

# Orthogeriatrics

## Evidence Update



**March 2018**  
(Quarterly)

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Recognising success  
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## Training Sessions 2018

### March (13.00-14.00)

8th (Thu)	Statistics
12th (Mon)	Literature Searching
20th (Tue)	Critical Appraisal
28th (wed)	Statistics

### April (12.00-13.00)

5th (Thu)	Literature Searching
9th (Mon)	Critical Appraisal
17th (Tue)	Statistics
25th (Wed)	Literature Searching

### May (13.00-14.00)

3rd (Thu)	Critical Appraisal
11th (Fri)	Statistics
14th (Mon)	Literature Searching
22nd (Tue)	Critical Appraisal
30th (Wed)	Statistics

### Your Local Librarian – Jo Hooper

Whatever your information needs, the library is here to help. As your outreach librarian I offer **literature searching services** as well as training and guidance in **searching the evidence** and **critical appraisal** – just email me at [library@uhbristol.nhs.uk](mailto:library@uhbristol.nhs.uk)

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## Updates

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

[Recovering after a hip fracture: helping people understand physiotherapy in the NHS. Physiotherapy 'hip sprint' audit report 2017](#) Source: [Royal College of Physicians of London - RCP](#) - 09 February 2018 - Publisher: Royal College of Physicians (RCP) [Read Summary](#)

[Fracture Liaison Service Database. Leading FLS improvement: Secondary fracture prevention in the NHS. Annual report October 2017 Data from January to December 2016](#) Source: [Royal College of Physicians of London - RCP](#) - 08 February 2018 - Publisher: Royal College of Physicians (RCP) [Read Summary](#)



[Comprehensive geriatric assessment for older people admitted to a surgical service](#)

Online Publication Date: January 2018

**UpToDate**<sup>®</sup>

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[Geriatric health maintenance](#)

**Literature review current through:** Feb 2018. | **This topic last updated:** Jan 02, 2018.

[Falls in older persons: Risk factors and patient evaluation](#)

**Literature review current through:** Feb 2018. | **This topic last updated:** Feb 27, 2018.

[Pelvic trauma: Initial evaluation and management](#)

**Literature review current through:** Feb 2018. | **This topic last updated:** Feb 05, 2018.



## Library Clinic

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

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

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

April 4<sup>th</sup>: **Foyer, Education Centre 12.00-14.00**

April 11<sup>th</sup>: **Foyer, St Michael's Hospital 12.00-14.00**

May 2<sup>nd</sup>: **Canteen (Level 9, BRI) 12.00-14.00**

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**

## Recent Database Articles

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

- Medical
- Patient care and management
- Psychological
- Other

If you would like any of the following articles in full text, or if you would like a more focused search on your own topic, then get in touch: [library@uhbristol.nhs.uk](mailto:library@uhbristol.nhs.uk)

### Medical

#### Hyperkyphosis and incident falls among community-dwelling older adults

**Author(s):** McDaniels-Davidson, Corinne Rae

**Source:** Dissertation Abstracts International: Section B: The Sciences and Engineering; 2018; vol. 78 (no. 8)

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

**Abstract:**Background: Falls are a common cause of morbidity among older adults. Although many fall risk factors are well understood, it is unknown whether a common geriatric condition, hyperkyphosis, increases fall risk. Objectives: This dissertation research sought to determine whether older persons with worse degrees of kyphosis may be at increased risk of falls. Methods: Three longitudinal cohorts of older adults (aged  $\geq 65$ ) were used, each with different kyphosis measures, to examine the association between degree of kyphosis and fall risk. Study 1 examined whether four measures of kyphosis (Debrunner kyphometer, flexicurve ruler, Cobb angle, and block method) increased the odds of an incident fall over one year of monthly falls follow-up in a mixed-gender sample of 72 individuals (mean age=78). Studies 2 and 3 each prospectively examined two different measures of kyphosis and incident falls over three years of tri-annual follow-up through multivariable modeling with GEEs. Study 2 included 2,346 men with the Cobb angle measure of kyphosis (mean age=74) and 2,929 men with block-measured kyphosis (mean age=79) from the Osteoporotic Fractures in Men Study (MrOS). Study 3 used data from 1,162 women with the Cobb angle measure (mean age=69) and 610 women with the flexicurve measure of kyphosis (mean age=73) from the Study of Osteoporotic Fractures in Women (SOF). Results: In Study 1, all four measures of kyphosis conferred a 2-3 fold increase per SD in the odds of a fall over the following year (64% of participants fell over one year). In Studies 2 and 3, Cobb angle was not associated with fall risk in either MrOS or SOF. The blocks method was predictive of fall risk in MrOS (RR=1.11 per SD; 95% CI=1.06, 1.17) and KI was predictive of fall risk in SOF (RR=1.22 per SD; 95% CI=1.07, 1.40). Conclusion: All three studies provide evidence that increased kyphosis predicts greater fall risk in older persons. The Cobb angle measure, however, appears to be least related to falls, possibly because it is a measure limited to the mid to lower thoracic spine whereas the block and flexicurve methods include curvature in the lower cervical and entire thoracic spine. (PsycINFO Database Record (c) 2017 APA, all rights reserved)

### **Soluble Inflammatory Markers and Risk of Incident Fractures in Older Adults: The Cardiovascular Health Study**

**Author(s):** Stojanovic D.; Buzkova P.; Young R.; Mukamal K.J.; Heckbert S.R.; Psaty B.M.

**Source:** Journal of Bone and Mineral Research; 2018; vol. 33 (no. 2); p. 221-228

**Publication Type(s):** Article

**Abstract:** Several in vitro and animal studies have showed that inflammatory markers play a role in bone remodeling and pathogenesis of osteoporosis. Additionally, some human longitudinal studies showed suggestive associations between elevated inflammatory markers and increased risk of nontraumatic fractures. We examined several inflammatory markers and multiple fracture types in a single study of older individuals with extensive follow-up. We assessed the association of four inflammatory markers with the risk of incident hip fractures among 5265 participants of the Cardiovascular Health Study (CHS) and a composite endpoint of incident fractures of the hip, pelvis, humerus, or proximal forearm in 4477 participants. Among CHS participants followed between 1992 and 2009, we observed 480 incident hip fractures during a median follow-up of 11 years. In the composite fracture analysis cohort of 4477 participants, we observed 711 fractures during a median follow-up of 7 years. Adjusted hazard ratios (HRs) and 95% confidence intervals (CIs) for hip fracture associated with doubling of IL-6 were HR 1.15 (95% CI, 1.02 to 1.30) overall and HR 1.17 (95% CI, 1.01 to 1.35) in women. We also observed a positive association between each unit increase in white blood cell (WBC) count and risk of hip fracture: HR 1.04 (95% CI, 1.01 to 1.06) overall and HR 1.06 (95% CI, 0.95 to 1.20) in women. We observed no significant associations between any of the four inflammatory markers and a composite fracture endpoint. Our findings suggest that chronic inflammatory and immune processes may be related to higher rates of incident hip fractures. © 2017 American Society for Bone and Mineral Research. Copyright © 2017 American Society for Bone and Mineral Research

### **Functional Performances on Admission Predict In-Hospital Falls, Injurious Falls, and Fractures in Older Patients: A Prospective Study**

**Author(s):** Hars M.; Audet M.-C.; Herrmann F.; Rizzoli R.; Ferrari S.; Trombetti A.; De Chassey J.

**Source:** Journal of Bone and Mineral Research; 2018

**Publication Type(s):** Article In Press

**Abstract:** Falls are common among older inpatients and remain a great challenge for hospitals. Despite the relevance of physical impairments to falls, the prognostic value of performance-based functional measures for in-hospital falls and injurious falls remains unknown. This study aimed to determine the predictive ability and accuracy of various functional tests administered at or close to admission in a geriatric hospital to identify in-hospital fallers and injurious fallers. In this prospective study, conducted in a geriatric hospital in Geneva, Switzerland, 807 inpatients (mean age 85.0 years) were subjected to a battery of functional tests administered by physiotherapists within 3 days (interquartile range 1 to 6) of admission, including Short Physical Performance Battery (SPPB), simplified Tinetti, and Timed Up and Go tests. Patients were prospectively followed up for falls and injurious falls until discharge using mandatory standardized incident report forms and electronic patients' records. During a median length of hospital stay of 23 days (interquartile range 14 to 36), 329 falls occurred in 189 (23.4%) patients, including 161 injurious falls of which 24 were serious. In-hospital fallers displayed significantly poorer functional performances at admission on all tests compared with non-fallers ( $p < 0.001$  for all). In multivariate analysis controlling for age, sex, previous falls, and fall as cause of admission, poorer functional performances on all functional tests predicted in-hospital falls and injurious falls ( $p < 0.001$  for all). The SPPB only significantly predicted serious injurious falls (adjusted odds ratio [OR]=0.76; 95% confidence interval [CI] 0.60-0.96) and fractures (adjusted OR=0.76; 95% CI 0.59-0.98). In conclusion, poor functional performances, as assessed by

SPPB, are independent predictors of in-hospital falls, injurious falls, and fractures in patients admitted to a geriatric hospital. These findings should help to design preventive strategies for in-hospital falls and support the adoption of objective performance-based functional measures into routine hospital practice. Copyright © 2018 American Society for Bone and Mineral Research.

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

**Author(s):** Lee S.J.; Graffy P.M.; Zea R.D.; Ziemelewick T.J.; Pickhardt P.J.

**Source:** Journal of Bone and Mineral Research; 2018

**Publication Type(s):** Article In Press

**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+/-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. Copyright © 2018 American Society for Bone and Mineral Research.

### **Biological sex variation in bone mineral density in the cranium and femur**

**Author(s):** Paschall A.; Ross A.H.

**Source:** Science and Justice; 2018

**Publication Type(s):** Article In Press

**Abstract:**Objectives: Sex and age trends in bone mineral density (BMD) play an important role in the estimation of age-at-death (AAD) of unidentified human remains. Current methodologies lack the ability to precisely estimate age in older individuals. In this study, BMD of the cranium and femur measured by DXA were examined to establish their applicability for age estimation in older adults. BMD as measured by DXA, is most commonly used clinically for prediction of osteoporotic fracture risk. We hypothesized that weight-bearing and non-weight-bearing bones, the femur and cranium, respectively, would provide valuable insights for aging. Methods: The sample consists of 32 sets of

excised cranial fragments from the Regional Forensic Center, Johnson City, Tennessee and 41 associated crania and femora from the North Carolina Office of the Chief Medical Examiner. All crania and femora were scanned using a Hologic (R) DXA scanner and data were analyzed using Student t-tests, Loess regression, and ANOVA. Results: Student t-tests indicate a significant relationship between the sexes and cranial BMD and a significant relationship between age cohorts and femoral neck BMD. The Loess regression showed different aging patterns in the cranium for females and males older than 55. And the ANOVA showed changes in femoral neck after age 55. Conclusions: These results indicate age and sex dependent changes in BMD especially for individuals over the age of 55, which offers improvement from current aging methods for older individuals. Further research using a larger sample size could improve the predictive capabilities of the model. Copyright © 2018.

### **Competing Risks of Fracture and Death in Older Adults with Chronic Kidney Disease**

**Author(s):** Hall R.K.; Colon-Emeric C.; Sloane R.; Pieper C.; Van Houtven C.; Lafleur J.; Adler R.

**Source:** Journal of the American Geriatrics Society; 2018

**Publication Type(s):** Article In Press

**Abstract:** Objectives: To examine whether chronic kidney disease (CKD) at any stage is associated with fracture risk after adjusting for competing mortality and to determine whether age or race modify the relationship between CKD and fracture risk. Design: Prospective cohort study. Setting: Department of Veterans Affairs (VA) national healthcare system. Participants: Men receiving VA primary care aged 65 and older with no history of fracture or osteoporosis therapy (N = 712, 918). Measurements: We determined CKD stage from baseline estimated glomerular filtration rate (eGFR). Participants were followed for up to 10 years for occurrence of any fracture or death. We ascertained fractures and covariates from VA medical records and Medicare claims. Results: Of the 356,459 older veterans with CKD (defined as eGFR <60 mL/min per 1.73 m<sup>2</sup>), 15.7% (n = 56,032) experienced a fracture, and 43.0% (n = 153,438) died over a median time at risk of 5.2 years. Veterans with CKD Stages 3 to 5 had a greater risk of death than those without CKD, which biased estimates from traditional survival models. Competing risk models showed that Stage 3 CKD was associated with greater hazard (adjusted subdistribution hazard ratio (sdHR) = 1.07, 95% confidence interval (CI) = 1.02-1.11) of fracture (than those without CKD) and a trend toward greater hazard for Stage 4 (sdHR = 1.07, 95% CI = 0.94-1.22) and Stage 5 (sdHR = 1.31, 95% CI = 0.97-1.77) CKD. Age, race, and bone mineral density did not modify the relationship between CKD and fracture risk. Conclusions: In older male veterans, CKD, including Stage 3, is associated with a moderately greater fracture risk irrespective of age, race, or bone mineral density. Copyright © 2017 American Geriatrics Society and Wiley Periodicals, Inc.

