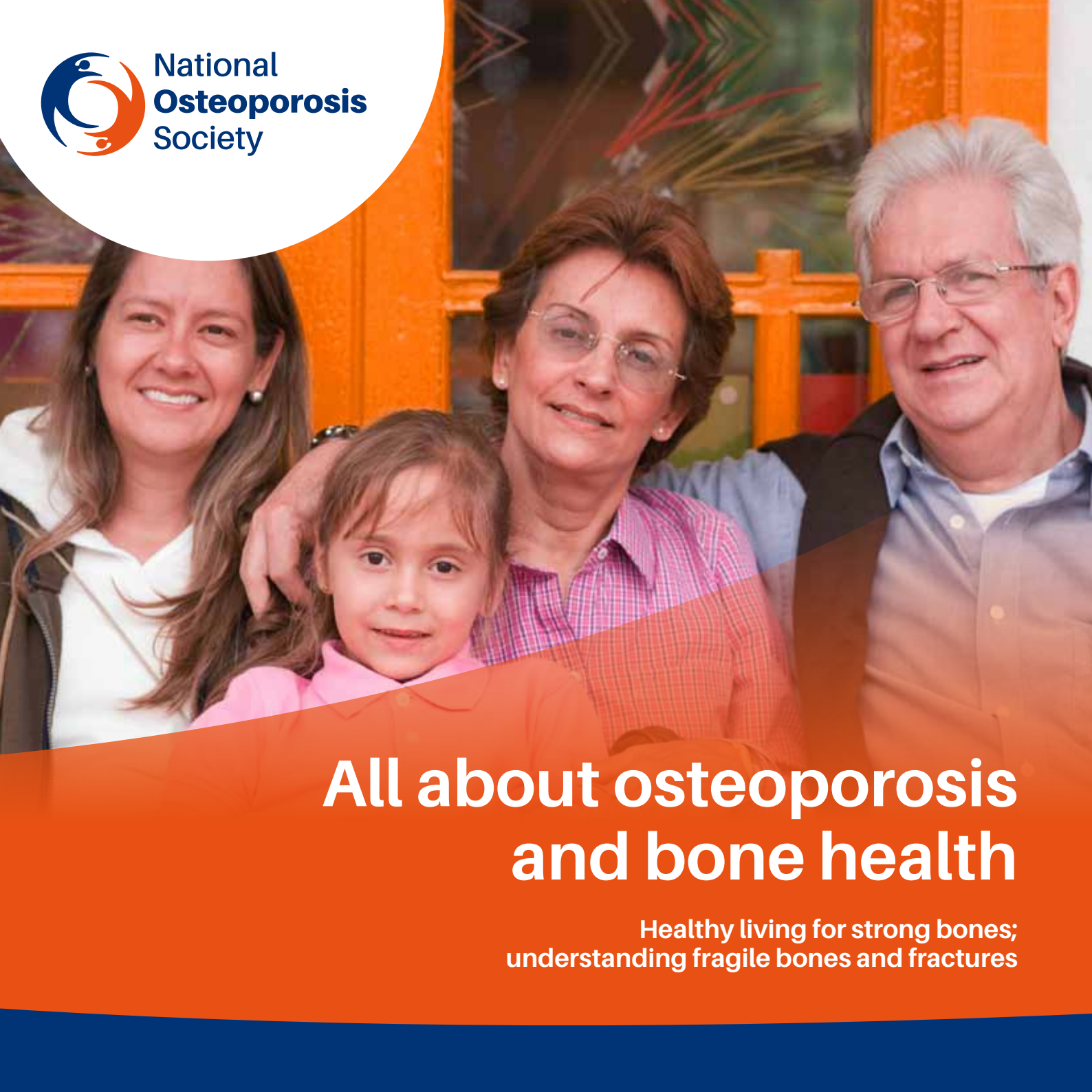




National
Osteoporosis
Society



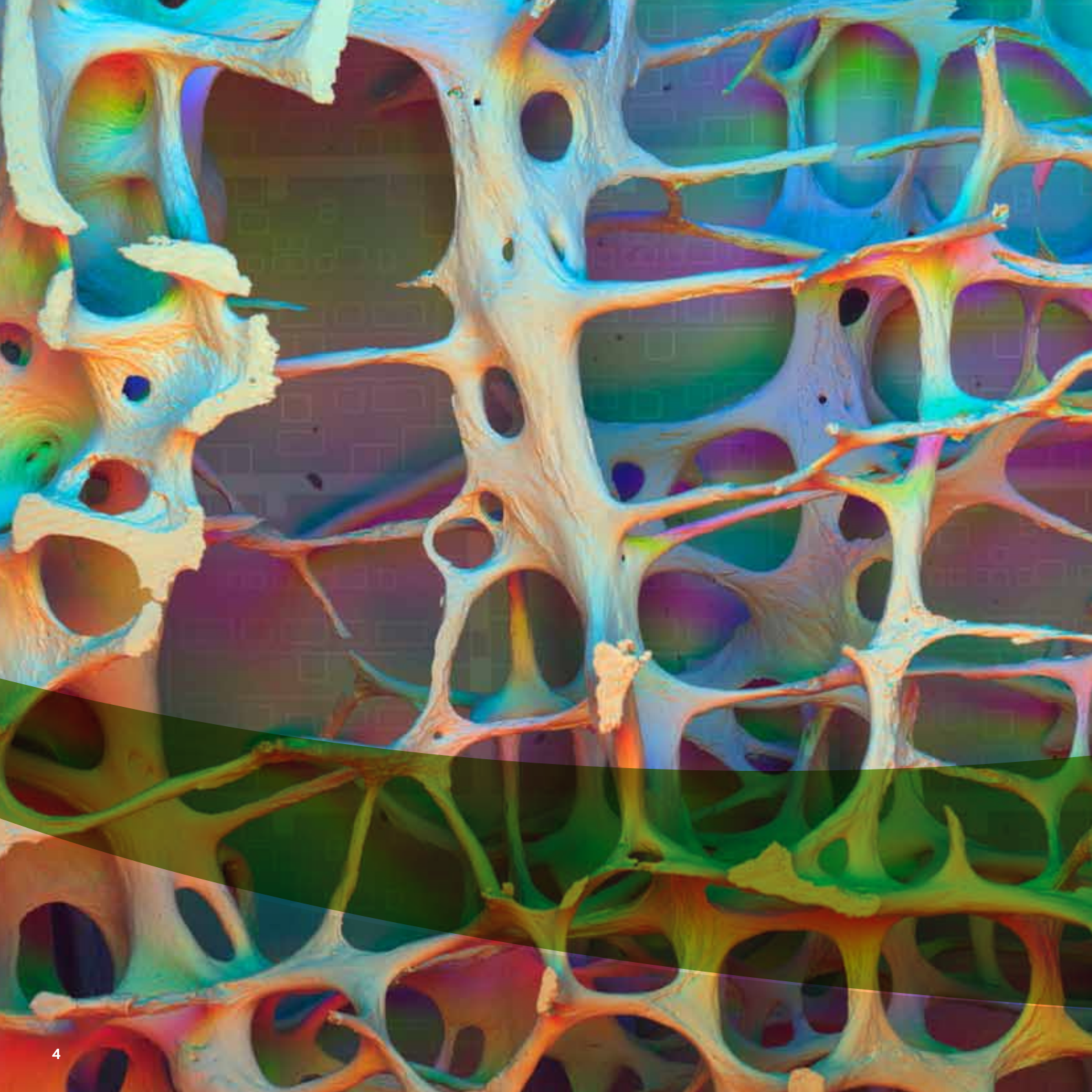
All about osteoporosis and bone health

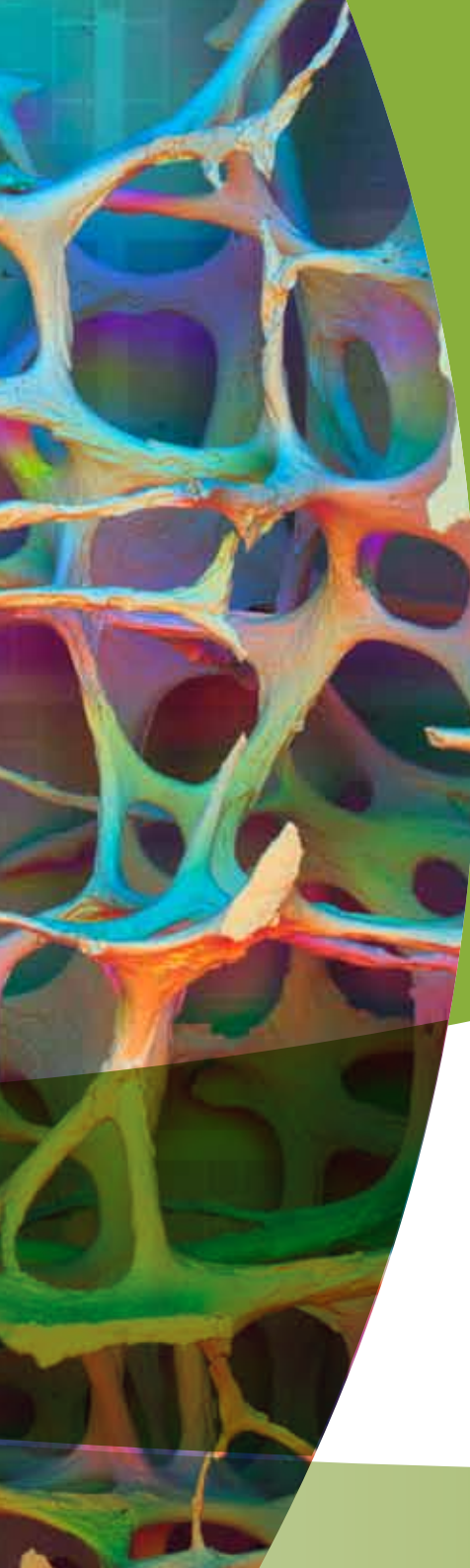
Healthy living for strong bones;
understanding fragile bones and fractures

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Section 1

What is osteoporosis?

- Your bones
 - Bones and osteoporosis
 - Who is affected by osteoporosis?
 - Consequences of osteoporosis
- Less common types of osteoporosis
 - Other bone conditions

Osteoporosis is a condition in which bones lose their strength and are more likely to break, usually following a minor bump or fall. Broken bones are also referred to as 'fractures' (the words mean the same thing). Fractures that occur because of reduced bone strength are described as 'fragility fractures' and many of these will be caused by osteoporosis. One in two women and one in five men over the age of 50 experience fractures, mostly as a result of low bone strength. Although fragility fractures caused by osteoporosis can happen in various parts of the body, the wrists, hips and spine are the most commonly affected sites.

Osteoporosis is also a term used to describe low bone density as measured on a bone density (DXA) scan. This means your bones may have lost strength.



For more information see section 4: Scans

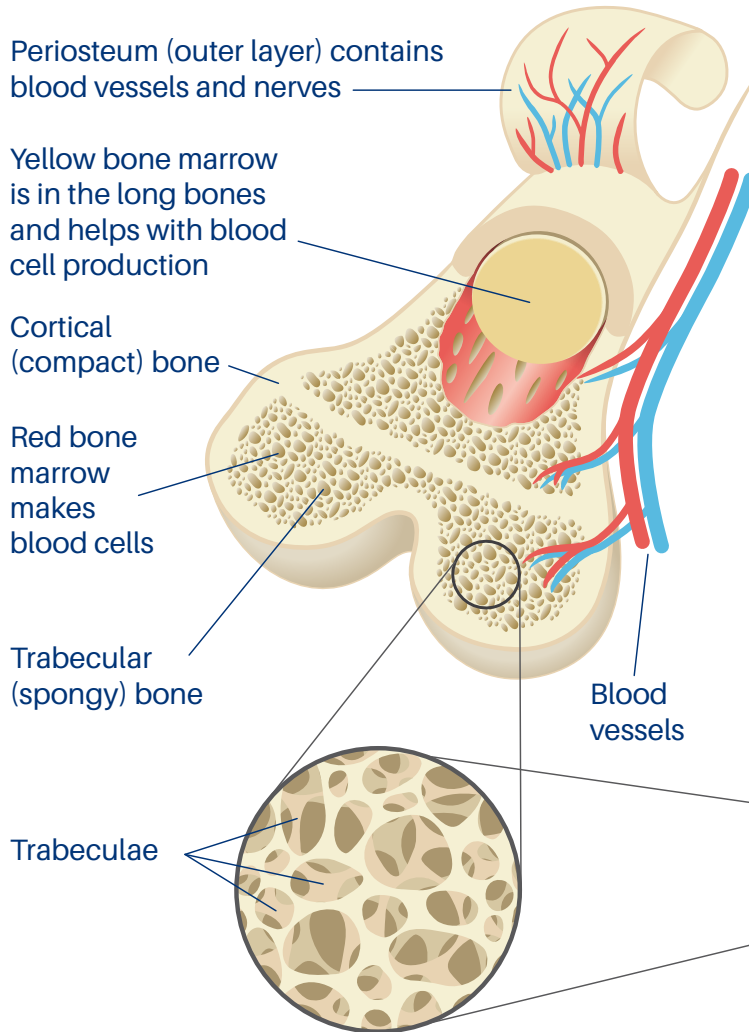
Your bones

Your bones have several functions. They give your body its overall structure and provide support and protection for your internal organs. They store calcium and other minerals and work with your muscles to allow your body to move. They also contain bone marrow, which is where your blood cells are produced.

Although from the outside your bones look like simple, solid structures, they actually have a clever design that allows your skeleton to be strong without being heavy. Each bone is made up of two types of bone tissue:

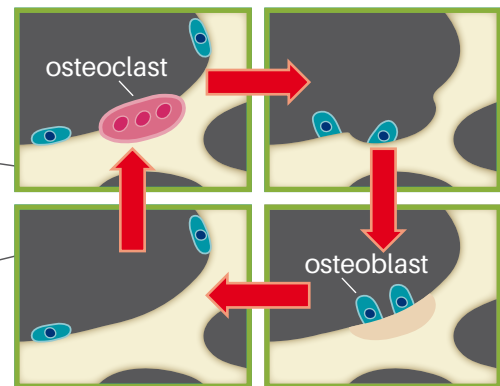
- a thick outer shell called 'cortical' bone
- a strong mesh or scaffolding (like a honeycomb) inside the shell called 'trabecular' bone.

Both types of bone tissue are fed by a nerve and blood supply while fat and bone marrow (for blood cell production) fill the spaces. Some bones, such as the ends of the long bones in your arms and legs, and your spinal bones, have a high proportion of trabecular bone.



Bone tissue is made up of protein hardened by calcium salts and other minerals to make it strong. Bone tissue is alive and constantly changes through life to make sure it remains as healthy as possible. Throughout each bone, older, worn-out bone tissue is broken down by specialist cells called osteoclasts and rebuilt by bone-building cells called osteoblasts. This process of renewal is called bone remodelling. In younger adults, up until about the age of 35 years, there is usually a balance between the amount of bone that is removed and the amount of bone that is laid down; repair and renewal are usually in balance and the total amount of bone tissue thus stays the same.

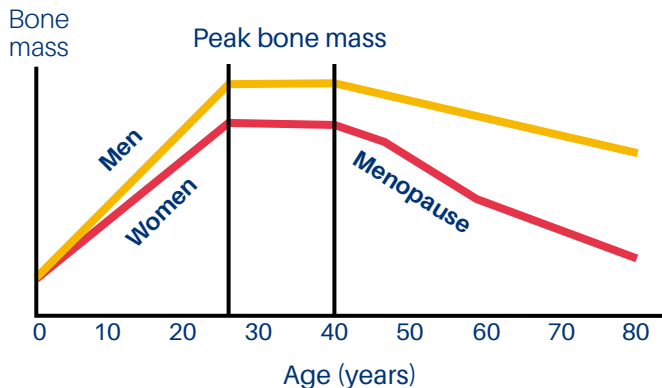
Bone remodelling



Osteoclast cells wear away bone on the surface. Osteoblast cells rebuild new bones.

In childhood, osteoblasts work faster, enabling the skeleton to increase in size, density and strength. During this period of rapid bone growth it takes the skeleton just two years to completely renew itself. In adults, this process takes seven to ten years. Bones stop growing in length between the ages of 16 and 18 years but the total amount of bone tissue you have (the thickness of the cortical shell and the trabecular bone inside) continues to increase slowly until your late twenties.

Changes in bone mass with age



Adapted from J Compston 1990

Bones and osteoporosis

After the age of about 35 years, the difference between the amount of bone that is removed and the amount of bone that is laid down starts to get slightly out of balance as part of the ageing process. As a result, the total amount of bone tissue starts to decrease. This is often described as 'bone loss' or 'bone thinning'. It doesn't mean your bones look any different from the outside. However, inside, the cortical 'shell' thins and the struts that make up the inner structure become thinner and sometimes break down. This results in the holes in the honeycomb structure becoming larger – hence the description 'osteoporosis', literally meaning 'porous bone'. This change in the quality of your bones is much more likely and more significant as you move into later life, which explains why bones become more fragile and fractures become more common in old age.

There are many other factors that can upset this balance of 'bone remodelling' and lead to osteoporosis, and these are described in Section 3.

Who is affected by osteoporosis?

Women and osteoporosis

Women are more susceptible to osteoporosis because bone loss becomes more rapid for several years after the menopause, when sex hormone levels decrease. In addition, women tend to have smaller bones than men and in general live longer, with loss of bone tissue continuing for longer, making fragility fractures more likely.

