

Safety Literature 23rd August 2020

'We got more than we expected.' Older people's experiences of falls-prevention exercise interventions and implications for practice; a qualitative study

Lafond N, Maula A, Iliffe S, Vedhara K, Audsley S, Kendrick D, Orton E. Prim. Health Care Res. Dev. 2019; 20: e103.

(Copyright © 2019, Cambridge University Press)

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Abstract

AIM: To explore the experiences of older adults participating in strength and balance exercise programmes and understand participants' rationale for programme uptake and completion.

BACKGROUND: Regular physical activity, specifically strength and balance exercises, has been shown to improve health and well-being and reduce the risk of falling in older adults. With the number of people living into older age increasing, understanding older people's experiences of strength and balance programmes and what encourages their take-up and completion is extremely important. This paper reports on the qualitative experiences of older adults that previously participated in ProAct65+, a randomised controlled trial of Falls Management Exercise (FaME) programme and Otago Exercise Programme (OEP) versus usual care.

METHODS: Ten general practices in Nottinghamshire and Derbyshire, England, who participated in the ProAct65+ trial were approached to take part. Using maximum variation sampling (age, gender, falls history, fear of falling and trial arm) we recruited, via the practices, 30 people that had participated in the FaME (n = 15) or OEP (n = 15) trial arms. Participants were interviewed in their own homes. Interviews were audio-recorded, transcribed verbatim and thematically analysed.

FINDINGS: We identified five themes: choice of exercise programme; commitment, discipline and motivation; benchmarking, feedback and monitoring; benefits of the exercise programmes and reactions to the end of the programmes. There were four sub-themes within the benefits theme: pleasure and boredom, social interaction and isolation, physical benefits, and knowledge and understanding.

This study has outlined the experiences and identified specific barriers and facilitators to uptake and completion of falls-prevention exercises by older adults. The perspective and experiences of these participants is important if programmes are to be designed to meet the needs of the target population. Insights from this study will enable commissioners to develop and provide appropriate falls-prevention exercise programmes that encourage high uptake and programme completion.

Language: en

Keywords

older people; physical activity; barriers and facilitators; falls-prevention

Association between ground reaction force in sit-to-stand motion and falls in community-dwelling older Japanese individuals

Kera T, Kawai H, Takahashi J, Hirano H, Watanabe Y, Fujiwara Y, Ihara K, Kim H, Obuchi S. Arch. Gerontol. Geriatr. 2020; 91: e104221.

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Abstract

OBJECTIVES: Ground reaction force (GRF) during sit-to-stand motion is associated with lower extremity strength and balance function. The relationship between GRF and experience of falls has been reported; however, there are no reports on whether GRF can predict the incidence of future falls. We aimed to evaluate the ability of GRF to predict falls and compare GRF with existing predictors.

METHODS: This prospective observational cohort study enrolled 456 community-dwelling older adults living in Itabashi ward who participated in health check-ups in 2016 and 2017. Participants' physical and cognitive functions were assessed, and the maximum GRF (F), F/weight (F/W), rate of force development (RFD), RFD/W (RFD/weight), and time taken to stand up were evaluated. The following year, participants were asked to report the number of falls during the year. Cox proportional hazards regression was conducted to analyze the relationship between the lowest quintile of each GRF parameter as a predictive factor for falling and assess the annual incidence of falls.

RESULTS: Twenty-three participants reported having two or more falls in the previous year. Of all GRF parameters evaluated, only F/W was lower in the fallers than in the non-fallers. After adjusting for sex, age, lifestyle, and comorbidities, F/W was associated with falls in 1 year, and the lowest F/W group had higher risks of falls than the highest F/W group (hazard ratio 2.72, 95 % confidence interval 1.11-6.68). Other measures were not associated with falls.

CONCLUSIONS: GRF during the sit-to-stand motion might predict the incidence of future falls.

Language: en

Keywords

Falls; Community-dwelling older adults; Ground reaction force; Sit-to-stand motion

Diagnostic dependence of muscle strength measurements and the risk of falls in the elderly

Bobowik P, Wiszomirska I. Int. J. Rehabil. Res. 2020; ePub(ePub): ePub.

(Copyright © 2020, Lippincott Williams and Wilkins)

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Abstract

Low muscle strength appears to increase balance disorders and the tendency to fall. Diagnostic terms indicate that sarcopenia and risks of falling are related. The aim of this study is to verify which diagnostic tools used for the assessment of muscle strength in sarcopenia can be used for fall risk assessment in older women. The study included 56 females [71.77 ± 7.43 (SD)]. The results of handgrip strength (HGS) and knee extensors torque [knee extension strength (KES)] were compared to the results of stabilographic parameters from Biodex Balance System platform in static and dynamic environment. The one-way ANOVA and Pearson correlation were performed. There were significant differences between groups with low and normal HGS in the chair test, and between groups with low and normal KES in the fall risk index, FRI12-6 and chair test ($P < 0.05$). Static parameters did not differentiate groups, due to a muscle strength of the upper and lower limbs. There was a statistically significant difference in FRI12-6 values between participants with low and normal KES in age groups ($P = 0.047$). No differences were found in FRI12-6 values between participants with low and normal HGS in age groups ($P = 0.949$). Statistical analysis showed differences in FRI12-6 between fallers with low KES and non-fallers with normal KES, non-fallers with low KES and non-fallers with normal KES.

RESULTS of the study show that there is diagnostic dependence in muscle strength of lower limbs and risk of falls in older women. KES and chair test can be used in fall risk assessment for older women.

Language: en

Dimensional reduction of balance parameters in risk of falling evaluation using a minimal number of force sensitive resistors

Ayena JC, Otis MJD. *Int. J. Occup. Safety Ergonomics* 2020; ePub(ePub): ePub.

(Copyright © 2020, Centralny Instytut Ochrony Pracy - Państwowy Instytut Badawczy, Publisher Informa - Taylor and Francis Group)

DOI 10.1080/10803548.2020.1811516 **PMID** 32807037

Abstract

PURPOSE: As the instrumented insole is for a wide commercial range available in the retail trade, this study aims to reduce its overall cost using less sensors with carrying out an effective risk of falling evaluation.

Methods: We compared the effect of reducing balance parameters by using four and three force sensing resistors (FSRs) of an instrumented insole. The data were previously collected among elderly participants during a Timed Up and Go (TUG) test.

Results: While reducing the number of balance parameters, during sit-to-stand and stand-to-sit activities, the risk scores using four FSRs were not significantly different compared with three FSRs. Parameters reduction did not show any significant loss of information among the study population using four FSRs. For certain configurations of three FSRs, a significant effect of loss information was found in the study participants, which revealed the importance of investigating the sensor locations in the process.

Conclusions: We concluded that it is feasible to estimate a risk index during a TUG test not only after reducing the number of needed sensing units from four to three FSRs but also after reducing the number of balance parameters. The three FSRs should be located at strategic positions to avoid a significant loss of information.

Language: en

Keywords

Falls; Elderly; TUG test

Elder fallers: a group at risk of readmission?

Ratsimbazafy C, Schwab C, Richebourg N, Fernandez C, Hindlet P. *Ann. Pharm. Fr.* 2020; ePub(ePub): ePub.

