

Bone Health and Healthy Aging

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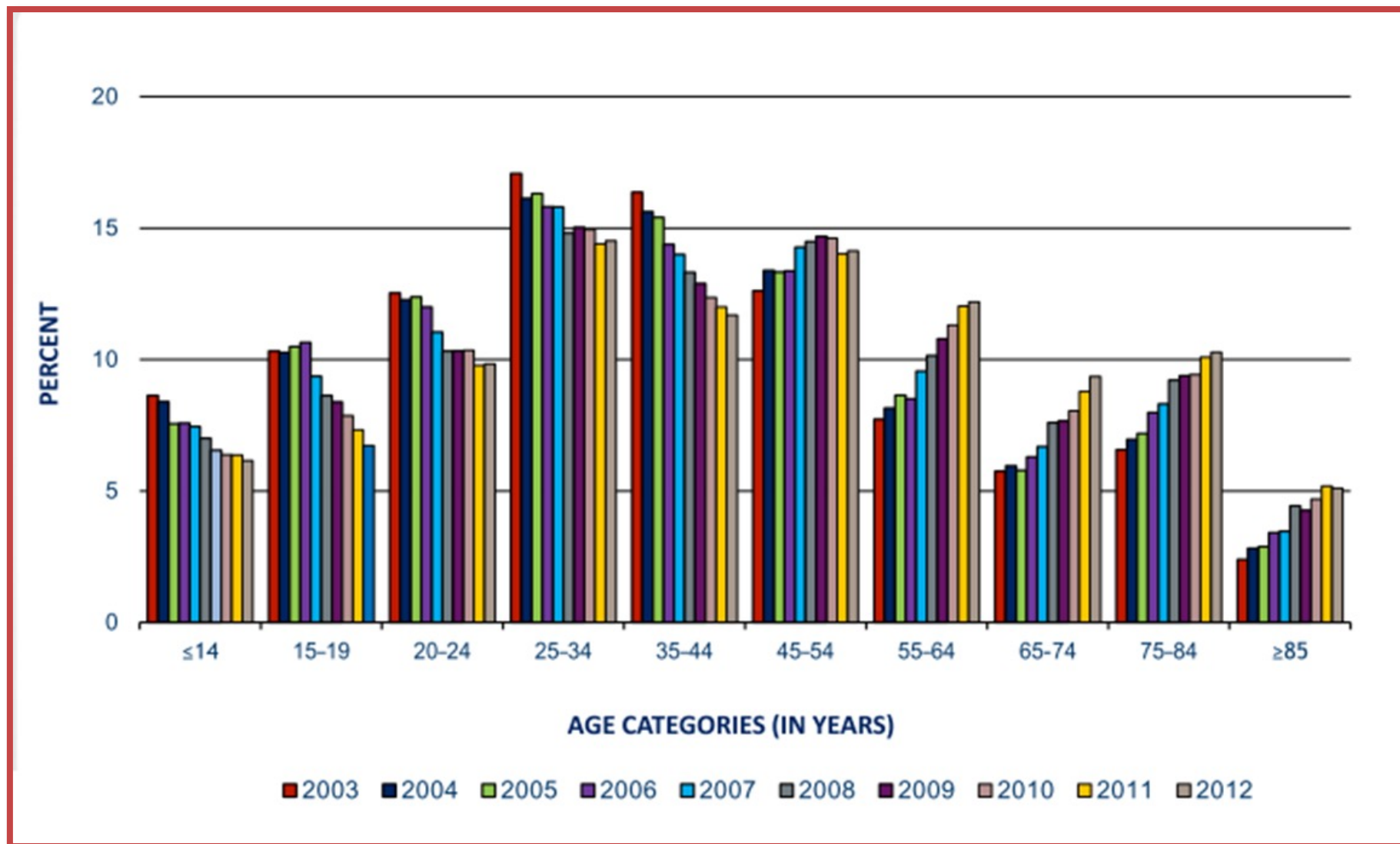
University of Minnesota Retirees Association

Bones are Good



When the bones are good, the rest don't
matter
Yeah, the paint could peel, the glass could
shatter
Let it rain, 'cause you and I remain the same
When there ain't a crack in the foundation
Baby, I know any storm we're facing
Will blow right over while we stay put
The house don't fall when the bones are good

