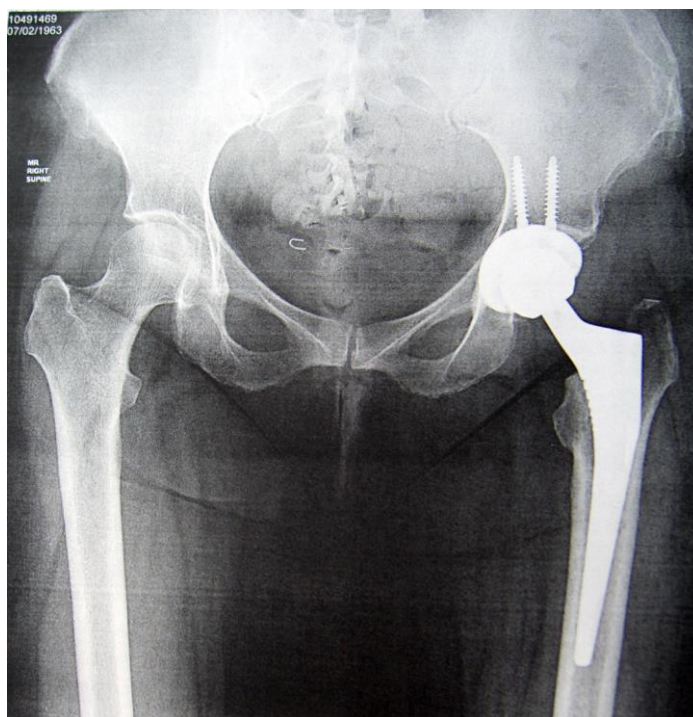




University Hospitals Bristol  
NHS Foundation Trust

# Orthogeriatrics



**Evidence Update**  
**June 2018 (Quarterly)**



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### Your Outreach Librarian Jo Hooper

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## Library Clinic

Stop by and find out more about our services. We will be here to answer any questions you may have!

June 6<sup>th</sup>: **Terrace (Level 4, Education Centre) 12.00-14.00**

June 19<sup>th</sup>: **Welcome Centre, BRI 10.00-16.00**

July 3<sup>rd</sup>: **Welcome Centre, BRI 10.00-16.00**

July 4<sup>th</sup>: **Canteen (Level 9, BRI) 12.00-14.00**

August 8<sup>th</sup>: **Foyer, Education Centre 12.00-14.00**

August 29<sup>th</sup>: **Foyer, St Michael's Hospital 12.00-14.00**

September 5<sup>th</sup>: **Canteen (Level 9, BRI) 12.00-14.00**

September 11<sup>th</sup>: **Welcome Centre, BRI 10.00-16.00**

October 3<sup>rd</sup>: **Terrace (Level 4, Education Centre) 12.00-14.00**

November 7<sup>th</sup>: **Canteen (Level 9, BRI) 12.00-14.00**

December 5<sup>th</sup>: **Foyer, Education Centre 12.00-14.00**

December 11<sup>th</sup>: **Welcome Centre, BRI 10.00-16.00**

## Lunchtime Drop-in Sessions

*All sessions last one hour*

### June (12.00-13.00)

7th (Thu) **Literature Searching**

11th (Mon) **Critical Appraisal**

20th (Wed) **Interpreting Statistics**

28th (Thurs) **Literature Searching**

### July (13.00-14.00)

5th (Thu) **Critical Appraisal**

9th (Mon) **Statistics**

19th (Thu) **Literature Searching**

23rd (Mon) **Critical Appraisal**

## Current Journals: Tables of Contents

Click on journal title (+ Ctrl) for hyperlink

Journal	Month	Volume	Issue
<a href="#"><u>The Bone and Joint Journal</u></a>	June	100-B	6
<a href="#"><u>Osteoporosis International</u></a>	May	29	5

If you require full articles please email: [library@uhbristol.nhs.uk](mailto:library@uhbristol.nhs.uk)

## Latest Evidence

**NICE** National Institute for  
Health and Care Excellence

[Interventions to Prevent Falls in Older Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force](#) 17 April 2018 - Publisher: Journal of the American Medical Association [UKMi comment](#)

[Best practice for management of distal radial fractures \(DRFs\)](#) [PDF] Source: [British Orthopaedic Association - BOA](#) - 01 April 2018 - Publisher: British Orthopaedic Association (BOA); British Society for Surgery of the Hand [Read Summary](#)

[Association of Clinical Outcomes With Surgical Repair of Hip Fracture vs Nonsurgical Management in Nursing Home Residents With Advanced Dementia](#) 07 May 2018 - Publisher: JAMA Internal Medicine [UKMi comment](#)

[Recommendation Statement: Interventions to Prevent Falls in Community-Dwelling Older Adults: US Preventive Services Task Force Recommendation Statement](#) 17 April 2018 - Publisher: Journal of the American Medical Association [UKMi comment](#)



[Comprehensive geriatric assessment for older people admitted to a surgical service](#)  
Online Publication Date: January 2018

**UpToDate**<sup>®</sup>

*OpenAthens login required. Register here: <https://openathens.nice.org.uk/>*

[Overview of geriatric rehabilitation: Patient assessment and common indications for rehabilitation](#)

- [Hip fracture](#)
- [Summary and recommendations](#)

**Literature review current through:** May 2018. | **This topic last updated:** Apr 18, 2018.

[Anesthesia for the older adult](#)

- [Central nervous system complications](#)
- [Summary and recommendations](#)

**Literature review current through:** May 2018. | **This topic last updated:** May 25, 2018.

[Medical care in skilled nursing facilities \(SNFs\) in the United States](#)

- [Comprehensive geriatric assessment](#)
- [Summary and recommendations](#)

**Literature review current through:** May 2018. | **This topic last updated:** May 08, 2018.

[Geriatric nutrition: Nutritional issues in older adults](#)

- [Vitamin B12 deficiency](#)
- [Vitamin D deficiency](#)
- [Summary and recommendations](#)

**Literature review current through:** May 2018. | **This topic last updated:** Apr 26, 2018.

[Overview of geriatric rehabilitation: Program components and settings for rehabilitation](#)

- [Rehabilitation therapy in the acute hospital](#)
- [Exercise](#)
- [Summary](#)

**Literature review current through:** May 2018. | **This topic last updated:** Feb 20, 2018.

## Current Awareness Database Articles

Below is a selection of articles recently added to the healthcare databases, grouped in the categories:

- Medical
- Patient care and management
- Psychological
- Other

If you would like any of the articles in full text, or if you would like a more focused search on your own topic, please contact us: [library@bristol.nhs.uk](mailto:library@bristol.nhs.uk)

### Medical

**CSF biomarkers and functional recovery following hip fracture repair**

**Author(s):** Bigelow G.; Neufeld K.; Rosenberg P.; Yan H.; Lyketsos C.; Sieber F.; Heath R.D.; Wang N.

**Source:** Journal of the American Geriatrics Society; 2018; vol. 66

**Publication Type(s):** Conference Abstract

**Abstract:**BACKGROUND: Abnormal cerebral spinal fluid (CSF) levels of Alzheimer's disease (AD) biomarkers amyloid-beta(Abeta)42/40, total(t)-tau, and phosphorylated(p)-tau have been associated with decline in Activities of Daily Living (ADL) and Instrumental ADL (IADL) in community-based older adults. Older patients undergoing repair of hip fracture are at increased risk of functional decline and the goal of this study was to examine the association of CSF biomarkers with changes in ADLs and IADLs up to 12 months following fracture repair. METHODS: Hip fracture patients were enrolled prior to surgery and CSF samples were collected during spinal anesthesia. CSF biomarkers were grouped into normal and abnormal values based on previously established cut-offs. We fit piecewise longitudinal linear mixed effects regression models (adjusted for age, sex, BMI, education, Charlson Comorbidity Index and ApoE4 status) with random intercepts and spline knots at 1 and 6 months for ADL and IADL scores following fracture. RESULTS: 170 patients with mean age 82 years old were included. 74% were women and 10% had dementia. The Abeta-normal group declined in ADLs between baseline and 1 month (beta= -0.045/ day, p<0.001), but then improved between 1 and 6 months (beta= 0.047/ day, p<0.001). There was no significant ADL change beyond 6 months. The Abeta-abnormal group did not differ from the Abeta-normal group in the ADL values at each time point or in the rate of change between the time points. Similar findings were seen with IADLs. T- and p-tau abnormal groups also did not show association with ADL/IADLs. Increasing age was associated with decline in ADLs (beta= -0.06, p<0.001) and IADLs (beta= -0.12, p<0.001). CONCLUSIONS: These results indicate that preoperative CSF levels of Abeta, t-tau, and p-tau are not associated with the trajectory of ADL and IADL recovery over 12 months following hip fracture repair. The next steps will be to incorporate other risk factors including intraoperative and in-hospital data, such as delirium.

**Sarcopenia Is Predictive of 1-Year Mortality After Acetabular Fractures in Elderly Patients.**

**Author(s):** Mitchell, Phillip M; Collinge, Cory A; O'Neill, David E; Bible, Jesse E; Mir, Hassan R

**Source:** Journal of orthopaedic trauma; Jun 2018; vol. 32 (no. 6); p. 278-282

**Publication Type(s):** Journal Article

**Abstract:**OBJECTIVETo determine whether sarcopenia is an independent predictor of mortality in geriatric acetabular fractures.DESIGNRetrospective cohort.SETTINGAmerican College of Surgeons Level I trauma center.PATIENTS/PARTICIPANTSONe hundred and forty-six patients over the age 60 with acetabular fractures treated at our institution over a 12-year period.MAIN OUTCOME MEASUREMENTSThe primary outcome was 1-year mortality, collected using the Social Security Death Index. We used the psoas:lumbar vertebral index (PLVI), calculated using the cross-sectional area of the L4 vertebral body and the left and right psoas muscles, to assess for sarcopenia.RESULTSUsing a multivariate logistic regression model, we found that low PLVI was associated with increased 1-year mortality (P = 0.046) when controlling for age, gender, Charlson Comorbidity Index, Injury Severity Score (ISS), smoking status, and associated pelvic ring injury. Increasing age and ISS also showed a relationship with 1-year mortality in this cohort (P < 0.001, P 75 years, ISS >14, and sarcopenia had 1-year mortality rates of 37.1%, 30.9%, and 32.4%, respectively. In patients with all 3 factors, the mortality rate was 90%.CONCLUSIONSarcopenia is an independent risk factor for 1-year mortality in elderly patients with acetabular fractures. This study highlights the importance of objective measures to assess frailty in elderly patients who have sustained fractures about the hip and pelvis.LEVEL OF EVIDENCEPrognostic Level III. See Instructions for Authors for a complete description of levels of evidence.

**Outcomes of Early Surgical Intervention in Geriatric Proximal Femur Fractures Among Patients Receiving Direct Oral Anticoagulation.**

**Author(s):** Franklin, Nathan A; Ali, Ashley H; Hurley, Richard K; Mir, Hassan R; Beltran, Michael J

**Source:** Journal of orthopaedic trauma; Jun 2018; vol. 32 (no. 6); p. 269-273

**Publication Type(s):** Journal Article

**Abstract:**OBJECTIVE To evaluate the prehospital use of direct oral anticoagulant (DOAC) agents on the outcomes of early surgical fixation of a geriatric hip fracture. DESIGN Case control study. SETTING Two academic Level 1 trauma centers. INTERVENTION Early (<48 h) surgical fixation of a geriatric proximal femur fracture. PATIENTS Nineteen patients receiving Pradaxa (dabigatran), Eliquis (apixaban), or Xarelto (rivaroxaban) who underwent surgery between 2010 and 2015 and 74 control patients. MAIN OUTCOME MEASUREMENTS Time to surgery, transfusion rates, changes in hemoglobin levels, postoperative complications, readmission rates, and survival out to 1 year. RESULTS There were no differences in transfusions, changes in hemoglobin levels, wound complications, or survival at any time point. Patients on DOAC had a longer delay to reach the operating room (28.9 h v 21.4 h P = 0.03) and were more likely to undergo readmission within 30 days (21% vs. 5.3% P = 0.05). No readmissions occurred for a complication of the surgical site, bleeding, or a venous thromboembolic event. CONCLUSIONS Geriatric patients with hip fractures receiving DOAC before admission did not demonstrate worse outcomes with early surgical intervention. The increased readmission rate in this population seems attributable to the underlying cardiac conditions for which the patients were receiving anticoagulation. These results suggest that the delay recommended for patients using a DOAC before elective procedures may be unwarranted in the surgically urgent setting of a hip fracture. Additional studies will be necessary for appropriate meta-analysis. LEVEL OF EVIDENCE Therapeutic Level III. See Instructions for Authors for a complete description of levels of evidence.