Men and osteoporosis

Osteoporosis is not a condition that just affects women, although this is a common misconception. If you are a man, you might be thinking osteoporosis can't affect you as it's a 'women's problem' but, in fact, one in five men break a bone after the age of 50 years because of low bone strength. Men with osteoporosis tell us that this confusion can sometimes make it more difficult to come to terms with the condition and to seek help and support.

Younger men and women and osteoporosis

Younger men and women (before the menopause) can also, but more unusually, have osteoporosis and fractures. Usually an underlying condition or reason is identified but sometimes no cause is found. The medical word for this is 'idiopathic'. If you are a healthy younger person who is frequently breaking bones, this can be particularly distressing. Diagnosing and treating osteoporosis in men and in younger women and children is complex and generally a referral to a hospital specialist is recommended.



**For more information see Section 4:
Scans and tests**

Consequences of osteoporosis

Although sufficient force (e.g., when moving at speed or falling from a height) will cause anyone to break a bone, if you have osteoporosis, broken bones are more likely to occur after even a simple fall.

If you are told you have 'established' osteoporosis, this means you are someone who has been diagnosed with osteoporosis on a scan and you also have fractures caused by osteoporosis.

Bones affected by osteoporosis are not in themselves painful but the broken bones that may result can cause pain and other problems.

Broken wrists

A broken wrist can be the first indication that you have osteoporosis. Wrist fractures in women often occur soon after the menopause and typically occur following a fall, as people commonly put out an arm in an attempt to break their fall. Healthy bones should be able to withstand a simple fall so a broken bone in these circumstances, without any other disease, is an indication that there may be underlying osteoporosis.

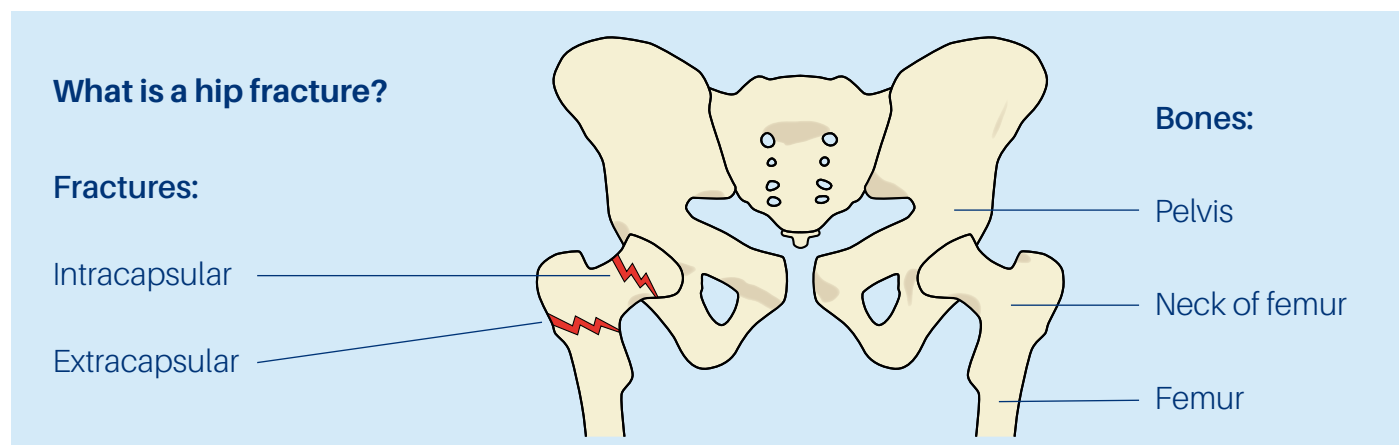


Fractures that occur because of reduced bone strength are described as 'fragility fractures' and many of these will be caused by osteoporosis.

Broken hips

The most common site for a hip to break is across the top of the thigh bone (fractured neck of femur). If you have broken your hip as a result of osteoporosis, you are most likely to be in your late seventies or eighties, although you may be younger. This type of hip fracture typically occurs as the result of a fall. Like any fracture, a broken hip is painful and has an immediate impact on day-to-day living. Most people who break a hip are admitted to hospital and require an operation. If you are fit and well before your hip breaks, you

should be able to look forward to independent living with appropriate physiotherapy and help from social services if you need it. As you get older, you may also be coping with other medical conditions, and making an uncomplicated recovery from an operation to mend your hip and getting back to your own home may be less easy. This is why it's so important to try to do everything possible to prevent a hip fracture happening in the first place.



Spinal fractures

Fractures due to osteoporosis of the bones in the spine (vertebrae) usually occur in the lumbar (lower) or thoracic (middle) areas of the spine. They are often referred to as spinal or vertebral fractures. Bones become squashed or compressed because of their reduced strength. Sometimes they are referred to as 'crush', 'collapsed' or 'wedge' fractures, depending on which part of the vertebra is affected. 'Compression fracture' is a good way of describing these fractures. Back pain is the most frequent symptom of a spinal fracture however, the degree of pain varies in different people, with many having no symptoms at all. Why this is so is not clear. In most people, spinal fractures heal over a period of 6–12 weeks and back pain if present tends to decrease during this time. However pain may persist for a longer period, particularly if you have had more than one fracture.

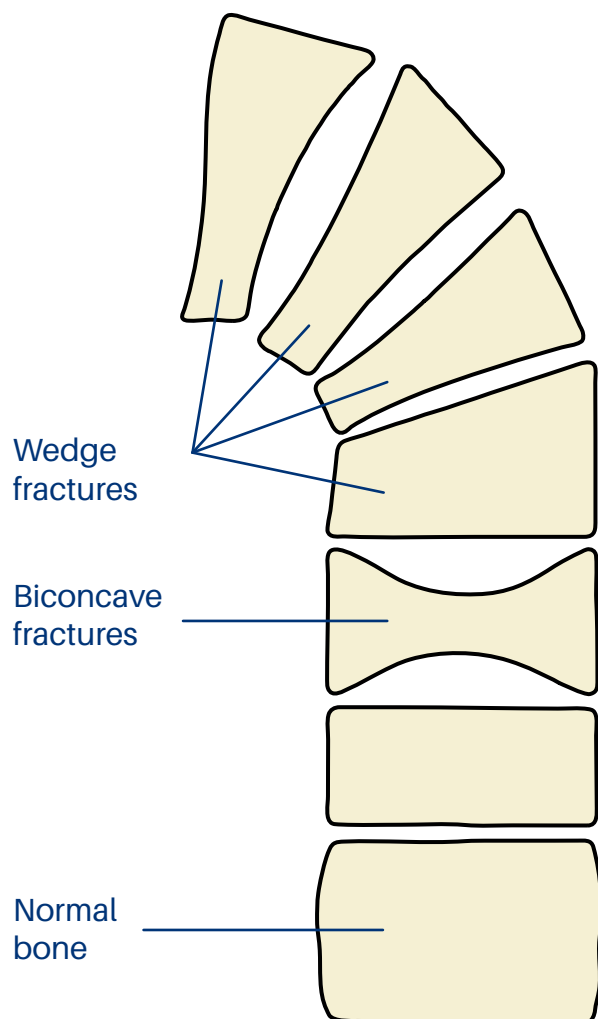
If you 'break your back' does it mean you will be paralysed?

No. The vast majority of fractures that occur in people with osteoporosis following minor levels of trauma are 'stable' and do not interfere with the spinal cord or result in paralysis or loss of sensation, except in very unusual cases.



See Section 6: Living with osteoporosis for more information about the experience of spinal fractures and how to cope

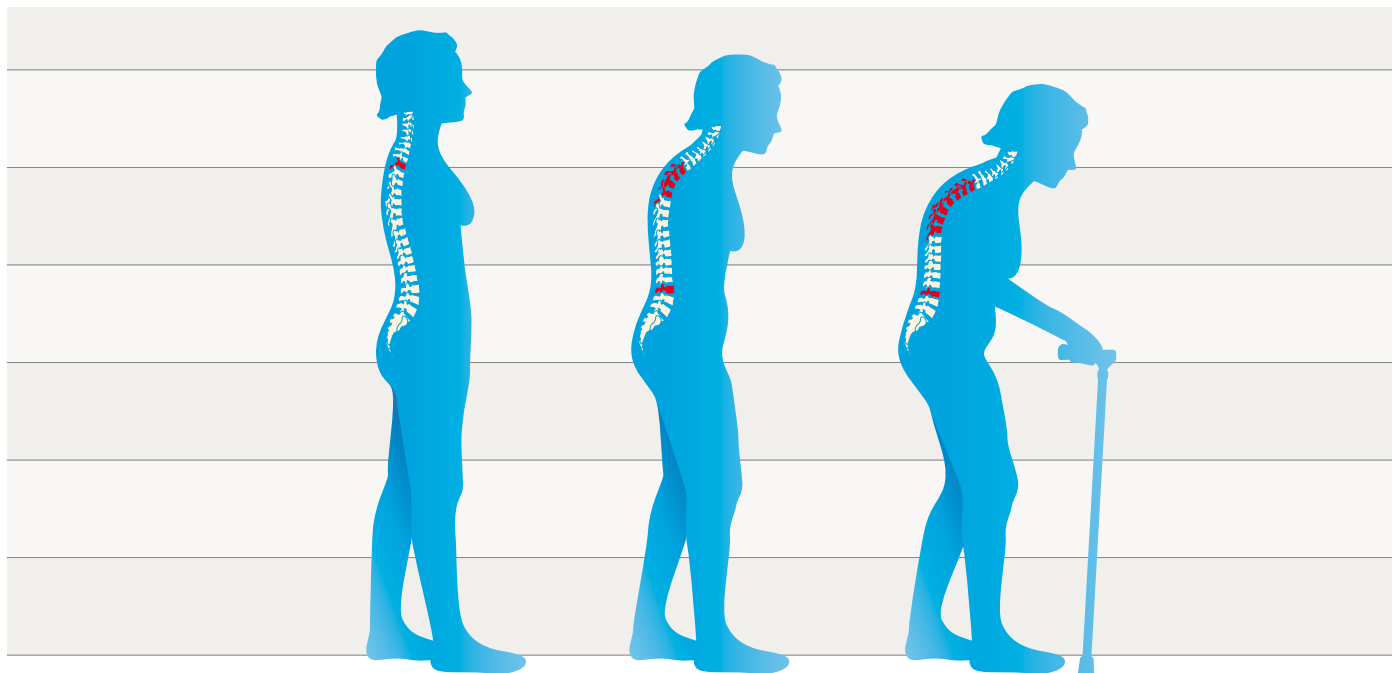
Types of compression fracture in the spine



How does osteoporosis cause height loss and spinal curvature ('dowager's hump')?

Although spinal bones heal, they do not return to their original shape, and this may result in height loss and spinal curvature. If fractures in your spine have healed in a flattened or wedge shape, this can cause the spine to tip forwards, resulting in an outward curve (kyphosis) in your back, and height loss (see diagram on page 14). Sometimes these changes can result in a lack of space for your internal organs so other problems such as breathlessness, a protruding abdomen, indigestion or stress incontinence, can occur. Changes in posture due to osteoporosis can affect how you feel about how you look (your body image). If you feel distressed and frustrated by the changes in your body shape and especially if buying suitable clothes has become difficult, our booklet ***Clothing and body image*** may be helpful.

If you are someone with very fragile bones, a fracture of one or more of the spinal bones can occasionally occur after an awkward movement such as reaching up to a cupboard. Unlike hip fractures, which happen when you fall, spinal

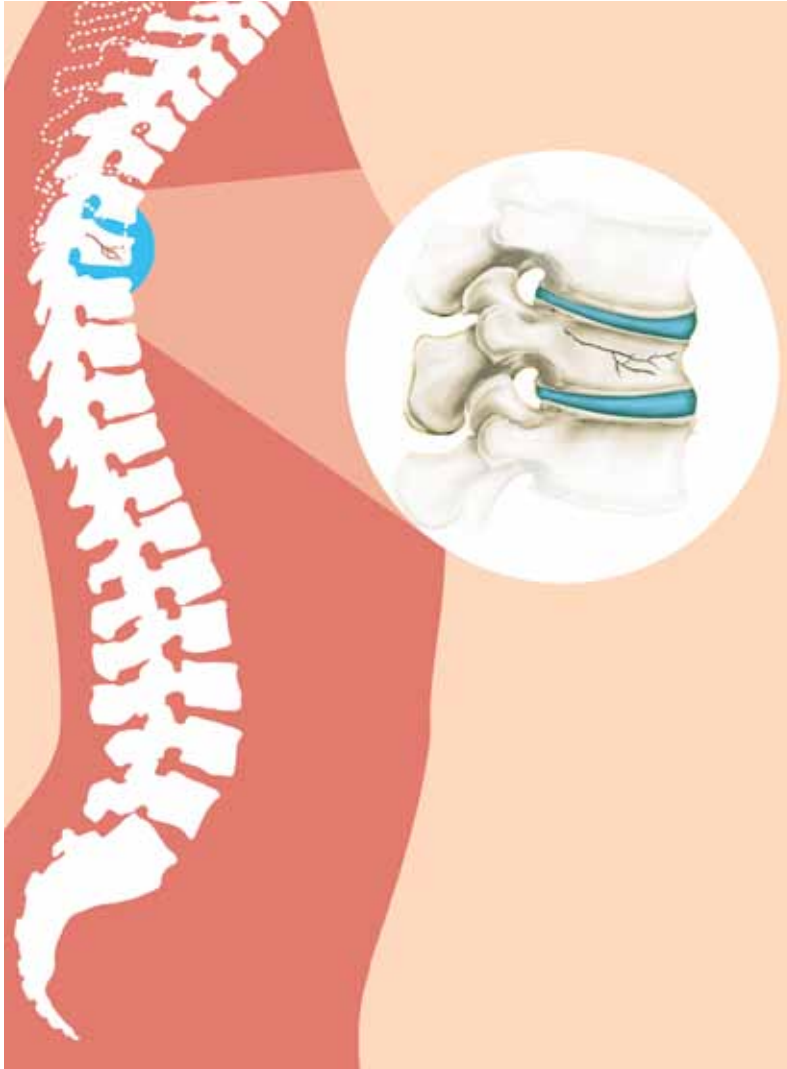


fractures can occur following everyday activities of daily living such as bending or stooping. This understandably can make you feel very frightened of further fractures and finding ways to continue normal activities with confidence will be important. It is vital to remember that not everyone has fractures that cause symptoms and disability. And, if you do experience such debilitating fractures, there are many things that can be done to help.



**For more information see Section 6:
Living with osteoporosis**

Other bones such as the humerus (upper arm), ribs or pelvis may break if they are fragile but the wrist, spinal bones and hip are the most common places for fractures to occur.



I have heard you can die from osteoporosis, which has frightened me. Can you explain?

Osteoporosis does not itself result in an increased risk of dying. As explained, the changes that occur within the bones to make them less strong, give you no symptoms at all, and fractures in themselves are not fatal. However, breaking bones, especially your hip when you are much older, can result in you becoming more frail and less well and you may find it much harder to get back to the same level of fitness and independence you had before. Statistically, this reduces your life expectancy compared to someone who hasn't broken their hip. It isn't the fracture itself but being less well following the fracture, coupled with the many other medical conditions that older people have to cope with, as well as having to have an operation, that can result in reduced life expectancy. Keeping fit and active into old age, as well as good treatment in hospital and after you are discharged, will greatly reduce the chance of fractures affecting your life span.

There are a number of less common types of osteoporosis and related conditions, and these are outlined on the next page.

Less common types of osteoporosis

There are several unusual types of osteoporosis. In some ways they are similar to the general form of osteoporosis but they also have some differences in terms of symptoms, consequences and treatments.

Osteoporosis in children

There is an unusual condition in young children called 'idiopathic juvenile osteoporosis' in which broken bones occur following minor levels of trauma without an apparent underlying problem. Sometimes, osteoporosis in children occurs because of other factors such as use of glucocorticoid steroids, brittle bone disease (osteogenesis imperfecta) or because a child is immobile.



For more information see our factsheets
Osteoporosis in children and Osteogenesis imperfecta and osteoporosis

Osteoporosis associated with pregnancy

This is a rare condition when bones, usually in the spine or hip, break easily during or after pregnancy.



For more information see our leaflet
Pregnancy and osteoporosis

Transient migratory osteoporosis

This is a rare condition that can cause chronic pain and is associated with sudden loss of bone density, usually in a hip. This is unlike 'ordinary' osteoporosis, which is only painful when broken bones have occurred. The pain goes away eventually but sometimes recurs in another part of the body. Referral to a pain clinic may be necessary to help with the difficult pain problems associated with this condition.

Other bone conditions

Some medical conditions that are very different from osteoporosis have similar names or share the same causes, symptoms or treatments, and this can cause confusion.

Complex regional pain syndrome (CRPS)

CRPS affects a hand, foot, wrist, ankle or knee but can spread up a whole limb. It may result in significant pain and disability. Loss of bone density in the affected area may occur as part of the syndrome. Although often triggered by a minor injury or previous broken bone, the reason for the continuous pain is poorly understood. Sometimes pain is traced to a specific nerve injury but sometimes not. Osteoporosis related to CRPS is, however, a localised problem and does not result in general osteoporosis.

 **For more information see our factsheet**
Complex regional pain syndrome and osteoporosis

Osteoarthritis

This is a different condition from osteoporosis and affects the joints in the body, causing them to become damaged. This can lead to pain, stiffness and loss of function in the joints. Hips, knees and knuckles can be affected and so can joints in the spine. Both osteoarthritis and osteoporosis occur more commonly as people age. In people with osteoporosis, symptoms of back pain may sometimes be due to the presence of osteoarthritis.

