Crash, Snap: Falls Cause “Osteoporosis-related” Fractures. What Can a Clinician Do?
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Neil Binkley, M.D.
University of Wisconsin School of Medicine and Public Health
Madison, WI, USA

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Amgen
Radius
• Some of this talk is my opinion
• This is indicated by orange text

Falls and Common Sense
Walking is “controlled falling”

People are top-heavy

Our default position is on the ground

Definition and Prevalence
“Fall” defined as an event which results in a person coming to rest inadvertently on the ground or floor or other lower level.
Falls are very common in older adults; incidence annually in those age and older:
30-40% of community-dwelling
50% of those in LTC facilities
60% in those with fall in previous year
Falls risk increases with advancing age
Most falls are not associated with syncope

WHO.int/mediacentre/factsheets/fs344/en/
Why Are We Talking About Falls in an Osteoporosis Session??

Why Are We Treating “Osteoporosis?”

Fracture is What’s Important

Falls Cause “Osteoporosis-related” Fracture

Reports vary, but some find that 10-15% of falls result in fracture or other serious injury

~95% of hip fractures are from falls

Usually from falling sideways

Preventing falls prevents fracture.....

Fracture Incidence and Morbidity

N

ational Electronic Injury Surveillance System All Injury Program

Generated national estimates of ED visits for fall related fracture in adults age 65+; 2001-2008

Estimated 4.05 million fall-related fracture during the 8 yrs

Fracture rate increased ~24% during study period

48% required hospitalization

Fracture rates increased with age; 2X higher in women

Orces CH. BMJ Open 2013;3 e001772
Risk Factors for Falls
Mean relative risk or odds ratios from 16 studies

- Muscle weakness 4.4
- History of falls 3.0
- Balance deficit 2.9
- Gait deficit 2.9
- Assist device 2.6
- Visual deficit 2.5
- Arthritis 2.4
- Impaired ADL 2.3
- Depression 2.2
- Cognitive impairment 1.8
- Age > 80 years 1.7

Rubenstein & Josephsen, Clin Ger Med

Impaired Physical Performance Increases Hip Fracture Risk
Evaluated the association of physical performance and hip fracture risk in MrOS; 5995 men age 65+

“Poor physical function is independently associated with an increased risk of hip fracture in older men.”
Adapted from Cawthon, et. al., J Bone Miner Res, 2008, 23:1037-1044

Sarcopenia: the Age-related Gradual Loss of Muscle mass, Strength and Function
Sarc for flesh (muscle), penia for deficiency

Term coined in 1989; more recently defined as: “The age-associated loss of skeletal muscle mass and function…. a complex syndrome associated with muscle mass loss alone or in conjunction with increased fat mass.”

Fielding, et. al, J Am Med Dir Assoc 2011; 12: 249-256

Osteoporosis Pathogenesis is Multifactorial
Hormonal declines
- GH/IGF-1, testosterone, estrogen
- Increased inflammation
- IL-6, TNF-alpha, etc, etc.
- Malnutrition
- Protein, vitamin D
- Sedentariness/Diseases leading to decreased use
- Toxin exposure
- Neuronal loss
- Reduced bone “quality” expressed ultimately as reduced function
- Changes in structure, fat and connective tissue

We Need to Get Past Treating “Osteoporosis” and Treat People
Fractures result from a syndrome: treatment should be directed at various conditions to reduce fracture risk.

**Dysmobility Syndrome**
- Osteoporosis
- Sarcopenia
- Diabetes
- Obesity
- Etc, etc

**Falls & Fractures**
- Reduced QOL
- Healthcare Cost
- Death
- Family History
- Toxins, e.g., tobacco

**Advancing age**

This Paradigm is Identical to Metabolic Syndrome

**Metabolic Syndrome**
- Hyperlipidemia
- Hypertension
- Diabetes
- Obesity
- Heart Attack
- Reduced QOL
- Healthcare Cost
- Death
- Family History
- Toxins, e.g., tobacco

**Advancing age**

Treating Osteoporosis Without Considering Other Parts of the Syndrome Causing Fractures is Comparable to Treating Hyperlipidemia and Ignoring Hypertension and Diabetes in Patients With Metabolic Syndrome

