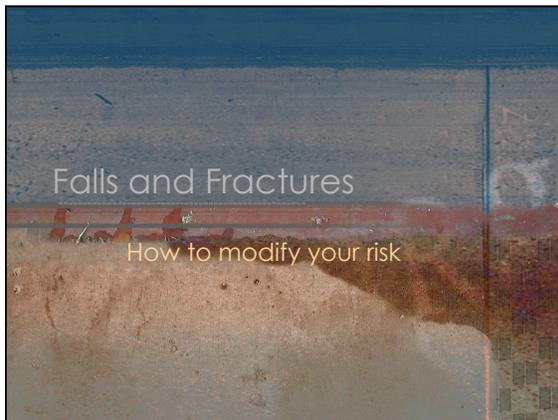


# Falls and Fractures



## How Serious is the Problem ?

- 90% of the 300,000 hip fractures in the US each year are the result of a fall
- 10% hip fractures occur spontaneously due to low bone density or osteoporosis
- Women 2-3 times more hip fx than Men
- Post Menopausal Women – 1 in 7 chance
- Hip fx rate increases at age 50, doubling every 5-6 years
- More than one-third of adults >65 years fall each year
- Nearly one-half of women who reach 90 will have suffered a hip fracture

## Outcomes linked to falls

- Leading cause of injury deaths
- Most common cause of non-fatal injuries and hospital admissions for trauma
- More than 60% of people who die from falls are 75 and older
- After a fall 20-30% suffer moderate to severe injuries such as hip fracture or head trauma that reduce mobility
- Each year 300,000 Americans suffer fractured hips.
- National Safety Council reported in 2005 there were 37,000 unintentional injury deaths in the home, 17,000 from falls.

Source: Murphy SL. Deaths: Final data for 1998. National Vital Statistics Reports, vol. 48, no. 11. Hyattsville (MD): National Center for Health Statistics; 2000.

## Outcomes linked to falls

- Only 25% of hip fracture patients will make a full recovery
- 40% will require nursing home care
- 50% will need a cane or walker
- 24% of those over age 50 will die within 12 months.
- Each year women suffer more osteoporosis-related fractures than strokes, heart attacks and breast cancer combined.

Source: Sterling DA, O'Connor JA, Bonadies J. Geriatric falls: injury severity is high and disproportionate to mechanism. Journal of Trauma-Injury Infection and Critical Care 2001;50(1):116-9.

## What Happened After A Fall?

| Category                       | Count      | Percentage |
|--------------------------------|------------|------------|
| Fall-related injuries          | 7 Millions | -          |
| Treated in ED and released     | 1,230,000  | 76%        |
| Treated in ED and hospitalized | 388,000    | 24%        |
| Died                           | 12,800     | 1%         |

**Fatal and nonfatal fall injuries among people 65+**

1.6 million

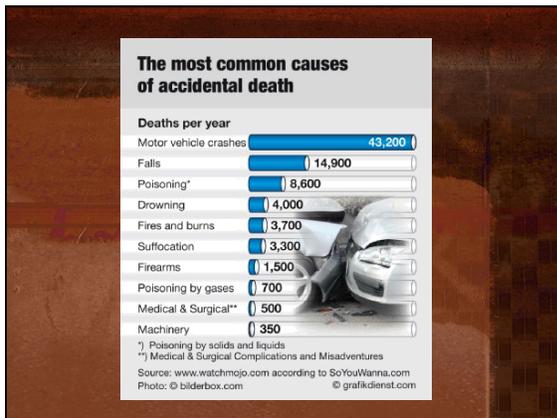
Source: <http://www.learnnotofall.com/content/fall-facts/how-often.jsp>

## Outcomes linked to falls

- Falls are the leading cause of traumatic brain injuries
- Among older adults the majority of fractures are caused by falls
- 5% of older adult falls cause fractures
- Most common fractures are of the vertebrae, hip, forearm, leg, ankle, pelvis, upper arm and hand

Source: Jager TE, Weiss HB, Coben JH, Peppé PE. Traumatic brain injuries evaluated in U.S. emergency departments, 1992-1994. Academic Emergency Medicine 2000;7(2):134-40.