 **For more information see our factsheet**
Osteoarthritis and osteoporosis

Osteogenesis imperfecta

Often called 'brittle bone disease', osteogenesis imperfecta is a genetic disorder of collagen, the protein that forms the framework for the minerals in bones. The collagen may be of poor quality, or there may not be enough to support the mineral structure of the bones. This results in a number of problems including bones becoming brittle and breaking easily.

 **For more information see our factsheet**
Osteogenesis imperfecta and osteoporosis





Section 2

Healthy living for strong bones

- Healthy eating for strong bones
 - Vitamin D
 - Exercise and osteoporosis
- What else can I do for my bones?

Although our genes play a key role in deciding the potential size and strength of our skeleton, the way we live our life can play an important part in determining the amount of bone we invest in our bone 'bank' during our youth.



Healthy living is important throughout life, for building strong bones and to prevent, as far as possible, the loss of bone strength that occurs with osteoporosis. It continues to be important as we move into later life, when fragility fractures caused by osteoporosis are common.

During childhood, adolescence and early adulthood, your skeleton is growing and it is vitally important to maximise bone strength. If you 'bank' plenty of bone in these years, your skeleton will be in a better position to withstand the loss of bone strength that occurs with advancing age.

You can do this by taking plenty of weight-bearing exercise and eating a well-balanced, calcium-rich diet as well as developing other positive lifestyle habits such as not smoking or drinking excessive alcohol. Exercising continues to be essential as you get older, not only to improve bone strength but also to keep your muscles strong, which is vitally important to prevent you falling. Strengthening bones and reducing falls risk in older age will help to prevent fragility fractures.



For more information about staying steady to prevent falls see Section 6: Living with osteoporosis

Healthy eating for strong bones



Give your child a head start by **building bones during pregnancy**. Building healthy bones actually starts in the womb. If you are pregnant, you should avoid smoking and drinking alcohol. Make sure you have a healthy, balanced diet with adequate protein and calcium as well as enough vitamin D to ensure you are doing the very best you can for your baby's developing skeleton.

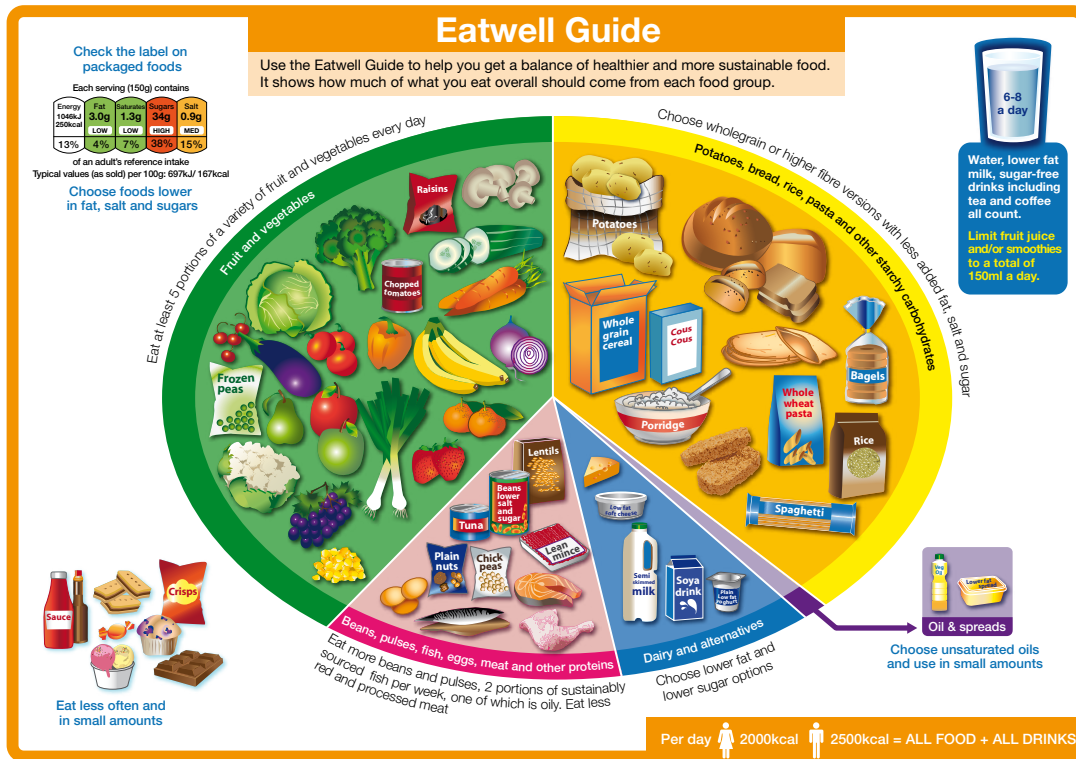
Children need a well-balanced diet and higher intakes of calcium and protein are required during adolescence. Throughout life, it's the balance of healthy foods that is essential. Setting a pattern for healthy eating provides a role model for children that they are likely to adopt in later life.

Aim for a **healthy body weight** throughout your life. If you are trying to lose weight, the low-fat versions of dairy foods provide equivalent amounts of calcium – in fact, they may have slightly more as the calcium is in the non-fat part of dairy products.

For women, menopause is a time to **re-evaluate eating habits and make healthy choices**. You don't need extra calcium or other nutrients at this time but it's a good opportunity to make sure you are eating healthily.

If you are older and frailer, make sure you follow the advice in the eatwell guide (over the page) if you can't eat larger meals – try and keep the same proportions but in smaller amounts.

Have enough protein too – low levels of protein seem to increase the risk of hip fracture.



What is a mixed, well-balanced diet?

Aim to eat meals that incorporate a wide variety of foods from the four main groups. These are fruit and vegetables; carbohydrates such as bread, potatoes, pasta and cereals; dairy and alternatives; beans, pulses, fish, eggs, meat and other proteins.

This will help to provide you with all the vitamins, minerals and energy you need to live life to the full and reduce the risk of other chronic diseases too.

The 'eatwell' guide shows the proportion of different foods that make up well-balanced, healthy eating. It's not essential to get a perfect balance every day but make sure you eat these proportions of the different food groups over about a week to ensure you get all the nutrients for good health, including what your bones need to stay strong. Having a mixture of foods within each food group will also ensure you consume a range of different nutrients.

Check your body mass index (BMI) to make sure you have a healthy body weight (see page 42).



Healthy eating tips

Eating for your bones needn't be boring – there are lots of delicious meals and snacks packed full of the vitamins and minerals you need, and they don't have to be fattening.

- Eat plenty of whole-grain foods such as brown rice and pulses for more minerals, vitamins and fibre.
- Eat more fruit and vegetables, at least five portions a day. (A portion is about the amount in a handful.) Choose lots of different coloured fruit and vegetables to ensure you get the range of essential nutrients you need, including some calcium.
- Eat more beans and pulses. Eat 2 portions of sustainably sourced fish per week one of which is oily and will provide some vitamin D. Eat less red and processed meat.
- Cut down on saturated fats and sugar. Check out the food labels: 5g or more of saturated fat per 100g and 10g or more of sugars per 100g is a lot.
- Try to cut down on the amount of salt you eat. Again, check out the food labels and remember that 0.5g or more of sodium per 100g is high.
- Don't skip food early in the morning. If you don't feel hungry when you wake up, start with a healthy snack and have regular meals throughout the day to maintain your health and wellbeing.



Find out more by visiting www.nhs.uk/Livewell/healthy-eating. If you are concerned about your eating habits, you could also speak to the practice nurse at your local GP surgery

Calcium and bones

Calcium is vital for teeth and bones because it gives them strength and rigidity.

Our bodies contain about 1kg of this important mineral and 99% of it is found in our bones. Most people should be able to get enough calcium through healthy eating.

How much calcium is recommended?

Age	Reference nutrient intake (RNI)
0–12 months (non-breastfed infants only)	525mg
1–3 years	350mg
4–6 years	450mg
7–10 years	550mg
11–18 years boys/girls	1,000/800mg
19+ years	700mg
Pregnant women	700mg
Breastfeeding women	700mg + 550mg

If you are taking osteoporosis drug treatments you may benefit from a higher daily calcium intake of around 1,000mg a day.



Reference nutrient intake

The government’s advisers on nutrition set recommended daily levels of intake of nutrients, called the reference nutrient intake (RNI). 700mg of calcium is sufficient to meet the daily requirements of most of the adult population (97.5%). These advisers also recommend that an intake of calcium below 400mg is likely to be insufficient. This amount is called the lower reference nutrient intake (LRNI) and is the lowest amount of calcium required to maintain a healthy adult skeleton. Do not worry if your calcium intake does not quite reach the RNI of 700mg a day; it is the average daily amount that is important. A low calcium intake on one day, when most days you achieve the right amount, will not have a detrimental effect on your bone strength.

Do I need a calcium supplement?

You can usually get enough calcium as part of healthy eating but, if not, you will need to take a calcium supplement.



For more information see our *Calcium supplements and tests* fact sheet - available soon

I am a vegan. Will this cause problems for my bones?

If you don't eat dairy products, you will need to include lots of other calcium-rich foods such as green leafy vegetables, almonds, sesame seeds, dried fruit, pulses, fortified soya drinks and soya protein (tofu) in your diet. A vegetarian diet is not a risk factor for osteoporosis and vegetarians and vegans do not appear to have poorer bone health than the rest of the population.



For more information about a healthy vegetarian or vegan diet, contact the Vegetarian Society or the Vegan Society - see contact details at the back of this booklet

I am lactose intolerant. How can I get more calcium into my diet?

Some people cannot tolerate lactose, the natural sugar found in milk, because they don't produce

enough lactase, the enzyme needed to digest lactose. When undigested lactose passes through the system unabsorbed, it will ferment in the large intestine, causing stomach cramps, bloating, flatulence and diarrhoea. Some people find they can tolerate small amounts. Lactose intolerance affects 5–10% of North Europeans and North Americans of European origin. This figure may be as high as 90% in some Asian, African and Caribbean populations. If you are lactose intolerant, make sure you enjoy plenty of non-dairy calcium-rich foods such as pilchards, sardines, curly kale, watercress, sesame seeds and tahini (sesame seed spread). You could also choose fortified foods, such as water, soya milk or bread with added calcium (though see below).

Can eating fortified foods help?

Supermarket shelves are increasingly filled with supplemented foods that claim to be good for you because they are fortified with vitamins and minerals. They may prove a convenient way of improving your intake of specific nutrients such as vitamin D. But remember, it's a well-balanced diet that provides a range of nutrients to keep bones strong, not just one added mineral or vitamin.

Calcium-rich food chooser: use our food chooser to get the calcium you need

Foods providing around 50mg of calcium per average portion	
Plain yoghurt	1 tablespoon (40g)
Fortified fromage frais	1 'mini' pot (47g)
Muesli Swiss style	1 portion (50g)
Bread (white)	1 medium slice (36g)
Bread (wholemeal)	1 thick slice (44g)
Green or French beans	1 portion (90g)
Green cabbage	1 portion (95g)
White cabbage (raw)	1 portion (90g)
Broccoli (steamed)	1 large portions (110g)
Watercress	1 small bag (40g)
Fried onion	1 medium sized (150g)
Tinned tomatoes	1 tin (400g)
Red kidney beans	2 tablespoons (70g)
Vegetable casserole	1 portion (260g)
Veggie burger	1 (56g)
Vegetable samosa	1 (75g)
Pasta (dried, boiled)	1 portion (230g cooked weight)
Rice (basmati, boiled)	10 heaped tablespoons
Dairy or non-dairy ice cream	1 scoop (60g)
Dried apricots	8 (64g)
Orange / easy-peel citrus (e.g. tangerines, satsumas)	1 large orange (50g) / 3 medium easy-peelers (210g)
Almonds	10 whole nuts (22g)
Brazil nuts	9 whole nuts (30g)

Foods providing around 100mg of calcium per average portion	
Cottage cheese	2 tablespoons (80g)
Camembert	1 portion (40g = 1/6th of whole)
White pitta bread	1 small (75g)
Plain naan bread	1/3 (43g)
Baked beans	1 small tin (200g)
Cornish pasty	1 medium size (155g)
Sausages (pork or vegetarian)	2 (80g)
Tahini (sesame paste)	1 heaped teaspoon (19g)
Sesame seeds	1 tablespoons (12g)
Tinned pink salmon	1 small tin (105g)
Grilled herring	1 (119g)
Custard (ready made)	1 portion (120g)
Dried figs	2 (40g)



Foods providing around 200mg of calcium per average portion

Milk or milk drink e.g. hot chocolate (skimmed/semi-skimmed/whole)	1 tumbler or mug (200ml)
Soya milk (calcium boosted)	1 tumbler or mug (200ml)
Cheddar cheese & low-fat hard cheese	Small matchbox size (30g)
Yoghurt (low-fat fruit, plain & calcium boosted soya)	1 pot (125g)
Porridge (made with semi-skimmed milk)	1 bowl (160g – weight with milk)
Halloumi	2 thin slices (35g)
Cauliflower cheese	1 portion (200g)
Lasagne (meal for one, vegetable or meat)	1 portion (290g)
Pizza 12" (cheese & tomato, vegetarian or meat topping)	¼ of the whole
Tofu (steamed or fried)	1 portion (120g)
Sardines (canned)	1 portion (50g)
Rice pudding	1 portion (200g)

Tip: Choose a wide variety of foods to make sure you get all the other nutrients your bones need.

Foods providing around 300mg of calcium per average portion

Edam / Gouda	1 portion (40g)
Paneer cheese	1 portion (60g)
Parmesan cheese	1 portion (30g)
Cheese omelette	1 portion (120g)
Quiche (cheese and egg)	1 portion (140g)
Macaroni cheese	1 portion (220g)

Other nutrients for bones

There are many other vitamins (such as B, C and K) and minerals (such as magnesium) that may play a part in keeping bones strong, but more research is needed in this area to fully understand their role. These nutrients are all readily available through a balanced diet and, as long as a wide range of foods from all the main food groups are obtained, it is likely that you will be getting enough and do not need to take supplements.



For more information see our **Further food facts and bone - Beyond calcium and vitamin D** factsheet

Vitamin D

You need vitamin D to help regulate the way your body uses calcium and ensure your bones, muscles and teeth remain strong. For healthy adults in the UK, much of the vitamin D you get is obtained by the action of sunlight on your skin. The sun's ultraviolet light makes a relatively inactive form of vitamin D (cholecalciferol/vitamin D3) in your skin. This is carried by your blood to organs in your body that convert this into an active form of vitamin D that your body can use.

How can I get the vitamin D that I need?

There are three ways you can get vitamin D:

- from sensible sunlight exposure;
- from food and drink containing vitamin D, either naturally or fortified;
- from vitamin D supplements.

A 2016 report from the Scientific Advisory Committee on Nutrition (SACN) says that not everyone is getting the vitamin D they need. To be on the safe side, they have recommended that everyone over 1 year of age should get 10 micrograms (sometimes described as 10 µg) of vitamin D every day. (This is provided by food or supplements.) Infants up to 1 year should get 8.5-10 micrograms.

10 micrograms (µg) is equal to 400 International Units(IU)

As a result of this report the government recommends:

From about late March/early April to the end of September, most of us should be able to get all the vitamin D we need from sunlight when we are outdoors alongside foods that contain vitamin D. In the UK, sunlight doesn't contain enough UVB radiation in winter (October to late March) for our skin to be able to make vitamin D.

During these months, we rely on getting our vitamin D from food sources (including fortified foods) and supplements.

To ensure they get enough vitamin D, babies and children aged under five years should be given vitamin D supplements all the year round even if they do get out in the sun (see page 29 for detail).

What should I do?

- Consider whether you are getting enough safe sunlight exposure and think about ways to improve this if you can.
- Consider whether you need to take a 10 microgram (400IU) supplement to ensure you get the vitamin D you need especially during the winter months. This includes pregnant and breastfeeding women as well as people with darker skin because of their ethnic origin.

- Check whether you are someone at greatest risk of not getting enough vitamin D (see list on the right) with implications for your bone health when it will be important that you take a vitamin D supplement.
- Remember if you aren't sure and decide to take a 10 microgram (400IU) supplement to be on the safe side – that should cause you no harm.

Can I get too much vitamin D?

High intakes of vitamin D for prolonged periods can be toxic so it is important that dietary supplements do not provide more than 100 micrograms of vitamin D daily. (The upper limit is 50 micrograms a day for children from 1-10 years and 25 micrograms for babies under a year). Remember the current recommendation is to take 10 micrograms (400IU) unless prescribed for a specific reason by your doctor. If you are taking a number of different vitamin and mineral supplements you will need to check to make sure you are aren't taking more than the recommended dose. Generally foods and fortified foods (with fortification at its current levels) provide small amounts of vitamin D which are very unlikely to cause you any problems.



For more information see our fact sheet 'Vitamin D supplements and tests' - available soon

You are likely to be getting inadequate amounts of vitamin D and a supplement is recommended:

- From birth to one year unless you are receiving 500 ml or more of formula milk which is fortified with vitamin D
- From 1-4 years
- If you aren't exposed to much sunlight – for example, if you cover up your skin for cultural reasons; you are frail, housebound or confined indoors for long periods or use sunblock for medical reasons.

Talk to your doctor if you have the following health problems or medications because a vitamin D supplement might be particularly important for you:

- If you have severe liver or kidney disease or a condition that affects the way you absorb food.
- If you take long-term anti-epileptic drugs. This is because these alter the way vitamin D is broken down and used by the body and can affect the absorption of calcium.

How can I get vitamin D from sunlight without increasing my risk of skin cancer?

Get outside between late March/April and the end of September, which is when the sun's rays produce vitamin D in your skin.

Get sunlight on your face and arms for short periods (about 10 minutes) once or twice a day without sun cream but taking care not to burn.

Ultraviolet rays from the sun produce vitamin D on cloudy days but it can take longer.

