

## Osteoporosis

If you have osteoporosis it means that you have lost some bone material. Your bones become less dense. This makes them more prone to break (fracture). 'Thinning' of the bones (osteoporosis) mainly affects older people but it can affect someone of any age.

### What is osteoporosis?

Osteoporosis is a condition that affects bone strength. (The word osteoporosis literally means 'porous bones'). Bone tissue is made of tough, elastic fibres (collagen fibres) and gritty, hard material (minerals). It is a living tissue and contains cells that make, mould and take back up (resorb) bone.

Initially, as you grow, bone forms faster than it is resorbed. But, as you get older, this reverses. As a result, from about the age of 35, you start to lose a certain amount of bone material overall. Your bones become less dense and less strong. The amount of bone loss can vary. If you have a lot of bone loss then you have 'thinning' of the bones (osteoporosis).

If you have osteoporosis, your bones can break more easily than normal, especially if you have an accident such as a fall. If you have a milder degree of bone loss, this is known as osteopenia.

### How common is osteoporosis?

In England and Wales, more than two million women are thought to have 'thinning' of the bones (osteoporosis). Women lose bone material more rapidly than men, especially after the menopause when their levels of oestrogen fall. Oestrogen is a hormone and helps to protect against bone loss. At the age of 50, about 1 in 50 women have osteoporosis. This rises to 1 in 2 women at the age of 80.

However, osteoporosis can also affect men. Over a third of women and 1 in 5 men in the UK have one or more bone fractures because of osteoporosis in their lifetime.

## Can anyone get osteoporosis?

All men and women have some risk of developing 'thinning' of the bones (osteoporosis) as they become older, particularly over the age of 60. As mentioned above, women are more at risk than men. The following situations along with factors such as your age may also lead to excessive bone loss and so increase the risk of developing osteoporosis. If you:

- Are a woman and you [had your menopause before the age of 45](#).
- Have already had a bone fracture after a minor fall or bump.
- Have a strong family history of osteoporosis (that is, a mother, father, sister or brother affected).
- [Have a body mass index \(BMI\) of 18.5 or less](#) (that is, you are very underweight) - for example, [if you have anorexia nervosa](#). In this situation, your levels of oestrogen are often low for long periods of time and, combined with a poor diet, this can affect bones.
- Are a woman and your periods stop for six months to a year or more before the time of your menopause. This can happen for various reasons. For example, over-exercising or over-dieting.
- Have taken, or are taking, [a steroid medicine](#) (such as [prednisolone](#)) for three months or more. A side-effect of steroids is to cause bone loss. For example, long-term courses of steroids are sometimes needed to control arthritis or certain other conditions. [See the separate leaflet called Preventing Steroid-induced Osteoporosis for more details](#).
- Are a smoker.
- Have an alcohol intake of more than four units per day. [See the separate leaflet called Alcohol and Sensible Drinking for details of recommended safe limits of alcohol](#).
- Lack [calcium](#) and/or [vitamin D](#) (due to a poor diet and/or little exposure to sunlight).

- Are not very mobile. For example if you have to use a wheelchair, or are confined to a bed or chair and unable to get about.
  - Have, or had, certain medical conditions. Some conditions or their treatments add to the risk of osteoporosis. For example:
    - [An overactive thyroid gland](#).
    - [Coeliac disease](#).
    - [Cushing's syndrome](#).
    - [Crohn's disease](#).
    - [Chronic kidney disease](#).
    - [Rheumatoid arthritis](#).
    - [Chronic liver disease](#).
    - [Type 1 diabetes](#).
    - [Breast cancer](#) (aromatase inhibitors).
    - [Anticoagulants](#) (warfarin and heparin).
    - Any condition that causes poor mobility.
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### **Is osteoporosis hereditary?**

Osteoporosis is not hereditary but it is thought that there is a greater risk if there is a family history of osteoporosis.

## **Osteoporosis symptoms**

'Thinning' of the bones (osteoporosis) usually develops slowly over several years, without any symptoms. However, after a certain amount of bone loss, the following may occur.

### **A bone fracture after a minor injury such as a fall**

This is often the first sign of osteoporosis. If you have osteoporosis, the force of a simple fall to the ground (from the height of a standard chair or less) is often enough to fracture a bone. A simple fall to the ground such as this does not usually cause a fracture in someone without osteoporosis. A bone fracture after a minor injury like this is known as a fragility fracture.