### **CORR Insights®: Is Anesthesia Technique Associated With a Higher Risk of Mortality or Complications Within 90 Days of Surgery for Geriatric Patients With Hip Fractures?**

**Author(s):** Ahn, Jaimo

**Source:** Clinical orthopaedics and related research; Jun 2018; vol. 476 (no. 6); p. 1189-1190

**Publication Type(s):** Journal Article

**Database:** Medline

### **Incidence, Risk Factors, and Clinical Implications of Pneumonia After Surgery for Geriatric Hip Fracture.**

**Author(s):** Bohl, Daniel D; Sershon, Robert A; Saltzman, Bryan M; Darrith, Brian; Della Valle, Craig J

**Source:** The Journal of arthroplasty; May 2018; vol. 33 (no. 5); p. 1552

**Publication Type(s):** Journal Article

**Abstract:**BACKGROUND Little is known regarding the occurrence of pneumonia after hip fracture surgery. The purpose of this study is to determine the incidence, risk factors, and clinical implications of pneumonia after surgery for geriatric hip fracture. METHODS The American College of Surgeons National Surgical Quality Improvement Program was used to retrospectively study geriatric patients undergoing surgery for hip fracture during 2006-2014. Independent risk factors for developing pneumonia within 30 days of surgery were identified using multivariate regression. RESULTS Of the 29,377 patients meeting inclusion criteria, 13,736 (46.8%) underwent hemiarthroplasty, 9468 (32.2%) intramedullary fixation, 4294 (14.6%) plate and/or screw fixation, 1299 (4.4%) total joint arthroplasty, and 580 (2.0%) percutaneous fixation. In total 1191 patients developed pneumonia, an incidence of 4.1%. The strongest risk factors for pneumonia were male sex, older age (especially ≥90 years), low body mass index, and chronic obstructive pulmonary disease. Patients who developed pneumonia had a higher readmission rate (79.1% vs 8.2%, P < .001), a higher rate of sepsis (16.6% vs



1.7%,  $P < .001$ ), and a higher mortality rate (29.2% vs 5.7%,  $P < .001$ ). Among 1602 total mortalities, 348 (17.9%) occurred in patients with pneumonia. **CONCLUSION** Pneumonia is a serious complication after geriatric hip fracture surgery, which increases the readmission and mortality risks. Evidence-based pneumonia prevention programs should be implemented among high-risk patients-males, patients  $\geq 90$  years, body mass index  $< 18.5$  kg/m<sup>2</sup>, and/or patients with chronic obstructive pulmonary disease-to decrease morbidity and mortality.

### **Comparisons of mortality and rehospitalization between hip-fractured elderly with outpatient rehabilitation and those without: A STROBE-compliant article.**

**Author(s):** Pan, Po-Jung; Lin, Pin-Hsun; Tang, Gau-Jun; Lan, Tzuo-Yun

**Source:** Medicine; May 2018; vol. 97 (no. 19); p. e0644

**Publication Type(s):** Comparative Study Journal Article Observational Study

Available at [Medicine](#) - from PubMed Central

**Abstract:** Geriatric patients with hip fractures have high mortality. This study aimed to compare the mortality and rehospitalization of recipient and nonrecipient of outpatient rehabilitation in hip-fractured elderly. This retrospective cohort study used nationwide claims data in Taiwan and included 3585 senior citizen patients admitted for hip fractures between January 1, 2005, and December 31, 2012. Patients were divided into the recipient (717) and nonrecipient (2868) of outpatient rehabilitation during the first 3 months after hospital discharge. Each patient was followed up for 1 year. Mortality rates of hip-fractured elderly after discharge during the first 3-month period in different groups were analyzed with Chi-square test. Cox proportional hazards regression model was employed for both death and rehospitalization risk analyses. The mortality rate of the rehabilitation group was lower than that of the nonrehabilitation group (12.69% vs 16.70%,  $P < .05$ ). A more beneficial effect was observed for patients receiving continuous rehabilitation. The rehabilitation group had a lower adjusted risk of death [hazard ratio (HR) = 0.74; 95% confidence interval (95% CI): 0.59-0.94] than that of the nonrehabilitation group. However, the rehabilitation group was at a higher risk of rehospitalization (HR = 1.37; 95% CI: 1.22-1.55). Hip-fractured elderly receiving outpatient rehabilitation have a lower risk of death but a higher risk of rehospitalization than those not receiving rehabilitation within 1 year after fracture.

### **Future Osteoporotic Fracture Risk Related to Lumbar Vertebral Trabecular Attenuation Measured at Routine Body CT.**

**Author(s):** Lee, Scott J; Graffy, Peter M; Zea, Ryan D; Ziemelewick, Timothy J; Pickhardt, Perry J

**Source:** Journal of bone and mineral research : the official journal of the American Society for Bone and Mineral Research; May 2018; vol. 33 (no. 5); p. 860-867

**Publication Type(s):** Journal Article

**Abstract:** We sought to determine if vertebral trabecular attenuation values measured on routine body computed tomography (CT) scans obtained for a variety of unrelated indications can predict future osteoporotic fractures at multiple skeletal sites. For this Health Insurance Portability and Accountability Act (HIPAA)-compliant and Institutional Review Board (IRB)-approved retrospective cohort study, trabecular attenuation of the first lumbar vertebra was measured in 1966 consecutive older adults who underwent chest and/or abdominal CT at a single institution over the course of 1 year. New pathologic fragility fractures that occurred after a patient's CT study date were identified through an electronic health record database query using International Classification of Diseases (ICD)-9 codes for vertebral, hip, and extremity fractures. Univariate and multivariate Cox proportional hazards regression were performed to determine the effect of L1 trabecular attenuation on fracture-free survival. Age at CT, sex, and presence of a prior fragility fracture were

included as confounders in multivariate survival analysis. Model discriminative capability was assessed through calculation of an optimism-corrected concordance index. A total of 507 patients (mean age  $73.4 \pm 6.3$  years; 277 women, 230 men) were included in the final analysis. The median post-CT follow-up interval was 5.8 years (interquartile range 2.1-11.0 years). Univariate analysis showed that L1 attenuation values  $\leq 90$  Hounsfield units (HU) are significantly associated with decreased fracture-free survival ( $p < 0.001$  by log-rank test). After adjusting for age, sex, prior fracture, glucocorticoid use, bisphosphonate use, chronic kidney disease, tobacco use, ethanol abuse, cancer history, and rheumatoid arthritis history, multivariate analysis demonstrated a persistent modest effect of L1 attenuation on fracture-free survival (hazard ratio [HR] = 0.63 per 10-unit increase; 95% confidence interval [CI] 0.47-0.85). The model concordance index was 0.700. Ten-year probabilities for major osteoporosis-related fractures straddled the treatment threshold for most subcohorts over the observed L1 HU range. In conclusion, for patients undergoing body CT scanning for any indication, L1 vertebral trabecular attenuation is a simple measure that, when  $\leq 90$  HU, identifies patients with a significant decrease in fracture-free survival. © 2018 American Society for Bone and Mineral Research.

## Patient Care and Management

### Hip fracture: A life-changing and often life-limiting event

**Author(s):** Ko J.; Perissinotto C.

**Source:** Journal of General Internal Medicine; 2018; vol. 33 (no. 2); p. 533

**Publication Type(s):** Conference Abstract

Available at [Journal of General Internal Medicine](#) - from EBSCO (MEDLINE Complete)

**Abstract:** Learning Objective #1: Identify patients at increased risk of poor outcomes after hip fracture who may benefit from earlier palliative care CASE: Ms. L is a 96-year-old home-bound woman with advanced Alzheimer dementia, osteoporosis, and diabetes who presented after a fall. She had been dependent in most activities of daily living (ADLs) and ambulated without an assistive device. Ms. L fell to the ground in her bedroom and was found complaining of left hip pain. An X-ray showed a left displaced intertrochanteric femoral fracture and she underwent surgical repair with intramedullary nailing within 24 hours. Post-operatively, she developed severe delirium, limiting her participation with physical therapy. Five days after her surgery she was discharged to a skilled nursing facility for rehabilitation, only to be readmitted a week later for pneumonia and aggressive behaviors. She was again discharged to a skilled nursing facility. One month later, Ms. L continued to have difficulty participating with physical therapy due to her dementia and was unable to walk. Her home-based medical care team met with her daughters to discuss the high risk for functional dependence and death after hip fracture in frail older patients, which the daughters were unaware of. They brought up concern about her decline and their need for additional support at home. The team also revisited Ms. L's goals given her limited life expectancy after hip fracture. IMPACT: Current standard care for hip fracture focuses on surgery and rehabilitation with the goal of return to functional baseline, involving palliative care only when a patient shows signs of poor recovery months later. However, the high rates of functional decline and mortality after hip fracture in frail older adults are comparable to those of other terminal illnesses, highlighting the importance of earlier palliative care, even when surgery is within goals. DISCUSSION: Among Medicare patients, roughly one quarter will die in the year after hip fracture and nearly one half will die that year if they are a long-term nursing home resident. A study of end-stage dementia patients with hip fracture found that over half had died at 6 months. These facts are not often discussed during pre-operative assessments. For the older patients who do live to 6 months, only half will recover their prior ability

to perform ADLs. Ms. L's age and dementia placed her at higher risk for worsening function and death. Despite this, her family was unaware of these risks and unprepared for her decline. Ms. L also developed delirium and had a readmission, both of which are common after hip fracture and independently associated with decline in ambulation, new nursing home placement, and death after controlling for age, cognitive impairment, and comorbidities. In this case, the addition of palliative care interventions one month into Ms. L's rehabilitation allowed for effectively communicating prognosis, addressing care needs resulting from new functional dependence, and readdressing goals of care.

### **Improving follow up after reported falls in the ambulatory setting**

**Author(s):** Narukonda S.; Mirk A.; Anderson B.

**Source:** Journal of the American Geriatrics Society; 2018; vol. 66

**Publication Type(s):** Conference Abstract

**Abstract:**Background: Complications resulting from falls are a leading cause of mortality and morbidity in adults aged 65 years and older. Falls account for over 95% of hip fractures. Mortality in men within 1 year of hip fracture is 37.5%, 51% higher than in women. American Geriatrics Society guidelines recommend screening all adults aged 65 years and older for fall risk annually and the 2012 United States Preventive Services Task Force recommends Vitamin D supplementation for adults aged 65 years or older with falls. Our objective was to increase documented follow up for Veterans in a single ambulatory clinic with a reported fall in the last year. Methods: A model for quality improvement was utilized to iteratively test for change. Workflow and clinic processes were determined through staff interviews. An existing electronic fall screen was completed by nursing staff annually for all patients during triage, prompting an electronic reminder for follow up to the physician for positive screens. To increase successful completion of fall follow up, nursing staff were encouraged to communicate positive screens effectively to providers and the providers were provided face to face education on best clinical practice and feedback on their rates for documented follow up. Results: Patients with positive fall screens seen in a single ambulatory clinic between September 1, 2016, and September 1, 2017, served as the baseline, and rates of documented fall follow up and vitamin D prescription were determined. 356 patients (97% male, 53% Caucasian, average age 84 years) had a positive fall screen during baseline and 73/356 (20.5%) had follow up documented. Vitamin D was prescribed to 153/356(42.9%). During the post-intervention period (a 3-week cycle of change 30 October-21 November 2017), fall follow up completion was 36/125 (28.8%) and vitamin D prescription rate was 53/125 (42.4%). Conclusion: After a minimally burdensome awareness and education intervention, rates of documented follow up for falls increased by 8%, a 40% relative increase. Vitamin D use remained stable. Objective quality metrics for geriatric syndromes, such as falls, can encourage quality care by incorporating assessment and management into clinic workflow.