Babies and children have very sensitive skin and need careful protection.

Make sure you are outdoors – glass will block the sun's rays.

People with dark skin, such as those of African, African-Caribbean or south Asian origin, will need to spend longer in the sun to produce the same amount of vitamin D as someone with lighter skin.

Will my skin make vitamin D if I use sun block?

Using sun blocks or high-factor sunscreens will reduce how much vitamin D your skin makes. Most people use sun blocks or sunscreens if they know they will be in strong sunshine for some time (e.g. on the beach, gardening or for outdoor sports) and not when they are going outside for short periods (e.g. hanging out washing, shopping or school playtimes).

These short periods of time in the sunlight, without sun block or sunscreen, should allow your skin to produce some vitamin D. Children and those at risk of skin cancer will need to cover up when the sun is strong. If you use sun block for medical reasons at all times, you will need to take vitamin D supplements.



Can I get vitamin D from what I eat and drink?

You will get some vitamin D from the foods listed in the table below although you need to be careful about the amount of oily fish, liver and processed meat, such as sausages (high in salt and fat), that you have on a regular basis.

It's important to have no more than 4 portions of oily fish a week because of potential pollutants, and only two portions a week if you are pregnant or trying to conceive (one portion is 140 grams of fish).

Liver contains high levels of a type of vitamin A called retinol which can be harmful for bones in excessive amounts*. You should limit portions of liver to once a week especially if you are over 50 and avoid liver if you are pregnant as too much vitamin A can harm the unborn child. Even cod liver oil contains vitamin A and so taking it is probably not a good way to get vitamin D – you would need a high dose oil to get sufficient vitamin D and this risks getting too much vitamin A (retinol). If you take cod or other liver oils for other health reasons, make sure the type of vitamin A* it provides, called retinol, is no higher than 1.500 micrograms per day.

What about fortified foods?

Many foods, such as drinks, yoghurts or cereals, have vitamin D added to them. The range of foods specially fortified with vitamin D is increasing (such as some yoghurt and bread products and specially processed mushrooms). This can be a convenient way of increasing your intake although it's important to remember it's a well-balanced diet that provides the range of nutrients to keep bones strong, not just one added mineral or vitamin. Be careful you still eat healthily with plenty of unprocessed foods and fresh fruit and vegetables. Research is needed to prove that vitamin D in bread made with specially enriched yeast (as opposed to added vitamin D) is absorbed by the body.



***For more information see our factsheet
Further food facts and bone - Beyond calcium
and vitamin D**

Use the vitamin D rich food chooser below to help you get the vitamin D you need.

Remember it's the combination of sensible sunlight exposure and enjoying an outdoor lifestyle during the summer months, including foods that contain vitamin D either fortified or naturally occurring, and possibly a supplement if you need it, that will ensure you get the vitamin D you need.

Vitamin D rich food chooser

Food item	Average/medium portion size	Vitamin D (micrograms per portion)
Around 20 micrograms vitamin D per portion		
Grilled herring *	1 portion (119g)	19.2
Around 12-13 micrograms vitamin D per portion		
Pink salmon, canned in brine & drained *	1 small can (100g)	13.6
Grilled salmon *	1 portion (170g)	13.3
Grilled kipper fillet *	1 portion (130g)	13.1
Grilled rainbow trout fillet *	1 portion (155g)	12.7
Smoked mackerel *	1 portion (150g)	12.3
Around 3-4 micrograms vitamin D per portion		
Some malted hot drinks (check labelling)	1 mug (25g)	4.6
Crab, cooked *	1 small can (75g)	3.5
Tinned sardines in tomato sauce *	1 small can (100g)	3.3
Scrambled eggs / plain omelette	2 eggs (120g)	3.3
Around 1-2 micrograms vitamin D per portion		
Build-up powdered sachet (shake)	1 sachet (38g)	1.7
Soya milk (fortified)	1 glass (200ml)	1.6
Boiled chicken's egg	1 egg without shell (50g)	1.6
Cornflakes (fortified)/bran flakes (fortified)	1 portion (30g)	1.4

Around 0.5 micrograms vitamin D per portion		
Pork chop, grilled	1 chop excluding bone (75g)	0.6
Corned beef	1 thick slice (50g)	0.6
Grilled bacon rashers	2 middle rashers (80g)	0.5
Low-fat spread, polyunsaturated (fortified)	1 teaspoon (5g)	0.4
Baking fat/margarine	1 teaspoon (5g)	0.4
Pork sausages, grilled or fried *	1 sausage (40g)	0.4
Lamb's liver, fried *	1 portion (40g)	0.4

- * Limit oily fish to 4 portions a week (2 if you are pregnant or trying to conceive) because of sea pollutants.
- * Limit liver products to 1 portion a week if you are over 50 as liver contains high levels of a type of vitamin A called retinol which can be harmful for bones in excessive amounts, and avoid if you are pregnant as too much vitamin A can harm the unborn child.
- * Limit processed meat such as sausages as they are high in salt and fat.

Some foods such as wild mushrooms can be high in vitamin D but this will vary.

The range of foods fortified with vitamin D is increasing. Check food labels or packaging for more information.



Exercise and osteoporosis

Exercise is important in building strong bones in your early years but also throughout life in strengthening your muscles and bones and reducing your risk of a fragility fracture. Exercise does this partly by directly strengthening bone and partly by keeping you steady as you age, to make it less likely you will fall. Whether you have osteoporosis or not, finding out and engaging in suitable exercise will help you gain confidence and reduce your risk of breaking a bone.

Taking enough exercise will not only make you feel good and reduce your risk of osteoporosis and fractures but will also be beneficial for your heart and reduce your risk of many other conditions such as cancer. Exercise helps with many types of pain and stiffness, and specific exercises can also help with the pain and problems caused by fragility fractures.



**For more information see Section 6:
Living with osteoporosis and our booklet
*Exercise and osteoporosis***

Exercise and strong bones

Bone is a living tissue that reacts to increases in loads and forces put upon it by growing stronger. It does this all the time but any increase in 'loading' above normal levels has the best chance of increasing bone strength. Movement causes muscles to pull on bones, and if this pull is 'loaded', the force on the muscles is stronger and the effect on bone is greater. Body weight itself increases bone loading so if you are underweight there will be less pull on your skeleton and your bones may sometimes be less strong.

Weight-bearing exercise that uses your body weight (such as jogging) and weight-resisted exercise (which involves pushing against some resistance, as in strength training) both help to improve bone strength. In later life, exercises to improve muscle strength and balance will also help to prevent falls.



**For more information see our booklet
*Exercise and osteoporosis***

Weight-bearing exercise is any exercise in which you are supporting your own body weight through your feet and legs (or hands and arms).

- Choose exercise that is right for you, that fits in with your lifestyle and that you will enjoy and keep doing. Join a class or go to the gym if you would like to but, if not, there are many other ways to get the exercise your bones need.
- Be sensible about the amount of exercise you take. Excessive exercise without getting adequate nutrition can result in being underweight, which reduces hormone levels and may cause bone loss.



**For more information see our booklet
*Exercise and osteoporosis***



How do I know which exercises are right for me?

One of the challenges in knowing what exercises to do is that high-impact exercise can help to improve bone density and strength, but if bones are very fragile then this may risk causing a fracture.

If you have had a bone density scan and have low bone density (osteoporosis or osteopenia) but are otherwise fit and healthy and have never broken a bone easily – including compression fractures in the spine – then your risk of fracture may not be very high and you may not need to moderate your exercise levels. In fact in some situations you may be advised to increase the exercise you do.

If, however, you have a high fracture risk and particularly if you have had fragility fractures already (including compression fractures in the spine), sudden new high-impact exercise (jogging, jumping etc.) would not be recommended. Exercise advice needs to be tailored to your own situation so a discussion with your doctor and a physiotherapist could be helpful.

Determining exactly how strong your bones are isn't easy. A bone density scan can help, though the results are best considered alongside other risk factors you may have including any history of fragility fractures and your age (fragile bones and fractures are more common in later life). Predicting your risk of breaking a bone in the near future can help to guide you in terms of the most appropriate exercises for you.



For more information see Section 4: Scans and tests, on fracture risk assessment and getting your bones checked

Some activities such as horse riding and skiing will obviously be more risky if your bones are less strong, but decisions about whether to do them will in the end be very personal to you, and will involve weighing up the perceived risks and benefits as best you can.



I have heard you shouldn't bend forwards if you have osteoporosis. Is that true?

It isn't as simple as that. In fact some experts have warned against being too cautious and making people with osteoporosis unnecessarily frightened about what movements they can and can't do. Exercise is important for so many reasons and reducing exercise and activity levels because of a fear of what will happen can exacerbate problems, leading to increased tension, muscle weakness and further pain from existing fractures, as well as reduced bone strength and a greater risk of falling.

There was one research study that found that, in a group of people who already had spinal compression fractures, those who did forward-bending 'touch your toes'-type exercises or abdominal crunches (lying on your back and lifting your upper body) were more likely to have further fractures than those who did backwards extension exercises (e.g. lying on your front and pushing up with your arms). There are plenty of other ways to strengthen your tummy muscles, such as pulling them in while you are walking or lying face down on the floor and pulling them up towards your spine. It certainly seems sensible to always lift any object properly – keeping your back straight and bending your knees to avoid 'loading' your spine excessively in a way that might increase your risk of fractures. However, this doesn't mean never leaning forwards

or never lifting anything; rather, you should think before you move and try not to do awkward, painful, jerky, twisting movements that put unnecessary strain on your back.



**For more information see our booklet
*Exercise and osteoporosis***

If you are used to certain types of exercise (such as controlled, smooth movements in yoga) that are comfortable for you then it is probably appropriate to keep doing them. If you feel your back is under strain then discuss any concerns with your teacher or instructor, who may be able to suggest which exercises to avoid or how to adapt them. There are many useful exercises that will improve muscle strength in your back safely, thus supporting your spine and improving bone strength and back pain problems.



Exercising when you are young and for anyone with a low fracture risk - to build and maintain bone strength and to prevent fragility fractures.

Brief bouts of high-impact exercise, creating a large force that rises rapidly, are a good way to load your bones and 'bank' as much bone as you can when you are young. You will then be in a better position to withstand the natural bone loss that we all experience in later life.

Team sports such as football, as well as participation classes such as dancing, are a great way of getting children involved in fitness from a young age. Key bone-building years are those up to about your mid-twenties, so plenty of weight-bearing exercise will build strength into young bones.

- Jumping on the spot or skipping is good for children and young people because it increases the impact on the bones. Aim for 50 jumps a day or skipping for five minutes each day.
- A 20-minute jog three times a week is good for building bone in both the hip and spine in younger people. Intermittent jogging is also good, especially for people who find continuous jogging too strenuous. Walk then jog every 20 metres or so. Even a very brisk walk can be good for your bones.

- The slow, controlled lifting of weights, best done in a proper gym with advice from an instructor, will increase bone density and makes your muscles stronger. Try to train three times a week on non-consecutive days.
- Tennis is another high-impact but enjoyable sport that builds bone density. Research has shown that professional tennis players have much higher bone density in their serving arm than their non-serving arm!
- Classes that involve exercising to music, such as aerobics, circuit training and boxercise, can be effective. Anything that involves a variety of movements and high-impact exercise will boost both your bones and your heart when you are young.

Children should aim to undertake 60 minutes of moderate-intensity physical exercise every day.

Adults are advised to do 150 minutes of moderate exercise (any activity that makes you feel warmer and slightly out of breath) over a week, with muscle-strengthening exercises on at least two days a week (UK government recommendations).



For more information about specific exercises or types of exercises see our booklet *Exercise and osteoporosis*

Exercising if you at a high risk of fracture, especially if you are over 70 or have broken bones easily in the past - to keep fit safely without causing further fractures; to keep bones strong and prevent fragility fractures

Although you may not want to do all the things you did when you were younger and fitter or before you had fractures, exercise continues to play a vital part in preventing falls and fractures. As you get older, your risk of falling increases, which puts you in greater danger of breaking a bone, particularly the hip. However, falling isn't inevitable, and doing strength and balance exercise is one of a number of ways to ensure you stay steady.



For more information about staying safe and steady see Section 6: Living with osteoporosis

The most important factors are:

- keeping active
- maintaining muscle strength, especially in your legs
- maintaining a good sense of balance and coordination.

The term 'active lifestyle' means enjoying a variety of physical activities throughout the day that keep you on the move. These may include sport or leisure activities such as ballroom dancing or gardening as well as necessary activities such as housework and shopping. It can be as simple as climbing the stairs regularly or taking short, regular walks. You can adopt a more active lifestyle at any age, provided you begin with familiar activities that you enjoy and progress at an appropriate pace. Research has shown that you are never too old to start reaping the rewards of being more active. Here are some suggestions:

- Exercise safely. Always warm up, begin gradually and then increase intensity over time.
- Enjoying a walk every day is great for older people. It's an easy and free way to a fitter, healthier older age. Over time you can add some extra weight to a well-fitted rucksack or weight belt. If you are prone to falling, increase the duration of the walk, not the speed, as brisk walking can increase your risk of falls.

- All types of dancing can provide enjoyable exercise and are especially good for balance as well as your bones. Choose a class that is suitable for your abilities.
- Tai Chi is an ancient form of Chinese martial arts that is good for improving posture and balance in older people. Choose a class that is suitable for your abilities.
- Swimming provides an excellent opportunity to improve stamina in a weight-supported environment. It can help to improve the flexibility of joints and can also help with pain. Try walking about in the water, sideways and backwards as well as forwards. If you progress to using paddles and equipment to resist the water (e.g. in aqua aerobics) then you may also see improvements in strength.

If you are prone to falls, it is best to find a group-based programme led by a specialist falls instructor. Such a person can tailor the exercises to suit your needs and put a focus on falls prevention as well as bone health. Although much of the advice about exercising in later life aims to prevent you falling, there are also some simple exercises that may have a direct effect on the strength of your bones. Many can be done from the comfort of your own home. For example:

- To help strengthen your wrists, try some gentle press ups while you are standing against a wall or lift tins of food a number of times – you could do this while watching TV.
- You can also squeeze a tennis ball slowly 10 times a day with each hand.
- Stand on one leg (holding onto something if necessary for your balance) for a minute, three times a day on each leg – this will help your hips.

Adults over 65 years who are at risk of falls should exercise to improve balance and coordination on at least two days of the week and avoid sitting for extended periods (UK Department of Health recommendations).

Doesn't exercise have to be high impact to make a difference to your bones?

The aim of increasing or maintaining exercise for osteoporosis is to reduce your risk of having a broken bone.

Although research has shown you probably need to do high-impact exercise to make significant improvements to your bone density, studies have also shown that just keeping active in older age seems to reduce the risk of fractures, especially a broken hip. This may be because of subtle changes in the strength of your bones or, most likely, because you have good balance and strong muscles, especially in your legs, so you are less likely to fall. Studies have shown that step aerobics and exercise-to-music sessions improve bone health, and these exercises are not necessarily high impact. Unfortunately we don't know exactly what exercise will reduce the risk of spinal fractures – apart from specific back exercises – although exercises that increase muscle strength and the pull on bones may also help to increase bone strength. There is emerging evidence that avoiding prolonged periods of sitting is favourable to bone health as well, so keeping moving and keeping active is important.



For information about specific exercises or types of exercise see our booklet *Exercise and osteoporosis*



What else can I do for my bones?

Keep a healthy body weight

Aim to keep your body weight in the range that is appropriate for you, as being underweight or overweight can increase the risk of osteoporosis and fractures. You can find out your appropriate weight by using the calculator opposite. Talk to the practice nurse at your doctor's surgery if you need help with this.

Interestingly, if you are a woman, you carry on producing small amounts of the hormone oestrogen in the fatty layers under your skin after the menopause. And, of course, ensuring you aren't too thin helps to provide some 'padding' if you do fall over. Remember, however, that being overweight isn't helpful – it increases your fracture risk as well as your risk of developing many other medical conditions.

How to calculate your BMI

Calculating your own BMI is very easy if you know your height and weight:

1. Measure your height in metres (h) and multiply the figure by itself
2. Measure your weight (w) in kilograms
3. Divide your weight by the number you calculated in step 1 (your height squared)
– i.e. $BMI = w / (h \times h)$

So if, for example, you are 1.6m tall and weigh 60kg, your body mass index is 23.4:

1. Your height is 1.6m so multiply 1.6 by 1.6 to give 2.56
2. Your weight is 60kg
3. $BMI = 60 / 2.56 = 23.4$

Free yourself from smoking

Smoking is well known to have an adverse effect on general health. It has been shown to slow down the work of the bone-building cells, osteoblasts. Smoking may also result in an earlier menopause in women and can increase your risk of a broken hip later in life. The good news is that fracture risk is reduced in those who give up smoking.



For more information speak to the practice nurse at your surgery or visit www.nhs.uk/smokefree

Be sensible about your alcohol intake

Excessive alcohol consumption appears to be a significant risk factor for osteoporosis and fractures. Even minor alcohol intoxication is associated with an increase in falls if you are older, which can result in breaking a bone. You should try not to exceed the government's recommended limit which says men and women should drink no more than 14 units of alcohol in a week and always spread them over the course of at least 3 or 4 days – it's best not to save up units and drink them all in one go and also to make sure you have alcohol free days.

How much is a unit of alcohol?

In the UK, one unit is equal to 8g of alcohol. As a rough guide, the following drinks contain one unit of alcohol:

- a single pub measure (25ml) of whisky, gin or brandy
- half a pint of beer or cider
- a quarter of a pint of super-strength beer or cider
- one small glass (125ml) of table wine contains one and a half units.