Personal opinion

It’s My Bias That “We” Haven’t Done a Good Job in Conveying Information That “Fractures Are Bad”
Fractures Reduce Quantity and Quality of Life

What do you fear most?
Loss of independence: 26%
Moving out of home into nursing home: 13%
Giving up driving: 11%
Loss of family/friends: 11%
Death: 3%

Maintaining Independence is THE Reason to Treat The Fracture Risk Syndrome

So, What Can a Clinician Do to Reduce Falls Risk?
Appreciate the Age-related Changes That Increase Falls Risk

Visual system: acuity, depth perception, contrast sensitivity, dark adaptation

Proprioceptive system: lower extremities

Vestibular system: loss of labyrinthine hair cells, vestibular ganglion cells, nerve fibers

Recognize Conditions That Increase Falls Risk

Risk Factors for Recurrent Falls

- Age
- Female
- History of falls
- Fear of falling
- Impaired mobility
- Sedentariness
- Arthritis/OA
- Parkinson’s disease
- Vision impairment
- Postural hypotension
- Depression
- Urinary incontinence
- Stroke
- CV disease
- Chronic pain
- Drug use


A Couple of Concrete Examples of Chronic Conditions That Increase Falls and Fracture Risk

- Parkinson’s disease
  - Rigidity of lower extremity musculature
  - Slow movement initiation to correct body sway
  - Hypotensive drug effects
  - Cognitive impairment
- Osteoarthritis, especially in knees
  - Can affect mobility
  - Inability to step over objects
  - Avoid complete weight bearing on joint

Review (and Reduce) the Medications

Common fall risk factor; potentially easily modifiable

Certain classes associated with hip fracture

- Benzodiazepines
- Antidepressants (including SSRIs)
- Antipsychotic drugs

Increased risk of fall…

- With recent change in dose
- With increasing total number of prescriptions
The exact number of falls caused by drugs or drug intoxication is not known because falls are not officially recognized as an ADR.

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Odds ratio for falls</th>
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<tbody>
<tr>
<td>Antidepressants</td>
<td>1.68</td>
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<tr>
<td>Neuroleptics/antipsychotics</td>
<td>1.59</td>
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<tr>
<td>Benzodiazepines</td>
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<tr>
<td>Sedative/hypnotics</td>
<td>1.47</td>
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<tr>
<td>Antihypertensives</td>
<td>1.24</td>
</tr>
<tr>
<td>NSAIDs</td>
<td>1.21</td>
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</tbody>
</table>


Post Hospitalization is a High-risk Time

After hospital discharge, falls rates are increased compared to community dwelling older adults. 40+% fall within 6 months; over half are injurious falls.
Hospitalization doubles the risk of hip fracture, notably in the month after discharge.
~ one-third experience ADL functional decline compared to their preadmission level of activities of daily living.

1Mahoney, et al., Arch Intern Med 2000;160:2788–95

Sarcopenia Medications Might Ideally be Used After Illnesses/Events to Get Back to Baseline

Diagnostic Approach: History

The most important question is:

When was the last time you fell down?

Among ~2800 older adults that reported fall within the last year:
50% of women and 60% of men did not talk with a healthcare provider about falls.
Falls prevention was discussed with a healthcare provider by 31% of women and 24% of men.

Diagnostic Approach: History

- Circumstances at time of fall
  - Activity
  - Prodromal symptoms
  - Time of fall
  - Medication use
  - Environmental factors (lighting, floor furniture, etc.)
- Loss of consciousness?
  - Increase index of suspicion for orthostatic hypotension, CV event or neurologic etiology

Diagnostic Approach: Physical Exam

- Focus on risk factors
- Assess for gait disturbance, postural stability
- Integrated musculoskeletal assessment most important
  - TUG
  - Romberg
  - Clinic walk

Laboratory and Diagnostic Tests

- No specific lab evaluation; tailor to problems and risks
- Vitamin deficiencies; B1, B6, B12 and D
- Holter, spine radiographs, MRI, echocardiography only if indicted by exam or history
- Imaging studies if lumbar stenosis or cervical spondylosis suspected or hyperreflexia or spasticity on PE

