Osteoporosis

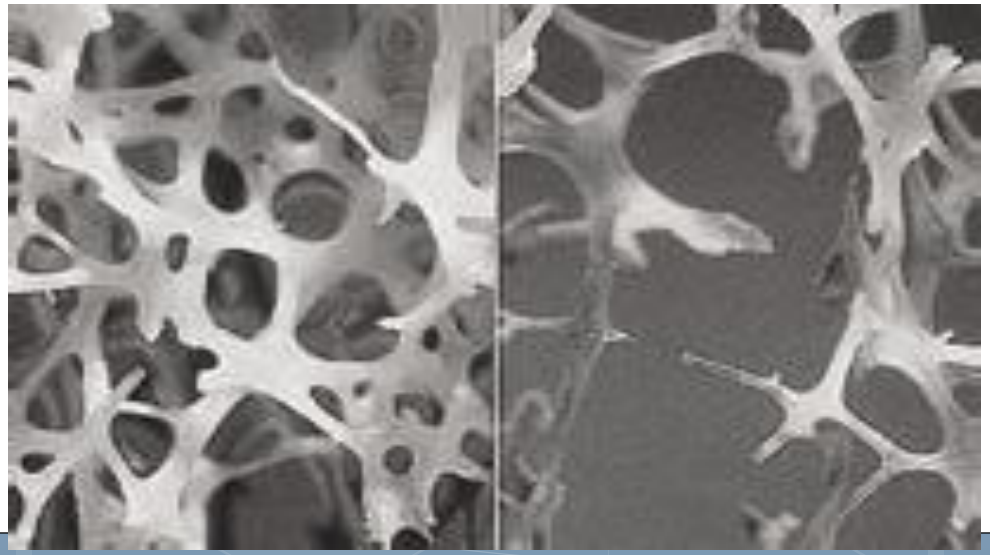
Dr Ali Alkazzaz
2106-Babylon Collage of Medicine

def

- “Silent disease” until complicated by fractures
- Most common bone disease in humans
- Characterized by:
  - Low bone mass
  - Microarchitectural deterioration
  - Compromised bone strength
  - Increased risk for fracture

- “If somebody had told me sooner what I know now about osteoporosis, none of this might be happening to me!

Osteoporosis causes weak bones. In this common disease, bones lose minerals like calcium. They become fragile and break easily.

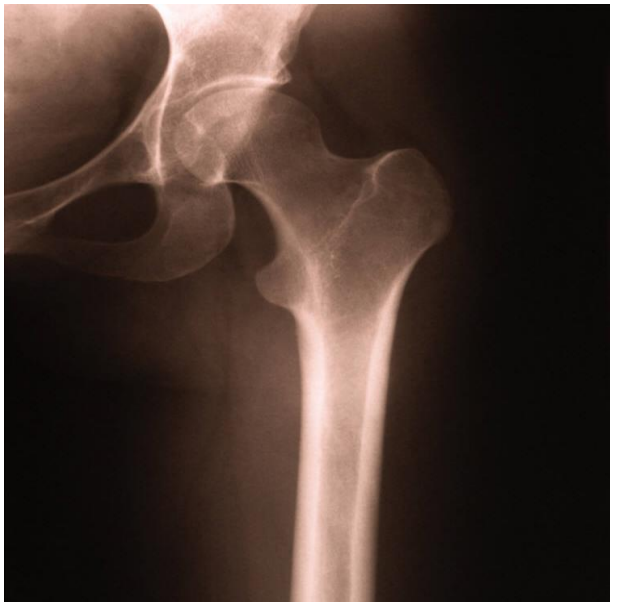


Osteoporosis

- Characterized by low bone mass and deterioration of bone structure
- Not a natural part of aging
- Increased risk for women, post-menopa over age 65
- All races, sexes, and ages are susceptib
- Preventable and treatable!

