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A fall prediction methodology for elderly based on a depth camera

Alazrai R, Mowafi Y, Hamad E.

Conf. Proc. IEEE Eng. Med. Biol. Soc. 2015; 2015: 4990-4993.

(Copyright © 2015, IEEE (Institute of Electrical and Electronics Engineers))

DOI 10.1109/EMBC.2015.7319512 **PMID** 26737412

Abstract

With the aging of society population, efficient tracking of elderly activities of daily living (ADLs) has gained interest. Advancements of assisting computing and sensor technologies have made it possible to support elderly people to perform real-time acquisition and monitoring for emergency and medical care. In an earlier study, we proposed an anatomical-plane-based human activity representation for elderly fall detection, namely, motion-pose geometric descriptor (MPGD). In this paper, we present a prediction framework that utilizes the MPGD to construct an accumulated histograms-based representation of an ongoing human activity. The accumulated histograms of MPGDs are then used to train a set of support-vector-machine classifiers with a probabilistic output to predict fall in an ongoing human activity. Evaluation results of the proposed framework, using real case scenarios, demonstrate the efficacy of the framework in providing a feasible approach towards accurately predicting elderly falls.

PDF Y Endnote Y

Activity, balance, learning, and exposure (ABLE): a new intervention for fear of falling

Wetherell JL, Johnson K, Chang D, Ward SR, Bower ES, Merz C, Petkus AJ.

Int. J. Geriatr. Psychiatry 2016; ePub(ePub): ePub.

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(Copyright © 2016, John Wiley and Sons)

DOI 10.1002/gps.4393 **PMID** 26729564

Abstract

OBJECTIVE: Fear of falling is an important problem among older adults, even those with relatively low rates of objective fall risk, who are often overlooked as targets for intervention.

METHOD: We developed and pilot tested a new intervention, Activity, Balance, Learning, and Exposure (ABLE), in a sample of 10 older adults with excessive fear of falling. The ABLE intervention integrates exposure therapy and cognitive restructuring with a home safety evaluation and an exercise program and is conducted in the home. In this pilot project, ABLE was jointly conducted by a physical therapist and a psychologist with expertise in geriatric anxiety disorders.

RESULTS: The intervention was feasible and acceptable and resulted in decreases in fear and activity avoidance for most participants. One participant experienced an injurious fall.

DISCUSSION: We learned a number of important lessons resulting in modifications to the inclusion criteria, assessments, and intervention over the course of this pilot study. Results suggest that ABLE has promise for treating excessive fear of falling in the elderly and support testing the intervention in a larger randomized trial. Copyright © 2015 John Wiley & Sons, Ltd.

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Adaptation of multi-joint coordination during standing balance in healthy young and healthy old individuals

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J. Neurophysiol. 2015; ePub(ePub): ePub.

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(Copyright © 2015, American Physiological Society)

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Abstract

Standing balance requires multi-joint coordination between the ankles and hips. We investigated how humans adapt their multi-joint coordination to adjust to various conditions and whether the adaptation differed between healthy young participants and healthy elderly. Balance was disturbed by push/pull rods, applying two continuous and independent force disturbances at the hip level and between the shoulder blades. In addition, external force fields were applied, represented by an external stiffness at the hip, (de)stabilizing the participants' balance. . With multivariate-closed-loop system-identification techniques a description of the neuromuscular control mechanisms were obtained from the corrective joint torques as a response to body sway, represented by Frequency Response Functions (FRFs). Model fits on the FRFs resulted in an estimation of time delays, intrinsic stiffness, reflexive stiffness and damping, of the ankle and hip. Elderly generated similar corrective joint torques but had reduced body sway compared to younger participants, which corresponded to the increased FRF magnitude with age. When a force field was applied, all participants adapted their neuromuscular control actions around the ankles, expressed in a change of FRF magnitude. However, the elderly adapted less compared to the young participants. Model fits on the FRFs showed that elderly had higher intrinsic and reflexive stiffness of the ankle, together with higher time delays of the hip. Furthermore, the elderly adapted their reflexive stiffness around the ankle joint less, compared to young participants. These results imply that elderly were stiffer and were less able to adapt to external force fields.

PDF Y Endnote Y

An innovative approach for decreasing fall trauma admissions from geriatric living facilities: preliminary investigation

Evans T, Gross B, Rittenhouse K, Harnish C, Vellucci A, Bupp K, Horst M, Miller JA, Baier R, Chandler R, Rogers FB.

Am. Surg. 2015; 81(12): 1279-1283.

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(Copyright © 2015, Southeastern Surgical Congress)

DOI unavailable **PMID** 26736168

Abstract

Geriatric living facilities have been associated with a high rate of falls. We sought to develop an innovative intervention approach targeting geriatric living facilities that would reduce geriatric fall admissions to our Level II trauma center. In 2011, a Trauma Prevention Taskforce visited 5 of 28 local geriatric living facilities to present a fall prevention protocol composed of three sections: fall education, risk factor identification, and fall prevention strategies. To determine the impact of the intervention, the trauma registry was queried for all geriatric fall admissions attributed to patients living at local geriatric living facilities. The fall admission rate (total fall admissions/total beds) of the pre-intervention period (2010-2011) was compared with that of the postintervention period (2012-

2013) at the 5 intervention and 23 control facilities. A P value < 0.05 was considered statistically significant. From 2010 to 2013, there were 487 fall admissions attributed to local geriatric living facilities (intervention: 179 fall admissions; control: 308 fall admissions). The unadjusted fall rate decreased at intervention facilities from 8.9 fall admissions/bed pre-intervention to 8.1 fall admissions/bed postintervention, whereas fall admission rates increased at control sites from 5.9 to 7.7 fall admissions/bed during the same period [control/intervention odds ratio (OR), 95% confidence interval (CI) = 1.32, 1.05-1.67; period OR, 95%CI = 1.55, 1.18-2.04, P = 0.002; interaction of control/intervention group and period OR 95% CI = 0.68, 0.46-1.00, P = 0.047]. An aggressive intervention program targeting high-risk geriatric living facilities resulted in a statistically significant decrease in geriatric fall admissions to our Level II trauma center.

PDF Endnote Y

Associations of walking speed, grip strength, and standing balance with total and cause-specific mortality in a general population of Japanese elders

Nofuji Y, Shinkai S, Taniguchi Y, Amano H, Nishi M, Murayama H, Fujiwara Y, Suzuki T.
J. Am. Med. Dir. Assoc. 2015; ePub(ePub): ePub.

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(Copyright © 2015, Lippincott Williams and Wilkins)

DOI 10.1016/j.jamda.2015.11.003 **PMID** 26717805

Abstract

OBJECTIVES: Walking speed, grip strength, and standing balance are key components of physical performance in older people. The present study aimed to evaluate (1) associations of these physical performance measures with cause-specific mortality, (2) independent associations of individual physical performance measures with mortality, and (3) the added value of combined use of the 3 physical performance measures in predicting all-cause and cause-specific mortality.

DESIGN: Prospective cohort study with a follow-up of 10.5 years.

SETTING: Tokyo Metropolitan Institute of Gerontology Longitudinal Interdisciplinary Study on Aging (TMIG-LISA), Japan.