### **Traumatic and Nontraumatic Spinal Cord Injuries**

**Author(s):** Ge L.; Arul K.; Ikpeze T.; Baldwin A.; Mesfin A.; Nickels J.L.

**Source:** World Neurosurgery; 2018

**Publication Type(s):** Article In Press

**Abstract:** Objective: Owing to the aging of the population in the United States, it is anticipated that injury mechanisms, treatment, and outcomes of spinal cord injuries (SCI) will change. There is a scarcity of literature on nontraumatic SCI. Our goal in this study was to evaluate the causes, management, complications, and outcomes after SCI. Methods: In a retrospective review, patients with traumatic and nontraumatic SCI admitted to the inpatient rehabilitation unit at a level 1 trauma center from 2003 to 2013 were reviewed. Results: In all, 757 entries were identified, and 685 unique patients met our inclusion criteria; 17.4% were <35 years of age, 51.7% were 35 to 64 years of age, and 30.9% were at least 65 years old. The young adults had the highest proportion of fractures

(60.5%) and subluxations (21.8%), whereas the oldest group had the highest rates of stenosis (35.4%), spondylotic myelopathy (16.5%), and cancer (15.1%). In SCI patients <35 years of age, 66.6% of injuries were caused by traumatic mechanisms of injury compared with 30.2% in the geriatric cohort. In the total of all SCI, 61.6% were nontraumatic. Surgical management was more prevalent with increasing age (58.8%, 73.7%, 82.1% from youngest to oldest group), as were overall rates of complications (58.6%, 59.4%, 66.7%). Mortality rates significantly increased with age (2.5%, 18.9%, 40.6% overall mortality rates in the 3 age groups). The overall mortality rate in nontraumatic SCI patients was 27.7% compared with 14.8% in traumatic SCI patients. Conclusions: Falls caused significantly more SCIs than expected, but most SCIs were predominantly nontraumatic in cause. The epidemiology of SCI is shifting rapidly. Copyright © 2017 Elsevier Inc.

### **Mismatch of long Gamma intramedullary nail with bow of the femur: Does radius of curvature of the nail increase risk of distal femoral complications?**

**Author(s):** Shetty A.; Shenoy P.M.; Swaminathan R.

**Source:** Journal of Clinical Orthopaedics and Trauma; 2018

**Publication Type(s):** Article In Press

**Abstract:**Introduction: Anterior cortical penetration of the distal nail tip is a recognized complication of intra-medullary nailing of the femur particularly in the geriatric population. This has been attributed to a mismatch between the femoral bow and the radius of curvature (ROC) of the femoral nail. We wanted to see if there was a reduction of this risk comparing cephalomedullary nails with ROC of 200 cm and 150 cm. Methods: 52 patients were split into 2 groups similar with respect to age, sex and comorbidities. Group A with 25 patients used a nail with a ROC of 200 cm and Group B with 27 patients used a 150 cm ROC nail. Lateral radiographs of the distal femur were evaluated to note the position of the nail tip in relation to the femoral canal. The diameter of the femur at the tip of the nail was divided into 3 equal zones. The anterior one-third was designated as Zone1, the middle one-third as Zone 2 and the posterior one-third as Zone 3. Results: 80% of the cases with a 200 cm ROC nail had the tip of the nail in the anterior one-third of the canal (zone 1). Fracture of the anterior femoral cortex distally by the nail tip was seen in 2 patients. Only 18.5% of cases with a 150 cm ROC nail had the tip of the nail in anterior one-third of the canal (zone 1). There were no incidences of complications such as fractures and anterior cortical perforation. Conclusions: A cephalomedullary nail with a ROC of 150 cm had its distal tip more towards the center of the femoral canal when compared to a nail with ROC of 200 cm. No case of anterior femoral penetration was seen when using a nail with an ROC of 150 cm. Copyright © 2017.

### **Ten-Year Incidence of High-Energy Geriatric Trauma at a Level 1 Trauma Center.**

**Author(s):** Lowe, Jason A; Pearson, Jeffrey; Leslie, Michael; Griffin, Russell

**Source:** Journal of orthopaedic trauma; Mar 2018; vol. 32 (no. 3); p. 129-133

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

**Abstract:**OBJECTIVETo examine the characteristics of high-energy geriatric trauma over time.DESIGNRetrospective chart review.SETTINGLevel 1 trauma center.PATIENTSDemographic, injury, and clinical characteristics were compared between 34,017 patients with geriatric and nongeriatric high-energy trauma from 2005 to 2014 using t test,  $\chi$  analysis, and negative binomial regression for annual trend in injuries.RESULTSGeriatric high-energy trauma composed 11.2% of all trauma activations. Patients with geriatric high-energy trauma nearly doubled from the study period of 2005-2014 to previous 10 years ( $P = 0.0004$ ). Compared with patients with nongeriatric trauma, geriatric high-energy traumas were twice as likely to be due to a fall from height ( $P < 0.0001$ ), had higher Injury Severity Scores ( $P < 0.0001$ ), fewer abdominal injuries ( $P = 0.0011$ ), and have head trauma ( $P < 0.0001$ ). Fracture patterns were similar between groups. Mortality was higher for all

geriatric patients (odds ratio [OR], 4.76; 95% confidence interval [CI], 4.00-5.67), and high-energy mechanisms (OR, 4.71; 95% CI, 3.90-5.68) compared with low-energy mechanisms (OR, 3.00; 95% CI, 2.48-3.62). **CONCLUSION** The number of geriatric high-energy traumas has doubled over 10 years. Patients with geriatric trauma are sicker on presentation, based on the Injury Severity Score, and high-energy geriatrics have a 4-fold increase in mortality. **LEVEL OF EVIDENCE** Prognostic Level III. See Instructions for Authors for a complete description of levels of evidence.

**The association between ambulatory activity, body composition and hip or knee joint replacement due to osteoarthritis: a prospective cohort study.**

**Author(s):** Munugoda, I P; Wills, K; Cicuttini, F; Graves, S E; Lorimer, M; Jones, G; Callisaya, M L

**Source:** Osteoarthritis and cartilage; Feb 2018

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

**Abstract:** **OBJECTIVE** To examine the association between ambulatory activity (AA), body composition measures and hip or knee joint replacement (JR) due to osteoarthritis. **DESIGN** At baseline, 1082 community-dwelling older-adults aged 50 - 80 years were studied. AA was measured objectively using pedometer and body composition by dual-energy x-ray absorptiometry. The incidence of primary (first-time) JR was determined by data linkage to the Australian Orthopaedic Association National Joint Replacement Registry. Log binomial regression with generalized estimating equations were used to estimate the risk of JR associated with baseline AA and body composition measures, adjusting for age, sex, x-ray disease severity, and pain. **RESULTS** Over 13 years of follow-up, 74 (6.8%) participants had a knee replacement (KR) and 50 (4.7%) a hip replacement (HR). AA was associated with a higher risk of KR (RR 1.09/1000 steps/day, 95% CI 1.01, 1.16) and a lower risk of HR (RR 0.90/1000 steps/day, 95% CI 0.81, 0.99). BMI (RR 1.07/kg/m<sup>2</sup>, 95% CI 1.03, 1.12), total fat mass (RR 1.04/kg, 95% CI 1.02, 1.07), trunk fat mass (RR 1.04/kg, 95% CI 1.02, 1.07), and waist circumference (RR 1.03/cm, 95% CI 1.01, 1.05) were associated with a higher risk of KR. Body composition measures were not associated with HR. **CONCLUSIONS** An objective measure of AA was associated with a small increased risk of KR and a small reduced risk of HR. Worse body composition profiles were associated with knee, but not hip replacement. Altogether this may suggest different causal pathways for each site with regard to habitual activity and obesity.

**Does Total Hip Arthroplasty Reduce the Risk of Secondary Surgery Following the Treatment of Displaced Acetabular Fractures in the Elderly Compared to Open Reduction Internal Fixation? A Pilot Study.**

**Author(s):** Weaver, Michael J; Smith, Raymond Malcolm; Lhowe, David W; Vrahas, Mark S

**Source:** Journal of orthopaedic trauma; Feb 2018; vol. 32

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

**Abstract:** **OBJECTIVE** The goal of open reduction and internal fixation (ORIF) is to anatomically reduce the fracture and maintain a congruent hip joint. However, ORIF in the elderly is technically challenging. Therefore, there are advocates for acute total hip arthroplasty (THA) in this patient population. The primary purpose of this study was to evaluate the rate of revision surgery in elderly patients with acetabular fractures treated with ORIF or THA. The secondary purpose was to compare patient's self-reported functional outcomes. **DESIGN** Retrospective review. **SETTING** Two American College of Surgeons Level 1 trauma centers. **PATIENTS/PARTICIPANTS** Thirty-three patients were treated with ORIF and 37 were treated with THA. The mean follow-up was 22 months (range 6-89 months). Patients were interviewed, and radiographs were examined. **INTERVENTION** Treatment of displaced acetabular fractures with either ORIF or THA. **MAIN OUTCOME MEASUREMENTS** Need for reoperation. Harris Hip Score and SF-36 questionnaire. **RESULTS** Those treated with ORIF had a higher rate of reoperation (10/33, 30%) compared with those treated with THA (5/37, 14%); however, this

was not statistically significant ( $P = 0.12$ ). Patients reported better bodily pain scores as measured by SF-36 (48 vs. 39,  $P = 0.04$ ), and a trend toward improved function as measured by patient reported Harris Hip Scores (82 vs. 63,  $P = 0.06$ ) in those treated with THA compared with ORIF. **CONCLUSIONS** Acute reconstruction of acetabular fractures with THA in the geriatric population seems to compare favorably with ORIF, with a similar rate of complications, but with improved pain scores. In addition, there was a high rate of conversion to THA within 2 years of injury when patients were treated with ORIF. Acute THA as primary treatment in this patient population merits further, more controlled, comparative study. **LEVEL OF EVIDENCE** Prognostic Level III. See Instructions for Authors for a complete description of levels of evidence.

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

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

**Source:** Journal of orthopaedic trauma; Feb 2018

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

**Abstract:** **OBJECTIVE** Evaluate the pre-hospital use of Direct Oral Anticoagulant (DOAC) agents on the outcomes of early surgical fixation of a geriatric hip fracture. **DESIGN** Case-Control. **SETTING** Two academic level 1 trauma centers. **INTERVENTION** Early (<48h) surgical fixation of a geriatric proximal femur fracture. **PATIENTS** 19 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, post-operative complications, readmission rates, and survival out to one 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 the operating room (28.9h v 21.4h  $p=0.03$ ), 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 for a venous thromboembolic event. **CONCLUSIONS** Geriatric patients with hip fractures receiving DOAC prior to admission did not demonstrate worse outcomes with early surgical intervention. The increased readmission rate in this population appears attributable to the underlying cardiac conditions for which the patients are receiving anticoagulation. These results suggest that the delay recommended for patients using a DOAC prior to 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** Prognostic Level III.

