Safety Literature 10th November 2019

Analysis of falls within paediatric hospital and community healthcare settings

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PMID

31678678

Abstract

PURPOSE: To identify characteristics of paediatric falls within a healthcare setting. DESIGN AND METHODS: A retrospective analysis of falls occurring within inpatient, outpatient, emergency and community healthcare settings of children aged 0-<18 years was conducted using data from the Children's Health Queensland Hospital and Health Service (CHQ-HHS) Clinical Incident Database and Electronic Medical Record between January 1st 2015 and December 31st 2017. One-sample and two-sample Chi-squared tests with post-hoc tests were performed to assess relationships between categorical variables.

RESULTS: The final dataset contained 385 fall events. Children 0-2 years fell most frequently (46.75%) and falls were higher in males (55.58%). Falls from bed were the most common mechanism (30.65%). The incidence rate of inpatient falls was 0.53 falls per 1000 bed days in the tertiary hospital setting and 1.2% of presentations to inpatient community health facilities. Falls from bed were most common in the tertiary hospital inpatient setting (39.84%, $p < .001$) and the emergency department (72.13%, $p < .001$). Falls from furniture/equipment constituted 26.04% of outpatient falls. Most falls occurred in the presence of parents/caregivers (79.48%) and 4.66% of fallers sustained multiple falls.

CONCLUSIONS: This study provides a comprehensive review of the characteristics of fall events in CHQ-HHS over a three-year period and summarises the existing literature in paediatric fall prevention. PRACTICE IMPLICATIONS: Risk assessment and management plans should focus on education, particularly surrounding bed safety. Our findings have informed the development of an integrated evidence-based paediatric-specific fall risk assessment tool and management plan to prevent falls in hospital and community healthcare settings.

Language: en

Analysis of the health profiles and prevalence of falls for patients over 65 years of age in a thermal environment

Bernard PL, Raffort N, Aliaga B, Gamon L, Faucanie M, Picot MC, Maurelli O, Soriteau L, Ninot G, Bousquet J, Blain H. Aging Clin. Exp. Res. 2019; ePub(ePub): ePub.

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DOI

10.1007/s40520-019-01381-6

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31667797

Abstract

BACKGROUND: A falls prevention programme has been initiated in balneotherapy at Balaruc-les-Bains. AIMS: To determine the health profiles of subjects who are at risk of falls, over 65 years of age and attending balneotherapy.

METHODS: Questionnaires were used to evaluate people on their fear of falling. Fatigue was assessed by visual analog scale as well as by functional status over the past 12 months. EQ-5D-3L, the IPAQ questionnaire and Fried's frailty scale were all used. Patients' functional capabilities were tested using the Unipedal stance test, the TUG test, the SPPB, the Tandem walking test and the isometric manual grip strength test.

RESULTS: Out of the 1471 patients (72.45 years ± 5.10), the women (67%) were tested. In the last 12 months, 485 of these 1471 patients fell (33%) and 37% of them suffered a severe injury. 45-50% of these subjects are now in good health. Women had a significantly higher impaired perception of their health than men ($0.02 < p < 0.0001$). According to Fried's criteria, 10.2% of the population is considered frail, with a significantly greater number of women ($p < 0.0001$). Static equilibrium was subnormal (less than 12 s during the TUG). The number of steps in tandem position discriminates individuals and gender as does the speed of moving from A to B and muscular strength.

CONCLUSIONS: More than one-third of the subjects (more women than men) aged 65 or older visiting the Balaruc-les-Bains health resort are pre-frail or frail. They all have a recent history of falls, suffer from impaired muscle strength, and have balance and gait disorders.

Language: en

Keywords

Elderly; Falls; Functional capabilities; Health perception; Thermal environment

Does a sway-based mobile application predict future falls in people with Parkinson disease?

Fiems CL, Combs-Miller SA, Buchanan N, Knowles E, Larson E, Snow R, Moore ES. Arch. Phys. Med. Rehabil. 2019; ePub(ePub): ePub.

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Abstract

OBJECTIVE: To determine whether a sway-based mobile application (SWAY) predicts falls and to evaluate its discriminatory sensitivity and specificity relative to other clinical measures in identifying fallers in individuals with Parkinson disease (PD).