As one small glass (125ml) of table wine is one and a half units, the upper limit for men and women is around two small glasses a day. Remember, pubs and restaurants often use larger measures than this.

The good news is that all the healthy lifestyle choices described here will not only be good for your bones but will also reduce your risk of heart disease, cancer and other medical conditions.



Section 3

Risk factors for osteoporosis and fractures

- Are there any risk factors that I can change?
 - Are there any other risk factors?
 - What medicines increase my risk?
- Are there any medical conditions that increase my risk?

Finding out more about your risk factors can be helpful because there may be actions you can take to reduce these risks and ultimately make the 'fragility fractures' that mostly occur in older age less likely.



**For more information see Section 2:
Healthy living for strong bones**



**Osteoporosis diagnosed on a bone density scan is, in fact, a risk factor for fracture.
For more information see Section 4:
Scans and tests**

Some risk factors seem to affect your bone density, as measured on a bone density scan. Others such as old age affect your bone strength and risk of fracture but in a way that doesn't always show up on a bone density scan.

Your doctor will often use your risk factors to build up a picture of your overall fracture risk (i.e. the chance of you having a fragility fracture as a result of osteoporosis). Remember this is more important than just considering your 'bone density scan' result. If your current risk of fracture is high, a drug treatment will be recommended to strengthen your bones and reduce your fracture risk.



**For more information about fracture risk assessment and understanding how treatment decisions are made, see Section 4:
Scans and tests**

Some risk factors, such as being someone who falls a lot or being very thin with little protective padding over your hips, don't directly affect bone strength but still increase your fracture risk. They can often be tackled via lifestyle changes.



**For more information see Section 6:
Living with osteoporosis**

Are there any risk factors that I can change?

A BMI (body mass index) below 19kg/m² is considered a risk factor for osteoporosis and fractures.

Low body weight: low body weight makes osteoporosis and fractures more likely because you have lower amounts of bone tissue overall. Older people with low body weight also have less fat padding around the hips to cushion the impact of a fall, which makes fractures more likely. Although some aspects of your body type are inherited, you have the potential to change your weight, which can affect your risk of osteoporosis and fractures.



For more information see Section 2:
Healthy living for strong bones



Smoking: current smokers are more likely to break bones. Smokers tend to have a lower body weight and women who smoke have an earlier menopause, which increases osteoporosis risk. However, smoking seems to have a direct effect on the bone-building cells too.



For more information Section 2:
Healthy living for strong bones

Alcohol: excessive alcohol, more than the recommended amounts described in Section 2, appears to be a significant risk factor for osteoporosis and fractures. Alcohol appears to affect the cells that build and break down bone, and even small amounts can cause unsteadiness and increase the chance you will fall. Some research has suggested that men with an excessive alcohol intake may also have had less nutritious diets, which may have made osteoporosis more likely.

Falling: older people who are at risk of falling are more likely to have fractures, especially of the hip, after the age of 75 years. Although falling feels like something that happens to you and that you have no control over, surprisingly, there are a large number of ways to stop yourself being someone who falls in later life.

Other factors such as eating healthily and getting sufficient vitamin D may affect your bone strength, but so far research has been unable to prove that they are as significant as the factors listed in this section. However, as part of an overall healthy lifestyle, they are important.



For more information see Section 2: Healthy living for strong bones



For more information about staying safe and steady see Section 6: Living with osteoporosis and our booklet *Exercise and osteoporosis*

Are there any other risk factors?

Some risk factors cannot be changed but it's important to know about them as some research suggests they make it much more likely you will have fragile bones and fractures in later life. It's important to understand that, often, osteoporosis and fractures aren't caused by something you have 'done' or could have changed. Their cause may just be part of your genetic makeup or, like many medical conditions, something that happens but where we don't fully understand why.

Genes: our genes determine our risk of osteoporosis to a large extent although there isn't a simple genetic test for osteoporosis. Research has shown that if one of your parents had a broken hip you are more likely to have a fragility fracture yourself.

Age: bone loss increases in later life, so by the age of 75 years about half of the UK population will have osteoporosis as measured on a bone density scan. As you get older, bones become more fragile and generally more likely to break, whatever your bone density as measured on a scan. This is partly because of generally reduced bone strength but also the result of an increased risk of falling as we get older.

Gender: osteoporosis and fractures are more common in women than men. Women tend to live longer, which makes fractures more likely, but in each age group the fracture risk is higher. Men have bigger bones, and bone size in itself seems to protect against fracture. In addition, at around the age of 50, women experience the menopause, at which point their ovaries almost stop producing the sex hormone oestrogen, which helps to keep bones strong.

Race: Afro-Caribbean people are at a lower risk of osteoporosis and fractures than those of Caucasian or Asian origin because their bones are bigger and stronger.

Previous fractures: if you have already broken bones easily, including in the spine, you are much more likely to have fractures in the future – having already broken bones easily is one of the most obvious indicators that your bones are fragile. In fact, research has shown that after one fragility fracture you are two to three times more likely to have another.

What medicines increase my risk?

Some medications (see below) are linked with an increased risk of osteoporosis and/or fractures. Once you know about these, you can discuss with your doctor the ways to limit their effects. Your doctor may review your medicines and possibly change the dose or even the drug (don't make any changes without talking to your doctor first). Sometimes an osteoporosis drug or a supplement can be prescribed to help protect your bones from the effect of these medicines. However, if you are only taking the drug at a low dose or for a limited period, your doctor may be able to reassure you the effect on your bones is insignificant.

- glucocorticoid ('steroids') tablets for other medical conditions for over three months
- anti-epileptic drugs
- breast cancer treatments such as aromatase inhibitors
- prostate cancer drugs that affect either the production of the male hormone testosterone or the way it works in the body.



Other medicines may increase risk, but more research is needed:

- drugs to reduce inflammation of the stomach and oesophagus, called proton pump inhibitors (PPIs)
- diabetic drugs in the glitazone group, including pioglitazone
- injectable progestogen contraceptives such as medroxyprogesterone acetate, known as Depo Provera
- some drugs used for mental health problems such as tricyclic antidepressants and particularly selective serotonin reuptake inhibitors (SSRIs).

Others at risk include people who have undergone gender re-assignment, especially if hormone replacement therapy is discontinued.



For more information see our factsheets
The contraceptive injection (Depo Provera) and osteoporosis, Anti-epileptic drugs and osteoporosis, Glucocorticoids and osteoporosis, Breast cancer treatments and osteoporosis and Transsexual people and osteoporosis

Are there any medical conditions that increase my risk?

Some medical conditions are associated with an increased risk of osteoporosis and/or fracture. Knowing you are at risk means you can discuss with your doctor how your other condition is being managed and treated. Proper care of these conditions will often reduce the effect on your bone health. Examples of these conditions are:

- rheumatoid arthritis
- low levels of the sex hormone oestrogen in women as a result of early menopause or having a hysterectomy with removal of ovaries (before 45), anorexia nervosa or Turner's syndrome; excessive exercise can also reduce hormone levels
- low levels of the sex hormone testosterone in men can occur for a number of reasons including following surgery for some cancers; some rare conditions that men are born with, such as Klinefelter syndrome or Kallman syndrome, also lower testosterone levels
- hyperthyroidism, in which levels of thyroid hormone are abnormally high
- parathyroid disease, in which levels of parathyroid hormone are abnormally high
- conditions that affect the absorption of food, such as Crohn's or coeliac disease
- conditions that cause long periods of immobility, such as stroke.



For more information see our factsheets *Thyroid disease and osteoporosis, Hyperparathyroidism and osteoporosis, Anorexia nervosa and osteoporosis and Coeliac disease and osteoporosis*

Other conditions may be associated with osteoporosis, such as diabetes, HIV (AIDS), liver disease, cystic fibrosis, dementia and Parkinson's disease. Organ transplant recipients and people with some respiratory diseases may also be at more risk, although more research is needed to understand why.





Section 4

Scans and tests

- How do I know if I have osteoporosis?
 - Investigations for spinal fractures
- Investigations after you break a bone
- Investigations if you have risk factors
- Investigations for children and younger people
 - Other investigations

How do I know if I have osteoporosis?

There is no simple way to look into your bones and see whether the inside structure has lost its strength, so health professionals will use a range of **scans, tests and checks** to decide whether you have osteoporosis (or another bone condition) and whether you need a prescribed osteoporosis drug treatment.



For more information see **Section 1: About osteoporosis** and **Section 5: Drug treatments for osteoporosis**

Investigations and assessments used may include ordinary X-rays, blood tests, bone density scans, fracture risk assessment, magnetic resonance imaging (MRI) scans, radio isotope bone scans, computerised tomography (CT) scans and bone markers.

Which investigations you need will depend on your individual situation. The following section describes the scans and tests you might need.

There is also a procedure called a bone biopsy, in which a piece of bone is extracted and looked at under the microscope. This could detect changes inside your bones but it is not a simple procedure so is rarely used to investigate osteoporosis.

Investigations for spinal fractures

I have lost height and have back pain. What investigations will I need?

It may be that a bone or several bones in your spine have fractured (compressed) because they have lost their strength as a result of osteoporosis. Your doctor will need to examine you and discuss whether you have any signs or symptoms of compression fractures, such as back pain, loss of height or curvature of the spine. Of course, other conditions such as osteoarthritis can cause these symptoms as well, so your doctor will need to make a clinical judgement about whether your signs and symptoms are likely to have been caused by compression fractures.

Finding out whether you have fractures

If fractures are suspected, an ordinary X-ray is usually the best way to confirm whether fractures have occurred. Sometimes your doctor will decide not to refer you for an X-ray if it isn't going to change your management or treatment. This is to avoid exposing you to unnecessary radiation. However, being certain you have had a fracture is very useful in building up a picture of how strong your bones are. You may also feel that knowing you have had a fracture is important to you to help explain the pain you are experiencing. Discuss your concerns and questions with your doctor.

Understanding what's caused your fractures

If you have had spinal fractures, your doctor will need to judge whether osteoporosis or something else has caused them and will want to know:

- Have you had an accident in the past that might have caused fractures? Obviously anyone will break a bone if sufficient force is experienced. If, however, a bone has broken after minimal trauma, your doctor will want to investigate further.
- Do you have another condition that causes fractures or that alters the shape of your bones, such as Scheuermann's disease (an arthritic condition identified by X-ray) or osteoarthritis?

Very occasionally, a type of cancer such as myeloma causes fractures; in this situation you would usually have lost weight, be feeling very unwell and already have had investigations.

Blood tests are sometimes needed to see whether you have another medical condition that is causing your fractures.

A bone scan (using a radioisotope dye) is occasionally used to check whether fractures are caused by other medical conditions or to pick

up fractures that have been difficult to identify on X-ray. This involves having an injection of a very weak radioactive substance followed, in a couple of hours, by a scan to show up any recent fractures.

Sometimes fractures might be identified using an **MRI scan**, especially if hip or spinal fractures are not seen on a normal X-ray. MRI scans use a strong magnetic field to produce detailed pictures of soft tissue, ligaments and muscles. Often, MRI is used to check whether another problem is causing back pain, such as soft tissue injuries or disc problems. MRI scans are more expensive than ordinary X-rays but the advantage is that they don't use any radiation.

What tests and checks will tell me if my fractures are caused by osteoporosis?

If your fractures were the result of a simple fall and no other medical condition has caused them, it will be important that your doctor considers whether you have osteoporosis. A bone that breaks easily is an important sign of osteoporosis, and research has shown that if you have had one fragility fracture you are much more likely to have another in the future.

'Osteoporosis', meaning bones are fragile, may be identified using many different scans and tests, but there is a specific 'diagnosis' that is based on the results of a bone density scan.

Osteoporosis is diagnosed, using a bone density scanning machine, when the amount of bone you have (bone density) as measured on the scan is found to be significantly lower than average. Research has shown that bone fragility can be assessed most accurately by considering all your risk factors (see Fracture Risk Assessment below), including your bone density.

Bone density scanning

A bone density scan, using a densitometry X-ray (DXA), measures how much 'bone mineral' is in the area being measured – usually, one hip and the lower part of your spine. Research has shown that the lower your bone density is the greater your risk is of having a fracture. The scan results are commonly given as a 'standard deviation' (SD) – the number of units above or below average. If your bone density is 2.5 SD below average, this is described as 'osteoporosis'. If your bone density is between the lower end of the normal range and the 'osteoporosis' range, you are said to have 'osteopenia'.



For more information see our factsheet
Bone density scanning and osteoporosis

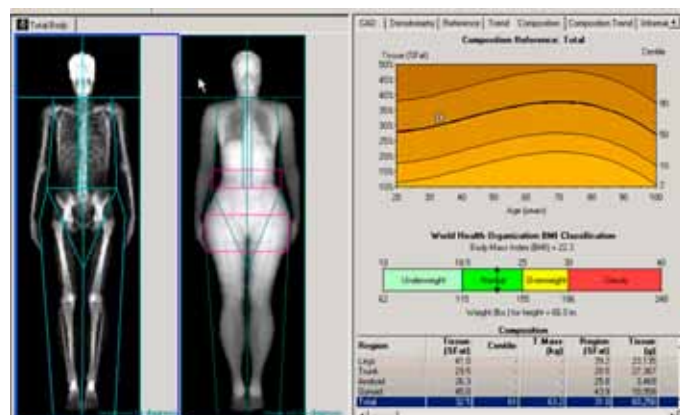
Osteoporosis measured on a bone density scan is a risk factor for fracture in the same way that high cholesterol is a risk factor for a heart attack.

If a bone density scan explained exactly what was happening inside your bones and how strong they were, scanning could be used routinely to see who had and who hadn't 'got osteoporosis', who was likely to have a fracture and who needed an osteoporosis drug treatment. However, the situation is more complicated than this; your bone density scan result isn't a perfect measure of your bone strength and doesn't assess the 'quality' of your bone tissue, only the 'quantity'.

The scan doesn't show whether the structure inside your bones has broken down, which is what often makes bones lose their strength. Research has now proved that bone fragility can be assessed more accurately by a fracture risk assessment, which combines the results of your bone density scan with other proven risk factors for fracture.

Does a bone density scan identify fractures?

A bone density scan might identify a spinal fracture but only if the fracture is in the area being scanned. However, it is not an effective method for diagnosing fractures. There is a new scanning technique called vertebral fracture assessment (VFA), sometimes used alongside the usual types of DXA scan, which can help to see whether you have had a spinal fracture.



Fracture risk assessment

Although low bone density on a scan increases your risk of fracture, many other factors will also contribute to your risk. When doctors are deciding who needs a drug treatment to reduce their risk of a fracture, they use a fracture risk assessment rather than simply diagnosing osteoporosis on a scan. Drug treatments, which have been proved to rapidly reduce the risk of fractures occurring, are then prescribed for those people with a high risk of fracture.

A number of computer-based questionnaires called 'fracture risk assessment tools' have been developed to help health professionals identify who is at high risk of fracture. A commonly used assessment tool is called FRAX. If a health professional is using one of these assessment tools, you will be asked a number of questions about your risk factors including your age, sex, weight, height, history of previous fractures, parental history of hip fractures and whether you have other medical conditions known to affect bone strength.

One of the main benefits of these tools is that they provide some numbers to quantify your risk of having a fracture. Using the answers you provide, this is usually expressed as a probability (in percent) of you breaking a bone in the next 10 years.

Health professionals can then use available guidelines to decide whether your risk is high enough for you to need an osteoporosis drug treatment.

Other investigations to see why you might have low bone density

If your bone density is unusually low, your doctor may refer you to a hospital specialist for further investigations, particularly if you are under 50 years of age, when bone density is usually stable. Blood tests and other investigations may be appropriate to see whether you have another medical condition that is causing low bone density and osteoporosis, such as coeliac disease*, hyperparathyroidism*, hyperthyroidism* or hyperprolactinaemia (high levels of a hormone called prolactin). Treating these medical conditions may help to improve your bone strength. Sometimes low bone density is a sign of another bone condition such as osteomalacia (soft bones caused by severe vitamin D deficiency). You may need to be referred to a specialist at a hospital, such as an endocrinologist, for investigations or treatment of these other conditions.

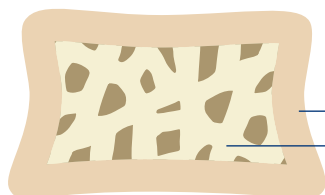


**For more information see our factsheet
Bone density scanning and osteoporosis -
available soon**

What does a bone density scan tell me about my bone strength?

Inside your bones

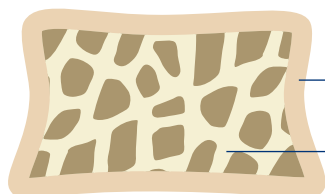
'Normal' bone density on a scan



This usually means your bones are strong because the cortical outer shell is thick and internal struts are thick and interconnected.

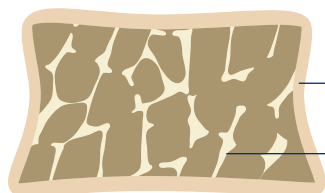
Low bone density on a scan (osteoporosis or osteopenia)

This means either:



Your bones are still generally strong because, despite some thinning of the cortical shell and the internal struts, the structure is still intact or interconnected.

or:



Your bones may have become fragile and at risk of breaking easily. This is because the cortical shell and internal struts have thinned and the structure has broken down with a loss of connections.

Osteoporosis is also a term used to describe low bone density as measured on a bone density (DXA) scan. It means your bones may have lost strength. A DXA scan measures the amount or *quantity* of bone tissue in the area measured but not the *quality* of the bone – having an 'osteoporosis result' doesn't always mean the struts inside your bones have broken down, although it's more likely.