PARTICIPANTS: A total of 1085 initially nondisabled older Japanese aged 65 to 89 years.

MEASUREMENTS: Usual walking speed, grip strength, and standing balance were measured at baseline survey.

RESULTS: During follow-up, 324 deaths occurred (122 of cardiovascular disease, 75 of cancer, 115 of other causes, and 12 of unknown causes). All 3 physical performance measures were significantly associated with all-cause, cardiovascular, and other-cause mortality, but not with cancer mortality, independent of potential confounders. When all 3 physical performance measures were simultaneously entered into the model, each was significantly independently associated with all-cause and cardiovascular mortality. The C statistics for all-cause and cardiovascular mortality were significantly increased by adding grip strength and standing balance to walking speed (P < .01), and the net reclassification improvement for them was estimated at 18.7% and 7.5%, respectively.

CONCLUSION: Slow walking speed, weak grip strength, and poor standing balance predicted all-cause, cardiovascular, and other-cause mortality, but not cancer mortality, independent of covariates. Moreover, these 3 components of physical performance were independently associated with all-cause and cardiovascular mortality and their combined use increased prognostic power.

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Automatic vs. Clinical assessment of fall risk in older individuals: a proof of concept

Rivolta MW, Aktaruzzaman M, Rizzo G, Lafortuna CL, Ferrarin M, Bovi G, Bonardi DR, Sassi R.
Conf. Proc. IEEE Eng. Med. Biol. Soc. 2015; 2015: 6935-6938.

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Abstract

Falling in elderly is a worldwide major problem because it can lead to severe injuries, and even sudden death. Fall risk prediction would provide rapid intervention, as well as reducing the overburden of healthcare systems. Such prediction is currently performed by means of clinical scales. Among them, the Tinetti Scale is one of the better established and mostly used in clinical practice. In this work, we proposed an automatic method to assess the Tinetti scores using a wearable accelerometer. The balance and gait characteristics of 13 elderly subjects have been scored by an expert clinician while performing 8 different motor tasks according to the Tinetti Scale protocol. Two statistical analysis were selected. First, a linear regression study was performed between the Tinetti scores and 8 features (one feature for each task). Second, the generalization quality of the regression model was assessed using a Leave-One SubjectOut approach. The multiple linear regression provided a high correlation between the Tinetti scores and the features proposed (adj. $R(2) = 0.948$; $p = 0.003$). Moreover, six of the eight features added statistically significantly to the prediction of the scores ($p < 0.05$). When testing the generalization capability of the model, a moderate linear correlation was obtained ($R(2) = 0.67$; $p < 0.05$). The results suggested that the automatic method might be a promising tool to assess the falling risk of older individuals.

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Classification of older adults with/without a fall history using machine learning methods

Lin Zhang, Ou Ma, Fabre JM, Wood RH, Garcia SU, Ivey KM, McCann ED.

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(Copyright © 2015, IEEE (Institute of Electrical and Electronics Engineers))

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Abstract

Falling is a serious problem in an aged society such that assessment of the risk of falls for individuals is imperative for the research and practice of falls prevention. This paper introduces an application of several machine learning methods for training a classifier which is capable of classifying individual older adults into a high risk group and a low risk group (distinguished by whether or not the members of the group have a recent history of falls). Using a 3D motion capture system, significant gait features related to falls risk are extracted. By training these features, classification hypotheses are obtained based on machine learning techniques (K Nearest-neighbour, Naive Bayes, Logistic Regression, Neural Network, and Support Vector Machine). Training and test accuracies with sensitivity and specificity of each of these techniques are assessed. The feature adjustment and tuning of the machine learning algorithms are discussed. The outcome of the study will benefit the prediction and prevention of falls.

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Cognitive and physical resources are important in order to complete a geriatric fall prevention programme

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Dan. Med. J. 2016; 63(1).

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(Copyright © 2016, Danish Medical Association)

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Abstract

BACKGROUND: It is well documented that falls may be prevented, but effectiveness in reducing the risk of falling depends on the uptake of and the adherence to preventive actions.

METHODS: 65+-year-old fallers identified by screening for fall risk were offered referral to a geriatric fall clinic together with fallers referred from general practitioners (GPs). They were assessed to identify individual risk factors for falling, and appropriate interventions were planned, including exercise classes.

RESULTS: A total of 811 persons were identified by screening, 342 of whom accepted referral. Furthermore, 176 were referred from GPs. Only 402 of 518 fallers attended the clinic. A total of 65 dropped out by their own request, 29 stopped because they became seriously ill or died. Another 62 patients were discharged before fulfilling the programme as they were unable to participate due to physical or cognitive problems. Indicators of cessation were cognitive or physical weakness.

CONCLUSIONS: Geriatric fall prevention is resource-consuming both in terms of staff needed and with respect to demands made on the patients, and the frailest part of the fall population cannot comply. It is necessary to differentiate fall prevention services for the population of elderly fallers as interventions in primary healthcare have been shown to be more effective among the most frail elderly fallers. **FUNDING:** The project received funding from the Danish Ministry of the Interior and Health and from The Fund for Scientific Work in the Geriatric Field within the former Copenhagen Hospital Corporation. **TRAIL REGISTRATION:** not relevant.

PDF Y Endnote Y

Context aware falls risk assessment: A case study comparison

Reginatto B, Taylor K, Patterson MR, Power D, Komaba Y, Maeda K, Inomata A, Caulfield B.

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(Copyright © 2015, IEEE (Institute of Electrical and Electronics Engineers))

DOI 10.1109/EMBC.2015.7319631 **PMID** 26737531

Abstract

This paper describes three retrospective case studies to illustrate the potential clinical value of a system capable of capturing objective gait metrics and environment data from older adults with a history of falls while they go about their daily lives. Participants in this study wore an inertial sensor above each ankle and a wearable camera around their neck for seven consecutive days. Selected metrics are presented to illustrate scenarios where the data collected by the system could be of clinical value. Evidence suggests that obtaining objective gait metrics and environment data from older adults may not only allow healthcare professionals to assess gait more accurately, but also to design treatment plans and falls prevention strategies that are more specifically tailored to each individual.

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Context focused older adult mobility and gait assessment

Taylor K, Reginatto B, Patterson MR, Power D, Komaba Y, Maeda K, Inomata A, Caulfield B.
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(Copyright © 2015, IEEE (Institute of Electrical and Electronics Engineers))

DOI 10.1109/EMBC.2015.7319989 **PMID** 26737889

Abstract

This paper presents an initial overview of insights gained into how older adults mobilize in the home and community, based on data from inertial sensors which were worn by study participants over a 7-day period. The addition of a wearable camera provided additional contextual information which can be used to assess mobility and understand the factors that influence it in the free living environment. Seven days of data collected from a group of older adults who had experienced one or more falls in the previous six months was compared to that of a control group with no history of falling.

RESULTS showed that both groups spent relatively little time walking in challenging environmental conditions, and that the fallers spent significantly less time walking under regular conditions (no effect on gait) and outdoors. Analysis of gait metrics showed that the fallers were slightly slower in general, and more noticeable differences were observed when the participants were regrouped according to mobility levels determined from baseline assessments using traditional methods.

