

Healthy Ageing 101:

How Best To Manage Your Bone Health To Enable Your Healthy Ageing

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Disclosures

- Nothing to disclose

Objectives



- Review the significance of Osteoporosis
- Learn how to define Osteoporosis and fracture risk
- Understand how to reduce fracture risk
 - Lifestyle
 - Medications



Introduction to Osteoporosis

Osteoporosis: Why should we care?



2 MILLION CANADIANS are affected by osteoporosis



At least **1 IN 3 WOMEN** and **1 IN 5 MEN** will suffer from an osteoporotic fracture during their lifetime



OVER 80% OF ALL FRACTURES in people 50+ are caused by osteoporosis



ONE IN THREE HIP FRACTURE PATIENTS will re-fracture within one year



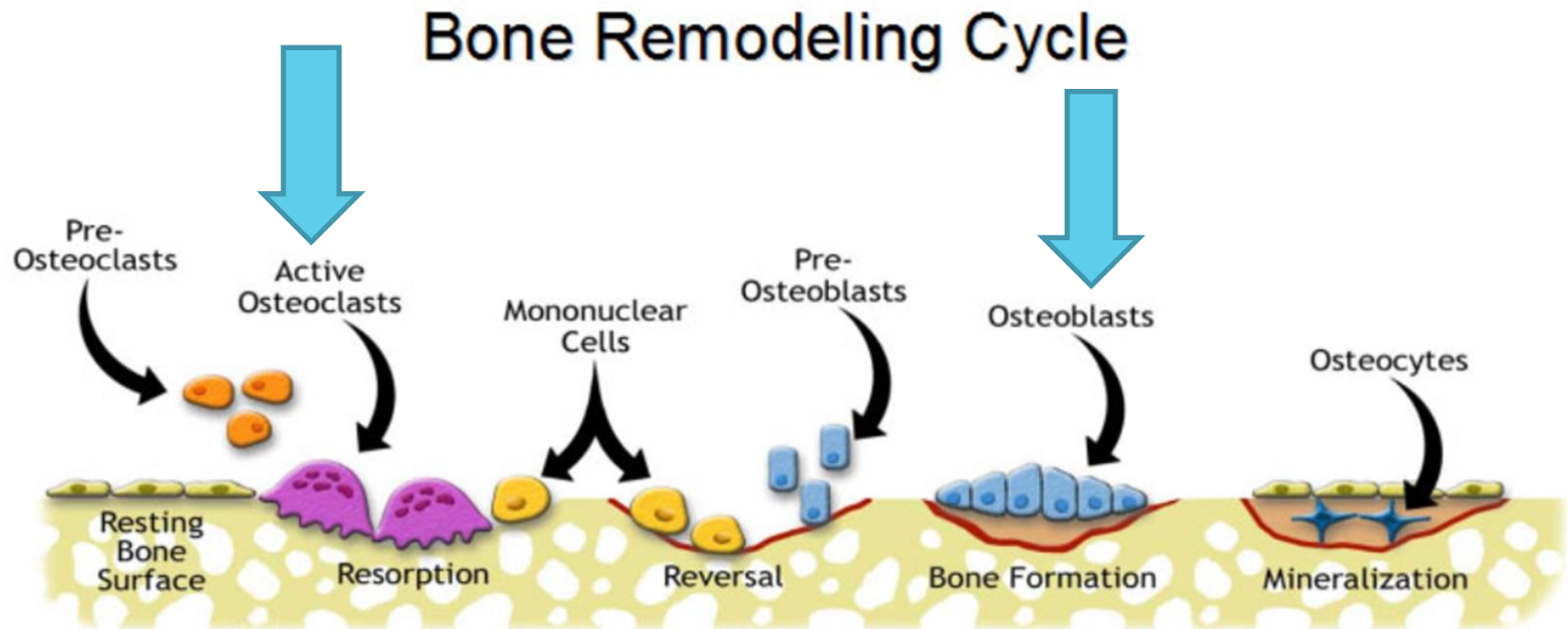
28% OF WOMEN and **37% OF MEN** who suffer a hip fracture will die within one year

The burden of fractures

- The GLOW study showed that fractures decrease quality of life as much or more than common comorbidities such as diabetes mellitus, arthritis and lung disease
- Fractures may also impact independent living, function, mobility and cause pain
- Fracture prevention is key to healthy ageing!
 - *Fracture: Osteoporosis :: Heart Attack: Heart disease*

