTIVE: Although a number of clinical factors have been linked to falls in Parkinson's disease (PD), the diagnostic value of gait parameters remains subject to debate. The objective of this retrospective study was to determine to what extent the combination of gait parameters with clinical characteristics can distinguish between fallers and non-fallers.

METHODS: Using a video motion system, we recorded gait in 174 patients with PD. The patients' clinical characteristics (including motor status, cognitive status, disease duration, dopaminergic treatment and any history of falls or freezing of gait) were noted. The considered kinematic gait parameters included indices of gait bradykinesia and hypokinesia, asymmetry, variability, and foot clearance. After a parameters selection using an ANCOVA analysis, support vector machine algorithm was used to build classification models for distinguishing between fallers and non-fallers. Two models were built, the first included clinical data only while the second incorporated the selected gait parameters.

RESULTS: The "clinical-only" model had an accuracy of 94% for distinguishing between fallers and non-fallers. The model incorporating additional gait parameters including stride time and foot clearance performed even better, with an accuracy of up to 97%.

CONCLUSION: Although fallers differed significantly from non-fallers with regard to disease duration, motor impairment or dopaminergic treatment, the addition of gait parameters such as foot clearance or stride time to clinical variables increased the model's discriminant power. **SIGNIFICANCE:** This predictive model now needs to be validated in prospective cohorts.

Language: en

Keywords

Falls; Parkinson's disease; Gait; Freezing of gait

Increased risk of falls and fractures in patients with psychosis and Parkinson disease

Forns J, Layton JB, Bartsch J, Turner ME, Dempsey C, Anthony M, Ritchey ME, Demos G. PLoS One 2021; 16(1): e0246121.

(Copyright © 2021, Public Library of Science)

DOI 10.1371/journal.pone.0246121 PMID unavailable

Abstract

OBJECTIVE: Evaluate whether the risk of falls and fractures differs between patients with Parkinson disease with psychosis (PDP) and patients with Parkinson disease (PD) without psychosis at similar disease stages.

METHODS: Patients with PD without psychosis were identified in the Medicare claims databases (2008-2018) and followed from the first PD diagnosis date during the study period. Patients with a subsequent diagnosis of psychosis were included in the PDP group. Patients with PDP and PD without psychosis were propensity score-matched based on characteristics within blocks of time since cohort entry. The incidence rates (IRs), expressed per 100 person-years, and 95% confidence intervals (CIs) of falls and fractures were evaluated as composite and separate outcomes. Incidence rate ratios (IRRs) were used to compare patients with PDP and PD without psychosis in the matched cohort.

RESULTS: 154,306 patients had PD without psychosis and no falls or fractures before cohort entry; the IR for falls and fractures was 11.41 events (95% CI, 11.29-11.53). 12,127 patients (7.8%) had a subsequent PDP diagnosis. PDP patients had a higher prevalence of most comorbidities and risk factors for falls and fractures than those without psychosis. The crude IR for falls and fractures among PDP patients was 29.03 events (95% CI, 28.27-29.81). PD without psychosis and PDP groups had more falls than fractures. After matching, 24,144 PD patients without psychosis (15.6%) and 12,077 PDP patients (99.6%) were retained. Matched PDP patients had a higher incidence of falls and fractures than PD patients without psychosis (IRR = 1.44; 95% CI, 1.39-1.49). The higher increased rate was noted separately for falls (IRR = 1.48; 95% CI, 1.43-1.54) and any fractures (IRR = 1.17; 95% CI, 1.08-1.27) as well as within specific types of fracture, including pelvis and hip fractures.

CONCLUSIONS: Our findings suggest a modest but consistently higher increased risk of falls and fractures in PDP patients compared with PD patients without psychosis.

Language: en

A comparison of the prevalence of Fear of Falling between older patients with Lewy body dementia, Alzheimer's disease, and without dementia

Soysal P, Tan SG, Smith L. *Exp. Gerontol.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.exger.2021.111248 PMID unavailable

Abstract

BACKGROUND: The development of cognitive impairment and Fear of Falling (FoF) are strongly linked, but prevalence of FoF is not known in patients with different types of dementia. This study aims to evaluate and compare the prevalence and severity of FoF in patients' with dementia with Lewy bodies (DLB), Alzheimer disease (AD), and non-dementia.

METHODS: 46 participants with DLB, 86 participants with AD and participants without dementia (controls), underwent Comprehensive Geriatric Assessment (CGA). The Falls Efficacy Scale-International (FES-I) was used to determine and classify FoF. An overall score on the FES-I of 16-19, 20-27 and ≥ 28 , was accepted as low, moderate, and high concern about FoF, respectively.

RESULTS: Prevalence of high FoF was 86.9% in DLB, 36.0% in AD and 37.4% in controls. All CGA parameters were worse in the DLB and AD group than non-dementia group ($p < 0.001$). The prevalence of high FoF/FES-scores was significantly higher in the DLB group than in the AD and non-dementia group ($p < 0.001$), but was similar in AD and non-dementia groups ($p > 0.05$). The significant relationship between DLB and FoF was maintained when adjusted for age, CGA parameters, and orthostatic hypotension (OR: 2.55, CI: 1.03-6.25, $p = 0.041$ comparison to AD; OR: 4.79, CI: 2.10-10.92, $p < 0.001$ comparison to non-dementia).

CONCLUSION: Eight out of ten elderly patients with DLB have high FoF, which is much higher than those with AD and without dementia. Therefore, clinicians should be aware of FoF and its related consequences in the management of DLB in older adults.

Language: en

Keywords

Alzheimer's disease; Dementia with Lewy bodies; Fear of Falling

Association of fall risk factors and non-motor symptoms in patients with early Parkinson's disease

Kwon KY, Park S, Lee EJ, Lee M, Ju H. *Sci. Rep.* 2021; 11(1): e5171.

(Copyright © 2021, Nature Publishing Group)

DOI 10.1038/s41598-021-84720-w PMID 33664423

Abstract

The association of non-motor symptoms (NMSs) with fall-related factors in patients with Parkinson's disease (PD) remains to be further elucidated in the early stages of the disease. Eighty-six patients with less than 5 years of the onset of PD were retrospectively enrolled in the study. We assessed potential fall-related risk factors including (1) a history of falls during the past year (faller versus non-faller), (2) the fear of falling (FoF), and (3) the freezing of gait (FoG). Different types of NMSs were measured using the Montreal Cognitive Assessment (MoCA), the Beck Depression Inventory (BDI), the Beck Anxiety Inventory (BAI), the Parkinson's disease Fatigue Scale (PFS), and the Scales for Outcomes in Parkinson's disease-Autonomic dysfunction (SCOPA-AUT). The faller group (37.2%) showed higher scores for BDI, BAI, PFS, and SCOPA-AUT, compared to the non-faller group. From logistic regression analyses, the prior history of falls was related to the gastrointestinal domain of SCOPA-AUT, FoF was associated with BAI, and gastrointestinal and urinary domains of SCOPA-AUT, and FoG was linked to BAI and gastrointestinal domain of SCOPA-AUT. In conclusion, we found that fall-related risk factors in patients with early PD were highly connected with gastrointestinal dysautonomia.

Language: en

Postural sway correlates with cognition and quality of life in Parkinson's disease

Apthorp D, Smith A, Ilschner S, Vlieger R, Das C, Lueck CJ, Looi JCL. *BMJ Neurol. Open* 2020; 2(2): e000086.

(Copyright © 2020, Holtzbrinck Springer Nature Publishing Group - BMC)

DOI 10.1136/bmjno-2020-000086 PMID 33681803

Abstract

BACKGROUND: The severity of Parkinson's disease (PD) is difficult to assess objectively owing to the lack of a robust biological marker of underlying disease status, with consequent implications for diagnosis, treatment and prognosis. The current standard tool is the Unified Parkinson's Disease Rating Scale (MDS-UPDRS), but this is hampered by variability between observers and within subjects. Postural sway has been shown to correlate with complex brain functioning in other conditions. This study aimed to investigate the relationship between postural sway, MDS-UPDRS and other non-motor measures of disease severity in patients with PD.

METHOD: 25 patients with PD and 18 age-matched controls participated in the study. All participants underwent assessment of postural sway using a force plate, with eyes open and closed. In addition, participants underwent tests of cognition and quality of life: Montreal Cognitive Assessment (MoCA), Neuropsychiatry Unit Cognitive Assessment (NUCOG) and, for the patients, the Parkinson's Disease Questionnaire (PDQ-39-1), and assessment of clinical status using the motor component of the MDS-UPDRS.

RESULTS: Patients swayed significantly more than controls. This was most obvious in the eyes-closed condition. Sway path length showed strong correlations with PDQ-39-1, MoCA and the verbal fluency component of the NUCOG, and, to a lesser degree, with the UPDRS-III in patients with PD.

CONCLUSION: These results suggest that motor and non-motor symptoms of PD are associated in patients, and, in particular, that postural sway shows potential as a possible measure of underlying disease status in PD, either alone or in combination with other measures.

Language: en

Keywords

cognition; Parkinson's disease; cognitive neuropsychology; motor physiology

Understanding the influence of pain and fatigue on physical performance, fear of falling and falls in people with Parkinson's disease: a pilot study

Khalil H, Alissa N, Al-Sharman A, E'leimat I, Qawasmeh MA, El-Salem K. Neurodegener. Dis. Manag. 2021; ePub(ePub): ePub.

(Copyright © 2021, Future Medicine)

DOI 10.2217/nmt-2020-0053

PMID unavailable

Abstract

OBJECTIVE: Pain and fatigue are highly prevalent debilitating symptoms in Parkinson's disease (PD), however, their relationship with physical performance, fear of falling (FOF) and falls is not clear. We aim in this pilot study to investigate the relationship of pain and fatigue with physical performance, FOF and falls in people with Parkinson's disease (PwPD).

Materials & methods: 53 PD patients were assessed for fall history, physical performance, FOF, pain and fatigue.

RESULTS: Pain and fatigue are significantly associated with physical performance and FOF ($p \leq 0.002$). Pain and fatigue were different between fallers and non-fallers ($p < 0.5$), but only fatigue could distinguish fallers from non-fallers (area under the receiver operating characteristics curve = 0.81; $p < 0.0001$).

CONCLUSION: This pilot study indicated that FOF in PwPD is significantly associated with pain and fatigue. Furthermore, fatigue level is related to fall history. By addressing pain and fatigue, we may ameliorate the deterioration of FOF and falls in PwPD.

Language: en

Keywords

pain; falls; Parkinson disease; fear of falling; fatigue; FOF; physical performance

A self-reported clinical tool predicts falls in people with Parkinson's disease

Almeida LRS, Piemonte MEP, Cavalcanti HM, Canning CG, Paul SS. *Mov. Disord. Clin. Pract. (Hoboken)* 2021; 8(3): 427-434.

(Copyright © 2021, John Wiley and Sons)

DOI 10.1002/mdc3.13170 **PMID** 33816673

Abstract

BACKGROUND: A 3-step clinical prediction tool including falling in the previous year, freezing of gait in the past month and self-selected gait speed <1.1 m/s has shown high accuracy in predicting falls in people with Parkinson's disease (PD). The accuracy of this tool when including only self-report measures is yet to be determined.

OBJECTIVES: To validate the 3-step prediction tool using only self-report measures (3-step self-reported prediction tool), and to externally validate the 3-step clinical prediction tool.

METHODS: The clinical tool was used with 137 individuals with PD. Participants also answered a question about self-reported gait speed, enabling scoring of the self-reported tool, and were followed-up for 6 months. An intraclass correlation coefficient (ICC(2,1)) was calculated to evaluate test-retest reliability of the 3-step self-reported prediction tool. Multivariate logistic regression models were used to evaluate the performance of both tools and their discriminative ability was determined using the area under the curve (AUC).

RESULTS: Forty-two participants (31%) reported ≥ 1 fall during follow-up. The 3-step self-reported tool had an ICC(2,1) of 0.991 (95% CI 0.971-0.997; $P < 0.001$) and AUC = 0.68; 95% CI 0.59-0.77, while the 3-step clinical tool had an AUC = 0.69; 95% CI 0.60-0.78.

CONCLUSIONS: The 3-step self-reported prediction tool showed excellent test-retest reliability and was validated with acceptable accuracy in predicting falls in the next 6 months. The 3-step clinical prediction tool was externally validated with similar accuracy. The 3-step self-reported prediction tool may be useful to identify people with PD at risk of falls in e/tele-health settings.

Language: en

Keywords

falls; gait; Parkinson's disease; fall prediction; freezing

Rehabilitation of falls in Parkinson's disease: self-perception vs. objective measures of fall risk

Sangarapillai K, Norman BM, Almeida QJ. Brain Sci. 2021; 11(3).

(Copyright © 2021, Switzerland Molecular Diversity Preservation International (MDPI) AG)

DOI 10.3390/brainsci11030320 PMID unavailable

Abstract

Falls are an important cause of injury and increased hospital/long-term care facility stays and has been reported in 70% of people with Parkinson's disease (PD), yet there is limited effectiveness of medications for reducing falls. As an adjunct, many exercise therapies succeed in objectively reducing the number of falls, but this may not translate to improved quality of life (QOL). Importantly, self-perceived fall risk has a greater influence on activities of daily living and QOL, making it important to evaluate in the rehabilitation of PD. The purpose of this study was to examine the influence of a 10-week exercise intervention (PD SAFE × TM) on self-perceived (according to balance confidence measures) and objective measures of gait that are commonly linked to fall risk in PD. Participants (N = 44) with PD completed PD SAFE × TM. Pre-/post-assessment involved the Activities-specific Balance Confidence Scale (perception), objective falls characteristics (stride time, stride width, stride length, and stride variability), and symptom severity (Unified Parkinson's Disease Rating Scale motor subsection III (UPDRS-III)) after participants were stratified into a mild (no-balance impairment) vs. severe (balance impairment) groups. Overall disease severity ($F(1, 43) = 8.75, p < 0.003$) and all objective fall parameters improved ($p < 0.05$) in both groups, yet self-perceived fall risk improved in only the severe PD group $F(1, 43) = 9.86, p < 0.022$. Given that self-perceived fall risk and objective fall risk both play a role in the quality of life, identifying strategies to improve both aspects may be important in improving the overall quality of life.

