

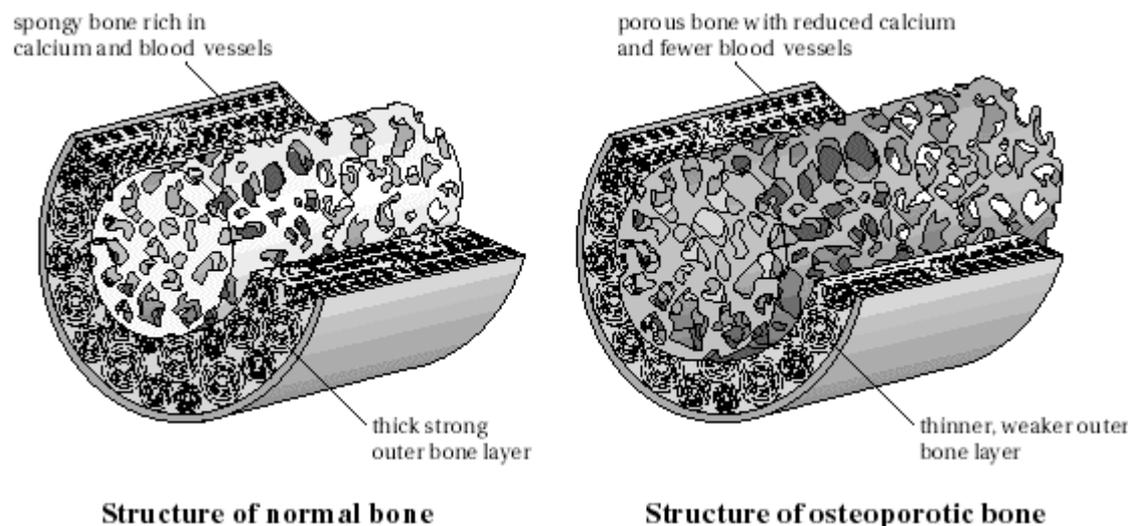
Osteoporosis

Osteoporosis means porous bones. Bones affected by osteoporosis are less dense than normal bones. They are also more likely to break, even as a result of a minor bump or fall, or even without an injury.

It is around four times more common in women than men, and most common in women who have been through the menopause. About three million people in the UK are affected - one in three women and one in 12 men over the age of 50. Each year there are around 70,000 hip, 120,000 spine and 50,000 wrist fractures due to osteoporosis.

What is osteoporosis?

The inside of a bone consists of a strong mesh made of protein and minerals (particularly calcium). This mesh is living tissue that is constantly being renewed by a process called bone turnover. Old, worn out bone is broken down and absorbed by the body while, at the same time, new bone tissue is created from fresh protein and minerals.



The structure of bone

In children and young people, more new bone is created than is broken down. This makes bones bigger and more dense.

The bones are at their strongest when the peak bone mass is reached, and this usually occurs in a person's mid-twenties. Peak bone mass is then maintained for about ten years, with roughly equal amounts of bone creation and breakdown. After the age of about 35, bone loss begins to overtake creation as part of the normal aging process. With osteoporosis, the process happens much more quickly, leading to premature bone weakness.

As well as bones, such as the wrist or hip, breaking more easily than usual, osteoporosis can result in small fractures of the bones in the spine. This can cause a curved back and a loss of height.

Low levels of oestrogen

The female hormone oestrogen reduces the amount of bone that is broken down and so helps to protect against osteoporosis. In women, the ovaries make oestrogen from puberty to the menopause. Any condition that reduces the number of years that a woman produces oestrogen tends to increase the risk of osteoporosis. These risks include:

- having an early menopause (before the age of 45),
- an early hysterectomy (before the age of 45, especially if both ovaries are removed),
- missing periods for six months or more as a result of over-exercising or over-dieting (especially due to anorexia).

