CONDITION

Osteoporosis

Osteoporosis weakens bones, making them more likely to break from minor falls or strain.

WHAT IT IS
Reduced bone strength with increased fracture risk

BODY SYSTEM
Bones and muscles

MAIN SYMPTOMS
Usually none, back pain, height loss, fractures

WHAT CAUSES IT
Ageing, hormonal changes, medicines, and other conditions

HOW IT IS DIAGNOSED
Bone density scan and fracture assessment

MAIN TREATMENT
Bone-strengthening medicines, exercise, nutrition, and fall prevention

CAN IT BE CURED?
No - bone strength can improve

IS IT AN EMERGENCY?
Sometimes - suspected hip or spinal fracture

LONG-TERM OUTLOOK
Fracture risk often falls with treatment

Overview

Osteoporosis is a condition in which bones become less strong and more likely to break. It develops when bone is lost faster than the body can replace it.

Bone is living tissue. It is continually broken down and rebuilt. This process helps repair small areas of damage and adapt bone to everyday strain. With osteoporosis, the balance shifts toward bone loss. The bone's internal structure also becomes weaker.

Osteoporosis is often called a "silent" condition because it usually causes no symptoms before a fracture. A fracture may happen after a minor fall, sudden movement, cough, or other force that would not normally break a healthy bone. This is called a fragility fracture.

The hip, wrist, spine, upper arm, and pelvis are common fracture sites. Spinal fractures involve the vertebrae, the small bones stacked to form the spine. Some are painful, while others are

found only after height loss or a change in posture.

Osteoporosis matters because fractures can affect movement, independence, sleep, and confidence. Treatment aims to protect bone, prevent fractures, and help you remain active.

Symptoms

Osteoporosis itself usually does not hurt. Symptoms most often appear when a bone fractures.

Possible signs include:

Spinal fractures may cause sharp pain that settles over weeks, but some lead to longer-lasting discomfort. Several spinal fractures can shorten the spine and change posture. This may make it harder to bend, reach, breathe deeply, or eat a large meal.

A hip fracture usually causes severe pain in the hip or groin and difficulty standing or putting weight on the affected leg. However, symptoms after an injury are not always typical, especially in older adults.

- Sudden back pain from a spinal fracture
- Gradual height loss or a more rounded upper back
- A broken wrist, hip, upper arm, pelvis, or other bone after a minor fall
- Ongoing back discomfort after one or more spinal fractures

Causes and risk factors

Bone strength is influenced by how much bone you build when young, how quickly you lose it later, and the quality of the remaining bone.

Ageing is a major factor. Bone loss commonly speeds up after menopause because levels of estrogen, a hormone that helps protect bone, fall. Low testosterone can also contribute to bone loss.

Your risk may be higher if you:

Some medicines can weaken bone, particularly long-term treatment with corticosteroids such as prednisolone. Certain treatments for breast or prostate cancer, some anti-seizure medicines, and a few other medicines may also affect bone.

Health conditions linked with osteoporosis include rheumatoid arthritis, overactive thyroid or parathyroid glands, coeliac disease, inflammatory bowel conditions, chronic kidney or liver problems, and conditions that reduce mobility. Eating disorders and other causes of poor

nutrition can also affect bone.

Having a risk factor does not mean that you have osteoporosis or will develop a fracture. Risk comes from the combination of bone strength, age, previous fractures, falls, medicines, and other health factors.

- Have previously had a fragility fracture
- Have a parent who fractured a hip
- Have low body weight or have lost substantial weight
- Smoke or regularly drink large amounts of alcohol
- Get little weight-bearing activity
- Have low calcium or vitamin D intake or absorption
- Fall often or have poor balance
- Went through menopause early
- Have low estrogen or testosterone levels

Diagnosis

Osteoporosis is commonly assessed with a dual-energy X-ray absorptiometry scan, usually called a DXA or DEXA scan. This quick, low-radiation test measures bone mineral density, most often at the hip and lower spine.