Language: en

Functional limits of stability and standing balance in people with Parkinson's disease with and without freezing of gait using wearable sensors

Hasegawa N, Maas KC, Shah VV, Carlson-Kuhta P, Nutt JG, Horak FB, Asaka T, Mancini M. *Gait Posture* 2021; 87: 123-129.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.gaitpost.2021.04.023 PMID unavailable

Abstract

BACKGROUND: People with from Parkinson's disease (PD) and freezing of gait (FoG) have more frequent falls compared to those who do not freeze but there is no consensus on which, specific objective measures of postural instability are worse in freezers (PD + FoG) than non-freezers (PD-FoG). **RESEARCH QUESTION:** Are functional limits of stability (fLoS) or postural sway during stance measured with wearable inertial sensors different between PD + FoG versus PD-FoG, as well as between PD versus healthy control subjects (HC)? **METHODS:** Sixty-four PD subjects with FoG (MDS-UPDRS Part III: 45.9 ± 12.5) and 80 PD subjects without FoG (MDS-UPDRS Part III: 36.2 ± 10.9) were tested Off medication and compared with 79 HC. Balance was quantified with inertial sensors worn on the lumbar spine while performing the following balance tasks: 1) fLoS as defined by the maximum displacement in the forward and backward directions and 2) postural sway area while standing with eyes open on a firm and foam surface. An ANOVA, controlling for disease duration, compared postural control between groups.

RESULTS: PD + FoG had significantly smaller fLoS compared to PD-FoG ($p = 0.004$) and to healthy controls ($p < 0.001$). However, PD-FoG showed similar fLoS compared to healthy controls ($p = 0.48$). Both PD+FoG and PD-FoG showed larger postural sway on a foam surface compared to healthy controls ($p = 0.001$) but there was no significant difference in postural sway between PD+FoG and PD-FoG. **SIGNIFICANCE:** People with PD and FoG showed task-specific, postural impairments with smaller fLoS compared to non-freezers, even when controlling for disease duration. However, individuals with PD with or without FoG had similar difficulties standing quietly on an unreliable surface compared to healthy controls. Wearable inertial sensors can reveal worse fLoS in freezers than non-freezers that may contribute to FoG and help explain their more frequent falls.

Language: en

Keywords

Freezing of gait; Inertial measurement unit; Limits of stability; Parkinson's disease; Postural sway

Remote smartphone gait monitoring and fall prediction in Parkinson's disease during the COVID-19 lockdown

Marano M, Motolese F, Rossi M, Magliozzi A, Yekutieli Z, Di Lazzaro V. *Neurol. Sci.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s10072-021-05351-7 PMID unavailable

Abstract

BACKGROUND: Falls could be serious events in Parkinson's disease (PD). Patient remote monitoring strategies are on the rise and may be an additional aid in identifying patients who are at risk of falling. The aim of the study was to evaluate if balance and timed-up-and-go data obtained by a smartphone application during COVID-19 lockdown were able to predict falls in PD patients.

METHODS: A cohort of PD patients were monitored for 4 weeks during the COVID-19 lockdown with an application measuring static balance and timed-up-and-go test. The main outcome was the occurrence of falls (UPDRS-II item 13) during the observation period.

RESULTS: Thirty-three patients completed the study, and 4 (12%) reported falls in the observation period. The rate of falls was reduced with respect to patient previous falls history (24%). The stand-up time and the mediolateral sway, acquired through the application, differed between "fallers" and "non-fallers" and related to the occurrence of new falls (OR 1.7 and 1.6 respectively, $p < 0.05$), together with previous falling (OR 7.5, $p < 0.01$). In a multivariate model, the stand-up time and the history of falling independently related to the outcome ($p < 0.01$).

CONCLUSIONS: Our study provides new data on falls in Parkinson's disease during the lockdown. The reduction of falling events and the relationship with the stand-up time might suggest that a different quality of falls occurs when patient is forced to stay home - hence, clinicians should point their attention also on monitoring patients' sit-to-stand body transition other than more acknowledged features based on step quality.

Language: en

Keywords

Falls; Sensors; Gait; Parkinson's disease; Remote patient monitoring; Timed-up-and-go test

Falls prevention and quality of life improvement by square stepping exercise in people with Parkinson's disease: project report

Mayoral-Moreno A, Chimpén-López CA, Rodríguez-Santos L, Ramos-Fuentes MI, Vaz-Leal FJ, Moral MA, Pérez-Gómez J, Adsuar JC. *J. Pers. Med.* 2021; 11(5): e361.

(Copyright © 2021, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/jpm11050361 **PMID** unavailable

Abstract

Parkinson's disease (PD) is a chronic neurodegenerative disorder that affects physical, psychological, and social quality of life. Square Stepping Exercise (SSE) is an effective balance training program to prevent falls and to stimulate cognitive function in the elderly; however, no study has analyzed the effect of SSE in people with PD. The main objective is to investigate whether the application of SSE is safe, applicable, and can improve balance, and is effective in preventing falls, improving cognitive and psychological aspects and thus maximize quality of life in people with PD.

METHODS/Design: SSE will be performed three times per week for 8 weeks with an additional month follow-up after the intervention. Sixty people with PD will participate, randomly distributed into two groups: experimental group (SSE: n = 30) and control group (Usual care: n = 30). The primary measurements will be: (1) Applicability, (2) Safety, (3) Balance, and (4) Annual number of falls. Secondary measurements will be: (1) Sociodemographic information, (2) Physical condition, (3) Health-related quality of life, (4) Depressive symptoms, (5) Cognitive aspects, (6) Perceived functional social support, and (7) Anticipatory cognition.

Language: en

Keywords depression; anticipatory cognition; balance; cognitive aspects; perceived social support

Does the impaired postural control in Parkinson's disease affect the habituation to non-sequential external perturbation trials?

Beretta VS, Carpenter MG, Barbieri FA, Santos PCR, Orcioli-Silva D, Pereira MP, Gobbi LTB. Clin. Biomech. 2021; 85: e105363.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.clinbiomech.2021.105363 PMID unavailable

Abstract

BACKGROUND: How people with Parkinson's disease habituate their postural response to unpredictable translation perturbation is not totally understood. We compared the capacity to change the postural responses after unexpected external perturbation and investigated the habituation plateaus of postural responses to non-sequential perturbation trials in people with Parkinson's disease and healthy older adults.

METHODS: In people with Parkinson's disease (n = 37) and older adults (n = 20), sudden posterior support-surface translational were applied in 7 out of 17 randomized trials to ensure perturbation unpredictability. Electromyography and center of pressure parameters of postural response were analyzed by ANOVAs (Group vs. Trials). Two simple planned contrasts were performed to determine at which trial the responses first significantly habituate, and by which trials the habituation plateaus.

FINDINGS: Older adults demonstrated a first response change in trial 5 and habituation plateaus after trial 4, while for people with Parkinson's disease, the first change occurred in trial 2 and habituation plateau after trial 5 observed by center of pressure range. People with Parkinson's disease demonstrated a greater center of pressure range in trial 1 compared to older adults. Independent of trial, people with Parkinson's disease vs. older adults demonstrated a greater ankle muscle co-activation and recovery time.

INTERPRETATION: Despite the greater center of pressure range in the first trial, people with Parkinson's disease can habituate to unpredictable perturbations. This is reflected by little, to no difference in the time-course of adaptation for all but 2 parameters that showed only marginal differences between people with Parkinson's disease and older adults.

Language: en

Keywords Adaptation; Balance control; Center of pressure; Movement disorders; Support-base translation

The relation between falls risk and movement variability in Parkinson's disease

Morrison S, Moxey J, Reilly N, Russell DM, Thomas KM, Grunsfeld AA. *Exp. Brain Res.* 2021; ePub(ePub): ePub.

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DOI 10.1007/s00221-021-06113-9 PMID unavailable

Abstract

Falls are a major health concern for older adults with Parkinson's disease (PD). This study was designed to examine differences in falls risk and its relation to changes in the average and variability (i.e. intra-individual variability) of reaction time (RT), finger tapping, standing balance and walking between healthy older adults and persons with PD. Thirty-nine adults with PD (70.0 ± 8.1 years) and 29 healthy older adults (66.8 ± 10.4 years) participated in this study. Falls risk (using the physiological profile assessment), gait, RT, balance and tapping responses were assessed for all persons.

RESULTS demonstrated that individuals with PD exhibited a greater risk of falling coupled with a general slowing of motor function covering declines in walking, RT and finger tapping. In addition, the movement responses of the PD group were more variable than the healthy older adults. Correlation results revealed group differences with regards to the neuromotor measures which were significantly correlated with falls risk. For the PD group, gait measures were highly correlated with their falls risk while, for the healthy older adults, falls risk was linked to balance measures even though PD persons had increased sway. Overall, persons with PD were at greater falls risk, moved slower and with increased variability compared to the healthy older adults. Further, while there are some similarities between the two groups in terms of those measures related to falls risk, there were also several differences which highlight that persons with PD can have different risk factors for falling compared to healthy adults of similar age.

Language: en

Keywords

Falls; Gait; Reactions; Tapping; Variability

Recovery of dynamic stability during slips unaffected by arm swing in people with Parkinson's Disease

Siragy T, Hill A, Nantel J. PLoS One 2021; 16(4): e0249303.

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DOI 10.1371/journal.pone.0249303 PMID unavailable

Abstract

The arm elevation strategy assists in recovering stability during slips in healthy young and elderly individuals. However, in people with Parkinson's Disease, one of the main motor symptoms affecting the upper limbs is reduced arm swing which intensifies throughout the course of the disease before becoming absent. This holds direct implications for these individuals when encountering slips as the arm elevation strategy is an integral component in the interlimb slip response to restore stability. Arm swing's effect in recovering from slips in people with Parkinson's Disease though remains unexamined. Twenty people with Parkinson's Disease (63.78 ± 8.97 years) walked with restricted and unrestricted arm swing conditions on a dual-belt treadmill where slips were induced on the least and most affected sides. Data were collected on the CAREN Extended System (Motek Medical, Amsterdam, NL). The Margin of Stability, linear and angular trunk velocities, as well as step length, time, and width were calculated. Data were examined during the slipped step and recovery step. The restricted arm swing condition, compared to unrestricted, caused a faster step time during the slipped step. Compared to the most affected leg, the least affected had a wider step width during the slipped step. During the recovery step, the least affected leg had a larger anteroposterior Margin of Stability and longer step time than the most affected. No differences between our arm swing conditions suggests that the normal arm swing in our participants was not more effective at restoring stability after an induced slip compared to when their arm motion was restricted. This may be due to the arm elevation strategy being ineffective in counteracting the slip's backward destabilization in these individuals. Differences between the legs revealed that our participants were asymmetrically impaired in their slip recovery response.

Language: en

Impact of motor subtype on non-motor symptoms and fall-related features in patients with early Parkinson's disease

Kwon KY, Lee EJ, Lee M, Ju H, Im K. *Geriatr. Gerontol. Int.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Japan Geriatrics Society, Publisher John Wiley and Sons)

DOI 10.1111/ggi.14156 PMID unavailable

Abstract

AIM: Clinical implications for motor phenotypes of Parkinson's disease (PD) remain to be further elucidated, particularly at the early stages of the disease. We aimed to compare the non-motor and fall-related features between tremor-dominant (TD) and postural instability-gait difficulty (PIGD) subtypes in patients with early PD.

METHODS: PD was categorized into TD, intermediate and PIGD types, according to the literature. Not only motor symptoms, but also non-motor symptoms for global cognition, depression, anxiety, fatigue and dysautonomia, were measured in detail. In addition, fall-related features, including a previous history of falls, fear of fall measurement and gait freezing were assessed.

RESULTS: In patients with early PD (disease duration no more than 5 years), 35 patients with TD-type PD and 31 patients with PIGD-type PD were finally evaluated for the study. Compared with the TD group, the PIGD group showed higher fatigue, gastrointestinal dysfunction and fall-related parameter scores. Moreover, the PIGD scores were significantly correlated with all of those symptoms.

CONCLUSIONS: Our findings suggest that PIGD is significantly linked to fatigue, gastrointestinal dysfunction and fall-related features during the early stages of PD. *Geriatr Gerontol Int* ••; ••: ••-•• *Geriatr Gerontol Int* 2021; ••: ••-••.

Language: en

Keywords

fall; motor subtype; non-motor symptom; Parkinson's disease

Acute effects of acupuncture in balance and gait of Parkinson disease patients - a preliminary study

Pereira CR, Criado MB, Machado J, Pereira CT, Santos MJ. *Complement. Ther. Clin. Pract.* 2021; 45: e101479.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.ctcp.2021.101479 PMID unavailable

Abstract

INTRODUCTION: Balance and gait disorders are relevant symptoms in the quality of life of Parkinson's patients. Currently, there is no therapy to reverse or treat this condition. Acupuncture treatment is believed to improve motor ability through the cortico-basal-thalamus-cortical-ganglia.