Other risk factors

Men who have low levels of the male hormone, testosterone, are also at a higher risk of osteoporosis. For both men and women, the following factors also increase the risk of developing osteoporosis:

- Long-term use of **steroid** tablets
- A **family history** of broken hips,
- **Digestive disorders** that affect absorption of nutrients, such as Crohn's disease or ulcerative colitis,
- **Lack of exercise** Moderate weight bearing exercise keeps the bones strong during childhood and throughout adulthood. Anyone who does not exercise, or has an illness or disability which makes exercise difficult, will be more prone to losing calcium from the bones, and so more likely to develop osteoporosis. Exercise is therefore very important in preventing osteoporosis.
- **Excessive exercise:** Those who exercise very intensively, in particular endurance athletes with low body weight, are at an increased risk of osteoporosis at certain sites in their body. This may result in frequent stress fractures or poor healing of sports injuries, in addition to overt bone fracture. Males and females can be affected, although the condition is more frequently diagnosed in females. See **The Female Athlete Triad** for further information.
- **Poor diet** A diet which does not include enough calcium or vitamin D can make osteoporosis more likely (see below).

- **Heavy smoking** Tobacco lowers the oestrogen level in women and may cause early menopause. In men, smoking lowers testosterone activity and this can weaken the bones.
- **Heavy drinking** A high alcohol intake reduces the ability of the body's cells to make bone.
- **Low body weight.**

Symptoms

Osteoporosis has been called the "silent disease". Most people affected are unaware that their bones are thinning until they experience a break, or notice more gradual signs such as height loss, or curvature of the spine (sometimes known as "dowager's hump").

The bones most likely to break as a result of osteoporosis are the hip, wrist and the vertebrae of the spine.

Prevention

People who reach a high peak bone density when they are young are less likely to develop osteoporosis. Bone density can be boosted by a healthy diet and regular exercise, particularly in people under 35. This means prevention needs to begin at a young age.

Diet

A varied, well-balanced diet is important to build and maintain healthy bones. A combination of bread and cereals, fruit and vegetables, milk and dairy products, and protein (from meat, fish, eggs, pulses, nuts and seeds) should provide the nutrients that your body needs.

Foods rich in calcium are especially valuable for healthy bones. Good sources include milk and dairy products, such as cheese and yogurt.

The body needs vitamin D to absorb calcium properly. About 15-20 minutes of daylight on the face and arms during the summer months will enable the body to store enough vitamin D for the rest of the year; you don't need to sunbathe. Vitamin D is also available in foods such as margarine and oily fish.

- If you are watching your weight it's worth knowing that skimmed or semi-skimmed milk actually contains more calcium than full-fat milk. We recommend a daily intake of calcium of 1000 milligrams (mg) or 1500 mg if you are over 60. A pint of milk a day, together with a reasonable amount of other foods which contain calcium, should be sufficient (see Table 1).

Vitamin D is needed for the body to absorb calcium. Vitamin D is produced by the body when sunlight falls on the skin, and it can be obtained from the diet (especially from oily fish) or vitamin supplements (see **arc** booklet 'Osteomalacia'). For people over 60 it may be helpful to take a supplement containing 10–20 micrograms (μg) of vitamin D.

Food	Calcium content
115 g (4 oz) whitebait (fried in flour)	980 mg
60 g (2 oz) sardines (including bones)	260 mg
0.2 litre (1/3 pint) semi-skimmed milk	230 mg
0.2 litre (1/3 pint) whole milk	220 mg
3 large slices brown or white bread	215 mg
125 g (4 1/2 oz) low-fat yogurt	205 mg
30 g (1 oz) hard cheese	190 mg
0.2 litre (1/3 pint) calcium-enriched soya milk	180 mg
125 g (4 1/2 oz) calcium-enriched soya yogurt	150 mg
115 g (4 oz) cottage cheese	145 mg
3 large slices wholemeal bread	125 mg
115 g (4 oz) baked beans	60 mg
115 g (4 oz) boiled cabbage	40 mg

Exercise

Exercises for Osteoporosis are very important and ideally should be customised to suit your needs.