The most common fragility fractures occur in the hip, the wrist and the bones that make up the spine (vertebrae). A fractured bone in an older person can have serious consequences in some people. For example, about half the people who have a hip fracture are unable to live independently afterwards because of permanent mobility problems. [See the separate leaflet called Hip Fracture.](#)

Having weaker bones does not in itself give you any symptoms. Unless you have had a fracture, aches and pains are NOT a symptom of osteoporosis. It does not cause pain other than as the result of a fracture. If you have not had a fracture and you have a pain, this will be due to another problem, not your osteoporosis. Having said that, fractures in the vertebrae are often not picked up. So if you have a new severe back pain and you know you have osteoporosis, you should tell your doctor. An [X-ray](#) can then be arranged to check you have not had a fracture.

### **Loss of height, persistent back pain and a bent forward (stooping) posture**

These symptoms can occur if you develop one or more fractured vertebrae. A vertebra affected by osteoporosis may fracture even without a fall or significant force on it. The vertebrae can become squashed following a fracture. If severe, a bent forward posture may affect your ability to go about your usual daily activities. It can also affect your breathing, as your lungs have less room to expand within your chest.

## **How is osteoporosis diagnosed?**

### **Before any symptoms develop**

The ideal situation is that 'thinning' of the bones (osteoporosis) should be prevented in the first place. If this is not possible, the next best thing is for diagnosis and treatment of osteoporosis as necessary before any symptoms or fractures occur.

At present, there is no national screening programme in the UK for osteoporosis. However, if you have a risk factor, your GP or other health professional may ask you questions to see how many other risk factors for osteoporosis (listed above) apply to you. A risk calculator is available to determine your risk of developing osteoporosis, depending on the number of risk factors that you have. There are two commonly used risk calculators. One is called [FRAX®](#), and the other is called [QFracture](#).

If you are found to be at increased risk, or your risk is uncertain, you may be referred for a DXA scan (also referred to as a DEXA scan). DXA stands for dual-energy X-ray absorptiometry. It is a scan that uses special X-ray machines to check your bone density. A DXA scan can confirm osteoporosis. [See the separate leaflet called DEXA Scan.](#)

### **After symptoms develop**

Osteoporosis is often first diagnosed when you break a bone after a minor bump or fall. Even after the first fracture has occurred, treatment can help to reduce your risk of further fractures. If you are thought to have sustained a fragility fracture, you will usually be referred for a DXA scan to look for signs of osteoporosis.

However, sometimes women of 75 or older who have a fracture are assumed to have had a fragility fracture. In this group of women, treatment for osteoporosis may be started without having a DXA scan first. This is because osteoporosis is so common in this age group.

### **Other tests**

A different test to look for osteoporosis is called digital X-ray radiogrammetry (DXR). It is easier to perform than a DXA scan because it requires less technical equipment. It may sometimes be used as a screening test for osteoporosis – for example, in someone who has broken their wrist after a fall. However, it is not as sensitive as a DXA scan at picking up all cases of osteoporosis. So, a DXA scan remains the gold standard test.

[Ultrasound scans](#) are also sometimes used as a screening test. They usually assess the bone at your heel. Again, they are not as sensitive as DXA and not used very often.

## **How to prevent osteoporosis**

The following may help to prevent, or slow down, bone loss. This advice is for everyone. However, it is particularly important if you are at increased risk of developing 'thinning' of the bones (osteoporosis). If you already have osteoporosis, the following measures can also help to try to slow down any bone loss.

### **Exercise**

Exercise can help to prevent osteoporosis. The pulling and tugging on the bones by your muscles during weight-bearing exercise help to stimulate bone-making cells and aid strong bones. Regular weight-bearing exercise throughout life is best but it is never too late to start. This means exercise where your feet and legs bear your body's weight, such as brisk walking, aerobics, dancing, running, etc.

For older people, a regular walk is a good start. However, the more vigorous the exercise, the better. For most benefit you should exercise regularly – aiming for at least 30 minutes of moderate exercise or physical activity at least five times per week. (**Note:** because swimming is not weight-bearing exercise, this is not so helpful in preventing osteoporosis.)

Muscle strengthening exercises are also important. They help to give strength to the supporting muscles around bones. This helps to increase tone, improve balance, etc, which may help to prevent you from falling. Examples of muscle strengthening exercises include press-ups and weight lifting but you do not necessarily have to lift weights in a gym. There are some simple exercises that you can do at home. [See the separate leaflet called Physical Activity For Health for more details.](#)

*"Public Health England advises 150 minutes of physical activity each week, in bouts of 10 minutes or more. This might feel like a tall order, but it can be done in a way that becomes an enjoyable part of your life. Honestly."*

Source: Dr Mary Harding

## **Food and diet**

Calcium and vitamin D are important for bone health. Your body needs adequate supplies of vitamin D in order to absorb calcium that you eat or drink in your diet. The recommended daily intake for calcium in adults over the age of 50 is at least 1000 mg per day.