### **Bisphosphonate use after clinical fracture and risk of new fracture.**

**Author(s):** Bergman, J; Nordström, A; Nordström, P

**Source:** Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA; Feb 2018

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

**Abstract:** Among older adults with a previous fracture, treatment for osteoporosis was initially associated with a higher risk of new fracture. However, the relative risk of new fracture decreased over time, a trend that is consistent with a beneficial effect, as treatment for osteoporosis is prescribed to reduce high fracture risks. **INTRODUCTION** The purpose of this study was to examine whether bisphosphonate use is associated with a lower risk of new fracture after a clinical fracture in older adults. **METHODS** Data were available for 3,329,400 adults in Sweden who were aged  $\geq 50$  years between 2006 and 2011. During this period, 260,353 sustained a clinical fracture and were naïve to bisphosphonates at the time. Those who subsequently received a bisphosphonate were matched to

up to three others on sex, year of birth, and type and year of initial fracture. The final cohort comprised 83,104 adults (26.3% bisphosphonate users).RESULTSDuring the period from initial fracture to initiation of bisphosphonate treatment, the incidence rate of any new clinical fracture was higher in those who later became bisphosphonate users than in those who remained nonusers (175.1 vs. 75.9 per 1000 person-years; hazard ratio 2.30, 95% confidence interval 2.19 to 2.41). Similarly, during the first 6 months of treatment, the incidence rate was higher in bisphosphonate users than in nonusers (128.8 vs. 90.2 per 1000 person-years; hazard ratio 1.41, 95% confidence interval 1.32 to 1.51). However, this difference decreased over time: by months 12 to 18, the incidence rate was similar in users and nonusers (59.3 vs. 55.3 per 1000 person-years; hazard ratio 1.03, 95% confidence interval 0.91 to 1.16).CONCLUSIONSThere was a decrease in the relative risk of new fracture during bisphosphonate treatment, a trend that is consistent with a beneficial treatment effect, as bisphosphonates are prescribed to reduce high fracture risks.

**Older men who sustain a hip fracture experience greater declines in bone mineral density at the contralateral hip than non-fractured comparators.**

**Author(s):** Rathbun, A M; Magaziner, J; Shardell, M D; Yerges-Armstrong, L M; Orwig, D; Hicks, G E; Hochberg, M C

**Source:** Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA; Feb 2018; vol. 29 (no. 2); p. 365-373

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

**Abstract:**Men experience declining bone mineral density (BMD) after hip fracture; however, changes attributable to fracture are unknown. This study evaluated the excess BMD decline attributable to hip fracture among older men. Older men with hip fracture experienced accelerated BMD declines and are at an increased risk of secondary fractures.INTRODUCTIONThe objective was to determine whether bone mineral density (BMD) changes in men after hip fracture exceed that expected with aging.METHODSTwo cohorts were used: Baltimore Hip Studies 7th cohort (BHS-7) and Baltimore Men's Osteoporosis Study (MOST). BHS-7 recruited older adults (N = 339) hospitalized for hip fracture; assessments occurred within 22 days of admission and at 2, 6, and 12 months follow-up. MOST enrolled age-eligible men (N = 694) from population-based listings; data were collected at a baseline visit and a second visit that occurred between 10 and 31 months later. The combined sample (n = 452) consisted of Caucasian men from BHS-7 (n = 89) and MOST (n = 363) with  $\geq 2$  dual-energy X-ray absorptiometry scans and overlapping ranges of age, height, and weight. Mixed-effect models estimated rates of BMD change, and generalized linear models evaluated differences in annual bone loss at the total hip and femoral neck between cohorts.RESULTSAdjusted changes in total hip and femoral neck BMD were - 4.16% (95% CI, - 4.87 to - 3.46%) and - 4.90% (95% CI, - 5.88 to - 3.92%) in BHS-7 participants; - 1.57% (95% CI, - 2.19 to - 0.96%) and - 0.99% (95% CI, - 1.88 to - 0.10%) in MOST participants; and statistically significant (P < 0.001) between-group differences in change were - 2.59% (95% CI, - 3.26 to - 1.91%) and - 3.91% (95% CI, - 4.83 to - 2.98%), respectively.CONCLUSIONHip fracture in older men is associated with accelerated BMD declines at the non-fractured hip that are greater than those expected during aging, and pharmacological interventions in this population to prevent secondary fractures may be warranted.

**Cross-cultural adaptation and validation of the SARC-F to assess sarcopenia: methodological report from European Union Geriatric Medicine Society Sarcopenia Special Interest Group**

**Author(s):** Bahat G.; Yilmaz O.; Karan M.A.; Oren M.M.; Reginster J.Y.; Beaudart C.; Bruyere O.

**Source:** European Geriatric Medicine; Feb 2018; vol. 9 (no. 1); p. 23-28

**Publication Type(s):** Article

**Abstract:**Sarcopenia is a well-identified process of aging known to cause functional deterioration, falls, fractures, frailty and mortality. Considering the global aging population, sarcopenia assessment has become a public health priority because its early detection is expected to prevent or decrease adverse outcomes through commencement of therapeutic measures. Therefore, the diagnosis of sarcopenia mediated by effective screening is expected to become particularly important. Being very practical with clearly demonstrated value to predict sarcopenia-related adverse outcomes, SARC-F questionnaire stands as one of the best tools to evaluate sarcopenia in every day practice. SARC-F has originally been created in English. Considering the variety of languages in Europe, it seems very valid to adapt and validate this tool in different European languages. This report is written to explain the details of the final consensus methodology suggested for SARC-F validation, thereby guiding and helping the research teams in their studies. Copyright © 2017, European Geriatric Medicine Society.

## Patient care and management

### High-Intensity Multimodal Resistance Training Improves Muscle Function, Symmetry during a Sit-to-Stand Task, and Physical Function Following Hip Fracture.

**Author(s):** Briggs, R A; Houck, J R; LaStayo, P C; Fritz, J M; Drummond, M J; Marcus, R L

**Source:** The journal of nutrition, health & aging; 2018; vol. 22 (no. 3); p. 431-438

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

**Abstract:**OBJECTIVES Post rehabilitation, older adults with hip fracture display low vertical ground reaction force (vGRF) on the involved lower extremity during a sit-to-stand task and low physical function. The purpose of this study was to test whether muscle performance, involved side vGRF during a sit-to-stand task, and physical function improved following multimodal high-intensity resistance training, when initiated after usual care (2 to 6 months after hip fracture). DESIGN Case series study, 12 weeks extended high-intensity strength training intervention following hip fracture. SETTING University hospital outpatient facility. PARTICIPANTS Twenty-four community-dwelling older adults (mean age 78.4 years (SD 10.4), 16 female/8 male), 3.6 (SD 1.2) months post-hip fracture and discharged from physical therapy participated. Intervention/Measurement: All participants performed sit-to-stand tasks, muscle performance tests, and modified physical performance test (mPPT) before and after 12 weeks (3x/wk) of training. Variables were compared using paired t-tests. RESULTS The vGRF rate of force development (RFD) and magnitude of discrepancy between limb loading during rising phase of sit-to-stand task (AREA) variables improved post-training (RFD ratio = Pre: 0.78 - Post: 0.82, AREA ratio = Pre: 0.79 - Post: 0.86). Surgical leg extension power gains were large (~65%) while strength gains were moderate (~34%); yielding improved symmetry in both strength (Pre: 0.74 - Post: 0.88) and power (Pre: 0.75 - Post: 0.82). Physical function improved pre-training 25 (SD 5.2) to post training 30 (SD 4.3), ( $p < 0.001$ ). CONCLUSION Unique to this study, participants recovering from hip fracture demonstrated improved symmetry in sit-to-stand vGRFs, muscle function, and physical function after training. However, a high percentage of patients continued to experience persistently low vGRF of the involved side compared to previous studies of healthy elderly controls. Developing alternative strategies to improve involved side vGRF may be warranted.

### Muscle Quality Improves with Extended High-Intensity Resistance Training after Hip Fracture.

**Author(s):** Briggs, R A; Houck, J R; Drummond, M J; Fritz, J M; LaStayo, P C; Marcus, R L

**Source:** The Journal of frailty & aging; 2018; vol. 7 (no. 1); p. 51-56

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

**Abstract:**BACKGROUND Muscle mass deficits endure after hip fracture. Strategies to improve muscle quality may improve mobility and physical function. It is unknown whether training after usual care

yields muscle quality gains after hip fracture. **OBJECTIVE** To determine whether muscle quality improves after hip fracture with high-intensity resistance training and protein supplementation. **DESIGN** Case series. **SETTING** University of Utah Skeletal Muscle Exercise Research Facility. **PARTICIPANTS** 17 community-dwelling older adults, 3.6+/-1.1 months post-hip fracture, recently discharged from usual-care physical therapy (mean age 77.0+/-12.0 years, 12 female), enrolled. **INTERVENTION** Participants underwent 12 weeks (3x/week) of unilaterally-biased resistance training. **METHODS/MATERIALS** Participants were measured via a 3.0 Tesla whole-body MR imager for muscle lean and intramuscular adipose tissue (IMAT) of the quadriceps before and after resistance training. Peak isometric knee extension force output was measured with an isokinetic dynamometer. Muscle quality was calculated by dividing peak isometric knee extension force (N) by quadriceps lean muscle mass (cm<sup>2</sup>). In addition, common physical function variables were measured before and after training. **RESULTS** Surgical and nonsurgical lean quadriceps muscle mass improved among participants (mean change: 2.9 cm<sup>2</sup>+/-1.4 cm<sup>2</sup>, and 2.7 cm<sup>2</sup>+/-1.3 cm<sup>2</sup>, respectively), while IMAT remained unchanged. Peak force improved in the surgical limb by 43.1+/-23N, with no significant change in the nonsurgical limb. Significant gains in physical function were evident after training. **CONCLUSION** Participants recovering from hip fracture demonstrated improvements in muscle mass, muscle strength, and muscle quality in the surgical limb after hip fracture. These were in addition to gains made in the first months after fracture with traditional care. Future studies should determine the impact that muscle quality has on long-term functional recovery in this population.

#### **Association between Serum Cholesterol Level and Osteoporotic Fractures.**

**Author(s):** Wang, Yanmao; Dai, Jiezh; Zhong, Wanrun; Hu, Chengfang; Lu, Shengdi; Chai, Yimin

**Source:** *Frontiers in endocrinology*; 2018; vol. 9 ; p. 30

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

Available at [Frontiers in Endocrinology](#) - from Europe PubMed Central - Open Access

**Abstract:** Objective Previous epidemiological studies have found an association between serum cholesterol level and bone mineral density. However, epidemiological studies evaluating the association between serum cholesterol level and the incidence of osteoporotic fracture are scant. Therefore, the objective of this study was to investigate whether serum cholesterol levels in Chinese participants aged 55 years or older was associated with an increased risk of osteoporotic fracture. Materials and methods We performed a cross-sectional study, including 1,791 participants (62.1% postmenopausal women and 213 fractures). Standardized self-administered questionnaires, physical examination, laboratory tests, and dual-energy X-ray absorptiometry examination were performed. Multivariate-adjusted logistic regression models were used to evaluate associations between serum cholesterol [total cholesterol (TC), triglycerides (TG), high-density lipoprotein (HDL-C), and low-density lipoprotein (LDL-C)] levels and the osteoporotic fracture risk. Results After adjusting for potential confounding factors, there were no associations between per SD increase in TC and LDL level and an increased risk of osteoporotic fracture in total participants, and in men and women as individual groups. There was a significant association between per SD increase in HDL-C level and an increased risk of osteoporotic fracture in total participants [odds ratios (OR) 1.20, 95% confidence interval (CI) 1.03, 1.40, P = 0.023] and in women (OR 1.37, 95% CI 1.12, 1.68, P = 0.003), whereas no association was observed in men (OR 1.01, 95% CI 0.73, 1.40, P = 0.951). Additionally, we found a significant association between per SD increase in TG level and an increased risk of osteoporotic fracture in total participants (OR 1.20, 95% CI 1.04, 1.38, P = 0.015). In women, a nonlinear relationship was observed between per SD increase in TG level and an increased risk of osteoporotic fracture. The risk of osteoporotic fracture in women increased with TG level >1.64 mmol/L (OR 1.93, 95% CI 1.24, 3.00, P = 0.004). Conclusion Among Chinese older adults, serum HDL-C level is significantly associated with a risk of osteoporotic fractures in women, and serum TG

level is significantly associated with a risk of osteoporotic fractures in total participants and in women with TG >1.64 mmol/L.

