

Osteoporosis: Key Information

What is osteoporosis?¹

Osteoporosis, which literally means “porous bone”, is a disease in which the density and quality of bone are reduced. As the bones become more porous and fragile, the risk of fracture is greatly increased. The loss of bone occurs “silently” and progressively. Often there are no symptoms until the first fracture occurs.



Fractures associated with osteoporosis occur most commonly at the wrist, hip and spine. In the short term, spine fractures (vertebral compression fractures) can cause intense pain, and may eventually result in a gradual loss of movement and the inability to carry out daily chores. They can lead to loss of height, and in severe cases the spine may curve to form what is termed a “dowager’s hump”.

In Europe, 24% of women and 33% of men die within one year of a hip fracture². Among those who survive, approximately 40% are unable to walk independently and up to 80% are not completely able to perform instrumental activities of daily living³. As a result, about a third of these patients live in care facilities in the year after the fracture⁴. In Asia, it is expected that the statistics are similar, and perhaps higher due to lack of surgical treatment and rehabilitation in rural areas.

Fractures caused by osteoporosis in women over 45 years are responsible for more days spent in hospital than most other diseases, including breast cancer or heart attack. The lifetime risk for a woman or man of dying from hip fracture complications is the same as for dying of breast or prostate cancer, respectively.

However, testing for osteoporosis is quick, easy and painless, and there are a number of different treatments available that can reduce the risk of vertebral fractures by up to 65% and non-vertebral fractures by up to 70%.

How does osteoporosis develop?

Bones are made of living, dynamic tissue. Throughout life, old bone tissue is removed and new bone tissue is formed. The critical years for building bone mass are during childhood and adolescence when new bone is formed more quickly than old bone is removed, causing bones to become larger and denser. This pace continues until around the mid 20’s when peak bone mass is normally reached. Although a person’s peak bone mass is determined largely by genetic factors, other factors such as nutrition, physical activity and disease also influence bone development.

Bone tissue loss generally begins after the age of about 40 years, when individuals are no longer able to replace bone tissue as quickly as it is lost. In women, the rate of bone tissue loss increases after menopause, when oestrogen production stops and bones no longer benefit from its protective effect. Men also suffer from loss of bone tissue, but the rate of loss is much slower than in women. At this stage in life, preventive measures will help to slow the rate of bone tissue thinning and reduce the risk of having osteoporosis-related fractures.

The best time in life to ensure bone health for the future is when young. Exercise and good nutrition, with plenty of calcium rich foods accompanied by enough regular sunshine to maintain vitamin D production in the body, makes for strong bones. However individuals can still contribute positively to

bone health later on in life. The same things that make bones strong in youth also help later on. For patients diagnosed with osteoporosis, there are also various treatments available that slow down the rate of bone loss.

How common is osteoporosis?

Osteoporosis is a global problem. Current estimates for the total number of sufferers set the figure at 75 million for Europe, the United States and Japan. This figure is projected to double within 50 years. It is also estimated that around 225 million people in Europe, the United States and Japan have low bone mass – termed ‘osteopenia’.

References available on www.iofbonehealth.org:

EUROPE

- In 2000, there were an estimated 4 million new fractures, with 8 fractures each minute or one every 8 seconds. The number of osteoporotic fractures was estimated at 3.79 million of which 0.89 million were hip fractures. The total direct costs were estimated at €31.7 billion (£21 billion) which were expected to increase to €76.7 billion (£51 billion) in 2050 based on the expected changes in the demography of Europe.
- Bone mineral density measurement is underutilized in majority of European countries. Reasons include limited availability of densitometers, restrictions in personnel permitted to perform scans, low awareness of usefulness of BMD testing, limited or nonexistent reimbursement.

ASIA

- By 2050 > 50% of all osteoporotic fractures will occur in Asia.
- The incidence of hip fracture has risen already 2- to 3-fold in most Asian countries during the past 30 years.
- The incidence of hip fracture in mainland China, which was one of the lowest in the world in 1988, at 10 per 10,000 in both men and women, has risen markedly- today 6.99 million Chinese over age 50 suffer from osteoporosis with 687,000 hip fractures each year.
- In Hong Kong *SAR* the incidence of hip fracture had increased by 300% from the 1960s to the 1990s.
- In Singapore, the incidence of hip fracture in 1998 was 5 times the incidence observed in the 1960s.

LATIN AMERICA

- From 1990 to projections in 2050 the number of hip fractures for women and men aged 50-64 in Latin America will increase by 400%. For age groups older than 65 the increase will be a staggering 700%
- Latin Americans will suffer an estimated 655,648 hip fractures in 2050, at an estimated direct cost of \$13 billion.
- In a study of five Latin American countries (Argentina, Brazil, Colombia, Mexico and Puerto Rico), the prevalence of vertebral fractures in women over 50 years of age was about 15%, with 7% occurring within the 50-60 years old age group and increasing to 28% for those greater than 80 years old.

One in three women and one in five men over the age of 50 years will suffer an osteoporotic fracture. The hormonal changes that take place at menopause are one reason why women are at greater risk than men.

There are a number of other risk factors associated with osteoporosis:

- A close family member diagnosed with osteoporosis;
- A family history of fractures resulting from minor bumps and falls;
- Frequent falls;
- A previous fracture;
- Long-term enforced bed rest;
- Little physical activity;



International Osteoporosis Foundation

- Low body weight;
- Loss in height;
- Periods stop for more than 12 months;
- A diet low in calcium and vitamin D;
- High alcohol intake;
- Smoking;
- Certain medications in long-term use such as corticosteroids;
- Age 60+;
- Chronic disorders such as anorexia nervosa, malabsorption syndromes including coeliac disease and Crohn's disease, chronic liver disease, primary hyperparathyroidism, post-transplantation, chronic renal failure, hyperthyroidism, Cushing's syndrome, arthritis, etc.