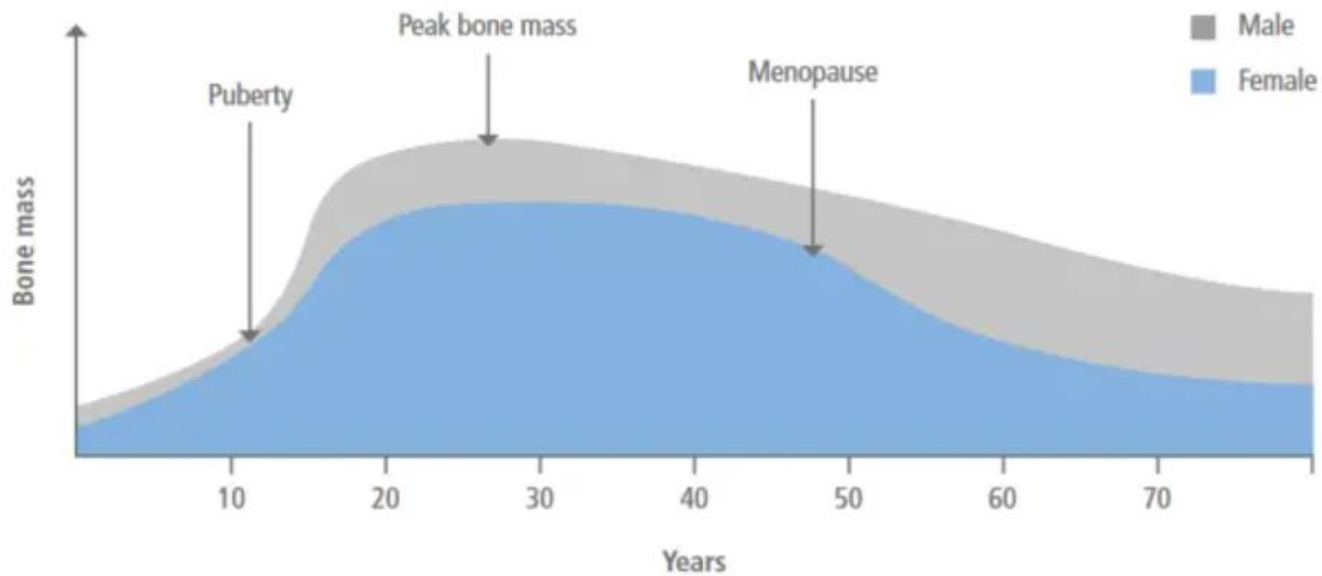
Watts, N. B. et al. Nat. Rev. Endocrinol. 10, 412–422 (2014)

Bone is a dynamic tissue!



Baron R. Primer on the Metabolic Bone Diseases and Disorders of Mineral Metabolism 6th ed.
Adapted from <http://www.ns.umich.edu/Releases/2005/Feb05/img/bpme.jpg>

