

Patient information from the BMJ Group

Osteoporosis

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Osteoporosis

If you have osteoporosis, your bones are weak and can break easily. More women than men get this condition. If you break a bone in your spine, hip, or wrist after going through the menopause, osteoporosis is the most likely cause.

Osteoporosis can have serious effects on your health and your life. But there are some good treatments that slow down the disease and help stop you breaking bones. There are also treatments that lower your chances of getting osteoporosis if you are especially likely to get it.

We've brought together the best research about osteoporosis and weighed up the evidence about how to treat it and how to prevent it. You can use our information to talk to your doctor and decide which treatments are best for you.

What is osteoporosis?

If you have osteoporosis, your bones are thinner and weaker than normal. That means they can break after only a small bump or fall.

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If you have osteoporosis, your bones are weak and can break easily.

You can't see from the outside that your bones are getting thin and weak. Most people only find out they have osteoporosis when they break a bone after a small fall or bump.

Osteoporosis is very common in later life. The older you are, the more likely you are to get it. This is because your bones get thinner as you age. And women are more likely to get it than men. This is because the changes in your **hormones** at the **menopause** speed up the thinning.

There isn't any cure for osteoporosis. But there are good treatments that can slow down the disease and help stop you getting broken bones.

Key points for people with osteoporosis

- Osteoporosis is the most common cause of broken bones in women who have been through the menopause.
- This condition takes years to develop. You may not know that you have osteoporosis until you break a bone.
- Osteoporosis is serious. Broken bones hurt and can make it hard for you to live on your own.
- There isn't any cure for osteoporosis. But you can get treatments to slow down the disease and lower your chances of breaking a bone.
- You can also do some things on your own to avoid getting broken bones.

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Your bones and how they are made

To understand osteoporosis and how it is treated, it may help to know a bit about how your body makes your bones.

Your bones have two main parts. ^[1]

- The **inside part** looks like a honeycomb. This is sometimes called spongy bone. Doctors call it **trabecular bone**. It is filled with blood vessels and **bone marrow**, where your blood cells are made.
- The **outside part** is hard. It's made of **calcium** and other substances. This is sometimes called compact bone. Doctors call it **cortical bone**. This hard outside protects the spongy inside.

Bone is a living, growing part of your body. ^[1] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

Certain cells cause the new bone to grow. They are called **osteoblasts**. Other cells break down the old bone. They are called **osteoclasts**.

When you are a child and teenager, new bone grows faster than old bone is broken down. So your bones get larger, heavier, and more dense. More dense means **stronger**. This happens until you are about 30 years old. That's when your bones are the strongest they will ever be.

After the age of 30, old bone is broken down faster than new bone is made. This happens slowly at first. But it speeds up when you are in your 50s and 60s because of changes in your **hormones**. ^[1]

If you have built up very strong bones by the age of 30, you are much less likely to get osteoporosis in later life. ^[2] How strong your bones are when you are young depends partly on the **genes** you get from your parents. But you can try to build strong bones by eating **healthy foods** and getting **exercise** too. To find out more, see [Preventing osteoporosis](#).

Doctors use a measurement called **bone mineral density** to say how strong your bones are. It's called **BMD** for short. It tells how much calcium and other minerals you have in your bone. The more that's packed into your bone, the **denser** your bones are. Denser bones are stronger bones.

What happens in osteoporosis?

As you age, old bone is broken down faster than new bone is made. This is normal. It happens to everyone starting at about the age of 30. And it speeds up as you get older. But in some people, it happens even faster than normal. This makes their bones thinner and more likely to break. That means they have osteoporosis.

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If you have osteoporosis the holes inside your bones get bigger and the bone between the holes gets thinner.

Osteoporosis affects both parts of your bone. But it affects the inside spongy part more than the outside hard part.

This is because the spongy part is broken down faster than the hard part.

So as you get older, the holes in the spongy bone get bigger and the bone between the holes gets thinner. This means your bones get weaker.

As your bones get weaker, they can't handle damage as well. So they may break after you have an accident that seems small, like a little bump or fall.

All the bones in your body are weaker if you have osteoporosis. But the ones most likely to break are in the ones in your **spine, hip, and wrist**. Not everyone who has osteoporosis gets a broken bone though. ^[3]

Doctors use a score to talk about your BMD. This score tells if you have osteoporosis. The score measures **how dense your bones are** compared with the bones in an average young, healthy adult. Remember that most people's bones get thinner eventually. ^[4]

- A score of 1 to -1 means your bones are **normal**.
- A score of -1 to -2.5 means your bones are a bit weak. This is called **osteopenia**.
- A score below -2.5 means you have **osteoporosis**.
- A score below -2.5 when you have already had a broken bone because of osteoporosis means you have **bad osteoporosis**.

Osteoporosis: why me?

We don't know for sure why some people get osteoporosis and others don't. But there are things that make you more likely to get it. These things are called **risk factors**.

Having a risk factor does not mean you will get osteoporosis for sure. It just means you are more likely to get it than someone who does not have that factor.

Some risk factors you can't change, but others you can. ^[1] ^[12]

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Here are some of the risk factors you **can't** do anything about.

- **Age.** Your bones get weaker as you get older. Osteoporosis is more common after the age of 60.
- **Sex.** Women are more likely to get osteoporosis than men. This is partly because their bones are smaller and weaker to start with. But it's also because the menopause affects your bones. For more, see [Menopause and osteoporosis](#) .
- **Race.** White and Asian people are more likely to get osteoporosis than people of African origin, who have stronger bones.
- **Your family.** Osteoporosis may be partly due to your **genes** . If your mother had osteoporosis, you are more likely to get it too.
- **Illnesses.** Some illnesses can make you more likely to get osteoporosis. See [Illnesses and drugs that can cause osteoporosis](#) .
- **Drugs.** Some drugs can increase your chances of osteoporosis too. See [Illnesses and drugs that can cause osteoporosis](#) .

Here are some of the risk factors you **can** do something about.

- **What you eat.** If you don't eat enough **calcium** and **vitamin D** over your lifetime, you may not get enough calcium to build strong bones.
- **Exercise.** Exercise helps keep your bones strong. If you don't get enough exercise, you may be more likely to get osteoporosis. But if you get too much (so much that you stop having periods if you are a woman), you may be more likely to get osteoporosis too.
- **Smoking.** Smoking cigarettes is bad for your bones.
- **Eating disorders.** Disorders like **anorexia** or **bulimia** can increase your chances of getting osteoporosis a lot. With these, you are not eating enough calcium and vitamin D. Also, if you are a woman with an eating disorder, your body is probably not making enough of the **hormone** called oestrogen. Both of these increase your risk of osteoporosis.

For more on risk factors you can change, see [Preventing osteoporosis](#) .

Getting older is the main cause of osteoporosis. But sometimes young children get it too.

[1] [2] For more, see [Osteoporosis in children](#) .

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What are the symptoms of osteoporosis?

The main symptom of osteoporosis is breaking bones because they have got weak. You can't feel them getting weak and you don't usually look any different on the outside.

You may not know you have osteoporosis until you break a bone. ^[1]

When you break a bone, doctors say you have a **fracture**. The bone might be snapped right across, like when you break one of the long bones in your arms or legs. Or it might be crushed. This is more likely if you break a bone in your spine.

Lots of people break their bones without having osteoporosis. But this is usually because they have a bad accident, like a big fall or a car crash. If you have osteoporosis, your bones are so weak that you can break them from a gentle bump, lifting something heavy, or even just sneezing. ^[18]

The symptoms you get depend on which bones get broken. With osteoporosis, you are most likely to break the ones in your **spine, hip, and wrist**. ^[19]

Broken bones in your spine

Here are some facts about broken bones in your spine.

- This is the **most common** fracture caused by osteoporosis. About 1 in 5 white women get a broken bone in their spine during their lifetime. ^[19]
- You may not feel any pain at all when you break a bone in your spine. Or you may feel a sudden bad pain in your back.
- If you break several bones in your spine, you may get shorter. Your spine may start to bend over too. This is sometimes called a dowager's hump or widow's hump.
- Because you don't always get bad pain, you may confuse fractures of your spine with other diseases like **rheumatoid arthritis**. ^[20]
- Most fractures of the spine caused by osteoporosis gradually heal by themselves. But if you think you have fractured your spine (if you get a sudden unexplained back pain, for example) see your doctor. You may need treatment in hospital.

Broken bones in your hip

Here are some facts about broken bones in your hip.

- This is the **second most common** fracture caused by osteoporosis. About 1 in 6 white women get a broken bone in their hip during their lifetime. ^[19]

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- If you break your hip, you get bad pain straight away. You won't be able to stand on it.
- You will need to stay in hospital for treatment until your hip heals. And you may need an operation.

Broken bones in your wrist

Here are some facts about broken bones in your wrist.

- This is the **third most common** fracture caused by osteoporosis. About 1 in 7 white women break a bone in their wrist during their lifetime. ^[19]
- If you break your wrist, you get bad pain straight away. And your wrist or arm may swell up.
- You may need to go to hospital for treatment. And you will have to wear a cast on your wrist until it heals.

How do doctors diagnose osteoporosis?

Your doctor may think you have osteoporosis just from talking to you and examining you. But you will probably need a scan to say for sure.

Here are some of the things that may make your doctor think you have osteoporosis.

- You broke a bone very easily, especially one in your spine, hip, or wrist.
- You are a woman who has been through the **menopause** and you are getting shorter or your spine is curving forward.
- You have lots of risk factors (things that make it more likely that you will get osteoporosis). For example, you are a woman who has been through the menopause, and your mother had osteoporosis, and you have small bones and you weigh less than 40 kilograms (88 pounds). ^[35]

If your doctor thinks you have osteoporosis, he or she will want to measure your **bone mineral density**. This is called **BMD** for short. It tells your doctor how much **calcium** and other minerals you have packed in your bones. The more you have, the stronger (denser) your bones are.

DXA scans and other scans

The most common type of scan to measure your BMD is called a **DXA scan**. That's short for **dual-energy x-ray absorptiometry**.

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You may need to go to hospital for this scan. But you will go home the same day. You may have to put on a hospital gown. But in some hospitals, you can keep your own clothes on.

For this scan, you just lie on a table while the machine moves over your body. It won't touch you and you won't feel anything. The scan takes just five minutes to ten minutes. It uses radiation to measure how strong your bones are. But you get less radiation from a DXA scan than you do from a regular x-ray.

This scan is the most reliable one for saying if you have osteoporosis. And it is the best test for measuring BMD. ^[36]

There are other, smaller scanning machines. These measure the BMD in your smaller bones, like the ones in your fingers, wrists, or heels. These scans aren't as reliable as a DXA scan. You may have these first if your hospital doesn't have a DXA scanner. For more, see [Other scans to measure BMD](#) .

Tests of your BMD **can't say for sure** if you will break a bone or not. They can only say how strong or weak your bones are. You may never break a bone, even if your bones are weak. And you can still break a bone even if your bones are strong.

Who should have a DXA scan?

In the UK, experts say you should have a DXA scan only if your doctor thinks you are more likely than average to get osteoporosis. ^[37]

Doctors agree that you should also have a DXA scan if: ^[37]

- You have already broken a bone after a small bump or fall
- You take corticosteroid tablets regularly (this can make your bones weak)
- You are a woman who had the menopause before the age of 45 or had your ovaries taken out before the age of 45
- You are a woman who has missed menstrual periods (except when you were pregnant or after the menopause) for more than a year (this could happen because of anorexia or bulimia , or exercising too much)
- You are a man who has low levels of a hormone called testosterone
- You have other conditions that cause weak bones (these include conditions called malabsorption syndrome and hyperparathyroidism)
- You have had to stay in bed for a long time
- You are a woman and your mother broke her hip.

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What does a DXA scan tell you?

A DXA scan gives lots of information about your bones. The part doctors usually use to diagnose osteoporosis is called a **T score**. It measures **how dense (strong) your bones are** compared with the bones of an average young, healthy adult. ^[4]

- A score of 1 to -1 means your bones are **normal**.
- A score of -1 to -2.5 means your bones are a bit weak. This is called **osteopenia**.
- A score below -2.5 means you have **osteoporosis**.
- A score below -2.5 when you have already had a broken bone because of osteoporosis means you have **severe osteoporosis**.

Even if you have a score below -2.5, your doctor may want to do some more tests to be sure you have osteoporosis. These tests check for other illnesses that can cause weak bones. Here are some examples of those illnesses. ^[38]

- **Osteomalacia**. With this condition, your body doesn't have enough **vitamin D** to keep your bones strong.
- **Malabsorption syndrome**. With this condition, your body doesn't absorb enough nutrients.
- **Hyperparathyroidism**. With this one, glands in your neck called parathyroid glands make too much of a hormone called parathyroid hormone. This hormone controls how much **calcium** is in your bones and blood. If you have too much of this hormone, your body may take calcium out of your bones, making them weak. ^[39]

If you have a score of -1 to -2.5, called osteopenia, your bones are a bit weak. But they are not as weak as in osteoporosis.

Your doctor probably won't give you any drug treatment for osteopenia. But he or she may give you advice on how you can help yourself. For example, you may be advised to get more calcium and vitamin D, and to exercise. ^[11] These things may help make your bones stronger. For more, see [Preventing osteoporosis](#) .

Some doctors use a different score from your DXA scan to say how strong your bones are. This score is called a **Z score**. It compares your BMD with the average for someone the same age as you.

How often should I have a DXA scan?

We don't know for sure how often you should have a DXA scan.

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If you have osteoporosis and are getting treatment, your doctors may use DXA scanning to see if your treatment is working.^[40] You may have a scan every year for the first two years. After that, you may have a scan every two years.

How common is osteoporosis?

Osteoporosis is the most common bone disease in the world. Ageing is the main cause of osteoporosis. So as people live longer, it is getting more and more common.

Experts think the number of broken bones caused by osteoporosis could double over the next 50 years.^[21] Doctors call broken bones **fractures**.

Osteoporosis is common in the UK.^[21]

- More than one-third of adult women get one or more broken bones from osteoporosis in their lifetime.
- Men are about half as likely as women to get these fractures.
- Osteoporosis causes more than 200,000 broken bones each year.
- With this condition, fractures of your spine are most common, followed by fractures of your hip, then fractures of your wrist.

White and Asian women are more likely to get osteoporosis than women of African origin. African-Caribbean women have stronger bones than white women at all ages.^[12]

What treatments work for osteoporosis?

If you have osteoporosis, your bones are weak and can break easily. But you can get good treatments to slow down this disease and make it less likely that you will break a bone.

Osteoporosis can have serious effects on your health and your life. But there are some good treatments that may stop your bones getting weaker and help you avoid broken bones. There are also things you can do on your own to prevent broken bones.

Most of the studies into these treatments look at how well they work for **women who have been through the menopause**. Men and younger women with osteoporosis may also be offered the same treatments. But there isn't as much evidence to show how well they work for these people.

Key points about preventing and treating osteoporosis

- Drugs called **alendronate** and **risedronate** work well for osteoporosis. They belong to a group called **bisphosphonates**.

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- A newer drug from the same group is called **ibandronate**. You take it only once a month. There is also a bisphosphonate called **zoledronic acid** that you have as a drip once a year.
- Bisphosphonate drugs can have side effects. To avoid these, you need to **take them as your doctor tells you**.
- If these drugs don't work or you can't take them, other drugs can help. They include **raloxifene, teriparatide, and strontium ranelate**.
- We don't know what happens to your bones when you stop taking any of these drugs. There haven't been any studies on this.
- Your doctor might recommend injections of a newer treatment called **denosumab** if other treatments haven't worked for you, or if you're at high risk of broken bones.
- Tablets of **calcium and vitamin D** are likely to help keep your bones strong, especially if you are low in vitamin D. But you need to take them together.
- Hormone replacement therapy (**HRT** for short) probably helps keep your bones strong too. But it has side effects. So doctors don't usually advise it first for osteoporosis.

