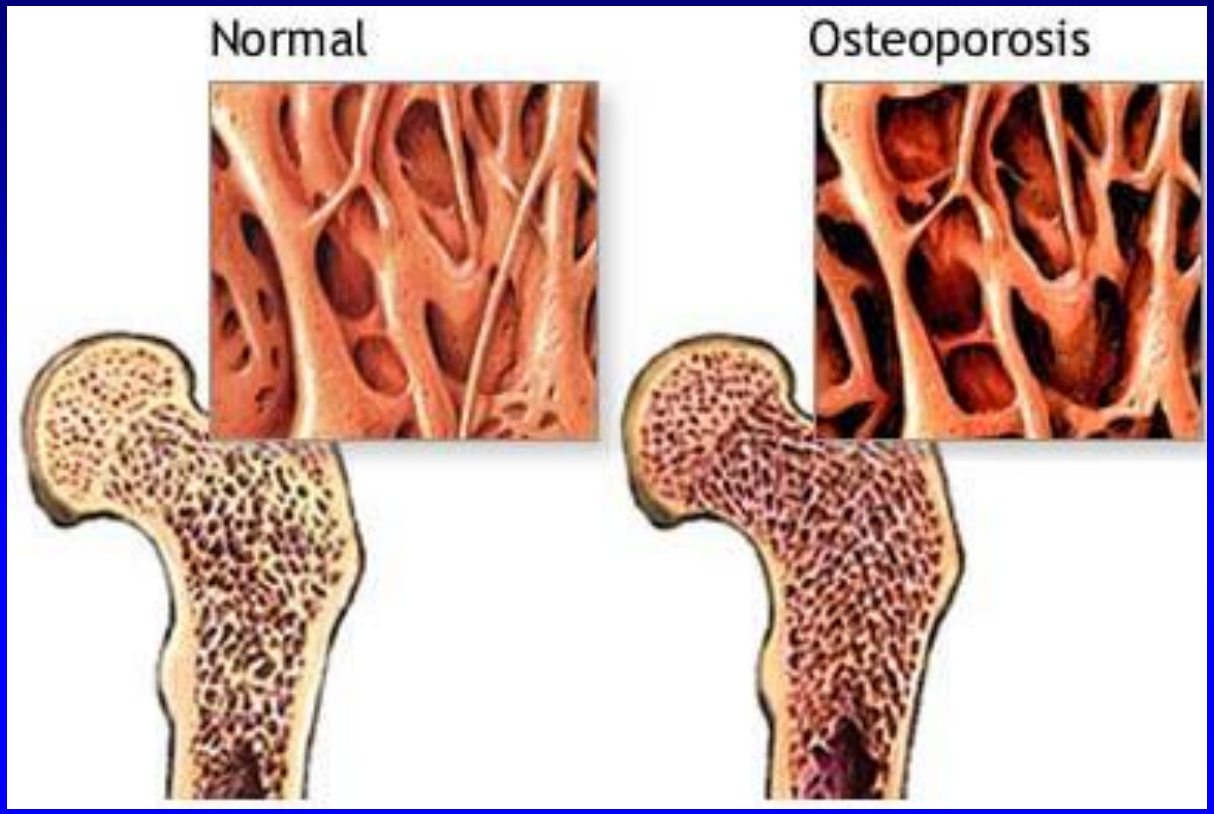

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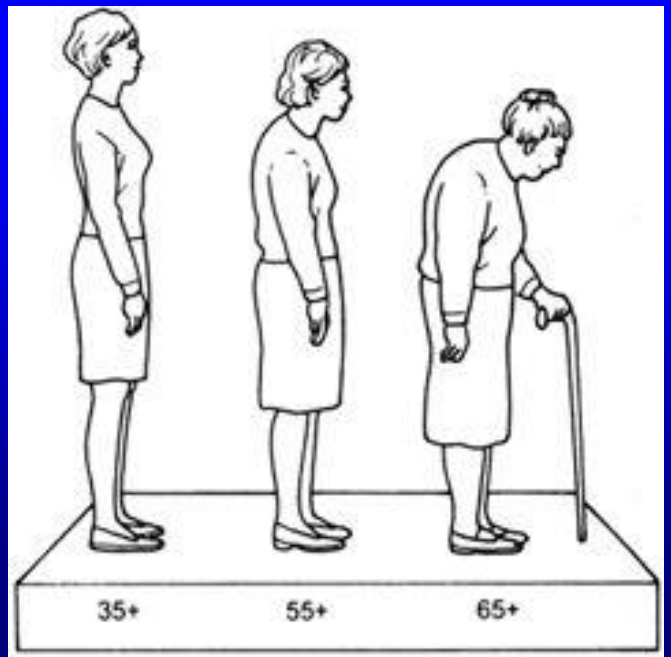
- Osteoporosis：clinical disorder is characterized by an abnormally low bone mass and defect in bone structure
- In most cases, bones weaken when low levels of calcium, phosphorus and other minerals in the bones and results as low bone density.
- A common result of osteoporosis is fractures of the spine, hip or wrist.
- Although it's often thought of as a women's disease, osteoporosis also affects many men.

SYMPTOMS

- Back pain, which can be severe if fractured or collapsed vertebra
- Loss of height over time, with an accompanying stooped posture
- Fracture of the vertebrae, wrists, hips or other bones



Normal bone has the appearance of a honeycomb matrix (left). Under a microscope, osteoporotic bone (right) looks more porous.

Secondary osteoporosis

Table 7.4 Causes of secondary osteoporosis

Nutritional
Malabsorption
Malnutrition
Scurvy

Inflammatory disorders
Rheumatoid disease
Ankylosing spondylitis
Tuberculosis

Drug induced
Corticosteroids
Excessive alcohol consumption
Anticonvulsants
Heparin
Immunosuppressives

Endocrine disorders
Gonadal insufficiency
Hyperparathyroidism
Thyrotoxicosis
Cushing's disease

Malignant disease
Carcinomatosis
Multiple myeloma
Leukaemia

Other
Smoking
Chronic obstructive pulmonary disease
Osteogenesis imperfecta
Chronic renal disease

RISK FACTORS

- **1. Sex** – Fractures from osteoporosis are about twice more in women than in men. Risk in women at menopause (45 yrs) that accelerates bone loss. Risk in men is greater than age 75.
- **2.Age**. The older, the higher risk of osteoporosis. Bones become weaker as ages.