Bone Health and Ageing



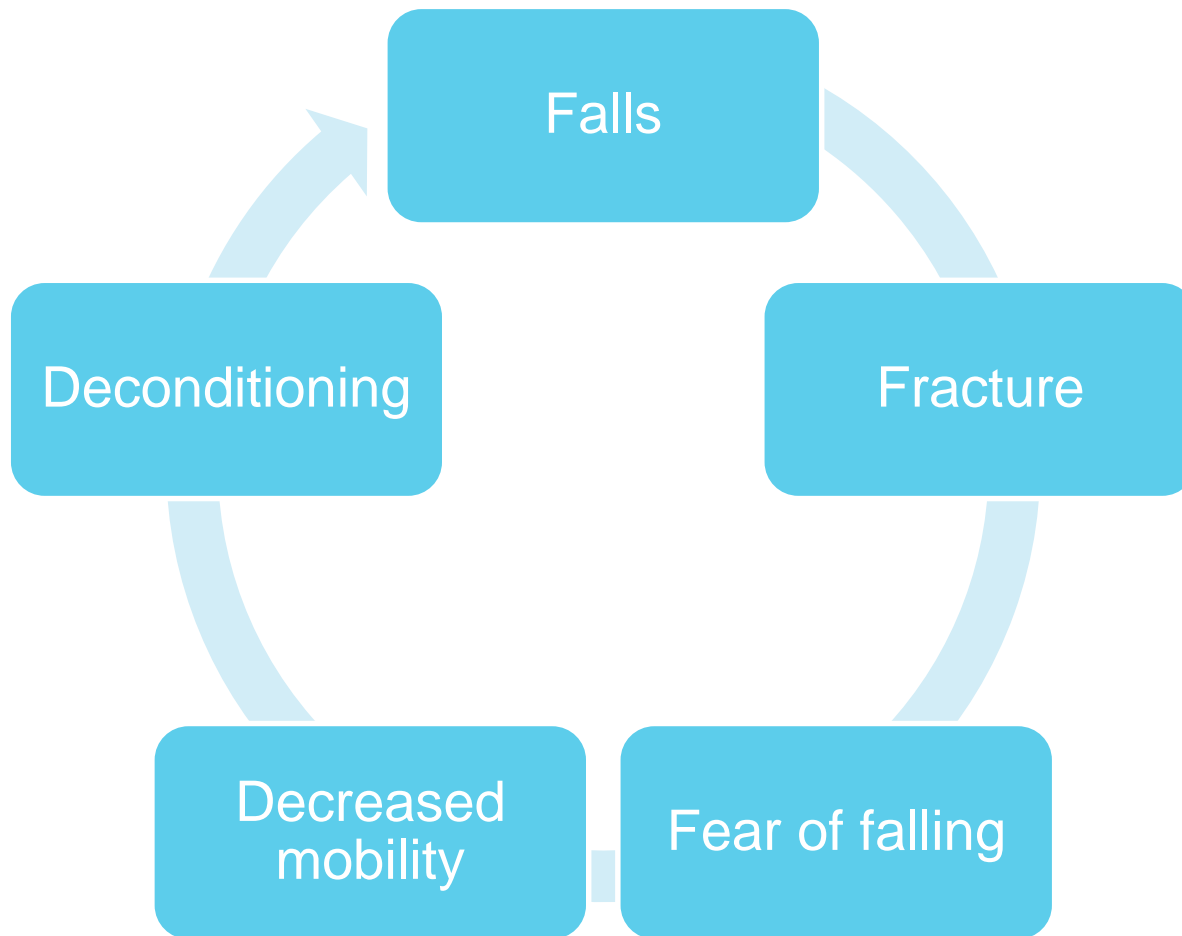
Bone mass throughout life

<https://www.osteoporosis.foundation>

Bone Health and Falls

- Falls are the #1 cause of injury-related hospitalizations among Canadian seniors, with 20% and 30% of seniors falling each year
- Falls present opportunities to fracture
Falls: Osteoporosis :: Chest pain: heart disease
- 95% of all hip fractures are caused by falls

Public Health Agency of Canada (2014) Seniors' Falls in Canada: Second Report. Ottawa: PHAC.



Diagnosis and Risk Stratification

How do you know if you're at risk?

- Osteoporosis means “porous bones.” Bones become less dense, and thus more prone to fracture
- Osteoporosis is often called “***a silent thief***” as it does not cause any symptoms until a fracture*
 - *Some vertebral fractures are clinically silent and go undiagnosed!
- Though many people do not know if they have osteoporosis, there are some known risk factors

RISK FACTORS



Family history
Rheumatoid arthritis
Premature menopause
Hypogonadism
Hyperthyroidism
Hyperparathyroidism
Diabetes (Type 1 and 2)
Inflammatory bowel disease
Malabsorption
History of eating disorders

Steroids
ADT
Aromatase inhibitors
Seizure medications
Proton pump inhibitors

Alcohol
Smoking
Caffeine
Diet
Low body weight

Bone Density Testing (DEXA)

- A bone density test is one way to diagnose osteoporosis and to assess your risk
- A bone density test measures the bone density in your spine and hip and tells you your T-score at each site
- Your T-score measures how many standard deviations your bone density is away from a healthy sample