Some of these treatments are also used for **preventing** osteoporosis if you are especially likely to get it. Others are used just for treating it.

In the UK, there are guidelines on who can be treated with osteoporosis drugs on the NHS. For more, see [Who can get treatment?](#)

There are many treatments for osteoporosis. But which treatments work best? We've looked at the best research and given a rating for each treatment according to how well it works.

For help in deciding which treatment is best for you, see How to make the best decisions about treatment.

Treatment Group 1

Treatments for osteoporosis

Treatments that work

- [Alendronate](#) : This belongs to a group of drugs called **bisphosphonates**. They slow down the breakdown of your bones. It comes as tablets. One brand name is Fosamax. [More...](#)
- [Risedronate](#) : This is also a bisphosphonate drug. It comes as tablets. The brand name is Actonel. [More...](#)

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- [Zoledronic acid](#) : This is also a bisphosphonate drug. You have it as a drip (an intravenous infusion or IV) once a year. Its brand name is Aclasta. [More...](#)
- [Denosumab](#) : This is a drug that slows bone loss. You have an injection once every six months. The brand name is Prolia. [More...](#)
- [Teriparatide](#) : This is a drug that encourages your body to make new bone. You have to inject it every day. The brand name is Forsteo. [More...](#)
- [Strontium ranelate](#) : This is a new drug that helps make your bones stronger. It comes as a powder you mix into water. The brand name is Protelos. [More...](#)

Treatments that are likely to work

- [Ibandronate](#) : This is a bisphosphonate drug. You can take it just once a month. It comes as tablets. The brand name is Bonviva. [More...](#)
- [Etidronate](#) : This is also a bisphosphonate. But it is an older one and not used as often. It comes as tablets. The brand name is Didronel. [More...](#)
- [Calcium plus vitamin D](#) : These play an important part in building your bones and keeping them strong. They usually come as tablets or capsules. You need to take both of them. [More...](#)
- [Calcitriol](#) : This is a strong type of vitamin D. It helps your body to make good use of the calcium you eat. It comes as a capsule. The brand name is Rocaltrol. But you can also get it as calcitriol. [More...](#)

Treatments that work, but whose harms may outweigh benefits

- [Hormone replacement therapy](#) : This is called HRT for short. It has the hormone oestrogen in it. So it helps keep your bones strong. But HRT can have serious side effects. Doctors don't usually choose it first for treating osteoporosis. Common brand names include Elleste Solo, Estraderm, Climesse, and Premique. [More...](#)
- [Raloxifene](#) : This is a type of drug called a selective oestrogen receptor modulator (SERM). It acts a bit like the hormone oestrogen to keep your bones strong. It comes as tablets. The brand name is Evista. [More...](#)
- [Calcitonin](#) : This is a natural hormone that slows down the breakdown of your bones. It isn't recommended any more for osteoporosis because it may slightly increase your risk of cancer when used long-term. [More...](#)

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Treatments that need further study

- [Exercise](#) : Regular exercise may help to keep your bones strong. But we don't know for sure yet. [More...](#)

What will happen to me?

If you have osteoporosis, you may worry about your future. Because your bones are weak, you are more likely than average to break one of them. But not everyone who has osteoporosis breaks a bone.

What are my chances of breaking a bone?

If you have osteoporosis, you are most likely to break a bone in your spine, hip, or wrist. When you break a bone, doctors say you have a **fracture**.

With osteoporosis, your chances of breaking a bone depend on lots of things. We discuss some of those things below.

People with osteoporosis often break a bone when they fall down. So if you have this condition, one way to make a fracture less likely is to try not to fall. For more, see [Preventing falls](#) .

How strong your bones are

Your bone mineral density (BMD for short) tells your doctor how strong (dense) your bones are. It is measured with a DXA scan (see [How do doctors diagnose osteoporosis?](#)). The results are called your **T score**.

If you have a score **lower than -2.5**, you have **osteoporosis**. Without treatment, 12 in 100 people with osteoporosis will break a bone in the next two years. ^[22]

If you have a score of **-1 to -2.5**, you have **osteopenia**. This means your bones are weak, but not as weak as in osteoporosis. About 2 in 100 people with osteopenia will break a bone because it's weak in the next year. ^[23]

But your BMD isn't the only thing that affects your chances of breaking a bone.

How old you are

Your chances of breaking a bone are lower when you are younger. ^[11]

- If you are 50 and have osteoporosis, your chances of breaking a bone in the next 10 years are only 5 in 100 (that means only 5 percent).
- If you are 60 and have osteoporosis, your chances of breaking a bone in the next 10 years are more than 20 in 100 (that means more than 20 percent).

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Having broken a bone already

You are most likely to break a bone if you have already had one broken bone. ^[20]

- Of 100 women who have had one hip fracture, 14 get another one.
- Of 100 women who have had a wrist fracture, 10 get another.
- Of 100 women who have a fracture of their spine, 25 get several more.

This is partly because breaking a bone means that your bones have got weak. But breaking one bone, particularly in your spine, can make it more likely that you will break another one. Here's why.

- If you break a bone in your spine, the other bones in your spine are under more stress.
- If you break a bone in your hip, you may have problems walking and be more likely to fall again.
- If you break a bone once, it makes the bone weaker and more likely to break again.

So it's important to do everything you can to avoid breaking a bone. For more, see [Preventing falls](#) .

Getting treatment for osteoporosis

You have a **much lower chance** of breaking a bone if you take drugs to stop your bones getting weaker. ^[24] And some research shows treatment may also help you live longer, by preventing falls that can lead to a decline in health. ^[25]

Some treatments can lower your risk of breaking a bone **by half**. For example, studies show that in women with osteoporosis: ^[22]

- About 15 in 1,000 women who take a drug called [alendronate](#) break a bone
- But 30 in 1,000 women who do not take the drug break a bone.

If you have treatment for osteoporosis, your bones stop getting weaker. They may even get stronger again. This means your risk of breaking a bone may go down the longer you have treatment. But we don't know what happens to your bones if you stop taking the medicine. ^[22]

What will happen if I break a bone?

Different types of fractures affect people in different ways. For example, a broken wrist hurts. But it doesn't cause as many problems in the long run as a broken hip.

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Here are some things that may happen if you break a bone.

Broken bone in your spine

This is the most common fracture caused by osteoporosis. It may happen if you fall down. But if your bones are very weak, it could happen just from sneezing or rolling over in bed.

A broken bone in your spine can cause a sharp pain in your back. But sometimes you don't feel anything when the bone first breaks.

If you break a bone in your spine, your doctor may tell you to lie in bed for a few days and take painkillers until it heals. You may need to have **physiotherapy**. The pain is likely to go away in six weeks to eight weeks.^[26] Lots of people get completely back to normal after a fracture of their spine.^[27]

You can break a bone anywhere along your spine. But it is most common in the middle and lower parts of your back. Between 2 in 10 and 3 in 10 of these fractures affect two or more bones.^[27] When this happens, doctors call it a **multiple fracture**.

If you break a bone in your spine, this puts pressure on all the other bones in your spine. So the other bones are more likely to break too. If several of the bones in your spine break, your spine may hunch over, so you can't stand up straight.^[20]

This can cause several problems:

- You may get a backache that won't go away
- You may find it hard to get comfortable in bed, so you have problems sleeping
- The organs at the front of your body, like your lungs and bowel, may get squashed. This makes it harder for them to work properly.

For more, see [Breaking a bone in your spine](#).

Broken bone in your hip

Most people with osteoporosis break their hips when they fall down. If you break your hip, it hurts a lot. And your leg may swell up. You will need to go to hospital for treatment. And you will probably need an operation to fix your hip.

Some people get a lot better and can go home and live on their own after surgery. But other people find this harder.

Here is what studies show one year after breaking a hip:^[20]

- About 3 in 10 people have to go into a nursing home for the first time
- About 4 in 10 people still can't walk on their own

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- About 6 in 10 people have problems with everyday tasks like brushing teeth, combing hair, and dressing
- About 8 in 10 people can't do other important activities, like driving and shopping.

Breaking a hip is especially serious for older adults who also have several other illnesses. And older adults are more likely to die after a hip fracture.^[28] For more, see [Breaking a bone in your hip](#) .

There hasn't been enough research to say for sure why people are more likely to die after a hip fracture. We know the chances of this happening are highest for men and for people with other illnesses. It is also higher the older you are. The chances of dying after a hip fracture are higher in the first year after the break.^[28] But for most people, the chances go back to normal for their age two years after the fracture.^[20]

Broken bone in your wrist

Fractures in your wrist are far less serious than fractures in your hip or spine. This is because they only affect the way your arm moves, not your general health.

If you break your wrist, you will probably need to stay in hospital. Your arm may be put in a cast. Or you may need an operation. Most people find their wrist heals well and they can use it properly again afterwards.^[29]

Questions to ask your doctor

If you've been told you have osteoporosis or a broken hip because of osteoporosis, you may want to talk to your doctor to find out more.

Here are some questions that you might want to ask about osteoporosis.

- How bad is my osteoporosis? Which of my bones are affected?
- What's the best treatment for me? How does it work?
- Does the treatment cause any side effects?
- Can I help myself by changing what I eat? What sort of changes would help?
- Can I help myself by taking exercise? What sort of exercise would help?
- Are there any vitamins or other things I can add to what I eat that might help my bones?
- What else can I do to lower my chances of breaking a bone?
- What will happen if I break another bone?

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- Am I doing anything that could be making my osteoporosis worse?
- Will I be tested regularly to see how my bones are doing?
- Should other members of my family be tested too?

You may have broken your hip. If so, here are some more questions that you might want to ask.

- Will I need an operation?
- How will the operation affect me? How quickly will I get better?
- What kind of help or support will I need after the operation?
- What if the treatment or operation doesn't work?

Treatments:

Alendronate

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[How good is the research on alendronate?](#)

This information is for people who have osteoporosis. It tells you about alendronate, a treatment used for osteoporosis. It is based on the best and most up-to-date research.

Does it work?

Yes. Alendronate makes your bones stronger and less likely to break.

What is it?

If you have osteoporosis, your bones are weak and can break easily. Alendronate is designed to make them stronger by slowing down the process that makes them weak.

Your doctor may prescribe it to **treat** osteoporosis. And your doctor may prescribe it to **prevent** osteoporosis if you are especially likely to get it.

Alendronate belongs to a group of drugs called **bisphosphonates**. They are all designed to help make your bones stronger and less likely to break. The ones that work best are alendronate and [risedronate](#). Your doctor is likely to try them first.

You need a prescription from your doctor to get alendronate. One brand name is Fosamax, but your doctor can also prescribe this unbranded.

Osteoporosis

It can be used: ^[46] ^[47]

- To treat osteoporosis in men and women
- To prevent osteoporosis in women who have been through the **menopause**
- To treat and prevent osteoporosis caused by taking tablets of drugs called **corticosteroids** for a long time (more than three months).

In the UK, there are some guidelines on who can be treated with alendronate and other osteoporosis drugs on the NHS. See [Who can get treatment?](#)

Alendronate comes as tablets. You take them either once a day or (in a higher dose) once a week. It's hard for your stomach to absorb this drug. So you have to take it: ^[46]

- On an empty stomach, first thing in the morning
- At least half an hour before you eat or drink anything else (this includes taking other drugs).

The tablets can irritate your oesophagus, the tube that takes food and drink from your mouth to your stomach.

If your oesophagus gets irritated, you can get serious problems. To make this less likely, you should: ^[46]

- Swallow the tablets whole, with a large glass of plain water
- Stand or sit upright for at least half an hour after taking them.

Because of this side effect, alendronate, like other drugs in this group, isn't right for everyone.

You may need to take alendronate for several years, but we don't yet know how long is best.

How can it help?

If you take alendronate: ^[48] ^[49] ^[1]

- Your bones will probably stay stronger for longer
- You are less likely to break a bone anywhere in your body.

This doesn't mean you won't break a bone for sure. It just means your chances of breaking a bone are lower than without the drug.

Osteoporosis

There's lots of good evidence to show that if you have osteoporosis after the menopause, taking alendronate can lower your chances of breaking a bone in your spine, hip, and wrist. ^[48] ^[50] ^[51] ^[52]

One large summary of the research (called a systematic review) found that, among women with low bone density or who had already had a fracture in their spine: ^[50]

- About 12 out of 100 women who **did not** take alendronate broke a bone in their spine, and 9 out of 100 women had a fracture elsewhere
- But 6 out of 100 women who **did** take alendronate broke a bone in their spine, and 7 out of 100 women broke a bone elsewhere in their body.

The research also found alendronate was slightly less beneficial for women with mild osteoporosis, or who had not yet had a fracture.

One study showed that if you take alendronate, your bones stay stronger than if you don't take it. ^[48] Some people's bones get stronger than they were at the start of treatment. Other people's bones still get weaker, but more slowly than if they weren't taking the drug. ^[49]

Some research also shows alendronate may work better than other treatments, such as [hormone replacement therapy](#) (HRT for short), and [raloxifene](#) . ^[53]

In studies, alendronate lowered the chances of broken bones in women who had osteoporosis **and** in women who did not. ^[48] This means it worked to **prevent** osteoporosis as well as to **treat** it.

We don't know how long you need to take alendronate to keep your bones strong. One study found that women who stopped taking alendronate after five years were no more likely to break a bone in the next five years than women who continued taking it. ^[54] But more research needs to be done to find out how long the drug can work safely.

How does it work?

Bone is a living, growing part of your body. ^[1] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

Certain cells cause the new bone to grow. They are called **osteoblasts**. Other cells break down the old bone. They are called **osteoclasts**.

As you get older, the cells that break down the old bone work harder than the cells that make new bone. This happens slowly at first. But it speeds up when you are in your 50s and 60s. This is because of changes in your hormones . If you have osteoporosis, it **happens too fast**. Then your bones get thin and are more likely to break.

Osteoporosis

Alendronate, like other drugs in the bisphosphonate group, slows down the cells that break down your old bone.^[46] This means the cells that build new bone have a chance to catch up. So your bones get stronger.

Can it be harmful?

Alendronate, like other drugs in the bisphosphonate group, can irritate your oesophagus (the tube that carries food from your mouth to your stomach). In bad cases, you can get swelling, **ulcers**, or a blockage in your oesophagus.^[55]

If you get **heartburn**, chest pain, or trouble swallowing, stop taking the tablets and see your doctor.^[46]

One study showed that 3 in 100 people taking a high dose of this drug got ulcers or damage to their oesophagus.^[56]

But if you carefully follow the instructions about how to take alendronate, it is **unlikely** that you will have these problems.^[57]

You can get some other side effects too. These include pain in your stomach and bloating, indigestion, feeling sick, getting **diarrhoea** or **constipation**, and having wind.^[46] But these are usually **mild**. In the studies we looked at, only about 3 in 100 people stopped taking the drug because of side effects.^[48]

Some research suggests that people taking alendronate are more likely to get a hairline fracture of their bones, called an **atypical stress fracture**.^{[58] [59] [60] [61] [62]} These fractures tend to happen at the top of the thigh bone. If you get thigh pain, make sure you see your doctor. If you do get an atypical stress fracture, your doctor will probably recommend stopping alendronate, and also avoiding other bisphosphonate drugs.

A few people taking bisphosphonate drugs have developed a serious bone disease in their jaw, called osteonecrosis. It seems to be more of a risk for people having the drugs via a drip (an intravenous infusion). Some groups of people taking bisphosphonates need to take extra precautions. The Medicines and Healthcare products Regulatory Agency (MHRA) says people at higher risk should have a dental check-up before starting treatment, and may need to avoid having dental treatment while taking bisphosphonate drugs.^[63] People at higher risk include people with cancer, people also taking high-dose steroids, and people with poor oral hygiene.

There have also been reports of people getting severe pain in their bones, joints, or muscles while taking bisphosphonate drugs. This pain can happen within days, months, or years of starting treatment. Some people recover quickly once they stop taking the drug, but others improve more slowly or have pain that doesn't completely go away. If you get pain, see your doctor.^[64]

Some studies have also shown a possible link between taking bisphosphonate drugs and developing an irregular heartbeat called atrial fibrillation, which can be very serious.