PDF Y Endnote Y

Depression and frailty in later life: a systematic review

Vaughan L, Corbin AL, Goveas JS.

Clin. Interv. Aging 2015; 10: 1947-1958.

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(Copyright © 2015, Dove Medical Press)

DOI 10.2147/CIA.S69632 **PMID** 26719681 **PMCID** PMC4687619

Abstract

Frailty and depression are important issues affecting older adults. Depressive syndrome may be difficult to clinically disambiguate from frailty in advanced old age. Current reviews on the topic include studies with wide methodological variation. This review examined the published literature on cross-sectional and longitudinal associations between frailty and depressive symptomatology with either syndrome as the outcome, moderators of this relationship, construct overlap, and related medical and behavioral interventions. Prevalence of both was reported. A systematic review of studies published from 2000 to 2015 was conducted in PubMed, the Cochrane Database of Systematic Reviews, and PsychInfo. Key search terms were "frailty", "frail", "frail elderly", "depressive", "depressive disorder", and "depression". Participants of included studies were ≥ 55 years old and community dwelling. Included studies used an explicit biological definition of frailty based on Fried et al's criteria and a screening measure to identify depressive symptomatology. Fourteen studies met the inclusion/exclusion criteria. The prevalence of depressive symptomatology, frailty, or their co-occurrence was greater than 10% in older adults ≥ 55 years old, and these rates varied widely, but less in large epidemiological studies of incident frailty. The prospective relationship between depressive symptomatology and increased risk of incident frailty was robust, while the opposite relationship was less conclusive. The presence of comorbidities that interact with depressive symptomatology increased incident frailty risk. Measurement variability of

depressive symptomatology and inclusion of older adults who are severely depressed, have cognitive impairment or dementia, or stroke may confound the frailty syndrome with single disease outcomes, accounting for a substantial proportion of shared variance in the syndromes. Further study is needed to identify medical and behavioral interventions for frailty and depressive symptomatology that prevent adverse sequelae such as falls, disability, and premature mortality.

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Effectiveness of a home-based cognitive behavioral program to manage concerns about falls in community-dwelling, frail older people: results of a randomized controlled trial

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BMC Geriatr. 2016; 16(1): e2.

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(Copyright © 2016, BioMed Central)

DOI 10.1186/s12877-015-0177-y **PMID** 26739339

Abstract

BACKGROUND: Concerns about falls are common among older people. These concerns, also referred to as fear of falling, can have serious physical and psychosocial consequences, such as functional decline, increased risk of falls, activity restriction, and lower social participation. Although cognitive behavioral group programs to reduce concerns about falls are available, no home-based approaches for older people with health problems, who may not be able to attend such group programs are available yet. The aim of this study was to assess the effectiveness of a home-based cognitive behavioral program on concerns about falls, in frail, older people living in the community.

METHODS: In a randomized controlled trial in the Netherlands, 389 people aged 70 years and older, in fair or poor perceived health, who reported at least some concerns about falls and related activity avoidance were allocated to a control (n = 195) or intervention group (n = 194). The intervention was a home-based, cognitive behavioral program consisting of seven sessions including three home visits and four telephone contacts. The program aims to instill adaptive and realistic views about fall risks via cognitive restructuring and to increase activity and safe behavior using goal setting and action planning and was facilitated by community nurses. Control group participants received usual care. Outcomes at 5 and 12 months follow-up were concerns about falls, activity avoidance due to concerns about falls, disability and falls.

RESULTS: At 12 months, the intervention group showed significant lower levels of concerns about falls compared to the control group. Furthermore, significant reductions in activity avoidance, disability and indoor falls were identified in the intervention group compared with the control group. Effect sizes were small to medium. No significant difference in total number of falls was noted between the groups.

CONCLUSIONS: The home-based, cognitive behavioral program significantly reduces concerns about falls, related activity avoidance, disability and indoor falls in community-living, frail older people. The program may prolong independent living and provides an alternative for those people who are not able or willing to attend group programs. **TRIAL REGISTRATION:** ClinicalTrials.gov, NCT01358032.

Registered 17 May 2011.

PDF Y Endnote Y



Gait analysis and estimation of changes in fall risk factors

Simila H, Immonen M, Merilahti J, Petakoski-Hult T.

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Abstract

Falls are a major problem for older adults. A continuous gait monitoring that provides fall risk assessment would allow timely interventions aiming for preventing falls. The objective of this work was to find out whether gait variables calculated from the acceleration signal measured during walk task in the baseline assessment can predict changes in commonly used fall risk assessment scales after 12 months follow-up. Forty two subjects were measured during walk test with a triaxial acceleration sensor worn on a waist belt at the lower back near the centre of mass. The fall risk was assessed using a test protocol, which included several assessment methods. Gait analysis was able to predict a decline in ABC, BBS and GDS total scores and slower time in STS-5 after twelve-months follow-up. A subsequent study is needed to confirm the model's suitability for data recorded in everyday lives.

PDF Y Endnote Y

Life-stage and mobility: an exploratory GPS study of mobility in multigenerational families, Ahmedabad, India

Isaacson M, D'Ambrosio L, Samanta T, Coughlin J.

J. Aging Soc. Policy 2015; 27(4): 348-363.

Affiliation: New England University Transportation Center, AgeLab , Massachusetts Institute of Technology , Cambridge , Massachusetts , USA.

(Copyright © 2015, Informa - Taylor and Francis Group)

DOI 10.1080/08959420.2015.1058123 **PMID** 26161686

Abstract

As the population of older adults in India grows, research is needed to plan a sustainable future for India's older adults. This paper reports results from a GPS (Global Positioning System) based pilot study that examined the mobility of middle class, older adults living in Ahmedabad, Gujarat, India. Using mobility as a lens through which to examine the lives of older adults, we map potential research and identify policy areas of interest considering older adults in urban India. The study explores the role of life stage in mobility as well as the effects of gender and urban environment on mobility. Using this distinctive perspective on day-to-day life, we propose themes through which, using policy and planning tools, the living environments of older adults in Indian cities can be improved. These policy measures include: focusing on walkability and pedestrian safety in residential areas, building on existing mixed land use to create high accessibility to goods and services in urban environments.

PDF Y Endnote Y

Longitudinal relationships between cognitive decline and gait slowing: the Tasmanian Study of Cognition and Gait

Callisaya ML, Blizzard CL, Wood AG, Thrift AG, Wardill T, Srikanth VK.

J. Gerontol. A Biol. Sci. Med. Sci. 2015; 70(10): 1226-1232.

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(Copyright © 2015, Gerontological Society of America)

DOI 10.1093/gerona/glv066 **PMID** 26009641

Abstract

BACKGROUND: Gait slowing and cognitive decline are both common in older people. Although cross-sectionally related, the longitudinal associations between specific cognitive functions and gait speed are less well understood. We aimed to determine whether decline in specific cognitive domains are associated with change in gait speed.

METHODS: Participants aged 60-85, randomly selected from the electoral roll, were assessed twice over 3 years. Gait speed was obtained using the GAITRite walkway. Raw scores from a cognitive battery were subjected to principal component analyses deriving summary domains of executive function, processing speed, memory, and visuospatial ability. Multivariable linear regression was used to examine the associations between change in each cognitive domain and change in gait speed, adjusting for covariates and stratifying for the presence of baseline cognitive impairment.