AIM: To investigate qualitatively the acute effect of acupuncture on balance and gait in Parkinson's disease in 7 patients.

METHODS: This is a randomized and controlled crossover study. The same individual patient was part of both, experimental (real acupuncture) and control group (false acupuncture/sham), and the sequence was randomized. Balance and gait parameters were measured at two different moments, before and after treatment, using four force platforms as well as the collection of 3D markers positions taken by 11 cameras. Images were analyzed using Qualisys Track Manager software that let us extract data related to the quality of gait and balance.

RESULTS: Statistically significant differences were found in gait speed ($p = 0.016$), gait cadence ($p = 0.006$), support base width ($p = 0.0001$), medio-lateral oscillation ($p = 0.017$), left-right step length ($p = 0.0002$), and stride length: right-right ($p = 0.0000$) and left-left ($p = 0.0018$), time of left support phase ($p = 0.029$), right support phase ($p = 0.025$) and double support phase ($p = 0.015$), between the initial and final moments for the experimental group. Differences in right-left stride length were found for both groups.

CONCLUSION: Our results suggest that the acupuncture protocol used objectively could improve gait in Parkinson disease patients. A deep research involving a statistical evaluation supported on a larger number of voluntaries should be accomplished to confirming these promising preliminary results.

Language: en

Keywords

Balance; Acupuncture; Gait; Heidelberg model; Parkinson disease; Traditional Chinese medicine

"Going Backward": Effects of age and fatigue on posterior-directed falls in Parkinson disease

Papa EV, Patterson RM, Bugnariu N. NeuroRehabilitation 2021; ePub(ePub): ePub.

(Copyright © 2021, IOS Press)

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Abstract

BACKGROUND: Nearly half of persons with Parkinson disease (PD) report fatigue as a factor in their fall history. However, it is unknown whether these self-reported falls are caused by a sensation of fatigue or performance fatigue.

OBJECTIVE: We sought to investigate the influences of performance fatigue and age on postural control in persons with PD.

METHODS: Individuals with PD (n=14) underwent postural control assessments before (T0) and immediately after (T1) fatiguing exercise. Biomechanical data were gathered on participants completing a treadmill-induced, posterior-directed fall. Performance fatigue was produced using lower extremity resistance exercise on an isokinetic ergometer. Repeated measures ANCOVAs were used with age as a covariate to determine the effects of performance fatigue on biomechanical variables.

RESULTS: After adjustment for age, there was a statistically significant difference in peak center of pressure (COP) latency during the support phase of recovery. Pairwise comparisons demonstrated a decrease in peak ankle displacement from T0 to T1. Age was also found to be significantly related to reaction time and peak knee displacement while participants were fatigued.

CONCLUSIONS: The decreased peak COP latency, along with decreased ankle angular displacement, suggest that persons with PD adopt a stiffening strategy in response to backward directed falls. Postural stiffening is not uncommon in persons with PD and could be a risk factor for falls. Older individuals with PD demonstrate slower mobility scores and decreased reaction times in the setting of fatigue, suggesting a combined effect of the aging and fatigue processes.

Language: en

Keywords

falls; balance; Parkinson's disease; fatigue; performance fatigue

Clinical relevance of fear of falling in patients with Parkinson's disease

Kwon KY. *Neurol. India* 2021; 69(3): 648-649.

(Copyright © 2021, Medknow Publications)

DOI 10.4103/0028-3886.319243 **PMID** unavailable

Abstract

[The publisher has not provided an abstract for this article.]

Language: en

Fear of falling: an independent factor affecting health-related quality of life in patients with Parkinson's disease

Albay VB, Tutuncu M. *Neurol. India* 2021; 69(3): 643-647.

(Copyright © 2021, Medknow Publications)

DOI 10.4103/0028-3886.319225 **PMID** unavailable

Abstract

BACKGROUND: Fear of falling (FOF) is a serious problem in Idiopathic Parkinson's Disease (IPD) which increases mortality and affects Health Related Quality of Life (HRQoL).

OBJECTIVE: To evaluate the effect of FOF on HRQoL in IPD.

METHODS: 84 controls and 87 IPD patients were compared by means of Fall Efficacy Scale (FES), Berg Balance Scale (BBS), Activities-specific Balance Confidence Scale (ABC Scale), Impact Of Events Scale-Revised (IES-R), Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), Parkinson Disease Specific Quality of Life Scale (PDQ-39). Then, patients were divided into two subgroups such as patients with FOF (Group 2a) and patients without FOF (Group 2b) by FES. Groups were compared in terms of BBS, ABC Scale, IES-R, BDI, BAI, PDQ-39. Independent factors affecting HRQoL were measured.

RESULTS: FOF was higher in IPD patients than controls. Female sex, previous falls, off periods, hallucinations, urge incontinence were significantly higher in Group 2a. However, RBD, dyskinesia, daytime somnolence and FOG were not different in IPD patients whether they have FOF or not. FOF was mostly correlated to disability level and disease severity. In addition, UPDRS and FOF were found to be independent factors affecting HRQoL in IPD.

CONCLUSIONS: Clinicians should be aware that FOF can be detected in IPD patients, who are female, depressed or anxious, who had more severe disease with off periods, urge incontinence, hallucinations and previous falls. FOF should be questioned in every IPD patients because it is an independent factor which affects HRQoL of IPD patients.

Language: en

Keywords

Fear of falling; health related quality of life; Hoehn–Yahr stage; idiopathic Parkinson's disease; UPDRS

Gerontotechnology for fall prevention: nursing care for older adults with Parkinson

Ferreira JM, Hammerschmidt KSA, Heideman ITSB, Alvarez AM, Santos SMAD, Fabrizzio GC. Rev. Esc. Enferm. USP 2021; 55: e03748.

(Copyright © 2021, Universidade de São Paulo, Escola de Enfermagem)

DOI 10.1590/S1980-220X2020018403748

PMID unavailable

Abstract

OBJECTIVE: To assess the contribution of gerontotechnologies in nursing care to older adults with Parkinson's disease, aiming at the prevention of falls.

METHOD: Convergent Assistance Research, through the development and evaluation of gerontotechnologies focused on the prevention of falls in older adults with Parkinson's Disease. Clinical evaluation, interviews and workshops with older adults were carried out, as well as analysis and judgment of the materials developed by ten judges certified in gerontology by the Brazilian Society of Geriatrics and Gerontology.

RESULTS: Older adults need at least six years of study to understand the educational gerontotechnology development. The objectives related to the content, understanding of the text, illustration, presentation, motivation and cultural adaptation were achieved.

CONCLUSION: The educational gerontotechnology developed has relevant content, which can be used by older adults, family members and caregivers, to generate clarification of questions on the theme of fall prevention for older adults with Parkinson's Disease.

Language: en

Predictive value of verbatim Parkinson's disease patient-reported symptoms of postural instability and falling

Javidnia M, Arbatti L, Hosamath A, Eberly SW, Oakes D, Shoulson I. J. Parkinsons Dis. 2021; ePub(ePub): ePub.

(Copyright © 2021, IOS Press)

DOI 10.3233/JPD-212636

PMID unavailable

Abstract

BACKGROUND: Postural instability is an intractable sign of Parkinson's disease, associated with poor disease prognosis, fall risk, and decreased quality of life.

OBJECTIVE: 1) Characterize verbatim reports of postural instability and associated symptoms (gait disorder, balance, falling, freezing, and posture), 2) compare reports with responses to three pre-specified questions from Part II of the Movement Disorder Society Unified Parkinson Disease Rating Scale (MDS-UPDRS), and 3) examine postural instability symptoms and MDS-UPDRS responses as predictors of future falls.

METHODS: Fox Insight research participants reported their problems attributed to PD in their own words using the Parkinson Disease Patient Reports of Problems (PD-PROP). Natural language processing, clinical curation, and data mining techniques were applied to classify text into problem domains and clinically-curated symptoms. Baseline postural instability symptoms were mapped to MDS-UPDRS questions 2.11-2.13. T-tests and chi-square tests were used to compare postural instability reporters and non-reporters, and Cochran-Armitage trend tests were used to evaluate associations between PD-PROP and MDS-UPDRS responses; survival methods were utilized to evaluate the predictive utility of PD-PROP and MDS-UPDRS responses in time-to-fall analyses.

RESULTS: Of participants within 10 years of PD diagnosis, 9,692 (56.0%) reported postural instability symptoms referable to gait unsteadiness, balance, falling, freezing, or posture at baseline. Postural instability symptoms were significantly associated with patient-reported measures from the MDS-UPDRS questions. Balance problems reported on PD-PROP and MDS-UPDRS 2.11-2.13 measures were predictive of future falls.

CONCLUSION: Verbatim-reported problems captured by the PD-PROP and categorized by natural language processing and clinical curation and MDS-UPDRS responses predicted falls. The PD-PROP output was more granular than, and as informative as, the categorical responses.

Language: en

Keywords

patient-reported outcomes; Clinical trials; disease progression; falling; observational research



Prevalence of freezing of gait in Parkinson's disease: a systematic review and meta-analysis

Zhang WS, Gao C, Tan YY, Chen SD. J. Neurol. 2021; ePub(ePub): ePub.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s00415-021-10685-5

PMID unavailable

Abstract

BACKGROUND: Freezing of gait (FOG) is considered one of the most disturbing and least understood symptoms in Parkinson's disease (PD). The reported prevalence rates of FOG in PD vary widely, ranging from 5 to 85.9%.

OBJECTIVE: We conducted a systematic review and meta-analysis to provide a reliable estimate of the average point prevalence of FOG in PD, and we further investigated the study characteristics that might have influenced the estimate.

METHODS: We searched different databases to identify studies that report the prevalence of FOG in PD or include relevant raw data for further calculation. The last inclusion date was February 20, 2020. The modified Quality Assessment of Diagnostic Accuracy Studies (QUADAS) tool was used for the quality assessment, and articles that met the predefined criteria were included in the quantitative analysis.

RESULTS: Sixty-six studies were selected from 3392 references. A weighted prevalence of 50.6% in 9072 PD patients experienced FOG based on the special questionnaires (the FOG-Q and NFOG-Q), which was about twice as high as that assessed by the specific items of the clinical rating scales (UPDRS item2.14 and MDS-UPDRS item3.11) (23.2%) or simple clinical questions (25.4%). The weighted prevalence was 37.9% for early stage (≤ 5 years) and 64.6% for advanced stage (≥ 9 years). Moreover, a higher prevalence was calculated from the population-based studies than that in multicenter and single-center studies (47.3% vs. 33.5% and 37.1%, respectively).

CONCLUSION: The result from this systematic review confirms that FOG is very common in PD and its prevalence is usually underestimated in hospital settings. Importantly, a more accurate assessment of FOG in future clinical researches would involve the use of special FOG scale rather than a single item on a scale or a general clinical inquiry.

Language: en

Keywords

Review; Prevalence; Meta-analysis; Parkinson's disease; Freezing of gait

How does perceived fall risk influence decisions about whether to undertake activities in people with Parkinson's disease and their care partners? A qualitative study

Huang Y, Canning CG, Song J, Clemson L, Allen NE. *Disabil. Rehabil.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Informa - Taylor and Francis Group)

DOI 10.1080/09638288.2021.1955983 PMID unavailable

Abstract

PURPOSE: To explore how perceptions of fall risk influence decisions to undertake activities in people with Parkinson's disease who have fallen, along with their care-partners.

MATERIALS AND METHODS: This qualitative study used semi-structured interviews to collect data from eight people with moderate to severe Parkinson's Disease and freezing of gait (including those with cognitive impairments) and their care-partners. An inductive approach to thematic analysis was used to analyse the data.

RESULTS: Four main, interconnected themes emerged, and a framework was developed to illustrate these connections. Weighing up the risks and benefits reflected the constant tension between assessing the likelihood of falling and potential benefit of any activity; Being fearful heightened the perceived risk resulting in a tendency to avoid or modify activities; Desire to lead a normal life heightened the perceived benefit of any activity, leading towards risk taking behaviour; It's a part of Parkinson's provided the context in which the decision-making process took place, with the reality of a progressive disorder influencing choices and contributing to a belief that falls were inevitable.

CONCLUSIONS: There is a complex interaction between perceptions of fall risk and behaviour. An understanding of these interactions will assist therapists to tailor individualised fall prevention interventions. **IMPLICATIONS FOR REHABILITATION** People are constantly weighing up the risks and benefits of activities while balancing fear of falling and a desire to lead a normal life in the context of Parkinson's disease. The resulting activity choices vary along a continuum from avoiding activities to taking risks, with a common approach to minimise the risk and then embrace the activity. Therapists can help people with Parkinson's and their care-partners to determine what level of risk is acceptable for them when balancing risk with quality of life. Understanding how people decide if they will undertake an activity that poses a risk of falling will allow therapists and patients to co-design fall prevention and management interventions based on the patient's values and priorities.

Language: en

Keywords

falls; rehabilitation; Parkinson's disease; qualitative; decision-making; cognitive impairment

Implementation of the StandingTall programme to prevent falls in older people: a process evaluation protocol

Taylor ME, Todd C, O'Rourke S, Clemson LM, Close JC, Lord SR, Lung T, Berlowitz DJ, Blennerhassett J, Chow J, Dayhew J, Hawley-Hague H, Hodge W, Howard K, Johnson P, Lasrado R, McInerney G, Merlene M, Miles L, Said CM, White L, Wilson N, Zask A, Delbaere K. *BMJ Open* 2021; 11(7): e048395.