The economic burden of osteoporosis

Osteoporotic fractures impose a significant financial burden to individuals, and health services⁶. In Asia, a general lack of solid epidemiological and economic data is a major hindrance in convincing health authorities about the economic burden of osteoporosis, but local studies suggest the cost in terms of socio-economic burden is immense. For example, In Hong Kong SAR the acute hospital care cost of hip fracture in 2006 amounted to 2% of the total hospital budget (unpublished data). The burden is thought to be especially severe in many rural areas, where hip fracture patients are often treated conservatively at home, without the benefit of surgery and rehabilitation. The result: premature death for as many as one in five, immense personal suffering, lost productivity and long-term dependence on family members.

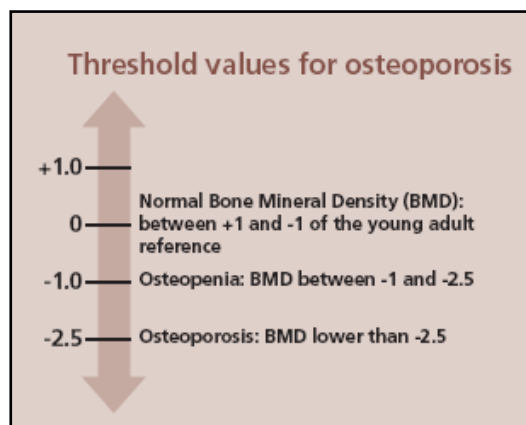
The importance of early diagnosis

Men and women over 60 years are at higher risk of osteoporosis than younger people. As osteoporosis has no obvious symptoms other than a fracture when the bone is already significantly weakened, it is important that those with risk factors see a physician.

A physician will take a thorough medical history that includes information on any recent fractures and may determine that the next step is to have a bone mineral density (BMD) test. A number of different types of BMD tests are available, but the most accurate is DXA (dual energy X-ray absorptiometry). DXA is a low radiation X-ray capable of detecting quite low percentages of bone loss. It is used to measure spine and hip bone density.

The World Health Organization has defined a number of threshold values for osteoporosis. The reference measurement is defined as healthy bone density in a young female of around 25 years. Osteoporosis is diagnosed when a person's BMD is more than 2.5 standard deviations (SD) below this reference measurement. Osteopenia – decreased bone mass, but not as severe as osteoporosis – is diagnosed when the measurement lies between 1 and 2.5 SD below the young adult reference measurement.

If the results of the BMD test show osteoporosis, it does not automatically mean a fracture will follow. There are a number of therapies that may be prescribed to slow down the rate at which bone loss occurs and to help prevent fractures. In addition, there are important nutritional and lifestyle changes that can help reduce the risk of fracture.



Treating Osteoporosis

In addition to recommending lifestyle changes, doctors may prescribe drug therapy if osteoporosis is diagnosed. Today there are a number of effective treatment options available that have been shown to act quickly (within one year), to maintain bone density and to reduce the risk of fracture. It is important that the choice of treatment be tailored to a patient's specific medical needs and lifestyle. Common treatments that are currently available (although not in all countries) are: bisphosphonates (alendronate, ibandronate, risedronate, zoledronate), calcitonin, raloxifene, strontium ranelate, teriparatide and tibolone.

Calcium and vitamin D supplements are also usually prescribed, to ensure adequate intake, and to ensure maximum effectiveness of the drug therapy. Sufficient calcium, vitamin D and protein intake not only helps to prevent osteoporosis, it is also important in helping to maintain bone density and muscle function in patients diagnosed with osteoporosis. Calcium and vitamin D supplements are especially important for individuals at high risk of fracture.

Nutrition and lifestyle factors as well as exercise play an important role in osteoporosis prevention and management. By improving balance, muscle strength and agility, individually tailored exercise programs can also help to prevent falls. Special exercise programs, under professional supervision, can help with rehabilitation and pain relief after a fracture. Other major aspects of treatment are psychological and emotional support, which can be provided by health professionals and osteoporosis patient support groups. Such support can be of great help in lessening the feelings of isolation and depression experienced by many patients with severe osteoporosis. Practical help such as advice on how to reduce the risk of falling, assistive devices such as walkers and hip protectors, and techniques for 'safe movement' in everyday activities such as walking, reaching/lifting, housework and gardening, is also very important.

¹ International Osteoporosis Foundation website www.iofbonehealth.org

² *Osteoporosis in Europe: Indicators of progress*. European Parliament Osteoporosis Interest Group. Accessed at <http://www.iofbonehealth.org/publications/eu-policy-report-of-2005.html> on 25 August 2009

³ Cooper C. The crippling consequences of fractures and their impact on quality of life. *Am J Med* 1997;103:12S–17S

⁴ *Facts and statistics about osteoporosis and its impact*. International Osteoporosis Foundation. Accessed at <http://www.iofbonehealth.org/facts-and-statistics.html> on 25 August 2009

⁵ *New study shows that osteoporosis accounts for significant 'burden of disease' worldwide*. International Osteoporosis Foundation. Accessed at <http://www.iofbonehealth.org/iof-articles/article-detail.html?articleID=27> on 02 September 2009

⁶ Cooper C. The crippling consequences of fractures and their impact on quality of life. *Am J Med* 1997;103:12S–17S