### **Risk factors for delay to surgery in geriatric hip fracture patients**

**Author(s):** Garbarino L.; Heller Y.; Fitterman N.; Carney M.; Goldman A.; Mota F.; Walden T.

**Source:** Journal of the American Geriatrics Society; 2018; vol. 66

**Publication Type(s):** Conference Abstract

**Abstract:**Background: Hip fractures are a significant source of morbidity and mortality in the geriatric population, with a 30-day mortality of nearly 10%. The implementation of a Geriatric-Orthopedic Co-Management (GOCO) Program is an attempt to reduce delay to surgery, length of stay and mortality rates in these patients. Guidelines suggest surgical treatment of hip fractures within 24-48 hours. However, patients frequently are delayed beyond this time period, increasing

morbidity and mortality. This study aims to identify the factors associated with delay to surgery prior to the implementation of a GOC program in an effort to most effectively improve morbidity and mortality. Methods: A retrospective chart review of operatively managed adult hip fracture patients by a fellowship-trained traumatologist between 2011 and 2013 at two tertiary care hospitals was performed. Variables measured were fracture type, ASA status, Charlson Comorbidity Index, admission service, cardiac clearance and associated tests, medical clearance, medical management and INR management. The primary outcome variable, time to surgery, was calculated as the difference between admission time to the Emergency Department and time of first incision. Results: 324 patients met the inclusion criteria; 113 males and 211 females with a mean age of 80.5 +/- 12.7 years. The mean time to surgery in this cohort was 42.9 + 36.9 hours (range 1.2-336.9). The variables associated with an increased time to surgery were cardiac clearance, INR management, medical management, and preoperative ASA score. Conclusions: Our results suggest that cardiac clearance, medical clearance, management of preoperative medical conditions, and management of INR are associated with longer times to surgery. Patients requiring cardiac consultation showed increased mean times to surgery and showed further delay with cardiac testing or intervention. These results will allow for a more efficient, directed, and effective implementation of a Geriatric-Orthopedic Co-Management Program by directly addressing factors increasing delay to surgery. (Table Presented).

### **The geriatric consult index: A surrogate marker for short-term mortality**

**Author(s):** Palmer A.; Bentov I.; Nair B.; Taitsman L.; Reed M.J.

**Source:** Journal of the American Geriatrics Society; 2018; vol. 66

**Publication Type(s):** Conference Abstract

**Abstract:**BACKGROUND Hip fractures result in significant morbidity and mortality in the older population. Indicators of the frailty syndrome are associated with poor outcomes in patients with hip fractures. Many commonly used frailty tools rely on motor skills that cannot be performed by this population. We determined the association between the Charlson Comorbidity Score (CCS), intraoperative hypotension (IOH), and a geriatric medicine consult index (GCI) with short term mortality in hip fracture patients. METHODS A retrospective cohort study was conducted at a single level one trauma center over a two-year period. All patients age 65 years of age and older who sustained a hip fracture following a low energy mechanism were identified using billing records and an orthopedic trauma registry. Medical records were reviewed to collect demographic data; fracture classification and operative records; calculation of the CCS; intraoperative details including hypotension; and assessments recorded in the geriatric consult notes. The GCI was calculated using 30 dichotomous variables contained within the geriatric consult note. The index, ranging from 0 to 1, included markers for physical and cognitive function, as well as medications. A higher GCI score indicated more markers for frailty. RESULTS One hundred and eight patients met inclusion criteria. Sixty-four were females (60%) and the average age was 77.3 years (range: 65-100). Thirty-five patients (32%) sustained a femoral neck fracture, 73 patients (68%) sustained an inter/subtrochanteric hip fracture. Eighty-nine patients were treated with fixation while 19 patients underwent arthroplasty. The 30-day mortality was 6%; the 90-day mortality was 13%. The mean GCI was 0.30 in the 30-day survivor group as compared to 0.52 in those who died (p=0.002). The mean GCI was 0.28 in the patients who were alive at 90-days as compared to 0.46 in those who died (p<0.001). In contrast, the CCS and IOH were not associated with 30 or 90-day mortality. CONCLUSIONS In our older hip fracture patients, an index calculated from information routinely obtained in the geriatric consult evaluation was associated with 30 and 90-day mortality whereas the CCS and measures of intraoperative hypotension were not.

### **Effect of medical and functional needs on costs of geriatric hip fracture care**

**Author(s):** Thirukumaran C.; Rubery P.; Li Y.; Ricciardi B.; Mendelson D.

**Source:** Journal of the American Geriatrics Society; 2018; vol. 66

**Publication Type(s):** Conference Abstract

**Abstract:**Background: Hip fractures are the 8th most common diagnosis for Medicare inpatient admissions, and Medicare spends more than \$4.7 billion for their care. In addition to being a high-cost cohort, these patients may have complex, coexisting needs such as multiple chronic medical conditions and functional limitations. While there is considerable focus on managing medical comorbidities, greater attention needs to be paid to functional limitations. The objective of this study is to assess the medical and functional needs, and the incremental role of functional limitations among hip fracture patients in influencing costs of their care. Methods: We used 2015 Medicare Claims and Minimum Data Set 3.0 to identify geriatric patients admitted to New York hospitals and discharged to skilled nursing facilities (SNF). We defined high medical needs as presence of 3 or more comorbidities, and high functional needs as activities of daily living (ADL) composite score of 15 or higher. This composite score included 7 ADL scores at SNF discharge. We used univariate and bivariate statistics, and multivariate linear regressions to assess whether outcomes such as length of stay (hospital and SNF) and episode spending (acute and postacute) varied across patients (i) without high medical or high functional needs (Group 1), (ii) with high medical needs but not high functional needs (Group 2), and (iii) with high medical and high functional needs (Group 3). Results: The cohort comprised of 4,923 patients. Mean number of comorbidities were 3.39+/-1.93 and mean ADL score at SNF discharge was 15.30+/-4.52. Of these, 12% (n=592), 20% (n=969), and 44% (n=2,143) met group 1, 2, and 3 criteria respectively. As compared to groups 1 and 2, group 3 included older patients (mean age 85.5 years), and higher proportion of males (31%) and minorities (9%). On multivariate analysis, group 3 had 35% longer hospital stay as compared to group 1 (Est.: 2.20, 95% Conf. Int. [CI]: 1.74 to 2.66, p<0.001) and 16% longer stay as compared to group 2 (Est.: 1.06, 95% CI: 0.67 to 1.44, p<0.001). Group 3 also had 11% higher episode spending (Est.: 4112.46, 95% CI: 2632.76 to 5592.15, p<0.001) as compared to group 1. Conclusions: Our study demonstrates that high functional needs are important drivers of prolonged stays and greater costs. Strategies intended to optimize the costs of hip fracture care need to focus on not only the medical but also the functional needs of these patients.

### **Management of osteoporosis in older adults; a prognostic approach to a common scenario**

**Author(s):** Safai Haeri N.; Baharlou S.

**Source:** Journal of the American Geriatrics Society; 2018; vol. 66

**Publication Type(s):** Conference Abstract

**Abstract:**Introduction: In practice most clinicians are reluctant to prescribe pharmacological agents for management of osteoporosis in older patients due to misconception that they might not benefit much from them. However, studies reveal pharmacological therapy in older osteoporotic adults with reasonable life expectancy has statistically significant impact on reducing the fracture risk within 1-year of initiation. Careful selection of appropriate patients for treatment could lead to reduced morbidity and functional dependence in this age group. Case #1: "A" is 84-year-old white female with HTN and Hyperlipidemia. Her medication list includes Valsartan and Atorvastatin. She has never smoked cigarette. BMI is 24.6. She never had any bone fracture. She is independent in all ADLs and IADLs. Her femoral neck T-score is -1.9. Her FRAX for Hip fracture is 4.8. Case #2: "B" is a 68-year-old white female with HTN, HFpEF, DM, CKD Stage 3A and Severe COPD on home Oxygen. Her medication list includes Lisinopril, Atorvastatin, Furosemide, Metoprolol, Fluticasone-Salmeterol and Ipratropium bromide inhalers, Oxygen and Insulin. She had 3 hospitalizations in the past 12 months for COPD exacerbation and decompensated heart failure. She is independent in her ADLs but dependent in most IADLs. She has been actively smoking 5 to 10 cigarettes a day for the past 30

years. BMI is 20.7. She never had any bone fracture. Her femoral neck T-score is -2.6. Her FRAX for Hip fracture is 5.7. Discussion: Most current osteoporosis guidelines do not include functional status and life expectancy as independent factors to determine the best course of management. Most clinicians might not see patient "A" as a better candidate for pharmacological treatment due to her advanced age comparing to "B". But based on Gagne life expectancy Index patient "A" has 1-year mortality risk of 2.4% and "B" has 1-year mortality risk of over 36.5%. Patient "B" has a lower T-score and is younger than "A" but her multiple comorbidities and shorter life expectancy makes her a less appropriate candidate for pharmacological treatment than patient "A". Conclusion: Based on major studies older patients who have life expectancy more than 1-year will benefit from pharmacological management of osteoporosis. We recommend utilization of prognostic tools in routine practice to determine patient's life expectancy and to evaluate if they will benefit from pharmacological interventions.

### **Association between skilled nursing facility quality ratings and outcomes after hospitalization for hip fracture**

**Author(s):** Mujahid N.; McNicoll L.; Monteiro J.F.; Giglio P.

**Source:** Journal of the American Geriatrics Society; 2018; vol. 66

**Publication Type(s):** Conference Abstract

**Abstract:**Background: The association between the Centers for Medicare and Medicaid Skilled Nursing Facility (SNF) Five Star Quality Ratings and clinical outcomes is largely unknown. Defining this association could educate patients and physicians in their decision making, drive SNF quality improvement, and minimize healthcare spending. Our aim was to study the association between one-year hip fracture outcomes and SNF five star ratings. Methods: We conducted a retrospective chart review of 245 patients 65 years or older treated at Rhode Island Hospital in 2012- 2014 for hip fracture who were discharged to SNF. We compared Nursing Home Compare Five Star Ratings to one-year mortality, hospital readmission, and Emergency Department (ED) visits. Data was collected by chart review, from national databases, and from Rhode Island Department of Health death records. Results: Of the patients, 122 were discharged to 1-3, and 123 to 4-5 overall star rating SNF. Among these, 101 (61%) were cared for by the Geriatric Fracture Program versus usual care. The groups were homogenous with similar baseline demographic characteristics. The mean age was 84.4 years (p-value = 0.7608) and rate of male was 24.6% for 1-3 Star SNF and 25.2% for 4-5 Star SNF (p-value = 0.9116). Patients discharged to SNF with 4-5 star staffing rating were 70% more likely to have at least one ED visit than 1-3 star SNF (adjusted p-value = 0.0494). Among patients who received usual care only, readmission rates were 2.3 times higher if discharged to a 1-3 than a 4-5 overall star SNF (adjusted p-value = 0.0482). There was no significant difference between patients discharged to 4-5 and 1-3 overall star SNF for mortality (p-value = 0.3581), readmission (p-value = 0.1412) and ED visits (p value =0.4933). Conclusions: CMS staffing rating was associated with an increase in ED visits in survivors of hip fracture treated at a single hospital and discharged to SNF. However, this study observed no significant association between overall five star ratings and one year outcomes in patients who suffered from hip fracture. Future studies are necessary to further characterize the relationship between SNF five star ratings and clinical outcomes.