Trauma



Fragility fractures increasing

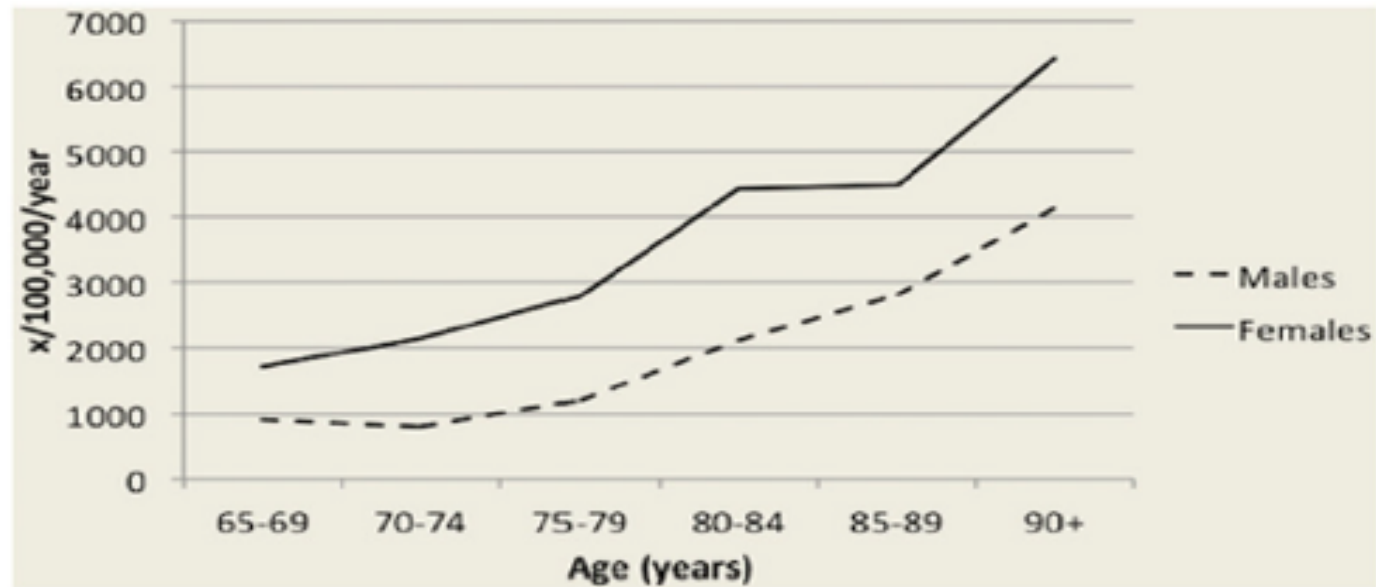
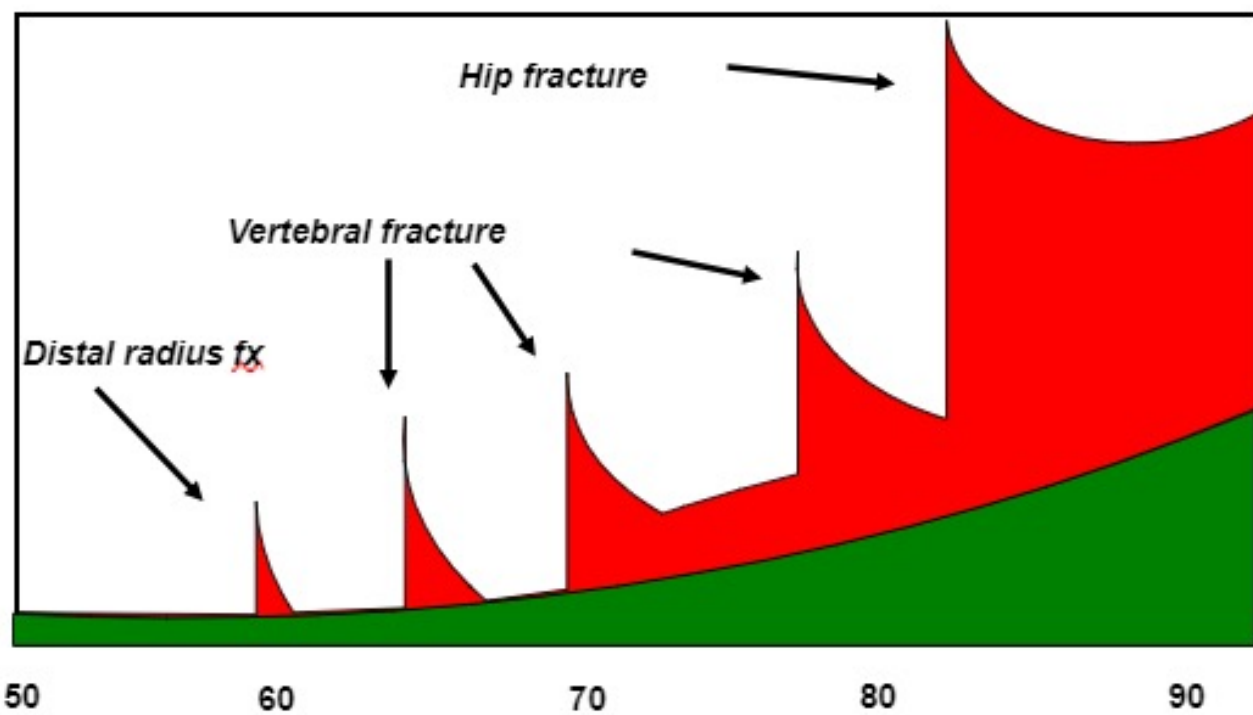


Fig. 1
The changing incidence of fractures in patients who are sixty-five years of age or older.

