



جامعة الإمام عبد الرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY

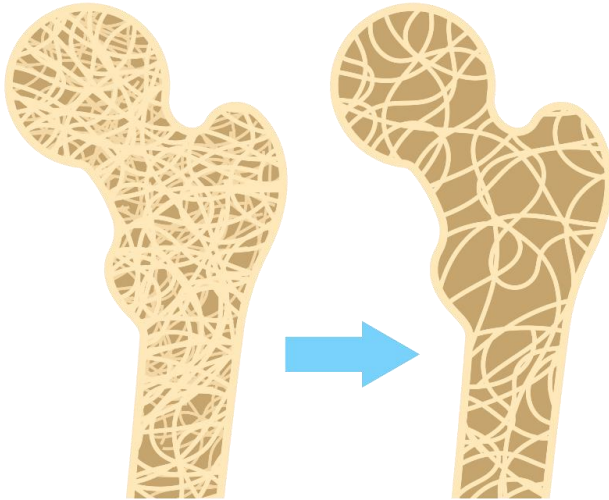
مستشفى الملك فهد الجامعي
King Fahad Hospital The University

Osteoporosis and Spine Health



What is Osteoporosis?

Osteoporosis is a bone disorder characterized by a reduction in bone mineral density and mass, or changes in the bone's structure and strength. This weakening of the bones increases the likelihood of fractures.



What are osteoporosis causes and risk factors?

+ Primary osteoporosis (most common)

1. Type I: postmenopausal osteoporosis:

- Estrogen helps promote bone formation by stimulating osteoblasts and inhibits bone resorption by osteoclasts.
- After menopause, the decline in estrogen levels leads to an increase in bone resorption, causing bone loss.

2. Type II: **senile osteoporosis**: A gradual loss of bone mass that occurs with aging, especially in individuals over 70 years old.



What are osteoporosis causes and risk factors?

Primary osteoporosis (most common)

3. Idiopathic osteoporosis

- Idiopathic juvenile osteoporosis (Very rare form of osteoporosis that manifests in patients 8–13 years of age, may resolve spontaneously a few years after puberty.)
- Idiopathic osteoporosis in young adults (seen in individuals **under 50 years** of age).



What are osteoporosis causes and risk factors?

Secondary osteoporosis

1. Drug-induced

- Often caused by long-term use of medications like corticosteroids, anticonvulsants, L-thyroxine, anticoagulants, proton pump inhibitors, and certain cancer medications.
- Other medications that may contribute include:
 - Anticonvulsants (e.g., phenytoin, carbamazepine)
 - L-thyroxine (used for hypothyroidism)
 - Anticoagulants (e.g., heparin)
 - Proton pump inhibitors (used for GERD)
 - Certain cancer medications
- Endocrine/metabolic factors.

What are the causes and risk factors of osteoporosis?

Additional risk factors

- Alcohol overuse.
- Smoking.
- Insufficient physical activity.
- Malabsorption such as celiac disease and malnutrition such as low calcium & vitamin D diet, loss of appetite.
- Weight loss
- Osteoporosis family History
- Previous recurrent fractures.



What are the symptoms of osteoporosis?

- Often shows no symptoms until a fracture occurs.
- Pathological fractures that happen from everyday activities, like bending or sneezing, or from minor trauma, such as falling from a standing position.
- **Common Sites of Major Fragility Fractures:**
 - Vertebral Compression Fractures (the most common)
 - Femoral Neck Fractures
 - Radius Fractures
 - Other long bones, such as the humerus.



How to diagnose osteoporosis?

Screening is recommended in the following cases:

- Women \geq 65 years old every 10 years
- Women $<$ 65 years old with increased risk
- **Bone Mineral Density scan:** The preferred method is DXA of the lumbar spine and hips. This noninvasive technique screens for osteoporosis by measuring bone mineral density, typically in the lumbar spine and hips, using two X-ray beams with different energy levels.



How to diagnose osteoporosis?

- Diagnostic criteria for osteoporosis met: Initiation of treatment for osteoporosis.
- Fracture risk assessment
- **Imaging:** Xray indicates if fractures are suspected.
- **Laboratory evaluation:**
 - Primary osteoporosis: Phosphate, calcium and parathyroid hormone (PTH) levels are usually normal.
 - Secondary osteoporosis: Abnormally increased or decreased depending on the underlying pathology.
- **Radiography:** X-rays if fractures are suspected.



How to prevent and treat osteoporosis?

1. Non-pharmacological:

- Calcium and vitamin D intake
- Encourage physical activity, including strength (resistance) and balance training. (Physical activity prompts bone growth and maintenance)
- Smoking cessation for smokers
- Limitation of caffeine and corticosteroids use

2. Pharmacological:

- Antiresorptive Agents e.g., bisphosphonates once a week and denosumab intramuscular injection every 6 months.
- Parathyroid hormone or calcitonin
- Hormonal therapies e.g., selective estrogen receptor modulators.

How to prevent and treat osteoporosis?

3. Surgical:

- If osteoporosis symptoms do not improve with medication, exercise, and diet after three months, surgery might be the only option.
- Two minimally invasive surgical procedures for spinal fractures caused by osteoporosis are
 - Kyphoplasty
 - Vertebroplasty



References and resources:

NCBI, MOH, NIH, Mayo clinic

All illustrations used from canva.com

Review and audit:

The content of this booklet has been reviewed by Neurosurgery
consultants at King Fahad University Hospital.

Neurosurgery Department
Health Awareness Unit
IAU-24-596



جامعة الإمام عبد الرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY

مستشفى الملك فهد الجامعي
King Fahad Hospital The University