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DOI 10.1016/j.pharma.2020.08.001 PMID 32805209

Abstract

OBJECTIVES: To describe older patients hospitalized for falls, at risk of readmission and priority for interventions to reduce this risk.

METHODS: We conducted an observational, monocentric, prospective study (from April to June 2019). The inclusion criteria were: patients aged 75 and over, admitted to the Emergency Department for falls, consenting to the study. For patients subsequently hospitalized, the geriatric scores were determined (risk of readmission (ISAR score), state of frailty, degree of autonomy (Katz score)), and when appropriate, medication treatments were listed and compliance of patients was assessed (Girerd score).

RESULTS: In three months, 154 patients were included (median age 86 years [min 75-max 103], sex ratio 0.44), of which 73 patients were hospitalized. Among these patients, 63% presented a high risk of readmission; 45.2% are likely to become frail; 72.6% were dependent. Finally, 53 of the 73 patients (72.6%) had a treatment in primary care and presented a 71.7% non-compliance or low-compliance rate. Fifty height patients (79.5%) had at least 1 drug associated with fall [min 1-max 7].

CONCLUSIONS: Older patients presenting at hospital with a fall were numerous, often likely to become frail and dependent for the majority of them. As the readmission risk is also very high in this population, future studies aiming at reducing the risk of hospital readmission are needed.

Language: fr

Keywords

Aged; risk factors; accidental fall; patient readmission; risk prevention

External validation of the recurrent falls risk scale in community-dwelling stroke individuals

Guimarães M, Monteiro MM, Matos RT, Furtado MC, Maia HF, Almeida LRS, Filho JO, Pinto EB. *J. Stroke Cerebrovasc. Dis.* 2020; 29(9): e104985.

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DOI 10.1016/j.jstrokecerebrovasdis.2020.104985 **PMID** 32807417

Abstract

OBJECTIVE: To externally validate the Recurrent Fall Risk Scale (ReFR) in community-dwelling stroke survivors.

METHODS: Cohort of stroke survivors with independent gait ability recruited from a reference outpatient stroke clinic. Besides sociodemographic and clinical data, the following scales were used: Modified Barthel Index (mBI), ReFR scale and National Institutes of Health Stroke Scale (NIHSS). Participants were followed up for 12 months to record the incidence of falls. Accuracy of the ReFR scale was measured by the area under the ROC curve.

RESULTS: One hundred and thirteen individuals were recruited between April 2016 and November 2016: mean age 54 years (\pm 14), 55% women, median time since the last stroke 24 months (range 12 -48 months), posterior vascular territory affected in 35% of the sample. Median NIHSS was 3 (range 1 to 6), median mBI 49 (range 46-50), median ReFR 3 (range 2 to 5). During the follow-up period, 32 (33%) subjects had at least one fall and 18 (19%) were recurrent fallers (two or more falls). The accuracy of ReFR scale was 0.67 (95% CI = 0.54-0.79), $p = 0.026$.

CONCLUSION: This study externally validated the ReFR as a tool to predict recurrent falls in individuals after stroke.

Language: en

Keywords

Community; Stroke; Recurrent falls; Prediction; Scale

Factors associated with falls in older women with breast cancer: the use of a brief geriatric screening tool in clinic

Bartlett DB, Broadwater G, White HK, Shelby R, Zullig LL, Robertson J, Kanesvaran R, Cohen HJ, Kimmick G. *Breast Cancer Res. Treat.* 2020; ePub(ePub): ePub.

(Copyright © 2020, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s10549-020-05862-5 **PMID** 32794062

Abstract

PURPOSE: Unintentional falls and breast cancer are common among older women, but the associations between them are understudied. We aimed to identify factors associated with falls in older women with breast cancer.

METHODS: We retrospectively reviewed clinical records of older women with breast cancer at Duke Medical Center who had completed the Senior Adult Oncology Program geriatric assessment. Characteristics were compared between women had had at least one fall in the past year and those who did not. Pearson's Chi-square tests and t tests were used for comparison of groups' characteristics. Logistic regression determined factors associated with falling.

RESULTS: We identified 425 women, age 76.2 years (range 65-89 years), at the time of the assessment. 118 (27.8%) women reported a fall in the prior year. Age, race, ethnicity, and time since diagnosis (all $p > 0.05$) were similar between groups. In univariate analyses, metastatic disease ($p = 0.023$) and history of endocrine therapy ($p = 0.042$) were more common among women who fell. Women who fell had lower systolic ($p = 0.001$), diastolic ($p < 0.001$) blood pressures, and SpO₂ ($p = 0.018$). Women who had fallen had a higher Charlson Comorbidity Index (CCI: $p = 0.033$), and were more likely to report using a walking aide ($p < 0.001$), nutritional issues ($p = 0.006$), and depression symptoms ($p = 0.038$). In multivariate analysis, falling was associated with low DBP (OR 0.93; $p = 0.0017$), low SpO₂ (OR 0.79; $p = 0.0169$), a higher CCI (OR 1.23; $p = 0.0076$), and depression symptoms (OR 1.61; $p = 0.039$).

CONCLUSIONS: Among older women with breast cancer, depressive symptoms, higher comorbidity level, and vital sign measurements were associated with having fallen.

Language: en

Fall-related measures in elderly individuals and Parkinson's disease subjects

Michalska J, Kamieniarz A, Brachman A, Marszałek W, Cholewa J, Juras G, Słomka KJ. PLoS One 2020; 15(8): e0236886.

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Abstract

Falls pose a serious problem in elderly and clinical populations. Most often, they lead to a loss of mobility and independence. They might also be an indirect cause of death. The aim of this study was to determine an objective predictor of the fear of falling and falls in elderly subjects (ESs) and Parkinson's disease (PD) subjects. Thirty-two ESs were examined in this study, of whom sixteen were diagnosed with PD. The testing procedures comprised force plate measurements (limit of stability test-LOS test) and clinical tests (Berg Balance Scale, Functional Reach Test, Timed Up and Go test, Tinetti test). The Falls Efficacy Scale International (FES-I) was used to evaluate the fear of falling. The range of the maximum forward lean was normalized to the length from the ankle joint to the head of the first metatarsal bone and was named the functional forward stability indicator (FFSI). The FFSI, derived from the LOS test, allowed us to demonstrate the real deficit in functional stability and individual safety margins. Moreover, the FFSI was highly correlated with the FES-I score and almost all clinical test results in elderly subjects ($r > 0,6$; $p < 0,05$). In PD subjects, the FFSI was poorly correlated with the fear of falling, the BBS score and the FR distance; however, a high correlation with the Tinetti test ($r > 0,6$, $p < 0,05$) was noted. The PD subjects presented a different balance strategy when close to their stability limits, which was also reflected in the lower values of sample entropy ($t = (-2.40)$; $p < 0,05$; $d = 0.87$). The FFSI might be a good predictor of the fear of falling in the group of elderly people. Additionally, the FFSI allows us to show real balance deficits both in PD subjects and in their healthy peers without the need for a reference group and norms. In conclusion, it is postulated that the popular clinical assessments of postural balance in PD subjects should be accompanied by reliable posturography measurements.

