Geriatric Hip Fracture Management: A Threat to Independence

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Dr. Creamer is a graduate of the Chicago College of Osteopathic Medicine, Downers Grove, Illinois, and completed her family medicine residency at Florida Hospital in Orlando. She also recently completed a fellowship in geriatric medicine at Winter Park Memorial Hospital, Florida. Dr. Creamer has been practicing and teaching family medicine for more than 20 years. Following her passion for osteoporosis prevention, she leads a National Osteoporosis Foundation (NOF) support group called Central Florida Healthy Bones and has earned her NOF fracture liaison service certificate. She believes one of family medicine's critical challenges is to motivate patients to be as physically active as possible.

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Assistant Director, Sports and Family Medicine Faculty, Florida Hospital Family Medicine Residency, Winter Park, Florida.

Dr. Falk is a graduate of the University of Nebraska College of Medicine. He completed his family medicine residency at Offutt Air Force Base (AFB). He served as residency faculty and director of sports medicine at Offutt AFB/University of Nebraska where he was the 2012 Faculty of the Year. Dr. Falk specializes in advanced non-surgical care for musculoskeletal conditions, including evaluation, ultrasound, and injections, as well as medical care of the athlete, ranging from asthma to concussions. Additionally, he has interest in faculty development and teaching residents to teach. He has published numerous chapters, books, and articles on sports and family medicine topics, as well as serving as an expert lecturer from Florida to China.

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Learning Objectives

1. Confirm diagnosis of hip fracture in geriatric patients presenting with hip pain after a fall.
2. Address comorbidities and search for other injuries.
3. Coordinate referral to an orthopedic surgeon, emphasizing bleeding risk assessment, preoperative prophylaxis, and provide adequate analgesia.
4. Develop a long-term rehabilitation plan, emphasizing improved functional state, adherence to anti-osteoporosis treatment, and fall prevention.

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Audience Engagement System

Step 1 Step 2 Step 3

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Recommended Practice Changes

1. Confirm the diagnosis of hip fracture in geriatric patients with hip pain after fall. Plain radiography should be initial diagnostic test.
2. Coordinate referral to an orthopedic surgeon, emphasizing bleeding risk assessment, preoperative prophylaxis and adequate analgesia.
3. Develop a long-term rehabilitation plan emphasizing improved functional state, adherence to anti-osteoporosis treatment and fall prevention.

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Outline for the Session

- Hip fracture pre-surgical considerations
- Immediate post-operative management
- Secondary fracture prevention
- Care coordination and the Team Approach

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Hip Fracture: A Threat to Independence

- Hip fractures are an important cause of morbidity and mortality in older adults.
- 20% of women and 10% of men will experience a hip fracture in their lifetime.
- Average age of a person with a hip fracture is 80.
- 8 in 10 elderly women would rather die than break their hip and end up in a nursing home.

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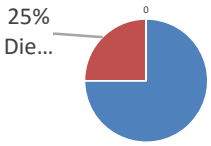
Hip Fracture a Threat to Independence
One year after a Hip Fracture



[1]*U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General. Bone Health and Osteoporosis: A Report of the Surgeon General. Washington, DC, 2004.*
[2]*Burge R, Dawson-Hughes DH, Wong JB, King A, Tosteson A. "Incidence and Economic Burden of Osteoporosis-Related Fractures in the United States, 2005-2025." JBMR 2007; 22 465-475.*

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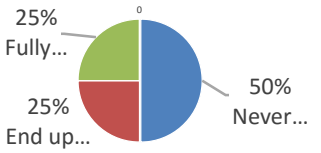
Hip Fracture a Threat to Independence
Of the 75% who survive 1st year…



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Case study - Presentation

- 75 year old female - lives independently at home
- History of rheumatoid arthritis, atrial fibrillation and urinary incontinence
- Found by her daughter lying on her back with severe left groin pain
- Gives history of falling about 8 hours prior while hurrying to the bathroom