Fracture morbidity

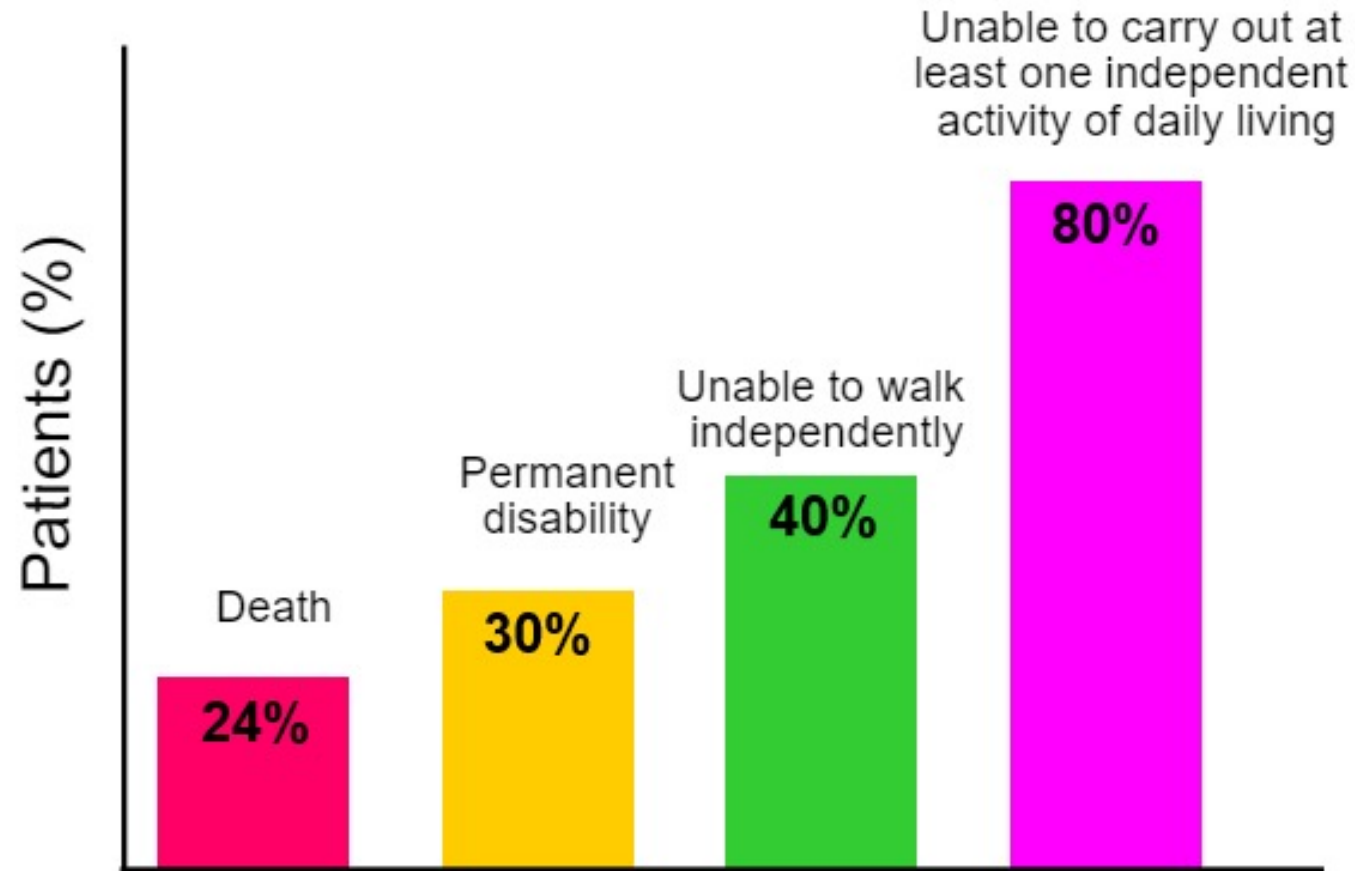
Morbidity



**Add'l morbidity
due to fractures**

**Morbidity due to
normal aging**

Hip fractures

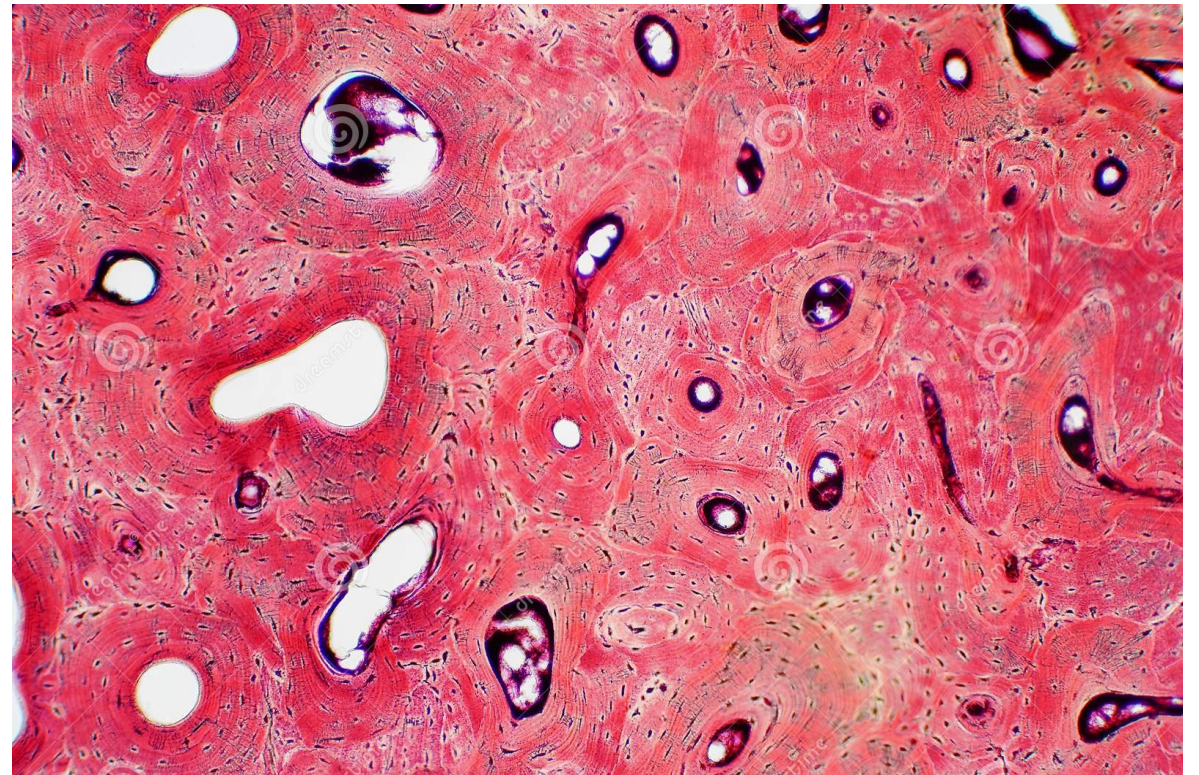


Bones - The Foundation



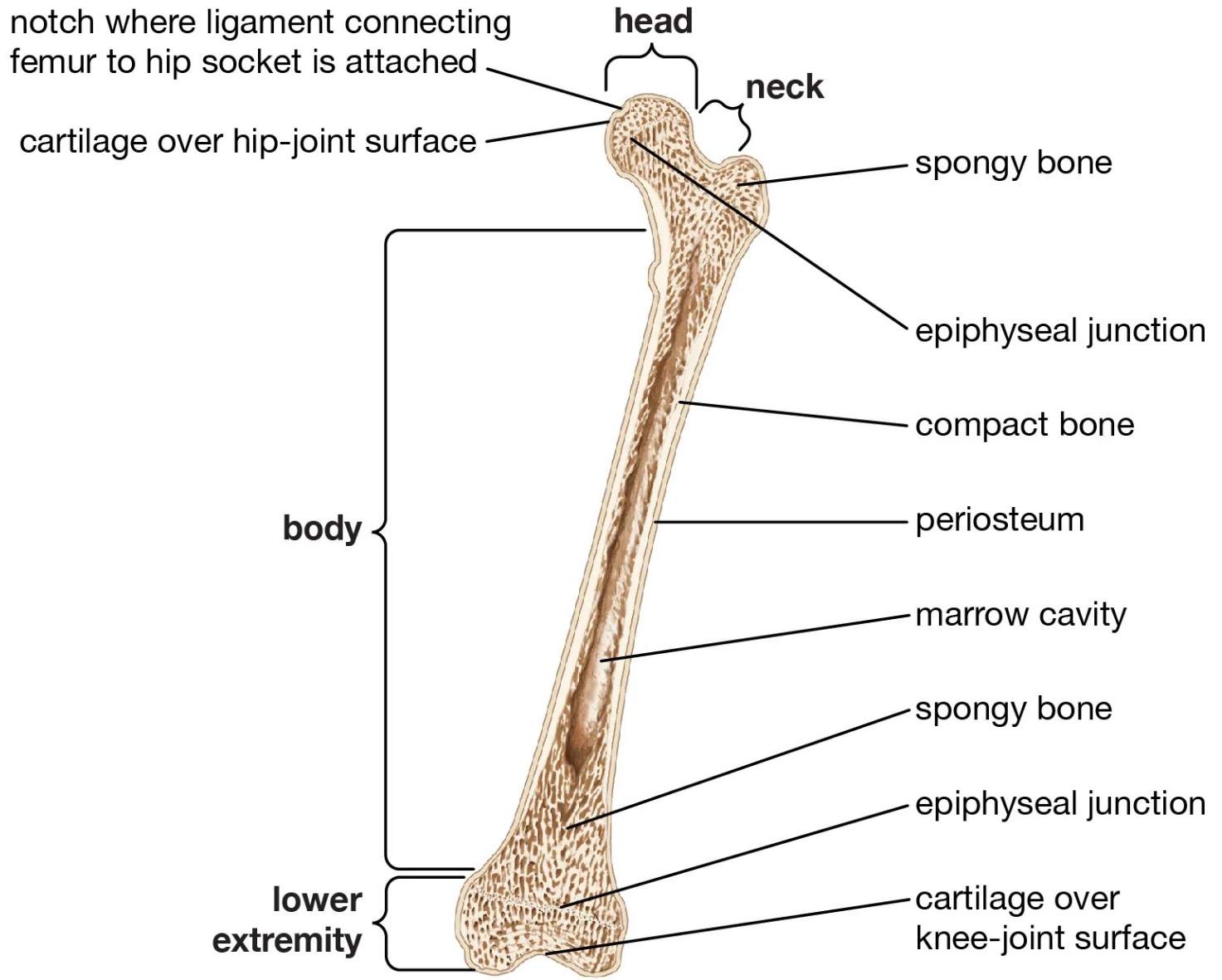