Language: en

Fear of older adult falling questionnaire for caregivers (FOAFQ-CG): evidence from content validity and item-response theory graded-response modelling

Yang R, Donaldson GW, Edelman LS, Cloyes KG, Sanders NA, Pepper GA. *J. Adv. Nurs.* 2020; ePub(ePub): ePub.

(Copyright © 2020, John Wiley and Sons)

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Abstract

AIMS: (1) Determine the content validity of the Fear of Older Adult Falling Questionnaire-Caregivers using a panel of gerontological experts and a target sample of family caregivers (Stage 1) and (2) Examine the response patterns of the Fear of Older Adult Falling Questionnaire-Caregivers and compare it with older adult version of Fear of Falling Questionnaire Revised using graded-response modelling (Stage 2).

DESIGN: Cross-sectional mixed-method design.

METHODS: Five content experts and 10 family caregivers were involved in the Stage 1 study and 53 family caregiver-older adult dyads (N = 106) were included in the Stage 2 study. The content-validity index and graded-response modelling were used to analyse data.

RESULTS: Among experts, the Fear of Older Adult Falling Questionnaire-Caregivers content-validity index for relevancy, importance, and clarity of individual items and total scale ranged from 0.60-1.00 and from 0.77-0.87, respectively. Among family caregivers, the ratings of the item and scale level content-validity index for relevancy, importance, and clarity ranged from 0.90-1.00 and from 0.95-0.97, respectively. Combining feedback from both groups, we revised one item. Subsequently, the graded-response modelling revealed that a 1-factor, 3-item version of the Fear of Older Adult Falling Questionnaire-Caregivers had acceptable psychometric properties.

CONCLUSIONS: The brief 3-item version of the Fear of Older Adult Falling Questionnaire-Caregivers is promising for assessing caregivers' fear of their older adult care recipient falling.

IMPACT: A significant concern for family caregivers is fearing that older adult care recipients will fall, but a lack of validated measures limits the study of this phenomena. A 3-item version of the Fear of Older Adult Falling Questionnaire-Caregivers has the potential to identify family caregivers with high fear of older adult falling so that fall risk can be appropriately assessed and addressed.

Language: en

Keywords

older adults; instrument development; falling; family caregivers; fear; graded-response modelling

Language equivalence of the modified falls efficacy scale (MFES) among English- and Spanish-speaking older adults: Rasch analysis

Lucero RJ, Romero S, Fieo R, Cortes Y, Cimiotti JP, Poghosyan L. BMC Geriatr. 2020; 20(1): e286.

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DOI 10.1186/s12877-020-01627-3 PMID 32787777

Abstract

BACKGROUND: To investigate item-level measurement properties of the Modified Falls Efficacy (MFES) Scale among English- and Spanish-speaking urban-dwelling older adults as a means to evaluate language equivalence of the tool.

METHODS: Secondary analysis of survey data from 170 English (n = 83) and Spanish (n = 87) speaking older adults who reported to the emergency department of a quaternary medical center in New York City between February 2010 and August 2011. The Rasch rating scale model was used to investigate item statistics and ordering of items, item and person reliability, and model performance of the Modified Falls Efficacy Scale.

RESULTS: The Modified Falls Efficacy Scale, for English- and Spanish-speakers, demonstrated acceptable fit to the Rasch model of a unidimensional measure. While the range of the construct is more limited for the Spanish group, the interval between tasks are much closer, reflecting little to no construct under-representation.

CONCLUSION: There is rationale for continued testing of a unidimensional English- and Spanish-MFES among urban community-dwelling older adults. Large-scale international studies linking the unidimensional MFES to patient outcomes will support the validity of this tool for research and practice.

Language: en

Keywords

Fear of falling; Language equivalence; Modified falls efficacy scale; Psychometric measurement; Rasch analysis

Novel mat exergaming to improve the physical performance, cognitive function, and dual-task walking and decrease the fall risk of community-dwelling older adults

Peng HT, Tien CW, Lin PS, Peng HY, Song CY. *Front. Psychol.* 2020; 11: e1620.

(Copyright © 2020, Frontiers Research Foundation)

DOI 10.3389/fpsyg.2020.01620 PMID 32793044

Abstract

Physical exercise and cognitive training were previously demonstrated to improve the physical functioning and decrease the incidence of falls for older adults. This study aimed to utilize an interactive exergame mat system to develop a novel cognitive-physical training program and explore the training effects on physical performance, cognitive function, dual-task walking (DTW), and fall risk compared to the control condition. In this quasi-experimental non-randomized controlled intervention study, 110 community-dwelling older adults participated. The exercise group ($n = 56$; mean age, 70.7 ± 4.6 years) performed ladder-type, three-by-three grid-type, and circle-type mat exergames with simultaneous cognitive-physical training (EMAT), while the control group ($n = 54$; mean age, 72.0 ± 5.7 years) underwent a multicomponent exercise intervention focused on physical and cognitive training. A 2 h training session was completed weekly for 3 months. Functional fitness (including upper- and lower-extremity strength and flexibility, grasp strength, aerobic endurance, static balance, dynamic balance and agility), a foot tapping test (FTT), the Montreal Cognitive Assessment (MoCA), DTW, and a fall risk questionnaire (FRQ) were assessed before and after the interventions. The EMAT program enhanced upper-extremity strength, lower-extremity strength and flexibility, aerobic endurance, and dynamic balance and agility; improved DTW and FTT performances; and decreased FRQ score. EMAT also showed a significant advantage over control in terms of lower-extremity strength and flexibility, aerobic endurance, dynamic balance and agility, and FRQ score (all $P < 0.05$). The current study provides evidence of the effects of a novel mat exergaming program on physical and cognitive performance. EMAT effectively reduced the fall risk and increased the dual-task ability of walking, factors that are important in fall prevention for community-dwelling older adults.

Language: en

Keywords

elderly; cognitive training; combined physical; exergame; fall prevention; smart exercise

Perceptions of falls risk and falls prevention among people with osteoarthritis

Tsindos T, Ayton D, Soh SE, Ackerman IN. *Disabil. Rehabil.* 2020; ePub(ePub): ePub.

(Copyright © 2020, Informa - Taylor and Francis Group)

DOI 10.1080/09638288.2020.1806364 PMID 32809876

Abstract

PURPOSE: To understand the perceptions of falls risk and falls prevention, and the perceived enablers and barriers to engaging in falls prevention strategies/activities among people with doctor-diagnosed hip and/or knee osteoarthritis.

METHODS: A qualitative study utilising semi-structured telephone interviews. Researchers independently analysed qualitative data using an inductive method guided by the COM-B framework. Interviews were analysed thematically using open, axial, and selective coding. Recruitment ceased at 20 interviews, once data saturation was evident.

RESULTS: Participants were 18 women and two men aged 52-84 years and half had fallen in the last 12 months. Main themes were the absence of recommendations to access activities after having a fall, inconsistencies between perceptions of the relationship between OA and falls, and individual beliefs of not being at risk of falling because of taking precautions. Knowledge about falls prevention programs was limited, the term "falls prevention" was considered stigmatising and only applicable to older frail people. Home modifications were perceived as broadcasting negativity; participants felt falls terminology should be changed from a negative to a positive focus.

