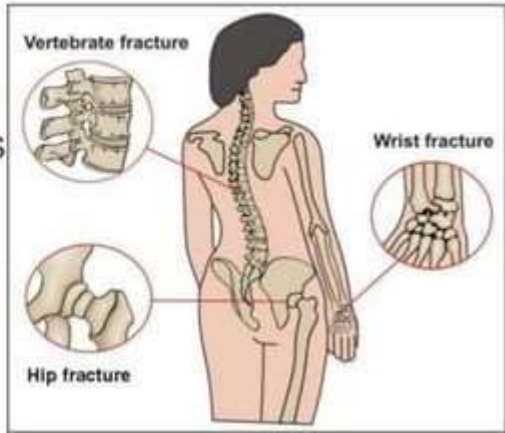
OSTEOPOROSIS

What is it?

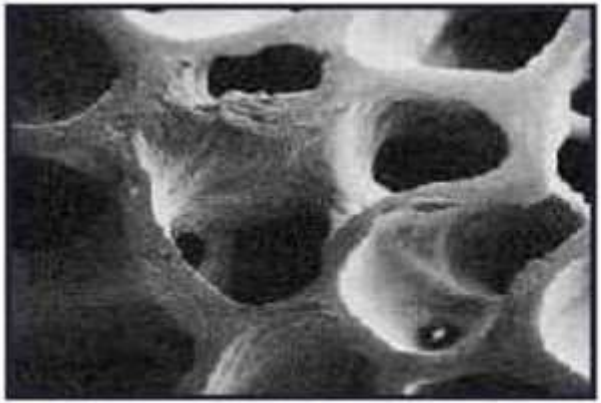
- **metabolic skeletal disease characterized by low bone density and microarchitectural deterioration of bone tissue which results in increased bone fragility and susceptibility to fracture.**