RESULTS: Mean age at baseline was 71.1 years (SD = 6.7) and 56% (159/284) were men. Mean follow-up was 2.55 (0.47) years. Decline in executive function, but not other cognitive domains ($p > .05$), was associated with decline in gait speed, cm/s ($\beta = -3.55$, 95% CI = -5.49, -1.61; $p < .001$), both in the presence and absence of baseline cognitive impairment. Stronger associations were seen for those with baseline multiple domain cognitive impairment ($\beta = -6.38$, 95% CI = -12.49, -0.27) and nonamnesic single-domain cognitive impairment ($\beta = -7.74$, 95% CI = -14.76, -0.72).

CONCLUSION: Decline in nonamnesic function (specifically executive function) was associated with decline in gait speed irrespective of the presence of baseline cognitive impairment. Strategies to improve or maintain executive function may prevent gait slowing.

PDF Y Endnote Y

Morbidity or mortality? Variations in trauma centres in the rescue of older injured patients

Zafar SN, Shah AA, Zogg CK, Hashmi ZG, Greene WR, Haut ER, Cornwell EE, Haider AH.

Injury 2015; ePub(ePub): ePub.

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(Copyright © 2015, Elsevier Publishing)

DOI 10.1016/j.injury.2015.11.044 **PMID** 26724172

Abstract

INTRODUCTION: Prior analysis demonstrates improved survival for older trauma patients (age > 64 years) treated at trauma centres that manage a higher proportion of geriatric patients. We hypothesised that 'failure to rescue' (death after a complication during an in-hospital stay) may be responsible for part of this variation. The objective of the study was to determine if trauma centre failure to rescue rates are associated with the proportion of older trauma seen.

METHODS: We analysed data from high volume level 1 and 2 trauma centres participating in the National Trauma Data Bank, years 2007-2011. Centres were categorised by the proportion of older trauma patients seen. Logistic regression analyses were used to provide risk-adjusted rates for major complications (MC) and, separately, for mortality following a MC. Models were adjusted for patient

demographics, comorbid conditions, mechanism and type of injury, presenting vital signs, injury severity, and multiple facility-level covariates. Risk-adjusted rates were plotted against the proportion of older trauma seen and trends determined.

RESULTS: Of the 396,449 older patients at 293 trauma centres that met inclusion criteria, 30,761 (8%) suffered a MC. No difference was found in the risk-adjusted incidence of MC by proportion of older trauma seen. A MC was associated with 34% of all deaths. Of those that suffered a MC, 7413 (24%) died and 76% were successfully rescued. Centres treating higher proportions of older trauma were more successful at rescuing patients after a MC occurred. Patients seen at centres that treat >50% older trauma were 33% (OR=0.67, 95% CI 0.47-0.96) less likely to die following a MC than in centres treating a low proportion (10%) of older trauma.

CONCLUSIONS: Centres more experienced at managing geriatric trauma are more successful at rescuing older patients with serious complications. Processes of care at these centres need to be further examined and used to inform appropriate interventions.

PDF Y Endnote Y

Multicenter external validation of the Geriatric Trauma Outcome Score: a study by the Prognostic Assessment of Life and Limitations After Trauma in the Elderly [PALLIATE] Consortium

Cook AC, Joseph B, Inaba K, Nakonezny PA, Bruns BR, Kerby JD, Brasel KJ, Wolf SE, Cuschieri J, Paulk ME, Rhodes RL, Brakenridge SC, Phelan HA.

J. Trauma Acute Care Surg. 2015; ePub(ePub): ePub.

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DOI 10.1097/TA.0000000000000926 **PMID** 26595708

Abstract

BACKGROUND: A prognostic tool for geriatric mortality after injury called the "Geriatric Trauma Outcome Score" (GTOS), where $GTOS = [age] + [ISS \times 2.5] + [22 \text{ if transfused any PRBCs by 24 hours after admission}]$, was previously developed based on 13 years of data from geriatric trauma patients admitted to Parkland Hospital. We sought to validate the model.

METHODS: Four level I centers identified subjects ≥ 65 years for the period of the original study. The GTOS model was first specified using the formula $[GTOS = age + (ISS \times 2.5) + 22(\text{if given PRBC by 24 hours})]$ developed from the Parkland sample, then used as the sole predictor in a logistic mixed model estimating probability of mortality in the validation sample, accounting for site as a random effect. We estimated the misclassification (error) rate, Brier score, Tjur R-square, and AUC in evaluating the predictive performance of the GTOS model.

RESULTS: The original Parkland sample (n=3,841) was mean age=76.6 years (SD±8.1); mean ISS=12.4 (SD±9.9); mortality=10.8%; and 11.9% received PRBCs at 24 hours. The validation sample (n=18,282) was mean age=77.0 years (SD±8.1); mean ISS=12.3 (SD±10.6); mortality=11.0%; and 14.1% received PRBCs at 24 hours. Fitting the GTOS model to the validation sample revealed that the parameter estimates from the validation sample were similar to those of fitting it to the Parkland sample with highly overlapping 95% confidence limits. The misclassification (error) rate for the GTOS logistic model applied to the validation sample was 9.97%, similar to that of the Parkland sample (9.79%). Brier score, Tjur R-square, and AUC for the GTOS logistic model when applied to the validation sample were 0.07, 0.25, and 0.86, respectively, compared with 0.08, 0.20, and 0.82, respectively, for

the Parkland sample.

CONCLUSION: Utilizing data available at 24 hours post-injury, the GTOS accurately predicts in-hospital mortality for the injured elderly. LEVEL OF EVIDENCE: III STUDY TYPE: Prognostic.

PDF Y Endnote Y

Muscle weakness is related to slip-initiated falls among community-dwelling older adults

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J. Biomech. 2015; ePub(ePub): ePub.

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Abstract

The purposes of this study were (1) to investigate the relationship between muscle weakness and slip-related falls among community-dwelling older adults, and (2) to determine optimal cut-off values with respect to the knee strength capacity which can be used to identify individuals at high risk of falls. Thirty-six healthy older adults participated in this study. Their muscle strength (torque) was assessed at the right knee under maximum voluntary isometric (flexion and extension) contractions. They were then moved to a special treadmill. After walking regularly five times on the treadmill, they experienced an identical and unannounced slip during walking on the treadmill with the protection of a safety harness. This treadmill could be considered a standardized platform, inducing an unexpected slip. Accuracy of predicting slip outcome (fall vs. recovery) was examined for both strength measurements (i.e., the strength capacity of knee extensor and flexor) using univariate logistic regressions. The optimal cutoff values for the two strength measurements were determined by the receiver operating characteristic analysis.

RESULTS showed that fallers displayed significantly lower knee strength capacities compared to their recovery counterpart (1.10 vs. 1.44Nm/kg, $p < 0.01$, effect size Cohen's $d = 0.95$ for extensor; 0.93 vs. 1.13Nm/kg, $p < 0.05$, $d = 0.69$ for flexor). Such results suggested that muscle weakness contributes to falls initiated by a slip during gait. Our findings could provide guidance to identify individuals at increased risk of falling using the derived optimal cutoff values of knee strength capacity among older adults.