# Falls and Fractures



## Fall Frequency and Consequence in New York State (>65 years)

- Average of 132 people *daily* suffer a fall serious enough to require hospitalization
- One in six falls result in a serious injury such as head injury, soft tissue damage or fracture
- 2.4 deaths *per day* can be attributed to falls.

## Falls Risk Assessment

### Morse Fall Scale

1. History of falling – immediate history of physiological falls (i.e., from seizures, impaired gait)
2. Secondary diagnosis – if more than one diagnosis is listed on patient chart
3. Ambulatory aid – walker, cane, or if clutches for support
4. Intravenous therapy
5. Gait – weak or impaired
6. Mental status – overestimates / forgets limitations

Sources: Morse JM, Morse RM, Tytko SJ. Development of a scale to identify the fall-prone patient. Canadian Journal on Aging. 8 (4): 366-367, 1989.

## Common causes of falls in the elderly

- Accident, environmental hazard, fall from bed
- Gait disturbance, balance disorders or weakness,
- pain related to arthritis
- Vertigo
- Medications or alcohol
- Acute illness
- Confusion and cognitive impairment
- Postural hypotension
- Visual disorder
- Central nervous system disorder, syncope, drop attacks, epilepsy

Adapted from Rubenstein LZ, Falls. In: Yoshikawa TT, Cobbs EL, Brummel-Smith K, eds. Ambulatory geriatric care. St. Louis: Mosby, 1993: 295-304.

## Common presentations for elderly falls on the same level

- Mechanical fall while attempting to reach commode.
- Trip and fall on carpet.
- Mechanical fall after standing up.
- Walking in house, lost balance, fell, striking head.
- Slipped while in bathroom.
- Mechanical fall in the shower.
- Backwards fall from walker.
- Mechanical fall while dressing, striking head.

## Common presentations for elderly falls one level to another

- Fall while transferring from wheelchair to chair.
- Mechanical fall while attempting to sit on chair.
- Rolled out of bed to floor while getting up.
- Fall while attempting to get out of bed to walker.
- Fall to floor while sitting on commode that slipped out from under.
- Became dizzy, stood up and became more dizzy, falling to the ground and striking head.
- Stumbled and tripped on low curb and fell to ground.
- Missed bottom stair step and fell.
- Standing on a stepstool and fell.

# Falls and Fractures

## I HATE FALLING

- I** Inflammation of joints (or joint deformity)
- H** Hypotension (orthostatic blood pressure changes)
- A** Auditory and visual abnormalities
- T** Tremor (Parkinson's disease or other causes of tremor)
- E** Equilibrium (balance) problem

### F Foot problems

- A** Arrhythmia, heart block or valvular disease
- L** Leg-length discrepancy
- L** Lack of conditioning (generalized weakness)
- I** Illness
- N** Nutrition (poor; weight loss)
- G** Gait disturbance

Adapted from Sloan JP. Mobility failure. In: Protocols in primary care geriatrics. New York: Springer; 1997:33-8.

## Risk Factors

- Lower body weakness
- Older age (especially  $\geq 75$  years)
- Housebound status
- Problems with walking and balance
- Taking four or more medications
- Taking psychoactive medications
- Poor nutrition
- Reduced vision
- Foot problems
- History of stroke and arthritis
- Dementia and cognitive impairment
- Living alone

## Modify Risk Factors

- Increasing lower body strength and improving balance through regular physical activity
- Seniors who are mobile and walk regularly keep joints and muscles limber reduce their risk of falling.
- Wear supportive, low-heeled shoes, even at home. Avoid walking around barefoot, in socks, stockings, or floppy, backless slippers
- Seniors who are sedentary and allow their muscles to atrophy are highly at risk for falling
- Arrange with a family member or friend for daily contact. Try to have at least one person who knows where you are

## Modify Risk Factors

- Proper nutrition can help reduce the risk of falling
- Seniors who are undernourished are often unsteady on their feet and can even feel dizzy when they stand up
- Inadequate nutrition can also lead to a number of other health failures and diseases that further destabilizes the body
- Proper diet and exercise can significantly improve strength and endurance which mitigates fall risk