- The vertebrae ,wrists ,and hips are the most common sites of fractures

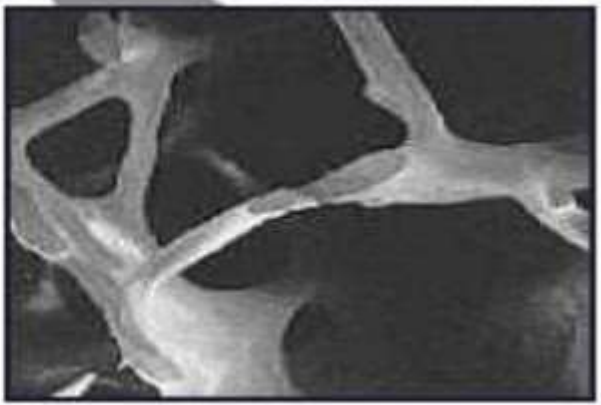


Section of bone showing osteoporosis

Normal Bone



Osteoporotic Bone



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Pathophysiology

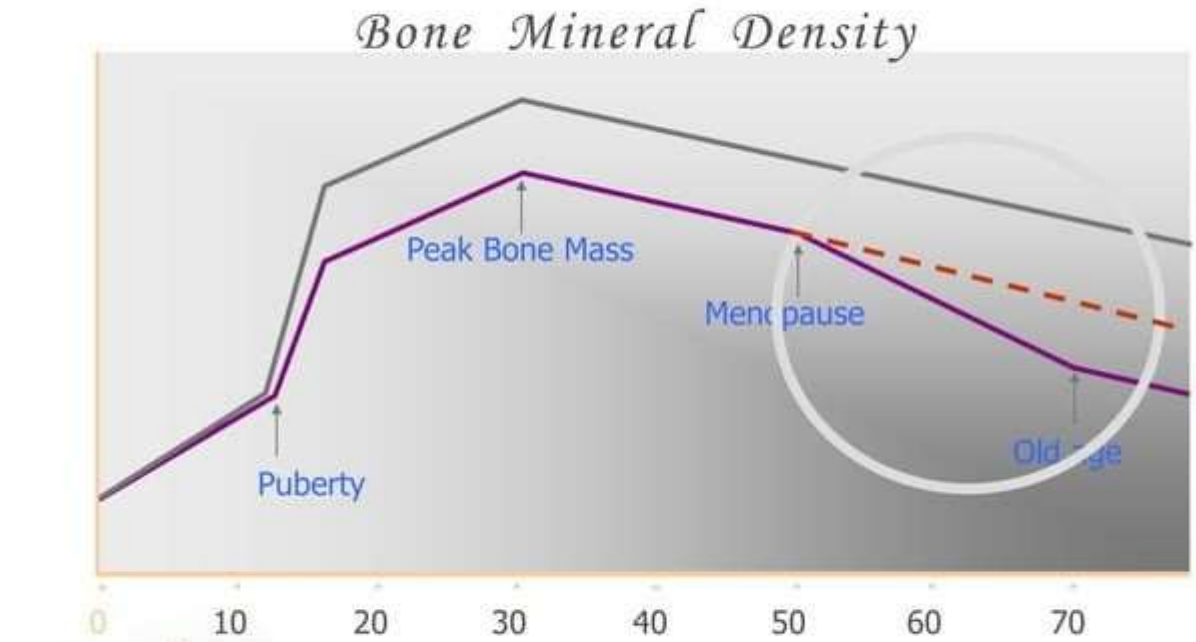
Result of prolonged imbalance of *Bone Remodeling*;

- Bone remodeling occurs throughout an individual's lifetime.
- In normal adults, the activity of osteoclasts (bone resorption) is balanced by that of osteoblasts (bone formation).
- normal bone remodeling in the adult result in gradually increase bone mass until the early 30s.

* **with ageing** the peak bone mass is gradually decrease and

1. Calicitonin which inhibit bone resorption and promote bone formation. (decrease)
2. Estrogen which inhibit bone breakdown. (decrease)
3. PTH increase bone turnover and resorption. (increase)

Bone Remodeling



Risk Factors

-female more than male.
-increase age.
-inadequate intake of calcium and vit D.
-estrogen deficiency or menopause.
-family history.
- Lack of physical activity .
-Smoking , alcohol consumbtion
-medication. (corticosteroids, antiseizure)
- low weight and body mass index.
-caucasian, asian.

Causes of Osteoporosis:

(A) **Idiopathic age-related osteoporosis (most common):**

(1) Young adults

(2) Postmenopausal (type I)

(3) Senile (type II)

(B) Osteoporosis secondary to disease states:

1. Metabolic conditions
e.g calc. deficiency, vit. D deficiency, malnutrition, scurvy.

2. Endocrine conditions
e.g, Hyperparathyroidism.

3. Renal disease.

4. Gastrointestinal-liver disease.

5.Bone marrow infiltration
e.g, leukemia.

7. Drugs

e.g Phenobarbital, Thyroid hormones, Corticosteroid.

8. Life style

e.g Nutnition, alcohol, smoking, inactivity, immobilization, excessive caffeine

9. Miscellaneous

e.g Rh. arthritis ..

Signs and symptoms

- Osteoporosis has been called "silent disease" because bone mass is lost over many years with no sings or symptoms.