Osteoporosis by T score

Osteoporos Int (2014) 25:2359–2381

2367

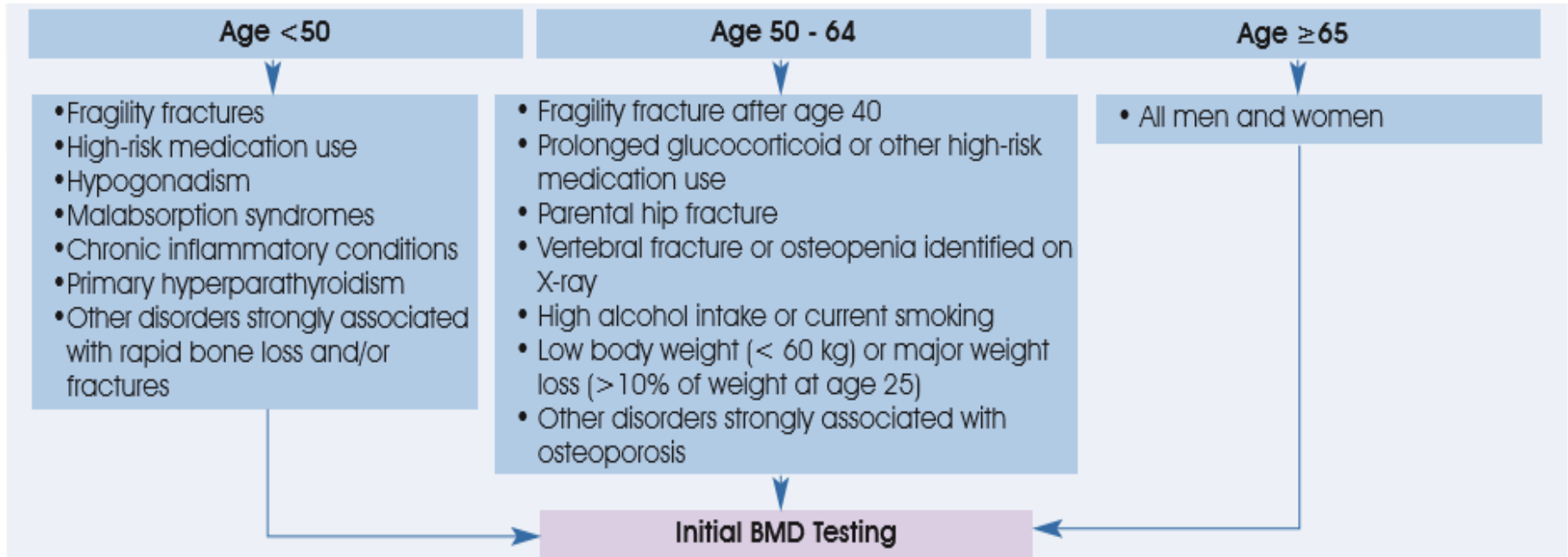
Table 5 Defining osteoporosis by BMD

WHO definition of osteoporosis based on BMD

| Classification | BMD | T-score |
|------------------------------------|---|---|
| Normal | Within 1 SD of the mean level for a young-adult reference population | T-score at -1.0 and above |
| Low bone mass (osteopenia) | Between 1.0 and 2.5 SD below that of the mean level for a young-adult reference population | T-score between -1.0 and -2.5 |
| Osteoporosis | 2.5 SD or more below that of the mean level for a young-adult reference population | T-score at or below -2.5 |
| Severe or established osteoporosis | 2.5 SD or more below that of the mean level for a young-adult reference population with fractures | T-score at or below -2.5 with one or more fractures |

Although these definitions are necessary to establish the presence of osteoporosis, they should not be used as the sole determinant of treatment decisions

Who Needs a Bone Density Test?



http://www.osteoporosis.ca/multimedia/pdf/Quick_Reference_Guide_October_2010.pdf

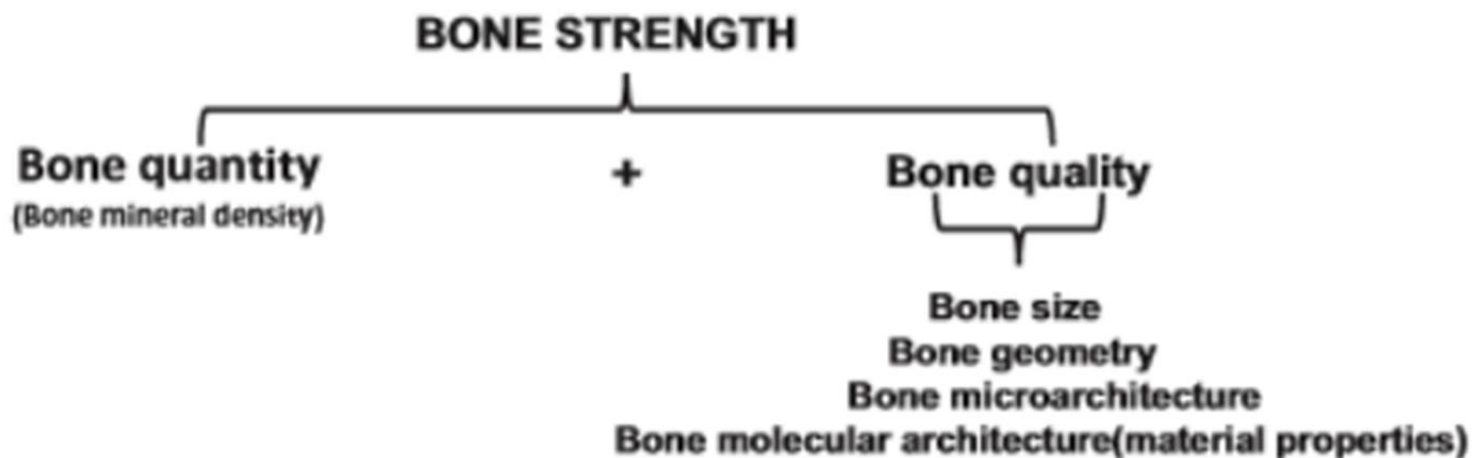
The problem with using Bone Density alone

- SPECIFIC but low SENSITIVITY
- Doesn't take into account clinical fractures which occur even in non-osteoporotic bone density
- Fragility fractures are the most serious outcome of osteoporosis and are the sequelae we are trying to prevent!

Fragility Fractures

- A fracture that occurs spontaneously or from minor trauma
 - Fall from standing height or less, walking speed or less
- Common sites
 - Wrist
 - Hip
 - Spine
 - Proximal humerus
- Having a fragility fracture means you have osteoporosis, even if your bone density is normal

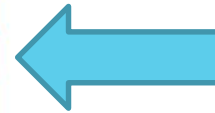
A better way to think about Osteoporosis



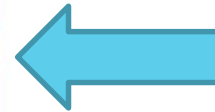
2010 CAROC GUIDELINES

10-year Risk Assessment for Women (CAROC Basal Risk)

| Age | Low Risk | Moderate Risk | High Risk |
|-----|------------|---------------|------------|
| 50 | above -2.5 | -2.5 to -3.8 | below -3.8 |
| 55 | above -2.5 | -2.5 to -3.8 | below -3.8 |
| 60 | above -2.3 | -2.3 to -3.7 | below -3.7 |
| 65 | above -1.9 | -1.9 to -3.5 | below -3.5 |
| 70 | above -1.7 | -1.7 to -3.2 | below -3.2 |
| 75 | above -1.2 | -1.2 to -2.9 | below -2.9 |
| 80 | above -0.5 | -0.5 to -2.6 | below -2.6 |
| 85 | above +0.1 | +0.1 to -2.2 | below -2.2 |



-Note different fracture risk with same T score



-Osteopenia vs. osteoporosis distinction not as important

The T-score for the femoral neck is derived from the National Health and Nutrition Education Survey III (NHANES III) reference database for white women.