### **Infection Versus Hematoma Following Surgical Treatment of Proximal Femoral Fractures in Geriatric Patients.**

**Author(s):** Müller, Franz; Galler, Michael; Roll, Christina; Füchtmeier, Bernd

**Source:** Geriatric orthopaedic surgery & rehabilitation; 2018; vol. 9 ; p. 2151458517750515

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

Available at [Geriatric Orthopaedic Surgery & Rehabilitation](#) - from PubMed Central

**Abstract:** Introduction The surgical treatment of proximal femoral fractures predominantly involves geriatric patients and is associated with high morbidity and mortality. However, analyses on postoperative infections or hematoma are rare. Methods Patients requiring surgical revision due to infection (n = 90) or hematoma (n = 77) in the postoperative phase were identified from an electronic database of 2000 consecutive patients surgically treated for proximal femoral fractures between 2006 and 2014. Demographic and clinical data were retrieved, including information on the pathogens in patients with infection. A follow-up on morbidity and mortality was conducted via telephone for at least 2 years postsurgery. Results The follow-up rate was 100%, and the mean age was 81.9 years. The incidence rate of infection was 4.1% (90/2000), and women were commonly affected. Staphylococcus aureus and Staphylococcus epidermidis were the most commonly detected pathogens (35.5% and 25.5%, respectively). Mixed infections were observed in 15 patients, and Methicillin-resistant Staphylococcus aureus infections were observed in only 4 patients. A total of 77 (85.6%) infections occurred within 30 days postsurgery. The implant was preserved in 76 (84.4%) patients, and resection arthroplasty was required in 14 patients. Dementia and pertrochanteric fractures were significantly more common in the infection than in the hematoma group. Although infections were associated with high mortality rates for up to 2 years postsurgery, the rates did not significantly differ from those in the hematoma control group. Conclusion One of every 2 patients who developed an infection following the surgical treatment of a proximal femoral fracture died within 2 years postsurgery. In addition, infections were significantly associated with dementia. Avoiding postoperative infection should be a high priority in the surgical treatment of proximal femoral fractures.

### **Impact of Total Knee Arthroplasty with General Anesthesia on Brain Networks: Cognitive Efficiency and Ventricular Volume Predict Functional Connectivity Decline in Older Adults.**

**Author(s):** Huang, Haiqing; Tanner, Jared; Parvataneni, Hari; Rice, Mark; Horgas, Ann;

**Source:** Journal of Alzheimer's disease : JAD; 2018; vol. 62 (no. 1); p. 319-333

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

Available at [Journal of Alzheimer's Disease](#) - from PubMed Central

**Abstract:** Using resting state functional magnetic resonance imaging (RS-fMRI), we explored: 1) pre- to post-operative changes in functional connectivity in default mode, salience, and central executive networks after total knee arthroplasty (TKA) with general anesthesia, and 2) the contribution of cognitive/brain reserve metrics these resting state functional declines. Individuals age 60 and older electing unilateral total knee arthroplasty (TKA; n = 48) and non-surgery peers with osteoarthritis (n = 45) completed baseline cognitive testing and baseline and post-surgery (post-baseline, 48-h post-surgery) brain MRI. We acquired cognitive and brain estimates for premorbid (vocabulary, reading, education, intracranial volume) and current (working memory, processing speed, declarative memory, ventricular volume) reserve. Functional network analyses corrected for pain severity and pain medication. The surgery group declined in every functional network of interest

( $p < 0.001$ ). Relative to non-surgery peers, 23% of surgery participants declined in at least one network and 15% of the total TKA sample declined across all networks. Larger preoperative ventricular volume and lower scores on preoperative metrics of processing speed and working memory predicted default mode network connectivity decline. Premorbid cognitive and premorbid brain reserve did not predict decline. Within 48 hours after surgery, at least one fourth of the older adult sample showed significant functional network decline. Metrics of current brain status (ventricular volume), working memory, and processing speed predicted the severity of default mode network connectivity decline. These findings demonstrate the relevance of preoperative cognition and brain integrity on acute postoperative functional network change.

### **Z-drugs and risk for falls and fractures in older adults--a systematic review and meta-analysis.**

**Author(s):** TREVES, NIR; PERLMAN, AMICHAJ; GERON, LITAL KOLENBERG; ASALY, ANGHAM; MATOK, ILAN

**Source:** Age & Ageing; Mar 2018; vol. 47 (no. 2); p. 201-208

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

**Abstract:**Objective: zolpidem, zopiclone, eszopiclone and zaleplon, also known as 'Z-drugs', are commonly used as alternatives to benzodiazepines (BZDs) to treat insomnia. Z-drugs are often perceived as safer than BZDs. We conducted a systematic review and meta-analysis evaluating the association between Z-drugs and fractures, falls and injuries. Methods: a systematic review was performed using MEDLINE, EMBASE and ClinicalTrials.gov. Pooled effect-sizes were calculated comparing Z-drugs users with non-users, using fixed and random-effect models with corresponding 95% confidence of intervals (CI). Results: we identified 14 eligible studies reporting on the association between Z-drugs and outcomes of interest. Z-Drugs were associated with a statistically significant increased risk for fractures, with evidence of considerable heterogeneity (OR = 1.63; 95% CI: 1.42-1.87;  $I^2 = 90\%$ ;  $n = 830,877$ ). Likewise, there was a trend suggesting a 2-fold increase in the odds for falls, however, this result was not statistically significant and there was evidence of considerable heterogeneity (OR = 2.40; 95% CI: 0.92-6.27;  $I^2 = 95\%$ ;  $n = 19,505$ ). In an analysis assessing the risk for injuries following exposure to zolpidem we found a statistically significant increased risk of injuries, with no evidence of heterogeneity (OR = 2.05; CI 95%: 1.95-2.15;  $I^2 = 0$ ;  $n = 160,502$ ). Results were similar in sensitivity analyses, including analyses restricted to studies of high-quality, studies with control groups suffering from insomnia, and with specific Z-drugs. Conclusion: our results indicate that Z-drugs are associated with an increased risk for fractures, and suggest a possible increased risk for falls and injuries as well. However, studies included were observational and susceptible to confounding. Physicians should consider these potential risks before prescribing these medications in older adults.

### **Atypical antipsychotic-associated falls in older adults.**

**Author(s):** Lam, Y. W. Francis

**Source:** Brown University Psychopharmacology Update; Mar 2018; vol. 29 (no. 3); p. 2-3

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

**Abstract:**Atypical antipsychotics are commonly prescribed for older patients, but their use constitutes an important risk factor associated with falls and resultant hip fracture. A recent analysis of Canadian population-based claims data showed atypical antipsychotics significantly increased 90-day risk for falls and various types of fractures. However, research data overall have offered conflicting results. The following study described an emulation analysis with U.S. claims data to evaluate further the risk of falls and fractures in elderly patients receiving atypical antipsychotics.

### **Alanine aminotransferase blood levels and rehabilitation outcome in older adults following hip fracture surgery.**

**Author(s):** Gringauz, Irina; Weismann, Jonathan; Justo, Dan; Adunsky, Abraham; Segal, Gad

**Source:** International journal of rehabilitation research. Internationale Zeitschrift fur Rehabilitationsforschung. Revue internationale de recherches de readaptation; Mar 2018; vol. 41 (no. 1); p. 41-46

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

**Abstract:**Low alanine aminotransferase (ALT) blood levels are associated with frailty and poor outcome in older adults. Therefore, we studied the association between ALT blood levels before rehabilitation and rehabilitation outcome in older adults following hip fracture surgery. A total of 490 older adults (age>60 years, mean age: 82.9±6.7 years, 82.0% women) admitted to rehabilitation following hip fracture surgery were included. The rehabilitation outcome was assessed by Functional Independence Measure (FIM) scores. ALT blood levels were documented between 1 and 6 months before rehabilitation. Patients with ALT blood levels over 40 IU/l possibly consistent with liver injury were excluded. The cohort was divided into two groups: patients with ALT more than 10 IU/l and patients with ALT less than or equal to 10 IU/l. Upon rehabilitation discharge, the FIM outcome measures (motor, cognitive, gain, efficiency) were significantly higher in patients with ALT more than 10 IU/l relative to patients with ALT less than or equal to 10 IU/l (P50), cognitive FIM scores (>16), and FIM efficiency (>0.228) upon rehabilitation discharge (odds ratio=1.56-1.78). However, this association was no longer significant following adjustment also for admission total FIM score, cognitive impairment, cancer, and albumin serum levels. High-normal ALT blood levels before rehabilitation are associated with a better rehabilitation outcome in older adults following hip fracture surgery. It may be used when data on admission FIM score, cognitive impairment, cancer, and albumin serum levels are not available.

### **Is treatment of geriatric hip fracture patients cost-covering? Results of a prospective study conducted at a German University Hospital.**

**Author(s):** Aigner, Rene; Hack, Juliana; Eschbach, Daphne; Ruchholtz, Steffen; Knobe, Matthias

**Source:** Archives of orthopaedic and trauma surgery; Mar 2018; vol. 138 (no. 3); p. 331-337

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

**Abstract:**INTRODUCTIONHip fractures have increased medical and socio-economic importance due to demographic transition. Information concerning direct treatment costs and their reimbursement in Germany is lacking.MATERIALS AND METHODSFour hundred two hip fracture patients older than 60 years of age were observed prospectively at a German University Hospital. Treatment costs were determined with up to 196 cost factors and compared to the reimbursement. Finally, statistical analysis was performed to identify clinical parameters influencing the cost-reimbursement relation.RESULTSTreatment costs were 8853 € (95% CI 8297-9410 €), while reimbursement was 8196 € (95% CI 7707-8772 €), resulting in a deficit of 657 € (95% CI 143-1117 €). Bivariate analysis showed that the cost-reimbursement relation was negatively influenced mainly by higher age, higher ASA score, readmission to the intensive care unit (ICU) and red blood cell transfusion. Adjusted for other parameters, readmission to the ICU was a significant negative predictor (- 2669 €; 95% CI - 4070 to - 1268 €; p < 0.001), while age of 60-75 years was a positive predictor for the cost-reimbursement relation (1373 €; 95% CI 265-2480 €; p = 0.015).CONCLUSIONSTreatment of geriatric hip fracture patients in a university hospital in Germany does not seem to be cost-covering. Adjustment of the reimbursement for treatment of complex hip fracture patients should be considered.

### **Patient Mortality in Geriatric Distal Femur Fractures.**

**Author(s):** Myers, Philip; Laboe, Patrick; Johnson, Kory J; Fredericks, Peter D; Crichlow, Renn J;

**Source:** Journal of orthopaedic trauma; Mar 2018; vol. 32 (no. 3); p. 111-115

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

**Abstract:**OBJECTIVE To estimate 1-year mortality rates in elderly patients who undergo operative treatment for distal femur fractures and identify potential risk factors for mortality. DESIGN Retrospective chart review. SETTING Level 1 and Level 2 trauma centers. PATIENTS/PARTICIPANTS Two hundred eighty-three elderly patients (average age 76.0 years  $\pm$  9.8) who sustained distal femur fractures between 2002 and 2012. INTERVENTION Fracture fixation of the distal femur. MAIN OUTCOME MEASURE Survival up to 1 year after surgery. RESULT The 1-year mortality rate for distal femur fractures in elderly patients was 13.4%. There were no statistically significant differences in overall mortality between native bone and periprosthetic fractures, intramedullary nail or open reduction internal fixation, or across Orthopaedic Trauma Association fracture classifications. Overall patient mortality was significantly higher at 30 days ( $P = 0.036$ ), 6 months ( $P = 0.019$ ), and 1 year ( $P = 0.018$ ), when surgery occurred more than 2 days from the injury. Mean Charlson Comorbidity Index scores were significantly lower in survivors versus nonsurvivors at all time intervals (30 days,  $P = 0.023$ ; 6 months,  $P = 0.001$  and 1 year  $P \leq 0.001$ ). A time to surgery of more than 2 days, regardless of baseline illness, did not result in improved survivability at 1 year. CONCLUSION Overall mortality for distal femur fractures was 13.4% in the elderly population. A surgical treatment more than 2 days after injury was associated with increased patient mortality. LEVEL OF EVIDENCE Prognostic Level III. See Instructions for Authors for a complete description of levels of evidence.