Weight-bearing exercise helps to promote bone formation and bone health. Good exercises include running, skipping, aerobics, tennis, weight-training and brisk walking. Ideally, try to do this type of activity three times a week for at least 20 minutes.

Lifestyle

Smoking can have a harmful effect on bone and can also cause an early menopause. If you smoke, try to give up. You should also be careful not to drink too much alcohol.

Diagnosis

The condition can be suspected by identifying risk factors during a consultation with your doctor. A scan (DEXA scan) will measure the density of the bones, typically lumbar spine and hip.

How can osteoporosis be treated?

Apart from the preventative measures already described there are other treatments available if you have osteoporosis. These may slow down the loss of bone or reduce the risk of fractures.

- **Calcium and vitamin D:** As mentioned earlier, people over 60 may benefit from taking small daily amounts of vitamin D, along with 1500 mg of calcium. Stronger vitamin D preparations are also commonly used.
- It should be noted that **Vitamin D insufficiency is a common problem in many individuals**. For more information on **Vitamin D**, [click here](#).
- **Bisphosphonates:** This group of drugs works by slowing bone loss; in many people, an increase in bone density can be measured over 5 years of treatment. Both **alendronate (Fosamax)** and **risedronate (Actonel)** reduce the risk of hip and spine fractures in patients with osteoporosis. Bisphosphonates can be administered by tablet form or by an intravenous infusion. The oral form of the drugs cannot be taken with food, and specific instructions on how to take the tablets are provided as they can cause irritation of the gullet. They are available either as daily-dose tablets or weekly-dose tablets. The infusions have the advantage of possible greater effectiveness, and some can be given just once a year. They are particularly useful in those who have difficulty with taking weekly tablets. **Etidronate (Didronel)** is a slightly weaker drug of the same group, which is well tolerated and is taken in 3-month cycles.
- **Hormone replacement therapy (HRT):** Women who have been through the menopause may consider using hormone replacement therapy to reduce their menopausal symptoms. HRT is only beneficial for bones while it is being used. A very large clinical trial reported in 2002 that using the commonest type of HRT tablet is associated with a reduction in fracture, but also with an increase in the risk of heart disease and breast cancer. It can also increase the risk of *venous thrombosis*. If you are considering long-term HRT use, discuss the potential risks and benefits with your doctor.
- **Selective estrogen receptor modulators (SERMs):** As previously mentioned, the hormone oestrogen helps to keep the bones strong. **Raloxifene (Evista)** is a SERM which mimics this effect and reduces spine fractures. It also reduces the risk of breast cancer without increasing the risk of heart disease. It is taken by mouth once a day without the need to follow special instructions. It may cause side-effects like menopausal 'flushing' and, as with HRT, may increase the risk of venous thrombosis.

- **Calcitonin (Miacalcic):** Calcitonin is a substance which the body produces naturally and which helps keep the bones healthy. When used as a treatment it has enabled the bones of people with osteoporosis to grow stronger. Calcitonin can only be given in the form of an injection or by nasal spray. Injections of calcitonin are normally given only as a short-term treatment for painful vertebral fractures, but the nasal spray may be used as a long-term treatment for osteoporosis. Possible side-effects include hot flushes, nausea, an unpleasant taste in the mouth, tingling in the hands and, rarely, an allergic reaction. The nasal spray may also cause a blocked or runny nose, sneezing and headaches.
- **Teriparatide (Forsteo):** Teriparatide is an effective drug which helps new bone to form and therefore reduces the risk of fractures. It is taken by daily injection into the thigh or tummy (patients are shown how to do this themselves). It is used for up to 18 months, during which time the bones are strengthened. At present it is used mainly for people who have had fractures despite using other treatments, or who have had side-effects from other treatments. Side-effects of teriparatide include nausea, limb pain, headaches and dizziness, but because it is a new drug the long-term side-effects are not known.

Further information

National Osteoporosis Society

<http://www.nos.org.uk>

Arthritis Research Campaign

www/arc.org.uk