PDF Y Endnote Y

Musculoskeletal pain characteristics associated with lower balance confidence in community-dwelling older adults

Stubbs B, Schofield P, Patchay S, Leveille S.

Physiotherapy 2015; ePub(ePub): ePub.

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DOI 10.1016/j.physio.2015.03.3721 **PMID** 26091560

Abstract

OBJECTIVE: To determine whether musculoskeletal pain (pain severity and number of chronic pain sites; single or multisite) is associated with balance confidence over and above previously

established risk factors.

DESIGN: Cross-sectional study.

SETTING: Ten community sites (five day centres, two sheltered housing schemes and three community 'clubs') in the UK.

PARTICIPANTS: Two hundred and eighty-nine community-dwelling older adults [response rate 72%, mean age 78 (standard deviation 8) years, 67% female] completed the study assessment. Eligibility criteria were as follows: living in the community; aged ≥ 60 years; able to walk ≥ 10 m; able to communicate in English; and no cognitive (e.g. dementia), neurological or mental health conditions.

INTERVENTIONS: Not applicable.

MAIN OUTCOME MEASURE: Balance confidence as measured by the 16-item Activities Balance Confidence (ABC) scale (lower scores indicate less confidence).

RESULTS: One hundred and fifty participants had at least one site of chronic musculoskeletal pain (52%), and the remaining 139 (48%) participants did not report chronic musculoskeletal pain. Older people with chronic musculoskeletal pain had significantly lower scores on the ABC scale compared with those without chronic musculoskeletal pain (mean 48.3 vs 71.3, $P < 0.001$). After adjustment for established risk factors, two separate hierarchical regression models demonstrated that both pain severity ($\beta = -0.106$, $P = 0.029$) and number of chronic musculoskeletal pain sites ($\beta = -0.98$, $P = 0.023$) were significantly associated with lower balance confidence.

CONCLUSION: Both pain severity and number of chronic pain sites (particularly multisite pain) are associated with lower balance confidence in community-dwelling older adults. Further research is needed to target pain symptoms and balance confidence in relation to fall risk in older adults with chronic musculoskeletal pain.

PDF Y Endnote Y

Older adults with history of falls are unable to perform walking and prehension movements simultaneously

Rinaldi NM, Moraes R.

Neuroscience 2015; ePub(ePub): ePub.

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DOI 10.1016/j.neuroscience.2015.12.037 **PMID** 26724582

Abstract

Older adults have a greater incidence of falls, and risk of falls will increase when combining two motor tasks. Thus, it is interesting to investigate the effect of fall history on motor performance in older adults when combining walking with another task such as grasping an object. The aim of this study was to investigate the combined task of walking and prehension with different levels of manual task difficulty in older adults with and without a history of falls. Thirty older adults participated in this study; groups were designated as fallers ($n=15$) and non-fallers ($n=15$). Participants were asked to reach-to-grasp a dowel during quiet standing and during walking. Level of manual task difficulty was manipulated by the type of dowel support and obstacles located at different distances to the sides of the dowel. Fall history influenced the performance of this combined task for the most difficult manual conditions. Fallers were able to be identified due to

differences in the grasping strategies used while walking compared to non-fallers. In addition, walking and grasping were mutually modulated due to the level of difficulty of the manual task.

PDF Y Endnote Y

Prevalence of falls in an urban community-dwelling older population of Cape Town, South Africa

Zimba Kalula S, Ferreira M, Swingler G, Badri M, Aihie Sayer A.

J. Nutr. Health Aging 2015; 19(10): 1024-1031.

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(Copyright © 2015, Springer Science+Business Media)

DOI 10.1007/s12603-015-0528-6 **PMID** 26624215

Abstract

OBJECTIVE: Falls are a major cause of disability and mortality in older adults. Studies on falls in this population have mainly been conducted in high income countries, and scant attention has been given to the problem in low and middle income countries, including South Africa. The aim of the study was to establish a rate for falls in older adults in South Africa.

DESIGN: A cross-sectional survey with a 12-month follow-up survey. **SETTING:** Three purposively selected suburbs of Cape Town: Plumstead, Wynberg Central and Gugulethu. **PARTICIPANTS:** Eight hundred and thirty seven randomly sampled ambulant community-dwelling subjects aged ≥ 65 years grouped according to ethnicity in three sub-samples: black Africans, coloureds (people of mixed ancestry) and whites. **MEASUREMENTS:** Data were collected on socio-demographic and health characteristics, and history of falls using a structured questionnaire and a protocol for physical assessments and measurements.

RESULTS: Of the total baseline ($n=837$) and follow-up ($n=632$) survey participants, 76.5% and 77.2 % were females with a mean (S.D) age of 74 years (6.4) and 75 years (6.2), respectively. Rates of 26.4% and 21.9% for falls and of 11% and 6.3% for recurrent falls, respectively, were calculated at baseline and follow-up. Fall rates differed by ethnic sub-sample at baseline: whites 42 %, coloureds 34.4% and black Africans 6.4 % ($p=0.0005$). Rates of 236, 406 and 354 falls per 1000 person years were calculated for men, women and both genders, respectively. Recurrent falls were more common in women than in men.

CONCLUSION: Falls are a significant problem in older adults in South Africa. Effective management of falls and falls prevention strategies for older people in South Africa, need to be developed and implemented.

PDF Y Endnote Y

Promoting walking in older adults: perceived neighborhood walkability influences the effectiveness of motivational messages

Notthoff N, Carstensen LL.

J. Health Psychol. 2015; ePub(ePub): ePub.

Affiliation: Stanford University, USA.

(Copyright © 2015, Sage Publications)

DOI 10.1177/1359105315616470 **PMID** 26604128

Abstract

Positively framed messages seem to promote walking in older adults better than negatively framed messages. This study targeted elderly people in communities unfavorable to walking. Walking was measured with pedometers during baseline (1 week) and intervention (4 weeks). Participants (n = 74) were informed about either the benefits of walking or the negative consequences of not walking. Perceived neighborhood walkability was assessed with a modified version of the Neighborhood Walkability Scale. When perceived walkability was high, positively framed messages were more effective than negatively framed messages in promoting walking; when perceived walkability was low, negatively framed messages were comparably effective to positively framed messages.

PDF Y Endnote Y

Rates and factors associated with falls in older European Americans, Afro-Caribbeans, African-Americans, and Hispanics

Vieira ER, Tappen R, Engström G, da Costa BR.

Clin. Interv. Aging 2015; 10: 1705-1710.

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(Copyright © 2015, Dove Medical Press)

DOI 10.2147/CIA.S91120 **PMID** 26604718 **PMCID** PMC4629952

Abstract

PURPOSE: To evaluate rates and factors associated with older adult falls in different ethnic groups.

PARTICIPANTS AND METHODS: Information on demographics, medical and falls history, and pain and physical activity levels was collected from 550 community-dwelling older adults (75±9 years old, 222 European Americans, 109 Afro-Caribbeans, 106 African-Americans, and 113 Hispanics).