Summary of the Updated American Geriatrics Society/British Geriatrics Society Clinical Practice Guideline for Prevention of Falls in Older Persons

- Modify home environment (multifactorial)
  - Done by healthcare professional
  - Effective for fallers with visual impairment
- Minimize/taper medications; including OTC
  - Sedatives, anxiolytics, antidepressants, antipsychotics
  - Reduction in total # of meds should be pursued
- Exercise; esp balance, strength and gait training
  - Tai Chi with balance and strength is effective

Treat visual impairment
Routine eye screening with visual correction effective only if part of a multifactorial intervention

Assess postural hypotension
Treat orthostatic hypotension to reduce dizziness, e.g., fluid optimization, medication review and reduction and behavioral changes
Pacemaker for carotid sinus hypersensitivity
Supplement vitamin D; at least 800 IU/day


Multiple Excellent Evidence-Based Falls Risk Reduction Resources Exist

American Geriatric & British Geriatric Society Guideline
AGS 2010 www.americangeriatrics.org

STEADI (Stopping Elderly Accidents, Deaths & Injuries)
www.cdc.gov/stead/index.html

National Falls Prevention Resource Center www.ncoa.org

Area Agency on Aging www.eldercare.gov

State Falls Prevention Coalition www.ncoa.org/resources/list-of-state-falls-prevention-coalitions/

Go4Life www.go4life.nia.nih.gov

A Common Sense, Clinical Falls Approach

1. Ask About Falls

“When was the last time that you fell down?”
“Tell me about it”
Circumstances, prodrome, environmental factors, time
Can risk taking behaviors be addressed?
“How many times have you fallen in the last year?”
“Did any of these falls cause injury?”

Based on AGS/BGS 2010 Guideline,
Prevention of Falls in Older Persons available at americangeriatrics.org
A Common Sense, Clinical Falls Approach

2. Medications: Reduce or Eliminate

- Neuroleptics, antipsychotics, antidepressants
- Incontinence medications (strong anti-cholinergics)
- Sleepers; including OTC
- Antihistamines, 1st and 2nd generation
- Any medication with: “drowsiness, dizziness, dry mouth, ataxia, confusion…” as adverse effects
- Ask about ETOH; alone or interacting with meds

Based on AGS/BGS 2010 Guideline: Prevention of Falls in Older Persons available at americangeriatrics.org

A Common Sense, Clinical Falls Approach

3. Physical Therapy Evaluation

For “gait abnormality, falls, balance and strengthening assessment and treatment”

Assess need for assistive device and if so teaching

Based on AGS/BGS 2010 Guideline: Prevention of Falls in Older Persons available at americangeriatrics.org

A Common Sense, Clinical Falls Approach

4. Single Vision Lenses for Walking

“Ban the Bifocal!” Robert Przybylski, M.D.

Based on AGS/BGS 2010 Guideline: Prevention of Falls in Older Persons available at americangeriatrics.org

A Common Sense, Clinical Falls Approach

5. Nutrition/Correct Vitamin D Deficiency

Undernutrition is not rare in older adults
~1/3 in recent Canadian report
Need to measure 25(OH)D
Don’t use high dose vitamin D supplementation
Huge doses increase falls risk
Aim for ~40 ng/mL
Don’t be amazed if it take 2000-4000 IU of vitamin D3 daily

Personal opinion

Based on AGS/BGS 2010 Guideline: Prevention of Falls in Older Persons available at americangeriatrics.org
Falling over isn’t part of the ageing process. Many falls are preventable, and we want to help you stay on your feet and living the life you want to live.

The booklet provides practical advice – whether you’re still working, needs support, managing an illness, disability or are a carer. As you get older, much of the ability to space, co-ordinate common sense and推理 will gradually reduce. This booklet may also help you prepare for the days when you might need a little more assistance to look after yourself.

For more info or to read go to our website
www.livelonger.org.nz
or
www.ssec.co.nz
www.nhpaad.govt
www.mh.org.nz

Treat the Person, Not Just Their Bones

“The good physician treats the disease; the great physician treats the patient who has the disease.”

Sir William Osler