Morbidity

- A woman's hip fracture risk equals her combined risk of breast, uterine and ovarian cancer



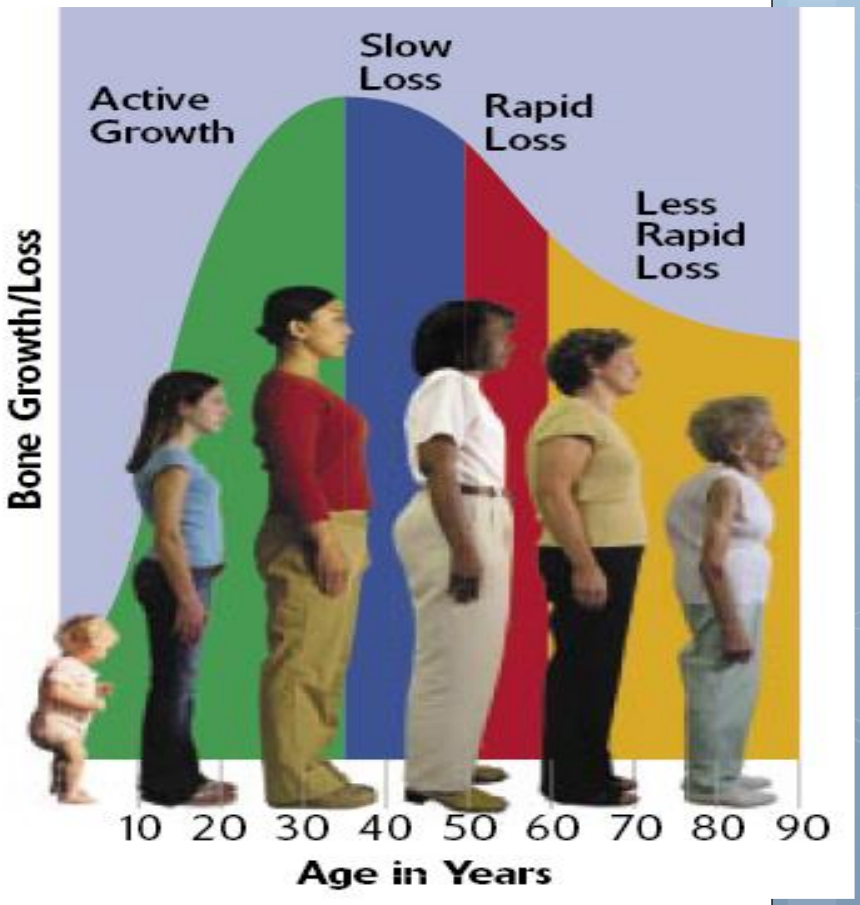
Site risk of fractures

- The most common breaks in weak bones are in the wrist, spine and hip

After mid-30's, you begin to slowly lose bone mass.

Women lose bone mass faster after menopause.

Men lose bone mass too.



Risk Factors

MajorRisk Factors

- History of fracture as an adult
- Fragility fracture in first degree relative
- Caucasian/Asian postmenopausal woman
- Low body weight (< 127 lb)
- Current smoking
- Use of oral corticosteroids > 3 mo.

Additional

- Impaired vision
- Estrogen deficiency at early age (< 45 YO)
- Dementia
- Poor health/frailty
- Recent falls
- Low calcium intake (lifelong)
- Low physical activity
- > 2 alcoholic drinks per day

Medical Conditions Associated with Increased Risk of Osteoporosis

- COPD
- Cushing's syndrome
- Eating disorders
- Hyperparathyroidism
- Hypophosphatasia
- IBS
- RA, other autoimmune connective tissue disorders
- Insulin dependent diabetes
- Multiple sclerosis
- Multiple myeloma
- Stroke (CVA)
- Thyrotoxicosis
- Vitamin D deficiency
- Liver diseases

BMD [DXA]testing should be performed on

All women 65 YOA and older regardless of risk factors*

Younger postmenopausal women with one or more risk factors (other than being white, postmenopausal and female)

Postmenopausal women who present with fractures (confirm diagnosis, determine disease severity)

1.
2.
3.