(Copyright © 2021, BMJ Publishing Group)

DOI 10.1136/bmjopen-2020-048395 PMID unavailable

Abstract

INTRODUCTION: One in three people aged 65 years and over fall each year. The health, economic and personal impact of falls will grow substantially in the coming years due to population ageing. Developing and implementing cost-effective strategies to prevent falls and mobility problems among older people is therefore an urgent public health challenge. StandingTall is a low-cost, unsupervised, home-based balance exercise programme delivered through a computer or tablet. StandingTall has a simple user-interface that incorporates physical and behavioural elements designed to promote compliance. A large randomised controlled trial in 503 community-dwelling older people has shown that StandingTall is safe, has high adherence rates and is effective in improving balance and reducing falls. The current project targets a major need for older people and will address the final steps needed to scale this innovative technology for widespread use by older people across Australia and internationally.

METHODS AND ANALYSIS: This project will endeavour to recruit 300 participants across three sites in Australia and 100 participants in the UK. The aim of the study is to evaluate the implementation of StandingTall into the community and health service settings in Australia and the UK. The nested process evaluation will use both quantitative and qualitative methods to explore uptake and acceptability of the StandingTall programme and associated resources. The primary outcome is participant adherence to the StandingTall programme over 6 months.

ETHICS AND DISSEMINATION: Ethical approval has been obtained from the South East Sydney Local Health District Human Research Ethics Committee (HREC reference 18/288) in Australia and the North West- Greater Manchester South Research Ethics Committee (IRAS ID: 268954) in the UK. Dissemination will be via publications, conferences, newsletter articles, social media, talks to clinicians and consumers and meetings with health departments/managers. **TRIAL REGISTRATION NUMBER:** ACTRN12619001329156.

Language: en

Keywords

preventive medicine; qualitative research; geriatric medicine

A vicious cycle of fear of falling avoidance behavior in Parkinson's disease: a path analysis

Landers MR, Jacobson KM, Matsunami NE, McCarl HE, Regis MT, Longhurst JK. Clin. Park. Relat. Disord. 2021; 4: e100089.

(Copyright © 2021, International Association of Parkinsonism and Related Disorders, Publisher Elsevier Publishing)

DOI 10.1016/j.prdoa.2021.100089 **PMID** 34316667

Abstract

BACKGROUND: Postural instability (PI) in Parkinson's disease (PD) is associated with several negative downstream consequences.

OBJECTIVE: The purpose was to explore the validity of a theoretical model of these downstream consequences arranged in a vicious cycle wherein PI leads to decreased balance confidence, which in turn leads to increased fear of falling (FOF) avoidance behavior, which in turn leads to decreased physical conditioning, which then feeds back and negatively affects PI.

METHODS: A path analysis of cross-sectional data from 55 participants with PD was conducted. The four constructs in the model connected in succession were: 1. PI (principal components analysis (PCA) composite of the Unified Parkinson's Disease Rating Scale PI and Gait Difficulty score, Timed Up and Go test, and Berg Balance Scale); 2. balance confidence (Activities-Specific Balance Confidence Scale); 3. FOF avoidance behavior (PCA composite of the FOF Avoidance Behavior Questionnaire and average number of steps per day); and, 4. physical conditioning (2-Minute Step Test).

RESULTS: The path model was an excellent fit to the data, $\chi^2 (7) = 7.910$, $p = .341$, CFI = 0.985, TLI = 0.968, RMSEA = 0.049 (90% CI: 0.000 to 0.179). The moderate to strong and uniformly significant parameter estimates were -0.519, -0.651, -0.653, and -0.570, respectively ($ps < 0.01$).

CONCLUSIONS: PI directly and inversely predicted balance confidence, which in turn directly and inversely predicted FOF avoidance behavior. Furthermore, FOF avoidance behavior directly and inversely predicted physical conditioning, which directly and inversely predicted PI, thereby closing the cycle. These findings highlight the downstream consequences of PI in PD and support the notion of a vicious cycle of FOF avoidance behavior.

Language: en

Keywords

Falls; Fear of falling; Gait; Postural balance; Avoidance behavior; Balance confidence; Postural instability

Stroke

Falls after stroke: a follow-up after ten years in Lund Stroke Register

Jönsson AC, Lindgren I, Delavaran H, Norrving B, Lindgren A. J. Stroke Cerebrovasc. Dis. 2021; 30(6): e105770.

(Copyright © 2021, National Stroke Association (U.S.A.), Publisher Elsevier Publishing)

DOI 10.1016/j.jstrokecerebrovasdis.2021.105770 PMID unavailable

Abstract

OBJECTIVES: To evaluate incidence of self-reported falls and associated factors in a ten-year perspective after stroke.

METHODS: From a population-based cohort of first-ever stroke patients (n = 416) included in the Lund Stroke Register between March 1, 2001, and February 28, 2002, we performed a follow up of all 145 survivors ten years after stroke. We collected data on age, gender, main stroke type, living and housing situation, general health status (question 1 in the Short Form Health Survey (SF-36), dizziness, physical activity, Barthel Index, mobility aids, moving ability inside/outside, and health-related quality of life as defined by the EuroQol 3 dimension scale (EQ-5D-3L). Factors that may relate to falls were compared between those who had experienced falls after stroke or not.

RESULTS: Ten years after stroke, 49 patients (34 %) reported falls and 96 patients (66 %) reported no falls. Compared to patients with no falls, those who reported falls were older (median age 83.3 years vs 75.6 years; $p < 0.001$), more often lived alone, were more dependent in daily living, had less physical activity, poorer general health status, more often needed mobility aids, were more often unable to move alone outside, and had poorer health-related quality of life in all items in EQ-5D-3L except pain/discomfort.

CONCLUSIONS: Falls had occurred in approximately one third of the participants ten years after the stroke, and were strongly associated with several measures of frailty. Our results indicate that fall prevention should in particular focus on those at high risk of falls.

Language: en

Keywords

Epidemiology; Risk Factors; Longitudinal study; Fall; Outcome; Cohort; Stroke

Does exercise-based conventional training improve reactive balance control among people with chronic stroke?

Kannan L, Vora J, Varas-Diaz G, Bhatt T, Hughes S. Brain Sci. 2021; 11(1): e2.

(Copyright © 2021, Switzerland Molecular Diversity Preservation International (MDPI) AG)

DOI 10.3390/brainsci11010002 PMID unavailable

Abstract

BACKGROUND: Exercise-based conventional training has predominantly benefited fall-associated volitional balance control domain; however, the effect on reactive balance control is under-examined. Therefore, the purpose of this study was to examine the effect of exercise-based conventional training on reactive balance control.

METHODS: Eleven people with chronic stroke (PwCS) underwent multi-component training for six weeks (20 sessions) in a tapering manner. Training focused on four constructs—stretching, functional strengthening, balance, and endurance. Volitional balance was measured via movement velocity on the Limits of Stability (LOS) test and reactive balance via center of mass (COM) state stability on the Stance Perturbation Test (SPT). Additionally, behavioral outcomes (fall incidence and/or number of steps taken) were recorded.

RESULTS: Movement velocity significantly increased on the LOS test ($p < 0.05$) post-intervention with a significant decrease in fall incidence ($p < 0.05$). However, no significant changes were observed in the COM state stability, fall incidence and number of recovery steps on the SPT post-intervention.

CONCLUSION: Although volitional and reactive balance control may share some neurophysiological and biomechanical components, training based on volitional movements might not significantly improve reactive balance control for recovery from large-magnitude perturbations due to its task-specificity.

Language: en

Keywords

chronic stroke; conventional therapy; exercises; reactive balance control

Effective combined assessments of weight bearing ratio and four square step test in predicting falls in discharged stroke patients

Yoshimoto Y, Tanaka M, Sakamoto A. J. Stroke Cerebrovasc. Dis. 2020; 30(3): e105582.

(Copyright © 2020, National Stroke Association (U.S.A.), Publisher Elsevier Publishing)

DOI 10.1016/j.jstrokecerebrovasdis.2020.105582 PMID unavailable

Abstract

BACKGROUND: We aimed to determine whether combined assessments of single movement tasks could predict falls in community dwelling people with stroke and it was more precision than the berg balance Scale consists of 14 movements.

METHODS: This prospective cohort study performed at five rehabilitation hospitals in Japan. Participants comprised 78 patients with ambulatory stroke. The single movement task assessments performed at discharge and included the weight bearing ratio, the 30-second chair standing test, the one-leg standing time, the four square step test and the timed up and go test. The results were used to derive a logistic regression equation to predict falls within 6 months from discharge. Area under the curve was used to compare prediction accuracy between the logistic regression equation and the berg balance Scale.

RESULTS: Overall, fifteen participants experienced a fall. The weight bearing ratio of the unaffected side and four square step test were observed to be significant assessments identified from the logistic regression analysis. The Area under the curve of the combined tests of weight bearing ratio of the unaffected side and four square step test was 0.78, which was higher than the than that of the berg balance Scale (0.70).

CONCLUSIONS: This study found that a combined assessment using single movement tasks including the weight bearing ratio of the unaffected side and four square step test predicted falls in people with stroke post-discharge more precisely than the berg balance Scale.

Language: en

Keywords

assessment; fall; prediction; stroke; single movement task

Effectiveness of non-pharmacological falls prevention interventions for people with Multiple Sclerosis, Parkinson's Disease and stroke: protocol for an umbrella review

O'Malley N, Clifford AM, Comber L, Coote S. HRB Open Res 2020; 3: e17.

(Copyright © 2020, Health Research Board ; F1000 Research Limited)

DOI 10.12688/hrbopenres.13023.2 PMID unavailable

Abstract

BACKGROUND: Falls are common among people with neurological diseases and have many negative physical, psychosocial and economic consequences. Implementation of single-diagnosis falls prevention interventions is currently problematic due to lack of participants and resources. Given the similarities in falls risk factors across stroke, Parkinson's Disease (PD) and Multiple Sclerosis (MS), the development of an intervention designed for mixed neurological populations seems plausible and may provide a pragmatic solution to current implementation challenges. This umbrella review aims to summarise the totality of evidence regarding the effectiveness of non-pharmacological falls prevention interventions for people with MS, PD and stroke and identify the commonalities and differences between effective interventions for each disease to inform the development of an evidence-based intervention that can be tailored for people with mixed diagnoses.

METHODS: This umbrella review will be conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. 15 electronic databases and grey literature will be searched. Systematic reviews of randomised controlled trials and studies investigating the effects of non-pharmacological falls prevention interventions on falls outcomes among people with MS, PD and stroke will be included.

METHODological quality of included reviews will be assessed using the Assessment of Multiple Systematic Reviews 2 tool. The Grading of Recommendations Assessments, Development and Evaluation framework will be used to rate the quality of evidence. A summary of evidence table and narrative synthesis will be utilised to clearly indicate the findings

DISCUSSION: This umbrella review presents a novel and timely approach to synthesise existing falls literature to identify effective non-pharmacological interventions for people with MS, PD and stroke. Of importance, a robust methodology will be used to explore the differences and similarities in effective interventions for individuals with these neurological conditions to facilitate the development of an intervention for these mixed neurological groups.

Language: en

Keywords

Falls; Intervention; Multiple Sclerosis; Parkinson's Disease; Stroke; Umbrella Review

Posterior fall-recovery training applied to individuals with chronic stroke: a single-group intervention study

Pigman J, Reisman DS, Pohlign RT, Jeka JJ, Wright TR, Conner BC, Petersen DA, Christensen MS, Crenshaw JR. Clin. Biomech. 2020; 82: e105249.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.clinbiomech.2020.105249 PMID unavailable

Abstract

BACKGROUND: To assess the effects of the initial stepping limb on posterior fall recovery in individuals with chronic stroke, as well as to determine the benefits of fall-recovery training on these outcomes.

METHODS: This was a single-group intervention study of 13 individuals with chronic stroke. Participants performed up to six training sessions, each including progressively challenging, treadmill-induced perturbations from a standing position. Progressions focused on initial steps with the paretic or non-paretic limb. The highest perturbation level achieved, the proportion of successful recoveries, step and trunk kinematics, as well as stance-limb muscle activation about the ankle were compared between the initial stepping limbs in the first session. Limb-specific outcomes were also compared between the first and last training sessions.

FINDINGS: In the first session, initial steps with the non-paretic limb were associated with a higher proportion of success and larger perturbations than steps with the paretic limb ($p = 0.02$, Cohen's $d = 0.8$). Paretic-limb steps were wider relative to the center of mass (CoM; $p = 0.01$, $d = 1.3$), likely due to an initial standing position with the CoM closer to the non-paretic limb ($p = 0.01$, $d = 1.4$). In the last training session, participants recovered from a higher proportion of perturbations and advanced to larger perturbations ($p < 0.05$, $d > 0.6$). There were no notable changes in kinematic or electromyography variables with training ($p > 0.07$, $d < 0.5$).

INTERPRETATION: The skill of posterior stepping in response to a perturbation can be improved with practice in those with chronic stroke, we were not able to identify consistent underlying kinematic mechanisms behind this adaptation.

Language: en

Keywords

Falls; Stability; Balance; Rehabilitation; Stroke; Perturbation training

Physical inactivity after stroke: incidence and early predictors based on 190 individuals in a 12-month follow-up of the fall study of Gothenburg

Botö S, Johansson Buvarp D, Hansson PO, Sunnerhagen KS, Persson CU. *J. Rehabil. Med.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Foundation for Rehabilitation Information)

DOI 10.2340/16501977-2852 PMID unavailable

Abstract

OBJECTIVE: To determine the incidence of physical inactivity and factors prior to stroke and in acute stroke that are associated with physical inactivity 1 year after stroke
Design: Prospective longitudinal cohort
Patients: A total of 190 consecutively included individuals with acute stroke
Methods: A follow-up questionnaire, relating to physical activity level using the Saltin-Grimby Physical Activity Scale, was sent to participants in the Fall Study of Gothenburg 1 year after stroke. Predictors of physical inactivity at baseline were identified using univariable and multivariable logistic regression analyses.