- Medications:
  - warfarin 5 mg daily
  - metoprolol tartrate 25mg bid
  - tolterodine(Detrol) 2 mg bid
  - prednisone 5mg daily
  - omeprazole 20 mg daily

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Case study - Presentation

- Triage exam:
  - Vitals: BP 105/ 60, pulse 95, respirations 18, afebrile. Wt: 105 lbs
  - Alert and oriented to recent history
  - Left leg externally rotated and appears shorter than right
  - Pain with log roll (internal/ external rotation) of lower leg and thigh
  - Distal pulses and sensation are intact
  - Skin exam- erythema of sacral area, pressure area from lying supine for several hours

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Goal is rapid ED management

- Imaging
  - X-ray: Anteroposterior(AP) pelvis and lateral view of the left hip revealed left femoral neck fracture.
  - Avoid unnecessary advanced imaging. Magnetic Resonance Imaging indicated to confirm if x-ray negative. Also for occult stress fractures, and osteonecrosis of the femoral head.
  - CT scan may be considered if question pathologic fracture.
- Rehydrate with normal saline 100-200 ml/hr started, follow fluid status closely.

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Case study - ED management

- Early analgesia without excess sedation
  - Morphine 1-2 mg IV every 2 hours for severe pain
  - Oral oxycodone 5 mg po every 4 hours moderate pain
  - Acetaminophen 500 mg every 4 hours mild pain
  - Hydromorphone if renal or hepatic insufficiency
  - Peripheral (regional) nerve block if available
- ECG- atrial fibrillation, no acute changes

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Case study - Lab Results

- Labs :
  - Comprehensive metabolic panel
  - Complete blood count
  - PT(INR),PTT- on warfarin
  - 25-hydroxyl Vitamin D
  - Urinalysis if symptomatic
  - CPK - ordered to evaluate for rhabdomyolysis due to prolonged immobility
  - Nasal culture-MRSA

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AES Interactive Question

- Which of the following is true about timing for hip fracture surgery?
  - Surgery performed within the first 24-48 hours may increase risk for post-operative DVT
  - Surgery performed within the first 24-48 hours may increase the risk for post-operative skin breakdown
  - In a stable hypertensive senior with medically managed CAD who could walk a flight of stairs prior to falling, an EKG without acute changes (or stable from prior EKGs) may be used for surgical clearance without further cardiac work-up
  - Anesthesia choice alters neither DVT rates nor early mortality after hip fracture surgery

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Goal: Surgery within 24-48 hours for medically stable patients

- Earlier mobilization and rehabilitation
- Faster functional recovery
- Decreases risk for pneumonia, skin breakdown, DVT, UTI
- Reduced pain
- Shorter length of stay
- Stabilization of comorbidities may cause delay in surgery

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Optimize care for early fracture repair

- Arrange for quick admission to medical service
- Consult Orthopedic Surgeon
  - Surgery - most patients
  - Nonsurgical intervention considered for patients:
    - Severe debilitation or Non-ambulatory
    - End stage of terminal illness
    - Unstable with uncorrectable disease
- Interdisciplinary team for best outcome
  - Orthopedics, geriatrics or family medicine/internal medicine/hospitalist, anesthesia, nursing and therapists

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Case study: Admission History and Physical

- History - family member, medical records, or nursing home for:
  - Determine cause of fall:
    - stroke, syncope, or myocardial infarction
    - metastatic cancer predisposing to fracture
  - Document: Advance Directives and Health Care Surrogate
  - Comprehensive Geriatric Assessment
    - Reconcile medications - minimize those associated with delirium
    - Medical history
    - Preinjury level of activity and independence
    - Recognize dementia and delirium:
      - Mental status testing if not delirious and pain controlled
      - Confusion assessment method (CAM) to evaluate delirium

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CAM Evaluation

- **1. Acute onset and fluctuating course**
  - Is there evidence of an acute change in mental status from the patient's baseline?
  - Does the abnormal behavior fluctuate during the day—tending to come and go or increase and decrease in severity?
- **2. Inattention**
  - Does the patient have difficulty focusing or keeping track of what is being said?
- **3. Disorganized thinking**
  - Is the patient's thinking disorganized or incoherent?
- **4. Altered state of consciousness**
  - Does the patient appear to be alert?