CONCLUSIONS: Falls were often seen as inevitable consequence of keeping active. Re-framing the language used to discuss falls is recommended to promote uptake of falls prevention activities. Implications for rehabilitation Despite growing evidence that osteoarthritis (OA) is an independent risk factor for falls, people with OA do not perceive themselves to be at risk and falls prevention is for those who are "old and frail". Re-framing the language used to discuss falls and falls prevention to focus on positive messages may promote the uptake of falls prevention activities in this population. Improving the awareness of falls and falls risk among people with OA through effective health education is needed in order to foster the uptake of, and engagement with, falls prevention activities.

Language: en

Keywords

barriers; falls; falls prevention; Osteoarthritis; enablers; perceptions

Polypharmacy, benzodiazepines, and antidepressants, but not antipsychotics, are associated with increased falls risk in UK care home residents: a prospective multi-centre study

Izza MAD, Lunt E, Gordon AL, Gladman JRF, Armstrong S, Logan P. *Eur. Geriatr. Med.* 2020; ePub(ePub): ePub.

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DOI 10.1007/s41999-020-00376-1 PMID 32813154

Abstract

PURPOSE: Falls and polypharmacy are both common in care home residents. Deprescribing of medications in residents with increased falls risk is encouraged. Psychotropic medications are known to increase falls risk in older adults. These drugs are often used in care home residents for depression, anxiety, and behavioural and psychological symptoms of dementia. However, a few studies have explored the link between polypharmacy, psychotropic medications, and falls risk in care home residents.

METHODS: This was a prospective cohort study of residents from 84 UK care homes. Data were collected from residents' care records and medication administration records. Age, diagnoses, gender, number of medications, and number of psychotropic medications were collected at baseline and residents were monitored over three months for occurrence of falls. Logistic regression models were used to assess the effect of multiple medications and psychotropic medication on falls whilst adjusting for confounders.

RESULTS: Of the 1655 participants, mean age 85 (SD 8.9) years, 67.9% female, 519 (31%) fell in 3 months. Both the total number of regular drugs prescribed and taking ≥ 1 regular psychotropic medication were independent risk factors for falling (adjusted odds ratio (OR) 1.06 (95% CI 1.03-1.09, $p < 0.01$) and 1.39 (95% CI 1.10-1.76, $p < 0.01$), respectively). The risk of falls was higher in those taking antidepressants ($p < 0.01$) and benzodiazepines ($p < 0.01$) but not antipsychotics ($p > 0.05$).

CONCLUSION: In UK care homes, number of medications and psychotropic medications (particularly antidepressants and benzodiazepines) predicted falls. This information can be used to inform prescribing and deprescribing decisions.

Language: en

Keywords

Accidental falls; Polypharmacy; Psychotropic medications; Residential facilities

Relationship between dynamic trunk balance and the balance evaluation systems test in elderly women

Takahashi Y, Saito K, Matsunaga T, Iwami T, Kudo D, Tate K, Miyakoshi N, Shimada Y. Prog. Rehabil. Med. 2020; 5: e20200004.

(Copyright © 2020, The Japanese Association of Rehabilitation Medicine)

DOI 10.2490/prm.20200004 PMID 32789272

Abstract

OBJECTIVE: Falls are major contributors to elderly subjects becoming bedridden. Consequently, it is important to evaluate and minimize the risk of falls in the elderly. Trunk stability is important for balance function and is related to fall prevention in elderly women. We developed a balance-measuring device that uses a dynamic sitting position to safely measure balance function. The Balance Evaluation Systems Test (BESTest) is useful method to assess balance function, a recently developed balance evaluation test that can detect minor balance problems not captured by previous tests. The purpose of the present study was to examine the relationship between dynamic trunk balance and findings of the BESTest in elderly women.

Methods: Thirty-one healthy women aged 60 years or more participated in this study. The evaluation items were the BESTest total score, scores for each of the six elements of the BESTest, dynamic sitting balance, static postural balance, and muscle strength.

Results: The mean total BESTest score was 85.4 points. The mean total trajectory length of the center of gravity (COG) during the dynamic sitting balance test was 1447.5 mm. A negative correlation ($r=-0.481$, $P=0.006$) was observed between the total COG trajectory length and the BESTest score. A negative correlation was also found between the total COG trajectory length and biomechanical constraints ($r=-0.492$, $P=0.005$) and anticipatory postural adjustments ($r=-0.532$, $P=0.002$). There were no correlations between the dynamic sitting balance total COG trajectory length and the stationary standing COG trajectory length or muscle strength.

Conclusions: In elderly women, the total COG trajectory length during dynamic sitting was negatively correlated with the BESTest total score.

Language: en

Keywords

elderly women; dynamic trunk balance; the Balance Evaluation Systems Test (BESTest)

Relationship between fear of falling, fear-related activity restriction, frailty, and sarcopenia

Merchant RA, Chen MZ, Wong BLL, Ng SE, Shirooma H, Lim JY, Sandrasageran S, Morley JE. *J. Am. Geriatr. Soc.* 2020; ePub(ePub): ePub.

(Copyright © 2020, John Wiley and Sons)

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Abstract

OBJECTIVES: To determine the prevalence of fear of falling (FOF) and fear-related activity restriction (FAR) and their association with frailty, sarcopenia, gait speed and grip strength, cognitive impairment, depression, social isolation, self-perceived health, and vision.

DESIGN: Observational cross-sectional study.

SETTING: Community.

PARTICIPANTS: A total of 493 community-dwelling older adults, 60 years and older.

MEASURES: FOF and FAR were assessed using validated single closed-ended questions.

Questionnaire was administered to evaluate frailty (FRAIL scale - Fatigue, Resistance, Aerobic, Illness, and Loss of Weight), sarcopenia (SARC-F - lifting and carrying 10 pounds, walking across a room, transferring from bed/chair, climbing a flight of 10 stairs, and frequency of falls in the past 1 year), social isolation (six-item Lubben Social Network Scale), depression (Even Brief Assessment Scale), cognition (Chinese Mini-Mental State Examination), and perceived general health and pain (The EuroQol-5 Dimension (EQ-5D) and EQ visual analogue scale (EQ VAS)). Binary logistic regression was performed to determine the influence of sociodemographic, medical, functional, and cognitive variables on FOF with/without FAR.

RESULTS: Prevalence of FOF was 69.2%, and among them, 38.4% had FAR. Prevalence of FOF with or without FAR in those with sarcopenia was 93.3% and in prefrail/frail was 76.6%. FOF was significantly associated with prefrail/frail (odds ratio (OR) = 2.17; 95% confidence interval (CI) = 1.26-3.73), depression (OR = 4.90; 95% CI = 1.06-22.67), number of medications (OR = 1.28; 95% CI = 1.03-1.59), and female sex (OR = 3.54; 95% CI = 1.82-6.90). FOF + FAR was associated with depression (OR = 5.17; 95% CI = 1.84-14.54) and sarcopenia (OR = 8.13; 95% CI = 1.52-43.41).