## Modify Risk Factors

- Medicines affect gait and balance for most adults. Limiting the number of different medicines that one is taking can help to stabilize and reduce fall risk.
- Asking the doctor or pharmacist to review all their medicines (both prescription and over-the-counter) to reduce side effects and interactions.
- **Get regular check-ups!!**
- It may be possible to reduce the number of medications used, particularly tranquilizers, sleeping pills, and anti-anxiety drugs.
- Talk with your doctor about having a bone mineral density (BMD) test. The most widely recognized bone mineral density test is called a dual-energy x-ray absorptiometry or DXA test. It is painless: a bit like having an x ray, but with much less exposure to radiation. It can measure bone density at your hip and spine.

## Bone Mineral Density Test (BMD)

- Requires a prescription from the physician
- Dual-energy X-ray Absorptiometry
  - Mainly scan hip and spine
  - Painless and noninvasive
  - Very safe low dose
  - Determines mineral content in bone

# Falls and Fractures

## Modify Risk Factors

- Studies have shown that some other important fall risk factors are Parkinson's Disease, history of stroke, arthritis, dementia and cognitive impairment and visual impairments.
- To reduce these risks, seniors should see a health care provider regularly for chronic conditions and have an eye doctor check their vision at least once a year.
- Seniors with dementia tend to be less careful ambulating than their non-demented counterparts who are constantly aware of and fear the consequences of a fall.

## Modify Risk Factors

- Calcium supplementation and estrogen are effective in preserving bone density in postmenopausal women.
- In a randomized trial in healthy postmenopausal women, calcium supplementation slowed bone loss and significantly reduced symptomatic fractures.
- Numerous studies suggest that risk of fracture can be reduced 25-50% by estrogen replacement therapy as well.
- All women should also receive counseling regarding universal preventive measures related to fracture risk, such as dietary calcium and vitamin D intake, weight-bearing exercise, and smoking cessation from their physician.

## Home Safety Checklist

### All living spaces

- Remove throw rugs.
- Secure carpet edges.
- Remove low furniture and objects on the floor.
- Reduce clutter.
- Remove cords and wires on the floor.
- Check lighting for adequate illumination at night (especially in the pathway to the bathroom).
- Secure carpet or treads on stairs.
- Install handrails on staircases.
- Eliminate chairs that are too low to sit in and get out of easily.
- Avoid floor wax (or use nonskid wax).
- Ensure that the telephone can be reached from the floor.

## Home Safety Checklist

### Bathrooms

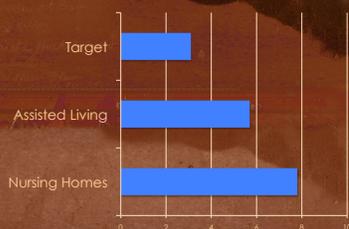
- Install grab bars in the bathtub or shower and by the toilet.
- Use rubber mats in the bathtub or shower.
- Take up floor mats when the bathtub or shower is not in use.
- Install a raised toilet seat.

### Outdoors

- Repair cracked sidewalks.
- Install handrails on stairs and steps.
- Trim shrubbery along the pathway to the home.
- Install adequate lighting by doorways and along walkways leading to doors.

Adapted from Rubenstein LZ, Falls. In: Yoshikawa TT, Cobbs EL, Brummel-Smith K, eds. Ambulatory geriatric care. St. Louis: Mosby, 1993:296-304.

## Falls Per 1,000 patient days



Source: Rubenstein LZ, Robbins AS, Josephson KR, Schulman BL, Osterweil D. The value of assessing falls in an elderly population. A randomized clinical trial. Annals of Internal Medicine 1990;113(4):308-16.