RESULTS: Taking medications for anxiety (risk ratio [RR] =1.4, 95% confidence interval [CI] =1.1-2.0), having incontinence (RR =1.4, 95% CI =1.1-1.8, P=0.013), back pain (RR =1.4, 95% CI =1.0-1.8), feet swelling (RR =1.3, 95% CI =1.1-1.7), and age ≥75 years (RR =1.3, 95% CI =1.0-1.6) were associated with falls. The associations were stronger for Afro-Caribbeans, but they presented approximately 40% lower prevalence of falls than the other groups.

CONCLUSION: Taking anxiety medication, incontinence, back pain, feet swelling, and age ≥75 years were associated with falls, and Afro-Caribbeans presented lower prevalence of falls. These findings need to be taken into consideration in clinical interventions in aging.

PDF Y Endnote Y

Real-world accuracy and use of a wearable fall detection device by older adults

Chaudhuri S, Oudejans D, Thompson HJ, Demiris G.

J. Am. Geriatr. Soc. 2015; 63(11): 2415-2416.

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(Copyright © 2015, John Wiley and Sons)

DOI 10.1111/jgs.13804 **PMID** 26603067 **PMCID** PMC4662041

Abstract [Abstract unavailable]

PDF Y Endnote Y

Robotic psychophysics system for assessment, diagnosis and rehabilitation of the neurological causes of falls in the elderly

Chin-Hsuan Lin, Faisal AA.

Conf. Proc. IEEE Eng. Med. Biol. Soc. 2015; 2015: 3731-3734.

(Copyright © 2015, IEEE (Institute of Electrical and Electronics Engineers))

DOI 10.1109/EMBC.2015.7319204 **PMID** 26737104

Abstract

Falls are the leading causes of unintentional injuries in the elderly and thus pose a major hazard to our ageing society. We present the FOHEPO (FOot HEight POSitioning) system to measure, diagnose and eventually rehabilitate ageing-related neurological causes of falls. We hypothesise that both perceptual and motor variability is likely to increase with age and may lead to imprecise perception and movements causing trip overs, the major triggers of falls. Our robotic experimental system automatically measures and tracks different sources of noise in the nervous system: visual perception noise of obstacle height, proprioceptive noise of localising raising one's foot to a desired height, noise in the visual feedback of the foot movements. We developed age-appropriate psychophysical measurement protocols shorter than standard protocols for perceptual and motor accuracy. These quantify individual subjects perceptual and movement accuracy thresholds through their psychometric curves. Therefore, these platform measurements will enable us to estimate fall probabilities quantitatively, i.e. the chance that a foot will clip an obstacle because subjects did not add a sufficient safety factor when clearing it. Potentially, we can use our FOHEPO system in a game-ified setting to rehabilitate elderly users to move with larger safety factors so as to reduce their risks of trip-over.

PDF Y Endnote Y

Straight and curved path walking among older adults in primary care: associations with fall-related outcomes

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PM R 2015; ePub(ePub): ePub.

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(Copyright © 2015, American Academy of Physical Medicine and Rehabilitation, Publisher Elsevier Publishing)

DOI 10.1016/j.pmrj.2015.12.004 **PMID** 26733078

Abstract

BACKGROUND: Most falls among community-dwelling older adults occur while walking. Simple walking tests that require little resources, and can be interpreted quickly are advocated as useful screening tools for fall prone patients.

OBJECTIVE: To investigate two clinically feasible walking tests, consisting of straight- and curved-path walking and examine their associations with history of prior falls and fall-related outcomes among community-living older adults.

DESIGN: A cross-sectional analysis was performed on baseline data from a longitudinal cohort study.

SETTING: Participants were recruited through primary care practices. **PARTICIPANTS:** Participants included 428 primary care patients ≥ 65 years of age at risk for mobility decline. Participants had a median age of 76.5 years, 67.8% were women, and 82.5% were white.

METHODS: Straight-path walking performance was measured as the time needed to walk a 4 meter

straight path at usual pace from standstill using a stopwatch (timed to 0.1 second). Curved-path walking performance was timed while participants walked from standstill in a figure-of-8 pattern around two cones placed 5 feet apart. MAIN OUTCOME MEASUREMENTS: Multivariable negative binomial regression analyses were performed to assess the relationship between straight-path walking or curved-path walking and self-reported history of number of falls. For fall-related injuries, and fall-related hospitalizations, logistic regression models were used.

RESULTS: In the fully adjusted model, an increase of 1 second in straight path walking time was associated with 26% greater rate of falls (RR=1.26, 95% CI: 1.10-1.45). An increase in curved-path walking time was associated with 8% greater rate of falls (RR=1.08, CI: 1.03-1.14). Neither walk test was associated with history of fall-related injuries or hospitalizations.

CONCLUSIONS: Poor performance on straight- and curved-path walking performance was associated with a history of greater fall rates in the prior year, but not with a history of fall-related injuries or hospitalizations. This information helps inform how prior fall history is related to performance on walking tests in the primary care setting.

PDF Y Endnote Y

Temporal and kinematic variables for real-world falls harvested from lumbar sensors in the elderly population

Bourke AK, Klenk J, Schwickert L, Aminian K, Ihlen EA, Helbostad JL, Chiari L, Becker C.

Conf. Proc. IEEE Eng. Med. Biol. Soc. 2015; 2015: 5183-5186.

(Copyright © 2015, IEEE (Institute of Electrical and Electronics Engineers))

DOI 10.1109/EMBC.2015.7319559 PMID 26737459

Abstract

Automatic fall detection will reduce the consequences of falls in the elderly and promote independent living, ensuring people can confidently live safely at home. Inertial sensor technology can distinguish falls from normal activities. However, <7% of studies have used fall data recorded from elderly people in real life. The FARSEEING project has compiled a database of real life falls from elderly people, to gain new knowledge about fall events. We have extracted temporal and kinematic parameters to further improve the development of fall detection algorithms. A total of 100 real-world falls were analysed. Subjects with a known fall history were recruited, inertial sensors were attached to L5 and a fall report, following a fall, was used to extract the fall signal. This data-set was examined, and variables were extracted that include upper and lower impact peak values, posture angle change during the fall and time of occurrence. These extracted parameters, can be used to inform the design of fall-detection algorithms for real-world falls detection in the elderly.

PDF Y Endnote Y

Understanding and preventing falls: perspectives of first responders and older adults

Ramsey R, Hin A, Prado C, Fernandez M.

Phys. Occup. Ther. Geriatrics 2015; 33(1): 17-33.

(Copyright © 2015, Informa - Taylor and Francis Group)

DOI 10.3109/02703181.2014.978432 PMID unavailable

Abstract

AIMS: To identify characteristics of older adults who contact first responders after a fall, understand experiences of fallers and first responders regarding fall incidents, and explore strategies for fall prevention education and intervention.

METHOD: In this mixed-methods study 471 fall incident reports were quantitatively analyzed for demographic and fall incident information, and qualitative data were collected and analyzed from focus groups and telephone interviews with older adult fallers and first responders.

RESULTS: The majority of fallers were female (62%), the average age was 81, and nearly half (47%) were alone during the fall incident. Polypharmacy was present for a majority of the older adult fallers, with 47% taking five or more medications. Mechanical (57%) and medical (29%) factors were primary contributors to falls. Fallers reported feeling increased vulnerability, depression, frustration, and self-blame after falling. First responders reported challenges communicating with older adult fallers and with care facility staff when assisting residents who had fallen.