### **Comparison between surgical and conservative management of ortho-geriatric patients in an Asian population**

**Author(s):** Nguyen M.; Sebastian P.; Foo W.; Yip K.; Mamun K.; Seow D.; Ruan X.

**Source:** Journal of the American Geriatrics Society; 2018; vol. 66

**Publication Type(s):** Conference Abstract

**Abstract:**Background: Given the global ageing population, there has been an increasing emphasis on the holistic care of elderly patients with fragility fractures. Despite advances in medicine and medical technology, there is still a substantial number of hip fracture patients treated conservatively. Our study evaluated the factors predisposing these individuals for conservative management. Methods: All patients aged 60 and above, who presented with hip fracture to our tertiary hospital from July to October 2017 were evaluated through a comprehensive geriatric assessment, with documentation of demographics, clinical and surgical parameters. Exclusion criteria include those with high velocity trauma, pathological, pelvic, shaft of femur and pathological fractures. Institutional review board approval was obtained. Statistical analysis was performed using Statistical Package for the Social Sciences statistics version 23.0. Results: Out of 118 patients (mean age 78 years, [SD 9.2]), 19 (16.1%) were conservatively managed while 99 (83.9%) had surgery of either the neck of femur fracture (60.6%) or intertrochanteric fracture (39.4%). The Clinical Frailty Score and Barthel Index of the surgical patients were lower compared to patients who were conservatively managed ( $p=0.001$ ). A higher proportion of patients who were conservatively managed came from nursing homes ( $p=0.042$ ), had lower abbreviated mental test scores ( $p<0.001$ ), with previous history of cognitive impairment ( $p=0.009$ ), and chronic renal disease ( $p=0.002$ ). The in-hospital mortality of these patients was higher at 10.5% compared to 0% within the surgical arm ( $p=0.025$ ). On discharge, these patient had lower Barthel Index ( $p<0.001$ ) and increased risk of institutionalization ( $p<0.001$ ). Conclusion: Elderly hip fracture patients who were conservatively managed had poorer pre-morbid status with reduced likelihood for good functional outcomes post-hospitalization.

**Social cognitive or learning theory use to improve self-efficacy in musculoskeletal rehabilitation: A systematic review and meta-analysis.**

**Author(s):** Ghazi, Cameron; Nyland, John; Whaley, Rumeal; Rogers, Thomas; Wera, Jeff;

**Source:** Physiotherapy theory and practice; Jul 2018; vol. 34 (no. 7); p. 495-504

**Publication Type(s):** Journal Article

**Abstract:**OBJECTIVE To review the rehabilitation research methodological quality and intervention effectiveness of studies that used social cognitive or learning theory principles to improve self-efficacy in patients with orthopedic or musculoskeletal conditions. DESIGN A systematic literature review and meta-analysis of peer reviewed studies published in English was performed using the OVID and SPORTDiscus databases. Initial search terms were "social cognitive theory" or "social learning theory" combined with "rehabilitation". RESULTS From the 25 total studies that contributed to this review, 23 contributed patient outcome information and 20 contributed to effect size determination. Of 1947 total study participants, most ( $n = 1537$ , 78.9%) were women. Participants were primarily late middle-age ( $64.8 \pm 17$  years). Studies included participants with hip or knee osteoarthritis (OA) or who were post-hip or knee arthroplasty (11/25, 44%), post-femur or tibia fracture (6/25, 24%), adults in assisted living or inpatient rehabilitation facilities (2/25, 8%), independent community dwelling older adults (2/25, 8%), college-age recreational athletes post-sports injury (2/25, 8%), older women with osteoporosis risk (1/25, 4%) or middle-aged adults post-traumatic hand injury (1/25, 4%). For the 20 studies that contributed to effect size determination, a large overall mean effect size (Cohen's  $d = 0.98$ , 95% CI 0.42-1.86) was observed. CONCLUSIONS Studies that used social cognitive or learning theory principles to improve self-efficacy in patients with orthopedic or musculoskeletal conditions generally displayed moderate to large effect sizes supporting this intervention. Sound research methodological quality and low risk of intervention-related injury or other adverse events were also generally observed. Findings suggest that these interventions may also benefit individuals with conditions that have not progressed to end-stage salvage surgery such as younger, more athletically active individuals for knee OA prevention.

### **Inability of Older Adult Patients with Hip Fracture to Maintain Postoperative Weight-Bearing Restrictions.**

**Author(s):** Kammerlander, Christian; Pfeufer, Daniel; Lisitano, Leonard Adolf; Mehaffey, Stefan

**Source:** The Journal of bone and joint surgery. American volume; Jun 2018; vol.100 (11); p. 936-941

**Publication Type(s):** Journal Article

Available at [The Journal of Bone and Joint Surgery](#) - from Ovid (Journals @ Ovid) - Remote Access

**Abstract:**BACKGROUNDFor elderly trauma patients, a basic goal is early mobilization, as immobilization can trigger various complications, such as venous thromboembolism, pneumonia, urinary tract infections, and pressure ulcers. Although partial weight-bearing has been shown to significantly increase mortality compared with unrestricted weight-bearing, it remains a frequent recommendation of aftercare following lower-extremity fracture fixation.METHODSAn insole force sensor was used to measure true postoperative weight-bearing by patients  $\geq 75$  years of age treated for hip fracture compared with patients 18 to 40 years of age treated for ankle fracture. Both groups were instructed to maintain partial weight-bearing on the affected limb ( $\leq 20$  kg) postoperatively. Following standardized physiotherapy training, gait analysis was performed.RESULTSNone of the patients in the elderly test group were able to comply with the weight-bearing restriction as recommended. We found that 69% (11 of 16) of the patients exceeded the specified load by more than twofold, whereas significantly more patients in the younger control group ( $>75\%$  [14 of 18]) achieved almost the entire weight-bearing restriction ( $p < 0.001$ ). Only 1 of the elderly patients was able to comply with the predetermined weight-bearing restriction, and only for a short period of time. In comparison, significantly more patients in the control group (89% [16 of 18];  $p < 0.001$ ) maintained the partial load for nearly the entire time during gait analysis.CONCLUSIONSElderly patients seem to be unable to maintain weight-bearing restrictions. As early mobilization of geriatric trauma patients is an important element for a successful rehabilitation, the directive of postoperative partial weight-bearing for these patients should be abandoned.LEVEL OF EVIDENCETherapeutic Level II. See Instructions for Authors for a complete description of levels of evidence.

### **Minimal impact of a care pathway for geriatric hip fracture patients.**

**Author(s):** Panella, Massimiliano; Seys, Deborah; Sermeus, Walter; Bruyneel, Luk; Lodewijckx, Cathy

**Source:** Injury; Jun 2018

**Publication Type(s):** Journal Article

**Abstract:**BACKGROUNDAdherence to guidelines for patients with proximal femur fracture is suboptimal.OBJECTIVETo evaluate the effect of a care pathway for the in-hospital management of older geriatric hip fracture patients on adherence to guidelines and patient outcomes.DESIGNThe European Quality of Care Pathways study is a cluster randomized controlled trial.SETTING26 hospitals in Belgium, Italy and Portugal.SUBJECTSOlder adults with a proximal femur fracture ( $n = 514$  patients) were included.METHODSHospitals treating older adults ( $>65$ ) with a proximal femur fracture were randomly assigned to an intervention group, i.e. implementation of a care pathway, or control group, i.e. usual care. Thirteen patient outcomes and 24 process indicators regarding in-hospital management, as well as three not-recommended care activities were measured. Adjusted and unadjusted regression analyses were conducted using intention-to-treat procedures.RESULTSIn the intervention group 301 patients in 15 hospitals were included, and in the control group 213 patients in 11 hospitals. Sixty-five percent of the patients were older than 80 years. The implementation of this care pathway had no significant impact on the thirteen patient outcomes. The preoperative management improved significantly. Eighteen of 24 process indicators



improved, but only two improved significantly. Only for a few teams a geriatrician was an integral member of the treatment team. **DISCUSSION** Implementation of a care pathway improved compliance to evidence, but no significant effect on patient outcomes was found. The impact of the collaboration between surgeons and geriatricians on adherence to guidelines and patient outcomes should be studied. **TRIAL REGISTRATION** [ClinicalTrials.gov: NCT00962910](https://clinicaltrials.gov/ct2/show/study/NCT00962910).

### **Toward a Meaningful Definition of Recovery After Hip Fracture: Comparing Two Definitions for Community-Dwelling Older Adults.**

**Author(s):** Auais, Mohammad; Morin, Suzanne N; Finch, Lois; Ahmed, Sara; Mayo, Nancy

**Source:** Archives of physical medicine and rehabilitation; Jun 2018; vol. 99 (no. 6); p. 1108-1115

**Publication Type(s):** Journal Article

**Abstract:** **OBJECTIVE** To examine the course of recovery and resulting health-related quality of life (HRQL) after low-trauma hip fracture using 2 different definitions of recovery. **DESIGN** Inception cohort with 8 assessments over 1 year. **SETTING** Participants were recruited from a tertiary-care hospital and followed up in the community. **PARTICIPANTS** Community-dwelling hip fracture patients (N=47, 75% of all eligible; aged  $\geq 65$  y). **INTERVENTIONS** Not applicable. **MAIN OUTCOME MEASURES** Prefracture functional level was used to identify subgroups of participants with similar trajectories of mobility over time. Recovery in functional mobility was defined in 2 ways: the "traditional" definition (return to prefracture level of functional mobility) and a "targeted recovery" definition (ability to climb 10 steps). Both were measured using the Lower Extremity Functional Scale. HRQL was measured using the RAND 36-Item Short-Form Health Survey. **RESULTS** Participants were categorized into 3 subgroups with: low, medium, and high prefracture functional abilities. Agreement between the 2 definitions of recovery (quantified using  $\kappa$  coefficient) was strong for the medium group (.81; 95% confidence interval, .56-1.00), weak for the high group (.46; 95% confidence interval, 0.0-.99), and minimal for the low group (.12; 95% confidence interval, 0.0-.328). Contrary to the traditional definition, patients who achieved targeted recovery had statistically and clinically better HRQL than the rest of the cohort throughout the study (estimated average difference of 10.8 points on RAND 36-Item Short-Form Health Survey; 95% confidence interval, 6.67-15.07). **CONCLUSIONS** The agreement between the 2 definitions of recovery ranged from minimal to strong according to patient group. Using a functional target to define recovery predicted HRQL better. It is vital to consider the definition of recovery carefully for research or clinical practice because it can influence subsequent decisions (eg, endorsing a specific intervention or discharging patients).

### **Determinants of functional outcome in hip fracture: the role of comorbidity.**

**Author(s):** Gialanella, Bernardo; Prometti, Paola; Monguzzi, Vittoria; Ferlucci, Cristina; Baiardi, Paola

**Source:** Aging clinical and experimental research; Jun 2018; vol. 30 (no. 6); p. 643-650

**Publication Type(s):** Journal Article

**Abstract:** **BACKGROUND AND AIM** Executed studies did not clearly identify which index of comorbidity was an independent outcome determinant. The aim of this prospective observational cohort study was to address this issue. **METHODS** We analyzed 200 consecutive patients with hip fracture. All patients underwent rehabilitation. At admission comorbidity was assessed through the cumulative severity, severity index, and comorbidity index of the Cumulative Illness Rating Scale. Discharge scores and effectiveness in the Functional Independence Measure motor subscale, and discharge destination were the outcome measures. Multivariate regression analyses were performed to identify determinants of outcome. **RESULTS** Mini Mental State Examination and comorbidity index of the Cumulative Illness Rating Scale were important independent determinants

of final (respectively,  $\beta = 0.46$  and  $-0.25$ ) and effectiveness (respectively,  $\beta = 0.47$  and  $-0.25$ ) in motor Functional Independence Measure scores, while hip strength and Rankin score were determinants of final motor Functional Independence Measure score (respectively,  $\beta = 0.21$  and  $-0.20$ ). Comorbidity index of the Cumulative Illness Rating Scale (odds ratio 8.18 for  $\geq 3$  versus  $< 3$  comorbidity score; 95% confidence interval, 1.03-64.7) and Geriatric Depression Scale (odds ratio 4.02 for  $\geq 6$  versus  $\leq 5$  depression scale score; 95% confidence interval, 1.52-10.63) were risk indicators for nursing home. **CONCLUSIONS** Among the indices of the Cumulative Illness Rating Scale, comorbidity index is the sole independent determinant of both motor Functional Independence Measure scores and discharge destination in hip fracture patients. This suggests to specifically evaluate this index to identify the patients who may be admitted to a rehabilitation program.