## Falls Intervention Assisted Living

### Organizational philosophy

- Supports family/resident's rights to risk taking, autonomy and self determination
- Resident's perspective, individual desires and needs are central to the safe application of these guidelines
- Family/Resident is an active participant around decisions regarding his/her care and in relation to these guidelines

# Falls and Fractures

## Falls Intervention Assisted Living

### Environmental - Bathrooms

- Grab bars near tubs and showers
- Showers and tubs equipped with seats
- Access ramps to shower stalls
- Large bathrooms accommodate caregiver and resident together
- Handicap raised toilets
- Padded floor mats with rubber base
- Handicap accessible sink with lever activated faucet
- Non-slip flooring
- Excellent lighting, motion detection light switches in resident bathrooms

## Falls Intervention Assisted Living

### Environmental – Common Areas

- Handrails in stairwells
- Secure low-pile padded carpeting, carpeted stairs
- "Stop" signs at staircases
- Color schemes for visually impaired
- Excellent lighting
- High profile sofas for safer access
- Recliners for safer positioning
- Correct height chairs to facilitate wheelchair transfer
- Dining tables at 31" to accommodate wheelchairs and provide additional support
- Absence of electrical cords, and low furniture which can pose tripping hazards

## Falls Intervention Assisted Living

### Operational - Medical

- Quarterly evaluation by physician of health status
- Medication review for polypharmacy and psychotropic drug regimes
- Track usage of sedatives, hypnotic, and antihypertensive drugs and other medications which can effect gait and balance
- Evaluate necessity of benzodiazepine/antipsychotic drugs – alprazolam (Xanax), bromazepam (Lexotanil), diazepam (Valium), lorazepam (Ativan), temazepam (Restoril), triazolam (Halcion)
- Exploration of alternatives to psychotropic medications for sedation

## Falls Intervention Assisted Living

### Operational – Medical (cont.)

- Monthly tracking by RN Clinical Director
- Regular Podiatrist visit to monitor foot health
- Physical therapy consultation if physician ordered
- Training available by physical therapist to safely use appropriate assistive device

## Falls Intervention Assisted Living

### Operational - Programmatic

- Morning stretches and exercise for strength training
- Sitercise program for wheel chair residents
- Walking twice daily or weight bearing exercises
- Music therapy and dancing to build strength and balance
- Art projects to sharpen motor skills and eye/hand coordination
- Games designed to sharpen hand/eye coordination, motor skills and keep muscles and joints limber

## Falls Intervention Assisted Living

### Operational – Provision of care

- Falls risk assessment upon admission and then quarterly
- Transfer assistance provided
- Every two hours during the day toileting schedule
- ½ hourly rounds throughout the night (7:00 pm – 7:00 am)
- Tabs personal alarms available for bed use
- Bedrails for safety
- Mattress on the floor
- Hip protectors available for high risk residents

# Falls and Fractures

## Protective Devices

- Most hip fractures occur as a result of falling sideways and not from compression.
- Hip fractures can be greatly reduced using hip protectors.



## Falls Intervention Assisted Living

### Operational – Provision of care (cont.)

- *Nutritional program designed by dietician to address nutritional needs of dementia population to keep them strong and healthy*
- *Weekly weights taken to alert for unexpected weight loss*
- *Select foods high in Calcium to address osteoporosis prevention in meal planning*
- *Promote exposure to sunshine to combat Vitamin D deficiency*
- *Orienting residents to the home, restrooms, their bed area and how to summon help if they need it*

## Therapeutic Options for Preventing and Treating Osteoporosis

- **Calcium supplementation (1,000 to 1,500 mg per day)**
- **Vitamin D supplementation (400 to 800 IU per day)**
- Bisphosphonates (e.g., alendronate [Fosamax], risedronate [Actonel])
- Selective estrogen receptor modulators (e.g., raloxifene [Evista])
- Calcitonin
- Regular physical activity (e.g., weight-bearing and muscle-strengthening exercises)
- Reduction of modifiable risk factors (e.g., smoking cessation, alcohol avoidance)
- Fall prevention (e.g., use of assistive devices, home safety practices, physical therapy for gait stabilization)
- Anabolic steroids, pulsatile growth hormone, or parathyroid hormone therapy (experimental)

## Improve your Balance

### Practice Balance Exercises Every Day

- While holding the back of a chair, sink, or countertop, practice standing on one leg at a time for a minute. Gradually increase the time. Try balancing with your eyes closed. Try balancing without holding on.
- While holding the back of a chair, sink, or countertop, practice standing on your toes, then rock back to balance on your heels. Hold each position for a count of 10.
- While holding the back of chair, sink, or countertop with both hands, make a big circle to the left with hips, repeat to the right. Do not move your shoulders or feet. Repeat 5 times.