RESULTS: Physical inactivity 1 year after stroke was reported by 70 of the 190 patients who answered the questionnaire (37%), was associated with physical inactivity before the stroke, odds ratio (OR) 4.07 (95% confidence interval (95% CI) 1.69-9.80, $p = 0.002$); stroke severity (assessed by National Institutes of Health Stroke Scale (NIHSS), score 1-4), OR 2.65 (95% CI) 1.04-6.80, $p = 0.042$); and fear of falling in acute stroke, OR 2.37 (95% CI 1.01-5.60, $p = 0.048$).

CONCLUSION: Almost 4 in 10 participants reported physical inactivity 1 year after stroke. Physical inactivity before the stroke, stroke severity and fear of falling in acute stroke are the 3 main factors that predict physical inactivity 1 year after stroke.

Language: en

Keywords

rehabilitation; physical activity; stroke

An exploratory qualitative study with older Malaysian stroke survivors, caregivers, and healthcare practitioners about falls and rehabilitation for falls after stroke

Ahmad Ainuddin H, Romli MH, Hamid TA, Sf Salim M, Mackenzie L. *Front. Public Health* 2021; 9: 611814.

(Copyright © 2021, Frontiers Editorial Office)

DOI 10.3389/fpubh.2021.611814 **PMID** unavailable

Abstract

BACKGROUND: Studies on rehabilitation for falls after a stroke remain limited despite its impact being profound. This scenario justifies a deeper understanding of why falls in stroke rehabilitation received less attention. Current investigations on the perception of falls and stroke also proved inadequate. Therefore, this study aims to explore the perceptions and experiences of older Malaysian stroke survivors, spousal caregivers, and healthcare practitioners on falls in stroke rehabilitation.

METHOD: A qualitative study of three focus groups with 18 individuals from one community-based stroke rehabilitation center was conducted. The discussions were audio-recorded, video-recorded, transcribed, summarized, and analyzed using thematic analysis.

RESULTS: Three themes emerged from the analysis: (i) perceived factors and consequences of falls after stroke, (ii) physical-based interventions predominate in rehabilitation for falls after stroke, and (iii) the role of home hazards in fall prevention is taken for granted. Although, awareness of falls is high, they are regarded as a peripheral issue in stroke. Rehabilitation interventions such as improved functionality are believed to be adequate and can indirectly prevent falls. Other interventions for fall prevention such as home hazards management are relatively less known.

CONCLUSION: There is a need for more attention regarding home environment risk assessment and intervention among healthcare professionals, and more education for clients and caregivers is required. Although, other stroke interventions may also benefit stroke survivors, falls prevention should be a central component in stroke rehabilitation. As this study focused on a specific population, the findings should be validated with larger populations, and in diverse settings.

Language: en

Keywords

aged; falls prevention; falls interventions; qualitative study; stroke

Interventions for preventing falls in people post-stroke: a meta-analysis of randomized controlled trials

Yang F, Lees J, Simpkins C, Butler A. *Gait Posture* 2021; 84: 377-388.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.gaitpost.2020.12.034 PMID unavailable

Abstract

BACKGROUND: Falls are a serious challenge facing individuals post-stroke. In the past decades, various fall prevention interventions have been developed. It remains unknown if any of these interventions are effective in reducing falls in this population. Such a knowledge gap could impede the effort of preventing falls in people post-stroke. **RESEARCH QUESTIONS:** 1) Are there effective interventions to prevent falls among people in the post-acute and chronic stages of stroke? and 2) How do fall prevention interventions change three key fall risk factors in this population: balance, mobility, and lower limb strength? **METHODS:** Eleven databases were searched for randomized controlled trials which included falls in people post-stroke as an outcome measure. Information on the participants, training protocol, and outcome measures were collected for each study. The primary outcome is the number of fallers and the explanatory variables included mean difference and standard deviation for fall risk factors. Studies were quality appraised using the Physiotherapy Evidence Database scale and the funnel plot.

RESULTS: Thirteen studies enrolling 1352 participants were identified. Effect size quantified by the odds ratio (OR) for falls and standardized mean difference (SMD) for fall risk factors were calculated. Overall no intervention appears to be significantly more effective in preventing falls than placebo training (OR = 0.88 with a range of [0.23 3.66]; 95 % confidence interval = [0.64 1.21], $p = 0.44$). All interventions showed little effect in improving the fall risk factors (SMD = -0.01 to 0.06 and p -value = 0.38-0.86), except one (the combined treadmill and overground walking) which significantly improved mobility. **SIGNIFICANCE:** Currently no program is effective in reducing falls in people post-stroke. Future studies should measure falls as a primary outcome based on a consistent definition of falls and reliable approaches to collect falls data.

Language: en

Keywords

Systematic review; Mobility; Balance; Fall risk factors; Falls prevention; Strength

Fall Efficacy Scale-International cut-off score discriminates fallers and non-fallers individuals who have had stroke

Faria-Fortini I, Polese JC, Faria CDCM, Scianni AA, Nascimento LR, Teixeira-Salmela LF. *J. Bodyw. Mov. Ther.* 2021; 26: 167-173.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.jbmt.2020.12.002 **PMID** unavailable

Abstract

BACKGROUND: Falls, which are common events after stroke, may lead to activity limitations and increased dependence. It is important to identify which commonly employed clinical measures could differentiate individuals, who are fallers from the non-fallers.

AIM: To investigate specific cut-off values of clinical measures that could discriminate fallers and non-fallers individuals with chronic stroke.

METHOD: This cross-sectional study involved 105 community-dwelling individuals with stroke. The primary outcome was report of falls over the last six months. The clinical predictors included measures of mobility (walking speed, stair ascent/descent cadences, time to perform the Timed Up and Go test, and ABILOCO) and the Fall Efficacy Scale - International (FES-I) scores. To identify which measures were able to detect between-group differences, independent Student's t-tests were employed. For measures which were able to discriminate fallers from the non-fallers, the Receiver Operating Characteristics (ROC) and the Area Under the ROC Curve (AUC) were calculated.

RESULTS: Out of the 105 participants (61 men), 41% reported falls over the previous 6 months. Stair ascent cadence, ABILOCO, and FES-I scores significantly differentiated the groups, but only the FES-I demonstrated acceptable discriminatory ability (AUC = 0.71). The optimal FES-I cut-off score was 28 points (sensitivity = 0.71; specificity = 0.57; positive predictive value = 51%; and negative predictive value = 74%).

CONCLUSIONS: The FES-I demonstrated good discriminatory ability to classify individuals with chronic stroke, who were fallers from the non-fallers. The use of the established cut-off value of 28 points is recommended and may help clinical reasoning and decision-making in stroke rehabilitation.

Language: en

Keywords

Rehabilitation; Fall; Gait; Cerebrovascular accident; Receiver operating characteristic curve

Effects of dual-task gait treadmill training on gait ability, dual-task interference, and fall efficacy in people with stroke: a randomized controlled trial

Baek CY, Chang WN, Park BY, Lee KB, Kang KY, Choi MR. Phys. Ther. 2021; ePub(ePub): ePub.

(Copyright © 2021, American Physical Therapy Association)

DOI 10.1093/ptj/pzab067 PMID unavailable

Abstract

OBJECTIVE: This study aimed to investigate the effects of dual-task gait training using a treadmill on gait ability, dual-task interference, and fall efficacy in people with stroke.

METHODS: Patients with chronic stroke (N = 34) were recruited and randomly allocated to the experimental or control group. Both groups underwent gait training on a treadmill and a cognitive task. In the experimental group, gait training was conducted in conjunction with the cognitive task, whereas in the control group, the training and the cognitive task were conducted separately. Each intervention was provided for 60 minutes, twice a week, for a period of 6 weeks for both groups. The primary outcomes were as follows: gait parameters (speed, stride, variability, and cadence) under single-task and dual-task conditions, correct response rate (CRR) under single-task and dual-task conditions, and dual-task cost (DTC) in gait parameters and CRR. The secondary outcome was the fall efficacy scale.

RESULTS: Dual-task gait training using a treadmill improved all gait parameters in the dual-task condition, speed, stride, and variability in the single-task condition, and CRR in both conditions. Difference between the groups was observed in speed, stride, and variability in the dual-task condition. Furthermore, dual-task gait training on a treadmill improved DTC in speed, variability, and cadence along with that in CRR, indicating true improvement of DTC, which led to significant improvement in DTC in speed and variability compared with single-task training.

CONCLUSIONS: Dual-task gait treadmill training was more effective in improving gait ability in dual-task training and DTI than single-task training involving gait and cognitive task separately in people with chronic stroke.

Language: en

Keywords

rehabilitation; stroke; dual-task condition; gait

Effect of cognitive function on balance and posture control after stroke

Yu HX, Wang ZX, Liu CB, Dai P, Lan Y, Xu GQ. *Neural Plast.* 2021; 2021: e6636999.

(Copyright © 2021, Hindawi Publishing)

DOI 10.1155/2021/6636999 PMID 33574837

Abstract

Hemiplegic gait is the most common sequela of stroke. Patients with hemiplegic gait are at a risk of falling because of poor balance. The theory of cognitive-motor networks paved the way for a new field of research. However, the mechanism of the relationship of cognition with gait or posture control networks is unclear because of the dynamic characteristics of walking and changing postures. To explore differences in the balance function and fall risk between patients with and without cognitive impairment after stroke, we utilized the Berg balance scale, Timed "Up and Go" test, and 10 m walking test. Patients were divided into two groups: the observation group (16 patients, female 6 and male 10), comprising patients with cognitive impairment after stroke, and the control group (16 patients, female 7 and male 9), comprising patients without cognitive impairment after stroke. We found that patients with cognitive impairment had worse balance function and a higher risk of falls. They needed a longer time to turn around or sit down. Our findings indicated that posture control in turning around and sitting down required more cognitive resources in daily life.

Language: en

Home-based, tailored intervention for reducing falls after stroke (FAST): protocol for a randomized trial

Dean C, Clemson L, Ada L, Scrivener K, Lannin N, Mikolaizak S, Day S, Cusick A, Gardner B, Heller G, Isbel S, Jones T, Mumford V, Preston E. *Int. J. Stroke* 2021; ePub(ePub): ePub.

(Copyright © 2021, John Wiley and Sons)

DOI 10.1177/1747493021991990 PMID unavailable

Abstract

RATIONALE: People with stroke experience falls at more than twice the rate of the general older population resulting in high fall-related injuries. However, there are currently no effective interventions that prevent falls after stroke. **AIMS:** To determine the effect and cost-benefit of an innovative, home-based, tailored intervention to reduce falls after stroke. **SAMPLE SIZE ESTIMATE:** A total of 370 participants will be recruited in order to be able to detect a clinically important between-group difference of a 30% lower rate of falls with 80% power at a two-tailed significance level of 0.05.

METHODS AND DESIGN: Falls after stroke trial (FAST) is a multistate, Phase III randomized trial with concealed allocation, blinded assessment, and intention-to-treat analysis. Ambulatory stroke survivors within five years of stroke who have been discharged from formal rehabilitation to the community and who have no significant language impairment will be randomly allocated to receive habit-forming exercise, home safety, and community mobility training or usual care. **STUDY OUTCOMES:** The primary outcome is the rate of falls over the previous 12 months. Secondary outcomes are the risk of falling (proportion of fallers), community participation, self-efficacy, balance, mobility, physical activity, depression, and health-related quality of life. Health care utilization will be collected retrospectively at baseline and prospectively to 6 and 12 months.

DISCUSSION: The results of FAST are anticipated to directly influence intervention for stroke survivors in the community. Trial Registration: ANZCTR 12619001114134.

Language: en

Keywords

falls prevention; home safety; Behaviour change; community participation; randomized trial; stroke

Effects of dual-task gait treadmill training on gait ability, dual-task interference, and fall efficacy in people with stroke: a randomized controlled trial

Baek CY, Chang WN, Park BY, Lee KB, Kang KY, Choi MR. Phys. Ther. 2021; ePub(ePub): ePub.

(Copyright © 2021, American Physical Therapy Association)

DOI 10.1093/ptj/pzab067 PMID unavailable

Abstract

OBJECTIVE: This study aimed to investigate the effects of dual-task gait training using a treadmill on gait ability, dual-task interference, and fall efficacy in people with stroke.

METHODS: Patients with chronic stroke (N = 34) were recruited and randomly allocated to the experimental or control group. Both groups underwent gait training on a treadmill and a cognitive task. In the experimental group, gait training was conducted in conjunction with the cognitive task, whereas in the control group, the training and the cognitive task were conducted separately. Each intervention was provided for 60 minutes, twice a week, for a period of 6 weeks for both groups. The primary outcomes were as follows: gait parameters (speed, stride, variability, and cadence) under single-task and dual-task conditions, correct response rate (CRR) under single-task and dual-task conditions, and dual-task cost (DTC) in gait parameters and CRR. The secondary outcome was the fall efficacy scale.

RESULTS: Dual-task gait training using a treadmill improved all gait parameters in the dual-task condition, speed, stride, and variability in the single-task condition, and CRR in both conditions. Difference between the groups was observed in speed, stride, and variability in the dual-task condition. Furthermore, dual-task gait training on a treadmill improved DTC in speed, variability, and cadence along with that in CRR, indicating true improvement of DTC, which led to significant improvement in DTC in speed and variability compared with single-task training.