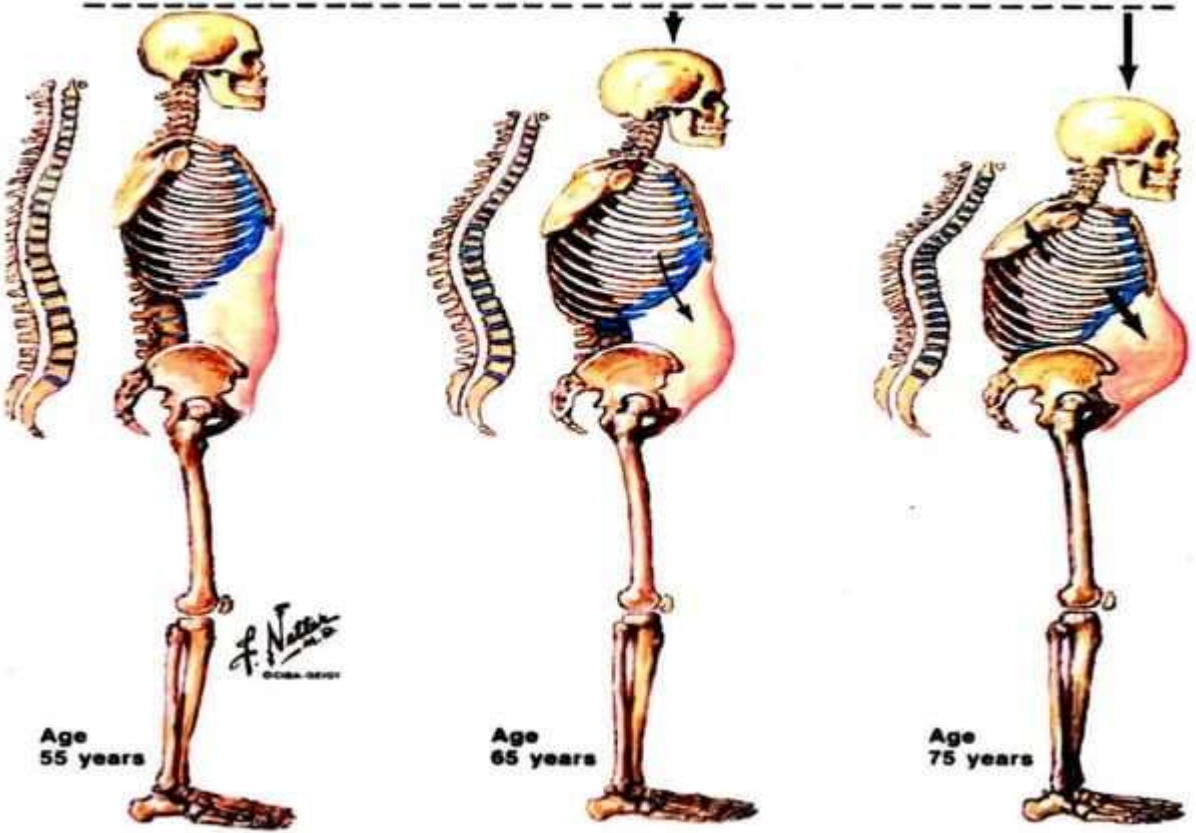
C\M: •

1.Loss of height.

2.Back pain.

3. vertebrae collapse. (dowager's hump)

Progressive Spinal Deformity in Osteoporosis



Diagnosing Osteoporosis

1.x-ray studies: determine bone density.

2. radiographic: bone mass. (osteopenia).

3.ultrasonography:determine bone density.

4. Dual-energy x-ray absorptiometry **(DEXA)** is the preferred modality for measuring bone mineral density (BMD).

Prevention and medical managment

- The main goal of treatment is to prevent development of osteoporosis and to stabilize remaining bone mass.

(1) A calc. rich diet esp. in childhood.

- adolescents may need 1200mg and postmenopausal women may need 1500mg daily.
- Milk, cheese and yogurt are rich in calcium.
- Elderly should be advised to take 400-800 units of Vit. D daily

Comes (from 2 sources : the sun and Fortified dairy products, egg yolks, saltwater fish, and liver)

(2) Never Smoking

(3) Exercise

- Exercising regularly in childhood and adolescence can ensure that you will reach peak bone density.

(4) Alcohol , caffeine intake should be avoided.

(5) Women with low body w.t (those with eating disorders) should receive appropriate evaluation, Rx and dietary counseling.

DRUG THERAPY

1.**calcitonin**: a synthetic thyroid hormone usually prescribe as a daily nasal spray to reduce factors that cause loss of calcium and increase reabsorption of calcium in the gastrointestinal tract.

2. **Selective Estrogen Receptor Modulators**.

3. **Hormone Replacement Therapy:** to increase serum estrogen levels, which in turn decrease the rate of bone resorption.