Osteoporosis

But other studies have not found a link.^[65] ^[66] Experts say the risk of atrial fibrillation appears to be low and shouldn't stop people taking these drugs.^[67]

How good is the research on alendronate?

There's good evidence that women who have gone through the **menopause** are less likely to break bones anywhere in their body if they take alendronate.

We found four large summaries of the research (called **systematic reviews**).^[50] ^[68] ^[69]
^[51] They looked at several good studies (called **randomised controlled trials**).

The studies involved more than 20,000 women. The women were studied for between one year and four years. Some women took alendronate. Other women took a dummy treatment (called a **placebo**) for comparison.

All of the studies showed that the women who took alendronate were **less likely to break a bone**.^[50] ^[68] ^[69] ^[51]

But the studies involved only women who had been through the menopause. So they don't tell us how well alendronate works in men or in younger women.

Also, these studies lasted for only four years at most. So they can't tell us what happens if you take alendronate for longer than that. They also don't tell us what happens to your bones if you stop taking it. But one recent study found that women who stopped taking alendronate after five years were no more likely to break a bone in the next five years than women who continued taking the drug.^[54]

Risedronate

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on risedronate?](#)

This information is for people who have osteoporosis. It tells you about risedronate, a treatment used for osteoporosis. It is based on the best and most up-to-date research.

Does it work?

Yes. Risedronate makes your bones stronger and less likely to break.

What is it?

If you have osteoporosis, your bones are weak and can break easily. Risedronate is designed to make them stronger by slowing down the process that makes them weak.

Osteoporosis

Your doctor may prescribe it to **treat** osteoporosis. And your doctor may prescribe it to **prevent** osteoporosis if you are especially likely to get it.

Risedronate belongs to a group of drugs called **bisphosphonates**. They are all designed to help make bones stronger and less likely to break. The ones that work best are risedronate and [alendronate](#). Your doctor is likely to try them first.

You need a prescription from your doctor to get risedronate. The brand name is Actonel. It's also available with sachets of vitamin D and calcium, as Actonel Combi.

It is used: ^[46]

- To treat osteoporosis in men and women
- To prevent osteoporosis in women who have been through the **menopause**
- To treat and prevent osteoporosis caused by taking **corticosteroid** tablets for a long time (more than three months).

In the UK, there are some guidelines on who can be treated with risedronate and other osteoporosis drugs on the NHS. See [Who can get treatment?](#)

Risedronate comes as tablets. You take them either once a day or (in a much higher dose) once a week. Your stomach may find it hard to absorb risedronate. So you have to take it: ^[46]

- On an empty stomach, first thing in the morning
- At least half an hour before you eat or drink anything else (this includes taking other medicine).

The tablets can irritate your oesophagus, the tube that takes food and drink from your mouth to your stomach.

If your oesophagus gets irritated, you can have serious problems. To make this less likely, you should: ^[46]

- Swallow the tablets whole, with a big glass of plain water
- Stand or sit upright for at least half an hour after taking it.

Because of this side effect, risedronate, like other drugs in this group, is not right for everyone.

How can it help?

If you take risedronate: ^{[70] [71] [72] [73]}

Osteoporosis

- Your bones will probably stay stronger for longer
- You are less likely to break a bone anywhere in your body.

This doesn't mean you won't break a bone for sure. It just means your chances of breaking a bone are lower than without the drug.

One big study looked at women who had been through the menopause and had osteoporosis.^[70] Here is what it showed after three years.

- About 11 in 100 women who took risedronate broke a bone in their spine (backbone). This compared with 17 in 100 who took a dummy treatment (a placebo) for comparison.
- About 3 in 100 women who took risedronate broke a bone somewhere else in their body. This compared with nearly 5 in 100 who took the dummy treatment.
- Risedronate made bones in the women's hips and spines stronger.

But we don't know how long the effects last. And we don't know what happens to your bones if you stop taking this drug. Most of the studies lasted only four years at most.

How does it work?

Bone is a living, growing part of your body.^[1] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

Certain cells cause the new bone to grow. They are called **osteoblasts**. Other cells break down the old bone. They are called **osteoclasts**.

As you get older, the cells that break down the old bone work harder than the cells that make new bone. This happens slowly at first. But it speeds up when you are in your 50s and 60s. This is because of changes in your **hormones**. If you have osteoporosis, it **happens too fast**. Then your bones get thin and are more likely to break.

Risedronate, like other drugs in the bisphosphonate group, slows down the cells that break down your old bone.^[46] This means the cells that build new bone have a chance to catch up. So your bones get stronger.

Can it be harmful?

Risedronate, like other drugs in the bisphosphonate group, can irritate your oesophagus (the tube that carries food from your mouth to your stomach). In bad cases, you can get swelling, **ulcers**, or a blockage in your oesophagus.^[74]

Osteoporosis

If you get **heartburn**, pain in your chest, or trouble swallowing, stop taking the tablets and see your doctor. ^[46]

One study showed that 3 in 100 people taking a high dose of this drug got ulcers or damage to their oesophagus. ^[74]

You can get some other side effects too. These include pain in your abdomen, feeling sick, and **diarrhoea**. But these side effects are usually **mild**. In the studies we looked at, very few women stopped taking risedronate because of side effects. ^[1]

Some research suggests that people taking bisphosphonates are also more likely to get a hairline fracture of their bones, called an **atypical stress fracture**. ^{[58] [59] [60] [62]} These fractures tend to happen at the top of the thigh bone. If you get thigh pain, make sure you see your doctor. If you do get an atypical stress fracture, your doctor will probably recommend stopping treatment, and also avoiding other bisphosphonate drugs.

A few people taking bisphosphonate drugs have developed a serious bone disease in their jaw, called osteonecrosis. It seems to be more of a risk for people having the drugs via a drip (an intravenous infusion). Some groups of people taking bisphosphonates need to take extra precautions. The Medicines and Healthcare products Regulatory Agency (MHRA) says people at higher risk should have a dental check-up before starting treatment, and may need to avoid having dental treatment while taking bisphosphonate drugs. ^[63] People at higher risk include people with cancer, people also taking high-dose steroids, and people with poor oral hygiene.

There have also been reports of people getting severe pain in their bones, joints, or muscles while taking bisphosphonate drugs. This pain can happen within days, months, or years of starting treatment. Some people recover quickly once they stop taking the drug, but others improve more slowly or have pain that doesn't completely go away. If you get pain, see your doctor. ^[64]

Some studies have also shown a possible link between taking bisphosphonate drugs and developing **atrial fibrillation**, an irregular heartbeat that can be very serious. But other studies have not found a link. ^{[65] [66]} Experts say the risk of atrial fibrillation appears to be low and shouldn't stop people taking these drugs. ^[67]

How good is the research on risedronate?

There's good evidence that women are less likely to break bones anywhere in their body after the **menopause** if they take risedronate.

We found three large summaries of the research (called **systematic reviews**). ^{[73] [75]} ^[72] They looked at a total of 10 good studies (called **randomised controlled trials**).

- The studies involved about 22,000 women. Some women took risedronate. Other women took a dummy treatment (called a **placebo**) or some other treatment that did not involve drugs, for comparison.

Osteoporosis

- All of the studies showed that the women who took risedronate were less likely to break a bone. ^[75] ^[76]
- But the studies involved only women who had been through the menopause. So they don't tell us how well risedronate works in men or in younger women.
- Also, the studies lasted for only four years at most. This means that we don't know what happens if you take risedronate for longer than that. It also means that we don't know what happens to your bones if you stop taking it.

Teriparatide

In this section

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[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on teriparatide?](#)

This information is for people who have osteoporosis. It tells you about teriparatide, a treatment used for osteoporosis. It is based on the best and most up-to-date research.

Does it work?

Yes. Teriparatide lowers your chances of breaking a bone if you are a woman with osteoporosis and you have been through the **menopause**. ^[77] It can also be used to treat men with weak bones.

You have to take teriparatide as an injection. Usually, doctors prescribe this drug only if you have bad osteoporosis, when drugs called **bisphosphonates** haven't worked. Some examples of those drugs are [alendronate](#) and [risedronate](#) .

What is it?

If you have osteoporosis, your bones are weak and can break easily. Teriparatide is designed to make your bones stronger by helping new bone to grow.

Your doctor may prescribe it to treat osteoporosis if:

- You are a woman with osteoporosis
- And you are especially likely to break a bone
- And you have been through the menopause.

Teriparatide can also be used to treat men who are at risk of breaking a bone.

Osteoporosis

This drug is based on a **hormone** your body makes. It's called **parathyroid hormone**. The hormone's job is to control the way your body uses **calcium**. Teriparatide is a man-made version. The brand name is Forsteo.

In the UK, there are some guidelines on who can be treated with teriparatide and other osteoporosis drugs on the NHS. See [Who can get treatment?](#)

Teriparatide comes in injection pens. You need to keep them in the refrigerator. Every day, you use a pen to inject teriparatide just under the skin of your thigh or abdomen.

You need a prescription for this drug. It's usually only prescribed by a doctor who specialises in osteoporosis. And you will need to learn how to give yourself the injections.

In the UK, it's recommended that you don't take teriparatide for more than 24 months. ^[78] If you've had 24 months of treatment, you should never take this medicine again. That's because tests in rats found that long-term treatment increased the risk of bone cancer.

How can it help?

If you take teriparatide and you are a woman who has gone through the menopause: ^[77] ^[79] ^[80]

- Your bones will probably get stronger, especially the bones in your spine and your hip
- You are less likely to break a bone anywhere in your body.

This doesn't mean you won't break a bone for sure. It just means your chances of breaking a bone are lower than without the drug.

Good research on women with osteoporosis after the menopause shows that women who have already broken at least one bone in their spine are **less likely to break more** if they take teriparatide. ^[77] ^[81] Between 4 in 100 and 5 in 100 women taking teriparatide break another bone. This compares with 14 in 100 taking a dummy treatment (called a placebo) for comparison. The research also shows that the bones of the women taking teriparatide get stronger.

The effects of this drug seem to last for at least 18 months after you stop taking it. ^[82] But we don't know how much longer than that.

How does it work?

Bone is a living, growing part of your body. ^[1] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

Osteoporosis

Certain cells cause the new bone to grow. They are called **osteoblasts**. Other cells break down the old bone. They are called **osteoclasts**.

As you get older, the cells that break down the old bone work harder than the cells that make new bone. This happens slowly at first. But it speeds up when you are in your 50s and 60s. This is because of changes in your hormones. If you have osteoporosis, it happens too fast. Then your bones get thin and are more likely to break.

Teriparatide works on the cells that make new bone. It encourages them to grow new bone faster. We don't know exactly how it does this.

Can it be harmful?

Teriparatide can cause mild side effects if you take a high dose (40 micrograms a day). You may feel sick and get a headache. In the research we looked at, about 1 in 10 women stopped treatment because of these side effects. ^[77]

But the recommended dose is 20 micrograms a day. And this dose does not seem to cause side effects.

In a small study, 1 in 17 women taking teriparatide stopped treatment because of back pain. ^[83] One other woman stopped because her skin got irritated where the drug was injected.

We don't know if teriparatide is safe to take for longer than two years. There have not been any studies of this.

How good is the research on teriparatide?

There's some good evidence that teriparatide helps to build new bone and to prevent broken bones in women with osteoporosis who have been through the menopause.

We found one big summary of 2,388 women with osteoporosis who took teriparatide. It showed women who took [teriparatide](#) for at least six months had stronger bones and were less likely to break a bone than women who took a dummy treatment (called a placebo). ^[80]

We found one big summary of the research in women who had broken a bone before, which included one large, good-quality study (called a randomised controlled trial). ^[79]
^[84]

The study involved 1,637 women who had broken a bone in their spine before. Some women took teriparatide. Other women took a dummy treatment (called a placebo) for comparison.

This study showed that teriparatide helped stop the women getting more broken bones in their spine. It also helped stop them getting broken bones in the rest of their body.

A second good-quality study looking at 1,226 women also found positive results. ^[81]

Strontium ranelate

In this section

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[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on strontium ranelate?](#)

This information is for people who have osteoporosis. It tells you about strontium ranelate, a treatment used for osteoporosis. It is based on the best and most up-to-date research.

Does it work?

Yes. Strontium ranelate lowers your chances of breaking a bone if you are a woman who has been through the **menopause** and you have osteoporosis.

What is it?

If you have osteoporosis, your bones are weak and can break easily. Strontium ranelate is designed to make your bones stronger in two ways. It encourages your body to grow new bone and it slows the breakdown of old bone.

Your doctor may prescribe this drug to treat osteoporosis. You can only get it if you are a woman with osteoporosis who has been through the menopause.

You will probably only be given strontium ranelate if you have already tried one of the drugs called **bisphosphonates**. Some examples of those drugs are [alendronate](#) and [risedronate](#). If that kind of drug works for you, you should keep taking it. But if you have to stop because of side effects, or if it isn't working, your doctor may suggest strontium ranelate. ^[17]

In the UK, there are some guidelines on who can be treated with strontium ranelate and other osteoporosis drugs on the NHS. See [Who can get treatment?](#)

Strontium ranelate comes as a powder. You mix it into water. You drink it every day at bedtime, at least two hours before eating and at least two hours after eating. With this drug, you don't have to stay upright afterward, like you do if you take a bisphosphonate.

How can it help?

If you take strontium ranelate: ^[85] ^[86] ^[87]

- You are less likely to break a bone in your spine
- You are less likely to get a backache
- You are less likely to get shorter
- You are less likely to break a bone in some other part of your body.

Osteoporosis

This doesn't mean you definitely won't break a bone. It just means your chances of breaking a bone are lower than without the drug.

Here is what one study showed after three years of treatment. ^[85]

- Just over 2 in 10 women who were taking strontium ranelate broke a bone in their spine.
- But nearly 4 in 10 women who were taking a dummy treatment (called a **placebo**) broke a bone in their spine.

In the study, the bones of the women who took the dummy treatment got weaker over three years. ^[85] But the bones of the women who took strontium ranelate got stronger.

Here is what another study showed over three years. ^[86]

- About 11 in 100 women taking strontium ranelate broke a bone in some part of their body other than their spine.
- But 13 in 100 women taking a dummy treatment broke a bone not in the spine.

We don't know exactly how long strontium ranelate takes to start working. But in the studies, bone mineral density (BMD) went up in the first six months after the women started taking strontium ranelate. ^[85] ^[86] And the chance of getting a broken bone went down in the first year of treatment.

We don't know if strontium ranelate is better at stopping you breaking a bone than treatments like the bisphosphonates ([alendronate](#) and [risedronate](#), for example), or [raloxifene](#) or [teriparatide](#). There haven't been any studies comparing them.

The studies we found were in women who'd been through the menopause. They don't tell us how well strontium ranelate works for men with osteoporosis. And they don't tell us how well it works for younger women with a lower chance of breaking a bone.

We don't know how long the effects of this drug last. And we don't know what happens to your bones if you stop taking strontium ranelate. The studies lasted for only five years.

How does it work?

Bone is a living, growing part of your body. ^[1] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

Certain cells cause the new bone to grow. They are called **osteoblasts**. Other cells break down the old bone. They are called **osteoclasts**.

As you get older, the cells that break down the old bone work harder than the cells that make new bone. This happens slowly at first. But it speeds up when you are in your 50s

Osteoporosis

and 60s. This is because of changes in your hormones . If you have osteoporosis, it **happens too fast**. Then your bones get thin and are more likely to break.

Strontium ranelate works by encouraging the cells that make new bone to make more of it. At the same time, the drug slows down the cells that break down old bone. We don't know exactly how strontium ranelate does these things. ^[85]

Can it be harmful?

You may have some side effects in the first few months after you start taking strontium ranelate. For example, you may feel sick or get diarrhoea .