## Osteoporosis: Bones of Contention

- Systemic skeletal disorder characterized by decreased bone mass and deterioration of bony microarchitecture
- Results from a combination of genetic and environmental factors that affect both peak bone mass and the rate of bone loss
- Factors include: medications, diet, race, sex, lifestyle, and physical activity

## Boning up on Osteoporosis

- A skeletal disorder characterized by compromised bone strength predisposing a person to an increased risk of fracture.



# Falls and Fractures

## World Health Organization risk factors for osteoporosis

- Age
- Previous fracture
- Family history of fracture
- Smoking
- Excessive alcohol intake
- Low body weight
- Steroid use
- Low bone mass
- Estrogen deficiency
- Poor intakes of calcium and vitamin D

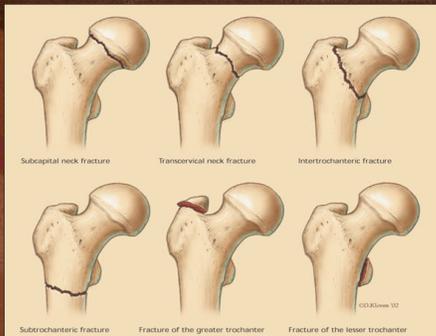
## Diagnosis

The doctor will x-ray the hip to determine exactly where the bone is broken and how far out of place the pieces have moved.

- Most hip fractures are one of two types:
  - Femoral neck fractures are 1-2 inches from the joint
  - Intertrochanteric fractures are 3-4 inches from the joint



## Types of Hip Fractures



## Treatment

- Modern treatment for hip fractures aims to get you back on your feet again as soon as possible.
- The doctor will reposition the fracture and hold it in place with an internal device.
- Femoral neck fractures are usually stabilized with surgical screws or pins. These are used if you are younger, or if your broken bone has not moved much out of place.
- If you are older and less active, you may need a high strength metal device that fits into your hip socket, replacing the head of your femur (hemiarthroplasty).
- For Intertrochanteric fractures a metallic device (compression screw and side plate) holds the broken bone in place while it allows the head of the femur to move normally in the hip socket.

## Recovery

- Recovery depends largely on the extent of the injury and the overall health and fitness of the patient.
- Some patients respond readily to physical therapy and rehabilitation, especially those with positive attitudes and cognitive awareness.
- Others who are less cooperative are more at risk for a prolonged recovery, or further decline.
- Ample research has demonstrated the mind's ability to influence our health and recovery.

## Recovery

- People who suffer a hip fracture often experience a sense of helplessness and despair which can lead to depression.
- Helping victims through their rehabilitation and recovery through positive reinforcement can often dramatically influence the results.
- Returning them to their home unsupervised could prolong the recovery process and subject them to re-injury.
- Consider supportive environment where trained staff can assist with therapy and recovery.

## Falls and Fractures

### Vitamin D and Calcium

- Studies in elderly patients have found that supplementation with calcium and vitamin D, resulted in fracture reductions (22-50%)
- Doses of Vitamin D greater than 800 IU per day are needed for benefit.

### Resources

**For additional information on osteoporosis**, visit the National Institutes of Health Osteoporosis and Related Bone Diseases ~ National Resource Center Web site at [www.niams.nih.gov/bone](http://www.niams.nih.gov/bone) or call 1-800-624-2663.

**For additional information on fall prevention**, visit the National Institute on Aging Web site at [www.nia.nih.gov/engadepages/falls.asp](http://www.nia.nih.gov/engadepages/falls.asp) or call 1-800-242-2663.

#### **For Your Information**

For updates and for any questions about any medications you are taking, please contact the U.S. Food and Drug Administration at 1-888-INFO-FDA (1-888-463-6332, a toll-free call) or visit their Web site at [www.fda.gov](http://www.fda.gov).