10-year Risk Assessment for Men (CAROC Basal Risk)

| Age | Low Risk | Moderate Risk | High Risk |
|-----|------------|---------------|------------|
| 50 | above -2.5 | -2.5 to -3.9 | below -3.9 |
| 55 | above -2.5 | -2.5 to -3.9 | below -3.9 |
| 60 | above -2.5 | -2.5 to -3.7 | below -3.7 |
| 65 | above -2.4 | -2.4 to -3.7 | below -3.7 |
| 70 | above -2.3 | -2.3 to -3.7 | below -3.7 |
| 75 | above -2.3 | -2.3 to -3.8 | below -3.8 |
| 80 | above -2.1 | -2.1 to -3.8 | below -3.8 |
| 85 | above -2.0 | -2.0 to -3.8 | below -3.8 |

Note: Fracture history and steroid use increase your risk by one category

The T-score for the femoral neck is derived from the National Health and Nutrition Education Survey III (NHANES III) reference database for white women.

Bone Health Treatment

Bone Health Treatment by Risk Category

Low

- Lifestyle modifications

Moderate

- Lifestyle modifications +/- Medications

High

- Lifestyle modifications + Medications

Lifestyle: Calcium



- Calcium is a mineral that the body needs to maintain strong bones
- Recommended daily intake is 1000-1200mg daily from all sources
- Calcium from diet is the preferred approach as it is the safest
- You can calculate your daily calcium intake using a calcium calculator tool (300mg @baseline, ~300mg/dairy serving)
- If taking a supplement, no more than 500-600mg of elemental calcium

Lifestyle: Vitamin D



- Vitamin D helps build strong bones by increasing the absorption of calcium
- Metabolism of Vitamin D depends on sunlight, skin absorption, and processing in the liver and kidney
- Unlike calcium, it is difficult to get enough from food
- Older patients are particularly at risk for low Vitamin D
 - Homebound or institutionalized seniors
 - Less effective skin absorption
- Recommendation for 800-2000 IU daily for those older than 50
- Caution with regular intake of >4000 IU daily

Lifestyle: Protein

- Important for bone strength and muscle health
- Many seniors do not eat enough protein in their diet
- Diets with good protein intake are associated with fewer fractures
- Good sources of protein include beef, pork, poultry, fish, beans, lentils, tofu, eggs, nuts



Lifestyle: Exercise

- Exercise is very important to maintain strong and healthy bones. It can help maintain balance, and build muscle strength and also help prevent falls.
- Older adults should aim to exercise for 30 minutes per day.
- Strength Training, Balance Training, and Weight Bearing Aerobic Exercises, are all recommended for strong and healthy bones.
- Ontario has over 2000 free exercises and falls preventions classes for older adults aged 65 and over.

Exercise Guide

| What exercises? | How often? | How hard? | How long? |
|--|----------------------------|--|--|
| <p>Strength Use exercise bands, hand weights, own body weight, resistance training equipment.</p> | At least 2 days a week | You should be able to do 8 to 12 reps. The last 2 to 3 reps should feel hard to do. | Do at least 2 sets of 8 to 12 reps per exercise. Include all major muscle groups. |
| <p>Posture Practice good posture when you stand and sit, do Shavasana, do back exercises that extend your spine.</p> | Every day | Be aware of your posture. Use a mirror when you exercise. | Pay attention to your posture during daily activities. Do posture exercises for 5 to 10 minutes daily. |
| <p>Balance Do Tai Chi, dance, walk heel to toe, reduce base of support, shift your weight, respond to things that upset your balance.</p> | Every day | Beginners: Do exercises where you stand in one spot. Advanced: Challenge your balance while you are moving. Try to get help to choose exercises. | Do balance exercises all at once or spread them out during the day. You can also build them into daily activities. |
| <p>Aerobic physical activity Walk quickly, dance, run, climb stairs, rake leaves.</p> | Most days (5 days or more) | Some people can do moderate to vigorous intensity—5 to 8 on the scale. If you are new to exercise or if you have had a spine fracture, start at low to moderate intensity — 3 to 6 on the scale (see scale on page 16). | Do aerobic physical activity for about 20 to 30 minutes per day. Exercise for at least 10 minutes at a time. In total, do 150 minutes or more per week. If you are new to exercise or if you have had a spine fracture, start with 10 minutes each day. |

What are spine sparing strategies?

Spine sparing strategies help “spare” the spine from injury. Injuries to the spine can occur when we bend forward or twist the spine quickly or repeatedly, or if we lift something heavy, bend far forward (e.g., tying shoes) or twist the torso all the way to the side. Bending or twisting while holding a weighted object (e.g., groceries, grandchild) is also risky.