- **3.Race**. Greatest risk – white or of Southeast Asian descent. Black and Hispanic men and women have a lower, but still significant, risk.

- **4.Family history**. Osteoporosis runs in families. Parent or sibling with osteoporosis puts at greater risk, especially if having a family history of fractures.
- **5.Frame size**. Men and women who are exceptionally thin or have small body frames tend to have higher risk because they may have less bone mass to draw from as they age.
- **6.Lifetime exposure to estrogen**. The greater a woman's lifetime exposure to estrogen, the lower her risk of osteoporosis.

- **7.Eating disorders**. Women and men with anorexia nervosa are at higher risk of lower bone density in their lower backs and hips.
- **8.Sedentary lifestyle**. Bone health begins in childhood. Children who are physically active and consume adequate amounts of calcium-containing foods have the greatest bone density. Exercise throughout life is important, but can increase bone density at any age.

- **9.Low calcium intake**. A lifelong lack of calcium plays a major role in the development of osteoporosis.
- **10.Excess soda consumption**. The link between osteoporosis and caffeinated sodas isn't clear, but caffeine may interfere with calcium absorption and its diuretic effect may increase mineral loss. In addition, the phosphoric acid in soda may contribute to bone loss by changing the acid balance in the blood.

- **11.Medical conditions and procedures that decrease calcium absorption**. Stomach surgery (gastrectomy) can affect the body's ability to absorb calcium.
- **12.Depression**. People who experience serious depression have increased rates of bone loss.