### **How Common-and How Serious- Is Clostridium difficile Colitis After Geriatric Hip Fracture? Findings from the NSQIP Dataset.**

**Author(s):** Bovonratwet, Patawut; Bohl, Daniel D; Russo, Glenn S; Ondeck, Nathaniel T; Nam, Denis

**Source:** Clinical orthopaedics and related research; Mar 2018; vol. 476 (no. 3); p. 453-462

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

**Abstract:**BACKGROUND Patients with geriatric hip fractures may be at increased risk for postoperative Clostridium difficile colitis, which can cause severe morbidity and can influence hospital quality metrics. However, to our knowledge, no large database study has calculated the incidence of, factors associated with, and effect of C. difficile colitis on geriatric patients undergoing hip fracture surgery. QUESTIONS/PURPOSE To use a large national database with in-hospital and postdischarge data (National Surgical Quality Improvement Program [NSQIP®]) to (1) determine the incidence and timing of C. difficile colitis in geriatric patients who underwent surgery for hip fracture, (2) identify preoperative and postoperative factors associated with the development of C. difficile colitis in these patients, and (3) test for an association between C. difficile colitis and postoperative length of stay, 30-day readmission, and 30-day mortality. PATIENTS AND METHOD This is a retrospective study. Patients who were 65 years or older who underwent hip fracture surgery were identified in the 2015 NSQIP database. The primary outcome was a diagnosis of C. difficile colitis during the 30-day postoperative period. Preoperative and procedural factors were tested for association with the development of C. difficile colitis through a backward stepwise multivariate model. Perioperative antibiotic type and duration were not included in the model, as this information was not recorded in the NSQIP. The association between C. difficile colitis and postoperative length of stay, 30-day readmission, and 30-day mortality were tested through multivariate regressions, which adjusted for preoperative and procedural characteristics such as age, comorbidities, and surgical procedure. A total of 6928 patients who were 65 years or older and underwent hip fracture surgery were identified. RESULT The incidence of postoperative C. difficile

colitis was 1.05% (95% CI, 0.81%-1.29%; 73 of 6928 patients). Of patients who had *C. difficile* colitis develop, 64% (47 of 73 patients) were diagnosed postdischarge and 79% (58 of 73 patients) did not have a preceding infectious diagnosis. Preoperative factors identifiable before surgery that were associated with the development of *C. difficile* colitis included admission from any type of chronic care facility (versus admitted from home; relative risk [RR] = 1.98; 95% CI, 1.11-3.55;  $p = 0.027$ ), current smoker within 1 year (RR = 1.95; 95% CI, 1.03-3.69;  $p = 0.041$ ), and preoperative anemia (RR = 1.76; 95% CI, 1.07-2.92;  $p = 0.027$ ). Patients who had pneumonia (RR = 2.58; 95% CI, 1.20-5.53;  $p = 0.015$ ), sepsis (RR = 4.20; 95% CI, 1.27-13.82;  $p = 0.018$ ), or "any infection" (RR = 2.26; 95% CI, 1.26-4.03;  $p = 0.006$ ) develop after hip fracture were more likely to have *C. difficile* colitis develop. Development of *C. difficile* colitis was associated with greater postoperative length of stay (22 versus 5 days;  $p < 0.001$ ), 30-day readmission (RR = 3.41; 95% CI, 2.17-5.36;  $p < 0.001$ ), and 30-day mortality (15% [11 of 73 patients] versus 6% [439 of 6855 patients]; RR = 2.16; 95% CI, 1.22-3.80;  $p = 0.008$ ). CONCLUSION *C. difficile* colitis is a serious infection after hip fracture surgery in geriatric patients that is associated with 15% mortality. Patients at high risk, such as those admitted from any type of chronic care facility, those who had preoperative anemia, and current smokers within 1 year, should be targeted with preventative measures. From previous studies, these measures include enforcing strict hand hygiene with soap and water (not alcohol sanitizers) if a provider is caring for patients at high risk and those who are *C. difficile*-positive. Further, other studies have shown that certain antibiotics, such as fluoroquinolones and cephalosporins, can predispose patients to *C. difficile* colitis. These medications perhaps should be avoided when prescribing prophylactic antibiotics or managing infections in patients at high risk. Future prospective studies should aim to determine the best prophylactic antibiotic regimens, probiotic formula, and discharge timing that minimize postoperative *C. difficile* colitis in patients with hip fractures. LEVEL OF EVIDENCE Level III, therapeutic study.

### **Impact of Anesthesia on Hospital Mortality and Morbidities in Geriatric Patients Following Emergency Hip Fracture Surgery.**

**Author(s):** Qiu, Chunyuan; Chan, Priscilla H; Zohman, Gary L; Prentice, Heather A; Hunt, Jessica J

**Source:** Journal of orthopaedic trauma; Mar 2018; vol. 32 (no. 3); p. 116-123

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

**Abstract:** OBJECTIVE To determine the impact of anesthesia type on in-hospital mortality and morbidity for geriatric fragility hip fracture surgery. DESIGN Retrospective cohort study. SETTING Integrates health care delivery system across 38 facilities in the United States. PATIENTS/PARTICIPANTS We identified 16,695 patients 65 years of age and older who underwent emergent hip fracture repairs between 2009 and 2014 through the Kaiser Permanente hip fracture registry and excluded pathologic or bilateral fractures. INTERVENTION Hip fracture surgery with general or regional anesthesia. MAIN OUTCOMES MEASURES Data on in-hospital mortality, time to death, discharge disposition, and length of stay (LOS) were analyzed among the following anesthesia types: general anesthesia (GA), regional anesthesia (RA), and intraoperative conversions from regional to general (Cv). RESULTS Compared with RA, the hazard ratio for GA for in-hospital mortality was 1.38 and 2.23 for the Cv group; the time ratio for GA-associated time to death was 0.97 and 0.89 for the Cv group. The GA-associated time ratio for LOS before discharge was 1.01, and the hazard ratio for home discharge was 0.86, but no significance was found with the Cv group. CONCLUSIONS RA may offer advantages over GA for fragility hip fracture surgeries when possible. In-hospital mortality, time to death, increased LOS, and discharge to an institute rather than home were all adversely influenced by GA. Furthermore, the previously understudied Cv group demonstrated adverse outcomes for in-hospital mortality and time to death. LEVEL OF EVIDENCE Therapeutic Level III. See Instructions for Authors for a complete description of levels of evidence.

### **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; Feb 2018

**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.

### **Effectiveness of interventions aimed at improving physical and psychological outcomes of fall-related injuries in people with dementia: a narrative systematic review.**

**Author(s):** Robalino, Shannon; Nyakang'o, Sarange B; Beyer, Fiona R; Fox, Chris; Allan, Louise M

**Source:** Systematic reviews; Feb 2018; vol. 7 (no. 1); p. 31

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

Available at [Systematic Reviews](#) - from PubMed Central

**Abstract:**BACKGROUND The annual prevalence of falls in people with dementia ranges from 47 to 90%. Falls are a common reason for hospital admission in people with dementia, and there is limited research evidence regarding the care pathways experienced by this population. In addition to immediate management of an injury, prevention of further falls is likely to be an important part of any successful intervention. This review aims to assess the effectiveness of interventions for improving the physical and psychological wellbeing of people with dementia who have sustained a fall-related injury. METHODSSystematic review methodologies were employed utilising searches across multiple databases (MEDLINE, CENTRAL, Health Management Information Consortium, EMBASE, CINAHL, Web of Science, Allied and Complementary Medicine Database, and Physiotherapy Evidence Database (PEDro)) and citation chaining. Studies including people with a known diagnosis of dementia living in the community and who present at health services with a fall, with or without injury, were included. Outcomes of interest included mobility, recurrent falls, activities of daily living, length of hospital stay, and post-discharge residence. Results were independently reviewed and quality assessed by two researchers, and data extracted using a customised form. A narrative synthesis was performed due to heterogeneity of the included studies. RESULTSSeven studies were included. Interventions clustered into three broad categories: multidisciplinary in-hospital post-surgical geriatric assessment; pharmaceuticals; and multifactorial assessment. Multidisciplinary care and early mobilisation showed short-term improvements for some outcomes. Only an annual administration of zoledronic acid showed long-term reduction in recurrent falls. CONCLUSIONS Due to high heterogeneity across the studies, definitive conclusions could not be reached. Most post-fall interventions were not aimed at patients with dementia and have shown little efficacy regardless of cognitive status. Minor improvements to some quality of life indicators were shown, but these were generally not statistically significant. Conclusions were also limited due to most studies addressing hip fracture; the interventions provided for this type of injury may not be suitable for other types of fractures or soft tissue injuries, or for use in primary care. SYSTEMATIC REVIEW REGISTRATION PROSPERO CRD42016029565 .

### **Study of fall risk-increasing drugs in elderly patients before and after a bone fracture.**

**Author(s):** Beunza-Sola, Mónica; Hidalgo-Ovejero, Ángel M; Martí-Ayerdi, Jon;

**Source:** Postgraduate medical journal; Feb 2018; vol. 94 (no. 1108); p. 76-80

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

Available at [Postgraduate Medical Journal](#) - from BMJ Journals

**Abstract:**BACKGROUND Accidental falls have a significant economic and human impact. The use of certain drugs is one of the modifiable risk factors associated with these events. OBJECTIVE The aim of this study was to determine the prevalence of use and to explore changes in treatment with fall-related drugs in patients over 65 years of age admitted as a result of a fall-related fracture. METHODS Observational and prospective study performed in a tertiary level hospital. A list of fall risk-increasing drugs (FRIDs) was drawn up. The main study variables were number and type of FRIDs prescribed at admission and 1 month after the fracture and number, type, treating physician and place where changes in FRIDs were implemented. RESULTS In total, 252 patients were included. At admission, 91.3% were receiving at least one FRID, mean daily use was 3.1 FRIDs and the most frequently prescribed FRIDs were diuretics (18%), renin-angiotensin system-acting agents (15.8%) and antidepressants (15%). One month later, mean daily use was 3.4 FRIDs ( $p=0.099$ ) and a significant increase was detected in the use of hypnotics ( $p=0.003$ ) and antidepressants ( $p=0.042$ ). A total of 327 changes in treatment were recorded (1.3 changes/patient). Of the changes, 52.6% were

new prescriptions, 72.2% occurred at discharge and 56.6% were ordered by a geriatrician. CONCLUSION The use of FRIDs among patients with a fall-related fracture is very high. This use rises 1 month after the fracture, significantly in the case of hypnotics and antidepressants.

**The effect of exercise on bone mineral density in adult cancer survivors: a systematic review and meta-analysis.**

**Author(s):** Dalla Via, J; Daly, R M; Fraser, S F

**Source:** Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA; Feb 2018; vol. 29 (no. 2); p. 287-303

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

**Abstract:** PURPOSE Certain cancer treatments are associated with bone loss and increased fracture risk. Weight-bearing impact exercise, resistance training or the combination, are recommended to preserve or improve bone mineral density (BMD) in healthy older adults, but their efficacy in cancer survivors is less well understood. The aim of this systematic review with meta-analysis of randomised control trials (RCT) was to review the evidence regarding the role of exercise to counteract cancer treatment-induced bone loss. METHODS Four databases were searched systematically with 12 RCTs of at least 6-month duration investigating the effects of exercise on BMD compared to a control group in adult cancer survivors identified. RESULTS Meta-analysis was completed using available data from six studies enrolling 814 participants, with lumbar spine, femoral neck and/or total hip BMD as the primary outcome measures. Overall, there was no significant benefit of exercise compared to controls on BMD at the lumbar spine (0.0071 g/cm<sup>3</sup>, 95% CI -0.0002 to 0.0145, p = 0.057), femoral neck (0.0044 g/cm<sup>3</sup>, 95% CI -0.0005 to 0.0093, p = 0.077), or total hip (0.0024 g/cm<sup>3</sup>, 95% CI -0.0038 to 0.0086, p = 0.443). Subgroup analysis revealed a positive effect on lumbar spine BMD in three studies implementing a combined resistance and impact exercise intervention (0.015 g/cm<sup>3</sup>, 95% CI 0.003 to 0.028, p = 0.019). CONCLUSIONS From the evidence available, exercise may not be sufficient to improve bone health in cancer survivors, but given the heterogeneity in the participant characteristics and several exercise programs which may not have been designed to specifically optimise bone health, these findings should be interpreted with caution.