CONCLUSION: FOF with/without FAR is highly prevalent among community-dwelling older adults, especially in those with sarcopenia, prefrailty, and frailty, with significant negative impact on function, quality of life, social network, and mental health. Further research is needed to investigate the value of population-level screening, causal relationship, and efficacy of comprehensive intervention strategies.

Language: en

Keywords

fear of falling; depression; fear-related activity restriction; FRAIL; SARC-F

The effects of physical exercise on balance and prevention of falls in older people: a systematic review and meta-analysis

Papalia GF, Papalia R, Diaz Balzani LA, Torre G, Zampogna B, Vasta S, Fossati C, Alifano AM, Denaro V. *J. Clin. Med.* 2020; 9(8): e2595.

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DOI 10.3390/jcm9082595 PMID 32796528

Abstract

The aims of this systematic review and meta-analysis were to evaluate the effects of physical exercise on static and dynamic balance in the elderly population, and to analyze the number of falls and fallers. A systematic literature search was conducted using PubMed-Medline, Cochrane Central, and Google Scholar to select randomized clinical trials that analyzed the role of exercise on balance and fall rate in patients aged 65 or older. Sixteen articles were included in this review. Applying the Cochrane risk-of-bias tool, three studies were determined to be at low risk of bias, nine at unclear risk of bias, and four at high risk of bias. The meta-analysis showed improvements in dynamic balance ($p = 0.008$), static balance ($p = 0.01$), participants' fear of falling ($p = 0.10$), balance confidence ($p = 0.04$), quality of life ($p = 0.08$), and physical performance ($p = 0.30$) in patients who underwent physical exercise compared to controls. The analysis of the total numbers of falls showed a decreased likelihood of falls in patients who participated in exercise programs ($p = 0.0008$). Finally, the number of patients who fell at least once was significantly reduced in the intervention group ($p = 0.02$). Physical exercise is an effective treatment to improve balance and reduce fall rates in the elderly.

Language: en

Keywords

systematic review; falls; older people; meta-analysis; balance; physical exercise

Fear of older adult falling questionnaire for caregivers (FOAFQ-CG): evidence from content validity and item-response theory graded-response modelling

Yang R, Donaldson GW, Edelman LS, Cloyes KG, Sanders NA, Pepper GA. *J. Adv. Nurs.* 2020; ePub(ePub): ePub.

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Abstract

AIMS: (1) Determine the content validity of the Fear of Older Adult Falling Questionnaire-Caregivers using a panel of gerontological experts and a target sample of family caregivers (Stage 1) and (2) Examine the response patterns of the Fear of Older Adult Falling Questionnaire-Caregivers and compare it with older adult version of Fear of Falling Questionnaire Revised using graded-response modelling (Stage 2).

DESIGN: Cross-sectional mixed-method design.

METHODS: Five content experts and 10 family caregivers were involved in the Stage 1 study and 53 family caregiver-older adult dyads (N = 106) were included in the Stage 2 study. The content-validity index and graded-response modelling were used to analyse data.

RESULTS: Among experts, the Fear of Older Adult Falling Questionnaire-Caregivers content-validity index for relevancy, importance, and clarity of individual items and total scale ranged from 0.60-1.00 and from 0.77-0.87, respectively. Among family caregivers, the ratings of the item and scale level content-validity index for relevancy, importance, and clarity ranged from 0.90-1.00 and from 0.95-0.97, respectively. Combining feedback from both groups, we revised one item. Subsequently, the graded-response modelling revealed that a 1-factor, 3-item version of the Fear of Older Adult Falling Questionnaire-Caregivers had acceptable psychometric properties.

CONCLUSIONS: The brief 3-item version of the Fear of Older Adult Falling Questionnaire-Caregivers is promising for assessing caregivers' fear of their older adult care recipient falling.

IMPACT: A significant concern for family caregivers is fearing that older adult care recipients will fall, but a lack of validated measures limits the study of this phenomena. A 3-item version of the Fear of Older Adult Falling Questionnaire-Caregivers has the potential to identify family caregivers with high fear of older adult falling so that fall risk can be appropriately assessed and addressed.

Language: en

Keywords

older adults; instrument development; falling; family caregivers; fear; graded-response modelling

Language equivalence of the modified falls efficacy scale (MFES) among English- and Spanish-speaking older adults: Rasch analysis

Lucero RJ, Romero S, Fieo R, Cortes Y, Cimiotti JP, Poghosyan L. BMC Geriatr. 2020; 20(1): e286.

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

DOI 10.1186/s12877-020-01627-3 PMID 32787777

Abstract

BACKGROUND: To investigate item-level measurement properties of the Modified Falls Efficacy (MFES) Scale among English- and Spanish-speaking urban-dwelling older adults as a means to evaluate language equivalence of the tool.

METHODS: Secondary analysis of survey data from 170 English (n = 83) and Spanish (n = 87) speaking older adults who reported to the emergency department of a quaternary medical center in New York City between February 2010 and August 2011. The Rasch rating scale model was used to investigate item statistics and ordering of items, item and person reliability, and model performance of the Modified Falls Efficacy Scale.

RESULTS: The Modified Falls Efficacy Scale, for English- and Spanish-speakers, demonstrated acceptable fit to the Rasch model of a unidimensional measure. While the range of the construct is more limited for the Spanish group, the interval between tasks are much closer, reflecting little to no construct under-representation.

CONCLUSION: There is rationale for continued testing of a unidimensional English- and Spanish-MFES among urban community-dwelling older adults. Large-scale international studies linking the unidimensional MFES to patient outcomes will support the validity of this tool for research and practice.

Language: en

Keywords

Fear of falling; Language equivalence; Modified falls efficacy scale; Psychometric measurement; Rasch analysis

Novel mat exergaming to improve the physical performance, cognitive function, and dual-task walking and decrease the fall risk of community-dwelling older adults

Peng HT, Tien CW, Lin PS, Peng HY, Song CY. *Front. Psychol.* 2020; 11: e1620.

(Copyright © 2020, Frontiers Research Foundation)

DOI 10.3389/fpsyg.2020.01620 PMID 32793044

Abstract

Physical exercise and cognitive training were previously demonstrated to improve the physical functioning and decrease the incidence of falls for older adults. This study aimed to utilize an interactive exergame mat system to develop a novel cognitive-physical training program and explore the training effects on physical performance, cognitive function, dual-task walking (DTW), and fall risk compared to the control condition. In this quasi-experimental non-randomized controlled intervention study, 110 community-dwelling older adults participated. The exercise group ($n = 56$; mean age, 70.7 ± 4.6 years) performed ladder-type, three-by-three grid-type, and circle-type mat exergames with simultaneous cognitive-physical training (EMAT), while the control group ($n = 54$; mean age, 72.0 ± 5.7 years) underwent a multicomponent exercise intervention focused on physical and cognitive training. A 2 h training session was completed weekly for 3 months. Functional fitness (including upper- and lower-extremity strength and flexibility, grasp strength, aerobic endurance, static balance, dynamic balance and agility), a foot tapping test (FTT), the Montreal Cognitive Assessment (MoCA), DTW, and a fall risk questionnaire (FRQ) were assessed before and after the interventions. The EMAT program enhanced upper-extremity strength, lower-extremity strength and flexibility, aerobic endurance, and dynamic balance and agility; improved DTW and FTT performances; and decreased FRQ score. EMAT also showed a significant advantage over control in terms of lower-extremity strength and flexibility, aerobic endurance, dynamic balance and agility, and FRQ score (all $P < 0.05$). The current study provides evidence of the effects of a novel mat exergaming program on physical and cognitive performance. EMAT effectively reduced the fall risk and increased the dual-task ability of walking, factors that are important in fall prevention for community-dwelling older adults.