In one study, 6 in 100 women had diarrhoea in the three months after starting to take strontium ranelate. ^[85] This compared with 3 in 100 who were taking a dummy treatment. But the diarrhoea stopped after three months of taking the drug.

There have been rare cases of people getting a severe allergic reaction to strontium ranelate. ^[88] These reactions usually start as a skin rash. If you get a rash while you're using this treatment, stop taking it and see a doctor straight away. The reaction can be treated with steroid medicines.

Strontium ranelate also slightly increases your chances of getting a potentially dangerous blood clot (a deep vein thrombus). ^[46] If the clot travels to one of your lungs and blocks an artery, this is called a pulmonary embolism. It can be deadly if not treated.

The European Medicines Agency (EMA) and the Medicines and Healthcare products Regulatory Agency (MHRA), the government bodies that check the safety of drugs in Europe and the UK, say strontium ranelate could increase the chances of serious heart problems. They recommend your doctor should not prescribe strontium ranelate for you if: ^[89] ^[90] ^[91]

- You have had a blood clot before
- You have heart disease , angina , or have had a heart attack before
- You have peripheral artery disease (when the big blood vessels in your body, called arteries, become too narrow)
- You have had a stroke or other diseases that affect the blood vessels in your brain.

The EMA and the MHRA recommend only people with severe osteoporosis who are likely to get fractures are prescribed strontium ranelate.

How good is the research on strontium ranelate?

We found one big summary of the evidence.^[92] It found that strontium ranelate reduces the risk of breaking a bone in the spine, and probably reduces the risk of breaking bones elsewhere in the body. It looked at four studies in total.

We found two other big, good-quality studies (called [randomised controlled trials](#)).^[93]
^[94]

The studies had more than 6,500 women in total. All of the women had been through the [menopause](#) and had osteoporosis. Some women took strontium. Other women took a dummy treatment (called a [placebo](#)) for comparison.

One study looked at broken bones in the spine.^[93] The other looked at broken bones in some other part of the body.^[94] Both studies showed that the women who took strontium ranelate were less likely to get broken bones.

But these studies were in women who had been through the menopause and were especially likely to break a bone. So they don't tell us how well strontium ranelate works in men or in younger women who are not so likely to break bones.

Ibandronate

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[How good is the research on ibandronate?](#)

This information is for people who have osteoporosis. It tells you about ibandronate, a treatment used for osteoporosis. It is based on the best and most up-to-date research.

Does it work?

Probably. If you have been through the [menopause](#) , ibandronate makes your bones stronger and less likely to break.^[95] But we only know that it lowers your chances of breaking broken bones in your **spine**. We don't know if it works on other bones in your body.

What is it?

If you have osteoporosis, your bones are weak and can break easily. Ibandronate is designed to make your bones stronger by slowing down the process that makes them weak.

Your doctor may prescribe it to **treat** osteoporosis.

Osteoporosis

Ibandronate belongs to a group of drugs called **bisphosphonates**. They are all designed to help make your bones stronger and less likely to break. The ones that work best are [alendronate](#) and [risedronate](#). Your doctor is likely to try them first.

You need a prescription from your doctor to get ibandronate. The brand name is Bonviva. A good thing about this drug is that you can take it only **once a month**. It is used to treat osteoporosis in women who have been through the menopause. Ibandronate comes as tablets.

It's hard for your stomach to absorb this drug. So you have to take it: ^[46]

- On an empty stomach, first thing in the morning
- At least an hour before you eat or drink anything else (this includes taking other medicine).

The tablets can irritate your oesophagus, the tube that takes food and drink from your mouth to your stomach.

If your oesophagus gets irritated, you can get serious problems. To make this less likely, you should: ^[46]

- Swallow the tablets whole, with a big glass of plain water
- Stand or sit upright for at least an hour after taking them.

Because of this side effect, ibandronate, like other drugs in this group, is not right for everyone.

How can it help?

If you take ibandronate: ^[95]

- You are less likely to get shorter
- You are less likely to break a bone in your spine.

This doesn't mean you won't break a bone for sure. It just means your chances of breaking a bone are lower than without the drug.

Here is what one study showed with three years of treatment. ^[95]

- About 5 in 1,000 women taking ibandronate broke a bone in their spine.
- But 10 in 1,000 women taking a dummy treatment (called a **placebo**) for comparison broke a bone in their spine.

Osteoporosis

Some of the women in the study took a lower dose of ibandronate every day. Others took a higher dose every other day for 12 days, every three months. This was to test whether taking ibandronate with a long time between doses still works. There was not much difference in the chances of breaking bones in the spine between the two groups. ^[95]

Here were some other things the study showed. ^[95]

- Women taking ibandronate every day for three years got shorter by an average of 4 millimetres (one-sixth of an inch).
- Women taking the dummy treatment got shorter by an average of 6 millimetres (one-fifth of an inch).
- Women taking ibandronate with a longer time between doses got shorter by an average of 5 millimetres.

We don't know exactly how long ibandronate takes to start working. But from the study, we know your bones begin getting stronger in the first six months after you start taking this drug. ^[95] And your chances of breaking a bone start to go down in the first year of treatment.

We don't know if ibandronate is better at stopping you breaking a bone than the other bisphosphonates (such as [alendronate](#) or [risedronate](#)) or than [raloxifene](#) , [strontium ranelate](#) , or [teriparatide](#) . There haven't been any studies comparing them.

The study looked at women who had already broken one bone in their spine. So it doesn't tell us how well ibandronate works for men with osteoporosis. And it doesn't tell us if it would stop women from getting a broken bone in their spine if they have never had one.

We don't know how long the effects last either. And we don't know what happens to your bones if you stop taking this drug. The study lasted for only three years.

How does it work?

Bone is a living, growing part of your body. ^[1] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

Certain cells cause the new bone to grow. They are called **osteoblasts**. Other cells break down the old bone. They are called **osteoclasts**.

As you get older, the cells that break down the old bone work harder than the cells that make new bone. This happens slowly at first. But it speeds up when you are in your 50s and 60s. This is because of changes in your hormones . If you have osteoporosis, it **happens too fast**. Then your bones get thin and are more likely to break.

Osteoporosis

Ibandronate, like other drugs in the bisphosphonate group, slows down the cells that break down your old bone. ^[46]

This means the cells that build new bone have a chance to catch up. So your bones get stronger.

Can it be harmful?

In the study we looked at, very few women had any side effects from ibandronate. ^[95] Some women felt sick and some had pain in their stomach. But this was as likely to happen to women taking the dummy treatment as women taking ibandronate.

But we do know that people taking other drugs in the bisphosphonate group sometimes get more serious problems. Those include **ulcers** in your oesophagus. If you get **heartburn**, pain in your chest, or trouble swallowing, stop taking the tablets and see your doctor. ^[46]

Some research suggests that people taking bisphosphonates are also more likely to get a hairline fracture of their bones, called an **atypical stress fracture**. ^{[58] [59] [60] [96]} These fractures tend to happen at the top of the thigh bone. If you get thigh pain, make sure you see your doctor. If you do get an atypical stress fracture, your doctor will probably recommend stopping treatment, and also avoiding other bisphosphonate drugs.

A few people taking bisphosphonate drugs have developed a serious bone disease in their jaw, called osteonecrosis. It seems to be more of a risk for people having the drugs via a drip (an intravenous infusion). Some groups of people taking bisphosphonates need to take extra precautions. The Medicines and Healthcare products Regulatory Agency (MHRA) says people at higher risk should have a dental check-up before starting treatment, and may need to avoid having dental treatment while taking bisphosphonate drugs. ^{[62] [63]} People at higher risk include people with cancer, people also taking high-dose steroids, and people with poor oral hygiene.

There have also been reports of people getting severe pain in their bones, joints, or muscles while taking bisphosphonate drugs. This pain can happen within days, months, or years of starting treatment. Some people recover quickly once they stop taking the drug, but others improve more slowly or have pain that doesn't completely go away. If you get pain, see your doctor. ^[64]

Some studies have also shown a possible link between taking bisphosphonate drugs and developing an irregular heartbeat called atrial fibrillation, which can be very serious. But other studies have not found a link. ^{[65] [66]} Experts say the risk of atrial fibrillation appears to be low and shouldn't stop people taking these drugs. ^[67]

How good is the research on ibandronate?

We found only one study looking at how well ibandronate works. ^[97] It was a big, good study (called a **randomised controlled trial**).

Osteoporosis

The study included 2,946 women. All of the women had gone through the **menopause**. And they all had broken bones in their spine before.

The study looked at whether ibandronate worked as well when taken with long gaps between doses as it did when taken every day.

- Some women took a higher dose every other day, on 12 days every three months.
- Other women took a lower dose every day.
- A third group of women took a dummy treatment (called a **placebo**).

The study showed that women taking the drug were **half as likely** to break more bones in their spine as women who took a dummy treatment. This was true whether they were taking the drug every day or with long gaps between doses.

Etidronate

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[How does it work?](#)

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[How good is the research on etidronate?](#)

This information is for people who have osteoporosis. It tells you about etidronate, a treatment used for osteoporosis. It is based on the best and most up-to-date research.

Does it work?

Probably. In women with osteoporosis who have been through the **menopause**, etidronate helps to prevent broken bones in the **spine**. But it doesn't seem to prevent broken bones in other parts of your body.

What is it?

If you have osteoporosis, your bones are weak and can break easily. Etidronate is designed to make them stronger by slowing down the process that makes them weak.

Your doctor may prescribe it to **treat** osteoporosis. And your doctor may prescribe it to **prevent** osteoporosis if you are especially likely to get it.

Etidronate belongs to a group of drugs called **bisphosphonates**. They are all designed to help make your bones stronger and less likely to break.

Etidronate comes as tablets. You need a prescription from your doctor to get it. The brand name is Didronel.

But etidronate is an older drug. Your doctor is more likely to suggest newer drugs in the same group, called [alendronate](#) and [risedronate](#).

Osteoporosis

You have to take etidronate in much higher doses than the other bisphosphonates for it to work. In very high doses, it can make your bones soft. Doctors call this **osteomalacia**. To prevent this, doctors prescribe it with **calcium**. But you can't take etidronate and calcium at the same time. ^[46] You have to take etidronate daily for 14 days, then calcium for the next 76 days. Then you start again with the etidronate.

Alendronate and risedronate work at much lower doses. And they don't make your bones soft. But your doctor might prescribe etidronate if other treatments haven't worked for you or don't suit you.

Etidronate has not been approved for treating or preventing osteoporosis. But your doctor may prescribe it for you if you get bad side effects from alendronate or risedronate or they don't work for you. ^[98]

It's hard for your stomach to absorb etidronate. So you have to take it: ^[46]

- On an empty stomach, first thing in the morning
- Two hours before you eat or drink anything else (this includes taking other medicine).

Also, for two hours before and two hours after you take a dose of etidronate, you should not take iron, mineral supplement tablets, or treatments for indigestion called **antacids**.

How can it help?

If you take etidronate, you are less likely to break a bone in your spine. This doesn't mean you definitely won't break a bone. It just means your chances of breaking a bone are lower than without the drug. ^[99] ^[100]

Research shows that taking etidronate for two years is better than [calcium with vitamin D](#) at preventing broken bones in your spine. ^[100]

But in this study, taking etidronate didn't lower the chances of broken bones in other parts of the body.

How does it work?

Bone is a living, growing part of your body. ^[1] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

Certain cells cause the new bone to grow. They are called **osteoblasts**. Other cells break down the old bone. They are called **osteoclasts**.

As you get older, the cells that break down the old bone work harder than the cells that make new bone. This happens slowly at first. But it speeds up when you are in your 50s

Osteoporosis

and 60s. This is because of changes in your **hormones** . If you have osteoporosis, it **happens too fast**. Then your bones get thin and are more likely to break.

Etidronate, like other medicines in the bisphosphonate group, slows down the cells that break down your old bone. ^[46] This means the cells that build new bone have a chance to catch up. So your bones get stronger.

Can it be harmful?

You may get side effects from etidronate. These include **heartburn** , **diarrhoea** , and cramps in your legs. But most women don't have side effects that stop them from taking the treatment. ^[100]

Other side effects you can get include feeling sick, **constipation** , and pain in your stomach. ^[46]

Some research suggests that people taking bisphosphonates are also more likely to get a hairline fracture of their bones, called an **atypical stress fracture**. ^{[58] [59] [60] [61] [62]} These fractures tend to happen at the top of the thigh bone. If you get thigh pain, make sure you see your doctor. If you do get an atypical stress fracture, your doctor will probably recommend stopping treatment, and also avoiding other bisphosphonate drugs.

A few people taking bisphosphonate drugs have developed a serious bone disease in their jaw, called osteonecrosis. It seems to be more of a risk for people having the drugs via a drip (an intravenous infusion). Some groups of people taking bisphosphonates need to take extra precautions. The Medicines and Healthcare products Regulatory Agency (MHRA) says people at higher risk should have a dental check-up before starting treatment, and may need to avoid having dental treatment while taking bisphosphonate drugs. ^[63] People at higher risk include people with cancer, people also taking high-dose steroids, and people with poor oral hygiene.

There have also been reports of people getting severe pain in their bones, joints, or muscles while taking bisphosphonate drugs. This pain can happen within days, months, or years of starting treatment. Some people recover quickly once they stop taking the drug, but others improve more slowly or have pain that doesn't completely go away. If you get pain, see your doctor. ^[64]

Some studies have also shown a possible link between taking bisphosphonate drugs and developing an irregular heartbeat called atrial fibrillation, which can be very serious. But other studies have not found a link. ^{[65] [66]} Experts say the risk of atrial fibrillation appears to be low and shouldn't stop people taking these drugs. ^[67]

How good is the research on etidronate?

There's good evidence that etidronate helps prevent broken bones in the **spine** in woman who have been through the **menopause** . But there isn't any evidence that it prevents broken bones in other parts of your body, like your hip or your wrist.

Osteoporosis

We found three large summaries of the research (called [systematic reviews](#)).^[101] ^[99] The summaries looked at several good-quality studies (called [randomised controlled trials](#)) and involved more than 1,000 women who had been through the menopause. Some women took etidronate. Other women took a dummy treatment (called a [placebo](#)) or some other treatment that did not involve drugs, for comparison.

The results showed that the women who took etidronate were less likely to break a bone in their spine. But they were just as likely to break a bone in other parts of their body.

Calcitonin

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[How good is the research on calcitonin?](#)

This information is for people who have osteoporosis. It tells you about calcitonin, a treatment for osteoporosis. It is based on the best and most up-to-date research.

Does it work?

Probably, but it has important side effects. Calcitonin is likely to help prevent broken bones in the spine in women who have been through the [menopause](#).^[102] But it doesn't seem to prevent broken bones in other parts of your body, and it seems to increase your risk of cancer slightly when used long term.

We can't be certain how well calcitonin works because there are problems with the research.

What is it?

If you have osteoporosis, your bones are weak and can break easily. Calcitonin is designed to make them stronger by slowing down the process that makes them weak.

Calcitonin is a [hormone](#). It helps control how your body handles [calcium](#). Your doctor may have prescribed it as a spray you put up your nose, or as an injection if other drugs called bisphosphonates were not right for you. But a review of studies found a small increase in cancer risk for people who took calcitonin for a long time. So the use of calcitonin for osteoporosis isn't recommended any more. If you take calcitonin for osteoporosis you should speak to your doctor about alternative treatments at your next regular appointment.^[103]

How can it help?

If you take calcitonin:^[102] ^[104]

- Your bones will probably get stronger

Osteoporosis

- You are less likely to break a bone in your spine.

This doesn't mean you won't break a bone for sure. It just means your chances of breaking a bone are lower than without the drug.

The studies we found showed calcitonin makes bones stronger.^[102] After five years of treatment, women taking calcitonin for osteoporosis after the menopause had stronger spines.

And it worked better at preventing broken bones in the spine than [calcium plus vitamin D](#). Women taking calcitonin were **half as likely** to get a broken bone as women taking calcium plus vitamin D.