More microscopically

- Calcium phosphate
- Collagen
- Cells
- Vessels

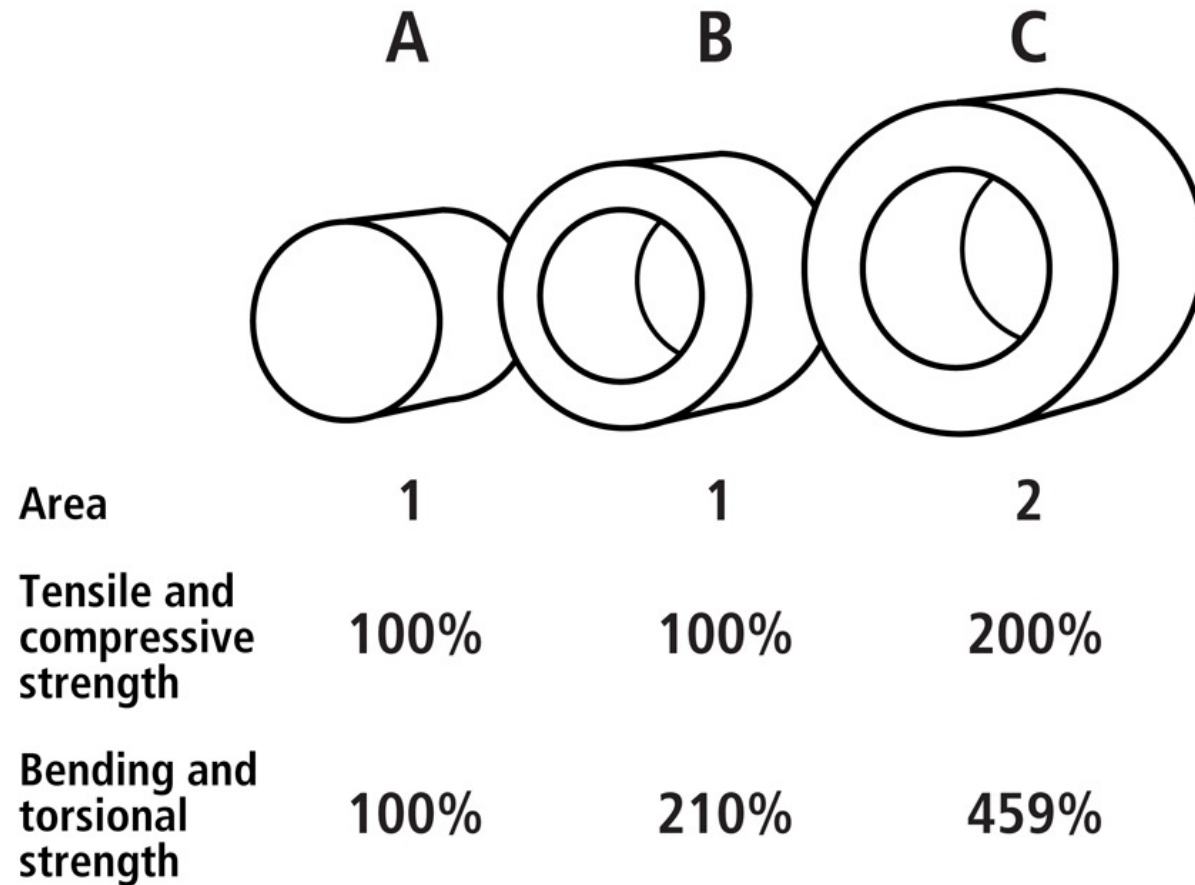


FAQ's

- Strontium
- Calcium and heart disease
- Food vs supplements
- Types of D vitamins
- Weight or BMI and protection from fracture