DXA

Bone mineral density (BMD) scans are indicated for

- Women over 65 yrs
- Men over 75 yrs
- Individuals with fragility fractures and silent vertebral fractures
- Individuals with major risk factors for osteoporosis

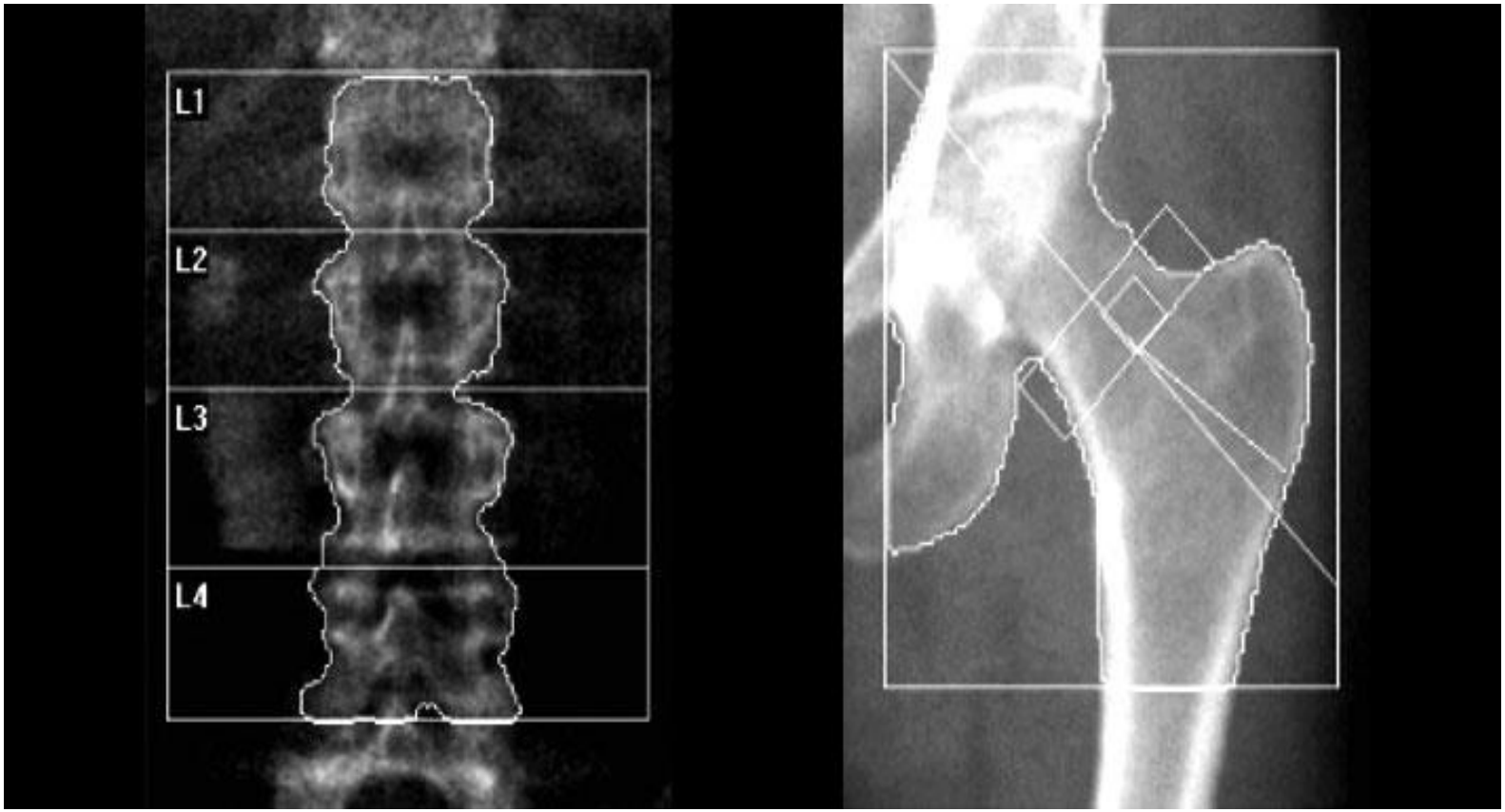
Others

Younger individuals with major risk factors:

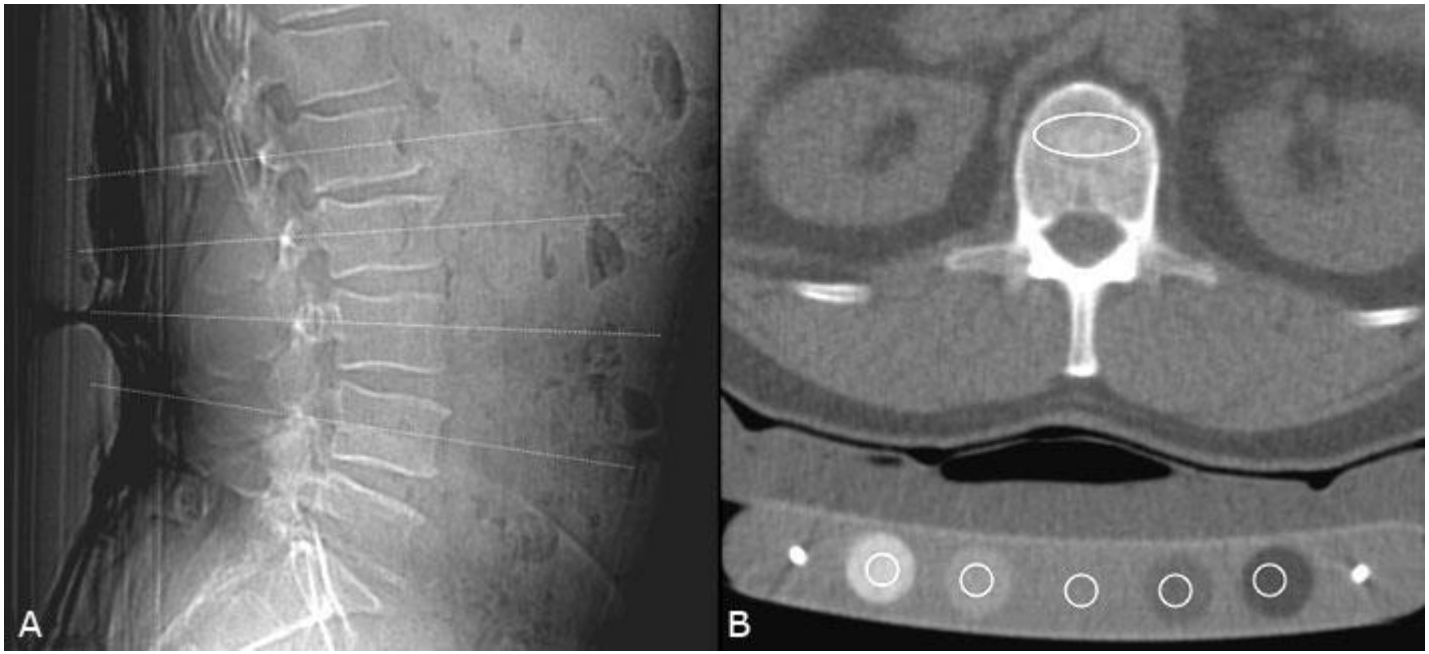
- History of prior fracture with minimal trauma
- Low body weight (BMI <23)
- Premature menopause
- Testosterone deficiency in men
- Chronic glucocorticoid therapy

Screening for Osteoporosis

- All patients with major risk factors for osteoporosis should be screened for osteoporosis by bone densitometry of the spine and hip. Dual-energy x-ray absorptiometry (DEXA) is the imaging method of choice in most cases. This is a very low dose x-ray scan in which the amount of x-ray energy absorbed by bone mineral is measured and the bone mineral content calculated. Bone mineral content divided by bone area gives the BMD. Because DEXA measurements are not corrected for thickness of the bone in the direction of the x-ray beam, DXA BMD measures a combination of bone size and true bone mineral density.