DESIGN: Observational cross-sectional study SETTING: Community PARTICIPANTS: A convenience sample of 59 subjects with idiopathic PD in Hoehn & Yahr levels I-III. INTERVENTIONS: Participants completed a balance assessment using SWAY, the Movement Disorders Systems-Unified PD Rating Scale motor exam, Mini-BESTest, Activities-specific Balance Confidence (ABC) Scale and reported 6 month fall history. Participants also reported falls for each of the following 6 months. Binomial logistic regression was used to identify significant predictors of future fall status. Cutoff scores, sensitivity and specificity were based on receiver operating characteristic plots. MAIN OUTCOME MEASURES: SWAY score RESULTS: The most predictive logistic regression model included fall history, ABC, and SWAY (P <.001). This model explained 61% (Nagelkerke R2) of the variance in fall prediction and correctly classified 85% of fallers. However, only fall history and ABC were statistically significant (P <.02). Using this model, participants were 32 times more likely to fall in the future if they fell in the past. The ABC and Mini-BESTest demonstrated greater accuracy than SWAY (AUC =.76,.72 and.65 respectively). Cutoff scores to identify fallers were 85% for the ABC and 21/28 for the Mini-BESTest.

CONCLUSION: SWAY did not improve the accuracy of predicting future fallers beyond common clinical measures and fall history.

Language: en

Keywords
Balance; Parkinson disease; Postural Sway; Technology Assessment

Fall prevention in primary care using chronic disease management plans: a process evaluation of provider and consumer perspectives

Mackenzie L, Clemson L, Irving D. Aust. Occup. Ther. J. 2019; ePub(ePub): ePub.

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Abstract

INTRODUCTION: Falls are an important issue in primary care. General practitioners (GPs) are in a key position to identify older people at risk of falls on their caseload and put preventative plans into action. Chronic Disease Management (CDM) plans allow GPs to refer to allied health practitioners (AHPs) for evidence-based falls interventions. A previous pilot study reduced falls risk factors using CDM pans with older people at risk of falls. This study aimed to conduct a process evaluation of how the intervention worked in the pilot study for providers and consumers.

METHODS: This process evaluation used qualitative descriptive methods by interviewing the GPs, AHPs and older people involved in the intervention study. An independent researcher conducted interviews. These were audiotaped, transcribed and analysed using thematic analysis. Data were also collected about the implementation of the programme.

RESULTS: Two GPs, three occupational therapists, three physiotherapists and eight older people were interviewed. Key themes emerged from the perspectives of providers and consumers. The programme was implemented as intended, adherence to the exercise diaries was variable and the falls calendars were fully completed for three months of follow-up. The programme was implemented as intended.

CONCLUSION: The pilot CDM falls prevention programme did not identify common barriers attributed to GPs. Older people were amenable to the programme and participated freely. Private AHPs needed to make the CDM items work for their business model. This approach can be rolled out in a larger study and integrated pathways are needed to identify and intervene with older people at risk of falls in primary care.

Language: en

Keywords

accidental falls; ageing; chronic disease; community health services; occupational therapy

Tai chi to prevent falls in older adults

Purdie N. Br. J. Community Nurs. 2019; 24(11): 550-552.

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DOI

10.12968/bjcn.2019.24.11.550

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31674227

Abstract

Frailty is common in older age and those living with frailty are at risk of adverse health outcomes. Exercise programmes could potentially reduce the risks for this group of people by increasing muscle strength, reducing falls and improving overall mobility. This study looks specifically at the effects of weekly tai chi classes in those people living with frailty in older age. This study monitored the participants who attended each week and looked to see if any improvements were made by reducing the risk of falls, and improving mobility. Validated tools that assess balance, gait, and identify falls risk were used throughout the study. Initial results indicate a perceived improvement in physical health and wellbeing.

Language: en

Keywords

Ageing; Balance; Falls prevention; Frailty; Tai chi

Impact of vitamin D supplementation on falls and fractures - a critical appraisal of the quality of the evidence and an overview of the available guidelines

Chakhtoura M, Chamoun N, Rahme M, El-Hajj Fuleihan G. Bone 2019; ePub(ePub): ePub.

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DOI 10.1016/j.bone.2019.115112 **PMID** 31676406

Abstract

INTRODUCTION: The beneficial effect of vitamin D supplementation on musculo-skeletal outcomes have been recently questioned and recommendations regarding supplementation vary widely. The aim of this paper is to systematically assess the quality of the evidence evaluating the effect of vitamin D supplementation on falls and fractures.

METHODS: We conducted a systematic search in Medline, PubMed, and Embase and selected systematic reviews (SRs) / meta-analyses (MAs) of randomized controlled trials (RCTs) on vitamin D supplementation and falls or fracture, published between 2012 - 2018. We identified 5 MAs of RCTs on falls, 4 on fractures and 4 on both outcomes. We applied the critical appraisal tool "A MeaSurement Tool to Assess systematic Reviews" - AMSTAR- to assess the quality of the identified MAs.