**Characteristics, consequences and prevention of falls in institutionalised older adults in the province of Malaga (Spain): a prospective, cohort, multicentre study.**

**Author(s):** Aranda-Gallardo, Marta; Morales-Asencio, Jose M;

**Source:** BMJ open; Feb 2018; vol. 8 (no. 2); p. e020039

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

Available at [BMJ open](#) - from Europe PubMed Central - Open Access

**Abstract:** OBJECTIVES Falls are an important adverse event among institutionalised persons. It is in this clinical setting where falls occur more frequently than in any other, despite the measures commonly taken to prevent them. This study aimed to determine the characteristics of a typical institutionalised elderly patient who suffers a fall and to describe the physical harms resulting from this event. We then examined the association between falls and the preventive measures used. METHODS This was a prospective cohort study in 37 nursing homes in Spain. The participants were all the nursing home residents institutionalised in these centres from May 2014 to July 2016. Participants were followed up for 9 months. During this period, two observations were made to evaluate the preventive measures taken and to record the occurrence of falls. RESULTS 896 residents were recruited, of whom 647 completed the study. During this period, 411 falls took place, affecting 213 residents. The injuries caused by the falls were mostly minor or moderate. They took place more

frequently among women and provoked 22 fractures (5.35%). The most commonly used fall prevention measure was bed rails (53.53% of cases), followed by physical restraint (16.79%). The latter measure was associated with a higher incidence of injuries not requiring stitches (OR=2.06, 95% CI 1.01 to 4.22, P=0.054) and of injuries that did require stitches (OR=3.51, 95% CI 1.36 to 9.01, P=0.014) as a consequence of falls. Bed rails protected against night-time falls. CONCLUSIONS Falls are a very common adverse event in nursing homes. The prevention of falls is most commonly addressed by methods to restrain movement. The use of physical restraints is associated with a greater occurrence of injuries caused by a fall.

### **Persistence of depressive symptoms and gait speed recovery in older adults after hip fracture**

**Author(s):** Rathbun, Alan M.; Shardell, Michelle D.; Stuart, Elizabeth A.; Gruber-Baldini, Ann L.; Orwig, Denise; Ostir, Glenn V.; Hicks, Gregory E.; Hochberg, Marc C.; Magaziner, Jay

**Source:** International Journal of Geriatric Psychiatry; Feb 2018 ; p. No

**Publication Type(s):** Journal Peer Reviewed Journal

**Abstract:** Objective Depression after hip fracture in older adults is associated with worse physical performance; however, depressive symptoms are dynamic, fluctuating during the recovery period. The study aim was to determine how the persistence of depressive symptoms over time cumulatively affects the recovery of physical performance. Methods Marginal structural models estimated the cumulative effect of persistence of depressive symptoms on gait speed during hip fracture recovery among older adults (n = 284) enrolled in the Baltimore Hip Studies 7th cohort. Depressive symptoms at baseline and at 2-month and 6-month postadmission for hip fracture were evaluated by using the Center for Epidemiological Studies Depression Scale, and persistence of symptoms was assessed as a time-averaged severity lagged to standardized 3 m gait speed at 2, 6, and 12 months. Results A 1-unit increase in time-averaged Center for Epidemiological Studies Depression score was associated with a mean difference in gait speed of -0.0076 standard deviations (95% confidence interval [CI]: -0.0184, 0.0032; P = .166). The association was largest in magnitude from baseline to 6 months: -0.0144 standard deviations (95% CI: -0.0303, 0.0015; P = 0.076). Associations for the other time intervals were smaller: -0.0028 standard deviations (95% CI: -0.0138, 0.0083; P = .621) at 2 months and -0.0121 standard deviations (95% CI: -0.0324, 0.0082; P = .238) at 12 months. Conclusion Although not statistically significant, the magnitude of the numerical estimates suggests that expressing more depressive symptoms during the first 6 months after hip fracture has a meaningful impact on functional recovery. (PsycINFO Database Record (c) 2018 APA, all rights reserved) (Source: journal abstract)

### **Optimization of perioperative management of proximal femoral fracture in the elderly**

**Author(s):** Merloz P.

**Source:** Orthopaedics and Traumatology: Surgery and Research; Feb 2018; vol. 104 (no. 1)

**Publication Type(s):** Review

**Abstract:** Proximal femoral fracture in elderly subjects is a major event that is life-threatening in the medium-to-long term. Advanced age, male gender and number of comorbidities largely account for high mortality and require geriatric expertise. Protein-energy malnutrition and bone demineralization increase mortality. Mortality can, on the other hand, be reduced by acting on two variables accessible to medical intervention: daily activities and nutritional status. Functional and neurocognitive assessment allow the risk of dependency to be evaluated, and global geriatric work-up can prevent sudden breakdown of homeostasis. In the emergency setting, pain is to be alleviated, poly medication and anticoagulation therapy checked, and instability (notably cardiac and pulmonary) and confusion syndrome screened for on geriatric and anesthesiologic opinions. Surgery should be implemented without delay, within 48 hours of admission, preferably using multimodal

anesthesia. The technique should be geared to allow early weight-bearing and mobilization. The most comprehensive care plan involves team-work between emergency physicians, surgeons, orthopedic specialists, anesthesiologists, geriatricians, pharmacists, rehabilitation specialists and nursing staff, to reduce mortality and readmission and improve functional results. Post-fracture coordination seeks to prevent falls and further fractures and to treat bone demineralization.  
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**The fates of pedicle screws and functional outcomes in a geriatric population following polymethylmethacrylate augmentation fixation for the osteoporotic thoracolumbar and lumbar burst fractures with mean ninety five month follow-up**

**Author(s):** Lin H.-H.; Chang M.-C.; Wang S.-T.; Liu C.-L.; Chou P.-H.

**Source:** International Orthopaedics; Feb 2018 ; p. 1-8

**Publication Type(s):** Article In Press

**Abstract:** Purpose: Polymethylmethacrylate (PMMA) augmentation is a common method to increase pullout strength fixed for osteoporotic spines. However, few papers evaluated whether these pedicle screws migrated with time and functional outcome in these geriatrics following PMMA-augmented pedicle screw fixation. Methods: From March 2006 to September 2008, consecutive 64 patients were retrospectively enrolled. VAS and ODI were used to evaluate functional outcomes. Kyphotic angle at instrumented levels and horizontal and vertical distances (HD and VD) between screw tip and anterior and upper cortexes were evaluated. To avoid bias, we used horizontal and vertical migration index (HMI and VMI) to re-evaluate screw positions with normalization by the mean of superior and inferior endplates or anterior and posterior vertebral body height, respectively. Results: Forty-six patients with 282 PMMA-augmented screws were analyzed with mean follow-up of 95 months. Nine patients were further excluded due to bed-ridden at latest follow-up. Twenty-six females and 11 males with mean T score of - 2.7 (range, - 2.6 to - 4.1) and mean age for operation of 77.6 +/- 4.3 years (range, 65 to 86). The serial HD and kyphotic angle statistically progressed with time. The serial VD did not statistically change with time ( $p = 0.23$ ), and neither HMI nor VMI ( $p = 0.772$  and  $0.631$ ). Pre-operative DEXA results did not correlate with kyphotic angle. Most patients (80.4%) maintained similar functional outcomes at latest follow-up. The incidence of screws loosening was 2.7% of patients and 1.4% of screws, respectively. The overall incidences of systemic post-operative co-morbidities were 24.3% with overall 20.2 days for hospitalization. Conclusion: Most patients (80%) remained similar functional outcomes at latest follow-up in spite of kyphosis progression. The incidence of implant failure was not high, but the post-operative systemic co-morbidities were higher, which has to be informed before index surgery.  
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**Standardised pre-operative diagnostics and treatment of peripheral arterial disease reduce wound complications in geriatric ankle fractures**

**Author(s):** Aigner R.; Lechler P.; Ruchholtz S.; Frink M.; Boese C.K.; Bockmann B.

**Source:** International Orthopaedics; Feb 2018; vol. 42 (no. 2); p. 395-400

**Publication Type(s):** Article

**Abstract:** Purpose: The aim of this study was to evaluate a standardised algorithm to assess and treat impaired limb perfusion prior to surgical fixation of geriatric ankle fractures and determine the prevalence of peripheral arterial disease (PAD) in geriatric patients presenting with ankle fractures. Methods: Eighty-four patients >65 years pre-operatively diagnosed and treated according to an algorithm (study group) were compared with 84 patients diagnosed and treated before the algorithm was introduced (control group). Results: In 14 patients of the study group, clinical noninvasive examination revealed signs of relevant PAD, which was confirmed with computed

tomographic angiography (CTA) in nine patients, all of whom had successful angioplasty prior to surgical fixation of the ankle fracture. In three of these patients, PAD had previously been diagnosed. After standardised diagnostics and treatment of malperfusion, a significantly reduced overall and, particularly, wound complication rate was found. Conclusion: PAD is an underdiagnosed condition in geriatric patients presenting with ankle fractures. This study underlines the relevance of limb perfusion for adequate wound healing in geriatric ankle fractures. Therefore, special attention should be paid to diagnose and-if indicated-optimize limb perfusion prior to surgical fixation of geriatric ankle fractures. Copyright © 2017, SICOT aisbl.

**Acute phase nutritional screening tool associated with functional outcomes of hip fracture patients: A longitudinal study to compare MNA-SF, MUST, NRS-2002 and GNRI**

**Author(s):** Inoue T.; Tanaka T.; Kakehi T.; Misu S.; Ono R.

**Source:** Clinical Nutrition; 2018

**Publication Type(s):** Article In Press

**Abstract:**Background & aims: Several hip fracture patients are malnourished, but no study has attempted to determine the optimal nutritional screening tool for predicting functional outcomes. We investigated the association between each nutritional status assessed by four nutritional screening tools at admission and functional outcomes during the postoperative acute phase in hip fracture patients. Methods: The Mini Nutritional Assessment-Short Form (MNA-SF), the Malnutrition Universal Screening Tool (MUST), the Nutritional Risk Score 2002 (NRS-2002) and the Geriatric Nutritional Risk Index (GNRI) were assessed at admission before surgery. We evaluated the motor domain of the functional independence measure (motor-FIM) score at discharge, efficiency on the motor-FIM (change in the motor-FIM score after postoperative rehabilitation divided by postoperative length of hospital stay), and 10-m walking speed at postoperative 14 days as functional outcomes. Results: Two hundred and five patients (mean patient age, 83.5 +/- 7.0 years; range, 65-100 years; 82% female) were included. The MNA-SF evaluation classified 56 patients as well-nourished, 103 as at risk of malnutrition and 46 as malnourished. The MUST evaluation classified 97 patients as low risk, 42 as medium risk and 66 as high risk. The NRS-2002 evaluation classified 89 patients as well-nourished, 69 as medium risk and 47 as nutritionally at risk. The GNRI evaluation classified 44 patients as no risk, 74 as low risk and 87 as a major risk. Multiple linear regression analysis revealed that MNA-SF had a significant association with discharge motor-FIM (well-nourished vs. at risk of malnutrition, standardised beta = -0.06, p = 0.04; vs. malnourished, standardised beta = -0.32, p < 0.01), efficiency on the motor-FIM (well-nourished vs. malnourished, standardised beta = -0.19, p = 0.02) and 10-m walking speed (well-nourished vs. malnourished, standardised beta = -0.30, p < 0.01). The GNRI was significantly associated with 10-m walking speed (no risk vs. mild risk, standardised beta = -0.23, p = 0.02; vs. major risk, standardised beta = -0.37, p < 0.01), but not of motor-FIM and efficiency on the motor-FIM. No significant relationships were found among MUST and NRS-2002 and any functional outcomes. Conclusions: The MNA-SF was found to be an optimal nutritional screening tool to associate with functional outcomes during the postoperative acute phase of elderly hip fracture patients. Copyright © 2018 Elsevier Ltd and European Society for Clinical Nutrition and Metabolism.

**Exercise and Older Adults**

**Author(s):** Mora J.C.; Valencia W.M.

**Source:** Clinics in Geriatric Medicine; Feb 2018; vol. 34 (no. 1); p. 145-162

**Publication Type(s):** Review

**Abstract:**Regular exercise is essential for healthy aging and offers many health benefits, including reduced risk of all-cause mortality, chronic disease, and premature death. Because physical inactivity

is prevalent, greater focus is needed on integrating exercise into care plans and counseling, and developing partnerships that support exercise opportunities. Older adults should be as physically active as their abilities and conditions allow. For substantial health benefits, older adults need to do aerobic, muscle-strengthening, and stretching exercises weekly, and balance activities as needed. Appropriate planning must take account of factors such as prescribed medications, nutrition, injuries, hip and knee arthroplasties, and chronic conditions. Copyright © 2017 Elsevier Inc.