L1
L2
L3
L4

Radiology



World Health Organization Diagnostic Criteria

* BMD CRITERIA	DIAGNOSIS
within 1 SD of a “young normal” adult (T-score at -1.0 and above)	*Normal*
between 1 and 2.5 SD below that of a “young normal” adult (T-score between -1 and -2.5)	*Osteopenia*
2.5 SD or more below that of a “young normal” adult (T-score at or below -2.5)	*Osteoporosis*
2.5 SD or more below that of a “young normal” adult and fracture(s)	*Severe Osteoporosis*

- T-score is the number of SDs above or below the average BMD value for young, normal adults of the same sex

SD = Standard deviation

BMD = Bone mineral density

FRAX

- Applies the recently released algorithm on absolute fracture risk call FRAX® by the WHO
- Also called 10-year fracture risk model and 10-year fracture probability
- Estimates the likelihood of a person to break a bone due to low bone mass over a period of 10 years
- Most useful to determine if treatment needed for those with low bone mass or osteopenia
- http://www.shef.ac.uk/FRAX/tool.jsp?locationValue=2

Who Should Be Treated?

- Initiate therapy to reduce fractures in postmenopausal women/men > 50 with:
  1. BMD T-scores ≤ -2.5 at hip or spine
  2. Prior vertebral or hip fracture
  3. Low bone mass (T-scores -1.0 to -2.5 at hip or spine) when:
     - 10-year probability of hip fracture is ≥ 3%
     - 10-year probability of major osteoporosis-related fracture is ≥ 20%
     - Based on US-adapted WHO algorithm

Drugs for Osteoporosis

- Bisphosphonates
  - Alendronate, Alendronate plus D (Fosamax®, Fosamax Plus D®)
  - Risedronate, Risedronate with Calcium (Actonel®)
  - Ibandronate (Boniva®)
- Selective Estrogen Receptor Modulators (SERMs)
  - Raloxifene (Evista

Calcitonin (Miacalcin®, Fortical®, Calcimar®)

Parathyroid Hormone [PTH (1-34), teriparatide] Forteo®

Estrogen/Hormone Therapy (ET/HT)
Premarin®, Estrace®, Prempro®

Bisphosphonates – Antiresorptive Agents

Agents FDA-approved for:

- Prevention and treatment of osteoporosis in postmenopausal women
- Treatment to increase bone mass in men with osteoporosis
- Treatment of glucocorticoid-induced osteoporosis in men and women receiving glucocorticoids
- Treatment of Paget's disease of bone in men and women

Mechanism: inhibits bone resorption by attaching to bony surfaces undergoing active resorption and inhibiting action of osteoclasts

- Leads to increases in bone density and reduced fracture risk

Bisphosphonates

Contraindications/Precautions

- Abnormalities of the esophagus which delay esophageal emptying, such as stricture or achalasia
- Inability to stand or sit upright for at least 30 minutes
- Patients at increased risk of aspiration
- Hypocalcemia
  - Should be corrected prior to initiating therapy
- Renal insufficiency (Not recommended if CrCl < 30-35 ml/min)

Approaches to Monitoring Therapy

- Always important to ask patients about adherence, encourage continuation of therapies to reduce fracture risk
- Monitoring of therapy should be considered, as up to 1/6 of women taking effective therapies continue to lose bone, especially if they smoke
- May measure bone mineral density at a single site after one year of therapy, but results may be misleading; usually done every 2 years
- Drugs may decrease a patient's risk for fracture even when there is no apparent increase in BMD

Improve Bone Health?HOW

Step 1

Get your daily recommended amounts of calcium and vitamin D

Step 2

- Be physically active everyday
- Improve strength and balance

Even simple activities such as walking, stair climbing and dancing can strengthen bones

Step 3

- Avoid smoking and excessive alcohol

12 oz.

5 oz.

no more than 1 drink per day for women and 2 for men

1.5 oz.