Consider delirium if 1 & 2 + either 3 or 4

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Case study: Admission History and Physical

- Examine to exclude additional injuries (subdural, vertebral fracture)
- Address comorbidities
- Full skin exam to assess for pressure ulcers and prevent occurrence:
  - Low-pressure mattress
  - Urinary catheter - often placed to avoid pain in females and in males with voiding difficulties

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Pre-op Cardiovascular Management

- Cardiac evaluation
  - ECG - compare with prior - acute changes order serum troponins
  - **American Heart Association**: 4 major contraindications to surgery:
    - Acute coronary syndrome within 2 weeks of surgery
    - Decompensated heart failure
    - Uncontrolled arrhythmia
    - Severe valve disease
  - 4 or more METS proceed to planned surgery (climb a flight of stairs, heavy housework)
- B-blockers
  - Possibly beneficial - history of heart failure or acute coronary syndrome within 2 years

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Pre-op Management of Chronic Anticoagulation

- Warfarin - INR < 1.5 to proceed to surgery
  - INR >1.5 - correct coagulopathy
    - oral vitamin K (oral is preferred route) or
    - fresh frozen plasma - fastest reversal
  - Consider bridging therapy in patients with:
    - mechanical valve
    - atrial fibrillation CHADS2 score ≥ 4
    - venous thromboembolism in past 3 months
- Factor XA inhibitors - dabigatran (Pradaxa), rivaroxaban (Xarelto) and apixaban (Eliquis)
  - No reversal, wait 24-48 hours from last dose for surgery

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Pre-op Evaluation of Anemia

- Anemia and transfusions
  - Increased bleeding risk if 2 of the following:
    - Peritrochanteric fracture
    - Hgb < 12
    - Age > 75
  - Consider blood transfusion if Hbg < 8 g/dL

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Pre-op Pulmonary Evaluation

- Postoperative pulmonary complications occur 50% patients with chronic pulmonary disease
- Preoperative pulmonary evaluation (pulmonary function tests) does not predict respiratory complications.
- Consider steroids and bronchodilators (increase risk myocardial ischemia and arrhythmia)
- Chest x-ray

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Anesthesia

- General or Regional (spinal or epidural or peripheral) anesthesia
- Regional anesthesia associated with better outcomes, reduced risk of postoperative confusion, decreased risk of deep vein thrombosis, less intraoperative blood loss, and reduced early mortality.
  - Operative times were longer with regional anesthesia.
- Regional nerve blocks such as obturator or iliac fascial nerve help block postoperative pain.
  - Good postoperative pain control reduces delirium and improves ability to participate in rehabilitation.
- Determine if patient taking anticoagulants. Epidural and spinal hematomas are rare but devastating complications.
- Patients with dementia may require general anesthesia if they are not able to cooperate during surgery.

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Hip Fracture Classification

Category	Classification	Significance
Extracapsular Intertrochanteric Subtrochanteric	Large amounts of cancellous bone and good blood supply	Typically heals well Subtrochanteric has higher risk of impact device failure
Intracapsular Femoral Head Femoral Neck	Little cancellous bone and relatively poor blood supply	Higher incidence of avascular necrosis, nonunion, malunion, and degenerative changes

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Surgical Procedure

- Internal Fixation
  - Reduced morbidity
  - Decreased blood loss and deep wound infection
- Arthroplasty
  - Replaces the acetabulum and head of the femur
  - Hemiarthroplasty- replaces only the femoral head
  - Lower reoperation rates
  - Reduced risk of avascular necrosis and nonunion and allow earlier recovery

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Antibiotic Prophylaxis

- Prophylactic Antibiotics recommended one to two hours before surgery.
- Staphylococcus Aureus - major pathogen of concern
- Cefazolin, 1-2 g IV every 8 hrs, recommended within 1 hour or surgery
- If allergic to cefazolin, 1 g of IV vancomycin every 12 hours within 2 hours of surgery.
- Continue antibiotics for 24 hours

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Interactive Question – Answer Time!