### **Impact of a patient blood management program within an Orthogeriatric care service.**

**Author(s):** Bielza, Rafael; Mora, Asunción; Zambrana, Francisco; Sanjurjo, Jorge; Sanz-Rosa, David

**Source:** Transfusion and apheresis science : official journal of the World Apheresis Association : official journal of the European Society for Haemapheresis; May 2018

**Publication Type(s):** Journal Article

**Abstract:** **BACKGROUND** Patient blood management (PBM) performs multidisciplinary strategies to optimize red blood cell (RBC) transfusion. Orthogeriatric share care models (surgeon and geriatrician manage the patient together from admission) have the goal of improving outcomes in hip fracture patients. **MATERIAL AND METHODS** A prospective observational study was conducted. Patients aged  $\geq 70$  years undergoing hip fracture (HF) surgery were consecutively included. When admitted on the orthogeriatric service a PBM protocol was applied based on: perioperative antithrombotic management, intravenous iron sucrose administration and restrictive transfusion criteria. Risk factors, clinical and functional effects of transfusion and its requirements were assessed to audit our model. **RESULTS** A total of 383 patients participated (women, 78.8%; median age, 86 (82-90) years). 210 patients (54.8%) were transfused. Age (OR = 1.055, 95% CI 1.017-1.094;  $p = 0.004$ ) and Hemoglobin (Hb) level on admission (OR = 0.497, 95% CI 0.413-0.597;  $p < 0.001$ ) were found to be significant risk factors for transfusion. Transfusion increased length of stay ( $b = 1.37$ , 95% CI 0.543-2.196;  $p = 0.001$ ) but did not have an effect on other variables. **DISCUSSION** The PBM program established within an orthogeriatric service showed positive outcomes in terms of clinical complications, mortality, delirium or functional recovery in transfused patients, whereas it did not impact on shorter length of stay. The risk of transfusion on admission was predicted with the lower Hb levels on admission, along with the age of the patients. New measurements as homogenous restrictive transfusion criteria, a single-unit RBC transfusion and the assessment of the intravenous iron efficacy are needed to be applied as a result of the high transfusion requirements.

### **ValuedCare program: a population health model for the delivery of evidence-based care across care continuum for hip fracture patients in Eastern Singapore.**

**Author(s):** Mittal, Chikul; Lee, Hsien Chieh Daniel; Goh, Kiat Sern; Lau, Cheng Kiang Adrian

**Source:** Journal of orthopaedic surgery and research; May 2018; vol. 13 (no. 1); p. 129

**Publication Type(s):** Journal Article

Available at [Journal of Orthopaedic Surgery and Research](#) - from EBSCO (MEDLINE Complete)

**Abstract:** **BACKGROUND** To test a population health program which could, through the application of process redesign, implement multiple evidence-based practices across the continuum of care in a functionally integrated health delivery system and deliver highly reliable and consistent evidence-based surgical care for patients with fragility hip fractures in an acute tertiary general hospital. **METHODS** The ValuedCare (VC) program was developed in three distinct phases as an

ongoing collaboration between the Geisinger Health System (GHS), USA, and Changi General Hospital (CGH), Singapore, modelled after the GHS ProvenCare® Fragile Hip Fracture Program. Clinical outcome data on consecutive hip fracture patients seen in 12 months pre-intervention were then compared with the post-intervention group. Both pre- and post-intervention groups were followed up across the continuum of care for a period of 12 months. RESULTS VC patients showed significant improvement in median time to surgery (97 to 50.5 h), as well as proportion of patients operated within 48 h from hospital admission (48% from 18.8%) as compared to baseline pre-intervention data. These patients also had significant reduction ( $p$  value < 0.001) of acute inpatient complications such as delirium, pneumonia, urinary tract infections, and pressure sores. VC program has shown significant reduction in median length of stay for acute hospital (13 to 9 days) as well as median combined length of stay for acute and sub-acute rehabilitation hospital (46 to 39 days), thus reducing the total duration of hospitalization and saving total hospital bed days. Operative and inpatient mortality, together with readmission rates, remained low and comparable to international Geriatric Fracture Centers (GFCs). CONCLUSION The implementation of VC methodology has enabled consistent delivery of high-quality, reliable and comprehensive evidence-based care for hip fracture patients at Changi General Hospital. This has also reflected successful change management and interdisciplinary collaboration within the organization through the program. There is potential for testing this methodology as a quality improvement framework replicable to other disease groups in a functionally integrated healthcare system.

#### **Hip Fracture in the Setting of Limited Life Expectancy: The Importance of Considering Goals of Care and Prognosis.**

**Author(s):** Johnston, C Bree; Holleran, Amanda; Ong, Thuan; McVeigh, Ursula; Ames, Elizabeth

**Source:** Journal of palliative medicine; May 2018

**Publication Type(s):** Journal Article

**Abstract:** IMPORTANCE Many older patients with a limited life expectancy experience fragility fracture of the hip, and this event is associated with increased risk of premature mortality, functional decline, and institutionalization. The treating team, in collaboration with patients and their families, must determine whether a surgical or conservative approach is in the patient's best interest when a patient has limited life expectancy. OBSERVATION Goals of care discussions appear to be rare in the setting of fragility fracture. The urgent nature of the problem makes such discussions challenging. We believe that many physicians have not considered goals of care discussions to be a standard component of fragility fracture management. CONCLUSION We propose that physicians caring for patients with limited life expectancy and fragility fracture of the hip should initiate a goals of care discussion to help determine whether operative repair will be the most patient-centered approach. Training on conducting goals of care discussions should be a standard part of surgical training programs. Goals of care discussions should include prognosis, patient values and preferences, pain, likelihood for functional recovery, and burdens and benefits of surgical versus nonsurgical management. Multidisciplinary input is required, and many patients will benefit from geriatric and/or palliative care team involvement.

#### **Stability of extracapsular hip fracture: Does it affect rehabilitation outcome of post-acute patients?**

**Author(s):** Hershkovitz, Avital; Brill, Shai; Sulam, Lior Neuhaus; Luria, Tal; Heller, Snir

**Source:** Injury; May 2018

**Publication Type(s):** Journal Article

**Abstract:**BACKGROUND Various factors have been shown to affect rehabilitation outcome of hip fractured patients. The degree of extracapsular fracture stability may also affect functional recovery. The aim of our study was to assess the relationship between extracapsular hip fracture stability and rehabilitation outcome in a post-acute setting. METHODS A retrospective cohort study of 144 hip fractured patients was carried out in a post-acute geriatric rehabilitation center from 1/2014 to 6/2015. The main outcome measures were the Functional Independence Measure (FIM) instrument, motor FIM (mFIM), Montebello Rehabilitation Factor Score (MRFS) on the mFIM and length of stay (LOS). The associations between patients with stable vs. unstable and clinical, demographic and comorbidity variables, were assessed by the Mann-Whitney U and chi-square tests. A multiple linear regression model was used to estimate the association between fracture stability and LOS score after controlling for sociodemographic characteristics and chronic diseases. RESULTS Rehabilitation outcomes (FIM and mFIM score changes, mFIM MRFS) were found independent of extracapsular hip fracture stability. Patients with an unstable fracture presented with a significantly longer LOS compared with a stable fracture ( $p = .008$ ). Multiple linear regression analysis showed that fracture stability was significantly associated with LOS after adjustment for confounding demographic, clinical and functional variables ( $p = .009$ ). CONCLUSION Patients with unstable extracapsular hip fractures may require a prolonged rehabilitation period in order to achieve the same functional gain as patients with stable fractures.

#### **Functional and clinical outcomes of patients aged younger and older than 85 years after rehabilitation post-hip fracture surgery in a co-managed orthogeriatric unit.**

**Author(s):** Mazzola, Paolo; Floris, Patrizia; Picone, Domenico; Anzuini, Alessandra; Tsiantouli, Eleni

**Source:** Geriatrics & gerontology international; May 2018

**Publication Type(s):** Journal Article

**Abstract:**AIM Literature investigating rehabilitation outcomes after hip surgery among individuals aged  $\geq 85$  years is sparse. We compared the characteristics and outcomes of patients aged under and over 85 years, and assessed factors potentially associated with rehabilitation success as described by the Barthel Index (BI). METHODS From 2011 to 2014, we prospectively enrolled 328 patients ( $n = 152$  aged  $< 85$  years,  $n = 176$  aged  $\geq 85$  years) admitted to an orthogeriatric unit (Sondrio, Italy) with a diagnosis of hip fracture requiring surgical treatment. We excluded patients who were being treated conservatively. Outcomes included absolute functional gain (AFG; BI at discharge - BI on admission), rehabilitation effectiveness index (AFG / length of stay) and postoperative complications. RESULTS Older patients were more functionally (mean BI on admission:  $11.7 \pm 9.6$  vs  $16.4 \pm 12.2$ ,  $P < 0.001$ ) and cognitively impaired than their younger counterparts (34.1% vs 18.4%,  $P < 0.001$ ). Surgery time ( $1.9 \pm 1.2$  vs  $2.3 \pm 1.3$  days,  $P = 0.008$ ) and length of stay were shorter for older patients ( $5.7 \pm 2.1$  vs  $6.6 \pm 2.4$  days,  $P < 0.001$ ). There were no differences in terms of complications. Patients aged  $< 85$  years showed better functional outcomes (BI, AFG, REI) at discharge than patients aged  $\geq 85$  years (mean AFG:  $38.2 \pm 24.2$  vs  $26.1 \pm 22.0$ ,  $P < 0.001$ ). BI on admission (OR 1.05, 95% CI 1.02-1.08) and cognitive impairment (OR 0.58, 95% CI 0.34-0.98) were independently associated with rehabilitation outcomes, regardless of chronological age. CONCLUSIONS Both groups (aged  $< 85$  and  $\geq 85$  years) showed a significant functional improvement at discharge. Older patients show a residual ability to recover after surgery. A high rehabilitation efficiency - regardless of age - should be pursued even for the oldest old patients experiencing hip fracture. Geriatr Gerontol Int 2018; ••: ••-••.

#### **Functional Outcome of Elderly Hip Fracture Patients is not Affected By Pre-Fracture Dementia.**

**Author(s):** Mizrahi, Eliyahu Hayim; Lubart, Emilia; Adunsky, Abraham

**Source:** American journal of physical medicine & rehabilitation; May 2018

**Publication Type(s):** Journal Article

**Abstract:**OBJECTIVEThe aim of the study was to examine whether a diagnosis of pre-fracture Dementia (PFD) affects functional outcome at discharge from a geriatric rehabilitation setting.DESIGNA total of 211 consecutive elderly hip fracture patients were evaluated retrospectively. We used the Functional Independence Measure (FIM) and analyzed data by t-test, chi square-test and multiple linear regression analysis.RESULTSPatients with PFD were older ( $P = 0.001$ ), presented with lower Mini-Mental State Examination (MMSE) scores ( $P < 0.001$ ) and lower pre-fracture function ( $P < 0.001$ ).Total-FIM and motor-FIM scores at admission and discharge, as well as FIM gain scores at discharge were lower among PFD patients, compared with non pre-fracture dementia (NPDF) patients ( $P < 0.001$ ). FIM daily gains (Efficiency) ( $P < 0.001$ ) and Montebello relative functional scores ( $P < 0.001$ ) were also lower in PFD, compared with NPDF patients. However, linear regression analysis showed that PFD did not predict total, motor, or FIM gain at discharge ( $\beta = -0.11$ ,  $P = 0.115$ ;  $\beta = -0.06$ ,  $P = 0.412$ ;  $\beta = -0.099$ ,  $p = 0.329$ , respectively). Upon discharge, PFD patients achieved lower FIM scores yet maintained similar motor-FIM gains compared with NPDF patients.CONCLUSIONSOur study results supports the inclusion of PFD patients in post-fracture rehabilitation programs.