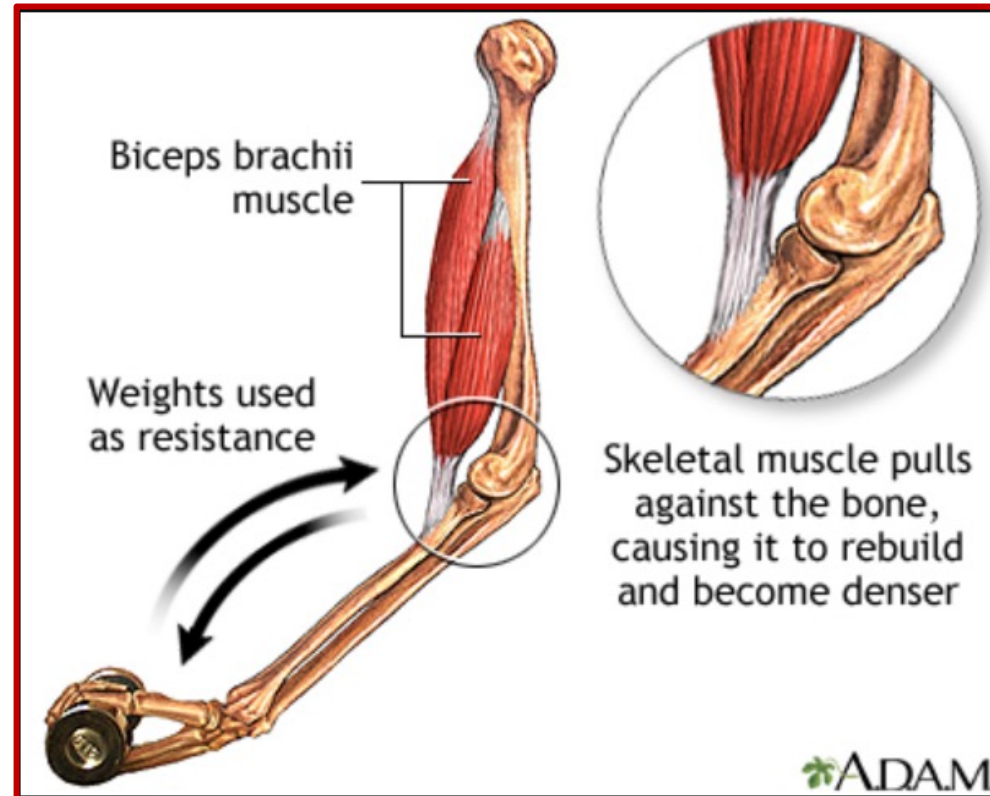


Bone biology and mechanical properties

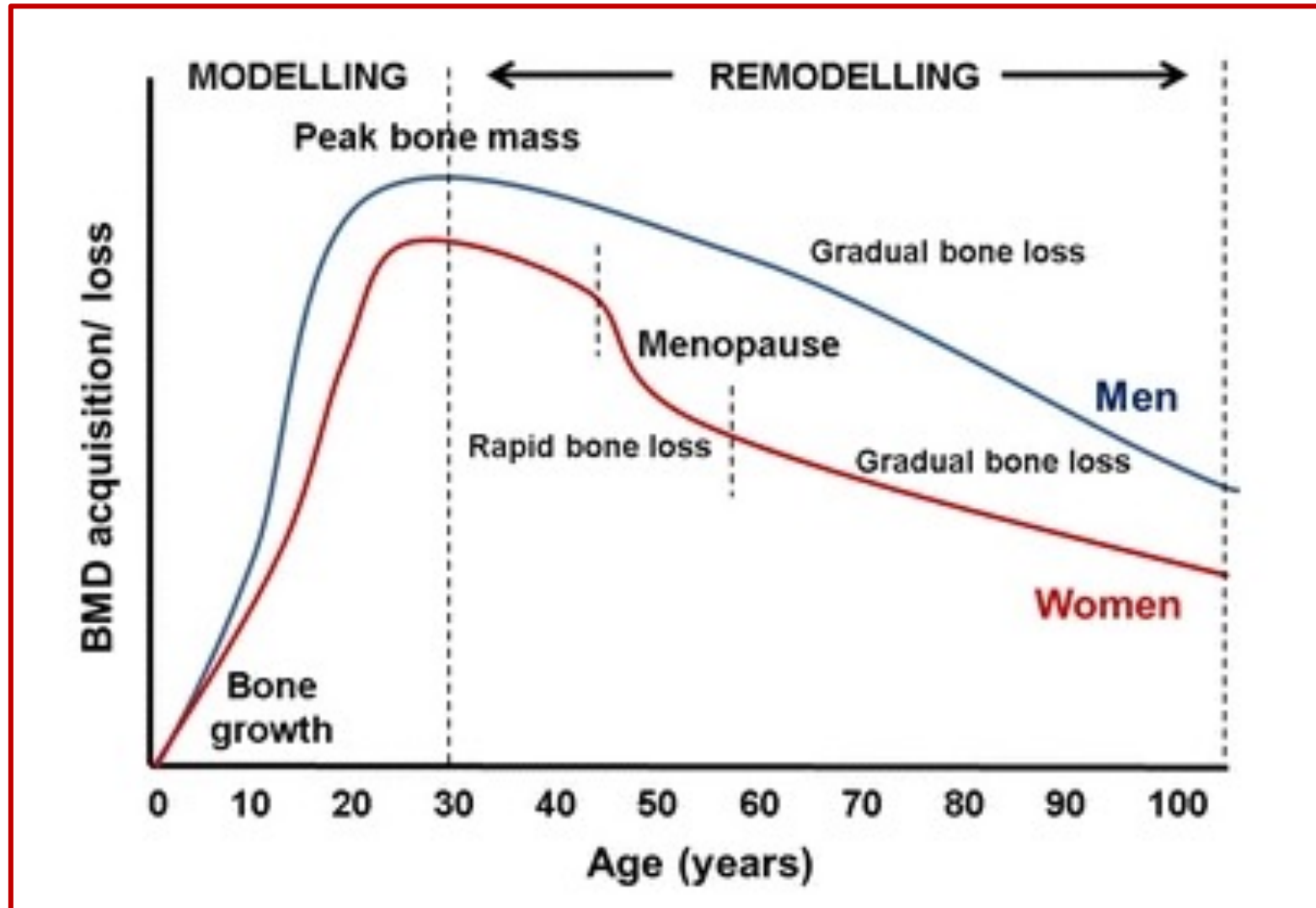


1882 "Wolff's Law"

- Bone responds and remodels based on external stresses applied to it



Bone acquisition



Good bone health=healthy aging

- Mobility
- Comfort/pain management
- Independence
- Cardiovascular wellness
- Decrease fall risk



Good bone health

- Exercise
- Diet- balanced w bias toward protein, calcium and vitamin D
- Healthy habits (alcohol, smoking)
- Osteoporosis medications