Language: en

Keywords

elderly; cognitive training; combined physical; exergame; fall prevention; smart exercise

Perceptions of falls risk and falls prevention among people with osteoarthritis

Tsindos T, Ayton D, Soh SE, Ackerman IN. *Disabil. Rehabil.* 2020; ePub(ePub): ePub.

(Copyright © 2020, Informa - Taylor and Francis Group)

DOI 10.1080/09638288.2020.1806364 PMID 32809876

Abstract

PURPOSE: To understand the perceptions of falls risk and falls prevention, and the perceived enablers and barriers to engaging in falls prevention strategies/activities among people with doctor-diagnosed hip and/or knee osteoarthritis.

METHODS: A qualitative study utilising semi-structured telephone interviews. Researchers independently analysed qualitative data using an inductive method guided by the COM-B framework. Interviews were analysed thematically using open, axial, and selective coding. Recruitment ceased at 20 interviews, once data saturation was evident.

RESULTS: Participants were 18 women and two men aged 52-84 years and half had fallen in the last 12 months. Main themes were the absence of recommendations to access activities after having a fall, inconsistencies between perceptions of the relationship between OA and falls, and individual beliefs of not being at risk of falling because of taking precautions. Knowledge about falls prevention programs was limited, the term "falls prevention" was considered stigmatising and only applicable to older frail people. Home modifications were perceived as broadcasting negativity; participants felt falls terminology should be changed from a negative to a positive focus.

CONCLUSIONS: Falls were often seen as inevitable consequence of keeping active. Re-framing the language used to discuss falls is recommended to promote uptake of falls prevention activities. Implications for rehabilitation Despite growing evidence that osteoarthritis (OA) is an independent risk factor for falls, people with OA do not perceive themselves to be at risk and falls prevention is for those who are "old and frail". Re-framing the language used to discuss falls and falls prevention to focus on positive messages may promote the uptake of falls prevention activities in this population. Improving the awareness of falls and falls risk among people with OA through effective health education is needed in order to foster the uptake of, and engagement with, falls prevention activities.

Language: en

Keywords

barriers; falls; falls prevention; Osteoarthritis; enablers; perceptions

Polypharmacy, benzodiazepines, and antidepressants, but not antipsychotics, are associated with increased falls risk in UK care home residents: a prospective multi-centre study

Izza MAD, Lunt E, Gordon AL, Gladman JRF, Armstrong S, Logan P. *Eur. Geriatr. Med.* 2020; ePub(ePub): ePub.

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Abstract

PURPOSE: Falls and polypharmacy are both common in care home residents. Deprescribing of medications in residents with increased falls risk is encouraged. Psychotropic medications are known to increase falls risk in older adults. These drugs are often used in care home residents for depression, anxiety, and behavioural and psychological symptoms of dementia. However, a few studies have explored the link between polypharmacy, psychotropic medications, and falls risk in care home residents.

METHODS: This was a prospective cohort study of residents from 84 UK care homes. Data were collected from residents' care records and medication administration records. Age, diagnoses, gender, number of medications, and number of psychotropic medications were collected at baseline and residents were monitored over three months for occurrence of falls. Logistic regression models were used to assess the effect of multiple medications and psychotropic medication on falls whilst adjusting for confounders.

RESULTS: Of the 1655 participants, mean age 85 (SD 8.9) years, 67.9% female, 519 (31%) fell in 3 months. Both the total number of regular drugs prescribed and taking ≥ 1 regular psychotropic medication were independent risk factors for falling (adjusted odds ratio (OR) 1.06 (95% CI 1.03-1.09, $p < 0.01$) and 1.39 (95% CI 1.10-1.76, $p < 0.01$), respectively). The risk of falls was higher in those taking antidepressants ($p < 0.01$) and benzodiazepines ($p < 0.01$) but not antipsychotics ($p > 0.05$).

CONCLUSION: In UK care homes, number of medications and psychotropic medications (particularly antidepressants and benzodiazepines) predicted falls. This information can be used to inform prescribing and deprescribing decisions.

Language: en

Keywords

Accidental falls; Polypharmacy; Psychotropic medications; Residential facilities

Relationship between dynamic trunk balance and the balance evaluation systems test in elderly women

Takahashi Y, Saito K, Matsunaga T, Iwami T, Kudo D, Tate K, Miyakoshi N, Shimada Y. *Prog. Rehabil. Med.* 2020; 5: e20200004.

(Copyright © 2020, The Japanese Association of Rehabilitation Medicine)

DOI 10.2490/prm.20200004 PMID 32789272

Abstract

OBJECTIVE: Falls are major contributors to elderly subjects becoming bedridden. Consequently, it is important to evaluate and minimize the risk of falls in the elderly. Trunk stability is important for balance function and is related to fall prevention in elderly women. We developed a balance-measuring device that uses a dynamic sitting position to safely measure balance function. The Balance Evaluation Systems Test (BESTest) is useful method to assess balance function, a recently developed balance evaluation test that can detect minor balance problems not captured by previous tests. The purpose of the present study was to examine the relationship between dynamic trunk balance and findings of the BESTest in elderly women.

Methods: Thirty-one healthy women aged 60 years or more participated in this study. The evaluation items were the BESTest total score, scores for each of the six elements of the BESTest, dynamic sitting balance, static postural balance, and muscle strength.

Results: The mean total BESTest score was 85.4 points. The mean total trajectory length of the center of gravity (COG) during the dynamic sitting balance test was 1447.5 mm. A negative correlation ($r=-0.481$, $P=0.006$) was observed between the total COG trajectory length and the BESTest score. A negative correlation was also found between the total COG trajectory length and biomechanical constraints ($r=-0.492$, $P=0.005$) and anticipatory postural adjustments ($r=-0.532$, $P=0.002$). There were no correlations between the dynamic sitting balance total COG trajectory length and the stationary standing COG trajectory length or muscle strength.

Conclusions: In elderly women, the total COG trajectory length during dynamic sitting was negatively correlated with the BESTest total score.

Language: en

Keywords

elderly women; dynamic trunk balance; the Balance Evaluation Systems Test (BESTest)

Relationship between fear of falling, fear-related activity restriction, frailty, and sarcopenia

Merchant RA, Chen MZ, Wong BLL, Ng SE, Shirooma H, Lim JY, Sandrasageran S, Morley JE. *J. Am. Geriatr. Soc.* 2020; ePub(ePub): ePub.

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Abstract

OBJECTIVES: To determine the prevalence of fear of falling (FOF) and fear-related activity restriction (FAR) and their association with frailty, sarcopenia, gait speed and grip strength, cognitive impairment, depression, social isolation, self-perceived health, and vision.