CONCLUSIONS: Dual-task gait treadmill training was more effective in improving gait ability in dual-task training and DTI than single-task training involving gait and cognitive task separately in people with chronic stroke.

Language: en

Keywords

rehabilitation; stroke; dual-task condition; gait

The influences of tai chi on balance function and exercise capacity among stroke patients: a meta-analysis

Zheng X, Wu X, Liu Z, Wang J, Wang K, Yin J, Wang X. Evid. Based Complement. Alternat. Med. 2021; 2021: e6636847.

(Copyright © 2021, Hindawi Publishing)

DOI 10.1155/2021/6636847 PMID 33708256

Abstract

OBJECTIVE: This study aims to explore the influences of Tai Chi on the balance function and exercise capacity among stroke patients.

METHODS: Databases including PubMed, Embase, WOS (Web of Science), the Cochrane Library, CNKI (China National Knowledge Infrastructure), Wanfang Data, VIP (VIP database), and CBM (China Biology Medicine disc) were retrieved to gather the figures of randomized controlled trials on the balance function and exercise capacity among stroke patients. Then relevant data were input and analyzed in Review Manager 5.3.

RESULTS: Nineteen papers were included and analyzed in this study. According to the combined effect size, the balance function of stroke patients improved significantly: the Berg Balance Function Scale score [MD = 7.67, 95% CI (3.44, 11.90)]; standing and walking test scores [MD = 3.42, 95% CI (4.22, -2.63)]; gravity swing area [MD = 0.79, 95% CI (1.48, 0.10)]; and gravity swing speed [MD = -5.43, 95% CI (-7.79, 3.08)]. In addition, the exercise capacity improved significantly as well: the FMA (Fugl-Meyer Assessment Scale) scale score [MD = 4.15, 95% CI (1.68, 6.63)]. There are no significant influences or changes of other related results.

CONCLUSIONS: Stroke patients are able to improve their balance functions and exercise capacities prominently when they do Tai Chi exercise once or twice a week and ≥ 5 times/week and $>30 \leq 60$ min/time.

Language: en

Effectiveness of walking training on balance, motor functions, activity, participation and quality of life in people with chronic stroke: a systematic review with meta-analysis and meta-regression of recent randomized controlled trials

Nindorera F, Nduwimana I, Thonnard JL, Kossi O. *Disabil. Rehabil.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Informa - Taylor and Francis Group)

DOI 10.1080/09638288.2021.1894247 PMID unavailable

Abstract

PURPOSE: To review and quantify the effects of walking training for the improvement of various aspects of physical function of people with chronic stroke.

METHODS: We conducted a systematic search and meta-analysis of randomized controlled trials (RCTs) of chronic stroke rehabilitation interventions published from 2008 to 2020 in English or French. Of the 6476-screened articles collated from four databases, 15 RCTs were included and analyzed. We performed a meta-regression with the total training time as dependent variable in order to have a better understanding of how did the training dosage affect the effect sizes.

RESULTS: Treadmill walking training was more effective on balance and motor functions (standardized mean difference (SMD)=0.70[0.02, 1.37], $p = 0.04$) and 0.56[0.15, 0.96], $p = 0.007$ respectively). Overground walking training improved significantly walking endurance (SMD = 0.38[0.16, 0.59], $p < 0.001$), walking speed (MD = 0.12[0.05, 0.18], $p < 0.001$), participation (SMD = 0.35[0.02, 0.68], $p = 0.04$) and quality of life (SMD = 0.46[0.12, 0.80], $p = 0.008$). Aquatic training improved balance (SMD = 2.41[1.20, 3.62], $p < 0.001$). The Meta-regression analysis did not show significant effect of total training time on the effect sizes.

CONCLUSION: Treadmill and overground walking protocols consisting of ≥ 30 min sessions conducted at least 3 days per week for about 8 weeks are beneficial for improving motor impairments, activity limitations, participation, and quality of life in people with chronic stroke. Implications for rehabilitation: Treadmill walking training is effective for improving balance and motor functions. Overground walking training improved significantly walking endurance, walking speed, participation and quality of life. Treadmill and overground walking protocols consisting of ≥ 30 min sessions conducted at least 3 days per week for about 8 weeks are beneficial for improving motor impairments, activity limitations, participation, and quality of life in patient with chronic stroke.

Language: en

Keywords

physical activity; stroke; Overground walking; treadmill walking; walking training

Stroke rehabilitation for falls and risk of falls in Southeast Asia: a scoping review with stakeholders' consultation

Ahmad Ainuddin H, Romli MH, Hamid TA, Salim MSF, Mackenzie L. *Front. Public Health* 2021; 9: e611793.

(Copyright © 2021, Frontiers Editorial Office)

DOI 10.3389/fpubh.2021.611793 PMID 33748063

Abstract

BACKGROUND: Research on rehabilitation for falls after stroke is warranted. However, published evidence on fall interventions with stroke survivors is limited and these are mainly international studies that may be less relevant for Southeast Asia.

OBJECTIVE: This review aims to systematically identify literature related to stroke rehabilitation for falls and risk of falls in Southeast Asia.

METHODS: A scoping review with stakeholders' consultation was implemented. An electronic search was conducted up to December 2020 on 4 databases (Medline, CINAHL, Scopus, ASEAN Citation Index). Only original studies conducted in Southeast Asia were selected.

RESULTS: The initial search yielded 3,112 articles, however, only 26 were selected in the final analysis. Most of the articles focused on physical rehabilitation and implemented conventional therapies. While the literature may reflect practice in Southeast Asia, stakeholders perceived that the literature was inadequate to show true practice, was not informative and missed several aspects such as functional, cognitive, and psychological interventions in managing falls. Individual-centric interventions dominated the review while community-based and environmental-focused studies were limited. Majority of the articles were written by physiotherapists while others were from physicians, occupational therapists, and an engineer but few from other healthcare practitioners (i.e., speech therapists, psychologists) or disciplines interested in falls.

CONCLUSIONS: Falls prevention among stroke survivors has received a lack of attention and is perceived as an indirect goal in stroke rehabilitation in Southeast Asia. More innovative research adopted from falls research with older people is needed to advance falls prevention and intervention practice with stroke survivors.

Language: en

Keywords

aged; falls; developing countries; rehabilitation; cerebrovascular accident

Association of barriers, fear of falling and fatigue with objectively measured physical activity and sedentary behavior in chronic stroke

Sánchez-Sánchez ML, Arnal-Gómez A, Cortés-Amador S, Pérez-Alenda S, Carrasco JJ, Climent-Toledo A, Espí-López GV, Ruescas-Nicolau MA. *J. Clin. Med.* 2021; 10(6).

(Copyright © 2021, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/jcm10061320 PMID unavailable

Abstract

Understanding the fostering factors of physical activity (PA) and sedentary behavior (SB) in post-stroke chronic survivors is critical to address preventive and health interventions. This cross-sectional study aimed to analyze the association of barriers to PA, fear of falling and severity of fatigue encountered by stroke chronic survivors with device-measured PA and SB. Ambulatory community-dwelling post-stroke subjects (\geq six months from stroke onset) were evaluated and answered the Barriers to Physical Activity after Stroke Scale (BAPAS), Short Falls Efficacy Scale-International (Short FES-I) and Fatigue Severity Scale (FSS). SB and PA were measured with an Actigraph GT3X+ accelerometer for \geq seven consecutive days. Stepwise multiple linear regression analysis was employed to identify factors associated with PA and SB. Fifty-seven participants (58.2 ± 11.1 years, 37 men) met the accelerometer wear-time criteria (three days, \geq eight h/day). The physical BAPAS score explained 28.7% of the variance of the prolonged sedentary time ($\beta = 0.547$; $p < 0.001$). Additionally, the walking speed ($\beta = 0.452$) together with physical BAPAS ($\beta = -0.319$) explained 37.9% of the moderate-to-vigorous PA time ($p < 0.001$). In chronic post-stroke survivors, not only the walking speed but, also, the perceived physical barriers to PA are accounted for the SB and PA. Interventions to reverse SB and to involve subjects post-stroke in higher levels of PA should consider these factors.

Language: en

Keywords

barriers; fear of falling; fatigue; physical activity; stroke; accelerometer; sedentary behaviour

Multiple Sclerosis

Fall prevention for people with multiple sclerosis who use wheelchairs and scooters

Rice LA, Yarnot R, Peterson EW, Backus D, Sosnoff J. Arch. Phys. Med. Rehabil. 2021; ePub(ePub): ePub.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.apmr.2020.10.107 PMID unavailable

Abstract

If you are a person with multiple sclerosis (MS) who uses a wheelchair or scooter, it is likely that you will experience a fall at least once within a 6-month period. Falls often happen because of symptoms of MS, such as muscle weakness or feeling fatigued. While many falls don't result in injury, some do. They can lead to bone fractures, concussions, and a fear of falling. Fear of falling can keep you safe by warning you against doing things that are too challenging. But fear of falling can also lead you to cut back on activities that you can do safely. Cutting back on activities you can do safely is a problem. Being less active can make you weaker and increase your risk of falling when you do have to do something. Luckily, there are things you can do to decrease your risk of falls and keep doing the activities that you enjoy.

Language: en

The application of principal component analysis to characterize gait and its association with falls in multiple sclerosis

Monaghan AS, Huisinga JM, Peterson DS. *Sci. Rep.* 2021; 11(1): e12811.

(Copyright © 2021, Nature Publishing Group)

DOI 10.1038/s41598-021-92353-2 PMID unavailable

Abstract

People with multiple sclerosis (PwMS) demonstrate gait impairments that are related to falls. However, redundancy exists when reporting gait outcomes. This study aimed to develop an MS-specific model of gait and examine differences between fallers and non-fallers. 122 people with relapsing-remitting MS and 45 controls performed 3 timed up-and-go trials wearing inertial sensors. 21 gait parameters were entered into a principal component analysis (PCA). The PCA-derived gait domains were compared between MS fallers (MS-F) and MS non-fallers (MS-NF) and correlated to cognitive, clinical, and quality-of-life outcomes. Six distinct gait domains were identified: pace, rhythm, variability, asymmetry, anterior-posterior dynamic stability, and medial-lateral dynamic stability, explaining 79.15% of gait variance. PwMS exhibited a slower pace, larger variability, and increased medial-lateral trunk motion compared to controls ($p < 0.05$). The pace and asymmetry domains were significantly worse (i.e., slower and asymmetrical) in MS-F than MS-NF ($p < 0.001$ and $p = 0.03$, respectively). Fear of falling, cognitive performance, and functional mobility were associated with a slower gait ($p < 0.05$). This study identified a six-component, MS-specific gait model, demonstrating that PwMS, particularly fallers, exhibit deficits in pace and asymmetry.

FINDINGS may help reduce redundancy when reporting gait outcomes and inform interventions targeting specific gait domains.

Language: en

Effectiveness of non-pharmacological falls prevention interventions for people with Multiple Sclerosis, Parkinson's Disease and stroke: protocol for an umbrella review

O'Malley N, Clifford AM, Comber L, Coote S. HRB Open Res 2020; 3: e17.

(Copyright © 2020, Health Research Board ; F1000 Research Limited)

DOI 10.12688/hrbopenres.13023.2 PMID unavailable

Abstract

BACKGROUND: Falls are common among people with neurological diseases and have many negative physical, psychosocial and economic consequences. Implementation of single-diagnosis falls prevention interventions is currently problematic due to lack of participants and resources. Given the similarities in falls risk factors across stroke, Parkinson's Disease (PD) and Multiple Sclerosis (MS), the development of an intervention designed for mixed neurological populations seems plausible and may provide a pragmatic solution to current implementation challenges. This umbrella review aims to summarise the totality of evidence regarding the effectiveness of non-pharmacological falls prevention interventions for people with MS, PD and stroke and identify the commonalities and differences between effective interventions for each disease to inform the development of an evidence-based intervention that can be tailored for people with mixed diagnoses.

METHODS: This umbrella review will be conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. 15 electronic databases and grey literature will be searched. Systematic reviews of randomised controlled trials and studies investigating the effects of non-pharmacological falls prevention interventions on falls outcomes among people with MS, PD and stroke will be included.

METHODological quality of included reviews will be assessed using the Assessment of Multiple Systematic Reviews 2 tool. The Grading of Recommendations Assessments, Development and Evaluation framework will be used to rate the quality of evidence. A summary of evidence table and narrative synthesis will be utilised to clearly indicate the findings

DISCUSSION: This umbrella review presents a novel and timely approach to synthesise existing falls literature to identify effective non-pharmacological interventions for people with MS, PD and stroke. Of importance, a robust methodology will be used to explore the differences and similarities in effective interventions for individuals with these neurological conditions to facilitate the development of an intervention for these mixed neurological groups.