- Which of the following is true about timing for hip fracture surgery?
  - Surgery performed within the first 24-48 hours may increase risk for post-operative DVT
  - Surgery performed within the first 24-48 hours may increase the risk for post-operative skin breakdown
  - In a stable hypertensive senior with medical managed CAD who could walk a flight of stairs prior to falling, an EKG without acute changes (or stable from prior EKGs) may be used for surgical clearance without further cardiac work-up
  - Anesthesia choice alters neither DVT or early mortality after hip fracture surgery

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AES Interactive Question

- All the following are true regarding post-operative management for hip fracture surgery except:
  - The rate of VTE is as high as 60% post-operatively
  - Starting low molecular weight heparin 12 hours prior to or 12 hours post-operatively from surgery is associated with less bleeding complications than starting within 4 hours of surgery
  - Delirium is a contraindication to using opioids for pain management post-operatively
  - Uncontrolled pain is a risk for delirium

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Thromboembolic Prophylaxis

- Rate of VTE after surgery reported up to 60%
- First step in prevention is early surgery and early mobilization
- Intermittent pneumatic compression devices recommended with anticoagulation until patient is ambulatory on regular basis (10-14 days)
- Graduated compression stockings - not recommended in patients able to tolerate anticoagulation.

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Thromboembolic Prophylaxis

- Thromboembolic prophylaxis is recommended:
  - Low-molecular weight heparin 12 hours or more preoperatively or postoperatively, rather than within 4 hours of surgery to reduce bleeding risk.
  - Warfarin - often used when patients were taking warfarin prior to fracture
  - Fondaparinux (Arixtra) – effective, but costly and irreversible
  - Factor Xa inhibitors – non-FDA approved indication, but commonly used
- Continue thromboembolic prophylaxis 28-35 days after surgery
- Aspirin may be used but is usually suboptimal for protection

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Reduce the High Risk for Delirium

- Patients with hip fractures are at high risk for delirium
  - Outcomes are often complicated by cognitive impairment
- Pain assessment and treatment in older hip fracture patients is inadequate
  - Uncontrolled pain is a risk factor for delirium
  - Ask patients about pain and provide adequate analgesia
- Opioid use to control pain may decrease delirium
- Delirium is not a contraindication to opioid use for pain control

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Reduce the High Risk for Delirium

- Mobilize as soon as possible with nursing as well physical therapy
- Get the Foley out!
- Orienting stimuli (clocks, calendars, radio)
- Provide eyeglasses, hearing aids and keep curtains open during the daytime
- Education of the family regarding importance of adequate socialization.
- Cognitive reconditioning through speech therapy and psychology
- Aim to provide social restraint (sitter) rather than use of pharmacologic or physical restraints.

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Postoperative Hip Fracture Care

- Indwelling urinary catheters should be removed within 24 hours of surgery
- Monitor and prevent constipation
- Take precautions to reduce risk of pressure ulcers including early mobilization and frequent repositioning if needed
- Nutrition- serum albumin < 3 g/dL associated with poor outcomes after hip fracture. Proper nutrition essential. Hand feed and supplement if needed.

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Postoperative Hip Fracture Care

- Provide Patient Education regarding the Universal Recommendations for Bone Health including:
- Nutrition
  - Adequate protein, fresh fruits and vegetables
  - Diet rich in calcium to meet recommended daily allowance (RDA). For patients over 70 years age, this is 1,200 mg calcium in divided doses. Supplement calcium only to meet the daily recommendations.
- Assure adequate Vitamin D - check 25-hydroxy vitamin D level
  - If < 20 ng/ml (50 nmol/L), replenish Vitamin D2 - 50,000 units weekly x 6-12 weeks; then Vitamin D3 2,000 units daily.
- Rehabilitation-physical and occupational therapy on inpatient rehabilitation unit, skilled nursing facility, home health, or outpatient therapy for muscle strengthening, posture, balance and fall prevention.