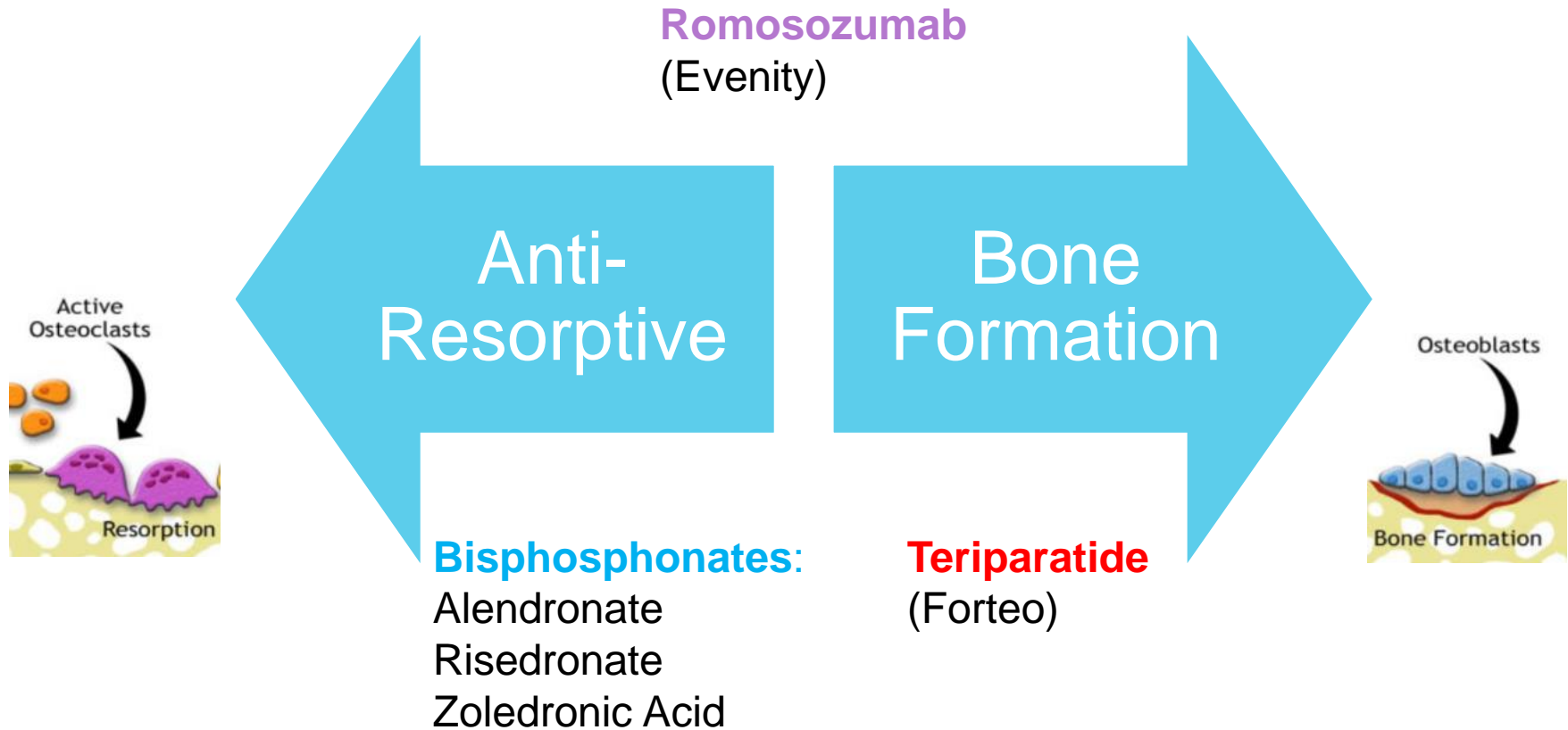
Spine sparing strategies:

- ▶ Bend with your hips and knees, not your spine
- ▶ Turn your whole body rather than twisting your spine