Results may include a T-score. This compares your bone density with that of a healthy young adult. In postmenopausal women and men aged 50 or older, a T-score of −2.5 or lower is one way osteoporosis is diagnosed. Different interpretation is needed for younger adults, children, and people who have not reached menopause.

Bone density is only part of the assessment. A fragility fracture, particularly at the hip or spine, can show that bones are weak even when a scan result is not in the osteoporosis range.

Your assessment may also consider:

Blood tests may check calcium, vitamin D, kidney function, thyroid function, or other possible causes of bone loss. Spinal X-rays or specialised DXA images may be used if a vertebral fracture is suspected.

- Previous fractures and falls
- Family history

- Current and past medicines
- Menstrual or hormone history
- Diet, alcohol use, smoking, and activity
- Height loss, posture, and balance
- A fracture-risk calculation covering the next several years

Treatment and management

Treatment is based on your overall fracture risk, not only your bone density score. A previous hip or spinal fracture, ongoing corticosteroid use, age, falls, and other medical conditions can affect the choice.

Bone-strengthening medicines include bisphosphonates. These slow the cells that break down bone. Depending on the medicine, they may be taken by mouth or given into a vein.

Other treatments include denosumab, which also slows bone breakdown, and medicines that stimulate new bone formation. Bone-forming treatments are generally considered for people with a particularly high fracture risk. Hormone-related treatments may be suitable in selected circumstances.

Each medicine has benefits, side effects, and practical differences. Kidney function, dental health, other medical conditions, pregnancy potential, previous fractures, and personal preferences may affect which option is appropriate.

Osteoporosis medicines should be reviewed rather than stopped without a plan. This is especially important with denosumab because stopping or delaying it without follow-on treatment can cause rapid bone loss and spinal fractures. Some people taking bisphosphonates may later have a planned break, but this is based on an individual reassessment.

Calcium and vitamin D support bone health but do not replace osteoporosis medicine when fracture risk is high. Food is generally the preferred calcium source. Supplements may be considered when diet does not provide enough or when there is a specific medical need.

Exercise helps preserve muscle, balance, and bone function. A suitable plan often combines:

If you have spinal fractures or a high fracture risk, ask for advice before starting high-impact activity or repeated forceful bending and twisting. A physiotherapist can help adapt movement safely.

Fall prevention may include reviewing eyesight, footwear, blood pressure, medicines that

cause dizziness, and hazards in the home.

- Weight-bearing activity, such as walking or stair climbing
- Resistance exercise using weights, bands, or body weight
- Balance and posture training
- Exercises adapted for pain, disability, or previous fractures

Complications

The main complication is fracture. A previous fragility fracture increases the chance of another, especially in the period soon afterward.

Hip fractures often require surgery and rehabilitation. Recovery can take months, and some people need lasting help with walking or daily activities.

Spinal fractures can cause persistent pain, reduced height, a curved upper spine, and difficulty with movement. Multiple fractures may limit the space available for the lungs and abdomen, affecting breathing or appetite.

Fear of falling can lead people to move less. This may weaken muscles and balance, which can increase fall risk further. Supported rehabilitation and gradually returning to suitable activity can help interrupt this cycle.

Osteoporosis medicines can also have uncommon but important side effects. These differ by treatment. For example, certain antiresorptive medicines have been linked with unusual thigh-bone fractures and delayed healing of the jawbone. Their benefits often outweigh these risks for people likely to fracture, but new thigh or groin pain and planned invasive dental work should be discussed during treatment.

Prevention

Osteoporosis cannot always be prevented. Age, menopause, inherited factors, and necessary medical treatments may cause bone loss despite healthy habits.

Building strong bones during childhood and early adulthood provides a useful reserve for later life. At any age, regular weight-bearing and resistance activity can support bone and muscle strength.

Adequate protein, calcium, vitamin D, and overall nutrition are important. Vitamin D may come from sunlight, food, or supplements, depending on your location, skin exposure, diet, and

health needs.

Not smoking, limiting alcohol, and avoiding long periods of inactivity can reduce preventable risks. If you take a medicine known to weaken bone, do not stop it on your own. Its benefits and bone effects can be reviewed, and protective treatment may be considered.