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Interactive Question – Answer Time!

- All the following are true regarding post-operative management for hip fracture surgery except:
  - The rate of VTE is as high as 60% post-operatively
  - Starting low molecular weight heparin 12 hours prior to or 12 hours post-operatively from surgery is associated with less bleeding complications than starting within 4 hours of surgery
  - Delirium is a contraindication to using opioids for pain management post-operatively
  - Uncontrolled pain is a risk for delirium

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AES Interactive Question

- A 70 year-old female sustained a hip fracture after a ground level fall. It was repaired via internal fixation 1 week ago. With regard to future fracture risk:
  - She is at no greater risk for future fracture than any other 70 year old female
  - Medications are her only evidence based option for preventing future fractures
  - It would be normal for her to receive neither BMD evaluation nor medication after her fracture
  - Osteoporosis medication should be started after the fracture has healed and she is cleared by orthopedics

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Prevent a Second Fracture

- Greatest Risk for Hip Fracture is a Previous Hip Fracture!
- Patients with hip fractures are at an increased risk for a second fracture.
- Secondary fracture prevention has been proven to decrease recurrent fracture rates, yet less than 30% of patients hospitalized with a hip fracture receive proper evaluation and care for osteoporosis.

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Prevent a Second Fracture: Performance Measure

- National Committee for Quality Assurance (NCQA) HEDIS measure: the number of women age 65-85 who suffered a fracture who had either BMD or a prescription for an anti-osteoporosis medication is less than 25%.
- Average cost of hospital episode of hip fracture is $42,000
- Current system leads to maximized charges
- Bundled care may provide better incentives to improve care and decrease cost

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Post Hip Fracture Care

- Screen for secondary causes of osteoporosis:
  - 25-hydroxy Vitamin D
  - Creatinine
  - Calcium and PTH
  - TSH
- Check bone density (DXA)
  - Reimbursed only as an outpatient

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Post Hip Fracture Care Osteoporosis Medications

- Hip fractures from falls from standing height (fragility fractures) are the manifestation of osteoporosis, yet the majority of hip fracture patients are not prescribed anti-osteoporosis medications.
- Bisphosphonates (BP) are considered first line medications and have been shown to reduce the risk of a second fracture.
- Following a hip fracture, patients should usually be treated with a BP regardless of their bone density DXA T-score.
- Screen for contraindications to BP therapy
  - Tolerate oral regime, evaluate for GI disease
  - CrCl >30 for oral BP (alendronate, risedronate) and > 35 for zoledronic acid
    - denosumab (Prolia) with caution if CrCl < 30
      - Supplement Calcium and watch for hypocalcemia
  - Risk of BP may increase after 5 years of use.

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Fracture Prevention – Beyond Medications

- 90% of fractures are due to a fall
- Formal Fall Prevention assessment
- Medications- polypharmacy
- Environmental hazards
- Physical therapy for fall prevention assessment and home exercise and balance program.

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Fall Prevention Strategies and Resources

- Screening Tests
  - Timed Up and Go (TUG) Test
  - 30-second Chair Stand Test
  - 4-stage Balance Test
- CDC - Stopping Elderly Accidents, Deaths & Injuries (STEADI)
- CDC – A CDC Compendium of Effective Fall Interventions: What Works for Community-Dwelling Older Adults