**Safe working in a 7-day service. Experience of hip fracture care as documented by the UK National Hip Fracture Database.**

**Author(s):** Neuburger, Jenny; Currie, Colin; Wakeman, Robert; Georghiou, Theo; Boulton, Chris

**Source:** Age and ageing; May 2018

**Publication Type(s):** Journal Article

**Abstract:**Objectiveto describe differences in care and 30-day mortality of patients admitted with hip fracture on weekends (Saturday-Sunday) compared to weekdays (Monday-Friday), and their relationship to the organisation of care.Methodsdata came from the National Hip Fracture Database (NHFD) linked to ONS mortality data on 52,599 patients presenting to 162 units in England between 1 January and 31 December 2014. This was combined with information on geriatrician staffing and major trauma centre (MTC) status. 30-day mortality and care were compared for patients admitted at weekends and weekdays; separately for patients treated in units grouped by the mean level of input by geriatricians, weekend geriatrician clinical cover and MTC status. Differences were adjusted for variation in patients' characteristics.Resultsthere was no evidence of differences in 30-day mortality between patients admitted at weekends compared to weekdays (7.2 vs 7.5%,  $P = 0.3$ ) before or after adjusting for patient characteristics in either MTCs or general hospitals. The proportion receiving a preoperative geriatrician assessment was lower at weekends (42.8 vs 60.7%,  $P < 0.001$ ). 30-day mortality was lower in units with higher levels of geriatrician input, but there was no weekend mortality effect associated with lower levels of input or absence of weekend cover.Conclusionthere was no evidence of a weekend mortality effect among patients treated for hip fracture in the English NHS. It appears that clinical teams provide comparably safe and effective care throughout the week. However, greater geriatrician involvement in teams was associated with overall lower mortality.

**Validity of Visual Assessment of Sit to Stand After Hip Fracture.**

**Author(s):** Zabloutny, Cynthia; Hilton, Tiffany; Riek, Linda; Kneiss, Janet; Tome, Joshua; Houck, Jeff

**Source:** Journal of geriatric physical therapy (2001); May 2018

**Publication Type(s):** Journal Article

**Abstract:**BACKGROUND AND PURPOSEWhen treating older adults post-hip fracture, physical therapists routinely assess the sit-to-stand (STS) task using observational analysis. Studies have demonstrated that significant movement asymmetries in ground reaction force production of the fractured lower limb persist during STS, even though individuals may rise independently. To date, the validity of therapist judgments of lower limb force during STS has not been addressed. The purpose of this observational cohort study was to determine the accuracy of physical therapists' observational assessments of STS for detecting the involved limb and its ground reaction force contribution in older adults post-hip fracture.METHODSEighteen home health physical therapists assessed 10 videotapes of older adults post-hip fracture rising from sitting and judged the side of involvement and the amount of ground reaction force generated by the fractured lower limb. Each videotape was synchronized with its respective force data. A wide spectrum of asymmetry in rising was represented in the test videos. Before making these judgments, the therapists viewed a separate set of training videos and received instructions in the use of specific visual cues to assist with subsequent judgments.RESULTS AND DISCUSSIONTherapists judged the involved side correctly 74% of the time. Mean accuracy in judging ground reaction force output was 39% across all therapists. Force symmetry did not significantly influence accuracy of force judgments. Inaccurate judgments of force may limit therapeutic intensity and minimize the potential for developing motor strategies that favor force production of the involved limb. Augmenting observational analysis of STS with quantitative data could assist in optimizing restorative function.CONCLUSIONJudgments of lower limb ground reaction force output during STS based on observation alone are not valid and may need to be supplemented with quantitative data.

#### **Gait Speed and Mobility Disability: Revisiting Meaningful Levels in Diverse Clinical Populations.**

**Author(s):** Miller, Michael E; Magaziner, Jay; Marsh, Anthony P; Fielding, Roger A; Gill, Thomas M

**Source:** Journal of the American Geriatrics Society; May 2018; vol. 66 (no. 5); p. 954-961

**Publication Type(s):** Journal Article

**Abstract:**OBJECTIVESTo investigate the heterogeneity of clinically meaningful levels of gait speed relative to self-reported mobility disability (SR-MD).DESIGNFive longitudinal studies with older adults in different health states (onset of acute event, presence of chronic condition, sedentary, community living) were used to explore the relationship between gait speed and SR-MD.SETTINGLifestyle Interventions and Independence for Elders Pilot (LIFE-P), LIFE, Trial of Angiotensin-Converting Enzyme Inhibition and Novel Cardiovascular Risk Factors (TRAIN), Baltimore Hip Fracture Study (BHS2), Invecchiare in Chianti (InCHIANTI).PARTICIPANTSIndividuals aged 65 and older (N=3,540): sedentary, community dwelling (LIFE-P/LIFE), with hip fracture (BHS2), random population-based sample (InCHIANTI), high cardiovascular risk (TRAIN).MEASUREMENTSUsual-pace gait speed across 3 to 4 m and SR-MD, defined as inability to walk approximately 1 block or climb 1 flight of stairs.RESULTSThe mean gait speed of participants without SR-MD was greater than 1.0 m/s in InCHIANTI and TRAIN, 0.79 m/s in LIFE-P/LIFE, and 0.46 m/sec in BHS2. Of individuals with SR-MD, mean gait speed was 0.08 m/s slower in LIFE-P/LIFE, 0.19 m/s slower in TRAIN, 0.22 m/s slower in BHS2, and 0.36 m/s slower in InCHIANTI. The optimal gait speed cutpoint for minimizing SR-MD misclassification rates ranged from 0.3 m/s in BHS2 to 1.0 m/s in TRAIN. In longitudinal analyses, development of SR-MD was dependent on initial gait speed and change in gait speed ( $p < .001$ ).CONCLUSIONThe relationship between absolute levels of gait speed and SR-MD may be context specific, and there may be variations between populations. Across diverse clinical populations, clinical interpretations of how change in usual pace gait speed relates to development of SR-MD depend on where on the gait speed continuum change occurs.

**A systematic review of evidence for older adults' sedentary behavior and physical activity after hip fracture.**

**Author(s):** Zusman, Enav Z; Dawes, Martin G; Edwards, Nicola; Ashe, Maureen C

**Source:** Clinical rehabilitation; May 2018; vol. 32 (no. 5); p. 679-691

**Publication Type(s):** Journal Article

**Abstract:**OBJECTIVE To synthesize evidence on older adults' sedentary behavior and physical activity during rehabilitation and recovery for hip fracture (1) across the care continuum and (2) from clinical interventions. DESIGN We conducted a systematic review of peer-reviewed publications using CINAHL, Embase, Ovid MEDLINE, PsycINFO, and SportDiscus (last search: 17 October 2017). STUDY SELECTION We included studies that measured sedentary behavior and physical activity of older adults with hip fracture using activity monitors (e.g. accelerometers). We identified literature at Level 1 (title and abstract) and Level 2 (full text), and conducted forward and backward searches. We assessed observational studies' adherence to reporting guidelines and intervention studies' risk of bias. RESULTS We included 14 studies (882 participants). Four studies reported sedentary behavior data, while all studies reported information on physical activity. Settings included hospital, rehabilitation centers, and the community. Nine studies were observational; five were experimental design. Older adults had excessive sedentary time (>10 hours/day) and low physical activity. Participants' average upright time differed across settings. During hospital stay, it ranged 16-52 minutes/day, while in the community, it ranged 51-261 minutes/day. Data from five interventions reported on physical activity change: two studies increased between 14 and 27 minutes/day. Another study reported participants accumulated 6994 steps/day at the end of the intervention, but for two other interventions, activity was below 5000 steps/day. CONCLUSION Based on available evidence, older adults with hip fracture engage in prolonged sedentary behavior and have low levels of physical activity during rehabilitation and recovery.

**CORR Insights®: The Rothman Index is Associated With Postdischarge Adverse Events After Hip Fracture Surgery in Geriatric Patients.**

**Author(s):** Jämsen, Esa

**Source:** Clinical orthopaedics and related research; May 2018; vol. 476 (no. 5); p. 1007-1009

**Publication Type(s):** Journal Article

**The Rothman Index Is Associated With Postdischarge Adverse Events After Hip Fracture Surgery in Geriatric Patients.**

**Author(s):** McLynn, Ryan P; Ottesen, Taylor D; Ondeck, Nathaniel T; Cui, Jonathan J; Rubin, Lee E

**Source:** Clinical orthopaedics and related research; May 2018; vol. 476 (no. 5); p. 997-1006

**Publication Type(s):** Journal Article

**Abstract:**BACKGROUND The Rothman Index is a comprehensive measure of overall patient status in the inpatient setting already in use at many medical centers. It ranges from 100 (best score) to -91 (worst score) and is calculated based on 26 variables encompassing vital signs, routine laboratory values, and organ system assessments from nursing rounds from the electronic medical record. Past research has shown an association of Rothman Index with complications, readmission, and death in certain populations, but it has not been evaluated in geriatric patients with hip fractures, a potentially vulnerable patient population. QUESTIONS/PURPOSES (1) Is there an association between Rothman Index scores and postdischarge adverse events in a population aged 65 years and older with hip fractures? (2) What is the discriminative ability of Rothman Index scores in determining which patients will or will not experience these adverse events? (3) Are there Rothman Index thresholds associated with increased incidence of postdischarge adverse outcomes? METHODS One

thousand two hundred fourteen patients aged 65 years and older who underwent hip fracture surgery at an academic medical center between 2013 and 2016 were identified. Demographic and comorbidity characteristics were characterized, and 30-day postdischarge adverse events were calculated. The associations between a 10-unit change in Rothman Index scores and postdischarge adverse events, mortality, and readmission were determined. American Society of Anesthesiologists (ASA) class was used as a measure of comorbidity because prior research has shown its performance to be equivalent or superior to that of calculated comorbidity measures in this data set. We assessed the ability of Rothman Index scores to determine which patients experienced adverse events. Finally, Rothman Index thresholds were assessed for an association with increased incidence of postdischarge adverse outcomes. RESULTS We found a strong association between Rothman Index scores and postdischarge adverse events (lowest score: odds ratio [OR] = 1.29 [1.18-1.41],  $p < 0.001$ ; latest score: OR = 1.37 [1.24-1.52],  $p < 0.001$ ) after controlling for age, sex, body mass index, ASA class, and surgical procedure performed. The discriminative ability of lowest and latest Rothman Index scores was better than those of age, sex, and ASA class for any adverse event (lowest value: area under the curve [AUC] = 0.641; 95% confidence interval [CI], 0.601-0.681; latest value: AUC = 0.640; 95% CI, 0.600-0.680); age (0.534; 95% CI, 0.493-0.575,  $p < 0.001$  for both), male sex (0.552; 95% CI, 0.518-0.585,  $p = 0.001$  for both), and ASA class (0.578; 95% CI, 0.542-0.614;  $p = 0.004$  for lowest Rothman Index,  $p = 0.006$  for latest Rothman Index). There was never a difference when comparing lowest Rothman Index value and latest Rothman Index value for any of the outcomes (Table 5). Patients experienced increased rates of postdischarge adverse events and mortality with a lowest Rothman Index of  $\leq 35$  ( $p < 0.05$ ) or latest Rothman Index of  $\leq 55$  ( $p < 0.05$ ). CONCLUSION The Rothman Index provides an objective method of assessing perioperative risk in the setting of hip fracture surgery in patients older than age 65 years and is more accurate than demographic measures or ASA class. Furthermore, there are Rothman Index thresholds that can be used to identify patients at increased risk of complications. Physicians can use this tool to monitor the condition of patients with hip fracture, recognize patients at high risk of adverse events to consider changing their plan of care, and counsel patients and families. Further investigation is needed to determine whether interventions based on Rothman Index values contribute to improved outcomes or value of hip fracture care. LEVEL OF EVIDENCE Level II, diagnostic study.