DESIGN: Observational cross-sectional study.

SETTING: Community.

PARTICIPANTS: A total of 493 community-dwelling older adults, 60 years and older.

MEASURES: FOF and FAR were assessed using validated single closed-ended questions.

Questionnaire was administered to evaluate frailty (FRAIL scale - Fatigue, Resistance, Aerobic, Illness, and Loss of Weight), sarcopenia (SARC-F - lifting and carrying 10 pounds, walking across a room, transferring from bed/chair, climbing a flight of 10 stairs, and frequency of falls in the past 1 year), social isolation (six-item Lubben Social Network Scale), depression (Even Briefer Assessment Scale), cognition (Chinese Mini-Mental State Examination), and perceived general health and pain (The EuroQol-5 Dimension (EQ-5D) and EQ visual analogue scale (EQ VAS)). Binary logistic regression was performed to determine the influence of sociodemographic, medical, functional, and cognitive variables on FOF with/without FAR.

RESULTS: Prevalence of FOF was 69.2%, and among them, 38.4% had FAR. Prevalence of FOF with or without FAR in those with sarcopenia was 93.3% and in prefrail/frail was 76.6%. FOF was significantly associated with prefrail/frail (odds ratio (OR) = 2.17; 95% confidence interval (CI) = 1.26-3.73), depression (OR = 4.90; 95% CI = 1.06-22.67), number of medications (OR = 1.28; 95% CI = 1.03-1.59), and female sex (OR = 3.54; 95% CI = 1.82-6.90). FOF + FAR was associated with depression (OR = 5.17; 95% CI = 1.84-14.54) and sarcopenia (OR = 8.13; 95% CI = 1.52-43.41).

CONCLUSION: FOF with/without FAR is highly prevalent among community-dwelling older adults, especially in those with sarcopenia, prefrailty, and frailty, with significant negative impact on function, quality of life, social network, and mental health. Further research is needed to investigate the value of population-level screening, causal relationship, and efficacy of comprehensive intervention strategies.

Language: en

Keywords

fear of falling; depression; fear-related activity restriction; FRAIL; SARC-F

The effects of physical exercise on balance and prevention of falls in older people: a systematic review and meta-analysis

Papalia GF, Papalia R, Diaz Balzani LA, Torre G, Zampogna B, Vasta S, Fossati C, Alifano AM, Denaro V. *J. Clin. Med.* 2020; 9(8): e2595.

(Copyright © 2020, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/jcm9082595 PMID 32796528

Abstract

The aims of this systematic review and meta-analysis were to evaluate the effects of physical exercise on static and dynamic balance in the elderly population, and to analyze the number of falls and fallers. A systematic literature search was conducted using PubMed-Medline, Cochrane Central, and Google Scholar to select randomized clinical trials that analyzed the role of exercise on balance and fall rate in patients aged 65 or older. Sixteen articles were included in this review. Applying the Cochrane risk-of-bias tool, three studies were determined to be at low risk of bias, nine at unclear risk of bias, and four at high risk of bias. The meta-analysis showed improvements in dynamic balance ($p = 0.008$), static balance ($p = 0.01$), participants' fear of falling ($p = 0.10$), balance confidence ($p = 0.04$), quality of life ($p = 0.08$), and physical performance ($p = 0.30$) in patients who underwent physical exercise compared to controls. The analysis of the total numbers of falls showed a decreased likelihood of falls in patients who participated in exercise programs ($p = 0.0008$). Finally, the number of patients who fell at least once was significantly reduced in the intervention group ($p = 0.02$). Physical exercise is an effective treatment to improve balance and reduce fall rates in the elderly.

Language: en

Keywords

systematic review; falls; older people; meta-analysis; balance; physical exercise

Development of a questionnaire to assess fear of falling in children with neuromuscular diseases

İpek C, Yılmaz, Karaduman A, Alemdaroğlu-Gürbüz. J. Pediatr. Orthop. B 2020; ePub(ePub): ePub.

(Copyright © 2020, Lippincott Williams and Wilkins)

DOI 10.1097/BPB.0000000000000792 PMID 32784329

Abstract

Fear of falling (FOF) indicates loss of confidence in the ability to perform daily living activities without falling. Although specific questionnaires do exist to assess FOF in different patient populations, any of them targets the pediatric patients with neuromuscular diseases which falling is a frequent symptom. This study aims to present the development of a self-report FOF questionnaire for children with neuromuscular diseases, pilot application of the questionnaire, and its preliminary psychometric properties. An International Classification of Functioning, Disability and Health (ICF)-based 'Pediatric Fear of Falling Questionnaire' for neuromuscular diseases (Ped-FOF) was created by the study team following the steps of developing an instrument. The questionnaire included 34 items which were organized based on the 'Activities and Participation' component of ICF-children and youth. Thirty children with Duchenne muscular dystrophy (DMD) were recruited to obtain preliminary reliability and validity results of the questionnaire. The mean Ped-FOF score of study population was 15.30 ± 7.03 . According to the preliminary results, intraclass correlation coefficient was 0.715 [confidence interval (CI) 95%], and moderate correlations between Ped-FOF and functional performance and quality of life were determined ($P < 0.05$). Ped-FOF promises a practical assessment of FOF in pediatrics with neuromuscular diseases with understandable items that allow self-report of children. Ped-FOF also allows clinicians and therapists to assess FOF efficiently in limited clinical time. Its preliminary reliability and validity results are also sufficient to be used in DMD that falling is a frequent condition, which indicates that the use of questionnaire is promising in many other pediatric neuromuscular disorders.

Language: en

Dimensional reduction of balance parameters in risk of falling evaluation using a minimal number of force sensitive resistors

Ayena JC, Otis MJD. *Int. J. Occup. Safety Ergonomics* 2020; ePub(ePub): ePub.

(Copyright © 2020, Centralny Instytut Ochrony Pracy - Państwowy Instytut Badawczy, Publisher Informa - Taylor and Francis Group)

DOI 10.1080/10803548.2020.1811516 **PMID** 32807037

Abstract

PURPOSE: As the instrumented insole is for a wide commercial range available in the retail trade, this study aims to reduce its overall cost using less sensors with carrying out an effective risk of falling evaluation.

Methods: We compared the effect of reducing balance parameters by using four and three force sensing resistors (FSRs) of an instrumented insole. The data were previously collected among elderly participants during a Timed Up and Go (TUG) test.

Results: While reducing the number of balance parameters, during sit-to-stand and stand-to-sit activities, the risk scores using four FSRs were not significantly different compared with three FSRs. Parameters reduction did not show any significant loss of information among the study population using four FSRs. For certain configurations of three FSRs, a significant effect of loss information was found in the study participants, which revealed the importance of investigating the sensor locations in the process.

Conclusions: We concluded that it is feasible to estimate a risk index during a TUG test not only after reducing the number of needed sensing units from four to three FSRs but also after reducing the number of balance parameters. The three FSRs should be located at strategic positions to avoid a significant loss of information.