In combination with other risk factors, such as being older (over 50 years) and having had fragility fractures already, low bone density can be used to predict your risk of fractures in the future. This can help with decisions about whether you need an osteoporosis drug treatment.

Investigations after you break a bone

I have broken a bone after a simple fall. What investigations will I need?

Often the first indication of osteoporosis is when a bone breaks easily. This might be a wrist in your fifties or sixties, after a simple fall from a standing height. Of course, anyone will break a bone with sufficient force, but if you break a bone very easily then you may have osteoporosis. Hopefully a health professional will have discussed osteoporosis and your bone health with you when you went to hospital with your fracture. Some hospitals and GP practices have a Fracture Liaison Service with specialist health professionals – usually specialist nurses – following you up and ensuring you have a bone check or fracture risk assessment.

Again, ordinary X-rays will be used to identify the fracture. As with a spinal fracture, you may need other tests and investigations to make sure other medical conditions haven't caused your fracture.

If you are over 50 years of age it would be good practice for your doctor to consider a fracture risk assessment after a fracture occurs, because breaking a bone can be a very important sign of osteoporosis and fragile bones. You may be referred for a bone density scan as part of this assessment.



For more information about fracture risk assessment see page 58



Investigations if you have risk factors

I think I am at risk. What investigations do I need?

If you are **under 40** or a pre-menopausal woman, the current recommendation is to discuss your risk factors with your doctor, who will decide whether further investigations are necessary. If you have broken a bone easily, especially in your spine or in your hip, wrist or forearm, or you are taking high-dose glucocorticoids (steroids), a bone density scan may be recommended to help measure your bone strength.

If you are **over 40** and especially if, as a woman, you are post-menopausal, research has shown that a fracture risk assessment is the best approach to predicting your risk of breaking bones in the next 10 years. This is because you are reaching an age when fractures are more likely and an osteoporosis drug treatment may be needed.

Fracture risk assessment is currently considered the best way of working out who needs an osteoporosis drug. Having a bone density scan will often form part of the fracture risk assessment.



Investigations for children and younger people

Is the diagnosis of osteoporosis any different for people under 50 and for children?

All the changes inside the bone that happen with osteoporosis are less common in younger people and especially in children. Interpreting bone density scans and assessing fracture risk in this setting is more complex, particularly because of changes that occur in the skeleton during growth

and puberty. It has been suggested that, even with a very low bone density result, a diagnosis of osteoporosis should only be made if you have fractures, as well as low bone density compared to your own age group. A referral to a hospital specialist is usually helpful in this situation.



**For more information see Section 1:
About osteoporosis and our factsheet
*Children and osteoporosis***



Other investigations

Computerised tomography (CT) scanning

This type of scanning uses X-rays and a computer to take pictures of bone and put images together. CT scanners can be used to measure bone density and may be useful following compression fractures in the spine, when getting an accurate result on a bone density scan can be difficult. However, CT scanning uses higher levels of radiation than DXA scanning, so a DXA scan is usually considered preferable.

Bone markers

Some specialist centres may carry out 'bone marker' tests.

When the cells that break down and build up bone are at work, they leave behind chemical traces. These are called bone markers and can be measured in urine or blood. The results of the tests can be used to monitor the rate of bone loss in people with osteoporosis. They can tell whether you are losing bone too fast and they may be used to monitor your response to drug treatments. These tests cannot be used alone to measure bone density or to assess your risk of breaking bones.

Ultrasound scanning

Ultrasound can be used to examine structures inside the body. Sound waves of extremely high frequency, inaudible to the human ear, are beamed into the body. The echoes of reflected sound are used to build up an electronic image or measurement of the structure being examined.

Ultrasound scanning has proved useful in visualising many different parts of the body.

Portable and relatively inexpensive ultrasound machines have been developed. These are designed to look at bone structure and strength in a different way from bone density scanning, and usually examine the heel, wrist or finger.

Ultrasound scanning can certainly tell you something about your bone strength and risk of fracture, especially your risk of hip fracture if you are older (75 years or over), but it is not as well developed as other methods such as DXA. If you have a low ultrasound result, you may need to be referred for a DXA scan, especially if you have other risk factors.



For more information see our factsheet *Blood and urine tests - bone markers - and osteoporosis*



A close-up photograph of human skin, showing fine lines and texture, is positioned on the left side of the page. It is partially obscured by a large, curved magenta shape that dominates the right side of the layout.

Section 5

Drug treatments for osteoporosis

- About drug treatments for osteoporosis
- Making decisions about drug treatments
- Getting the most out of your drug treatment



About drug treatments for osteoporosis

What do drug treatments for osteoporosis do and how do they work?

Drug treatments for osteoporosis help to strengthen your bones and reduce your risk of having fractures. They are not given to help with the pain that can occur when bones break.



For more information about methods of reducing the pain associated with broken bones see Section 6: Living with osteoporosis



Most drug treatments for osteoporosis work by slowing down the activity of the cells that break down old bone (osteoclasts). These are known as 'antiresorptive' drugs. Some treatments stimulate the cells that build new bone (osteoblasts). These are known as 'anabolic' drugs. Others have less well understood ways of working that might combine both of these. The main aim of these drug treatments is to decrease the risk of breaking bones, and drugs are licensed on the basis that they do this. Often treatments will show an increase in bone density as well.

Which drug treatments are available?

Group/drug name	Brand/product name	Dose and method of administration
Bisphosphonates:		
Alendronate	alendronic acid*	Weekly 70mg tablet
	Fosamax Once Weekly	Weekly 70mg tablet
	Fosamax	Daily 10mg tablet
	Fosavance	Weekly tablet containing 70mg alendronate and 2800iu vitamin D3
	Alendronic Acid Oral Solution	Oral solution (drink) containing 70mg alendronate taken weekly
	Binosto	Effervescent tablet for oral solution containing 70mg alendronate taken weekly
Risedronate	risedronate sodium*	Weekly 35mg tablet
	Actonel Once a Week	Weekly 35mg tablet
	Actonel Combi	Weekly 35mg risedronate tablet and daily sachet providing 1000mg calcium and 880iu vitamin D3
	Actonel	Daily 5mg tablet
Ibandronate	ibandronic acid*	Monthly 150mg tablet
		Three-monthly 3mg intravenous injection
	Bonviva	Monthly 150mg tablet
	Bonviva Injection	Three-monthly 3mg intravenous injection
Zoledronate	zoledronic acid*	Annual 5mg intravenous infusion
	Aclasta	Annual 5mg intravenous infusion

Group/drug name	Brand/product name	Dose and method of administration
Denosumab	Prolia	Twice-yearly 60mg injection given under the skin
Strontium Ranelate	Protelos	2g sachet of granules, mixed with water and taken daily
Selective Oestrogen Receptor Modulator:		
Raloxifene	Raloxifene hydrochloride*	Daily 60mg tablet
	Evista	Daily 60mg tablet
Parathyroid hormone treatment:		
Teriparatide	Forsteo	Daily 20 microgram self-administered injection
Hormone therapy or hormone replacement therapy (HRT) for women	Many products available	Various routes of administration are available (tablets, patches, topical gels, vaginal creams)
Hormone therapy for men	Many products available	Various routes of administration are available (tablets, patches, implants, injections)
Calcitriol	Rocaltrol	Twice-daily 0.25 microgram tablet



* These treatments are generic (non-branded) drugs. For more information about these see page 75

What about hormone therapy or hormone replacement therapy (HRT)?

As recently as two decades ago, HRT was the only treatment available for osteoporosis and was prescribed for post-menopausal women to raise the level of the hormone oestrogen after the menopause.

Over the past 20 years, the range of drug treatments for osteoporosis has greatly increased and there is better understanding of both the benefits and the adverse effects linked with long-term use of HRT. Adverse effects include a risk of breast cancer, strokes and other blood clots and an increased risk of cardiovascular disease. It is because of these that HRT is not generally used as a treatment for osteoporosis.

In post-menopausal women under the age of 60 at high risk of breaking a bone, this treatment may be considered provided that the benefit of reducing fracture risk outweighs any adverse risks.



For more information see our factsheet
Hormone therapy in men and women and osteoporosis

Are there any new treatments on the horizon?

New drug treatments are being developed for osteoporosis all the time and many are currently undergoing testing. Scientists are looking at other factors that influence the bone-remodelling process. This includes work on the development of a treatment called odanacatib to inhibit the enzyme cathepsin K, which has a role in the breakdown of bone.

Studies are also looking at a drug called romosozumab, which inhibits the action of sclerostin, a protein that affects bone formation.

At the same time, existing drugs are also being manufactured in new forms. Preparations of parathyroid hormone treatment, currently available only as an injection, may in the future be delivered in different ways including, for example, by inhaler, nasal spray or patch.

Are there any drug treatments for osteoporosis that are no longer used?

As advances have been made in the understanding of osteoporosis and new, improved treatments have been developed, some older drug treatments have become unavailable. This may be because they are not so effective in reducing the risk of fracture as the newer drug treatments, and unacceptable side effects have occasionally been identified.

Didronel PMO is an example of the former while calcitonin is no longer used because of long-term health risks.

At one time sodium fluoride was prescribed for people with osteoporosis but it was discovered that, although it increased bone density, it actually led to an increased risk of fracture.



Making decisions about drug treatments

Should I take a drug treatment?

There are many factors that will influence decisions about whether you take a treatment for osteoporosis. Some of these will affect your doctor's decision and recommendations and other factors relate to how you feel about taking a drug treatment for your bones.

- Your doctor will have recommended a drug treatment because you have osteoporosis and have a high risk of fractures. This decision is usually made on the basis of a fracture risk assessment (as described in Section 4).

This assessment (particularly useful in older people) will have established that your risk of breaking a bone in the next 10 years is significantly raised and as a result a drug treatment to reduce that risk is recommended. Occasionally younger people may be advised to take a drug treatment for their bones, though such advice would usually be based on specialist opinion.

- You may be worried about potential side effects and long-term risks of taking a drug treatment and you may be struggling to balance these against the benefits for your bones. As with any medicine for any condition, osteoporosis drugs can potentially cause side effects. The likelihood of experiencing a side effect will depend on a variety of factors, and you should remember that if the drug treatment is taken correctly most people will not experience any problems at all. It may be helpful to find out more about the side effects that worry you as often they can be an initial response to the drug and will go after a short time. If you experience them it may be worth persevering.
- You may have read about potential long-term risks, and these may be putting you off starting or continuing with the treatment that your doctor has prescribed. Again, familiarise yourself with these, as the risk of such problems occurring is often very small. Fear of side effects need not put you off trying a treatment. The risk of these occurring is usually very much smaller than the risk of you having a fragility fracture if you don't have a treatment.

Some people with osteoporosis may decide not to take a treatment because they have personal health beliefs about taking conventional drugs or because the side effects or risks associated with treatments seem to them to outweigh their personal benefits. They or their doctor may decide there is no medical treatment appropriate for them. If this is the case for you, there may be other practical steps you can take to help protect against broken bones.



**For more information see Section 2:
Healthy living for strong bones**

Although research has shown changes to diet and exercise have some effect, these benefits have not always been sustained. Unfortunately, there have been few research trials comparing the effectiveness of drug and non-drug approaches in altering the risk of fracture. As yet, complementary therapies have not been shown to reduce the risk of breaking a bone. Lifestyle changes are important anyway, but you will then have to decide whether to take a drug treatment by balancing the risks and benefits of both approaches.



Which drug treatment should I take?

People often ask 'which drug treatment is best?' The answer is that, in terms of effectiveness, broadly they probably all reduce the risk of fracture to about the same extent. There are a number of factors that will affect the choice of treatment. These include the following factors.

Which type of drug will suit you: tablet, drink, injection or infusion 'drip'?

Drug treatments for osteoporosis are given in a variety of ways. Sometimes a particular route will be more appropriate than others. If, for example, you already suffer with an irritated gullet (food pipe) or have swallowing problems because of another medical problem, you could take a drug given via a drip in your arm or an injection, which bypasses the digestive tract altogether.

Potential side effects

Some of the bisphosphonate tablets can cause inflammation to the oesophagus, injectable bisphosphonates sometimes cause flu-like symptoms for a few days, and raloxifene (Evista) and strontium ranelate (Protelos) slightly increase the risk of blood clots.

Sometimes other medical problems you have might make particular drug treatments unsuitable.

It is worth remembering that you may not be offered a choice when a treatment is prescribed but if you struggle with a particular treatment the good news is that there are others you can try.

The important thing is that you take a treatment that you are happy with because you will probably need to take it for at least five years.



For more detailed information on the potential side effects associated with each drug treatment, see our drug factsheets

Local or NHS guidance, based on what is cost-effective

The treatment your doctor is able to offer you will be influenced by local or NHS guidance. In the UK, national guidance is produced by NICE* (the National Institute for Health and Care Excellence). This is an independent organisation that the government developed to get rid of the 'postcode lottery' whereby some drugs and treatments were available in some parts of the country but not in others. NICE aims to give independent advice about which treatments should be available on the NHS in England and Wales to make sure that people have the same access to treatment and care wherever they live.

NICE ensures that a treatment:

- benefits the people taking it
- will help the NHS to meet its targets, for example by reducing the number of hip fractures
- is cost-effective or value for money.

Your doctor may also be restricted by local or country-based guidance that influences the drug treatment offered to you.

Whether a cheaper generic drug is available rather than a branded version

Most people are prescribed alendronic acid – the generic (non-brand) version of alendronate (Fosamax) – for osteoporosis. This is because generic medicines contain the same active treatment as branded ones but are cheaper for the NHS.

Even with medicines that you can buy, such as paracetamol, there is often a big price difference between generic and branded products. You may worry that because it is cheaper it is not so effective or is more likely to cause side effects, but in the UK there are strict quality controls before a product licence is granted for brand-name and also generic versions of medicines. This means generic and brand-name versions of a drug will contain the same active medication although the additives, coatings and so on could be different.

* In Scotland, guidance is provided by the Scottish Medicines Consortium and the Scottish Intercollegiate Guidelines Network.

I am a man with osteoporosis. Which drug treatments can I take?

Not all drug treatments for osteoporosis have a specific licence to be used in men, although many of the treatments that are used in women are also used in men with a high risk of fracture or if they have already broken a bone. The exceptions to this are raloxifene (Evista) and some types of hormone therapy (HRT), which are only appropriate for women. Your doctor may also be restricted by country-based guidance that influences the drug treatments that can be offered to men.

I am a younger person with osteoporosis. Should I take a drug treatment?

As explained in Section 4, if you are a pre-menopausal woman or a younger man (under 50) with low bone density, you are unlikely to break a bone in the near future and so will not usually need a drug treatment. You may be given lifestyle advice and should also be advised to discuss your risk of having a fragility fracture with your doctor when you are older.

There are, however, exceptions to this advice. If you have broken bones easily and have a bone density below the average for your age, are using high-dose glucocorticoid tablets, or have a hormonal disorder that affects your oestrogen or testosterone levels, a drug treatment may be recommended. Your doctor will usually refer you to a specialist such as a rheumatologist (joints and bones), an endocrinologist (hormones) or a gynaecologist (women's health). One of the reasons for caution in using drug treatments, such as bisphosphonates, in younger people is that these drugs often stay in the bones for a long time. This may cause problems later in life, and in women of child-bearing age they could potentially affect the development of a baby in the womb.

Low bone density in younger people may be caused by other contributing factors such as the eating disorder anorexia nervosa. The disorder causes low levels of the hormone oestrogen or testosterone, and this can be detrimental to bone. If this applies to you, you will need support and help to manage the underlying problem. In women and girls, an increase in body weight will help to restore normal menstrual periods and hormone levels, which should in turn

help to prevent further bone loss. Hormone replacement may be given if you have no menstrual periods because of low body weight, but any potential benefits are unproven. If you are in your adolescence and still growing, hormones may not be recommended as they could potentially affect normal bone growth. You may be recommended to take calcium and vitamin D supplements if you are not getting enough of these important nutrients.



For more information see our factsheet
Anorexia nervosa and osteoporosis

If you are a woman or man with coeliac disease, you will have an increased risk of osteoporosis. You will be given advice about gluten-free foods and healthy eating, which will help to increase the absorption of minerals and vitamins. As with other conditions that affect the absorption of food in the body, calcium and vitamin D supplementation may be recommended.



For more information see our factsheet
Coeliac disease and osteoporosis

What about children with osteoporosis - should they take a treatment?

Osteoporosis can very occasionally affect children either because of an underlying condition (secondary osteoporosis) or because of a rare form of primary osteoporosis called idiopathic juvenile osteoporosis. Expert guidance suggests that children will only be diagnosed with osteoporosis if they have low bone density for their age as well as fragility fractures and will usually only be given drug treatments if they have had multiple fractures. Their management and care will come from a team with specialist expertise in paediatric bone health.

As with many medical conditions, drugs for osteoporosis have not been licensed for children. However, in some cases, after an individual assessment of your child, your specialist may decide to use smaller amounts of the drugs that are used for adults, especially if your child has been severely affected with fractures. Monitoring of this treatment should take place within a specialist centre. As juvenile osteoporosis can spontaneously improve, especially during puberty, many specialists adopt a 'watch and wait' approach where possible. Calcium and vitamin D may also be prescribed.



For more information see our factsheet
Children and osteoporosis

Licensing of drug treatments and medicines

Before a drug can be sold in the UK, a marketing authorisation (formerly product licence) from the Medicines and Healthcare Products Regulatory Agency (MHRA) is required. The MHRA will only issue a marketing authorisation if:

- clinical trials have proved that the drug successfully treats the condition it was developed for
- the drug's effects are acceptable, and
- the drug meets high safety and quality standards.