**Calcium** – you can get 1000 mg of calcium most easily by:

- Drinking a pint of milk a day (this can include semi-skimmed or skimmed milk); **plus**
- Eating 50 g (2 oz) of hard cheese such as Cheddar or Edam, or one pot of yoghurt (125 g), or 50 g of sardines.

Bread, calcium-fortified soya milk, some vegetables (curly kale, okra, spinach and watercress) and some fruits (dried apricots, dried figs and mixed peel) are also good sources of calcium. Butter, cream, and soft cheeses do not contain much calcium. You can check how much calcium you eat with an [online dietary calcium calculator](#). There are several available [calcium calculators](#) for this online. [See also the separate leaflet called Calcium-rich Diet for more details.](#)

There is a possibility that taking calcium supplements when you have enough calcium in your diet might cause other problems such as heart disease. Therefore, it is best not to take calcium supplements without first discussing this with your doctor.

**Vitamin D** - there are only a few foods that are a good source of vitamin D. Approximately 115 g (4 oz) of cooked salmon or cooked mackerel provide 400 IU of vitamin D. The same amount of vitamin D can also be obtained from 170 g (6 oz) of tuna fish or 80 g (3 oz) of sardines (both canned in oil).

Vitamin D is mainly made by your body after exposure to the sun. The ultraviolet rays in sunshine trigger your skin to make vitamin D. This may not provide as much vitamin D as you need. In the UK it is advised that everyone should consider vitamin D supplements in the winter, and some people should have them all year round. [See the separate leaflet called Vitamin D Deficiency for more details.](#)

If you are unsure about whether you should have calcium and/or vitamin D supplements, ask your practice nurse or GP.

### **Smoking and drinking**

Chemicals from tobacco can get into your bloodstream and can affect your bones, making bone loss worse. If you smoke, you should try to make every effort to stop. Also, you should try to cut down on your alcohol intake if you drink more than fourteen units of alcohol per week. See the separate leaflets called [Quit Smoking \(Smoking Cessation\)](#) and [Alcohol and Sensible Drinking](#) for more details.

# Osteoporosis treatment

If you have 'thinning' of the bones (osteoporosis) but have not had a fragility fracture, your doctor will be able to advise whether or not treatment is recommended in your case. They may use a special risk calculator to look at your risk of having a fragility fracture, to help with this decision. This incorporates things such as:

- Your age.
- Your bone density measurements on a DXA scan.
- Any history in your family of hip fracture.
- How much alcohol you drink.
- Whether you smoke.
- Your BMI.
- Whether you have other medical conditions such as rheumatoid arthritis.

If you are found to have osteoporosis and you have already had a fragility fracture, medication is usually recommended to help prevent a further fracture.

If treatment is started, repeat DXA scanning on a regular basis may be suggested to look at how effective treatment is. Lifestyle measures and prevention of falls are important for all people with osteoporosis (see below).

## Medication for osteoporosis

Various medicines are available that can help to prevent and treat bone loss. Options used to treat 'thinning' of the bones (osteoporosis) include the following.

### Bisphosphonates



Bisphosphonates are the most commonly used medicines to treat osteoporosis. They work on the bone-making cells. They can help to restore some lost bone and help to prevent further bone loss. Research studies have shown that the risk of bone fracture may be reduced by taking one of these medicines if you have osteoporosis. They may also help to reduce the chance of a second fracture if you have already had a fragility fracture.

Bisphosphonates are a group of medicines and there are several options, which are available as tablets, liquid or an injection. [See the separate leaflet called Bisphosphonates.](#)

### **Hormone replacement therapy**

[Hormone replacement therapy \(HRT\)](#) contains oestrogen and can help raise hormone levels. A few years ago, HRT can be used to reduce the risk of fractures due to osteoporosis but only for women who also have [menopausal symptoms](#) that require treatment.

### **Denosumab**

This medicine may be an alternative for women with osteoporosis who have been through the menopause if a bisphosphonate is not suitable or is not tolerated. It is given twice a year by injection and helps to slow down bone loss. As with bisphosphonates, there is a small risk of a rare problem of the jawbone, called osteonecrosis. However, it is thought that in the vast majority of people, the benefits of treatment outweigh the risks.

### **Romsozumab for treating severe osteoporosis**

The National Institute for Health and Care Excellence (NICE) has recommended romsozumab as an option for treating severe osteoporosis in women:

- Who have been through the menopause; **and**
- Who are at a high risk of breaking their bones (fractures).

Women are at high risk if they have had a fracture from their osteoporosis in the previous two years. These fractures would usually be in the spine or anywhere on the arms.

It is given by injection once a month for 12 months. It helps slow down the loss of bone by stopping it being broken down and increasing it being made in the body.

For more information, see the 'Further Reading' section below.