CONCLUSIONS: Older adults who fall may benefit from services and supports from first responders and health professionals to help reduce fall risk and maintain independence despite falling.

PDF Y Endnote Y

Understanding the experience of age-related vestibular loss in older individuals: a qualitative study

Harun A, Li C, Bridges JF, Agrawal Y.

Patient 2016; ePub(ePub): ePub.

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(Copyright © 2016, Springer Science+Business Media)

DOI 10.1007/s40271-015-0156-6 **PMID** 26739817

Abstract

BACKGROUND: Inner ear balance (or vestibular) function declines with age and is associated with decreased mobility and an increased risk of falls in older individuals. We sought to understand the lived experience of older adults with vestibular loss in order to improve care in this population.

METHODS: Qualitative data were derived from semi-structured interviews of individuals aged 65 years or older presenting to the Balance and Falls Prevention Clinic from February 1, 2014 to March 30, 2015 for evaluation of age-related vestibular loss. Transcripts were analyzed using interpretive phenomenological analysis. We created a taxonomy of overarching superordinate themes based on the World Health Organization's International Classification of Functioning, Disability, and Health (ICF) Framework, and classified key dimensions within each of these themes.

RESULTS: Sixteen interviews were conducted with individuals (mean age 76.0 years, 75 % female) with age-related vestibular loss. The three superordinate themes and associated key dimensions were (1) body impairment (including depression, fatigue, fear/anxiety, and problems with concentrating and memory); (2) activity limitation and participation restriction (isolation, needing to stop in the middle of activities, reduced participation relative to expectations, reduced ability to drive or travel, and problems with bending/looking up, standing, and walking); and (3) environmental influences (needing help with daily activities). All participants reported difficulty walking.

CONCLUSIONS: Older adults report that vestibular loss impacts their body functioning and restricts their participation in activities. The specific key dimensions uncovered by this qualitative study can be used to evaluate care from the patient's perspective.

PDFN Endnote Y

Wearable technology and ECG processing for fall risk assessment, prevention and detection

Melillo P, Castaldo R, Sannino G, Orrico A, de Pietro G, Pecchia L.

Conf. Proc. IEEE Eng. Med. Biol. Soc. 2015; 2015: 7740-7743.

(Copyright © 2015, IEEE (Institute of Electrical and Electronics Engineers))

DOI 10.1109/EMBC.2015.7320186 **PMID** 26738086

Abstract

Falls represent one of the most common causes of injury-related morbidity and mortality in later life. Subjects with cardiovascular disorders (e.g., related to autonomic dysfunctions and postural hypotension) are at higher risk of falling. Autonomic dysfunctions increasing the risk of falling in the short and mid-term could be assessed by Heart Rate Variability (HRV) extracted by electrocardiograph (ECG). We developed three trials for assessing the usefulness of ECG monitoring using wearable devices for: risk assessment of falling in the next few weeks; prevention of imminent falls due to standing hypotension; and fall detection. Statistical and data-mining methods are adopted to develop classification and regression models, validated with the cross-validation approach. The first classifier based on HRV features enabled to identify future fallers among hypertensive patients with an accuracy of 72% (sensitivity: 51.1%, specificity: 80.2%). The regression model to predict falls due to orthostatic dropdown from HRV recorded before standing achieved an overall accuracy of 80% (sensitivity: 92%, specificity: 90%). Finally, the classifier to detect simulated falls using ECG achieved an accuracy of 77.3% (sensitivity: 81.8%, specificity: 72.7%). The evidence from these three studies showed that ECG monitoring and processing could achieve satisfactory performances compared to other system for risk assessment, fall prevention and detection. This is interesting as differently from other technologies actually employed to prevent falls, ECG is recommended for many other pathologies of later life and is more accepted by senior citizens.

PDF Y Endnote Y

Camera-based fall detection using a particle filter

Debard G, Baldewijns G, Goedemé T, Tuytelaars T, Vanrumste B.

Conf. Proc. IEEE Eng. Med. Biol. Soc. 2015; 2015: 6947-6950.

(Copyright © 2015, IEEE (Institute of Electrical and Electronics Engineers))

DOI 10.1109/EMBC.2015.7319990 **PMID** 26737890

Abstract

More than thirty percent of persons over 65 years fall at least once a year and are often not able to get up again. The lack of timely aid after such a fall incident can lead to severe complications. This timely aid can however be assured by a camera-based fall detection system triggering an alarm when a fall occurs. Most algorithms described in literature use the biggest object detected using background subtraction to extract the fall features. In this paper we compare the performance of our state-of-the-art fall detection algorithm when using only background subtraction, when using a particle filter to track the person and a hybrid method in which the particle filter is only used to enhance the background subtraction and not for the feature extraction. We tested this using our simulation data set containing reenactments of real-life falls. This comparison shows that this hybrid method significantly increases the sensitivity and robustness of the fall detection algorithm resulting in a sensitivity of 76.1% and a PPV of 41.2%.

PDF Y Endnote Y

Easy-to-use, general, and accurate multi-Kinect calibration and its application to gait monitoring for fall prediction

Staranowicz AN, Ray C, Mariottini GL.

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(Copyright © 2015, IEEE (Institute of Electrical and Electronics Engineers))

DOI 10.1109/EMBC.2015.7319513 **PMID** 26737413

Abstract

Falls are the most-common causes of unintentional injury and death in older adults. Many clinics, hospitals, and health-care providers are urgently seeking accurate, low-cost, and easy-to-use technology to predict falls before they happen, e.g., by monitoring the human walking pattern (or "gait"). Despite the wide popularity of Microsoft's Kinect and the plethora of solutions for gait monitoring, no strategy has been proposed to date to allow non-expert users to calibrate the cameras, which is essential to accurately fuse the body motion observed by each camera in a single frame of reference. In this paper, we present a novel multi-Kinect calibration algorithm that has advanced features when compared to existing methods: 1) is easy to use, 2) it can be used in any generic Kinect arrangement, and 3) it provides accurate calibration. Extensive real-world experiments have been conducted to validate our algorithm and to compare its performance against other multi-Kinect calibration approaches, especially to show the improved estimate of gait parameters. Finally, a MATLAB Toolbox has been made publicly available for the entire research community.

PDF Y Endnote Y

Fall-detection solution for mobile platforms using accelerometer and gyroscope data

De Cillisy F, De Simioy F, Guidoy F, Incalzi RA, Setolay R.

Conf. Proc. IEEE Eng. Med. Biol. Soc. 2015; 2015: 3727-3730.