Wherever possible, doctors will try to prescribe a licensed drug for your condition. However, doctors may sometimes prescribe a drug for use outside the terms of its marketing authorisation (such as in men or younger people with osteoporosis). This is called prescribing an unlicensed drug.

Doctors may prescribe an unlicensed drug if:

- there is no available licensed product
- in their judgement, that drug is the best one available to treat your condition.

If there are no appropriate licensed drugs, a specialist at your hospital with expert knowledge of a specific condition may consider prescribing an unlicensed drug.

The Medicines and Healthcare Products Regulatory Agency (MHRA) is the organisation in the UK that makes sure drugs and medical devices work and are acceptably safe.

For how long should I take my osteoporosis drug treatment? What happens to my bones when I stop?

The length of time you need to stay on a drug treatment varies depending on your individual circumstances. For some people, short-term treatment may be required, while for others, particularly those at higher fracture risk, a minimum of five years, and probably longer, may be needed. Not surprisingly, drug treatments reduce the risk of breaking a bone most effectively while you are taking them.

When you stop treatment the benefit will start to wear off, though the speed at which the effects of a drug wear off differs between treatments.

The effects of bisphosphonates last the longest; some may continue to have an effect for several years after treatment is stopped.

Bear in mind that some specific drugs (e.g. parathyroid hormone therapy) are given for a limited time period. Usually this is because research studies have obtained results on the effectiveness and safety of the drug treatment for that length of time, and so their licence reflects this.

Why shouldn't I just keep taking the drugs on a long-term basis?

This is because there is a small risk of developing serious but very rare adverse effects with some drug treatments for osteoporosis (the bisphosphonates and denosumab). These are osteonecrosis of the jaw and atypical (or unusual) fractures of the thigh bone. The risk of these occurring is extremely small but, in the case of atypical fractures, appears to increase the longer you take the treatment, although more research is needed to confirm this. As already explained, however, even if you are taking treatments for a longer period of time, if you have a high risk of fracture, this usually outweighs the very small risk of such problems occurring.



For more information see our factsheets on these subjects

For some people, however, shorter-term treatment may be all that is required. For instance, if you are taking glucocorticoids ('steroids') or treatments for cancer called aromatase inhibitors (which reduce bone strength), an osteoporosis drug might be prescribed only while you take these other medicines.

I have been taking an osteoporosis drug for many years. Do I need to go back to discuss my treatment with my doctor?

Yes. It is now considered good practice for doctors to review all osteoporosis drugs after patients have been taking them for a number of years to make sure that the drugs are still needed, that they aren't causing side effects and that the benefits of continuing to take the drug continue to outweigh any potential harm. At a treatment review, your doctor will decide whether you need to continue to take the drug or whether you can stop taking it. Formal recommendations have been produced to help doctors decide how long to prescribe the bisphosphonates (e.g. alendronic acid) and when to perform a review, because these are the drugs that have been linked with either osteonecrosis of the jaw or atypical fractures.

Denosumab has recently been linked with these rare problems so a formal review every few years would be recommended for this treatment too.



For more information see our factsheets on individual drug treatments

How will my doctor decide whether I need to continue with my drug treatment at my review? Will I need a bone density scan?

Just like when you started your treatment, your doctor will assess whether you are still at significant risk of breaking a bone. Your doctor may recommend you have a bone density scan to help assess your risk. If you are considered to be at high risk (e.g. if you have a history of having broken one or more bones in the past and have other risk factors for osteoporosis), your doctor may recommend that you continue with your osteoporosis drug treatment without the need for a bone density scan.



I have heard a 'pause' in treatment is a good idea? What does this mean and how does it work?

A 'pause' in treatment means your doctor stopping your medicine and, after a while (usually one to three years), reassessing whether or not to restart it.

The reason for restarting will usually be that your risk of fracture has been reduced because of treatment but isn't low enough to permanently stop taking a drug treatment altogether.

These pauses in treatment have only been recommended to date for bisphosphonates because these drugs continue to have an effect on bone and provide some benefit even after they are stopped. As with any decision to stop an osteoporosis medicine, a pause in your treatment would probably not be recommended if you are considered to have a high fracture risk.

If you are older or have had fragility fractures already – especially compression fractures in your spine or a previous hip fracture – you may be considered to be at high risk and your doctor would probably recommend continuing treatment.

How will my doctor decide whether and when to restart a bisphosphonate?

This will depend on your individual situation and the drug you were taking. Assuming nothing has changed in terms of your health, some doctors may simply restart the bisphosphonate drug treatment after one to three years.

Sometimes your doctor will need to, once again, consider all your risks for fracture including your history of broken bones, and may possibly need to refer you for a bone density scan. It is important to remember a scan is useful only if it will help with treatment decisions.

Getting the most out of your drug treatment

Taking your osteoporosis drugs as prescribed and following the instructions carefully will ensure you get the most from your medication. Understanding why the instructions are important can be helpful.

Get enough of the medicine to make a difference

Continue to take your tablets and take them regularly. Missing the odd tablet will probably not have an impact on your bone health in the long run but you should avoid this if you can. If you are taking a weekly tablet such as alendronic acid, it is useful to choose a day that you will remember every week, for example the day your bins are emptied or a memorable day such as a Sunday. If you continually forget or struggle to take your medication, it would be sensible to speak to your doctor about other treatment options that you may find easier to take.

Reduce the risk of side effects by taking your drug treatment correctly

Bisphosphonate tablets, for example, must be swallowed whole with a full glass of water while staying upright (sitting or standing), thus ensuring that the tablet does not stick in your gullet, where it can cause irritation.



For more information see our factsheets on individual drug treatments

Make sure your osteoporosis drug is properly absorbed

Some drug treatments for osteoporosis (strontium ranelate and bisphosphonates, such as alendronic acid) are very poorly absorbed, so if you eat or drink anything apart from water around the time you take your medicine the drug won't be absorbed and therefore won't work to strengthen your bones. To maximise this absorption process, it is important that you observe the fasting instructions that are described in the leaflet that comes with your medication. If you are taking a calcium supplement it is particularly important that you do not take it at the same time of day as these osteoporosis drugs, as calcium will prevent their absorption.

Make sure you get all the nutrients your bones need as well as your osteoporosis drug treatment

Eat a well-balanced, calcium-rich diet. Your doctor may prescribe calcium and vitamin D supplements as well as osteoporosis drug treatments if your intake is thought to be low. Supplements don't reduce your fracture risk like a drug treatment but you do need to get enough calcium and vitamin D to maintain your bone strength.



For more information see our *Calcium supplements and tests* factsheet – available soon

Be confident your drug treatment is working

This can be difficult because the main purpose of these treatments is to prevent fractures, rather than to relieve pain or symptoms. However, you can be confident that all of the licensed drug treatments for osteoporosis have been clinically tested and research has proven they reduce the risk of breaking bones. Having a bone density scan provides some information but doesn't tell you everything about your bone strength or show conclusively whether a drug is working or not. If you have a fracture while on treatment it does not necessarily mean that the drug is not working – no drug is 100% effective. However, if you continue to break bones, talk to your doctor; depending on your circumstances, a different drug may be suggested.

Research

Clinical trials on new drugs usually go through a series of stages. First, a small number of healthy volunteers try a new drug, then a few hundred people with the condition test it to see whether it works and what side effects occur. This information is used to develop the dosage and method of taking the drug. After this, a larger number of people take the drug over a longer period of time, and, if the drug is proven to work and is safe and tolerable, it will be licensed either by the Medicines and Healthcare Products Regulatory Agency (MHRA) or the European Medicines Agency for doctors to use. In the final stage, further studies are carried out once the drug is available on prescription to look at long-term side effects. Drug trials are monitored by regulatory authorities and, if there are doubts over the safety of a drug, the trial may be suspended or stopped.







Section 6

Living with osteoporosis

- Living with osteoporosis
- Falls, fractures and staying steady
 - Living with fractures

If you are living with osteoporosis, you may be wondering what this means for you and whether normal daily activities might result in broken bones. It is natural to have a range of thoughts and feelings about how to cope with being at an increased risk of breaking a bone. However, it is important to remember that, just because you have been told you have an increased risk of fractures, this doesn't mean they are inevitable. Also, even if you do have fractures, they don't all lead to severe problems with pain and disability.

Living with osteoporosis

If you find it difficult knowing that your bones may be more prone to fracture, or if you are struggling with the impact of fractures on your life, consider speaking to your doctor or health professional, or, alternatively, contact the Helpline at the National Osteoporosis Society and talk your worries through with a member of our team of nurses.

It can be a challenge finding a balance between looking after your health and not 'wrapping yourself in cotton wool', especially if this means you are avoiding activities and interests that are important to you. It can help to think of a diagnosis of osteoporosis as something that prompts you to make informed choices about helpful lifestyle changes and effective drug treatments that will reduce your risk of fractures in the future.

Generally life should be able to go on as normal, although some aspects of your life may be affected.



For more information see our *Living with osteoporosis factsheet* *Travel insurance and osteoporosis*

Falls, fractures and staying steady

Feeling more confident

Many people worry about breaking a bone and for some, especially in later life, fear of falling can mean they avoid tasks and activities and go out less, which can affect their confidence, independence and overall quality of life.

Limitations on your ability to get out and about may make you feel less in touch with the outside world, which can lead to social isolation, loneliness and even depression. However, it is important to remember that there are many self-help steps that you can take to maintain your safety and independence at home. There is also a range of support services accessible through health and social services.

What can I do to help keep myself steady?

The suggestions and activities below can help to improve steadiness and avoid falls. Choose those that feel right for you. Although falling is common in older age and may seem like something you can't control, research has shown that 'falls risk' can be reduced. Falls are not inevitable and these suggestions may make a difference:

- If you have a medical condition that makes you feel unsteady or dizzy, talk to your doctor. Getting treatments for these will make you safer.
- Some medications can cause unsteadiness. If you are taking a number of different tablets ask your doctor or pharmacist to review them.
- Shoes and slippers that have a patterned tread are less slippery than smooth soles. Avoid loose, backless and high-heeled footwear, as these may increase your risk of a fall.
- Avoid clothes that are long and trailing.
- Keep your glasses clean and hearing aids well maintained.
- If you enjoy an alcoholic drink, be aware it might make you unsteady.

- Eat food you enjoy but try and have a well-balanced diet to give your body the right amounts of protein, starchy foods, vitamins and minerals for energy and stronger muscles.
- People who become dehydrated are at greater risk of falling. Ensure that you drink enough so that your mouth is not dry and your urine is straw-coloured and not dark and concentrated.
- Having low vitamin D levels may be a risk factor for falling. If you are over 65 and you don't get enough vitamin D, talk to your doctor about whether you need a supplement.



**For more information see Section 2:
Healthy living for strong bones**

- If you have been falling, talk to your doctor or nurse as there may be specialist falls services in your local hospital.
- Staying active as you age is the best way to fight infirmity and stay independent. Strength and balance exercises will make you steadier.



**For more information see our booklet
*Exercise and osteoporosis***

Staying steady around the home

Many falls happen in the home. Simple measures can help to reduce the risk of this happening:

- Fit handrails on the stairs and, if it helps, next to the toilet and by the bath.
- Move any mats so that you can't trip over them.
- Ensure stair carpets are not loose or frayed.
- Use non-slip mats under rugs if they are on polished floors.
- Fit a cage over your letterbox to avoid having to pick up letters from the floor.
- Buy long-life light bulbs. You won't need to change them so often. If they are not easy to reach, ask someone to change them for you.
- Use a high-wattage light bulb on the landing and stairs so that these areas are clearly illuminated. Turn on the lights at night if you need to go to the bathroom. Clear up cluttered walkways and ensure that wires and flexes are kept out of the way.

What can I do to protect my hips if I fall?

- Mop up spills immediately using a long-handled mop to reduce the risk of slipping.
- Get up slowly out of a chair or bed in case you feel dizzy.
- Ask for help rather than climbing on chairs or stepladders for window cleaning.
- Think and plan – for instance bring objects you regularly need close to you rather than over-reaching for them
- Keep warm in your home. If your muscles get cold they won't work so efficiently.
- Consider installing a personal alarm in case you do fall.

Age UK has a booklet with lots more advice entitled *Staying Steady*. The **Disabled Living Foundation** produces information about choosing equipment to maintain safety and independence at home. Please see the contact details at the end of this section.

If you are older and at risk of falling, hip-protector pants are available that can help to cushion the force of a fall. These underwear garments have protective hard shells built into cotton pants covering your hips to absorb the impact of a fall. Although research studies have not proved conclusively that they prevent broken bones, they might make a difference if you are motivated to wear them.



For more information see our factsheet
Hip protectors and osteoporosis

Living with fractures

As explained in Section 1, pain and other problems associated with osteoporosis are caused by the fractures it causes, and these experiences can vary from person to person.

Osteoporosis does not affect the healing process. So if you have a fracture it will usually heal in about six to twelve weeks although, like any broken bone, sometimes it can take longer. If you are having problems coping at home after your fracture, there are services such as physiotherapy and occupational therapy that can help you to regain your independence.



For more information see our Living with osteoporosis factsheets

As with any broken bone, it is really important that you are eating healthily to help with your recovery and the healing process; see Section 2 for more information about a well-balanced diet. It is especially important that you have enough protein to help the healing process, especially if you are older and frailer.

If you smoke, a fracture may take significantly longer to heal as smoking alters the blood supply to the bones. Ask your doctor or practice nurse for help with giving up smoking to give your bones the best chance of healing well.

Some broken bones require an operation to aid healing; others get better on their own. Sometimes a fracture needs to be immobilised (or kept still) for a period of time, but with other fractures this isn't necessary. Here are three common fractures that can be caused by osteoporosis, how they are treated and how healing is promoted.

Wrist fracture

A plaster cast will usually be applied in hospital to stabilise the break and aid healing. A hospital stay will not usually be necessary. The plaster cast will stay on until the bone has healed, usually for about six weeks. You will be advised about appropriate exercises to help strengthen your muscles and get back to normal activities.

Occasionally an operation may be needed to re-align and stabilise the bones. Sometimes wires are used to hold the bones in position and a partial cast is applied in the operating theatre. After a few days, when the swelling has gone down, a full cast is applied.

A small proportion of people with wrist fractures may go on to develop longer-term problems, such as osteoarthritis of the wrist. A rare but painful complication of wrist fracture is a condition known as complex regional pain syndrome (CRPS). To reduce your chance of developing CRPS it is important to do the recommended exercises before and after the cast is removed.



For more information see our factsheet
Complex regional pain syndrome and
osteoporosis

Hip fracture

Broken hips most commonly occur in people over 75 years of age who fall directly onto their hip. An operation is normally required to fix or replace the upper end of the thigh bone that has broken (see photos opposite). Your surgeon will want to repair the break as soon as possible, but this may be delayed if you have a urine or chest infection, low levels of red blood cells (anaemia) or heart problems. You will either have a general anaesthetic or an injection into your spine to completely numb the lower half of your body.

The quicker you get up after surgery, the more successful your recovery is likely to be as this reduces your risk of problems such as a chest infection and clotting issues. You will usually be up and out of bed the next day with the help of a physiotherapist and a walking frame, and gradually become more mobile as the days progress. After the operation you will have regular, strong pain-relieving injections or a patient-controlled analgesia pump, which provides a pain-relieving drug straight into a vein. This allows you to control your pain by giving yourself safe amounts of medicine.

If you were already quite frail before breaking your hip, you may need a period of rehabilitation after your operation so that you can go home safely. The length of stay in hospital can be between five days and three weeks. A physiotherapist should give you specific advice about appropriate exercises to help with your recovery.

Operations to mend a hip fracture



Plates and screws



Partial hip replacement

There are other fractures that may occur with osteoporosis such as fractures of a rib, an upper arm or the pelvis. If you experience one of these, talk to your doctor or ask to see a physiotherapist for advice about what you can expect and also about appropriate exercises (or limits to your activities) to aid your recovery.

Spinal compression fracture

The experience of compression fractures is varied. For some people these fractures occur suddenly with severe and disabling pain, but for many the compression of the bone is 'silent', causing little or no pain.

These are usually stable fractures so you do not need an operation and you do not need to wear a special spinal brace to keep your back immobile. In fact it is important that you keep as mobile as you can to help to prevent problems such as chest infections, constipation and even blood clots. Keeping mobile will also help to maintain your muscle strength and reduce further pain problems. Taking a pain-relieving medication can help with the pain and will also help you to stay as active as you can. However, if pain is severe in the early stages, you may need to reduce your mobility for a while, although this isn't necessary to aid healing.

In the longer term, whether or not your spinal fractures are painful, you may notice you have lost some height or are beginning to get an outward curve at the top of your spine (see Section 1 for more information on how these changes in your spine occur).

Many people recover well from painful compression fractures but some will go on to experience chronic (persistent) back pain due to the effects of the changes in spinal shape. Sometimes these fractures can lead to being less active, having sleep problems, feeling emotionally low and reduced general health. Height loss and postural changes can cause shortness of breath and your stomach may feel squashed and bloated. This can make day-to-day living more difficult.



For hints and tips on how to overcome various problems associated with broken bones caused by osteoporosis see our Living with osteoporosis factsheets *Daily living after fractures* and *Out and about after fractures*

A compression fracture seems different from a normal broken bone so why is it painful and what can I expect?

It is still a broken bone in the sense that there is a break in the outermost layer. Nerves are therefore stimulated, sending signals to the spinal cord and up to your brain.

Often, during a fracture, blood vessels in the bone are torn and bleed, and back muscles can go into spasm as they try to hold the broken bone together. These changes create further pressure on nerve endings. This immediate pain is often described as 'acute pain'. You may experience it immediately when a bone breaks and it will usually lessen over the following six to twelve weeks, as the injured tissue and bone heal.

Why am I still getting pain after my spinal fracture has healed?