Language: en

Keywords

Falls; Intervention; Multiple Sclerosis; Parkinson's Disease; Stroke; Umbrella Review

Predicting falls and injuries in people with multiple sclerosis using machine learning algorithms

Piryonesi SM, Rostampour S, Piryonesi SA. *Mult. Scler. Relat. Disord.* 2021; 49: e102740.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.msard.2021.102740 PMID unavailable

Abstract

Falls in people with Multiple Sclerosis (PwMS) is a serious issue. It can lead to a lot of problems including sustaining injuries, losing consciousness and hospitalization. Having a model that can predict the probability of these falls and the factors correlated with them and can help caregivers and family members to have a clearer understanding of the risks of falling and proactively minimizing them. We used historical data and machine learning algorithms to predict three outcomes: falling, sustaining injuries and injury types caused by falling in PwMS. The training dataset for this study includes 606 examples of monthly readings. The predictive attributes are the following: Expanded Disability Status Scale (EDSS), years passed since the diagnosis of MS, age of participants in the beginning of the experiment, participants' gender, type of MS and season (or month). Two types of algorithms, decision tree and gradient boosted trees (GBT) algorithm, were used to train six models to answer these three outcomes. After the models were trained their accuracy was evaluated using cross-validation. The models had a high accuracy with some exceeding 90%. We did not limit model evaluation to one-number assessments and studied the confusion matrices of the models as well. The GBT had a higher class recall and smaller number of underestimations, which make it a more reliable model. The methodology proposed in this study and its findings can help in developing better decision-support tools to assist PwMS.

Language: en

Keywords

Injury; Machine learning; Fall prediction; Model evaluation; Multiple sclerosis

Cognitive and motor slowing mediate the relationship between depression and falls in multiple sclerosis patients

Cohen JN, Seng E, Foley FW. *Mult. Scler. Relat. Disord.* 2021; 50: e102808.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.msard.2021.102808 PMID unavailable

Abstract

OBJECTIVE: Given the limited research concerning the relationship between depression and falls in multiple sclerosis (MS), this study aimed to examine the direct and indirect association between fall history and depressive symptoms.

METHODS: One hundred and forty seven MS patients had completed at least one neuropsychological assessment that included detailed information regarding fall history, as well as measures of depression, motor function, and cognitive processing speed.

RESULTS: Fall history was associated with higher depressive symptoms and poorer overall motor function. Higher self-reported depressive symptoms were associated with higher odds of falls in the last year (OR = 1.64, 95% CI 1.16, 2.31) in an age adjusted model. Cognitive and motor slowing serially mediated the relationship between depressive symptoms and fall history (estimate = 0.060, 95% CI = 0.01, 0.15).

CONCLUSIONS: With the extensive research on the cognitive and motor correlates of falls in MS, our findings suggest that depressive symptoms are also associated with falls in people with MS. Moreover, this study provides preliminary support for a pathway by which depressive symptoms are related to falls in part through their relationships with cognitive and motor slowing.

Language: en

Keywords

Falls; Multiple sclerosis; Depressive symptoms; Motor function; Processing speed

Fall prevention education for people with multiple sclerosis: a randomized clinical trial

Chanes DC, Piza FMT, San Martin G, Leão ER, dos Santos OFP. Int. J. Qual. Health Care 2021; ePub(ePub): ePub.

(Copyright © 2021, Oxford University Press)

DOI 10.1093/intqhc/mzab035 PMID unavailable

Abstract

BACKGROUND: Online spaced education (OSE) is a method recognized for promoting long-term knowledge retention, changing behaviors, and improving outcomes for students and healthcare professionals. However, there is little evidence about the impacts on patient education. The aim of this research was to compare knowledge retention using educational brochure and OSE on individuals with multiple sclerosis (MS); to verify the impact of educational methods on fall outcome.

METHODS: Individuals with MS (n=230) were randomly assigned for two types of patient education - educational brochure (control) and OSE (intervention). During 12 weeks, the intervention group received multiple choice tests on fall prevention. Knowledge retention, behavior change, and fall incidence were assessed before intervention and after three and six months. The participants' satisfaction with the education method was also evaluated.

RESULTS: Knowledge retention was similar between groups and behavior change was observed in both groups. There was a significant reduction in fall rate in the intervention group, from 0.60 to 0.27 at six months ($p < 0.001$). Participants' satisfaction achieved an average of 8.75, with no differences between groups.

CONCLUSION: Individuals demonstrated significant improvement in fall rate outcome in both groups with no significant difference. On regard to test scores and satisfaction, results were similar between groups.

Language: en

Keywords

fall; patient safety; chronic illness; internet-based education; patient education; patient engagement

Identifying falls remotely in people with multiple sclerosis

Block VJ, Pitsch EA, Gopal A, Zhao C, Pletcher MJ, Marcus GM, Olgin JE, Hollenbach J, Bove R, Cree BAC, Gelfand JM. *J. Neurol.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s00415-021-10743-y PMID 34405267

Abstract

BACKGROUND: Falling is common in people with multiple sclerosis (MS) but tends to be under-ascertained and under-treated.

OBJECTIVE: To evaluate fall risk in people with MS.

METHODS: Ninety-four people with MS, able to walk > 2 min with or without an assistive device (Expanded Disability Status Scale (EDSS) \leq 6.5) were recruited. Clinic-based measures were recorded at baseline and 1 year. Patient-reported outcomes (PROs), including a fall survey and the MS Walking Scale (MSWS-12), were completed at baseline, 1.5, 3, 6, 9, and 12 months. Average daily step counts (STEPS) were recorded using a wrist-worn accelerometer.

RESULTS: 50/94 participants (53.2%) reported falling at least once. Only 56% of participants who reported a fall on research questionnaires had medical-record documented falls. Fallers had greater disability [median EDSS 5.5 (IQR 4.0-6.0) versus 2.5 (IQR 1.5-4.0), $p < 0.001$], were more likely to have progressive MS ($p = 0.003$), and took fewer STEPS (mean difference - 1,979, $p = 0.007$) than Non-Fallers. Stepwise regression revealed MSWS-12 as a major predictor of future falls.

CONCLUSIONS: Falling is common in people with MS, under-reported, and under-ascertained by neurologists in clinic. Multimodal fall screening in clinic and remotely may help improve patient care by identifying those at greatest risk, allowing for timely intervention and referral to specialized physical rehabilitation.

Language: en

Keywords

Fall; Falling; Multiple sclerosis; Outcome measurement; Quality improvement; Remote monitoring

Cerebral Palsy

Randomised trial of virtual reality gaming and physiotherapy on balance, gross motor performance and daily functions among children with bilateral spastic cerebral palsy

Jha KK, Karunanithi GB, Sahana A, Karthikbabu S. Somatosens. Mot. Res. 2021; ePub(ePub): ePub.

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Abstract

BACKGROUND: Balance issues and poor gross motor function affect the daily needs of children with cerebral palsy.

PURPOSE: The study objective was to examine the effects of virtual reality gaming and physiotherapy on balance, gross motor performance and daily functioning among children with bilateral spastic cerebral palsy.

METHOD: Thirty-eight children with bilateral spastic cerebral palsy aged 6-12 years with GMFCS- level II-III, Manual Ability Classification System level I-III participated in this randomized controlled trial. The experimental group performed virtual reality games and physiotherapy, while the control group underwent physiotherapy alone. The exercise intensity was 60 minutes session a day, 4-days a week for 6-weeks. Paediatric Balance Scale (PBS), Kids-Mini-Balance Evaluation System Test (Kids-Mini-BESTest), Gross Motor Function Measure-88 (GMFM-88), and Wee-Functional Independence Measure (WeeFIM) were the outcome measures collected at baseline, 6-week post-training and 2-months follow-up.

RESULTS: The time by group interaction of repeated measures ANOVA revealed no statistical significance for all the outcome measures except Kids-Mini-BESTest ($p < 0.05$). The PBS and, Kids-Mini-BESTest improved by a mean (standard deviation) score of 5.1(1.7) and 8.7(2.8) points, respectively in the experimental group as compared to control group [3.4(1.6) and 5.8(2.5) points]. These gains remained at follow-up ($p < 0.001$).

CONCLUSION: Combined virtual reality gaming and physiotherapy is not superior over physiotherapy alone in improving the gross motor performance and daily functioning among children with bilateral spastic cerebral palsy. Virtual gaming, along with physiotherapy, appears to be beneficial in their balance capacity, warranting further trials to investigate the same in children with GMFCS level-III.

Language: en

Keywords

balance; Bilateral spastic cerebral palsy; daily activities; virtual reality

Development of the better balance program for people with multiple sclerosis: a complex fall-prevention intervention

Comber L, Peterson E, O'Malley N, Galvin R, Finlayson M, Coote S. *Int. J. MS Care* 2021; 23(3): 119-127.

(Copyright © 2021, Clinicians Group)

DOI 10.7224/1537-2073.2019-105 **PMID** 34177384

Abstract

BACKGROUND: Approximately 56% of people with multiple sclerosis (MS) will fall in any 3-month period, with the potential for physical, psychological, and social consequences. Fall-prevention research for people with MS is in its infancy, with a timely need to develop theory-based interventions that reflect the complexity of falls. The clear articulation of the development of any complex intervention is paramount to its future evaluation, usability, and effectiveness. Our aim was to describe how the development of Better Balance, a complex multicomponent fall-prevention intervention for people with MS, was guided by the Medical Research Council framework for the development of complex interventions.

METHODS: Sources of information included existing literature, original research, clinician interviews, and views of people with MS. These sources were synthesized and refined through an iterative process of intervention development involving researchers, clinicians, and people with MS.

RESULTS: The resulting intervention is outlined through a variety of key tasks supplementing the original Medical Research Council framework. Use of this framework resulted in a theoretically based and user-informed complex intervention designed to address the physiological, personal, and behavioral risk factors associated with falls in people with MS.

CONCLUSIONS: The articulation of the systematic process used to develop Better Balance will inform the future evaluation and usability of the intervention.

Language: en

Keywords

Accidental falls; Rehabilitation research; Fall prevention; Multiple sclerosis (MS)

Other Neurological Conditions

Prevalence, etiology and risk factors for falls in neurological patients admitted to the hospital in northern Turkey

Koç Z, Memiş A, Sağlam Z. Acta Clin. Croat. 2020; 59(2): 199-208.

(Copyright © 2020, Klinička bolnica "Sestre milosrdnice" : Institut za kliničko-medicinska istraživanja u Zagrebu)

DOI 10.20471/acc.2020.59.02.01 PMID 33456105

Abstract

This study was carried out to determine the prevalence of falls, their etiology and risk factors in neurological patients admitted to the hospital in northern Turkey. A cross-sectional, descriptive design was used. Data were collected by survey that identified socio-demographic and clinical features of the subjects, Hendrich II fall risk model and Berg Balance Scale (BBS). Study results revealed approximately one-third of the study patients (33.1%) to have sustained falls before. Concerning the timing of falls, 24.9% of these incidents had occurred within the last year. The most common reason for falling was dizziness (14.3%). The mean score on the Hendrich II fall risk model was 2.7 ± 0.1 for those who had fallen and 2.3 ± 0.1 for those who had not fallen. The respective mean BBS score was 20.7 ± 1.9 and 18.4 ± 1.3 . It was found that approximately one-third of neurological patients had fallen before and had restricted their activities due to fear of falls; the great majority of them had a chronic disease and permanently used medicines; and the most important risk factors for falls were advanced age, fear of falls and impaired balance.

Language: en

Keywords

Prevention; Risk; Prevalence; Neurology; Fall; Balance; Etiology

Predictors of falls in patients with degenerative cervical myelopathy: a prospective multi-institutional study

Inose H, Yoshii T, Kimura A, Takeshita K, Inoue H, Maekawa A, Endo K, Miyamoto T, Furuya T, Nakamura A, Mori K, Kanbara S, Imagama S, Seki S, Matsunaga S, Takahashi K, Okawa A. *Spine* 2021; ePub(ePub): ePub.

(Copyright © 2021, Lippincott Williams and Wilkins)

DOI 10.1097/BRS.0000000000003958 PMID unavailable

Abstract

STUDY DESIGN: Prospective multicenter study.

OBJECTIVES: The purpose of this study was to characterize a population of patients with degenerative cervical myelopathy (DCM) combined with a history of falling, and to identify the predictors associated with those falls. SUMMARY OF BACKGROUND DATA: Falls among patients with DCM are common and can lead to the worsening of neurological symptoms. However, there are no prospective studies that have investigated the risk factors for falls in these patients.

METHODS: We prospectively enrolled patients scheduled for surgery for DCM and evaluated the significance of various preoperative measures for predicting falls. We then examined the correlation between the number of falls and the preoperative factors. Lastly, we performed stepwise logistic regression analysis to assess the concurrent effects of various factors on the occurrence of falls.

RESULTS: Among the 135 patients analyzed, 64 experienced one or more falls from the time of enrollment to 1 year postoperatively. Univariate analysis showed that the preoperative potassium and albumin levels, handgrip strength, and the Japanese Orthopaedic Association score for the assessment of cervical myelopathy (C-JOA score) were lower and Nurick grade was higher in the fallers group. Serum potassium level, handgrip strength, C-JOA score, Nurick grade, European Quality of Life-5 Dimensions (EQ-5D) score, t1 pelvic angle, and sagittal vertical axis had weak correlations with the number of falls. The fallers group had a lower C-JOA and EQ-5D scores and a lower recovery rate at one year postoperatively. Stepwise multiple logistic regression analysis identified preoperative potassium level and handgrip strength as the independent preoperative predictors for falling.

CONCLUSION: We identified preoperative lower serum potassium level and weaker handgrip strength as significant predictors of falls in patients with DCM. Therefore, DCM patients with these risk factors should be cautious about falls and might be candidates for immediate surgical intervention. Level of Evidence: N/A.