(Copyright © 2015, IEEE (Institute of Electrical and Electronics Engineers))

DOI 10.1109/EMBC.2015.7319203 **PMID** 26737103

Abstract

Falls are a major health risk that diminish the quality of life among elderly people. Apart from falls themselves, most dramatic consequences are usually related with long lying periods that can cause serious side effects. These findings call for pervasive long-term fall detection systems able to automatically detect falls. In this paper, we propose an effective fall detection algorithm for mobile platforms. Using data retrieved from wearable sensors, such as Inertial Measurements Units (IMUs) and/or Smartphones (SPs), our algorithm is able to detect falls using features extracted from accelerometer and gyroscope. While mostly of the mobile-based solutions for fall management deal only with accelerometer data, in the proposed approach we combine the instantaneous acceleration magnitude vector with changes of the user's heading in a Threshold Based Algorithm (TBA). In such a way, we were able to handle falls detection with minimal computational load, increasing the overall system accuracy with respect to traditional fall management methods. Experimental results show the strong detection performance of the proposed solution in discriminating between falls and typical Activities of Daily Living (ADLs) presenting fall-like acceleration patterns.

PDF Y Endnote Y

Influence of urinary urgency and other urinary disturbances on falls in Parkinson's disease

Sakushima K, Yamazaki S, Fukuma S, Hayashino Y, Yabe I, Fukuhara S, Sasaki H.

J. Neurol. Sci. 2016; 360: 153-157.

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(Copyright © 2016, Elsevier Publishing)

DOI 10.1016/j.jns.2015.11.055 **PMID** 26723992

Abstract

INTRODUCTION: Falling is one of the most common and serious public health problems. It can cause injuries such as sprains and fractures, and hospitalization may be required for serious injuries.

Patients with Parkinson's disease have a higher risk of falls, and urinary incontinence is a known risk factor for falls in the elderly. However, whether other urinary disturbances contribute to the risk of falling remains unclear. The purpose of this study was to identify the association between falls and urinary disturbances in Parkinson's disease.

METHODS: A prospective cohort study was conducted at a single institution with a 6-month observation period. Subjects were ambulatory patients with Parkinson's disease. Assessments included patient demographics, disease severity measured by the Hoehn and Yahr scale, and urinary disturbances measured using the overactive bladder symptom score (OABSS). Falls were reported using a self-documented fall record.

RESULTS: A total of 97 patients were included. Forty-four subjects experienced one or more falls during the observation period. The frequency of urination was not related to falling; however, mild urinary urgency, but not severe urinary urgency, increased the risk of falls by an odds ratio of 5.14 (95% confidence interval: 1.51-17.48). Mild urinary urgency was also associated with the time to the first fall and the frequency of falls. One third of falls occurred in the living room, and 13.8% of falls occurred on the way to/from the toilet.

CONCLUSION: Falls in patients with Parkinson's disease might be associated with urinary urgency, but not with the frequency of urination.

PDF Y Endnote Y

Obese patients who fall have less injury severity but a longer hospital stay than normal-weight patients

Chuang JF, Rau CS, Liu HT, Wu SC, Chen YC, Hsu SY, Hsieh HY, Hsieh CH.

World J. Emerg. Surg. 2016; 11: 3.

Affiliation: Department of Trauma Surgery, Kaohsiung Chang Gung Memorial Hospital and Chang Gung University College of Medicine, No.123, Ta-Pei Road, Niao-Sung District, Kaohsiung City, 833 Taiwan.

(Copyright © 2016, BioMed Central)

DOI 10.1186/s13017-015-0059-9 **PMID** 26734069 **PMCID** PMC4700636

Abstract

BACKGROUND: The effects of obesity on injury severity and outcome have been studied in trauma patients but not in those who have experienced a fall. The aim of this study was to compare injury patterns, injury severities, mortality rates, and in-hospital or intensive care unit (ICU) length of stay (LOS) between obese and normal-weight patients following a fall.

METHODS: Detailed data were retrieved for 273 fall-related hospitalized obese adult patients with a body mass index (BMI) ≥ 30 kg/m² and 2357 normal-weight patients with a BMI < 25 kg/m² but ≥ 18.5 kg/m² from the Trauma Registry System of a Level I trauma center between January 1, 2009,

and December 31, 2013. We used the Pearson's chi-squared test, Fisher's exact test, the Mann Whitney U test, and independent Student's t-test to analyze differences between the two groups. RESULTS: Analysis of AIS scores and AIS severity scaling from 1 to 5 revealed no significant differences in trauma regions between obese and normal-weight patients. When stratified by injury severity (Injury Severity Score [ISS] of <16, 16-24, or ≥ 25), more obese patients had an ISS of <16 compared to normal-weight patients (90.5 % vs. 86.0 %, respectively; $p = 0.041$), while more normal-weight patients had an ISS between 16 and 24 (11.0 % vs. 6.6 %, respectively; $p = 0.025$). Obese patients who had experienced a fall had a significantly lower ISS (median (range): 9 (1-45) vs. 9 (1-50), respectively; $p = 0.015$) but longer in-hospital LOS than did normal-weight patients (10.1 days vs. 8.9 days, respectively; $p = 0.049$). Even after taking account of possible differences in comorbidity and ISS, the obese patients have an average 1.54 day longer LOS than that of normal-weight patients. However, no significant differences were found between obese and normal-weight patients in terms of the New Injury Severity Score (NISS), Trauma-Injury Severity Score (TRISS), mortality, percentage of patients admitted to the ICU, or LOS in the ICU.

CONCLUSION: Obese patients who had experienced a fall did not have different injured body regions than did normal-weight patients. However, they had a lower ISS but a longer in-hospital LOS than did normal-weight patients.

PDF Y Endnote Y

Predictors of outcome in traumatic brain injury

Baum J, Entezami P, Shah K, Medhkour A.

World Neurosurg. 2015; ePub(ePub): ePub.

(Copyright © 2015, Elsevier Publishing)

DOI 10.1016/j.wneu.2015.12.012 PMID 26721615

Abstract

INTRODUCTION: The purpose of this study was to retrospectively evaluate patients treated for traumatic brain injuries (TBI) to determine how multiple organ trauma (MOT) and lung injuries sustained at the time of initial injury affect outcome.

METHOD: A single institution retrospective review of all patients diagnosed with TBI at a level I trauma center from 2000-2014 was conducted. Clinical outcome was based on Glasgow Outcome Scale (GOS) at hospital discharge. Lung injury was defined as the presence of pulmonary contusions, pneumothorax, hemothorax, rib fractures, or diaphragmatic rupture proven by X-ray or CT scan.

MOT was defined as trauma to one body region with an AIS score ≥ 3 plus trauma to two additional body regions with AIS scores ≥ 1 . Regression analysis was conducted using SPSS 21.

RESULTS: There were 409 patients reviewed. Majority of patients were male (73%), average age was 46y (16-94), average GCS was 7, and 71% had a severe TBI ($GCS \leq 8$). Thirty percent of patients had poor outcome ($GOS=1-2$) Regression analysis indicated age ($OR=1.03$, $p<0.001$), initial GCS ($OR=0.88$, $p<0.001$), ISS ($OR=1.03$, $p=0.021$), and head AIS ≥ 5 ($OR=0.55$, $p=0.019$) were significant independent predictors of poor outcome. Sex, MOT, lung injury, and lung injury severity were not significant predictors of outcome.

CONCLUSIONS: Age, GCS, ISS, and critical head injuries ($AIS \geq 5$) were significant tools in predicting outcome in this patient cohort. Multiple organ trauma and traumatic lung injury may cause significant damage to a patient suffering from a severe TBI, but these injuries do not predict mortality in this patient population.

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