### **Prospective Prognostic Cohort Study of Pressure Injuries in Older Adult Patients with Hip Fractures.**

**Author(s):** Forni, Cristiana; D'Alessandro, Fabio; Genco, Rossana; Mini, Sandra; Notarnicola, Teresa

**Source:** *Advances in Skin & Wound Care*; May 2018; vol. 31 (no. 5); p. 218-224

**Publication Type(s):** Academic Journal

**Abstract:** OBJECTIVE: The aim of this study was to assess the rate of pressure injury and real predictors thereof in the older adult population with hip fractures in an orthopedic hospital. METHODS: In this prospective prognostic cohort study, all patients admitted with fragility hip fractures were monitored over a 12-month period. On a daily basis, ward nurses and physiotherapists assessed the condition of the patients' skin and collected data about all the predictors connected to their healthcare and hospital organization until the patients were discharged from hospital or until the onset of pressure injury. RESULTS: From October 1, 2013, to September 30, 2014, 467 older adult patients with fragility fractures were enrolled in the study. Of these, 27% ( $n = 127$ ) developed a pressure injury. Multivariate analysis identified the following predictive factors: age older than 81 years, type of surgery, and placing the limb in a foam rubber splint. No other factor connected to the patient or medical, nursing, or rehabilitation treatment was significantly correlated to the onset of pressure injury, even when the univariate analysis showed some of them were possible predictors. CONCLUSIONS: Pressure injury in older adults with hip fractures is a relatively common complication, especially in high-risk patients or following certain



treatments. These potential indicators could help provide safe and targeted care by preemptively identifying patients at highest risk of pressure injury.

**Proof of Concept of a Partial Weight-Bearing Supporting Real-Time Feedback System... "Biomedical Meets eHealth "From Sensors to Decisions," -- papers from the 12th eHealth conference, held in Vienna, Austria, May 8-9, 2018.**

**Author(s):** TKACHENKO-BRIL, Andrés I.; JAGOŠ, Harald; DAVID, Veronika; PILS, Katharina; GAUDERNAK, Jakob; RAFOLT, Dietmar

**Source:** Studies in Health Technology & Informatics; May 2018; vol. 248 ; p. 286-292

**Publication Type(s):** Academic Journal

**Abstract:**Background: Patient compliance with lower limb partial weight bearing (PWB) instructions during post-surgical early mobilization is often low and many are unable to adhere to the prescribed limits without the implementation of concurrent biofeedback. Objectives: A real-time feedback system based on eSHOE instrumented insoles was tested in order to preliminarily quantify its efficiency at improving geriatric patients' compliance. Methods: In order to gain a proof of concept, measurements with one patient after a hip fracture were carried out. The compliance with the prescribed load restriction was measured on four measurement dates, first without and then with the feedback. The number of correctly loaded steps (NCS), the mean peak load (MPL) and the maximal load (ML) were considered. Results: Preliminary results of one patient show that NCS was nearly doubled and the MPL was reduced to acceptable limits, while the ML was reduced on three of the four days. Conclusion: The results indicate that the developed system is easily implementable into the rehabilitative routine and has a positive effect on PWB performance of geriatric subjects while walking.

**Effect of sensory-motor latencies and active muscular stiffness on stability for an ankle-hip model of balance on a balance board.**

**Author(s):** Chumacero, Erik; Yang, James; Chagdes, James R

**Source:** Journal of biomechanics; May 2018

**Publication Type(s):** Journal Article

**Abstract:**To achieve human upright posture (UP) and avoid falls, the central nervous system processes visual, vestibular, and proprioceptive information to activate the appropriate muscles to accelerate or decelerate the body's center of mass. In this process, sensory-motor (SM) latencies and muscular deficits, even in healthy older adults, may cause falls. This condition is worse for people with chronic neuromuscular deficits (stroke survivors, patients with multiple sclerosis or Parkinson's disease). One therapeutic approach is to recover or improve quiet UP by utilizing a balance board (BB) (a rotating surface with a tunable stiffness and time delay), where a patient attempts to maintain UP while task difficulty is manipulated. While BBs are commonly used, it is unclear how UP is maintained or how changes in system parameters such as SM latencies and BB time delay affect UP stability. To understand these questions, it is important that mathematical models be developed with enough degrees-of-freedom to capture the many responses evoked during the maintenance of UP on a BB. This paper presents an ankle-hip model of balance on a BB, which is used to study the combined effect of SM latencies and active muscular stiffness of the ankle and hip joints, and the BB stiffness and time delay on UP stability. The analysis predicts that people with proprioceptive, visual, vestibular loss, or increased SM latencies may show either leaning postures or larger body-sway. The results show that the BB time delay and the visual and vestibular feedback have the largest impact on UP stability.

## Psychological

### **Delirium identification and management on an orthopaedic unit**

**Author(s):** Griggs L.; Hammen C.; Baum E.

**Source:** Journal of the American Geriatrics Society; 2018; vol. 66

**Publication Type(s):** Conference Abstract

**Abstract:**Background: Delirium is an acute, fluctuating disturbance of consciousness, attention, and cognition. Postoperative delirium is recognized as the most common surgical complication in older adults, occurring in 5% to 50% of patients. Delirium is not only associated with an increased mortality, but also an increased hospital length of stay and likelihood of discharge to a nursing home. About 50% to 80% of delirium cases go unrecognized or undocumented by the treating clinical team. Methods: A hospital orthopaedic unit was selected to pilot a delirium quality improvement project. The purpose of the pre-intervention phase was to determine the baseline incidence of delirium and/ or cognition deficits in patients on admission and discharge with usual medical care. The staff received education regarding delirium and screening tools for delirium, using the Confusion Assessment Method (CAM) and the Mini-Cog for undiagnosed dementia. The purpose of the post-intervention phase was to determine the effectiveness of a non-pharmacologic delirium prevention and treatment protocol in reducing delirium in hospitalized older adults. A modified Hospital Elder Life Program (HELP) was used to develop a nursing algorithm. Over a 4 month period (2 months for pre- and 2 months post-intervention), all consecutive patients 65 and older were screened for delirium on admission and twice daily during hospitalization. Because of the heterogenous population on the unit, data is presented by the three main subgroups. Results: Refer to table Conclusions: As expected, the elective joints had the lowest occurrence of delirium. This is most likely related to a healthier patient selection and shorter hospital stays. The literature suggests a higher occurrence of delirium in hip fracture patients, which was corroborated by this study. The lack of significance with the intervention may relate to the small numbers in the post intervention group. The medical patient subgroup did show a significant decrease in delirium post intervention and a downward trend in length of stay.

### **Serotonin syndrome from polypharmacy**

**Author(s):** Yoo B.; Bynum D.; Katz J.

**Source:** Journal of the American Geriatrics Society; 2018; vol. 66

**Publication Type(s):** Conference Abstract

**Abstract:**Serotonin syndrome is a condition with increased serotenergic activity resulting in increased autonomic activity, mental status changes and neuromuscular hyperactivity. It is most always the result of polypharmacy. Diagnosis can be difficult as symptoms mimic other conditions and there is no single diagnostic test. A 67 year-old male with ischemic cardiomyopathy status post left ventricular assist device, COPD, anxiety and depression presented with hip fracture. Operative intervention was initially delayed due to presenting volume overload requiring diuresis, acute kidney injury, fever (treated with a single dose of vancomycin), and an elevated INR due to warfarin. On hospital day three, he underwent hip repair during which he received Fentanyl. Due to mental status

changes (confusion and somnolence), the patient's pain regimen was switched from oxycodone to tramadol, and his home clonazepam was decreased. He remained on his home doses of citalopram, bupropion and ondansetron. The next day, he developed recurrent fever for which he was started on antibiotics and tylenol, and gluteal compartment syndrome, necessitating emergent surgery requiring additional Fentanyl. His fevers persisted and his mental status continued to deteriorate. His exam showed diaphoresis, clonus and myoclonic jerking in all extremities. Urine and blood cultures, cerebrospinal fluid analysis, rapid flu, HIV, herpes simplex 1 and 2 PCRs, serum cryptococcal antigen, chest x-ray, head CT, upper and lower extremity venous doppler studies and electroencephalogram were unrevealing. Given his history of serotonergic agents use and exam consistent with serotonin syndrome, all potentially offending agents were stopped and cyprohepazine was initiated. Within 24 hours, the patient's fevers, delirium and clonus ceased. He remained symptom free until discharge. This case illustrates the potential risks of prescribing multiple serotonergic agents for older patients. Before starting new medications, clinicians must consider drugs' serotonergic properties and the patients' concomitant medications. Older patients often have slower clearance, thus guidelines suggest lower doses for many medications. The standard dose of citalopram, prescribed in this case, is twice the recommended geriatric dose. Serotonin syndrome can mimic many other processes. Thus, consideration and recognition is crucial as to not delay treatment or expose patients to extensive work-ups.

### **Factors Contributing to Memory of Acute Pain in Older Adults Undergoing Planned and Unplanned Hip Surgery.**

**Author(s):** Halicka, Monika; Bąbel, Przemysław

**Source:** The Clinical journal of pain; Jun 2018; vol. 34 (no. 6); p. 543-551

**Publication Type(s):** Journal Article

**Abstract:**OBJECTIVESPrevious research on pain memory provides inconsistent evidence about the accuracy of pain recall, and few studies have attempted to examine broad affective and contextual contributions to this phenomenon. The present research aimed to determine the accuracy of postoperative pain recall after 3 months, with respect to the context of the surgery and the congruence of affective states concurrent with the initial experience and its recall. The study also aimed to identify predictors of remembered pain by analyzing a range of sensory, cognitive, and affective factors.METHODSOlder adults, undergoing planned (N=40) and unplanned hip surgery (N=31), were enrolled in this prospective study to investigate their presurgery, postsurgery, and delayed ratings of expected, experienced, and recalled pain intensity and unpleasantness, state anxiety, and positive and negative affect.RESULTSMemory of postoperative pain was found to be accurate, regardless of the context of the surgery. Affective states in the postoperative period were congruent with those during pain recall. The study also revealed that in planned surgery context, remembered pain was predicted by experienced postoperative pain, cognitive functions, positive and negative affect; whereas in unplanned surgery context its significant predictors included age, anxiety, and negative and positive affect.DISCUSSIONThe results of this study suggest that older orthopedic patients remember postoperative pain correctly after 3 months and that mood dependence effect may contribute to memory of pain. Pain recall after planned surgery seems to depend mainly on the actual experience, while following unplanned surgery it depends on affective factors. Present findings contribute to knowledge about pain memory in older adults and have implications for patients' recovery and best practice in perioperative hospital care.