Language: en

Physical therapy to address fall risk in an individual with neurofibromatosis

Adams RB, Dudley JT, Struessel TS. *Physiother. Theory Pract.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Informa - Taylor and Francis Group)

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Abstract

BACKGROUND: While physical therapy may help improve function and quality of life in patients with neurofibromatosis (NF), a standard of care remains to be established. This case report describes the physical therapy management of an individual with NF who was at high fall risk. **Case Description:** A 61-year-old male with NF and multiple comorbidities was determined to be at high fall risk by the Dynamic Gait Index, Berg Balance Scale, and Modified Falls Efficacy Scale. Deficits included coordination and strength which limited his ability to ascend and descend stairs or walk on uneven terrain. This reduced his independence at home and in his rural community. Interventions incorporated components of hip and trunk coordination, and addressed balance, strength, and functional mobility. **Outcomes:** The patient scored above the cutoff for high fall risk on all outcome assessments.

DISCUSSION: This case report describes physical therapy management to reduce fall risk for an individual with NF. Due to the limited research on NF, the treatment plan was developed using evidence-based practice for fall-risk reduction in other neurological disorders.

Language: en

Keywords

fall risk; quality of life; function; Neurofibromatosis; physical therapy

Establish a nomogram to predict falls in spinocerebellar ataxia type 3

Lin J, Zhang L, Cao B, Wei Q, Ou R, Hou Y, Xu X, Liu K, Gu X, Shang H. *Front. Neurol.* 2020; 11: e602003.

(Copyright © 2020, Frontiers Research Foundation)

DOI 10.3389/fneur.2020.602003 PMID 33584500

Abstract

PURPOSE: Falls are common and are frequently accompanied by injuries in patients with spinocerebellar ataxias type 3 (SCA3). We explored which factors could predict falls in a cohort of patients with SCA3 and developed a nomogram model to predict the first fall in non-fallen patients with SCA3.

METHOD: We conducted a prospective cohort study. Forty-four non-fallen patients with SCA3 were followed up until the first fall or November 5, 2020, whichever came first. Univariate and multivariate Cox proportional hazard regression analyses were applied to explore the predictive factors of falls in patients with SCA3. A nomogram model predicting the no-fall probabilities at 3, 6, 12, and 24 months was formulated based on the results of the multivariate Cox analysis. Internal validation was conducted to assess the discrimination and calibration of the final model using bootstrapping with 1,000 resamples.

RESULTS: Multivariate Cox proportional hazard regression showed that the presence of dystonia, hyperreflexia, urinary incontinence, and hidrosis and the number of abnormal eye movements predicted a more rapid progression to falls in patients with SCA3. The nomogram model showed good discrimination with a concordance index of 0.83 and good calibration.

CONCLUSION: Patients with dystonia, hyperreflexia, urinary incontinence, and hidrosis, and more types of abnormal eye movement had a more rapid progression to falls in SCA3.

Language: en

Keywords

falls; eye movements; nomogram; prospective; spinocerebellar ataxia type 3

Fall prediction in neurological gait disorders: differential contributions from clinical assessment, gait analysis, and daily-life mobility monitoring

Schniepp R, Huppert A, Decker J, Schenkel F, Schlick C, Rasoul A, Dieterich M, Brandt T, Jahn K, Wuehr M. J. Neurol. 2021; ePub(ePub): ePub.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s00415-021-10504-x PMID unavailable

Abstract

OBJECTIVE: To evaluate the predictive validity of multimodal clinical assessment outcomes and quantitative measures of in- and off-laboratory mobility for fall-risk estimation in patients with different forms of neurological gait disorders.

METHODS: The occurrence, severity, and consequences of falls were prospectively assessed for 6 months in 333 patients with early stage gait disorders due to vestibular, cerebellar, hypokinetic, vascular, functional, or other neurological diseases and 63 healthy controls. At inclusion, participants completed a comprehensive multimodal clinical and functional fall-risk assessment, an in-laboratory gait examination, and an inertial-sensor-based daily mobility monitoring for 14 days. Multivariate logistic regression analyses were performed to identify explanatory characteristics for predicting the (1) the fall status (non-faller vs. faller), (2) the fall frequency (occasional vs. frequent falls), and (3) the fall severity (benign vs. injurious fall) of patients.

RESULTS: 40% of patients experienced one or frequent falls and 21% severe fall-related injuries during prospective fall assessment. Fall status and frequency could be reliably predicted (accuracy of 78 and 91%, respectively) primarily based on patients' retrospective fall status. Instrumented-based gait and mobility measures further improved prediction and provided independent, unique information for predicting the severity of fall-related consequences.

INTERPRETATION: Falls- and fall-related injuries are a relevant health problem already in early stage neurological gait disorders. Multivariate regression analysis encourages a stepwise approach for fall assessment in these patients: fall history taking readily informs the clinician about patients' general fall risk. In patients at risk of falling, instrument-based measures of gait and mobility provide critical information on the likelihood of severe fall-related injuries.

Language: en

Keywords

Gait analysis; Fall prediction; Fall risk; Mobility assessment; Neurological gait disorder

Evaluating intrinsic fall risk factors after incomplete spinal cord injury: distinguishing fallers from nonfallers

Musselman KE, Arora T, Chan K, Alavinia M, Bone M, Unger J, Lanovaz J, Oates A. Arch. Rehabil. Res. Clin. Transl. 2021; 3(1): e100096.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.arrct.2020.100096 PMID 33778471

Abstract

OBJECTIVE: To determine whether performance on measures of lower extremity muscle strength, sensory function, postural control, gait speed, and balance self-efficacy could distinguish fallers from nonfallers among ambulatory individuals with spinal cord injury or disease (SCI/D).

DESIGN: Prospective cohort study. **SETTING:** Community. **PARTICIPANTS:** Individuals (N=26; 6 female, aged 58.9±18.2y) with motor incomplete SCI/D (American Spinal Injury Association Impairment Scale rating C [n=5] or D [n=21]) participated. Participants were 7.5±9.1 years post injury. Seventeen participants experienced traumatic causes of spinal cord injury. **MAIN OUTCOME MEASURES:** Participants completed laboratory-based and clinical measures of postural control, gait speed, balance self-efficacy, and lower extremity strength, as well as proprioception and cutaneous pressure sensitivity. Participants were then followed for up to 1 year to track falls using a survey. The survey queried the circumstances and consequences of each fall. If a participant's number of falls equaled or exceeded the median number of falls experience by all participants, they were classified a faller.

RESULTS: Median follow-up duration was 362 days and median time to first fall was 60.5 days. Fifteen participants were classified as fallers. Most falls occurred during the morning or afternoon (81%), at home (75%), and while walking (47%). The following laboratory-based and clinical measures distinguished fallers from nonfallers (P<.05): measures of lower extremity strength, cutaneous pressure sensitivity, walking speed, and center of pressure velocity in the mediolateral direction.

CONCLUSIONS: There are laboratory-based and clinical measures that can prospectively distinguish fallers from nonfallers among ambulatory individuals with spinal cord injury. These findings may assist clinicians when evaluating their patients' fall risk.

Language: en

Keywords

Falls; Accidental falls; Walking; Rehabilitation; Spinal cord injuries; 10MWT, 10-m walk test; ABC, Activities-specific Balance Confidence; Ambulation; AP, anteroposterior; COP, center of pressure; EC, eyes closed; EO, eyes open; IQR, interquartile range; ML, mediolateral; SCI/D, spinal cord injury or disease

Therapists' perspectives on fall prevention in spinal cord injury rehabilitation: a qualitative study

Singh H, Collins K, Flett HM, Jaglal SB, Musselman KE. *Disabil. Rehabil.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Informa - Taylor and Francis Group)

DOI 10.1080/09638288.2021.1904013 **PMID** unavailable

Abstract

PURPOSE: Therapists play a key role in delivering fall prevention/management education to individuals with spinal cord injury/disease, yet their perspectives on this topic remain understudied. Here, we described the perspectives of physical and occupational therapists who routinely provided rehabilitation to patients with spinal cord injury/disease on: (1) how fall risk was assessed, (2) what fall prevention education, interventions or strategies were provided, and (3) opportunities to improve fall risk assessment and the delivery of fall prevention education, strategies and interventions.

MATERIALS AND METHODS: Twenty-one therapists completed an individual interview or focus group that was analyzed using an inductive thematic analysis.

RESULTS: Four main themes were identified: (1) policy and procedures impact practice (i.e., policy and procedures positively and negatively impact practice), (2) assessing and managing fall risk/falls in patients with spinal cord injury/disease (i.e., discipline-specific roles in fall risk assessments and fall management processes in rehabilitation), (3) fall prevention and management education (i.e., helicopter therapists and challenges with fall prevention and management education), (4) building insight into fall risk and management (e.g., building insight into fall risk for patients and therapists).

CONCLUSIONS: This study revealed opportunities to improve the delivery of fall prevention education and training to individuals with spinal cord injury/disease.

IMPLICATIONS FOR REHABILITATION: Fall prevention education should be initiated in spinal cord injury rehabilitation and then reinforced in community rehabilitation. Barriers and challenges faced by therapists when delivering fall prevention and management education/training in spinal cord injury rehabilitation include their perceptions of a patient's readiness to receive fall prevention education, short length of stay in rehabilitation, organization's expectations of zero falls and a lack of spinal cord injury-specific fall prevention resources. Therapists who work in spinal cord injury rehabilitation may benefit from information about fall risk factors encountered by individuals with spinal cord injury/disease in the community.

Language: en

Keywords

Accidental falls; qualitative research; rehabilitation; allied health personnel; spinal cord injuries

Traumatic spinal cord injury caused by low falls and high falls: a comparative study

Zhang ZR, Wu Y, Wang FY, Wang WJ. *J. Orthop. Surg. Res.* 2021; 16(1): e222.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group - BMC)

DOI 10.1186/s13018-021-02379-5 PMID unavailable

Abstract

BACKGROUND: Quite a few traumatic spinal cord injuries (TSCI) were caused by falls. However, the comparison of different causes of TSCI or the epidemiological characteristics of TSCI caused by falls of different heights are rare. This study investigated the epidemiological characteristics of TSCI caused by falls and conducted a comparison between low falls and high falls.

METHOD: Data from cases with TSCI admitted to China Rehabilitation Research Center from 2010 to 2019 were collected, including age, gender, occupation, cause, neurological level, and severity of the injury in admission, combined injuries, complications, and rehabilitation length of stay. Mann-Whitney U and chi-square (χ^2) tests were used to assess the differences between two groups at a statistical significance level of 0.05.

RESULT: A total of 1858 TSCI cases were included and 41.7% were caused by falls, 11.4% by low falls and 30.3% by high falls, respectively. Patients with fall-induced TSCI were older and had a shorter rehabilitation length of stay than those with non-fall-induced TSCI. Patients with high fall-induced TSCI were younger and more likely to suffer from paraplegia, severer injuries, and combined injuries, and had longer time from injury to rehabilitation and rehabilitation length of stay, compared with patients with low fall-induced TSCI.

CONCLUSION: Falls is the leading causes of TSCI and high fall is becoming more common. Attention not only should be paid to high falls for the severe injury and longer hospitalization, but also low falls due to the higher neurological level of the injury and the aging of population in China.

Language: en

Keywords

Epidemiology; Fall; Length of stay; Spinal cord injury; Functional outcome; Older people; Workplace

Vibrotactile-based rehabilitation on balance and gait in patients with neurological diseases: a systematic review and metanalysis

De Angelis S, Princi AA, Dal Farra F, Morone G, Caltagirone C, Tramontano M. *Brain Sci.* 2021; 11(4): e518.

(Copyright © 2021, Switzerland Molecular Diversity Preservation International (MDPI) AG)

DOI 10.3390/brainsci11040518 **PMID** unavailable

Abstract

Postural instability and fear of falling represent two major causes of decreased mobility and quality of life in cerebrovascular and neurologic diseases. In recent years, rehabilitation strategies were carried out considering a combined sensorimotor intervention and an active involvement of the patients during the rehabilitation sessions. Accordingly, new technological devices and paradigms have been developed to increase the effectiveness of rehabilitation by integrating multisensory information and augmented feedback promoting the involvement of the cognitive paradigm in neurorehabilitation. In this context, the vibrotactile feedback (VF) could represent a peripheral therapeutic input, in order to provide spatial proprioceptive information to guide the patient during task-oriented exercises. The present systematic review and metanalysis aimed to explore the effectiveness of the VF on balance and gait rehabilitation in patients with neurological and cerebrovascular diseases. A total of 18 studies met the inclusion criteria and were included. Due to the lack of high-quality studies and heterogeneity of treatments protocols, clinical practice recommendations on the efficacy of VF cannot be made.

RESULTS show that VF-based intervention could be a safe complementary sensory-motor approach for balance and gait rehabilitation in patients with neurological and cerebrovascular diseases. More high-quality randomized controlled trials are needed.

Language: en

Keywords balance rehabilitation; cerebrovascular disease; gait rehabilitation; motor-cognitive; neurological disease; vibrotactile feedback

Reducing fall-related revisits for elderly diabetes patients in emergency departments: a transition flow model

Zhu W, DeLonay A, Smith M, Carayon P, Li J. *IEEE Robot. Autom. Lett.* 2021; 6(3): 5642-5649.

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DOI unavailable PMID 34179457

Abstract

This paper introduces a transition flow model to study fall-related emergency department (ED) revisits for elderly patients with diabetes. Five diabetes classes are used to classify patients at discharge, within 7-day revisits, and between 8 and 30-day revisits. Analytical formulas to evaluate patient revisiting risks are derived. To reduce revisits, sensitivity analysis is introduced to identify the most critical, i.e., dominant, factors whose changes can lead to the largest reduction in revisits. In addition, a case study at University of Wisconsin (UW) Hospital ED is described to illustrate the applicability of the model.

Language: en

Keywords

falls; Emergency department; diabetes; elder patients; revisits; transition flow model