**"Life Goes On." Everyday Tasks, Coping Self-Efficacy, and Independence: Exploring Older Adults' Recovery From Hip Fracture.**

**Author(s):** Langford, Dolores; Edwards, Nicola; Gray, Samantha M; Fleig, Lena; Ashe, Maureen C

**Source:** Qualitative health research; Feb 2018 ; p. 1049732318755675

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

**Abstract:**Older adults face many challenges in the first few months after hip fracture. Rehabilitation holds promise to assist the recovery process. Therefore, we used semistructured interviews to explore older adults' and allied health professionals' acceptance of a rehabilitation intervention for hip fracture, and we described perceptions of the early recovery period (<4 months). Interviews were recorded and transcribed verbatim; three authors independently read the transcripts multiple times and together developed themes guided by Interpretive Description. Older adults described the intervention as acceptable and provided valuable feedback for its future implementation. Older adults also provided reflections on their experience of fracture recovery. Themes that emerged included physical limitations and loss of independence, the long recovery time, and coping with additional complications of living with multimorbidity. To overcome challenges, older adults identified the need for social support and physical activity, balanced by their own personal outlook.

**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; Feb 2018

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

**Abstract:**OBJECTIVETo examine the course of recovery and resulting health-related quality of life (HRQL) after low-trauma hip fracture using two different definitions of recovery.DESIGNInception cohort with eight assessments over one year.SETTINGParticipants were recruited from a tertiary-care hospital and followed in the community.INTERVENTIONNot applicable PARTICIPANTS: 47 (75% of all eligible) community-dwelling hip fracture patients (≥65 years).MAIN OUTCOME MEASURESPre-fracture functional level was used to identify subgroups of participants with similar trajectories of mobility over time. Recovery in functional mobility was defined in two ways: the "traditional" definition (return to pre-fracture 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.RESULTSParticipants were categorized into three subgroups: low, medium, and high pre-fracture functional abilities. Agreement between the two definitions of recovery (quantified using Kappa coefficient) was strong for the medium group (0.81; 95% CI: 0.56-1.00), weak for the high group (0.46; 95% CI: 0.0-0.99), and minimal for the low group (0.12; 95% CI: 0.0-0.328). 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 =10.8 points on RAND-36; 95% CI: 6.67-15.07).CONCLUSIONThe agreement between the two 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 (e.g. endorsing a specific intervention or discharging patients).

### **New Immobilization Guidelines Change EMS Critical Thinking in Older Adults With Spine Trauma.**

**Author(s):** Underbrink, Linda; Dalton, Alice Twink; Leonard, Jan; Bourg, Pamela W

**Source:** Prehospital emergency care : official journal of the National Association of EMS Physicians and the National Association of State EMS Directors; Feb 2018 ; p. 1-8

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

**Abstract:**OBJECTIVEThe impact of immobilization techniques on older adult trauma patients with spinal injury has rarely been studied. Our advisory group implemented a change in the immobilization protocol used by emergency medical services (EMS) professionals across a region encompassing 9 trauma centers and 24 EMS agencies in a Rocky Mountain state using a decentralized process on July 1, 2014. We sought to determine whether implementing the protocol would alter immobilization methods and affect patient outcomes among adults  $\geq 60$  years with a cervical spine injury.METHODSThis was a 4-year retrospective study of patients  $\geq 60$  years with a cervical spine injury (fracture or cord). Immobilization techniques used by EMS professionals, patient demographics, injury characteristics, and in-hospital outcomes were compared before (1/1/12-6/30/14) and after (7/1/14-12/31/15) implementation of the Spinal Precautions Protocol using bivariate and multivariate analyses.RESULTSOf 15,063 adult trauma patients admitted to nine trauma centers, 7,737 (51%) were  $\geq 60$  years. Of those, 237 patients had cervical spine injury and were included in the study; 123 (51.9%) and 114 (48.1%) were transported before and after protocol implementation, respectively. There was a significant shift in the immobilization methods used after protocol implementation, with less full immobilization (59.4% to 28.1%,  $p < 0.001$ ) and an increase in the use of both a cervical collar only (8.9% to 27.2%,  $p < 0.001$ ) and not using any immobilization device (15.5% to 31.6%,  $p = 0.003$ ) after protocol implementation. While the proportion of patients who only received a cervical collar increased after implementing the Spinal Precautions Protocol, the overall proportion of patients who received a cervical collar alone or in combination with other immobilization techniques decreased (72.4% to 56.1%,  $p = 0.01$ ). The presence of a neurological deficit (6.5% vs. 5.3,  $p = 0.69$ ) was similar before and after protocol implementation; in-hospital mortality (adjusted odds ratio = 0.56, 95% confidence interval: 0.24-1.30,  $p = 0.18$ ) was similar post-protocol implementation after adjusting for injury severity.CONCLUSIONSThere were no differences in neurologic deficit or patient disposition in the older adult patient with cervical spine trauma despite changes in spinal restriction protocols and resulting differences in immobilization devices.

## **Psychological**

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

**Author(s):** Sakata N.; Okumura Y.; Fushimi K.; Nakanishi M.; Ogawa A.

**Source:** Journal of the American Geriatrics Society; 2018

**Publication Type(s):** Article In Press

**Abstract:**Objectives: 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. Copyright © 2018, American Geriatrics Society and Wiley Periodicals, Inc.

### **Gender differences in the association of cognitive impairment with the risk of hip fracture in the older population**

**Author(s):** Lobo E.; Marcos G.; Santabarbara J.; De la Camara C.; Lopez-Anton R.; Gracia-Garcia P.; Lobo-Escolar L.; Salvador-Roses H.; Lobo-Escolar A.

**Source:** Maturitas; Mar 2018; vol. 109 ; p. 39-44

**Publication Type(s):** Article

**Abstract:** Objectives To test the hypothesis that differences by gender will be observed in the association of hip fracture risk with stages of cognitive impairment; and to explore the association between Petersen's "mild cognitive impairment" (MCI) and DSM-5 "mild neurocognitive disorder" (MND). Study design A community sample of 4803 individuals aged 55+ years was assessed in a two-phase case-finding enquiry in Zaragoza, Spain, and was followed up for 16 years. Medical and psychiatric history was collected with standardized instruments, including the Mini-Mental Status Examination (MMSE), Geriatric Mental State (GMS), History and Aetiology Schedule, and a Risk Factors Questionnaire. The statistical analysis included calculations of Hazard Ratios (HR) in multivariate Cox proportional hazards regression models. Main outcome measures Identified cases of hip fracture, validated by blind researchers. Results In men, hip fracture risk was increased at the "mild" (HR = 4.99 (1.39-17.91)) and at the "severe" (HR = 9.31 (1.35-64.06)) stages of cognitive impairment, indicated by MMSE performance. In contrast, in women no association could be documented at the "mild stage" (power = 89%), and the association disappeared altogether at the "severe stage" in the final multivariate statistical model (power 100%). No association observed between hip fracture and mild cognitive impairment in both men (power = 28% for P-MCI) and women (power = 44% and 19% for Petersen's MCI and DSM-5 MND, respectively). Conclusions Increased hip fracture risk was associated with "mild" stages of cognitive impairment in men, but not in women. To explore the potential association with the construct MCI or MND, studies with greater statistical power would be required. Copyright © 2017

## **Other**

### **Cross-sectional associations of dietary and circulating magnesium with skeletal muscle mass in the EPIC-Norfolk cohort**

**Author(s):** Hayhoe R.P.G.; Welch A.A.; Lentjes M.A.H.; Mulligan A.A.; Luben R.N.; Khaw K.-T.

**Source:** Clinical Nutrition; 2018

**Publication Type(s):** Article In Press

**Abstract:** Background: Maintenance of skeletal muscle in older age is critical to reducing frailty and the risk of falls and fractures. Nutrition has established importance for muscle health in general, but

less research has looked at associations of dietary intake of specific micronutrients on skeletal muscle mass in older adults. Aims: This study aimed to investigate the influence of dietary and circulating magnesium on skeletal muscle mass in a UK population of 14,340 middle to older-aged men and women participating in the EPIC-Norfolk cohort study. Methods: Dietary nutrient intakes were estimated from 7-day food diaries and fat-free mass (FFM) by bioelectrical impedance analysis. Multivariable regression was used to investigate associations of FFM-based indices of muscle mass with quintiles of dietary magnesium intake or serum magnesium concentration groups. All analyses were stratified by sex, and regression models were adjusted for relevant covariates. Results: Significant positive trends in FFM measures were evident across magnesium dietary intake quintiles for both sexes (all  $p < 0.001$ ;  $n = 6350$  men;  $n = 7990$  women) and both  $<60$  and  $\geq 60$  year olds, with all-age quintile 5 versus quintile 1 maximal differences of 4.6% in men and 6.3% in women; highly relevant compared to the estimated 1% decline per year after 40 years of age. These observations were not reflected in serum magnesium analyses, where no consistent trends were found across the skeletal muscle mass indices tested. Conclusion: Further investigation will be required to improve our understanding of the relationship between serum magnesium concentration and skeletal muscle mass. However, this study has demonstrated strong associations between dietary magnesium intake and indices of skeletal muscle mass in a UK population of middle to older-aged adults, highlighting the likely importance of dietary magnesium for optimal muscle health in this population. Copyright © 2018 Elsevier Ltd and European Society for Clinical Nutrition and Metabolism.

### **The Association of Vitamin D Levels and the Frailty Phenotype Among Non-geriatric Dialysis Patients: A Cross-sectional Study.**

**Author(s):** Demircioglu, Demet Tekdos

**Source:** Clinics (Sao Paulo, Brazil); 2018; vol. 73 ; p. e116

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

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

**Abstract:**OBJECTIVEThe aim of this study was to investigate the frequency of frailty and the association of vitamin D levels and the frailty phenotype among non-geriatric dialysis patients.METHODSeventy-four stable, chronic hemodialysis patients from the hemodialysis unit of the hospital were enrolled in the study. The patients' medical histories and laboratory findings were obtained from the medical records of the dialysis unit. Serum parathyroid hormone and 25-hydroxy vitamin D levels were determined using chemiluminometric immunoassays. Frailty was defined by Fried et al. as a phenotype; shrinking, weakness, self-reported exhaustion, decreased activity and slowed walking speed were evaluated.RESULTSForty-one (55%) of the patients were males. The patients were divided into 3 groups according to frailty scores: 39 (53%) patients were frail, 6 (8%) patients were intermediately frail, and 28 (39%) patients were normal. Significant differences were found for 25-hydroxy vitamin D and hemoglobin levels among the groups; however, no differences were observed in body mass index, comorbidities, sex, marital status, education, disease and dialysis durations, or parathyroid hormone, creatinine, serum calcium, phosphorus, and potassium levels.CONCLUSIONSWeakness and slowness are serious outcomes of both vitamin D deficiency and frailty, and vitamin D deficiency has been associated with increased risks of decreased physical activity, falls, fractures and death in postmenopausal women and older men. Although studies on frailty have focused on older adults, growing evidence indicates that the frailty phenotype is becoming a factor associated with poor health outcomes in non-geriatric populations with chronic disease.

### **Dairy product intake and bone properties in 70-year-old men and women**

**Author(s):** Hallkvist O.M.; Johansson J.; Nordstrom A.; Hult A.; Nordstrom P.

**Source:** Archives of Osteoporosis; Dec 2018; vol. 13 (no. 1)

**Publication Type(s):** Article

Available at [Archives of Osteoporosis](#) - from International DOI Foundation

**Abstract:**Summary: In the present population-based study including 70-year-old men and women, total dairy product intake was associated with a weak positive association with tibia trabecular and cortical cross-sectional areas. Purpose: Milk consumption has recently been suggested to increase fracture risk. Therefore, we aimed to investigate associations between dairy product consumption and peripheral bone properties. Furthermore, we explored whether consumption of milk and fermented dairy products affected bone properties differently. Methods: The Healthy Aging Initiative is a population-based, cross-sectional study investigating the health of 70-year-old men and women. Out of the 2904 individuals who met the inclusion criteria, data on self-reported daily dairy product consumption (dl/day), peripheral quantitative computed tomography (pQCT) examinations at the 4 and 66% scan sites of the tibia and radius, and dual-energy X-ray absorptiometry (DXA) scans were collected from 2040 participants. Associations between dairy product consumption and bone properties were examined using multiple linear regression models adjusted for sex, muscle area, meal size, dietary protein proportion, current smoking status, and objectively measured physical activity. Results: Total dairy product intake was associated with larger trabecular (2.296 (95% CI, 0.552-4.039) mm<sup>2</sup>, per dl/day increase,  $p = 0.01$ ) and cortical cross-sectional areas (CSAs) in the tibia (1.757 (95% CI, 0.683-2.830) mm<sup>2</sup>,  $p = 0.001$ ) as measured by pQCT and higher areal bone mineral density (aBMD) of the radius (3.231 (95% CI, 0.764-5.698) mg/cm<sup>2</sup>,  $p = 0.01$ ) as measured by DXA. No other measurement in the tibia, radius, femoral neck, or lower spine was associated significantly with dairy product intake. Bone properties did not differ according to the type of dairy product consumed. Conclusion: No evidence of a negative association between dairy product consumption and bone health was found. Furthermore, total dairy product consumption was associated with increased CSAs in the tibia, regardless of dairy product type. Collectively, our findings indicate the existence of a weak but significant positive association between dairy product consumption bone properties in older adults. Copyright © 2018, The Author(s).