### **Impact of Competing Risk of Mortality on Association of Cognitive Impairment with Risk of Hip Fracture in Older Women.**

**Author(s):** Diem, Susan J; Vo, Tien N; Langsetmo, Lisa; Schousboe, John T; Yaffe, Kristine;

**Source:** Journal of bone and mineral research : the official journal of the American Society for Bone and Mineral Research; May 2018

**Publication Type(s):** Journal Article

**Abstract:** Previous studies examining the association of cognitive impairment and dementia with fracture outcomes in older adults have usually used standard approaches that did not take into account the competing risk of mortality. However, ignoring mortality may not provide accurate estimates of risk of fracture because dementia in older adults strongly predicts death, making mortality a competing risk. 1491 women (mean age 87.6 years) participating in the prospective Study of Osteoporotic Fractures (SOF) Year 20 exam were cognitively assessed and followed to ascertain vital status (deaths verified by death certificates) and hip fractures (confirmed by radiographic reports). Cognitive status was categorized as normal, MCI, or dementia, based on a standardized evaluation. Absolute probability of hip fracture by category of cognitive function was estimated using traditional Kaplan-Meier method and cumulative incidence function accounting for competing mortality risk. Risk of hip fracture by cognitive function category was determined using conventional Cox proportional hazards regression and sub-distribution hazards models with death as a competing risk. During an average follow-up of 5.6 years, 139 (9.3%) women experienced a hip fracture and 990 (66.4%) died before experiencing this outcome. Among women with dementia, the risk of hip fracture was 11.7% (95% CI, 7.3-17.2) at 5 years and 18.6% (95% CI, 9.1-30.9) at 10 years using traditional survival analysis versus 7.9% (95% CI, 5.1-11.6) at 5 years and 8.8% (95% CI, 5.8-12.8) at 9.8 years using a competing risk approach. Results were similar for women with MCI. Women with MCI and dementia have a higher risk of hip fractures than women with normal cognition. However, not taking into account the competing risk of mortality significantly overestimates the risk of hip fracture in women in the ninth and tenth decades of life with cognitive impairment. This article is protected by copyright. All rights reserved.

#### **Dementia and Risk of 30-Day Readmission in Older Adults After Discharge from Acute Care Hospitals.**

**Author(s):** Sakata, Nobuo; Okumura, Yasuyuki; Fushimi, Kiyohide; Nakanishi, Miharuru; Ogawa, Asao

**Source:** Journal of the American Geriatrics Society; May 2018; vol. 66 (no. 5); p. 871-878

**Publication Type(s):** Journal Article

**Abstract:** OBJECTIVE To assess the association between dementia and risk of hospital readmission and to evaluate whether the effect of dementia on hospital readmission varies according to primary diagnosis. DESIGN Retrospective cohort study. SETTING Nationwide discharge database of acute care hospitals in Japan. PARTICIPANTS Individuals aged 65 and older diagnosed with one of the 30 most common diagnoses and discharged from 987 hospitals between April 2014 and September 2015 (N = 1,834,378). MEASUREMENTS The primary outcome was unplanned hospital readmission within 30 days. Poisson generalized estimating equation models were fitted to assess the risks of readmission for individuals with and without dementia, using primary diagnosis as a possible effect modifier and clinical factors as potential confounders. RESULTS The overall prevalence of dementia was 14.7% and varied according to primary diagnosis, ranging from 3.0% in individuals with prostate cancer to 69.4% in those with aspiration pneumonia. Overall, individuals with dementia had a higher risk of hospital readmission (8.3%) than those without (4.1%) (adjusted risk ratio (aRR))=1.46, 95% confidence interval (CI)=1.44-1.49), although diagnostic category substantially modified the relationship between dementia and hospital readmission. For hip fracture, dementia was associated with greater risk of hospital readmission (adjusted risk 11.5% vs 7.9%; aRR=1.46; 95% CI=1.28-1.68); this risk was attenuated for cholecystitis (adjusted risk 12.8% vs 12.4%; aRR=1.03; 95% CI=0.90-1.18). CONCLUSION Risk of hospital readmission associated with dementia varied according to primary diagnosis. Healthcare providers could enforce interventions to minimize readmission by

focusing on comorbid conditions in individuals with dementia and specific primary diagnoses that increase their risk of readmission.

### **The impact of bereavement on health and mortality among older adults: A nationwide, matched prospective cohort study**

**Author(s):** Morin L.; Wastesson J.; Agahi N.; Johnell K.

**Source:** Palliative Medicine; May 2018; vol. 32 (no. 1); p. 13-14

**Publication Type(s):** Conference Abstract

**Abstract:**Context and aims: Providing psychosocial and bereavement support to family caregivers is an important mission of palliative care. However, we lack robust evidence to evaluate the health consequences of bereavement. This is especially true among older adults, since previous studies have often focused on younger age groups. The present study aimed to investigate the effects of spousal loss on health outcomes and mortality among older adults. Study population: All surviving spouses of older adults (65 years) who died in Sweden in 2013-2014 were matched 1:1 (sex, age) with married older adults who did not experience spousal loss. Study design: Nationwide, longitudinal matched cohort study. Data was extracted from national registers with full-population coverage in Sweden. Using the date of spousal loss as index date, cases and controls were followed-up for 1 year. Statistical analysis: The risk of adverse health outcomes was estimated using adjusted Cox proportional hazard regression models with stratification on the matched pairs. We calculated hazard ratios (HR) with 95% confidence intervals (CI). Results: A total of 42,941 bereaved older adults were included and matched with an equal number of married controls. Mean age was 78.4 years (SD= 7.2), 68.3% women. Mortality rate was significantly higher among bereaved older adults (49.3 per 1000 person-years) than among controls (30.7 per 1000 person-years). The adjusted Cox regression showed a risk of 1-year mortality 1.66 (95% CI 1.54-1.79) times higher for bereaved older adults, with a greater excess risk among men (HR 1.82, 95% CI 1.62-2.03) than among women (HR 1.52, 95% CI 1.37-1.70). We found an increased risk of stroke (HR 1.27, 95% CI 1.13-1.44), injurious fall (HR 1.30 95% CI 1.23-1.37), hip fracture (HR 1.48, 95%CI 1.30-1.68), and unplanned hospitalization (HR 1.27, 95% CI 1.23-1.31) during the first year after spousal loss. Bereaved individuals were also at increased risk of nursing home admission (HR 2.01, 95% CI 1.89-2.13). During the first 90-day period after index date, we observed a 65% increase in the use of benzodiazepines and a 10% increase in the use of selective serotonin reuptake inhibitors among cases while no variation was noted in the control group. Conclusions: Our findings confirm that bereavement has a significant and rapid impact on both fatal and non-fatal health outcomes among surviving spouses. This demonstrates the need for appropriate support of recently bereaved older adults.

## **Other**

### **Continuously declining incidence of hip fracture in Finland: Analysis of nationwide database in 1970-2016.**

**Author(s):** Kannus, Pekka; Niemi, Seppo; Parkkari, Jari; Sievänen, Harri

**Source:** Archives of gerontology and geriatrics; 2018; vol. 77 ; p. 64-67

**Publication Type(s):** Journal Article

**Abstract:**BACKGROUNDHip fractures of older adults are a major public health issue.METHODSWe determined the current trend in the number and incidence (per 100,000 persons) of hip fracture among older adults in Finland by taking into account all persons 50 years of age or older who were admitted to hospitals for primary treatment of such fracture between 1970 and 2016.RESULTSThe

number of hip fractures rose sharply till the end of 1990s (from 1857 in 1970 to 7122 in 1997), but since then, the rise has slowed down (7716 fractures in 2016). Similarly, the age-adjusted incidence of hip fracture increased until 1997 but declined thereafter. The decline was especially clear in women whose age-adjusted incidence was 537.9 (per 100,000 persons) in 1997 but only 344.1 in 2016. In men, the corresponding incidence was 256.5 in 1997 and 194.7 in 2016. With the current 2016 incidence rates, the number of hip fractures in Finland will increase by 44% by the year 2030 due to the sharp growth of the population at risk. The only way to limit the rise is to have a further decline in fracture incidence in 2016-2030. CONCLUSION The decline in the incidence of hip fracture in Finland has continued through the entire new millennium. Despite this we have to effectively continue implementation of the fracture prevention efforts, because our elderly population will grow rapidly in the near future.

**Characteristics of New-Onset and Chronic Sleep Medication Users Among Older Adults: A Retrospective Study of a US Medigap Plan Population using Propensity Score Matching.**

**Author(s):** Musich, Shirley; Wang, Shaohung S; Slindee, Luke B; Sapphire, Lynn; Wicker, Ellen

**Source:** Drugs & aging; May 2018; vol. 35 (no. 5); p. 467-476

**Publication Type(s):** Research Support, Non-u.s. Gov't Journal Article

Available at [Drugs & Aging](#) - from Publishers' website (via doi.org)

**Abstract:** BACKGROUND Prescription sleep medications are often utilized to manage sleep problems among older adults even though these drugs are associated with multiple risks. OBJECTIVE The aim was to determine the prevalence and characteristics of new-onset compared to chronic sleep medication users and to examine factors associated with the conversion from new to chronic use. A secondary objective was to investigate the impact of sleep medications on health outcomes of injurious falls and patterns of healthcare utilization and expenditures. METHODS A 25% random sample of adults  $\geq 65$  years with 3-year continuous AARP<sup>®</sup> Medicare Supplement medical and AARP<sup>®</sup> MedicareRx drug plan enrollment was utilized to identify new-onset and chronic sleep medication users. Prescription sleep medication drugs were defined using National Drug Codes (NDCs); falls or hip fractures were identified from diagnosis codes. New users had no sleep medication use in 2014, but initiated medication use in 2015; chronic users had at least one sleep medication prescription in 2014 and in 2015; both groups had follow-up through 2016. Characteristics associated with new users, new users who converted to chronic use, and chronic users were determined using multivariate logistic regression. Prevalence of falls, healthcare utilization and expenditures were regression adjusted. RESULTS Among eligible insureds, 3 and 9% were identified as new-onset and chronic sleep medication users, respectively. New-onset sleep medication prescriptions were often associated with an inpatient hospitalization. The strongest characteristics associated with new users, those who converted to chronic use, and chronic users were sleep disorders, depression and opioid use. About 50% of new users had  $> 30$  days' supply; 25% converted to chronic use with  $\geq 90$  days' supply. The prevalence of falls for new-onset users increased by 70% compared to a 22% increase among chronic users. CONCLUSION New-onset and chronic sleep medication users were characterized by sleep disorders, depression and pain. Addressing the underlying problems associated with sleep problems among older adults may decrease the need for sleep medications and thus reduce the risk of sleep medication-related adverse events.

**Nutritional Status and Nutritional Treatment Are Related to Outcomes and Mortality in Older Adults with Hip Fracture.**

**Author(s):** Malafarina, Vincenzo; Reginster, Jean-Yves; Cabrerizo, Sonia; Bruyère, Olivier

**Source:** Nutrients; May 2018; vol. 10 (no. 5)

**Publication Type(s):** Academic Journal

Available at [Nutrients](#) - from PubMed Central

**Abstract:** Malnutrition is very prevalent in geriatric patients with hip fracture. Nevertheless, its importance is not fully recognized. The objective of this paper is to review the impact of malnutrition and of nutritional treatment upon outcomes and mortality in older people with hip fracture. We searched the PubMed database for studies evaluating nutritional aspects in people aged 70 years and over with hip fracture. The total number of studies included in the review was 44, which analyzed 26,281 subjects (73.5% women,  $83.6 \pm 7.2$  years old). Older people with hip fracture presented an inadequate nutrient intake for their requirements, which caused deterioration in their already compromised nutritional status. The prevalence of malnutrition was approximately 18.7% using the Mini-Nutritional Assessment (MNA) (large or short form) as a diagnostic tool, but the prevalence was greater (45.7%) if different criteria were used (such as Body Mass Index (BMI), weight loss, or albumin concentration). Low scores in anthropometric indices were associated with a higher prevalence of complications during hospitalization and with a worse functional recovery. Despite improvements in the treatment of geriatric patients with hip fracture, mortality was still unacceptably high (30% within 1 year and up to 40% within 3 years). Malnutrition was associated with an increase in mortality. Nutritional intervention was cost effective and was associated with an improvement in nutritional status and a greater functional recovery. To conclude, in older people, the prevention of malnutrition and an early nutritional intervention can improve recovery following a hip fracture.

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