RESULTS: Vitamin D and calcium supplementation (CaD), compared to calcium only or placebo, may reduce the risk of falls, in institutionalized individuals and/or those from the community, but the data is inconsistent. The largest and most consistent evidence for a protective effect of CaD, compared to placebo or control, is in reducing the risk of hip fracture, by 16-33%, and any fracture, by 5-19%. This effect was demonstrated when combining trials in community-dwelling and institutionalized individuals, potentially driven by data from institutionalized individuals as shown in 3 SRs/MAs. Major limitations to the quality of the evidence include variability in the methodology of MAs, but more importantly, differences between trials in terms of subjects' characteristics, vitamin D regimens, outcome definition and ascertainment, risk of bias, trial duration and/or low power. The quality of the included MAs was moderate to critically low.

CONCLUSIONS: While the effect on falls is inconsistent, CaD reduces the risk of fracture (hip and any fracture), as shown in meta-analyses pooling data of studies combining institutionalized and community individuals. The evidence is however limited by major shortcomings and heterogeneity.

Language: en

Keywords

AMSTAR; falls; fractures; meta-analysis; vitamin D

Developing fall-impact protection pad with 3D mesh curved surface structure using 3D printing technology

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DOI

10.3390/polym11111800

PMID

31684002

Abstract

In this study, we present the development of fall-impact protection pads for elderly people using three-dimensional (3D) printing technology. To develop fall-impact protection clothing, it is important to maintain the functionality of the protection pad while ensuring that its effectiveness and appearance remain optimal in the process of inserting it. Therefore, this study explores the benefit of exploiting 3D scan data of the human body using 3D printing technology to develop a fall-impact protection pad that is highly suited to the human body shape. The purpose of this study was to present a 3D modeling process for creating curved protective pads comprising a hexagonal mesh with a spacer fabric structure and to verify the impact protection performance by printing curved pads. To this end, we set up a section that includes pads in the 3D human body scan data and extracted body surface information to be applied in the generation of the pad surface. The sheet-shaped hexagonal mesh structure was cut and separated according to the pad outline, and then deformed according to the curved surface of the human body. The pads were printed, and their protection performance was evaluated; a 79.2-81.8% reduction in impact force was observed compared to similar cases in which the pads were not used.

Language: en

Keywords

3D body scan; 3D mesh; 3D modeling; 3D printing; force attenuation; impact protection pad

A turn for the worse: turning performance in Parkinson's disease and Essential tremor

Baudendistel ST, Schmitt AC, Rodriguez AV, McFarland NR, Hass CJ. Clin. Biomech. 2019; 70: 245-248.

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DOI 10.1016/j.clinbiomech.2019.09.008

PMID 31669958

Abstract

BACKGROUND: Turning is an activity of daily living known to elicit falls in older adults and particularly in persons with movement disorders. Specifically, those with Parkinson's disease have marked impairments in forward walking and turning. Although recent work has identified gait impairment in those with Essential tremor, turning has not been extensively evaluated. As the cerebellum is key in the pathophysiology of Essential tremor, complex tasks like turning, may be impaired for this population. The purpose of this study was to investigate turning behavior and falls in those with Essential tremor and Parkinson's disease.

METHODS: 15 persons with Essential tremor and 15 persons with Parkinson's disease performed forward walking and turns on an instrumented walkway. t-tests compared groups and a regression was performed to predict fall frequency.

FINDINGS: During turning, those with Essential tremor had lower cadence ($p = .042$) and took more time ($p = .05$). No other variables, including forward walking variables, differed between groups. When pooling groups, the significant fall frequency predictor model ($p = .003$) included decreased forward cadence, increased turning cadence, and female sex. Overall, the model explained 40.7% of the variance.

INTERPRETATION: While forward gait performance was similar between groups, those with Essential tremor had increased turn time, a measure often associated with turning impairment. Together, these results suggest overall gait impairment in Essential tremor is more prevalent than recognized. Walking performance, both turning and forward, and sex were predictive of fall frequency. Therapeutic interventions in these populations should include both forward walking and turns to mitigate fall risk.

Language: en

Keywords

Essential tremor; Falls; Gait; Parkinson's disease; Turns

Commonly used screening instruments to identify frailty among community-dwelling older people in a general practice (primary care) setting: a study of diagnostic test accuracy

Ambagtsheer RC, Visvanathan R, Dent E, Yu S, Schultz TJ, Beilby JMD. J. Gerontol. A Biol. Sci. Med. Sci. 2019; ePub(ePub): ePub.