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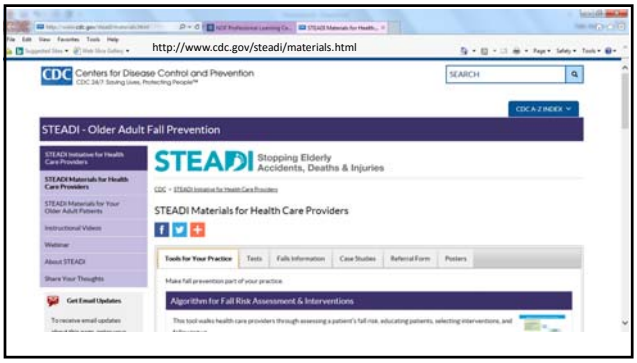
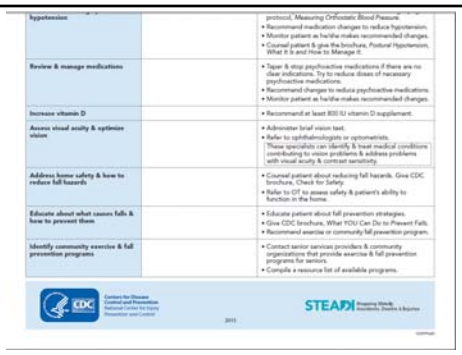


http://www.cdc.gov/steadi/materials.html

Assessments and/or Interventions	Identify who in your practice can do this	What it involves
Screen all older patients for falls		• Have each patient complete the Stay Independent brochure—help if necessary.
Identify modifiable fall risk factors		• Review Stay Independent brochure & take a falls history.
Evaluate gait, lower body strength & balance Address identified deficits		• Administer one or more gait, strength & balance tests: o Timed Up & Go Test (Recommended) (Observe & record patient's postural stability, gait, stride length & sway.) o 30-Second Chair Stand Test (Optional) o 4-Stage Balance Test (Optional) • As needed, refer to physical therapist or recommend community exercise or fall prevention program. (PTs can assess gait & balance, provide one-on-one progressive gait & balance retraining, strengthening exercises, & recommend & teach correct use of assistive devices.)
Conduct focused physical exam Address modifiable and/or treatable risk factors		In addition to a customary medical exam: • Assess muscle tone, look for increased tone, hypertonia (cogwheeling). • Screen for cognitive impairment & depression. • Examine feet & evaluate footwear. Look for structural abnormalities, deficits in sensation & proprioception. • If needed, refer to podiatrists or pedorthists. (These specialists can identify & treat foot problems & can prescribe corrective footwear & orthotics.)
Assess for & manage postural hypotension		• Check supine & standing blood pressure using 1-page protocol, Measuring Orthostatic Blood Pressure. • Recommend medication changes to reduce hypotension. • Monitor patient as he/she makes recommended changes. • Counsel patient & give the brochure, Postural Hypotension, What It Is and How to Manage It.
Review & manage medications		• Taper & stop psychoactive medications if there are no clear indications. Try to reduce doses of necessary psychoactive medications. • Recommend changes to reduce psychoactive medications. • Monitor patient as he/she makes recommended changes.



hypotension		protocol, Measuring Orthostatic Blood Pressure. • Recommend medication changes to reduce hypotension. • Monitor patient as he/she makes recommended changes. • Counsel patient & give the brochure, Postural Hypotension, What It Is and How to Manage It.
Review & manage medications		• Taper & stop psychoactive medications if there are no clear indications. Try to reduce doses of necessary psychoactive medications. • Recommend changes to reduce psychoactive medications. • Monitor patient as he/she makes recommended changes.
Increase vitamin D		• Recommend at least 800 IU vitamin D supplement.
Assess visual acuity & optimize vision		• Administer brief vision test. • Refer to ophthalmologists or optometrists. (These specialists can identify & treat medical conditions contributing to vision problems & address problems with visual acuity & contrast sensitivity.)
Address home safety & how to reduce fall hazards		• Counsel patient about reducing fall hazards. Give CDC brochure, Check for Safety. • Refer to OT to assess safety & patient's ability to function in the home.
Educate about what causes falls & how to prevent them		• Educate patient about fall prevention strategies. • Give CDC brochure, What YOU Can Do to Prevent Falls. • Recommend exercise or community fall prevention program.
Identify community exercise & fall prevention programs		• Contact senior services providers & community organizations that provide exercise & fall prevention programs for seniors. • Compile a resource list of available programs.