Screening is offered according to age and risk factors. The recommended timing differs between health systems and is less certain for some groups, including men without specific risk factors.

Living with it and what to expect

Osteoporosis is usually a long-term condition. Bone density changes slowly, but fracture risk can change sooner as falls, medicines, health, and activity levels change.

Treatment can reduce fracture risk, although it cannot remove it completely. Some medicines increase bone density, while others mainly slow further loss. Follow-up may include checking how you take the medicine, reviewing side effects and falls, and repeating a DXA scan when the result is likely to affect care.

Many people with osteoporosis remain active and independent. Exercise, social activity, and ordinary daily movement are usually encouraged rather than avoided. If you have had a fracture, recovery may involve pain control, physiotherapy, occupational therapy, mobility aids, or changes at home.

Regular reviews are important because treatment duration is not the same for every medicine. A review may lead to continuing treatment, changing it, or arranging a carefully planned break. New fractures, major health changes, or new long-term medicines can also alter the plan.

When to get medical help

Arrange a routine appointment if you have lost height, developed a rounded upper back, or had a fracture after a minor fall. It is also reasonable to ask about bone health if you use long-term corticosteroids like prednisone or hydrocortisone , went through early menopause, or have another major risk factor.

Seek prompt medical assessment for new, unexplained back pain, particularly if it began after a small movement, cough, lift, or fall. A spinal fracture may need pain treatment and further evaluation.

Get emergency help after a fall or injury if you have severe hip or groin pain, cannot stand or

put weight on a leg, or the leg appears shortened or turned outward.

Emergency assessment is also needed for severe back pain with new leg weakness, numbness around the genitals or buttocks, or loss of bladder or bowel control. These symptoms can indicate pressure on spinal nerves, which is uncommon but time-sensitive.

Common questions

Can osteoporosis be reversed?

There is no simple cure that permanently restores all lost bone. Treatment can slow bone loss, improve bone density in some people, and reduce the chance of fractures.

Is osteoporosis painful?

Osteoporosis usually causes no pain until a bone fractures. Spinal fractures may cause sudden or ongoing back pain, while fractures elsewhere usually cause pain at the injured site.

What is the difference between osteopenia and osteoporosis?

Osteopenia means bone density is lower than expected but not in the osteoporosis range on a DXA scan. People with osteopenia can still fracture, so treatment decisions also consider age, falls, previous fractures, and other risks.

Can I exercise if I have osteoporosis?

Usually, yes. Weight-bearing, resistance, balance, and posture exercises can be helpful. Activities may need adapting if you have spinal fractures, significant pain, poor balance, or a very high fracture risk.

Do calcium supplements treat osteoporosis?

Calcium supports normal bone function, but supplements alone do not usually provide enough protection when fracture risk is high. Supplements are most useful when food intake is insufficient or there is another identified need.

How often will I need a bone density scan?

The timing is individual. It depends on your initial result, treatment, age, fracture history, and whether a repeat scan would change management. Bone density usually changes too slowly for very frequent scanning to be useful.

Sources

- National Institute of Arthritis and Musculoskeletal and Skin Diseases. Osteoporosis: Diagnosis, Treatment, and Steps to Take .
- LeBoff MS, Greenspan SL, Insogna KL, et al. The clinician's guide to prevention and treatment of osteoporosis . Osteoporosis International. 2022;33:2049-2102.
- National Osteoporosis Guideline Group. Clinical guideline for the prevention and treatment of osteoporosis . Updated 2024.
- Eastell R, Rosen CJ, Black DM, et al. Pharmacological management of osteoporosis in postmenopausal women: an Endocrine Society clinical practice guideline . Journal of Clinical Endocrinology & Metabolism. 2019;104:1595-1622.
- Shoback D, Rosen CJ, Black DM, et al. Pharmacological management of osteoporosis in postmenopausal women: guideline update . Journal of Clinical Endocrinology & Metabolism. 2020;105:dgaa048.
- US Preventive Services Task Force. Screening for Osteoporosis to Prevent Fractures: Recommendation Statement . JAMA. 2025;333:498-508.