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PMID 31689342

Abstract

BACKGROUND: Rapid frailty screening remains problematic in primary care. The diagnostic test accuracy (DTA) of several screening instruments has not been sufficiently established. We evaluated the DTA of several screening instruments against two reference standards: Fried's Frailty Phenotype [FP] and the Adelaide Frailty Index [AFI]), a self-reported questionnaire.

METHODS: DTA study within three general practices in South Australia. We randomly recruited 243 general practice patients aged 75+ years. Eligible participants were 75+ years, proficient in English and community-dwelling. We excluded those who were receiving palliative care, hospitalised or living in a residential care facility.We calculated sensitivity, specificity, predictive values, likelihood ratios, Youden Index and AUC for: Edmonton Frail Scale [EFS], FRAIL Scale Questionnaire [FQ], Gait Speed Test [GST], Groningen Frailty Indicator [GFI], Kihon Checklist [KC], Polypharmacy [POLY], PRISMA-7 [P7], Reported Edmonton Frail Scale [REFS], Self-Rated Health [SRH] and Timed Up and Go [TUG]) against FP [3+ criteria] and AFI [> 0.21].

RESULTS: We obtained valid data for 228 participants, with missing scores for index tests multiply imputed. Frailty prevalence was 17.5% frail, 56.6% pre-frail [FP], and 48.7% frail, 29.0% pre-frail [AFI]. Of the index tests KC (Se: 85.0% [70.2 - 94.3]; Sp: 73.4% [66.5 - 79.6]) and REFS (Se: 87.5% [73.2 - 95.8]; Sp: 75.5% [68.8 - 81.5]), both against FP, showed sufficient diagnostic accuracy according to our pre-specified criteria.

CONCLUSIONS: Two screening instruments - the KC and REFS, show the most promise for wider implementation within general practice, enabling a personalised approach to care for older people with frailty.

Language: en

Keywords

80 and over; Aged; Frailty; Geriatric Assessment; Mass Screening; Primary Health Care

Critical thinking about three meta-analyses: can vitamin D alone or with calcium prevent fractures?

Fan H, Xiao J. Curr. Med. Res. Opin. 2019; ePub(ePub): ePub.

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DOI

10.1080/03007995.2019.1687432

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31670980

Abstract

Critical thinking is crucially important in both research and practice. This article demonstrates that a lack of critical thinking in two meta-analyses resulted in a conclusion that contradicts another meta-analysis and popular opinions.Kahwati et al. and Zhao et al. drew a conclusion that "Vitamin D supplementation alone or with calcium was not associated with reduced fracture incidence among community-dwelling adults without known vitamin D deficiency, osteoporosis, or prior fracture", which apparently contradicted that of Tang et al.Kahwati et al. and Zhao et al. meta-analyzed vitamin D and/or calcium supplementation, which can decrease fracture risk factors, in a population with no known disorders of bone metabolism or vitamin D deficiency. They concluded that supplementation did not reduce fracture incidence. It is important to note that osteoporosis, which supplementation can prevent, and fractures are two distinct concepts.Zhao et al. presented their conclusion without including the conditions under which their conclusion was true. Subsequently, their conclusion was misleadingly interpreted by the public media as "Vitamin D and Calcium Don't Prevent Bone Fractures" and "Vitamin D Does Not Prevent Falls, Calcium Does Not Prevent Fractures-A $2 Billion Waste of Money".If study conclusions do not specify the applicable conditions, guidelines on medications, including supplements, are clinically unacceptable. Researchers must critically think about every step of their studies, including the way their conclusions are presented.

Language: en

Keywords

calcium; critical thinking; fractures; osteoporosis prevention; vitamin D

Development of a frailty phenotype questionnaire for use in screening community-dwelling older adults

Kim S, Kim M, Jung HW, Won CW. J. Am. Med. Dir. Assoc. 2019; ePub(ePub): ePub.

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PMID 31672563

Abstract

OBJECTIVE: The purpose of this study was to develop a screening questionnaire for frailty based on the Fried frailty phenotype (FFP) in community-dwelling older adults.

DESIGN: Cross-sectional data analysis of a cohort study. SETTING AND PARTICIPANTS: The study used baseline data from the Korean Frailty and Aging Cohort Survey, a multicenter longitudinal study undertaken in 10 urban, rural, and suburban communities in Korea between 2016 and 2017. A total of 2917 older adults aged 70 to 84 years were included in the analysis, who were administered questionnaires and physical function tests.