But not all the studies agreed on how well calcitonin worked.

How does it work?

Bone is a living, growing part of your body.^[1] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

Certain cells cause the new bone to grow. They are called **osteoblasts**. Other cells break down the old bone. They are called **osteoclasts**.

As you get older, the cells that break down the old bone work harder than the cells that make new bone. This happens slowly at first. But it speeds up when you are in your 50s and 60s. This is because of changes in your **hormones**. If you have osteoporosis, it **happens too fast**. Then your bones get thin and are more likely to break.

Calcitonin slows down the cells that break down your old bone.^[105] This means the cells that build new bone have a chance to catch up. So your bones get stronger.

Can it be harmful?

The European Medicines Agency (EMA), which monitors drug safety in Europe, has looked at studies and other reports on people using calcitonin. These seemed to show that there is a small increase in your chances of getting cancer if you take calcitonin for a long time. About three extra people in 100 got cancer if they were using calcitonin nose spray, compared with people who weren't taking calcitonin. As a result, the EMA recommended that calcitonin shouldn't be used any more to treat osteoporosis.^[103] But you should remember that the increase in risk is small. If you are taking calcitonin for osteoporosis, your doctor should advise you on alternative treatments at your next appointment.

Two studies also showed women taking calcitonin got headaches and symptoms of the menopause, like hot flushes.^[102] Other side effects of calcitonin include stomach upsets. Also, the spray can irritate your nose and throat. You may get a runny nose, swelling in your sinuses, and nosebleeds.^[105]

How good is the research on calcitonin?

There's some evidence that calcitonin makes bones stronger and prevents broken bones in the spine in women with osteoporosis who have been through the **menopause** .

We found two summaries of the research (called **systematic reviews**). ^[106] ^[107]

One summary looked at 30 good studies (called **randomised controlled trials**) comparing calcitonin with other treatments. ^[106] The studies involved nearly 4,000 women who had been through the menopause. Some women took calcitonin. Other women took a dummy treatment (called a **placebo**) or some other treatment that did not involve drugs, for comparison.

The larger, better studies showed calcitonin **helped prevent broken bones in the spine**. The smaller, poorer studies did too. But in those studies, the calcitonin didn't help as much.

The second summary was smaller. ^[107] It looked at five good studies (randomised controlled trials) that compared different doses of calcitonin. It involved about 1,000 women in all. This summary showed the drug **worked the same** whether women took a higher dose or a lower dose.

The European Medicines Agency, which monitors drug safety in Europe, looked at the safety of calcitonin. They considered evidence from two studies of an experimental calcitonin given by mouth, plus other published studies and information held by manufacturers of calcitonin. This showed that there was a small increase in the risk of cancer for people taking calcitonin long term. ^[103]

Calcium plus vitamin D

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[How good is the research on calcium plus vitamin D?](#)

This information is for people who have osteoporosis. It tells you about calcium plus vitamin D, a treatment used for osteoporosis. It is based on the best and most up-to-date research.

Does it work?

Probably. Taking tablets of both **calcium** and **vitamin D** may prevent broken bones in your hip and in other parts of your body. But we can't say this for sure because different studies say different things.

Osteoporosis

We do know that calcium and vitamin D are important for building healthy bones and keeping them strong. Many people don't get enough of these nutrients in their diet, particularly as they get older.

Calcium and vitamin D don't cost much. They are safe if you take them as recommended. And you can find them easily.

Taking vitamin D on its own, or calcium on its own, doesn't seem to help with osteoporosis. ^[108] ^[109] ^[110] Doctors advise that you take them together. ^[111]

What is it?

If you have osteoporosis, your bones are weak and can break easily. If you get plenty of calcium and vitamin D, you are less likely to get osteoporosis. And if you do get osteoporosis, you will probably need to take calcium and vitamin D on top of an osteoporosis drug.

Calcium is an important nutrient that your body gets from food. There's lots of calcium in dairy products, fish that have bones, and green leafy vegetables.

Vitamin D is another important nutrient. It is made in your skin after you have been in the sun. It is also found in oily fish, milk, and foods that have had extra nutrients added to them, like some breakfast cereals.

Calcium and vitamin D are the **most important nutrients** for building your bones and keeping them strong. If you don't get enough of these nutrients as a child or young adult, you are more likely to get osteoporosis in later life.

If you don't get enough calcium and vitamin D from food or sunshine, you can take them as tablets. ^[112] Many older people need to do this. That's because your body doesn't take up calcium as well in later life. Also, older people often get less sunlight because they don't go outside much, particularly in winter.

You can get a wide range of calcium tablets from pharmacies and health food shops. Most of these tablets also have vitamin D in them.

The type of vitamin D shown to work well on osteoporosis in research is vitamin D-3. It's also known as cholecalciferol.

Some of the brand names for calcium and vitamin D together are Calcichew-D3, Calceos, and Cacit D3.

Your doctor may recommend you take calcium and vitamin D if: ^[112] ^[113]

- You have osteoporosis and are taking a drug for it
- You are older and don't leave your house much, or you live in a nursing home
- You are a woman who has a high chance of getting osteoporosis

Osteoporosis

- You don't get much calcium and vitamin D from the foods you eat.

If you have osteoporosis, you will probably need to take a drug on top of the calcium and vitamin D. That's because these nutrients are **not recommended for treating osteoporosis on their own.** ^[114]

If you plan to start taking calcium and vitamin D, talk with your doctor first to find out what dose is right for you. Too much vitamin D can cause serious side effects. ^[113]

Tablets of calcium are easiest to digest if you take them with a meal or a bedtime snack. ^[114] Most women can take them safely for as long as they want.

How can it help?

Some research shows that taking calcium plus vitamin D-3 lowers the chances of broken bones in the hip and elsewhere in older men and women. ^[115] Another study found that taking calcium plus vitamin D lowered the chances of broken bones in the hip and elsewhere, whatever the person's age. ^[116] But not all research shows this.

One large study was done in women over 69 living in nursing homes. ^[117] It showed that over three years, women were less likely to break their hip if they took calcium plus vitamin D-3.

- About 12 in 100 women taking calcium and vitamin D broke their hip. This compared with 16 in 100 taking a dummy treatment (called a placebo).
- And 22 in 100 women taking calcium and vitamin D broke a bone somewhere besides their spine. This compared with 27 in 100 taking the dummy treatment.

But this treatment may work better in older women living in nursing homes than in other women. ^{[118] [119]} That's because older women in nursing homes usually have low levels of vitamin D because they don't go outside much.. A big summary of the evidence found that taking vitamin D and calcium didn't make any difference to people living outside nursing homes. ^[117]

We don't know if calcium and vitamin D has any effect on breaking bones in your spine.

A big study of more than 36,000 women aged 50 to 79 looked at what happened to women during seven years of taking calcium and vitamin D. ^[120]

The women who took calcium and vitamin D had slightly more dense hip bones, but there wasn't much difference in their chances of breaking a bone, compared with women who took a dummy treatment.

Taking calcium or vitamin D on its own does not seem to work. ^{[108] [110] [117]}

Osteoporosis

How does it work?

Bone is a living, growing part of your body.^[1] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

Certain cells cause the new bone to grow. They are called **osteoblasts**. Other cells break down the old bone. They are called **osteoclasts**.

As you get older, the cells that break down the old bone work harder than the cells that make new bone. This happens slowly at first. But it speeds up when you are in your 50s and 60s. This is because of changes in your hormones. If you have osteoporosis, it **happens too fast**. Then your bones get thin and are more likely to break.

Calcium makes up part of the bone itself. And calcium builds bone and helps keep it strong. It does this by affecting certain hormones. These hormones control the cells that make new bone and that break down old bone.

Vitamin D helps your body to take in and use the calcium in the foods you eat.

Can it be harmful?

It's unlikely that you will get side effects from calcium, as long as you stick to the recommended dose. That dose is 800 milligrams a day.^[121] With higher doses, you can get **constipation** and indigestion.

If you take tablets with vitamin D in them, the level of calcium in your blood may get too high. Doctors call this **hypercalcaemia**. It can be dangerous. But this is more likely to happen if you take a type of vitamin D called [calcitriol](#).

Your chances of getting side effects from vitamin D are small. This is especially so if you stick to the recommended dose. In the studies we looked at, about 1 in 100 people taking vitamin D had side effects.^[117] This compared with about 3 in 100 taking a dummy treatment for comparison. But talk to your doctor before taking vitamin D, especially if you have problems with your **kidneys**.

If you get too much vitamin D, the side effects include not feeling hungry, losing weight, feeling sick, throwing up, **diarrhoea**, headache, being thirsty, and feeling dizzy.^[112]

There's some evidence that you may be slightly more likely to get kidney stones if you take calcium plus vitamin D.^[120]

How good is the research on calcium plus vitamin D?

There's some evidence that taking tablets of **calcium** and **vitamin D** can prevent broken bones in your hip and elsewhere if you are aged over 50.^[115] There's also some research that shows taking calcium plus vitamin D lowers the chances of broken bones in the hip and elsewhere, whatever your age.^[116]

Osteoporosis

But studies have had mixed results. And for women who already have osteoporosis, studies show that taking drugs for osteoporosis on top of calcium plus vitamin D works better than taking just calcium plus vitamin D.

We found three big summaries of the research (called [systematic reviews](#)). ^[122] ^[123]
^[124]

The first summary involved more than 10,000 people. ^[122] Some took calcium plus vitamin D. Others took a dummy treatment (called a [placebo](#)) for comparison. Women who took calcium plus vitamin D were a bit less likely to break bones in their hip and in other places. But they were just as likely to break bones in their spine.

The second summary involved more than 13,000 people. ^[123] They were mainly older women. Some took calcium plus vitamin D. Others took a dummy treatment or just calcium on its own. The women who took calcium plus vitamin D were less likely to get broken bones in their hip and in other places besides their spine. But this was the case only when they took more than 700 IU of calcium each day. IU is short for international units.

A more recent, big good-quality study looked at more than 36,000 women who had been through the menopause. ^[125] Some took calcium plus vitamin D. Others took a dummy treatment. There wasn't much difference in how likely they were to break bones.

Calcitriol

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[How good is the research on calcitriol?](#)

This information is for people who have osteoporosis. It tells you about calcitriol, a treatment used for osteoporosis. It is based on the best and most up-to-date research.

Does it work?

Probably. Calcitriol seems to help prevent broken bones in women after the [menopause](#). But there isn't much evidence to show this. And this treatment can have side effects.

What is it?

If you have osteoporosis, your bones are weak and likely to break. Calcitriol is designed to help your body:

- Take in more [calcium](#) from what you eat
- Put calcium into your bones.

Osteoporosis

Your doctor may prescribe it to **treat** osteoporosis. And your doctor may prescribe it to **prevent** osteoporosis if you are especially likely to get it.

Calcitriol belongs to a group of drugs called **vitamin D analogues**. They are a stronger form of **vitamin D** than you get in tablets of regular vitamin D.

You need a prescription to get calcitriol. The brand name is Rocaltrol.

Your doctor may prescribe this treatment if other treatments, such as drugs called **bisphosphonates**, are not right for you. Some examples of those drugs are [alendronate](#) and [risedronate](#) .

Calcitriol comes as capsules. You take it twice a day. With this drug, the level of calcium in your blood can get too high. So your doctor will do regular blood tests to make sure your dose is right.

If you take calcitriol, how much calcium you get from foods and from tablets is important. If you get **too much calcium**, you may get side effects from calcitriol. If you get **too little** calcium, calcitriol won't work properly. Your doctor should advise you about how to get the right amount of calcium. ^[126]

How can it help?

If you take calcitriol you may be less likely to break a bone.

- Calcitriol lowers the chances of breaking a bone by about half in women who have been through the menopause. ^[127]
- Calcitriol and the other drug in this group work better than regular vitamin D in preventing broken bones in your spine. ^[128]

But not all studies show this. One summary of the research found no difference between taking calcitriol, taking calcium, and taking a dummy drug (for a **placebo**). ^[129]

How does it work?

Bone is a living, growing part of your body. ^[1] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

Certain cells cause the new bone to grow. They are called **osteoblasts**. Other cells break down the old bone. They are called **osteoclasts**.

As you get older, the cells that break down the old bone work harder than the cells that make new bone. This happens slowly at first. But it speeds up when you are in your 50s and 60s. This is because of changes in your **hormones** . If you have osteoporosis, it **happens too fast**. Then your bones get thin and are more likely to break.

Osteoporosis

Calcium makes up part of the bone itself. And calcium builds bone and helps keep it strong. It does this by affecting certain hormones. These hormones control the cells that make new bone and that break down old bone.

Vitamin D helps your body take in and use the calcium in what you eat. Calcitriol works a lot like regular vitamin D. But it is **stronger**.

Can it be harmful?

All kinds of vitamin D that you take as tablets or capsules can increase your chances of getting too much calcium in your blood. Doctors call this **hypercalcaemia**. It can be dangerous. Because calcitriol is stronger than normal vitamin D, there is a bigger chance this will happen. ^[129]

In the studies we looked at, people who took any type of vitamin D were twice as likely to get too much calcium in their blood (hypercalcaemia) as people who took a dummy treatment (called a placebo) or just calcium for comparison. But people who took calcitriol were 15 times more likely to get this problem. ^[129]

Here are some early signs that your calcium level is getting too high: ^[130]

- Weakness
- Headache
- Sleepiness
- Feeling sick
- Throwing up
- Dry mouth
- Constipation
- Pain in your muscles
- Pain in your bones
- A taste like metal in your mouth
- Not feeling hungry
- Pain in your abdomen.

If you get these side effects, see your doctor. If you stop taking calcitriol and cut down on how much calcium you are eating, you should be better in a few days.

Osteoporosis

Some doctors think that calcitriol can cause stones in your **kidneys** . But in the studies we looked at, people who took calcitriol were not more likely to get kidney stones or any type of problems with their kidneys.

How good is the research on calcitriol?

There is some fairly good evidence that calcitriol helps to prevent broken bones in women who have been through the **menopause** . But not all studies agree.

We found three big summaries of the research (called **systematic reviews**).^[131] ^[132] They both showed that women who took calcitriol were less likely to get broken bones.

The first summary looked at 17 good studies (called **randomised controlled trials**).^[131] In the studies, some women took calcitriol or a similar drug (called **alfacalcidol**). Others took a dummy treatment (called a **placebo**) or just **calcium** for comparison.

This summary showed that after two years, the women who took calcitriol or the similar drug were only about **half as likely** to have broken a bone as the other women.

The second summary looked at 33 good studies (randomised controlled trials).^[132] They involved a total of more than 14,500 women. Some women took calcitriol or the similar drug. Others took tablets of regular **vitamin D** for comparison.

This summary showed that the women who took calcitriol and the similar drug were less likely to break bones in their spine than the other women.

But a third summary, looking at two good studies, found no difference in women taking calcitriol, compared with a dummy treatment (placebo) or calcium on its own.^[133]

Hormone replacement therapy

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[How good is the research on hormone replacement therapy?](#)

This information is for people who have osteoporosis. It tells you about hormone replacement therapy, a treatment used for osteoporosis. It is based on the best and most up-to-date research.

Does it work?

Yes. If you take hormone replacement therapy (HRT for short) after the **menopause** , your bones will probably get stronger and be less likely to break.

But there is a small risk of serious side effects from HRT. These include breast cancer, heart attack, **stroke** , and **blood clots** .

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For this reason, doctors don't usually recommend HRT as the first choice for treating osteoporosis. ^[134]

Also, HRT may not work as well as a drug called [alendronate](#) . ^[135] That drug belongs to a group called **bisphosphonates**.

What is it?

If you have osteoporosis, your bones are weak and can break easily. In women, this is more likely to happen after the menopause. This is because the **hormone** oestrogen helps keep your bones strong. Your **ovaries** make this hormone before the menopause. But they stop making it afterward.