Even though a fracture has healed, sometimes pain improves but doesn't go away completely, with pain coming and going or occasionally becoming constant. Pain that lasts beyond the expected healing time, sometimes defined as longer than three months, is called persistent pain or 'chronic pain'. If the fracture has healed, there will be other causes of the pain:

- **Nerves** leave the spinal cord and travel between the individual spinal bones to all areas of the body. It is possible for a spinal fracture to pinch or irritate one or more of these nerves, causing pain. Sometimes this pinching or irritation of the nerve carries on after healing because the bone has healed into a flattened or wedge shape. Occasionally, pain persists when nerves carrying pain signals have become overly sensitive and continue to 'fire off' pain signals even though the fracture has healed.
- **Joints and ligaments**, where spinal bones join together, are put under strain as they try to adapt to the new shape of the spine. Sometimes **arthritis** in your back may be aggravated by the change in the natural curve of the spine caused by osteoporosis.
- Painful **muscle spasms** can happen with a new spinal fracture due to inflammation around the fracture and the altered stresses and strains on the back muscles caused by the new shape of the spine. However, when a spinal fracture has healed, unfortunately these spasms may still occur because of ongoing muscle strain. Height loss and changes in the natural curves of the spine can over-stretch or shorten some back and torso (chest and abdominal) muscles. These may become easily tired when pulled and strained in ways they are not used



**For more information see our factsheet
Osteoarthritis and osteoporosis**

to and may be prone to going into spasm. Typically, a spasm can happen when lifting an object, or when pushing, pulling, bending or twisting, such as when using a vacuum cleaner. Occasionally even a small movement can set off a muscle spasm. See below for ways to help with pain.

Pain and pain relief

Acute pain and chronic pain can respond well to pain-relieving medications that are purchased from a chemist or supermarket such as paracetamol, anti-inflammatory medications (such as ibuprofen) and codeine. Sometimes pain is more severe and your doctor will need to prescribe stronger pain-relieving drugs.



For more information see our factsheet *Living with osteoporosis: pain relieving drugs after fractures*

Learning and using 'self-help' strategies can also play a valuable part in helping to lessen the impact of chronic pain that cannot be relieved completely.



For more information see our factsheet *Living with osteoporosis: managing persistent pain after fractures*

Everyone responds to pain differently so pain relief that works for one person may not be effective for another. Experiencing pain can lead to difficulties with sleeping, low mood and tension, but in turn feeling tired, emotionally low and stressed can make pain more difficult to manage. You may feel everything is improving and then have a set-back. This is common and can be very frustrating. Many tissues around the fracture have been affected so it can take a long time to get back to normal but, in time, most people make a good recovery.

What can I do myself to help relieve chronic back pain caused by a spinal fracture?

There are a number of steps you can take that may help to avoid or relieve chronic pain and back-muscle spasm caused by spinal fractures. Exercises that help with posture and that build muscle strength may also help to reduce pain and increase your sense of wellbeing.

Ways to avoid pain and muscle spasm:

- When planning to lift anything heavy or bulky, allow someone to help you if you can. If you have no option but to lift it yourself, do so by bending your knees and not by bending your back forwards, and hold the object close to your body and not at arm's length.

- Housework and shopping can be strenuous! Avoid over-stretching when reaching to a high shelf and when pushing or pulling a vacuum cleaner. When hanging out the washing, put the washing basket on a chair or table to avoid repeatedly bending down. Avoid carrying one heavy shopping bag; divide the shopping into two lighter bags held in each hand. If lifting bags from a shopping trolley into your car boot, don't twist your spine while holding a heavy bag. Instead, hold the bag close to your body rather than at arm's length and step round to face the boot of the car.
- When sitting, use a rolled-up towel or 'lumbar roll' to support your lower back, and keep your knees below the level of your hips.
- If you notice that you are prone to muscle spasm with certain types of moves or activities, try doing some gentle warm-up stretching exercises beforehand (some examples are coming up next). These can help by strengthening over-stretched muscles, improving the blood supply to the area and gradually increasing the length and 'stretchiness' of shortened muscles.
- When sitting at a table, try gently sliding your arms from side to side on the table in an arc, keeping your body upright. If lying on your bed, bend your knees with your feet flat on the bed, then gently roll your knees to one side and then the other as far as you can comfortably go – don't force them to go further. If lying on your front, gently raise your head and shoulders by pushing up with your arms; this can help to build up the back muscles and may ease back pain. These gentle exercises work even better if done after some warmth to help muscles relax, such as a hot water bottle, shower or bath.



For more information on safe lifting techniques and exercises see our booklet *Exercise and osteoporosis*

When your back is hurting or you are having a muscle spasm:

- Alter your posture or rest for a while using a lumbar support (such as a rolled-up towel) in your lower back. Resist the temptation to curl up and instead gently arch your upper body backwards or try some of the gentle exercises above.
- Apply warmth to the painful area for up to 20 minutes. Use a covered hot water bottle or a microwave-heated wheat bag (making sure you don't burn yourself), or have a warm bath or shower. Special heat patches and gel packs can be purchased from chemists and supermarkets. Heat therapy has a number of possible benefits. It helps to block some of the pain signals going to the brain and relaxes tight and painful muscles. Heat can also improve the blood supply to the muscles, which may help inflamed or sore muscles and tissues to heal.
- Alternatively, try an ice or cold pack. Use a bag of frozen peas wrapped in a tea towel (to avoid an ice burn) or special reusable ice gel packs, which can be bought from supermarkets or chemists and re-chilled in the freezer. You could even try ice-cold water in a hot water bottle. Another method is to place a damp, folded towel in a plastic bag in the freezer for 10 to 20 minutes. Remove the plastic bag and apply the towel to the painful area. It's important that ice or cold packs are applied for no longer than 15 minutes at a time to avoid damage to the skin from prolonged exposure, but they can be re-applied every few hours.
- Try a relaxation technique or watch a favourite TV programme. This helps to slow down your breathing, lessen muscle tightness and relax neck and shoulder muscles that have 'tensed up' because of pain.
- Try 'pacing' your daily activities. This means 'doing a bit, resting a bit and then doing a bit more'. This allows muscles to have rest periods before they become over-tired and can help reduce the frequency of spasms.

There is no easy solution that will stop all pain, but a good working partnership between you, your family and your GP is a helpful starting point.

Other ways to help relieve pain

It can help to use other therapies or treatments to ease pain either alongside or instead of taking a pain-relieving medication. You may find some of the following useful to try.

Transcutaneous electrical nerve stimulation (TENS) machines

A TENS machine works on the same principle as rubbing an area after it has been hurt. When rubbing sensations are relayed along nerves, the number of pain signals reaching the brain is reduced and this lessens or blocks the feeling of pain. In a similar way, TENS relays tiny electrical signals that block some of the pain signals. It also encourages the body to produce endorphins, a group of chemicals that are the body's natural pain relievers.

TENS machines are quite small and portable. Some can be clipped to the waistband of a skirt or trousers so movement is not restricted. The machines themselves have wires with small adhesive pads attached that are placed just above and on either side of the painful area, such as the spine, or following a painful nerve pathway such as around the ribs. You will feel a tingling sensation but this should not be painful or unpleasant. The depth and frequency of the tingling pulse can be easily adjusted to suit your own preference and needs.

You can often borrow a TENS machine on a trial basis for around four weeks from a physiotherapist or doctor's surgery. They are also sold in most high street pharmacist shops, and cost around £15 to £20.

Physiotherapy

If you are having problems getting up and about again following a broken bone, ask your doctor if you can be referred to a physiotherapist. The physiotherapist will assess you to work out what would best help you and show you exercises matched to your abilities and needs.

The purpose of physiotherapy includes:

- improving mobility and independence and generally getting back to normal
- improving balance and muscle strength to reduce the risk of a fall
- improving flexibility, breathing and posture; even if you suffer from severe curvature of the spine, it is possible that appropriate exercises and some activity may bring relief and improvement
- increasing confidence and wellbeing
- helping with pain; physiotherapists can offer a combination of pain-relieving techniques such as TENS machines, acupuncture, hydrotherapy and exercises tailored to your needs.



For more information on safe and helpful exercises, see our booklet *Exercise and osteoporosis*

Hydrotherapy

Hydrotherapy may be helpful if you have back pain or other difficulties that affect walking and movement. Hydrotherapy is exercise therapy in a warm-water pool, usually within a hospital's physiotherapy department, with specially trained staff or a physiotherapist supervising the exercises. Usually other people undergoing treatment will share the pool with you.

Hydrotherapy involves slow, controlled movements that help to improve your range of movement and can be particularly helpful in relieving pain. By pushing your arms and legs against the water's resistance, you can increase muscle strength and balance and improve mobility, and the support of the warm water encourages relaxation of tight muscles and joints.

Your GP or hospital doctor may be able to refer you to your local NHS hydrotherapy department, usually for a course of five or six half-hour sessions. Before you start, you will be seen by the physiotherapist, who will assess your individual needs. You do not need to be able to swim to participate in hydrotherapy. The pool is usually fairly shallow and most have a range of depths so that you can exercise at a depth that suits you. There will be a good supply of floats and a rail around the edge, and you are never left alone as

there is always at least one staff member in the pool with you. Even those who feel nervous in swimming pools find hydrotherapy safe, soothing and beneficial. If you have difficulty using the steps into the pool, a mechanical hoist will be available to gently lower you into or out of the water.

Once the course has finished, your physiotherapist may suggest continuing with aqua aerobics in your local swimming pool. This is usually a more strenuous form of exercise and the water will be cooler. Sometimes, it is possible to pay for extra sessions in the hydrotherapy pool, although this may be without the close supervision of a member of staff that you had during the course.



Complementary therapies

Most complementary therapies have not undergone the rigorous testing and clinical trials expected of conventional medicine so you are unlikely to find proof that they work to reduce pain. However, having gathered sufficient information, you may wish to try complementary therapies as part of your pain-management plan.

Some of the most commonly used therapies are acupuncture, osteopathy, chiropractic therapy, the Alexander Technique, aromatherapy, reflexology, herbal medicine and homeopathy. It is important to let the therapist know if you have had spinal or other fractures or are at high risk of fractures because of osteoporosis.



For more information see our factsheet
Complementary therapies after fractures

Courses for self-management of long-term health conditions

As someone with a long-term health condition it's likely that you spend just a few hours a year with your doctor, and possibly much less than that. The rest of the time you probably manage the effects of fractures by yourself.

A self-management course aims to give you the skills and knowledge to help manage pain, and the symptoms, fatigue and emotional changes linked to pain and living with a long-term health condition. It also aims to empower you to communicate better with your doctor, make decisions about your health, set personal goals, and increase your self-confidence and self-esteem. Ask your doctor whether there is a self-management course in your area, or contact Self Management UK (details below).



Self Management UK

This is a not-for-profit group that works through the NHS and other organisations. For more information see the organisation's website **www.selfmanagementuk.org** or call the freephone number 0800 988 5560.

Pain-management clinics

If you live with long-term pain from spinal or other fractures, you may have found pain-relieving medications and other ways of managing pain that work for you. If, however, you are having significant problems managing and living with your pain, a referral by your doctor to a pain-management clinic may be helpful.

Pain clinics vary but they usually offer a variety of treatments aimed at relieving long-term pain. These may include pain-relieving medications, injections, hypnotherapy, acupuncture and psychological strategies, although some may focus solely on the control of pain by various types of drug treatments. Each clinic team will be different but may include doctors, nurses, psychologists, physiotherapists and occupational therapists who work together to help people with pain.

Some hospitals run a Pain Management Programme, which is a series of sessions for a small group of people aimed at showing you how to live with your pain and enjoy a better quality of life. Many who attend also enjoy meeting others who are experiencing similar problems.

It's possible that you may need to wait quite a long time to be seen in one of these clinics or attend one of these programmes. Your GP may be able to tell you how long the waiting list is in your area.



For more information see our factsheet *Living with osteoporosis - managing persistent pain after fractures* for ideas on how to avoid pain and lessen its impact

Surgery to help with pain

There are surgical techniques called percutaneous vertebroplasty and balloon kyphoplasty that may help with the pain of spinal fractures in a few specific situations. However, surgery is not suitable for the majority of people with spinal fractures.



For more information see our factsheet *Percutaneous vertebroplasty and balloon kyphoplasty and osteoporosis*

Useful contacts

Action on Pain

0345 6031593

www.action-on-pain.co.uk

Age UK

0800 169 2081

www.ageuk.org.uk

Arthritis Care

020 7380 6500 (General enquiries)

0808 800 4050 (Helpline)

www.arthritiscare.org.uk

Arthritis Research UK

0300 790 0400

www.arthritisresearchuk.org

Back Care

0208 977 5474

www.backcare.org.uk

b-eat (beating eating disorders)

0300 123 3355 (Office)

0345 634 1414 (Adult Helpline)

0345 634 7650 (Under 25s Helpline)

www.b-eat.co.uk

Breast Cancer Care

0808 800 6000

www.breastcancercare.org.uk

The British Nutrition Foundation

0207 557 7930

www.nutrition.org.uk

The British Pain Society

020 7269 7840

www.britishpainsociety.org

British Thyroid Foundation

01423 810093

www.btf-thyroid.org

Coeliac UK

0333 332 2033 (Helpline)
www.coeliac.org.uk

Crohn's and Colitis UK

0300 222 5700 (Information line)
0121 737 9931 (Support line)
www.crohnsandcolitis.org.uk

Epilepsy Society

01494 601300 (General enquiries)
01494 601 400 (Helpline)
www.epilepsysociety.org.uk

Expert Patients Programme

03333 445840 (General enquiries)
www.selfmanagementuk.org

Extend (movement to music for
the over 60s and less-able people)
01582 832760
www.extend.org.uk

First Stop Advice

0800 377 7070
www.firststopcareadvice.org.uk

Klinefelter's Syndrome Association UK

0300 1114748 (Helpline)
www.ksa-uk.net

**National Institute for Health
and Care Excellence**

0300 323 0140
www.nice.org.uk

NHS 111

For urgent medical help or advice
for something that is not a life-
threatening situation
Tel: 111

NHS Choices

www.nhs.uk

NHS Direct Wales

(Galw Iechyd Cymru)
0845 4647
www.nhsdirect.wales.nhs.uk

Pain Concern

0300 1230789 (Helpline)
www.painconcern.org.uk

The Patients Association

020 8423 8999 (Helpline)
www.patients-association.org.uk

The Pituitary Foundation

0117 370 1320 (Support and information
Helpline)
0117 370 1317 (Endocrine Nurse Helpline)
www.pituitary.org.uk

Prostate Cancer UK

0800 074 8383 (Helpline)
www.prostatecanceruk.org

SMOKEFREE

www.nhs.uk/smokefree

Scotland NHS 24

Tel: 111
www.nhs24.com

**Scottish Inter-Collegiate
Guidelines Network**

0131 623 4720
www.sign.ac.uk

Turner Syndrome Support Society

0141 952 8006
0300 111 7520 (Helpline)
www.tss.org.uk

The Vegan Society

0121 523 1730 (General Enquiries)
www.vegansociety.com

The Vegetarian Society

0161 925 2000
www.vegsoc.org

Women's Health Concern

01628 890 199 (General Enquiries)
www.womens-health-concern.org

Leading the fight against osteoporosis

The National Osteoporosis Society is the only UK-wide charity dedicated to improving the prevention, diagnosis and treatment of osteoporosis

We help those whose lives have been affected by the condition through the information and support we provide and through awareness raising and education. We also help by supporting the establishment of Fracture Liaison Services and influencing government and NHS health policy.

As an independent charity, we can only continue to provide our services through the generosity of our supporters. If you would like either to join as a member or support the charity with a donation, please tear off the attached form and send it to us at:

FREEPOST RTJH-ERRL-ZEBK, National Osteoporosis Society, Camerton, Bath, BA2 0PJ.

Helpline

Our osteoporosis specialist nurses are here to give you the information you need through a confidential service. We also produce a wide range of information leaflets and booklets for people living with osteoporosis and for those wanting to improve their bone health.



You can contact the Helpline by calling **0808 800 0035**, by emailing **nurses@nos.org.uk**, via our forum at **www.nos.org.uk/forum** or by writing to **Camerton, Bath, BA2 0PJ**

Funding essential research

We have committed £3 million to research and provided funding for over 100 projects, all of which help people affected by osteoporosis and fragile bones.



Support Groups

We have a network of Support Groups across the UK which provide essential support and information to their local communities.

Become a member

By joining the National Osteoporosis Society you'll become part of a supportive organisation founded to help all of those whose lives have been affected by osteoporosis.

By becoming a member you'll receive:

- Four issues a year of our informative magazine Osteoporosis News
- Hard copies of any of our range of publications about osteoporosis and bone health
- Access to the members' area of our website and exclusive member offers.



Join the National Osteoporosis Society today

Become a member and support the only UK-wide charity dedicated to improving the diagnosis, prevention and treatment of osteoporosis. You can join today by calling us, visiting our website or filling in the attached card

 **01761 473287**

 **www.nos.org.uk**

Our publications are free of charge but we would welcome a donation

You can support the work of the National Osteoporosis Society by making a single or regular donation:

 **01761 473111**

 **www.nos.org.uk**

Helpline - for information and support

 **FREEPHONE 0808 800 0035**

 **nurses@nos.org.uk**

General enquiries - for publications

 **01761 471771**

 **info@nos.org.uk**

Website

 **www.nos.org.uk**

 **Camerton, Bath BA2 0PJ**

If you do not need this booklet please pass it on to someone who does or to your local GP surgery.

National Osteoporosis Society is a registered charity No. 1102712 in England and Wales and no. SC039755 in Scotland.

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