Exercise

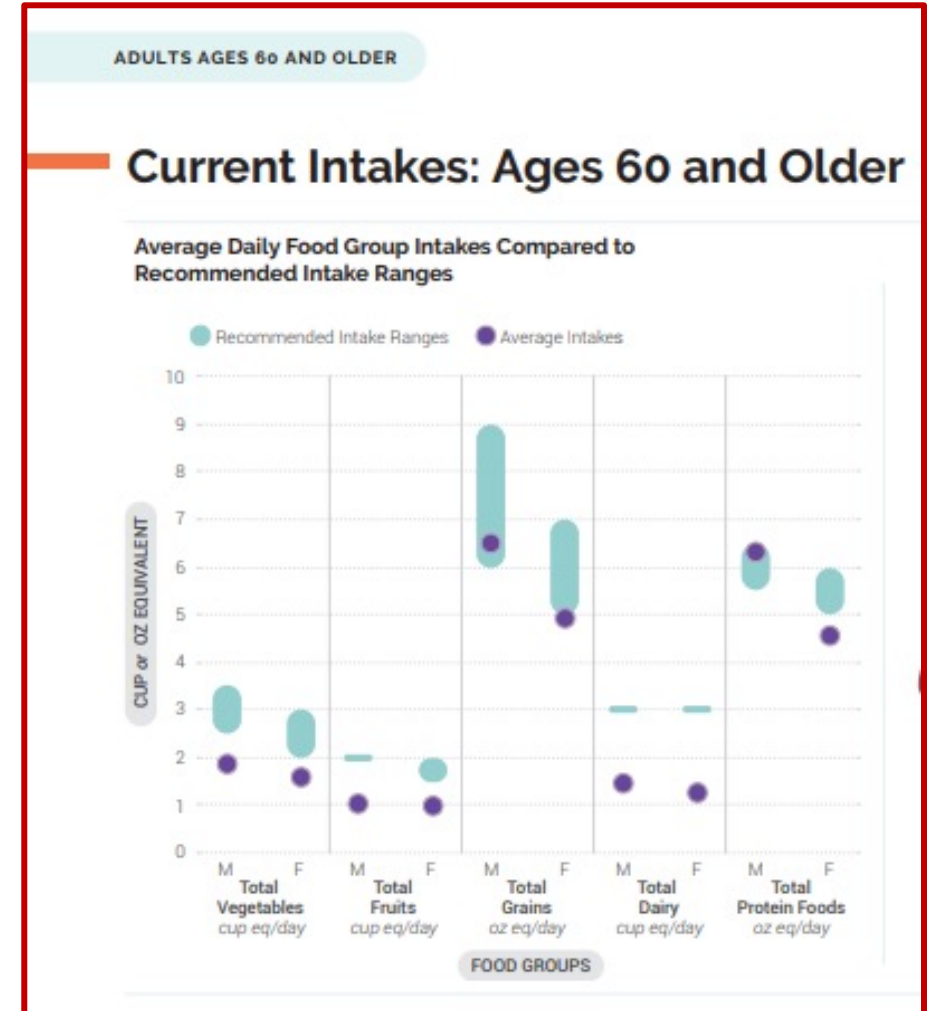
- Mobility
- Comfort
- Cognitive wellness
- Emotional wellness
- Improved sleep
- Decreased fall risk



- Brisk walking and hiking
- Jogging/running
- Dancing
- Jumping rope
- Hopscotch
- Tennis, badminton, ping pong, and pickleball
- Team sports, such as basketball, soccer, and volleyball
- Stair climbing

Diet

- Protein (0.36 multiplied by body wt)
- Calcium (1200 mg)
- Vitamin D (800 iu)
- Magnesium (350 mg)



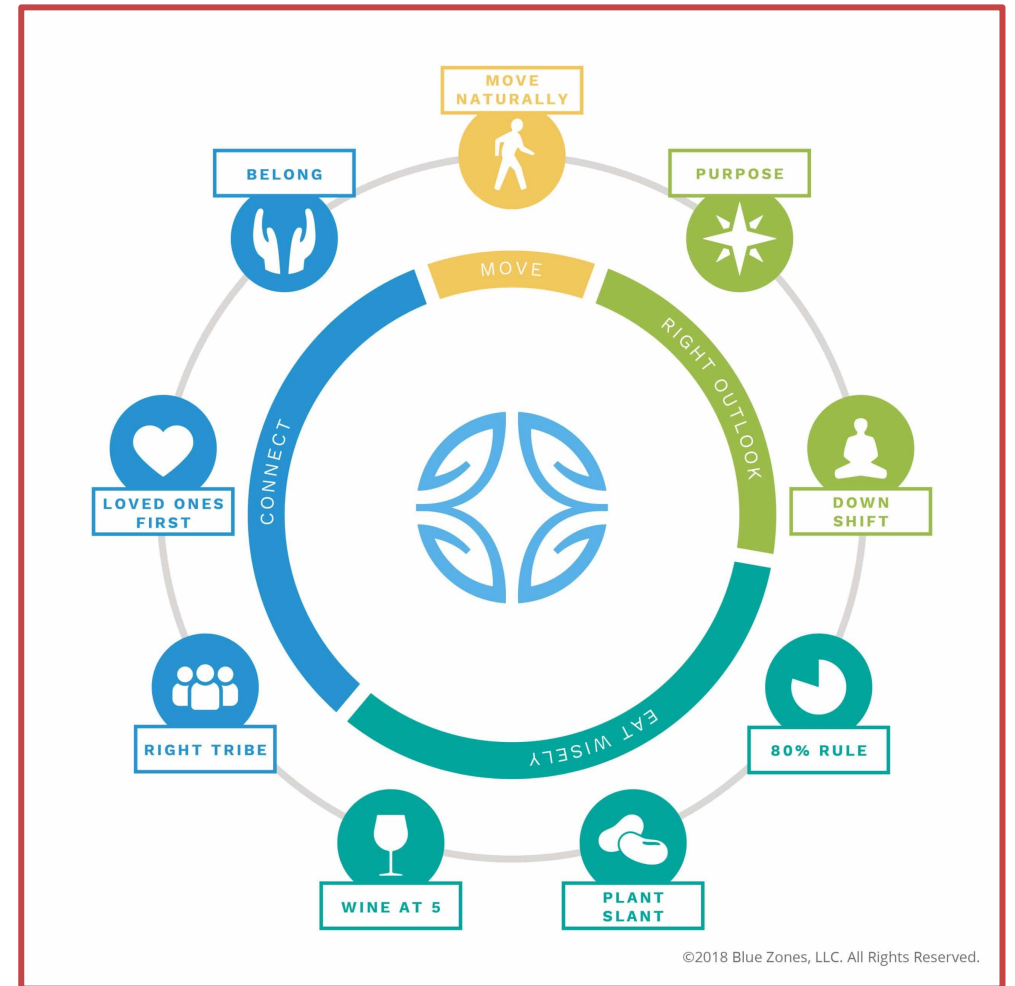
Sources of protein, calcium, and vitamin D