<http://www.osteoporosis.ca/osteoporosis-and-you/too-fit-to-fracture/>

Medications

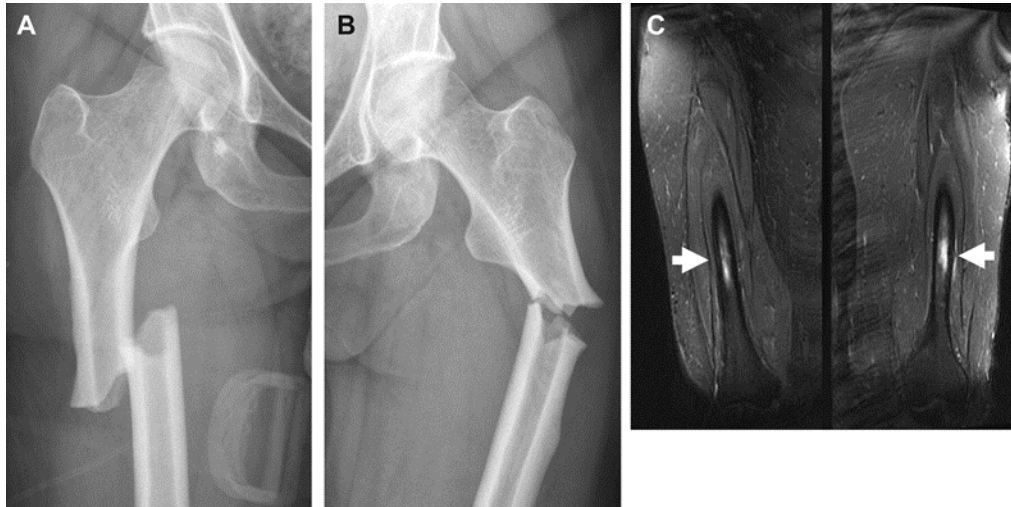


Medications

- Target different parts of the bone cycle
- All are effective in reducing fracture risk
- A patient-centered approach should be used when deciding about medication, taking into account:
 - Preference for route and frequency
 - Contraindications
 - Cost

Aren't Osteoporosis Medications Dangerous?

Atypical Femur Fractures



Osteonecrosis of the Jaw



Aren't Osteoporosis Medications Dangerous?

Table 1. Relative risk table⁷

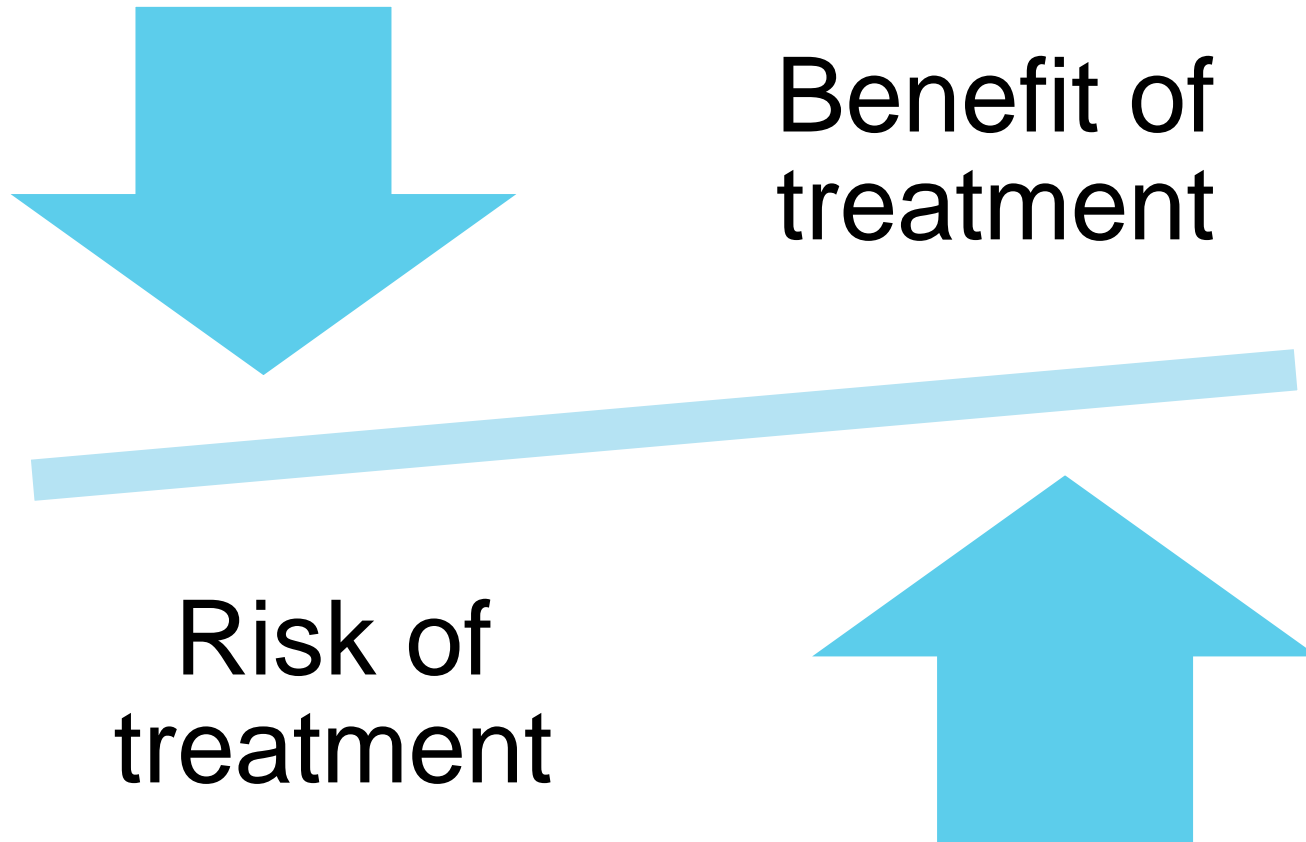
| | BP and ONJ | 2 yr BP and AFF | 8 yr BP and AFF | Murder | Motor vehicle accident | Major OP fracture in low risk women | Major OP fracture in moderate risk women | Major OP fracture in high risk women |
|---------------------------------|-------------------|------------------------|------------------------|---------------|-------------------------------|--|---|---|
| Per 100,000 person years | 1.03 | 2.00 | 78 | 1.62 | 8.4 | 650 | 1600 | 3100 |

BP = Bisphosphonate, ONJ = Osteonecrosis of the jaw, AFF = Atypical (subtrochanteric) femoral fracture, OP = Osteoporosis

JUBY & DAVIS | COMMON CONTROVERSIES IN OSTEOPOROSIS THERAPY – HELPING PATIENTS MAKE INFORMED DECISIONS

CGS JOURNAL OF CME | VOLUME 5, ISSUE 2, 2015

Still, in MOST cases....