METHODS: Gait speed and grip strength were measured, and all participants completed the International Physical Activity Questionnaire and answered questions about weight loss and exhaustion based on FFP.

RESULTS: Five questions were chosen to screen for FFP: fatigue (exhaustion), resistance (weakness), ambulation (slowness), inactivity, and loss of weight. The Frailty Phenotype Questionnaire (FPQ; range of 0-5) was well correlated with the Fried frailty scale (range of 0-5) ($r = 0.643$; $P < .001$). Frailty based on the FPQ score (≥3 of 5) showed satisfactory diagnostic accuracy for FFP (area under the curve = 0.89), with high sensitivity (81.7%) and specificity (82.5%).

CONCLUSIONS AND IMPLICATIONS: The FPQ is a highly accurate screening tool for FFP in community-dwelling older adults.

Language: en

Keywords

Elderly; Korean; diagnosis; frailty; screening

Gait deficits and dynamic stability in children and adolescents with cerebral palsy: a systematic review and meta-analysis

Chakraborty S, Nandy A, Kesar TM. Clin. Biomech. 2019; 71: 11-23.

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DOI 10.1016/j.clinbiomech.2019.09.005

PMID 31677546

Abstract

BACKGROUND: Studies have demonstrated that ambulatory children and adolescents with cerebral palsy demonstrate atypical gait patterns. Out of numerous gait variables, identification of the most deteriorated gait parameters is important for targeted and effective gait rehabilitation. Therefore, this study aimed to identify the gait parameters with the most discriminating nature to distinguish cerebral palsy gait from normal gait.

METHODS: Multiple databases were searched to include studies on ambulatory children and adolescents with cerebral palsy that included gait (spatio-temporal, kinematic, and kinetic) and dynamic stability variables.

FINDINGS: Of 68 studies that met the inclusion criteria, 35 studies were included in the meta analysis. Effect size was used to assess the discriminative strength of each variable. A large effect (≥ 0.8) of cerebral palsy on double limb support time (Standardized Mean Difference = 0.98), step length (Standardized Mean Difference = 1.65), step width (Standardized Mean Difference = 1.21), stride length (Standardized Mean Difference = 1.75), and velocity (Standardized Mean Difference = 1.42) was observed at preferred-walking speed. At fast-walking speed, some gait variables (i.e. velocity and stride length) exhibited larger effect size compared to preferred-walking speed. For some kinematic variables (e.g. range of motion of pelvis), the effect size varied across the body planes.

INTERPRETATION: Our systematic review detects the most discriminative features of cerebral palsy gait. Non-uniform effects on joint kinematics across the anatomical planes support the importance of 3D gait analysis. Differential effects at fast versus preferred speeds emphasize the importance of measuring gait at a range of speeds.

Language: en

Keywords

Cerebral palsy; Dynamic stability; Gait; Gait biomechanics; Meta-analysis

The effect of external lateral stabilization on the use of foot placement to control mediolateral stability in walking and running

Mahaki M, Bruijn SM, van Dieen JH. PeerJ 2019; 7: e7939.

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DOI

10.7717/peerj.7939

PMID

31681515

Abstract

It is still unclear how humans control mediolateral (ML) stability in walking and even more so for running. Here, foot placement strategy as a main mechanism to control ML stability was compared between walking and running. Moreover, to verify the role of foot placement as a means to control ML stability in both modes of locomotion, this study investigated the effect of external lateral stabilization on foot placement control. Ten young adults participated in this study. Kinematic data of the trunk (T6) and feet were recorded during walking and running on a treadmill in normal and stabilized conditions. Correlation between ML trunk CoM state and subsequent ML foot placement, step width, and step width variability were assessed. Paired t-tests (either SPM1d or normal) were used to compare aforementioned parameters between normal walking and running. Two-way repeated measures ANOVAs (either SPM1d or normal) were used to test for effects of walking vs. running and of normal vs. stabilized condition. We found a stronger correlation between ML trunk CoM state and ML foot placement and significantly higher step width variability in walking than in running. The correlation between ML trunk CoM state and ML foot placement, step width, and step width variability were significantly decreased by external lateral stabilization in walking and running, and this reduction was stronger in walking than in running. We conclude that ML foot placement is coordinated to ML trunk CoM state to stabilize both walking and running and this coordination is stronger in walking than in running.

Language: en

Keywords

Balance; External lateral stabilization; Foot placement strategy; Gait stability; Running; Stepping strategy; Walking