- Protein
 - Nuts, legumes, meat, milk, cheese, soy, eggs
- Calcium
 - Yogurt, kefir, greens, sardines, tofu, fortified foods
- Vitamin D
 - Fish , soy, egg yolk, mushrooms, butter



Healthy habits

- Exercise
- Moderate or low alcohol intake
- Balance practice
- Home safety
- Smoking cessation
- Self care/wellness
- Social interaction

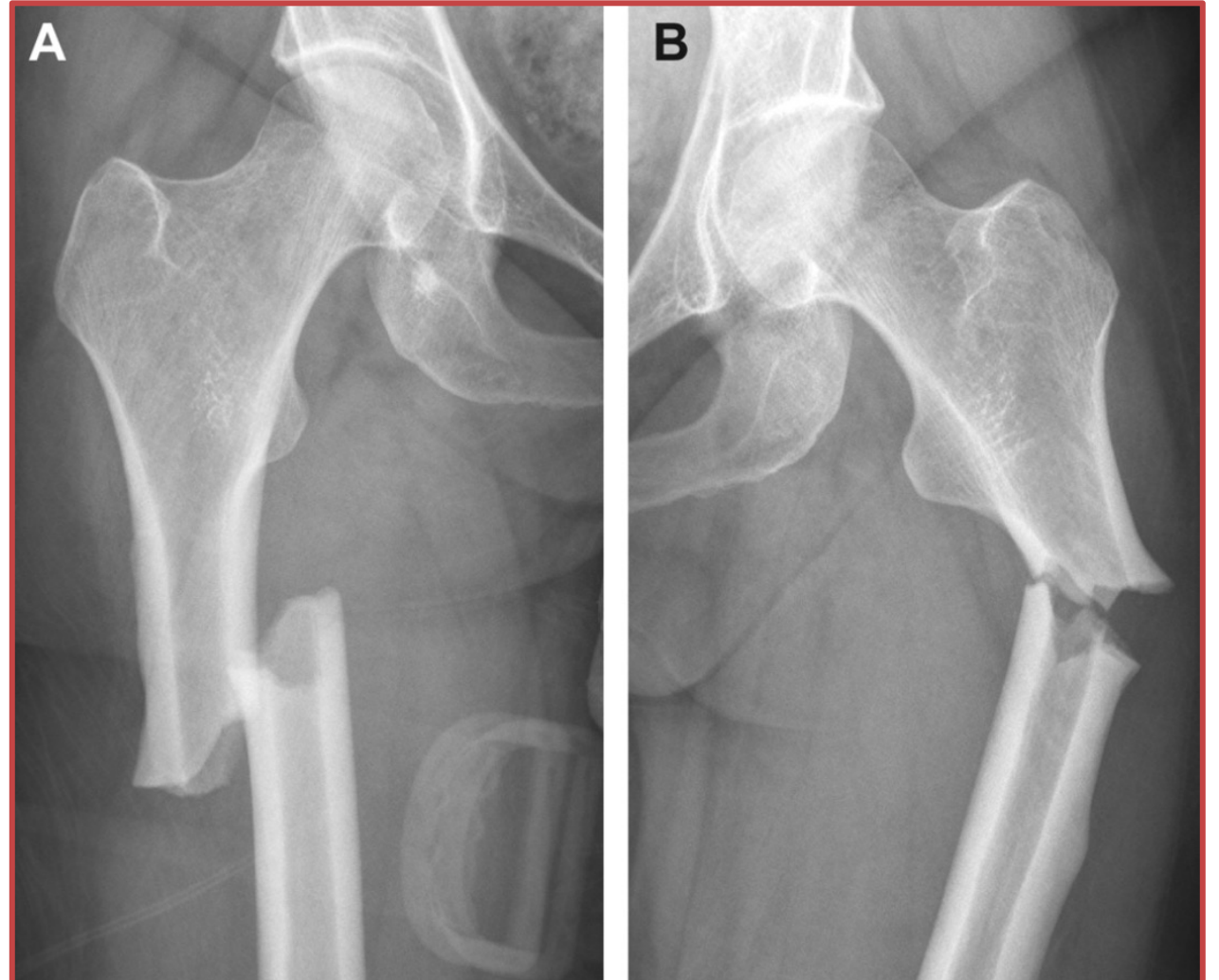


Osteoporosis medications

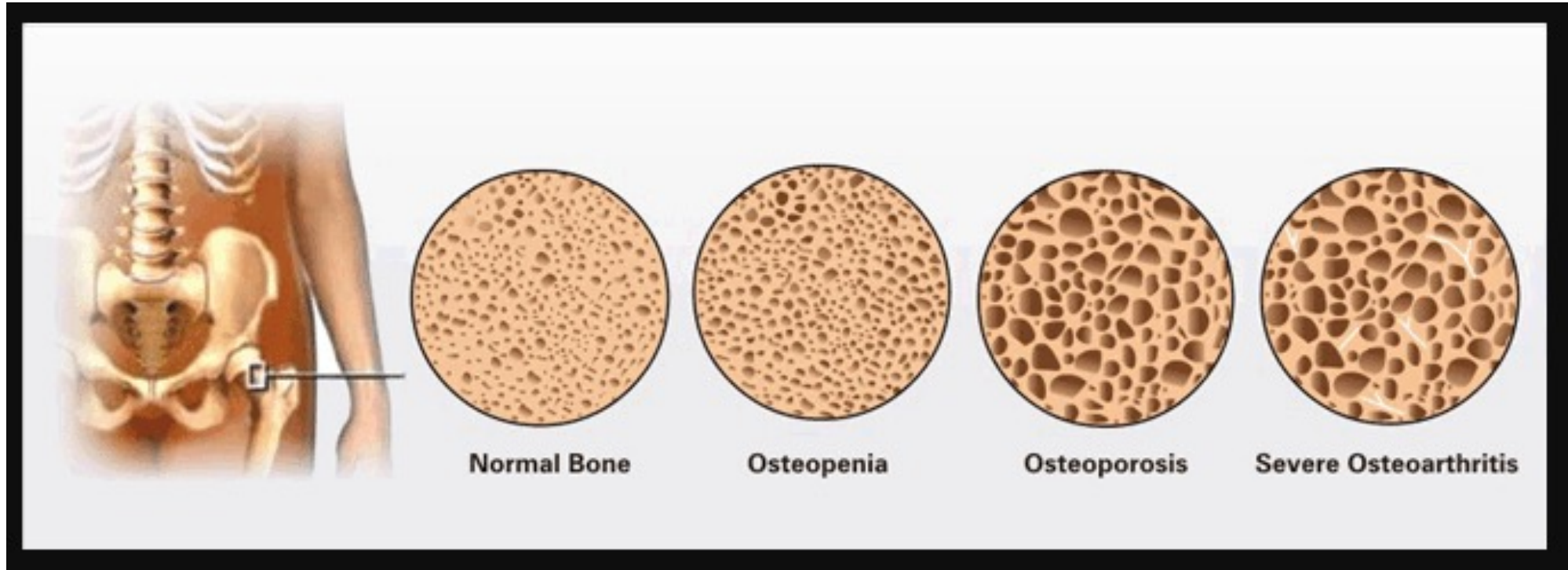
- Bisphosphonates (Fosamax, Reclast, Boniva)
- Anabolic medications (Forteo, Tymlos)
- Monoclonal antibodies (Prolia, Evenity)
- Selective estrogen receptor modulators (Evista)