### **Associations of components of sarcopenic obesity with bone health and balance in older adults**

**Author(s):** Scott D.; Shore-Lorenti C.; McMillan L.; Mesinovic J.; Ebeling P.R.; Hayes A.; Sanders K.M.

**Source:** Archives of Gerontology and Geriatrics; Mar 2018; vol. 75 ; p. 125-131

**Publication Type(s):** Article

**Abstract:**Objectives To determine characteristics of sarcopenic obesity that are independently associated with bone health and balance in older adults. Study design Cross-sectional study of 168 community-dwelling older adults (mean age 67.7 +/- 8.4 years; 55% women). Main outcome measures Appendicular lean mass (ALM), whole-body areal BMD (aBMD) and body fat percentage were assessed by dual-energy X-ray absorptiometry. Peripheral quantitative computed tomography assessed muscle density and cortical volumetric BMD (vBMD), area, thickness, and strength-strain index (SSI) at 66% tibial length. Hand grip strength (dynamometry) and balance path length (computerised posturography) were assessed. Obesity was defined as high body fat percentage. Results Greater lower-leg muscle density was associated with lower balance path length in men ( $r = -0.36$ ;  $P < .01$ ) and women ( $r = -0.40$ ;  $P = < .01$ ). Obese participants by body fat percentage did not differ to non-obese on bone indices, although a trend towards lower cortical vBMD was observed in obese compared with non-obese men (1041.4 +/- 39.8 vs 1058.8 +/- 36.1 mg/cm<sup>3</sup>;  $P = .051$ ). In multivariable models, ALM was positively associated with all bone parameters in obese women, and with whole-body aBMD, proximal tibial cortical area and SSI in non-obese women, and both non-obese and obese men (all  $P < .05$ ). Lower-leg muscle density was also positively associated with cortical vBMD ( $B = 2.91$ ; 95% CI 0.02, 5.80) and area (2.70; 0.06, 5.33) in obese women. Conclusions Amongst components of sarcopenic obesity, higher ALM is a consistent independent predictor of

better bone health. Low muscle density may also compromise bone health and balance. Interventions which improve muscle mass and composition may lower fracture risk in sarcopenic obesity. Copyright © 2017 Elsevier B.V.

### **The relationship between protein quantity, BMD and fractures in older adults**

**Author(s):** Curneen J.M.G.; Casey M.; Laird E.

**Source:** Irish Journal of Medical Science; Feb 2018; vol. 187 (no. 1); p. 111-121

**Publication Type(s):** Review

**Abstract:**Background: Previously, no large-scale literature reviews have focussed on the relationship between dietary protein and its impact on bone mineral density (BMD) and fracture risk-as measures of bone health-in older adults and its potential impact as a primary prevention tool. Aims: The aim of this study was to assess the impact of varying dietary protein levels on bone health. Methods: A literature review of trials concerning older adults' (>50 years of age) and animals' varying protein intake in the diet and its effect on BMD (human and animal) and fracture risk (human only) was carried out. Additionally, a review of dietary assessment tools used in these studies was also analysed. Results: Ten out of fourteen trials assessing BMD and dietary protein quantity in humans and 3/4 in animal trials found a positive relationship between these two parameters. Four out of seven trials investigating the relationship between dietary protein quantity and fracture risk displayed a positive, protective effect of dietary protein levels on fracture risk. Sixty-two percent of studies used the Food-Frequency Questionnaire assessment method. Discussion: Increased protein intake in the diet is beneficial to bone health and reduces morbidity and mortality. The importance of using dietary protein, along with calcium and vitamin D, as a primary preventative strategy should be stressed, given the health and cost benefits that this would deliver, with a possible need for a higher level of protein in the diet of an elderly person than what is currently recommended. Copyright © 2017, Royal Academy of Medicine in Ireland.

### **Nutritional markers may identify patients with greater risk of re-admission after geriatric hip fractures**

**Author(s):** Stone A.V.; Jinnah A.; Emory C.L.; Wells B.J.; Futrell W.M.; Lenoir K.; Atkinson H.

**Source:** International Orthopaedics; Feb 2018; vol. 42 (no. 2); p. 231-238

**Publication Type(s):** Article

**Abstract:**Purpose: Osteoporotic hip fractures are increasing in prevalence with the growing elderly population. Morbidity and mortality remain high following osteoporotic hip fractures despite advances in medical and surgical treatments. The associated costs and medical burdens are increased with a re-admission following hip fracture treatment. This study sought to identify demographic and clinical values that may be a predictive model for 30-day re-admission risk following operative management of an isolated hip fracture. Methods: Between January 1, 2013 and April 30, 2015 all patients admitted to a single academic medical centre for treatment of a hip fracture were reviewed. Candidate variables included standard demographics, common laboratory values, and markers of comorbid conditions and nutrition status. A 30-day, all-cause re-admission model was created utilizing multivariate logistic regression. Results: A total of 607 patients with hip fractures were identified and met the inclusion criteria; of those patients, 67 were re-admitted within 30 days. Univariate analysis indicates that the re-admission group had more comorbidities ( $p < 0.001$ ) and lower albumin ( $p = 0.038$ ) and prealbumin ( $p < 0.001$ ). The final, reduced model contained 12 variables and incorporated four out of five nutritional makers with an internally, cross-validated C-statistic of 0.811 (95% CI: 0.754, 0.867). Conclusion: Our results indicate that specific nutritional laboratory markers at the index admission may identify patients that have a greater risk of re-admission after hip fracture. This model identifies potentially modifiable risk factors and may

allow orthogeriatricians to better educate patients and better treat post-operative nutritional status and care. Copyright © 2017, SICOT aisbl.

### **Isolated Orbital Fractures Are Severe Among Geriatric Patients**

**Author(s):** Toivari M.; Suominen A.L.; Apajalahti S.; Lindqvist C.; Snall J.; Thoren H.

**Source:** Journal of Oral and Maxillofacial Surgery; Feb 2018; vol. 76 (no. 2); p. 388-395

**Publication Type(s):** Article

**Abstract:** Purpose: The purpose of the present study was to clarify the reasons for, types of, and degree of involvement of the orbital wall and the severity of orbital fractures in geriatric patients and to compare the differences between geriatric and younger adult patients. Materials and Methods: A retrospective case-control study of geriatric patients aged at least 65 years (n = 72) and younger controls aged 20 to 50 years (n = 58) with a diagnosis of a unilateral isolated orbital fracture was designed and implemented. The main exposure was age, the primary outcome was the isolated orbital fracture type, and the secondary outcomes were the associated orbital zones, fracture area (cm<sup>2</sup>), degree of dislocation (mm), involvement of anatomic landmarks, diplopia, altered ocular position, restricted eye movement, and ocular injuries. The confounding variables were gender, trauma mechanism, and alcohol abuse. The statistical methods included chi<sup>2</sup> tests and logistic regression analyses. Results: Among the geriatric patients, the great majority of isolated orbital fractures had been caused by falls (66.7%; P <.001). Geriatric orbital fractures were significantly more often extensive (2 cm<sup>2</sup> or larger; P =.045) and associated with the middle-posterior orbital third (P =.032). In the logistic regression analyses, the elderly had a 2.2-fold greater risk of fractures of the middle-posterior orbital third and a 2.3-fold greater risk of extensive fractures compared with the younger controls. Ocular injuries were only diagnosed in the geriatric patients (5.6%). Conclusions: Falling is the most common mechanism of elderly orbital fractures. Isolated orbital fractures are extensive and mainly affect the globe supporting the middle and posterior parts of the orbital floor among geriatric patients. Copyright © 2017 American Association of Oral and Maxillofacial Surgeons

### **The 24,25 to 25-hydroxyvitamin D ratio and fracture risk in older adults: The cardiovascular health study**

**Author(s):** Ginsberg C.; Rifkin D.E.; Ix J.H.; Katz R.; Kestenbaum B.R.; de Boer I.H.; Chonchol M.; Shlipak M.G.; Sarnak M.J.; Hoofnagle A.N.; Garimella P.S.

**Source:** Bone; Feb 2018; vol. 107 ; p. 124-130

**Publication Type(s):** Article

**Abstract:** 25-hydroxyvitamin D [25(OH)D] may not optimally indicate vitamin D receptor activity. Higher concentrations of its catabolic product 24,25-dihydroxyvitamin D [24,25(OH)<sub>2</sub>D] and a higher ratio of 24,25(OH)<sub>2</sub>D to 25(OH)D (the vitamin D metabolite ratio [VMR]) may provide additional information on receptor activity. We compared the strength of associations of these markers with serum PTH concentrations, hip bone mineral density (BMD), and risk of incident hip fracture in community-living older participants in the Cardiovascular Health Study. Among 890 participants, the mean age was 78 years, 60% were women, and the mean 25(OH)D was 28 +/- 11 ng/ml. In cross-sectional analysis, the strength of association of each vitamin D measure with PTH was similar; a 1% higher 25(OH)D, 24,25(OH)<sub>2</sub>D, and VMR were associated with 0.32%, 0.25%, and 0.26% lower PTH, respectively (p < 0.05 for all). Among 358 participants with available BMD data, we found no associations of 25(OH)D or VMR with BMD, whereas higher 24,25(OH)<sub>2</sub>D was modestly associated with greater hip BMD (1% higher 24,25(OH)<sub>2</sub>D associated with 0.04% [95% CI 0.01-0.08%] higher BMD). Risk of incident hip fracture risk was evaluated using a case-cohort design. There were 289 hip fractures during a mean follow up time of 8.4 years. Both higher 24,25(OH)<sub>2</sub>D and VMR were

associated with lower risk of hip fracture (HR per SD higher, 0.73 [0.61, 0.87] and 0.74 [0.61, 0.88], respectively) whereas 25(OH)D was not associated with hip fracture (HR 0.93 [0.79, 1.10]). We conclude that evaluating vitamin D status by incorporating assessment of 24,25(OH)D and the VMR provides information on bone health above and beyond 25(OH)D alone. Copyright © 2017 Elsevier Inc.

### **Milk and other dairy foods and risk of hip fracture in men and women.**

**Author(s):** Feskanich, D; Meyer, H E; Fung, T T; Bischoff-Ferrari, H A; Willett, W C

**Source:** Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA; Feb 2018; vol. 29 (no. 2); p. 385-396

**Publication Date:** Feb 2018

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

**Abstract:**The role of dairy foods for hip fracture prevention remains controversial. In this study, among US men and women, a glass of milk per day was associated with an 8% lower risk of hip fracture. This contrasts with a reported increased risk with higher milk intake in Swedish women.**INTRODUCTION**The purpose of this study was to examine whether higher milk and dairy food consumption are associated with risk of hip fracture in older adults following a report of an increased risk for milk in Swedish women.**METHODS**In two US cohorts, 80,600 postmenopausal women and 43,306 men over 50 years of age were followed for up to 32 years. Cox proportional hazards models were used to calculate the relative risks (RR) of hip fracture per daily serving of milk (240 mL) and other dairy foods that were assessed every 4 years, controlling for other dietary intakes, BMI, height, smoking, activity, medications, and disease diagnoses.**RESULTS**Two thousand one hundred thirty-eight incident hip fractures were identified in women and 694 in men. Each serving of milk per day was associated with a significant 8% lower risk of hip fracture in men and women combined (RR = 0.92, 95% confidence interval (CI) 0.87 to 0.97). A suggestive inverse association was found for cheese in women only (RR = 0.91, CI 0.81 to 1.02). Yogurt consumption was low and not associated with risk. Total dairy food intake, of which milk contributed about half, was associated with a significant 6% lower risk of hip fracture per daily serving in men and women (RR = 0.94, CI 0.90 to 0.98). Calcium, vitamin D, and protein from non-dairy sources did not modify the association between milk and hip fracture, nor was it explained by contributions of these nutrients from milk.**CONCLUSIONS**In this group of older US adults, higher milk consumption was associated with a lower risk of hip fracture.

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