Talk to doctor about bone health

Step 5

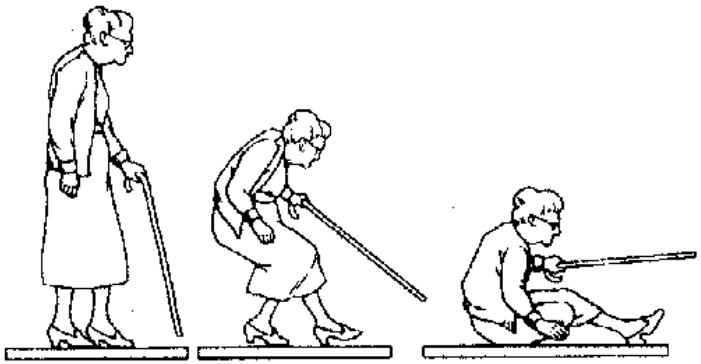
Have a bone density test

and take medication when appropriate

Testing is a simple, painless procedure

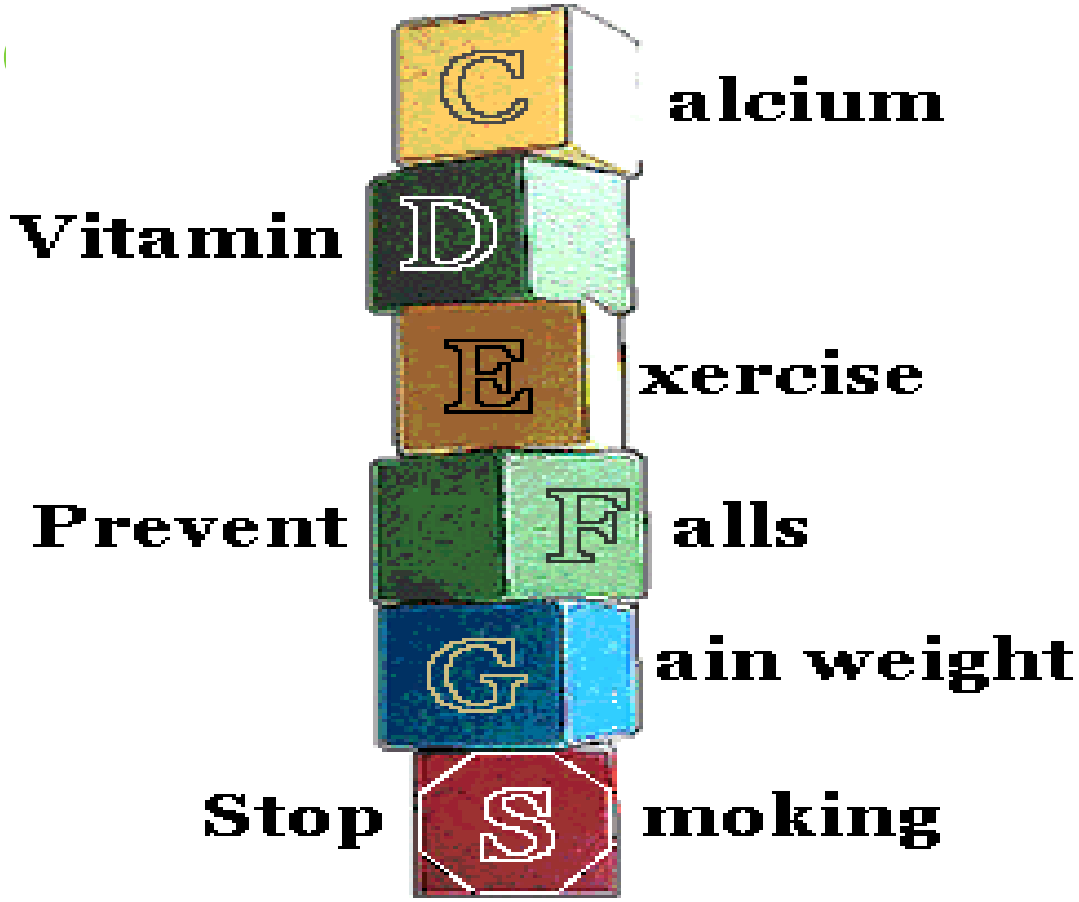
Hip Fracture Prevention: Falling

How do Older Adults Fall



Older people tend to collapse downwards often landing directly on a hip. A fall occurring while standing still or walking slowly has little forward momentum, therefore the principal point of impact will be near the hip.

Bone Health Building Blo



The good news: Osteoporosis is preventable for most people!