Taking HRT is a way of putting oestrogen back into your body after the menopause. Putting it back may make your bones stronger and less likely to break.

HRT is usually prescribed to stop symptoms of the menopause like hot flushes, night sweats, and dryness of your vagina. It is also given to younger women if they can't make oestrogen naturally. For example, they may have had an operation to take out their ovaries.

There are lots of different types of HRT. Some have just oestrogen. Others have both oestrogen and progesterone (another hormone).

HRT comes in different forms too. You can get pills, patches, or gels. You need a prescription from your doctor to get it. The brand names include Climesse, Elleste Solo, Estraderm, and Premique.

For more on the different HRT products, see our articles on the [menopause](#) .

Doctors sometimes prescribe HRT to prevent osteoporosis. But it's not normally the first choice because of the chance of side effects. If you are thinking about HRT, talk with your doctor to see if it is right for you. ^[12]

The other thing to think about is that once you stop taking HRT, your bones start getting weaker again. HRT works best for preventing osteoporosis if you start taking it early in the menopause and keep taking it for up to five years. ^[136]

How can it help?

Some studies show that HRT helps prevent broken bones of all kinds in women after the menopause.

- In a big review of studies, women taking HRT for at least a year got fewer broken bones in their spine than women taking a dummy treatment (called a **placebo**), calcium alone, [calcium plus vitamin D](#) , or no treatment. ^[137] Their chances of breaking a bone in their spine were about one-third lower.

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- In another, smaller study, women taking HRT for at least a year got fewer broken bones in parts of their body other than their spine.^[138] But this happened mostly in women under 60.

But not all studies show these effects.

How does it work?

Bone is a living, growing part of your body.^[1] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

Certain cells cause the new bone to grow. They are called **osteoblasts**. Other cells break down the old bone. They are called **osteoclasts**.

As you get older, the cells that break down the old bone work harder than the cells that make new bone. This happens slowly at first. But it speeds up when you are in your 50s and 60s. This is because of changes in your hormones. If you have osteoporosis, it happens too fast. Then your bones get thin and are more likely to break.

The oestrogen that your body makes naturally helps keep your bones strong. It does this by slowing down the cells that break down the old bone.^[139] When your body stops making oestrogen, your bone is broken down faster.^[140] This may increase your chances of osteoporosis. Putting back the oestrogen with HRT may help.

This is why doctors used to prescribe HRT to prevent osteoporosis in women who have been through the menopause.

Can it be harmful?

Yes. You can get some serious side effects from HRT, although for most women the risk of these is small.

One large study compared women taking HRT with women taking a dummy treatment (called a **placebo**).^[141]

Here is what the study showed.

- About 20 in 1,000 women taking HRT got **breast cancer**. This compared with 15 in 1,000 taking the dummy treatment.
- About 19 in 1,000 women taking HRT had **heart attacks**. This compared with 15 in 1,000 taking the dummy treatment.
- About 15 in 1,000 women taking HRT had **strokes**. This compared with 11 in 1,000 women taking the dummy treatment.

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- About 8 in 1,000 women taking HRT got **blood clots in their lungs**. This compared with 4 in 1,000 women taking the dummy treatment.

HRT can have other side effects that are less serious. But they can be annoying. Some of the more common ones are: ^[46]

- Unexpected spotting and bleeding from your vagina
- Headaches
- Soreness and swelling of your breasts
- Changes in your mood.

In one study, 1 in 5 women stopped taking HRT because of these types of side effects. ^[142]

Contraceptives that contain hormones: Researchers have looked at whether contraceptives that contain the hormones oestrogen and progestin can affect women's bones. These contraceptives can be pills or implants. So far there is no evidence that they make women's bones weaker. So it's perfectly safe to keep using these contraceptives. ^[143]

How good is the research on hormone replacement therapy?

There's some good evidence showing that women who have been through the menopause are **less likely to break bones** if they take hormone replacement therapy (called HRT for short). But not all studies show this.

There is also good evidence that HRT can have **serious side effects**. This means doctors don't usually choose it first for treating osteoporosis.

We found three big summaries of the research (called **systematic reviews**). ^[144] ^[145] ^[146] They looked at 77 good studies (called **randomised controlled trials**). The studies compared HRT with other treatments or no treatment in women who had been through the menopause. The studies involved many thousands of women in all.

Two of the summaries showed that women who had gone through the menopause were less likely to break a bone anywhere in their body if they took HRT. ^[144] ^[145] The third summary looked just at broken bones in the spine. It didn't find any difference between women taking HRT and women taking a dummy treatment (called a **placebo**) or **calcium** or **vitamin D**. All were equally likely to get a broken bone in their spine. ^[146]

Two other big, good studies (randomised controlled trials) also showed that women taking HRT were less likely to get broken bones. ^[147] ^[148] These studies looked at women who

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had gone through the menopause, not just women who had osteoporosis. So we don't know for sure that HRT works if you already have osteoporosis.

We also found good evidence that HRT can have serious side effects. One review looked at four big, good studies (randomised controlled trials).^[149] The studies involved more than 20,000 women. This review showed that the women who took HRT were more likely to get breast cancer, have a stroke, and get blood clots in their lungs. Two more studies also showed that HRT increased the chance of getting breast cancer.^[147] ^[150]

Raloxifene

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[How good is the research on raloxifene?](#)

This information is for people who have osteoporosis. It tells you about raloxifene, a treatment used for osteoporosis. It is based on the best and most up-to-date research.

Does it work?

Yes, but it also has important side effects. Raloxifene helps to prevent broken bones in your **spine** if you are a woman who has been through the menopause and you have osteoporosis. But it doesn't seem to prevent broken bones in other parts of your body, like your hip or wrist. People taking raloxifene may have a greater chance of having a blood clot in their vein, or of having a stroke.

What is it?

If you have osteoporosis, your bones are weak and can break easily. Raloxifene is designed to make them stronger by slowing down the process that makes them weak.

Your doctor may prescribe it to **treat** osteoporosis.^[46] Or your doctor may prescribe it to **prevent** osteoporosis if you are especially likely to get it. In the United States, doctors may prescribe raloxifene to prevent or treat osteoporosis after the menopause.^[151]

Raloxifene belongs to a group of drugs called **selective oestrogen receptor modulators**. You may hear them called SERMs for short. These drugs keep your bones strong and work a bit like the hormone called oestrogen.

Other drugs in this group include tamoxifen. Doctors use tamoxifen to treat breast cancer. But raloxifene is the only drug in this group that has been approved for osteoporosis.

You need a prescription from your doctor to get raloxifene. The brand name is Evista. Raloxifene comes as tablets that you take once a day. You can take this drug at any time, with or without food.

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Your doctor may prescribe raloxifene to prevent osteoporosis or to treat osteoporosis. But he or she will probably try a drug from another group first. Those drugs are called **bisphosphonates**. Some examples are [alendronate](#) and [risedronate](#) .

In the UK, there are some guidelines on who can be treated with raloxifene and other osteoporosis drugs on the NHS. See [Who can get treatment?](#)

How can it help?

If you take raloxifene:^[152] ^[153]

- Your bones will probably get stronger
- You are less likely to break a bone in your spine.

This doesn't mean you definitely won't break a bone in your spine. It just means your chances of breaking a bone are lower than without the drug.

One large study looked at women who took raloxifene for three years. Here is what it showed.^[152]

- Between 6 in 100 and 7 in 100 women taking raloxifene broke a bone in their spine.
- About 10 in 100 women taking a dummy treatment (called a [placebo](#)) for comparison broke a bone their spine.

Good research on women with osteoporosis after the menopause shows that women who have already broken at least one bone in their spine are less likely to break more if they take raloxifene.^[81] But raloxifene didn't seem to stop women getting broken bones in other places, like their hips or their wrists.^[152]

Raloxifene makes your bones stronger. Doctors use a measurement called bone mineral density (BMD for short) to say how strong your bones are. The study showed that the women's BMD in their hip and spine went up.^[152] It went up by between 2 percent and 3 percent over three years.

But we don't know how long the effects last. And we don't know what happens to your bones if you stop taking this drug.

Raloxifene works a bit like the hormone oestrogen. But unlike oestrogen, raloxifene doesn't make the cells in your breast multiply. That can cause breast cancer. In fact, two studies showed raloxifene may lower your risk of breast cancer.^[154] ^[155]

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How does it work?

Bone is a living, growing part of your body.^[156] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

Certain cells cause the new bone to grow. They are called **osteoblasts**. Other cells break down the old bone. They are called **osteoclasts**.

As you get older, the cells that break down the old bone work harder than the cells that make new bone. This happens slowly at first. But it speeds up when you are in your 50s and 60s. This is because of changes in your **hormones**. If you have osteoporosis, it **happens too fast**. Then your bones get thin and are more likely to break.

The hormone oestrogen helps to slow the breakdown of your bones. It does this by sticking to the bone and making it harder to break down. When your body stops making oestrogen, you lose this protection. So your bone is broken down faster.

Raloxifene works a lot like oestrogen does. Like oestrogen, it sticks to your bones. And it also slows your bones from being broken down. So they stop getting weaker and they may even get stronger.

Can it be harmful?

Raloxifene increases your chances of getting **blood clots**. The most common type of blood clot is called a **deep vein thrombosis**. This can be serious if part of the clot goes to your lungs. There, it can block an **artery**. This is called a **pulmonary embolism**. You can die from it.

But the chance that this will happen is **small**. In the study we looked at, 10 in 1,000 women taking raloxifene got a blood clot.^[152] This compared with 3 in 1,000 women taking a dummy treatment (a **placebo**). But this study also showed that the chance of blood clots did not go up if women took a **lower dose** of raloxifene (60 milligrams a day).

In another study, women who took raloxifene were more likely to die from a **stroke**. About 2 in 1,000 women taking raloxifene died from a stroke, compared with 1 in 1,000 women taking a dummy treatment. So the chance is still quite small.^[155]

Other problems you might get with raloxifene include hot flushes, leg cramps, swelling in your legs or feet, and symptoms like the ones you get with flu.

In the study we looked at, 12 in 100 women taking raloxifene got hot flushes and nearly 5 in 100 got leg cramps. Women taking a dummy treatment got these side effects too.^[152] But they were not as likely to get them as the women taking raloxifene.

How good is the research on raloxifene?

There's good evidence that raloxifene can lower your chances of breaking a bone in your **spine** if you are a woman with osteoporosis and have been through the **menopause**.

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We found one large summary of the research (called a [systematic review](#)).^[157] The summary included one big, good-quality study (called a [randomised controlled trial](#)).^[158]

The study involved 7,705 women. Some women took raloxifene. Other women took a dummy treatment (called a [placebo](#)) for comparison.

The results showed that after three years, the women taking raloxifene had **stronger bones** and were **less likely to have broken a bone in their spine**.^[158] After four years, the results were the same.^[159]

But the study was in women who had been through the menopause. So it does not tell us how well raloxifene works in men or in younger women.

Also, the study lasted for only four years. So we don't know what happens if you take raloxifene for longer than that. And we don't know what happens to your bones if you stop taking it.

A good-quality study looking at 1,226 women found that raloxifene helped stop them getting more broken bones in their spine.^[81]

Exercise

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[How good is the research on exercise?](#)

This information is for people who have osteoporosis. It tells you about exercise, a treatment used for osteoporosis. It is based on the best and most up-to-date research.

Does it work?

We don't know. We do know that being physically active helps to build your bones and keep them strong. And we do know that not being active makes your bones weaker. So exercise may work to prevent osteoporosis. But we can't be sure that it does anything to stop you breaking bones once you have osteoporosis.

What is it?

If you have osteoporosis, your bones are weak and can break easily. Exercise makes your bones work. So it may keep them strong and make them less likely to break.

Exercise covers a huge range of activities, from walking to running, from golfing to lifting weights, from aerobics to gymnastics, and from table tennis to squash.

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It really means anything other than sitting, lying, or standing around. Even housework counts as exercise if you do it actively enough.

Two kinds of exercise make your bones stronger.

- **Weight-bearing exercise.** This type of exercise you do on your feet. That means your bones have to hold up your weight. Some examples are walking, jogging, tai chi, climbing stairs, dancing, tennis, and aerobics.
- **Strength-training exercise.** This type of exercise makes your body work against something that is heavy or that pushes back. Some examples are lifting weights, using weight machines, using giant rubber bands, and doing activities in the water.

These types of exercise can also help you move more easily and have better balance. That could help stop you falling down. So you may be less likely to break bones. ^[17]

Experts recommend these two types of exercise for people with osteoporosis to help them stay as healthy as possible. ^[160]

To work well, all exercise programmes should start at a level that is easy for you and build up slowly, as you get more fit and stronger. ^[160]

Before you start, check with your doctor that the exercise you want to do is okay for you. Ideally, you should also get advice from an expert like a physiotherapist about what type of exercise is best and how to get started.

How can it help?

If you exercise regularly:

- Your bones may stay stronger
- You may be less likely to get osteoporosis.

One big study showed that if you have gone through the **menopause**, certain types of exercise may **make the bones in your lower spine and hip stronger**. ^[161] This could stop you getting osteoporosis. Here is what the study showed.

- Weight-bearing exercise and strength-training exercise made bones in the spine stronger.
- Walking helped make bones in the spine and hip stronger.
- Aerobics made bones in the wrist a bit stronger.

But we don't know if exercise helps if you already have osteoporosis. There hasn't been much research on this. Some studies show that exercise doesn't prevent people with

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osteoporosis having fewer falls or fewer broken bones.^{[162] [163] [164] [165] [166]} However, one good-quality study reported that women doing an exercise programme for 30 weeks were less likely to have broken bones from falls than women who did no exercise.^[167]
^[168]

How does it work?

Bone is a living, growing part of your body.^[1] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

When you make a part of your body work often or hard, it gets **stronger**. This is as true of your bones as it is of your muscles. So your body will build new bone if you keep using your bones all the time.

Can it be harmful?

With almost all types of exercise, you can get hurt. Most injuries are caused either by working too hard or by having some kind of accident, like a fall. People with osteoporosis who do exercise such as brisk walking may be more likely to fall.^[169]

How good is the research on exercise?

There isn't much evidence to tell us if doing exercise helps prevent broken bones or falls if you already have osteoporosis.

We found six small, good studies (called **randomised controlled trials**).^{[170] [171] [172]}
^{[173] [174] [167] [168]} They included many older adults with osteoporosis.

Five of the studies found that exercise didn't make much difference to the number of broken bones or falls people had. Some examples of the types of exercise the studies used were walking briskly three times a week or doing exercises that make your balance better or your muscles stronger.

However, one study found that women doing a 30-week exercise programme were less likely to have broken bones from falls than women who did no exercise.^{[167] [168]}

We also found one large summary of research (called a **systematic review**) that included some women who hadn't yet developed osteoporosis.^[175] It found that in women who had been through the **menopause**, exercises generally made bones stronger. But it couldn't tell us if exercise made it less likely that they would break bones.

Zoledronic acid

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[How good is the research on zoledronic acid ?](#)

This information is for people with osteoporosis. It tells you about zoledronic acid, a treatment used for osteoporosis. It is based on the best and most up-to-date research.

Does it work?

Yes. Zoledronic acid makes your bones stronger and less likely to break.

What is it?

If you have osteoporosis, your bones can break easily. Zoledronic acid is designed to make them stronger by slowing down the process that makes them weak.

Zoledronic acid belongs to a group of drugs called **bisphosphonates**. They are all designed to help make your bones stronger and less likely to break.

You take zoledronic acid as a drip into a vein (an **intravenous infusion** or IV). It takes about 15 minutes. You only need it once a year.

The Aclasta brand of zoledronic acid is used for osteoporosis in men, and in women who have gone through the menopause. ^[176]

How can it help?

A large study found that taking zoledronic acid once a year helped women have stronger bones. ^[177] They also had a lower risk of fractures. The study looked at nearly 7,800 women. They had all been through the menopause, and they all had osteoporosis. Some women in the study were given zoledronic acid, and others were given a dummy treatment (a **placebo**).