Potential side effects

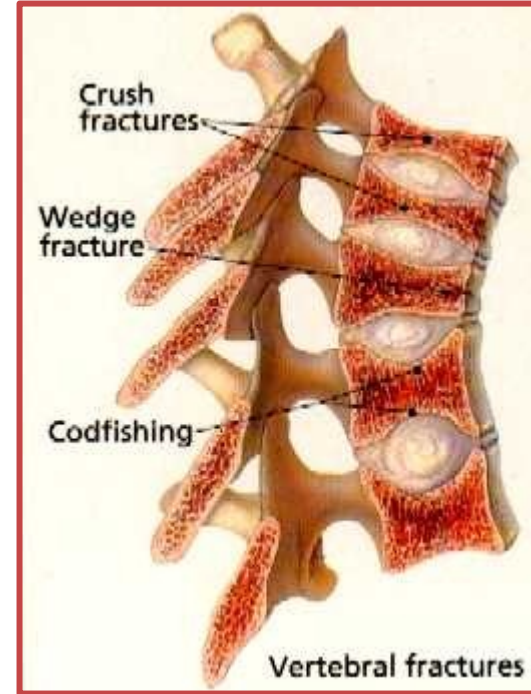
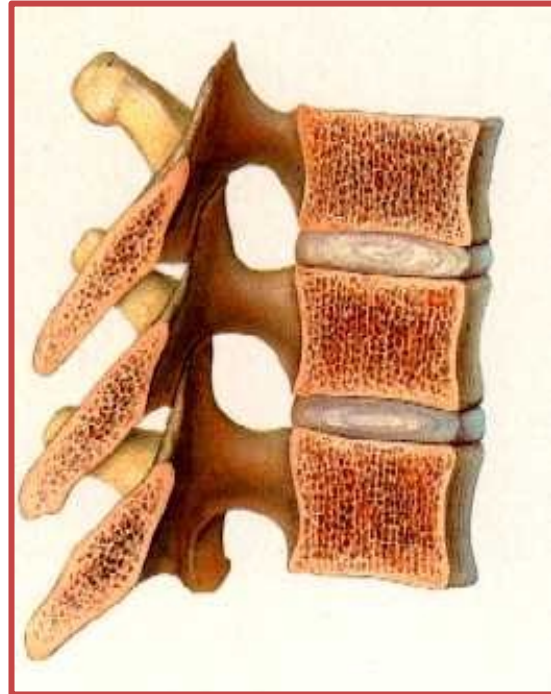
- Muscle aches
- Nausea
- Osteonecrosis of the jaw
- Atypical femur fracture



Osteoporosis



Vertebral compression fractures

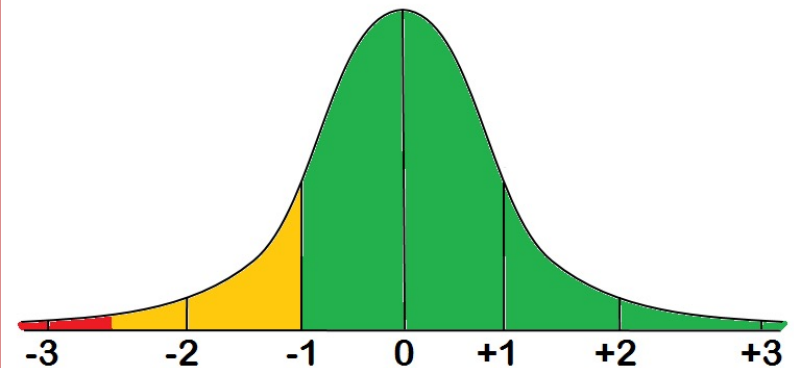


DXA scan information

- WHO: Osteoporosis: T score < -2.5
- Osteopenia: T score $-1 - -2.5$



DEXA T-Scores



Osteopenia: -1 to -2.5

Osteoporosis: ≤ -2.5



Calculation Tool

Please answer the questions below to calculate the ten year probability of fracture with BMD.

Country: **US (Caucasian)** Name/ID: [About the risk factors](#)

Questionnaire:

1. Age (between 40 and 90 years) or Date of Birth
 Age: Date of Birth: Y: M: D:

2. Sex Male Female

3. Weight (kg)

4. Height (cm)

5. Previous Fracture No Yes

6. Parent Fractured Hip No Yes

7. Current Smoking No Yes

8. Glucocorticoids No Yes

9. Rheumatoid arthritis No Yes

10. Secondary osteoporosis No Yes

11. Alcohol 3 or more units/day No Yes

12. Femoral neck BMD (g/cm²)
 Select BMD



Weight Conversion

Pounds kg

Height Conversion

Inches cm

10989223

Individuals with fracture risk assessed since 1st June 2011

Take homes

- Exercise
- Eat well
- Do things you love
- Spend time w people you love