Available Options if Positive Screening

- Formal PT referral (home vs outpatient)
- Home exercises

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Otago Exercise Program

- 17 strength and balance exercises
- Developed in New Zealand - Accident Compensation Corporation
- 35-40% reduction in falls in frail elderly over 6-12 month period
- Improvement may start in as little as 8 weeks
- Promoted by:
  - Centers for Disease Control
  - Patient Centered Outcomes Research Project
  - Administration for Community Living

Shubert, TE; Smith, ML; Jiang, L; Ory, M. **Perceived and Actual Physical Performance Improvements from an In-Home Evidence-Based Fall Prevention Program for Older Adults** in Press for The Gerontologist

Otago Exercise Program
3 Main Components

- Strengthening
  - 5 muscle strengthening exercises
  - 2 sets of each exercise
  - 3 times each week
- Balance Retraining
  - 12 balance retraining exercises
  - 1 set each – progress from supported to unsupported
  - 3 times each week
- Walking
  - Advice and assistance
  - 2 times each week

http://www.hfwcny.org/Tools/BroadCaster/Upload/Project13/Docs/Otago_Exercise_Programme.pdf

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Interactive Question – Answer Time!

- A 70 year-old female sustained a hip fracture after a ground level fall. It was repaired via internal fixation 1 week ago. With regard to future fracture risk:
  - She is at no greater risk for future fracture than any other 70 year old female
  - Medications are her only evidence based option for preventing future fractures
  - It would be normal for her to receive neither BMD evaluation nor medication after her fracture
  - Bisphosphonate medication should be started after the fracture has healed and she is cleared by orthopedics

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Post Hip Fracture Care Coordination

- Add a care-coordinator, such as a medical assistant, to serve as an education specialist and to follow up with patients who have fractured.
  - Utilizing Chronic Care Management (CPT 99490)
- Schedule physician office visits specifically for post-fracture care to address osteoporosis and falls prevention.
- Streamline the referral process and communication between the orthopedic surgeon and family physician for patients who have suffered a fracture.
- Develop templates with check lists for :
  - Post-fracture care appointments
  - Osteoporosis and Falls Prevention appointment

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Development of a Fragility Fracture Practices for Secondary Prevention

- Multidisciplinary team for secondary fracture prevention
  - Physician Champion (Family Physician, Orthopedist, et al.)
- Resources:
  - National Bone Health Alliance (NBHA) - Fracture Liaison Service (FLS)
  - International Geriatric Fracture Society
  - American Orthopedic Association - "Own the Bone"

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Post Hip Fracture Care Coordination

- Provide patient education resources including written and online material available from the AAFP, CDC and National Osteoporosis Foundation (NOF) on Osteoporosis and Fall Prevention.
- Develop a NOF Support Group. Invite healthcare providers from the community to speak on bone health and fall prevention. Presenters could include: family physicians, physical therapists, endocrinologists, orthopedic surgeons, radiologists.
  - Develop group patient visits to cover the broad amount of patient education on osteoporosis?
  - Bill for this?

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Session Wrap-up

- Hip fracture pre-surgical considerations
- Immediate post-operative management
- Secondary fracture prevention
- Care coordination and the Team Approach

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Questions?

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- http://www.hfwcny.org/Tools/BroadCaster/Upload/Project13/Docs/Otago_Exercise_Programme.pdf
- CDC.gov

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Billing & Coding

When services performed in conjunction with:

Office Visit 992xx *

*Time-based selection documentation criteria:

- Face-to-face time
- greater than 50% spent counseling/coordinating care

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Associated Session

- Geriatric Hip Fracture Management: PBL

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Interested in More CME on this topic?

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