Language: en

Keywords

Falls; Elderly; TUG test

Falling as a strategy to decrease knee loading during landings: implications for ACL injury prevention

Li L, Baur M, Baldwin K, Kuehn T, Zhu Q, Herman D, Dai B. J. Biomech. 2020; 109: e109906.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.jbiomech.2020.109906 PMID 32807342

Abstract

Anterior cruciate ligament (ACL) injuries often occur when individuals land primarily on a single leg. Falling has been proposed as a potential strategy to decrease knee loading during landings. The purpose of this study was to compare impact forces, knee angles, and knee moments during natural landings, soft landings, and landings followed by falling after forward and vertical jumps, each under single or double-leg conditions. Sixteen male and sixteen female participants (age: 22.0 ± 2.9 years) completed each landing condition while kinematics and ground reaction forces were collected. In the natural landing condition, participants landed as they would in a sport setting. In the soft landing condition, participants landed as softly as possible with increased knee and hip flexion. In the falling condition, participants landed softly and then fell forward or backward onto a mat after forward and vertical jumps, respectively. The falling condition demonstrated the greatest initial and peak knee flexion angles, the least peak vertical ground reaction forces, and the least peak knee extension and adduction moments compared to the natural landing and soft landing conditions. The soft landing condition resulted in similar changes in landing mechanics compared to the natural landing, but the effect was limited for single-leg landings compared to double-leg landings. When the sports environment allows, falling appears to be a potential strategy to decrease knee loading when individuals must land on a single leg with sub-optimal body postures. Future studies are needed to develop progressive training of effective and safe falling techniques.

Language: en

Keywords

Injury risk; Impact; Biomechanics; Forces; Jump-landing

Hospital readmission after climbing-related injury in the United States

Forrester JD, Hunter KA, Tennakoon L, Spain DA. *Wilderness Environ. Med.* 2020; ePub(ePub): ePub.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.wem.2020.05.005 PMID 32800446

Abstract

INTRODUCTION: Rock climbing and mountaineering may result in injury requiring hospital admission. Readmission frequency after climbing-related injury is unknown. The aim of this study was to assess readmission frequency, morbidity, and mortality after admission for climbing-related injury.

METHODS: We performed a retrospective analysis of the 2012 to 2014 national readmission database, a nationally representative sample of all hospitalized patients. Rock climbing, mountain climbing, and wall climbing injuries were identified using International Classification of Diseases-Ninth Revision-Clinical Modification codes (E004.0). Outcomes evaluated included readmission frequency, morbidity, mortality, inpatient admission, and costs. Adjusted analyses accounting for survey methodology were performed. Data are presented as mean±SD.

RESULTS: A weighted-estimate 1324 inpatient admissions were associated with a climbing-related injury. Most patients were aged 18 to 44 y (64%), and 68% (n=896) were male. Isolated extremity injuries were more common than other injuries (49%, n=645). Sixty-five percent (n=856) underwent a major operative procedure. Less than 1% of all climbing-related visits resulted in death. Within 6 mo of the index hospitalization, 2% (n=23) of the patients had at least 1 readmission, with a time to readmission of 9.9±6.6 (95% CI 4.5-15.4) d. Only female sex was associated with increased odds of readmission (odds ratio=5.5; 95% CI 1.5-20.1; P=0.01).

CONCLUSIONS: There is a very low frequency of readmissions after being admitted to the hospital for climbing-related injury. A considerable opportunity to describe the long-term burden of climbing-related injury exists, and further research should be done to assess injury burden treated in the outpatient setting.

Language: en

Keywords

trauma; mortality; morbidity; injury burden; climbing; rock climbing

Reducing falls through the implementation of a multicomponent intervention on a rural mixed rehabilitation ward

Ma CLK, Morrissey RA. *Aust. J. Rural Health* 2020; ePub(ePub): ePub.

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DOI 10.1111/ajr.12646 **PMID** 32794315

Abstract

PROBLEM: There is an absence of literature to guide staff in how falls can be reduced in a diverse patient population on a mixed acute/subacute rehabilitation unit, especially one with daily fluctuations in acuity that occurs due to frequent changes in its acute/rehabilitation patient ratio.

DESIGN: Pre-intervention and post-intervention audits.

SETTING: The Rehabilitation Unit at Tamworth Rural Referral Hospital in Tamworth, NSW.

KEY MEASURES FOR IMPROVEMENT: Improvement in the number of falls and repeat fallers.

STRATEGIES FOR CHANGE: A multicomponent intervention involving: (a) in-service education sessions for nursing staff about falls risk-increasing drugs, (b) patient and family education regarding falls risks and prevention strategies, (c) improving documentation of incident reports by using a set template, (d) ensuring that the correct patient mobility status information is handed over between nursing shifts and physiotherapists providing timely and regular updates, (e) the introduction of the 'traffic light mobility system' and (f) enhancing the use of existing falls prevention strategies.

EFFECTS OF CHANGE: The total falls reduced in number from 36 falls to 19 with a decrease in the number of repeat fallers from 8 to 4. There was also increased compliance with existing falls risk tools and improved documentation of each falls incident which provided insight into activities and times with higher falls risk.

LESSONS LEARNT: A multicomponent approach remained effective even when applied to a mixed acute/subacute rehabilitation ward setting.

Language: en

Keywords

rural; falls reduction; heterogeneous patient population; multicomponent intervention

Trunk and foot acceleration variability during walking relates to fall history and clinical disability in persons with multiple sclerosis

Craig JJ, Bruetsch AP, Lynch SG, Huisinga JM. Clin. Biomech. 2020; 80: e105100.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.clinbiomech.2020.105100 PMID 32798813

Abstract

BACKGROUND: Persons with multiple sclerosis are often at higher risk for falling, but clinical disability scales and fall risk questionnaires are subjective and don't provide specific feedback about why an individual is unstable. The purpose of this study was to determine how relationships between trunk and foot acceleration variability relate to physiological impairments, clinical disability scales, and mobility questionnaires in persons with multiple sclerosis.

METHODS: 15 fallers and 25 non-fallers with multiple sclerosis walked on a treadmill at normal walking speed while trunk and foot accelerations were recorded with wireless accelerometers and variability measures were extracted and used to calculate the gait stability index metrics as a ratio of trunk acceleration variability divided foot acceleration variability. Subjects' sensorimotor delays and lower extremity vibration sensitivity were tested. Subjects also completed clinical disability scales (Guy's Neurological Disability Scale and Patient Reported Expanded Disability Status Scale) and mobility questionnaires (Falls Efficacy Scale, Activities Balance Confidence Scale, 12 Item Multiple Sclerosis Walk Scale).

FINDINGS: Multiple gait stability index metrics were significantly correlated with clinical measures of disability and mobility in multiple sclerosis subjects ($r = 0.354-0.528$), but no correlations were found for sensorimotor delays or lower extremity sensation. Multiple gait stability indices performed at least as well as clinical questionnaires for separating fallers from non-fallers.

INTERPRETATION: The gait stability indices can potentially be used outside of a laboratory setting to measure walking characteristics related to fall history and disability level in people with multiple sclerosis.

Language: en

Keywords

Accelerometers; Falls; Multiple sclerosis; Gait