- About 109 in 1,000 women taking a dummy treatment went on to get a fracture in one of the bones in their back. But only 33 in 1,000 women who took zoledronic acid went on to get that kind of fracture.
- About 25 in 1,000 women taking a dummy treatment went on to get a fracture in their hip bone. Only 14 in 1,000 women taking zoledronic acid went on to get this kind of fracture.

A later study with around 2,100 men and women had similar results, although it didn't find that people taking zoledronic acid had a lower risk of a broken hip bone. However, the study may have been too small to spot a difference in risk. ^[178]

Good studies haven't yet compared zoledronic acid with other drugs for osteoporosis. So we don't know if it's better or worse than drugs that you take regularly (once a day, once a week, or once a month).

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How does it work?

Bone is a living, growing part of your body.^[1] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

Certain cells cause the new bone to grow. They are called **osteoblasts**. Other cells break down the old bone. They are called **osteoclasts**.

As you get older, the cells that break down the old bone work harder than the cells that make new bone. This happens slowly at first. But it speeds up when you are in your 50s and 60s. This is because of changes in your hormones. If you have osteoporosis, this process of cells breaking down bone **happens too fast**. Then your bones get thin and are more likely to break.

Zoledronic acid, like other drugs in the bisphosphonate group, slows down the cells that break down your old bone.^[46] This means the cells that build new bone have a chance to catch up. So your bones get stronger.

Can it be harmful?

Some people taking zoledronic acid get side effects, including muscle pain, headaches, and other flu-like symptoms.^[177]

A few people taking bisphosphonate drugs have developed a serious bone disease in their jaw, called osteonecrosis.^{[179] [180]} The Medicines and Healthcare products Regulatory Agency (MHRA) says people at higher risk should have a dental check-up before starting treatment, and may need to avoid having dental treatment while taking this drug.^[63] People at higher risk include people with cancer, people also taking high-dose steroids, and people with poor oral hygiene. Experts also advise maintaining good dental hygiene if you have had zoledronic acid.

Zoledronic acid has also been linked to a higher risk of kidney damage, particularly among those already at risk of kidney problems.^[181]

Some research suggests that people taking bisphosphonates are also more likely to get a hairline fracture of their bones, called an **atypical stress fracture**.^{[58] [59] [60] [61] [62]} These fractures tend to happen at the top of the thigh bone. If you get thigh pain, make sure you see your doctor. If you do get an atypical stress fracture, your doctor will probably recommend stopping treatment, and also avoiding other bisphosphonate drugs.

There have also been reports of people getting severe pain in their bones, joints, or muscles while taking bisphosphonate drugs. This pain can happen within days, months, or years of starting treatment. Some people recover quickly once they stop taking the drug, but others improve more slowly or have pain that doesn't completely go away. If you get pain, see your doctor.^[64]

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Some studies have also shown a possible link between taking bisphosphonate drugs and developing an irregular heartbeat called atrial fibrillation, which can be very serious. But other studies have not found a link.^[65] ^[66] Experts say the risk of atrial fibrillation appears to be low and shouldn't stop people taking these drugs.^[67]

How good is the research on zoledronic acid ?

We found two good-quality studies (randomised controlled trials) looking at how well zoledronic acid works. The first included nearly 7,800 women and the second included more than 2,100 men and women.^[177] ^[178]

Both studies found that people taking zoledronic acid were less likely to have broken bones in their spines and elsewhere in the body, compared with people taking a dummy treatment (a placebo). However, the second trial didn't find lower rates of broken hip bones in the zoledronic acid group. But the study may not have been large enough to spot a difference in risk.

We don't know how zoledronic acid compares with other treatments for osteoporosis, as good-quality studies haven't looked at this yet.

Denosumab

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[How good is the research on denosumab?](#)

This information is for people who have osteoporosis. It tells you about denosumab, a treatment used for osteoporosis. It is based on the best and most up-to-date research.

Does it work?

Yes. Denosumab makes your bones stronger and less likely to break.

What is it?

If you have osteoporosis, your bones can break easily. Denosumab is designed to make them stronger by slowing down the process that weakens them.

You have denosumab as an injection every six months. It's brand name is Prolia.

Denosumab is a newer drug, so it hasn't been as widely studied as other treatments. Doctors usually recommend trying [alendronate](#) and other bisphosphonates first. However, your doctor may prescribe denosumab if you are past the menopause, have a high risk of broken bones, and:^[45]

- You have difficulty following the more frequent dosing of bisphosphonates

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- Or bisphosphonates haven't helped or have caused side effects.

How can it help?

If you take denosumab:

- Your bones will probably stay stronger for longer
- You are less likely to break a bone, particularly in your spine.

This doesn't mean you definitely won't break a bone. It just means your chances of breaking a bone are lower than without the drug.

Not many studies have looked at denosumab yet. But we did find a large, good-quality study (a randomised controlled trial) that followed women taking either denosumab or a dummy treatment (a placebo) for three years. During the study: ^[182]

- About 2 out of 100 women taking denosumab broke a bone in their spine, compared with 7 out of 100 taking a placebo
- About 6 out of 100 women taking denosumab broke a bone elsewhere in their body, compared with 8 out of 100 taking a placebo.

We don't know how denosumab compares with other medicines for osteoporosis, as good studies haven't looked at this yet.

How does it work?

Bone is a living, growing part of your body. ^[1] Throughout your lifetime, new bone grows and old bone breaks down to make way for it. This process goes on all the time. It is called **bone turnover**.

Certain cells cause the new bone to grow. They are called **osteoblasts**. Other cells break down the old bone. They are called **osteoclasts**.

As you get older, the cells that break down the old bone work harder than the cells that make new bone. This happens slowly at first. But it speeds up when you are in your 50s and 60s. This is because of changes in your hormones. If you have osteoporosis, this process of cells breaking down bone **happens too fast**. Then your bones get thin and are more likely to break.

Denosumab blocks production of the cells that break down bones (osteoclasts). This means the cells that build new bone have a chance to catch up. So your bones get stronger.

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Can it be harmful?

Yes. Denosumab can cause side effects. Some people in studies have had: ^[183]

- Back pain
- Pain in their arms or legs
- Raised cholesterol levels
- Bladder infections.

More serious problems are also possible, but rare. These include: ^[183] ^[184]

- Skin reactions such as dermatitis, rashes, and eczema
- Serious infections, including infections of the skin
- A severe bone disease of the jaw (osteonecrosis)
- Low calcium levels in the blood (hypocalcaemia).

How good is the research on denosumab?

Denosumab is a newer treatment, so not as much research has been done on it as on other treatments, such as bisphosphonates. Even so, there's good evidence that women who have gone through the **menopause** are less likely to break bones if they have injections of denosumab twice a year.

We found one large study (a **randomised controlled trial**) that looked at nearly 8,000 women with osteoarthritis. Over the three-year study, women were less likely to break a bone if they were treated with denosumab than if they were treated with a dummy treatment (a **placebo**). ^[182]

But the study involved only women who had been through the menopause. So it doesn't tell us how well denosumab works in men or in younger women. We also don't know how denosumab compares with other treatments for osteoarthritis.

Further informations:

Preventing osteoporosis

There isn't much evidence to show that changing the way you live can help if you already have osteoporosis. But most doctors agree that there are sensible things you can do that may help prevent osteoporosis. Here are some of those things.

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Keep a healthy weight

A lot of research shows that women who are very thin and have small bones are more likely to get osteoporosis. Women who weigh more are less likely to get it. ^[5]

You can find out if you don't weigh enough (or weigh too much) by using our [BMI calculator](#) . Talk to your doctor about your BMI score. If your weight is low, ask your doctor to see a dietitian. This person can advise you about the healthiest way to put on weight.

Stop smoking

Women who smoke tend to be thinner than women who don't smoke. They also have less of the hormone called oestrogen. And they have the menopause earlier than women who don't smoke. All these things make them more likely to get osteoporosis. ^[6]

Smoking makes men's bones weaker too. ^[7]

If you give up smoking, your chances of getting osteoporosis start to go down. But the risk doesn't go down much until 10 years after you give up. ^[8]

Get some exercise

Getting sensible, regular exercise is good for preventing osteoporosis. Regular means about three to four times each week. Activities like walking, jogging, running, climbing stairs, dancing, exercising on a treadmill, and lifting weights are all good for building up your bones. ^[9]

Eat healthy foods, with plenty of calcium and vitamin D

Calcium and vitamin D are important nutrients for building up healthy bone. ^[9]

You can get a lot of calcium from dairy products. These include milk, yoghurt, and cheese. Other foods with lots of calcium are tinned sardines and salmon with bones, and green leafy vegetables, like broccoli and spinach. The European Food Information Council recommends you eat 800 milligrams of calcium a day. ^[10]

Vitamin D is made in your skin. But your skin needs some sunlight to do this. Vitamin D is also found in oily fish (like salmon or mackerel), milk, and foods that have extra nutrients added to them, like breakfast cereals. The European Food Information Council recommends you eat 5 micrograms of vitamin D a day. ^[10]

If you don't get enough calcium and vitamin D from the food you eat, you can take them in tablets or capsules.

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Don't drink too much alcohol

Having one or two units of alcohol a day does not seem to make your bones weaker.^[11] But drinking a lot may increase your chances of osteoporosis. We need more research to say for sure.^[12]

Menopause and osteoporosis

Most women go through the **menopause** at about the age of 50. When this happens, your **ovaries** stop making the **hormone** called **oestrogen**. Oestrogen helps to keep your bones strong. This is because it slows down the cells that break down old bone in your body.^[13] Those cells are called **osteoclasts**.

When your body stops making oestrogen, your bone is **broken down faster** for between five years and eight years afterwards.^[14] Then your body gets used to not having the oestrogen. The breakdown process slows down again.

This rapid breakdown of your bones happens whenever you have your menopause. So if your menopause comes early (before age 45), you can get osteoporosis at a young age.^[15] And if it comes later than average, your bones stay strong for longer.

If you are very thin and have small bones, you are more likely to get osteoporosis right after you go through your menopause.^[14]

Because oestrogen keeps your bones strong, your bones will get weaker if your body stops making oestrogen for any reason. This can happen if you have surgery to take out your ovaries. It can also happen if you stop having periods for six months or more (not including pregnancy or menopause). You can stop having periods if you eat too little or if you exercise too much. In these cases, your doctor may offer you drug treatment to replace the missing oestrogen.

Illnesses and drugs that can cause osteoporosis

Some illnesses make it more likely that you will get osteoporosis. And some drugs can do this too. These can give you osteoporosis at **any age**.

Osteoporosis that is caused by an illness or drugs is known as **secondary osteoporosis**. It is more common in men than in women.^[12]

Illnesses

Here are some of the illnesses that can cause osteoporosis:

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- Eating disorders (anorexia and bulimia are eating disorders where you get too thin and don't get enough nutrients)
- Losing lots of weight for any other reason
- Having diseases of your liver or lungs for a long time
- Coeliac disease (this is a condition where your bowel can't digest food properly)
- Hyperparathyroidism (this is one where your body makes too much of a hormone that affects the amount of calcium in your bones)
- Inflammatory bowel disease (this is another condition where your bowel can't digest food properly)
- Having too low a level of a hormone called testosterone (in men only)
- Problems with your kidneys
- Rheumatoid arthritis
- Having too low a level of vitamin D
- Anything that makes you sit or lie still for a long time (for example, if you are very ill and have to stay in bed for weeks)
- You might be more likely to get osteoporosis if you've had a stroke, especially if you're a woman. ^[16]

Drugs

Here are some of the drugs that can cause osteoporosis: ^[17]

- Drugs used to treat seizures , called anticonvulsants
- Certain medicines used to treat cancer, called cytotoxic medicines
- Drugs called corticosteroids , which are used to treat many illnesses, including rheumatoid arthritis and asthma
- Some medicines given to men or women to help get pregnant
- Drugs that calm your immune system , used after organ transplantation and to treat conditions like rheumatoid arthritis

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- A drug called lithium, which you may take for a condition known as manic depression
- A drug called heparin, which thins your blood
- An injection called Depo-Provera, which helps prevent pregnancy
- Thyroxine, a drug you may take if your thyroid gland isn't working properly
- A drug called anastrozole, which is used to treat breast cancer.

Osteoporosis in children

Osteoporosis is rare in children and teenagers. When it does happen, it is usually caused by another illness or by drugs. This is called **secondary osteoporosis**.^[1]

Osteoporosis caused by illnesses

Here are some of the illnesses that can cause osteoporosis in your child.

- **Juvenile rheumatoid arthritis.** This type of arthritis can affect the way your child's bones grow. That can lead to osteoporosis.
- **Problems with certain glands.** The thyroid gland and parathyroid glands make hormones. These affect how quickly bone is made or broken down in your child's body. If these glands make too much hormone, your child's body breaks down bone faster than it should.
- **Coeliac disease.** People who have coeliac disease can't digest a substance in wheat. This disease can stop your child's body taking up nutrients like calcium and vitamin D. These are important for building healthy bones.
- **Eating disorders.** With disorders like anorexia and bulimia, your child may get too thin and may not get enough nutrients from food. This makes it very likely he or she will get osteoporosis.
- **Osteogenesis imperfecta.** This is a rare illness. It is caused by genes. This illness affects how your child's bones grow.
- **Disease in your kidney.** If your child has problems with his or her kidneys, that can lead to osteoporosis.
- **Diabetes.** Children with diabetes can get osteoporosis too.

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The best treatment for this kind of osteoporosis is to work out what is causing it and treat that illness. Then your child's bones should get stronger as he or she grows.

Osteoporosis caused by medicines

Here are some drugs that can cause osteoporosis in your child:

- Drugs used to stop seizures, called anticonvulsants
- Corticosteroid tablets (these are usually used to treat rheumatoid arthritis and asthma)
- Drugs that calm the immune system (these are used to treat lots of illnesses).

If your child's osteoporosis is caused by a drug, your doctor will prescribe the lowest dose possible or change to a different drug.

Your child will also need to eat foods that have a lot of calcium and vitamin D. And he or she should get as much exercise as possible. These things help to grow healthy bones.

Osteoporosis for no clear reason

Sometimes children get osteoporosis for no clear reason. This is called **idiopathic osteoporosis**. But it's very rare.

This usually happens in healthy children just before they reach puberty. Typically, the first symptom is pain in your child's back, hips, and feet. The pain may make it hard for your child to walk.

The good news about this type of osteoporosis is that it usually gets better on its own. And your child's bones get stronger again on their own.

Preventing falls

These precautions haven't been studied to the same scientific standards that we use to judge the other treatments we cover. (See Our method.) But we discuss them because you may have questions about them. As you read this information, keep in mind that more research is needed to say if these precautions work.

Falls are an important cause of broken bones in people with osteoporosis. So it makes sense to do everything you can to lower your chances of falling down.

There are lots of things you can do inside and outside your home to make a fall less likely.^[1] Here are some of them.

- Wear shoes that have rubber on the bottom outdoors.

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- Use a walking stick outdoors.
- Keep your floors smooth (but not slippery) and free of clutter.
- Wear shoes that fit well and support your feet, even at home.
- Don't walk around in socks, stockings, or slippers.
- Tack any rugs in your house firmly to the floor.
- Make sure the area where you walk has a lot of light, so you can see.
- Have handrails on both sides of your stairs.
- Put bars you can hold on to in your bathroom.
- Use a rubber mat in your bathtub or shower.
- Keep a torch with fresh batteries by your bed, in case you need to get up in the dark.

It's also a good idea to have your vision and hearing checked regularly. And your doctor or pharmacist can check any drugs you take to see if they might affect your balance and how stable you are on your feet.^[17]

You can get underwear with built-in hip pads. The pads are made of plastic or foam. This underwear stops you breaking your hip if you fall down. But we don't know if it works. A big summary of the research showed they don't seem to make any difference to people who live at home.^[30] And it's not clear if they make any difference to people living in nursing homes either. Many people stop wearing hip pads because they find them uncomfortable.