Take home points

1. Osteoporosis and fractures cause significant burden
2. Osteoporosis is diagnosed using BOTH bone density and fracture history
3. It is important to know your risk of fracture
4. Bone health treatment depends on fracture risk
5. Lifestyle modification is important for all levels of risk
6. Medications are recommended for those at HIGH risk

References

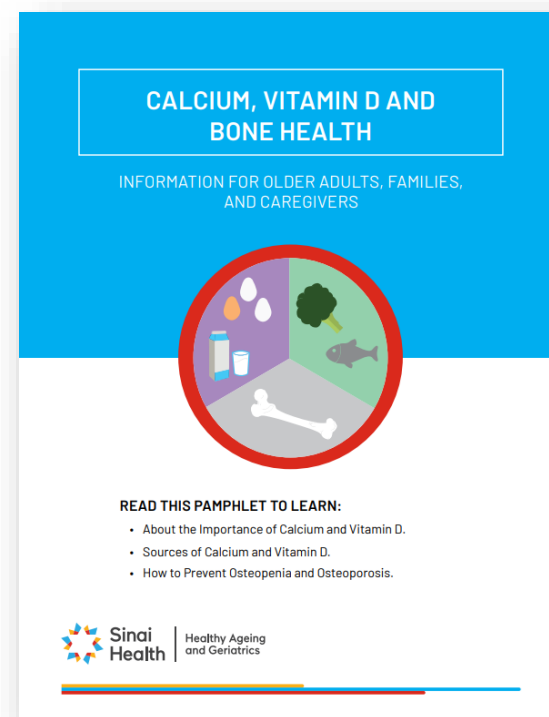
- Baron R. Primer on the Metabolic Bone Diseases and Disorders of Mineral Metabolism 6th ed .Adapted from <http://www.ns.umich.edu/Releases/2005/Feb05/img/bpme.jpg>
- Juby Angela, Davis Christopher: Common Controversies in Osteoporosis Therapy—Helping Patients Make Informed Decisions: CGS Journal of CME, 2015, 5(2): 49-55 (http://canadiangeriatrics.ca/wp-content/uploads/2016/11/6_Common-Controversies_Angela-Juby.pdf)
- Osteoporosis.ca
- The Osteoporosis Canada (OC) guideline, (http://www.cmaj.ca/content/early/2010/10/12/cmaj.100771.full.pdf+html?ijkey=edc6c6048e7d4_acdc41368fe3f1e622bf5a2deac&keytype2=tf_ipsecsha)
- Watts Nelson B. et al: Insights from the Global Longitudinal Study of Osteoporosis in Women (GLOW): Nat.Rev. Endocrinol 2014,10: 412-422

Additional Resources

<https://sinaigeriatrics.ca/healtheducation/>

Find more information in “Calcium, Vitamin D and Bone Health” available on our website

<https://sinaigeriatrics.ca/patient-resources/calcium-vitamin-d-and-bone-health/>



Additional Resources

<https://www.ontario.ca/page/health-care-ontario>

Seniors' INFOline at 1-888-910-1999

Osteoporosis Canada

<https://osteoporosis.ca/>

Osteoporosis Line (Toll Free)

English: 1-800-463-6842

French: 1-800-977-1778

IOF

[International Osteoporosis Foundation | IOF](#)

Bone Fit

[Looking for A Bone Fit™ Trained Professional?](#)

Additional Resources

Physical Activity Guidelines

<https://csepguidelines.ca/>

Healthy Eating: Variety and Balance

www.dietitians.ca

Canada's Food Guide

<https://www.unlockfood.ca/en/Articles/Bone-Health>

Exercise and Falls Prevention Programs

<https://www.ontario.ca/page/exercise-and-falls-prevention-programs>



That's all Folks!

THANK YOU

Questions? (Submit through Q&A)



Stay Connected With Us



<https://sinaigeriatrics.ca/healtheducation/>

Website:

<https://sinaigeriatrics.ca>

Twitter:

@SinaiGeriatrics

LinkedIn Account:

Healthy Ageing and Geriatrics Program (Sinai Health and University Health Network)

Upcoming Healthy Ageing Sessions

**Sessions will be communicated
via mailing list email**

Upcoming Events & News

2022 Sinai Health/UHN Geriatrics Summer Scholars Program

- Application cycle is open
- Visit <https://sinaigeriatrics.ca/geriatrics-summer-scholars-program/> for more information

2022 Sinai Health/UHN Geriatrics Institute Education Day

- 12th annual edition to be hosted in June
- Date will be communicated via email