TESTS AND DIAGNOSIS

- Osteopenia refers to mild bone loss that isn't severe enough to be called osteoporosis, but that increases the risk of osteoporosis.

Dual energy X-ray absorptiometry

- The best screening test is dual energy X-ray absorptiometry (DEXA) – measures the density of bones in the spine, hip and wrist and it's used to accurately follow changes in these bones over time.
- Ultrasound
- Quantitative CT scanning

National Osteoporosis Foundation Guidelines

- Counsel all women on risk factors for osteoporosis
- Perform BMD tests for all postmenopausal women with fractures
- Recommend BMD for:
  - postmenopausal women <65 years with 1 or more risk factors
  - all women >65 years

COMPLICATIONS

- Fractures are the most frequent and serious complication of osteoporosis.
- Often occurs in spine or hips – bones that directly support your weight.
- Hip fractures and wrist fractures from falls are common.
- Compression fractures can cause severe pain and require a long recovery. If many such fractures, can lose several inches of height as the posture becomes stooped.

TREATMENTS AND DRUGS

- Hormone therapy (HT)
- Prescription medications – Bisphosphonates, Raloxifene (Evista) / selective estrogen receptor modulators (SERMs), Calcitonin, Teriparatide (Forteo), Tamoxifen.
- Emerging therapies – New physical therapy program combines the use of a device called a spinal weighted kypho-orthosis (WKO), a harness with a light weight attached and specific back extension exercises. The WKO is worn daily for 30 minutes in the morning and afternoon.

National Osteoporosis Foundation Guidelines

Treatment/Prevention

- Calcium intake 1200 mg/day
- Vitamin D 400-800 IU/day for high-risk patients
- Regular weight-bearing, muscle-strengthening exercise
- Avoid smoking; moderate alcohol consumption
- Treat all vertebral and hip fracture cases
- Consider prophylactic treatment if:
  - T-score below –2.0
  - T-score below –1.5 with risk factors
- HRT is first-line therapy

ESTIMATED DAILY CALCIUM INTAKES

Age group	Estimated adequate daily calcium intake, mg/day
Young children (1-3 years)	500
Older children (4-8 years)	800
Adolescents and young adults (9-18 years)	1300
Men and women (19-50 years)	1000
Men and women (51 and older)	1200

Source: Lindsay et al. Harrison's Principles of Internal Medicine, 16th ed.

RECOMMENDED DAILY INTAKE OF VITAMIN D

Age group	Recommended daily intake, IU
Adults <50 years	200
Adults between 50 and 70 years	400
Adults >70 years	600

Source: Lindsay et al. Harrison's Principles of Internal Medicine, 16th ed.

Nursing Interventions

- 1. Promoting Understanding of Osteoporosis and the Treatment Regimen
- Patient teaching focuses on factors influencing the development of osteoporosis, interventions to arrest or slow the process, and measures to relieve symptoms. It is emphasized that all people continue to need sufficient calcium, vitamin D, and weight-bearing exercise to slow the progression of osteoporosis.

- 2. ***Relieving Pain***

  Relief of back pain resulting from compression fracture may be accomplished by resting in bed in a supine or side-lying position several times a day.. Intermittent local heat and back rubs promote muscle relaxation. The nurse instructs the patient to move the trunk as a unit and to avoid twisting. trunk orthosis (eg, lumbosacral corset) may be worn for temporary support and immobilization

- 3. ***Improving Bowel Elimination***

  Constipation is a problem related to immobility and medications. Early institution of a high-fiber diet, increased fluids, and the use of prescribed stool softeners help prevent or minimize constipation.

- 4. ***Preventing Injury***

  Physical activity is essential to strengthen muscles, improve balance, prevent disuse atrophy, and retard progressive bone demineralization. Isometric exercises can strengthen trunk muscles. The nurse encourages walking, good body mechanics, and good posture. Daily weight-bearing activity, preferably outdoors in the sunshine to enhance the body's ability to produce vitamin D, is encouraged. Sudden bending, jarring, and strenuous lifting are avoided.