Breaking a bone in your spine

If you have a small break of one of the bones in your spine, you may recover fully after treatment. But if you have a big break or lots of them, you can get more serious problems.

When you break a bone, doctors say you have a fracture. And when you break a bone in your spine, doctors call it a **spinal fracture** or a **vertebral fracture**.

Here's why you can get more serious problems after breaking a bone in your spine.^[18]

- When one bone in your spine breaks, the weight of your body presses down on the other bones in your spine. This makes those bones **more likely to break**.

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- As your bones are squashed together, your spine **curves forward** at the top. This is sometimes called a dowager's hump or widow's hump.
- This squashing of bones in your spine can make you **shorter**. You may notice that you are around 5 centimetres (2 inches) shorter than you used to be.

These changes in your spine can give you a **backache**. This can make it hard for you to get around and do daily tasks like bathing, dressing, cooking, and shopping.^[31] You may need help around the house to cope.^[32] Your doctor may recommend that you get some help with daily tasks at home.

Some people with broken bones in their spine get **depressed** because they can't live on their own as they used to and because these fractures can hurt.^[20] If you are getting depressed, see your doctor. He or she may be able to help with better painkillers. And there are good treatments for depression. For more, see [Depression in adults](#) .

The change in the shape of your spine can have other effects on your health. This is because the organs inside your body have less room. So they can get squashed together. That makes it harder for them to work properly. The problems you can get include constipation , not feeling hungry, and having trouble with breathing.^[17]

You may still have a bad backache after your broken bone has been treated. In that case, your doctor may suggest another treatment called **percutaneous vertebroplasty**. This is an operation. Doctors inject a substance like plastic into your spine to make it stronger. But it won't straighten out your spine again.

The good news is that you can get treatment to lower your chances of breaking bones in your spine. For more, see [What treatments work for osteoporosis?](#)

Breaking a bone in your hip

Many people get back to normal after breaking their hip and having an operation to fix it. But some people get more health problems.

Here are some of the problems you can get with a broken hip.

- **Blood clots**. If you can't move around, you may get a **blood clot** in a **vein** . Doctors call this **deep vein thrombosis** . The clot can break off and go to your lungs. This can be dangerous. Between 2 in 10 and 5 in 10 people who break a hip get blood clots.^[33]
- An **infection in your chest**. If you are older, breaking your hip and having a big operation can put a lot of strain on your body. This means your body can't cope as

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well with things like an infection in your chest. Chest infection is life threatening for older adults who have had a hip operation. ^[34]

These kinds of health problems can be serious, especially if you are an older adult and have hip surgery. Between 1 and 2 in every 10 people who break a hip die within one year. ^[33]

What will happen if you break your hip depends partly on **how healthy you are** in general. If you have several other illnesses, like problems with your heart or your lungs, or you have had a **stroke**, your body is already weak. It may not be able to cope with the added strain of breaking your hip and having an operation. In one study, people who had three or more illnesses besides their broken hip were most likely to die after surgery to fix their hip. ^[34]

The good news is that you can get treatment to lower your chances of breaking your hip. For more, see [What treatments work for osteoporosis?](#)

You can do some things on your own too. If you have osteoporosis, you often get a broken hip from a fall. So it's very important **not to fall down**. For more, see [Preventing falls](#).

Other scans to measure bone mineral density

If your doctor thinks you might have osteoporosis, you will probably need to have a scan that measures your **bone mineral density** (BMD for short). Most people have a kind called a DXA scan. It measures the BMD in the bones of your hip and your spine and some other places. But you can't get these scans everywhere. So you may be offered other ones.

Two types of scanning machines measure BMD. ^[41]

- Some machines, including the DXA one, measure BMD in your **larger bones**, like the ones in your hip and spine. These are called **central** machines.
- Other machines measure BMD in your **smaller bones**, like the ones in your finger, wrist, and heel, and in your kneecap and shin bone. These are called **peripheral** machines.

Your larger bones have most of your body's **spongy bone** (also called trabecular bone). This is the kind of bone that is most likely to get weak if you have osteoporosis. So if you have a scan of your hip or spine, it has a good chance of picking up osteoporosis.

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Your smaller bones have more hard bone (also called cortical bone). This kind is less likely to get weak from osteoporosis. So if you have a scan of your wrist or shin, it is less likely to pick up osteoporosis.

Lots of machines are used to measure BMD in your smaller bones. We can't say if these are as good as DXA. That's because there has not been much research comparing them.

[12]

Here are some of the ones you are most likely to be offered. [41]

- **Peripheral DXA** measures BMD in your wrist, heel, or finger bones.
- **Single-energy x-ray absorptiometry (SXA)** measures BMD in your wrist or heel bones.
- **Quantitative ultrasound (QUS)** uses sound waves to measure BMD in your heel, shin, and kneecap.
- **Peripheral quantitative computed tomography (QCT)** measures BMD in your wrist bones.
- **Radiographic absorptiometry** uses an x-ray of your hand to work out your BMD.

Your doctor may suggest a special scan to measure the BMD in your spine. It is called **quantitative computed tomography (QCT)** of your spine. Experts think it is the best choice after a DXA scan. But you get more radiation than if you have DXA scan. [42]

Who can get treatment?

The National Institute for Health and Care Excellence (NICE) advises the government about which treatments work best. It has made recommendations about who should be treated with osteoporosis drugs. [43] [44] [45]

The recommendations are quite complicated. It depends in part on how old you are. It also depends on whether you have a family history of hip fracture, how much you weigh, whether you have any other conditions that mean you're more likely to have a fracture, and how strong your bones are. Doctors use something called a **T score** to look at this. See [How do doctors diagnose osteoporosis?](#)

We've summarised the recommendations here. If you are not sure if you can get treatment, ask your doctor.

For women past the menopause who have already broken a bone, and who have been diagnosed with osteoporosis:

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- The bisphosphonate drug [alendronate](#) is recommended as the first treatment for some women
- If women can't take alendronate, they may be offered the other bisphosphonate drugs [etidronate](#) or [risedronate](#)
- If women can't take any of the bisphosphonate drugs, they may be offered [denosumab](#) , [raloxifene](#) , or [strontium ranelate](#)
- If women can't take any of these drugs, they may be offered [teriparatide](#) .

Women who've broken another bone, or whose bone mineral density has gone down after taking one of the bisphosphonate drugs for at least a year, may also be offered teriparatide.

Women aged over 75 who've broken a bone may not need a DXA scan to check their bone density. It's up to the doctor to decide. Women younger than 75 should have a DXA scan to diagnose their osteoporosis.

For women past the menopause who have not already broken a bone, but who have been diagnosed with osteoporosis with a DXA scan:

- The bisphosphonate drug alendronate is recommended as the first treatment for some women
- If women can't take alendronate, they may be offered the other bisphosphonate drugs etidronate or risedronate
- If women can't take any of the bisphosphonate drugs, they may be offered strontium ranelate or denosumab.

NICE does not recommend raloxifene as a treatment to prevent fractures in women with osteoporosis who haven't broken a bone.

To read the full guidelines, see <http://www.nice.org.uk/guidance/ta160> if you haven't had a broken bone, or <http://www.nice.org.uk/guidance/ta161> if you have had a broken bone.

Glossary:

hormones

Hormones are chemicals that are made in certain parts of the body. They travel through the bloodstream and have an effect on other parts of the body. For example, the female sex hormone oestrogen is made in a woman's ovaries. Oestrogen has many different effects on a woman's body. It makes the breasts grow at puberty and helps control periods. It is also needed to get pregnant.

menopause

When a woman stops having periods, it is called the menopause. This usually happens around the age of 50.

bone marrow

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Your bone marrow is the soft material inside your bones. Bone marrow makes and stores blood cells.

calcium

Calcium is an important mineral in your body. It helps to make your bones and teeth strong. It also keeps your heart, nerves, muscles and blood working properly.

genes

Your genes are the parts of your cells that contain instructions for how your body works. Genes are found on chromosomes, structures that sit in the nucleus at the middle of each of your cells. You have 23 pairs of chromosomes in your normal cells, each of which has thousands of genes. You get one set of chromosomes, and all of the genes that are on them, from each of your parents.

vitamin D

Your body uses vitamin D to help make strong, healthy bones. You can get vitamin D from some foods, such as egg yolks and some dairy products. And your skin makes vitamin D when it is exposed to sunlight.

anorexia

Anorexia is an eating disorder. People who have anorexia starve themselves because they think they are too fat. They do this even when they are very thin. It is most common among teenage girls. Doctors may call it anorexia nervosa.

bulimia

Bulimia is a psychological illness. People who have it tend to eat too much at one time (called bingeing) and then do something to keep from gaining weight. For example, they may make themselves sick or do too much exercise.

ovaries

Women have two ovaries, one on each side of their womb. They are small glands that store eggs. Inside the ovaries are hundreds of thousands of pre-eggs, called follicles. Some of these grow into eggs.

liver

Your liver is on the right side of your body, just below your ribcage. Your liver does several things in your body, including processing and storing nutrients from food, and breaking down chemicals, such as alcohol.

testosterone

Testosterone is a sex hormone. When boys go through puberty, testosterone causes the development of male characteristics like a deep voice and a muscular body. Testosterone is also known to affect men's sex drive and mood. Although testosterone is thought of as a 'male hormone', women also make testosterone (although they make much less of it than men).

kidney

Your kidneys are organs that filter your blood to make urine. You have two kidneys, on either side of your body. They are underneath your ribcage, near your back.

rheumatoid arthritis

If you have rheumatoid arthritis, your joints get painful, swollen, and stiff. Rheumatoid arthritis is caused by inflammation inside your joints. It happens when your immune system attacks the lining of your joints.

seizure

A seizure (or fit) is when there is too much electrical activity in your brain, which results in muscle twitching and other symptoms.

corticosteroids

Corticosteroids are substances that your body makes naturally. But they can also be made in a laboratory to treat certain conditions. Corticosteroids have many different effects, including helping the body to use sugar and to control the amount of fluid it retains. They also reduce inflammation in the body, which is why they are sometimes used to treat diseases like asthma. (Asthma is caused by inflammation in the tubes that carry air in the lungs.)

asthma

Asthma is a disease of the lungs. It makes you wheeze, cough and feel short of breath. Asthma attacks are caused by inflammation and narrowing of your airways, which makes it hard for air to pass in and out of your lungs.

immune system

Your immune system is made up of the parts of your body that fight infection. When bacteria or viruses get into your body, it's your immune system that kills them. Antibodies and white blood cells are part of your immune system. They travel in your blood and attack bacteria, viruses and other things that could damage your body.

thyroid gland

Your thyroid gland is a small organ that sits in your neck, just in front of your windpipe. It sends out a hormone called thyroxine. This acts on receptors within cells. By acting on the receptors it gives the cells a message to speed up their metabolism and work harder.

diabetes

Diabetes is a condition that causes too much sugar (glucose) to circulate in the blood. It happens when the body stops making a hormone called insulin (type 1 diabetes) or when insulin stops working (type 2 diabetes).

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puberty

Puberty is the time when boys and girls develop secondary sexual characteristics. For boys, the major changes include pubic hair, a deeper voice, and growth of their penis and testicles. For girls, major changes include pubic hair, breasts and starting to have periods. After puberty, girls are able to become pregnant and boys are able to father children.

physiotherapy

Physiotherapy is a way of using movements or exercises to help people's bodies heal.

depression

Depression is a mental illness in which your mood is low and you feel sad most of the time. It can range from a mild illness through to a severe one in which you lose interest in life and may be suicidal.

constipated

When you're constipated, you have difficulty passing stools (faeces). Your bowel movements may be dry and hard. You may have fewer bowel movements than usual, and it may be a strain when you try to go.

blood clot

A blood clot forms when the cells in blood clump together. Sometimes this happens to stop you from bleeding if you've had an injury. But it can also happen on the inside of your blood vessels, even when you haven't had an injury. A blood clot inside a blood vessel is called a thrombus.

veins

Veins are blood vessels that carry blood back to your heart after your blood has delivered oxygen and food to the tissues.

deep vein thrombosis

A deep vein thrombosis is a blood clot that has formed in the deep veins of your arms or legs. These clots can form if a person doesn't move their limbs often enough. This is because blood is pushed through your veins by the contraction of muscles that occurs when a limb is moved. Blood tends to clot when it is not kept flowing, so clots can form if a person is not moving. Deep vein thrombosis is also called deep venous thrombosis or DVT.

stroke

You have a stroke when the blood supply to a part of your brain is cut off. This damages your brain and can cause symptoms like weakness or numbness on one side of your body. You may also find it hard to speak if you've had a stroke.

intravenous infusion

When a medicine or a fluid, such as blood, is fed directly into a vein, it's called an intravenous infusion (or IV). To give you an intravenous infusion, a nurse, technician or a doctor places a narrow plastic tube into a vein (usually in your arm) using a needle. The needle is then removed and the fluid is infused (or dripped) through the tube into the vein.

ulcer

An ulcer is an open sore. Ulcers can happen in many parts of your body, such as in your stomach, and the skin of your legs, mouth, or genitals.

heartburn

Heartburn is a painful, burning sensation in the chest. It happens, often after meals, when the contents of the stomach pass back up into the oesophagus. The oesophagus is the tube that runs from the mouth to the stomach.

diarrhoea

Diarrhoea is when you have loose, watery stools and you need to go to the toilet far more often than usual. Doctors say you have diarrhoea if you need to go to the toilet more than three times a day.

systematic reviews

A systematic review is a thorough look through published research on a particular topic. Only studies that have been carried out to a high standard are included. A systematic review may or may not include a meta-analysis, which is when the results from individual studies are put together.

randomised controlled trials

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

placebo

A placebo is a 'pretend' or dummy treatment that contains no active substances. A placebo is often given to half the people taking part in medical research trials, for comparison with the 'real' treatment. It is made to look and taste identical to the drug treatment being tested, so that people in the studies do not know if they are getting the placebo or the 'real' treatment. Researchers often talk about the 'placebo effect'. This is where patients feel better after having a placebo treatment because they expect to feel better. Tests may indicate that they actually are better. In the same way, people can also get side effects after having a placebo treatment.

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Drug treatments can also have a 'placebo effect'. This is why, to get a true picture of how well a drug works, it is important to compare it against a placebo treatment.

heart disease

You get heart disease when your heart isn't able to pump blood as well as it should. This can happen for a variety of reasons.

angina

Angina is the name that doctors use for a pain in your chest that you get when your heart muscle isn't getting enough oxygen.

heart attack

Doctors call a heart attack an acute myocardial infarction (or acute MI). This is the name for the damage that occurs to the heart muscle if it isn't getting enough blood and oxygen because a branch of the coronary arteries is blocked. During a heart attack, you may have pain or heaviness over your chest, and pain, numbness or tingling in your jaw and left arm.

antacids

Antacids are medicines you can buy over the counter. They counteract the acid in your stomach. Antacids can make you feel better if you have heartburn.

oestrogen

Oestrogen is the name given to three female sex hormones: oestradiol, oestrone and oestriol. Oestrogen causes women's sexual development during puberty: it is needed to develop breasts, have periods and get pregnant. Oestrogen is also thought to affect women's health in other ways. It may influence their mood, cholesterol levels and how their bones grow. Men have very low levels of oestrogen in their bodies, but doctors aren't completely sure what it does. Oestrogen is an important ingredient in most types of contraceptive pill and hormone replacement therapy.

arteries

Arteries are the blood vessels that take blood that is rich in oxygen and food away from your heart. The arteries carry this blood to all the tissues in your body.

pulmonary embolism

A pulmonary embolism can give you chest pain, make you feel breathless and uncomfortable or make you breathe rapidly. A pulmonary embolism is dangerous and can kill you if it is not treated.

physiotherapist

A physiotherapist is a health professional who is trained to use physical activity and exercises to help people's bodies heal.

randomised controlled trials

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

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