## **Raloxifene**

[Raloxifene](#) is another option for some women with osteoporosis. It is usually only used if a woman has already had a fragility fracture. It works by mimicking the natural effects of oestrogen. This gradually reverses the excessive breakdown of bone that happens at the menopause, and makes bones stronger. However, there may be a small increased risk of developing a [deep vein thrombosis](#) in some people who take raloxifene. You should discuss this with your doctor.

## **Parathyroid hormone peptide medicines**

These medicines are sometimes suggested for people who have already had a fragility fracture. There are two of these medicines available: teriparatide (brand name Forsteo®) and parathyroid hormone (brand name Preatact® - not used in the UK). They are given by an injection under the skin every day for two years.

Studies have shown that they can reduce the risk of some osteoporotic fractures. These medicines are only recommended if other options cannot be tolerated or taken. Alternatively, they may be used if someone has been taking another treatment for one year and they have another fragility fracture and their bone density is getting worse.

## **Calcium and vitamin D tablets**

Your body needs plenty of calcium and vitamin D to make bone. Unless your doctor is sure that you have an adequate intake of calcium and have enough vitamin D, they will often suggest calcium and/or vitamin D supplements in addition to one of the above medicines. These come in [combined calcium and vitamin D tablets](#), or separately.

However, studies have shown that taking vitamin D tablets does not prevent fractures or falls, or make a significant improvement to bone density. See 'Further Reading' below.

## **Strontium ranelate**

This is an option occasionally used for treating osteoporosis but only for severe osteoporosis when other treatments have failed or are unsuitable. It can only be started by a specialist.

# Other measures are also important

## Lifestyle

Medication will not restore all lost bone. Also, medication may not be suggested for all people with 'thinning' of the bones (osteoporosis). So, there are a number of lifestyle measures that are also important in treating osteoporosis. They include:

- Weight-bearing exercise.
- Muscle strengthening exercises.
- Not smoking.
- Keeping any alcohol drinking to within the levels as described earlier.

## Preventing falls

You can also take measures to help prevent yourself from falling and breaking a bone.

- Check your home for hazards such as uneven rugs, trailing wires, slippery floors, etc.
- Regular weight-bearing exercise may help to prevent falls (as described above).
- Are your vision and hearing as good as possible? Do they need checking? Do you need glasses or a hearing aid?
- Beware of going out in icy weather.
- Do you take any medicines that can make you drowsy or that may lower your blood pressure too much and increase your risk of falls? Can they be changed? You can discuss this with your doctor.
- Hip protectors may also possibly help in some people in nursing homes or residential care settings. These are special protectors that you wear over your hips that aim to cushion your hips if you do have a fall.

If you have had a fall, or have difficulty walking, you may be advised to have a formal falls risk assessment. This involves various things such as:

- A physical examination.

- Checking your vision, hearing and ability to walk.
- Reviewing your medication.
- Reviewing your home circumstances.

Following this, where appropriate, some people are offered suggestions such as a muscle strengthening and balance programme, or recommendations on how to reduce potential hazards in their homes.

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## Further reading

- [Denosumab for the prevention of osteoporotic fractures in postmenopausal women](#); NICE Technology appraisal guidance, October 2010
- [Osteoporosis: assessing the risk of fragility fracture](#); NICE Clinical Guideline (August 2012, updated February 2017)
- [Management of osteoporosis and the prevention of fragility fractures - A national clinical guideline](#); Scottish Intercollegiate Guidelines Network (SIGN - January 2021)
- [Avenell A, Mak JC, O'Connell D](#); Vitamin D and vitamin D analogues for preventing fractures in post-menopausal women and older men. Cochrane Database Syst Rev. 2014 Apr 14;4:CD000227. doi: 10.1002/14651858.CD000227.pub4.
- [Vitamin D and health](#); Scientific Advisory Committee on Nutrition (July 2016)
- [Bisphosphonates for treating osteoporosis](#); NICE Technology appraisal guidance, August 2017 - last updated July 2019
- [Black DM, Rosen CJ](#); Clinical Practice. Postmenopausal Osteoporosis. N Engl J Med. 2016 Jan 21;374(3):254-62. doi: 10.1056/NEJMcp1513724.
- [Mark J Bolland, PhD et al](#); Effects of vitamin D supplementation on musculoskeletal health: a systematic review, meta-analysis, and trial sequential analysis, The Lancet, October 2018.
- [Osteoporosis - prevention of fragility fractures](#); NICE CKS, July 2021 (UK access only)
- [Romosozumab for treating severe osteoporosis](#); NICE Technology appraisal guidance, May 2022
- [Clinical guideline for the prevention and treatment of osteoporosis](#); National Osteoporosis Guideline Group (updated September 2021)

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