

**When
Moving
Hurts**



**Assess
Understand
Take Action**

GLOBAL YEAR AGAINST MUSCULOSKELETAL PAIN

OCTOBER 2009 – OCTOBER 2010

Osteoporosis

Introduction

Osteoporosis is a systemic disorder characterized by decreased bone mass and microarchitectural deterioration of bone tissue, leading to bone fragility and increased susceptibility to fractures of the hip, spine, and wrist. Due to its important prevalence worldwide, osteoporosis is considered a serious public health concern associated with disability and pain.

Epidemiology and Economics

- Osteoporosis affects over 200 million people worldwide.
- One in three females and one in eight males will develop osteoporosis.
- The combined lifetime risk of hip, forearm, and vertebral fractures coming to clinical attention is around 40%, which is equivalent to the risk of cardiovascular diseases.
- In women above 45 years of age, osteoporosis accounts for more days in hospital than diseases such as diabetes, myocardial infarction, and breast cancer.
- In the United States, osteoporosis causes more than 44 million patient-days in nursing homes and an estimated US\$13.8 billion in annual health care expenditures
- Vertebral fractures are a significant component of osteoporosis because the first osteoporotic fractures typically occur in the central region of the spine (thoracic and lumbar vertebrae) during the early stages of the disease. New fractures are most likely to occur in vertebrae adjacent to those with fractures.
- Vertebral fractures may be accompanied by acute onset of pain, which may disappear or become chronic, dull back pain.

Pathophysiology

The pathophysiology of osteoporosis is an imbalance between bone resorption and bone formation. In osteoporosis, bone resorption takes place to a greater extent than bone formation, so a negative balance occurs with a net loss of bone and an accompanying increasing risk of fractures, resulting in deformity and chronic pain. Nociceptive pain is considered to be chronic when it has been present for at least 3 months.

The imbalance between bone formation and bone resorption might occur as a result of one or a combination of the following factors:

- Increased bone resorption within a remodeling unit.
- Decreased bone formation within a remodeling unit (incomplete coupling).

Clinical Features

- Osteoporosis is called the “silent disease” because bone loss by itself does not cause any symptoms. Patients may be asymptomatic for years, until fractures begin to occur. Most of the chronic pain typical of osteoporosis results from fractures, which may develop after minimal, inapparent, or no trauma.
- Multiple thoracic compression fractures eventually cause dorsal kyphosis, with exaggerated cervical lordosis (“dowager’s hump”). Abnormal stress on the spinal muscles and ligaments causes chronic, dull, aching pain, particularly in the lower back.
- Back pain associated with vertebral fractures is one of the most important factors impairing quality of life.

Diagnostic Criteria

Osteoporosis is characterized by low bone mineral density. However, as osteoporosis is widely underdiagnosed, the first clinical symptom is often a low-energy fracture of the spine or hip.

Diagnosis and Treatment

- Osteoporosis is diagnosed either through:
 - Measurement of bone mineral density by means of a bone scan (Dual Energy X-ray Absorptiometry scan [DEXA-scan]).
 - The presence of a low-energy fracture in either the spine or hip.
- The intensity of nociceptive pain can be measured using a numerical rating scale.
- The fundamental management goals for patients with osteoporosis are to prevent fractures, decrease pain when present, and maintain function. A combination of options should be used, including not only medical interventions, but also physical therapy (including TENS), psychological support, and exercise. The options include:
 - Lifestyle changes
 - Exercise regimens tailored to individual patient abilities (i.e., the intensity/resistance of exercise might need to be adjusted to bone mineral density)
 - Nutritional supplements (vitamin D and calcium)
 - Medications proven to stop further bone loss
 - Analgesics
 - i. Simple analgesics
 - ii. Nonsteroidal anti-inflammatory drugs
 - iii. Tricyclic antidepressants, serotonin reuptake inhibitors, and antiepileptics
 - iv. Strong opioids

References

1. Riggs BL, Melton LJ III. The worldwide problem of osteoporosis: insights afforded by epidemiology. *Bone* 1995;17(Suppl):505–11.
2. Francis RM, Aspray TJ, Hide G, Sutcliffe AM, Wilkinson P. Back pain in osteoporotic vertebral fractures. *Osteoporos Int* 2008;19:895–903.

