CONDITION

Osteonecrosis

Osteonecrosis is bone damage caused by a loss of blood supply, often affecting the hip or another joint.

WHAT IT IS
Bone tissue death from reduced blood supply

BODY SYSTEM
Bones and joints

MAIN SYMPTOMS
Joint pain, stiffness, limping, reduced movement

WHAT CAUSES IT
Interrupted bone blood flow, sometimes unexplained

HOW IT IS DIAGNOSED
X-rays and MRI scans

MAIN TREATMENT
Joint protection, pain relief, and surgery

CAN IT BE CURED?
Sometimes - surgery can replace the damaged joint

IS IT AN EMERGENCY?
Sometimes - sudden inability to bear weight after injury

LONG-TERM OUTLOOK
Early treatment may preserve joints; collapse may require replacement

Overview

Osteonecrosis happens when part of a bone does not receive enough blood. Without a steady blood supply, bone cells die and the bone becomes weaker. It is sometimes called avascular necrosis, or AVN.

Osteonecrosis most often affects the head of the thigh bone, which forms the ball of the hip joint. It can also develop in the knees, shoulders, ankles, wrists, or other bones. More than one joint may be affected.

Early osteonecrosis may cause no symptoms. As the damage progresses, the bone beneath a joint surface can crack or collapse. The smooth cartilage covering the joint then loses its support. This can lead to arthritis, ongoing pain, and reduced movement.

The condition matters because damage to dead bone cannot simply be reversed. However, finding it before the joint collapses may create more options for preserving the joint. Treatment is based on the affected bone, the amount of damage, your symptoms, and your general health.

Symptoms

Pain is the main symptom. It often starts gradually and becomes more noticeable when you put weight or pressure on the affected joint.

Hip osteonecrosis commonly causes pain in the groin, buttock, or upper thigh. Knee osteonecrosis causes pain around the knee. Shoulder osteonecrosis may hurt when you lift or rotate your arm.

Symptoms can include:

Symptoms may be mild even when imaging shows bone damage. In other people, pain becomes disabling. The speed of progression is not predictable from symptoms alone.

Joint pain has many possible causes. Having these symptoms does not mean that you have osteonecrosis.

- Pain during activity or while bearing weight
- Pain that later continues during rest or at night
- Stiffness or reduced joint movement
- Limping or difficulty walking
- Trouble with stairs, standing, or everyday activities

Causes and risk factors

Osteonecrosis develops when blood flow within a bone is interrupted or reduced. Sometimes the reason is clear, but many cases have no identifiable cause.

An injury can damage blood vessels that supply the bone. A major fracture or joint dislocation, especially around the hip, may lead to osteonecrosis months or years later.

Long-term or high-dose corticosteroid treatment is another important risk factor. Corticosteroids like prednisone or hydrocortisone are medicines used to control inflammation and immune conditions. They are different from the anabolic steroids sometimes used to build muscle. The way corticosteroids contribute to osteonecrosis is not fully understood, and most

people who take them do not develop the condition.

Heavy alcohol use can also increase risk. It may contribute to fatty changes that interfere with blood flow inside the bone.

Osteonecrosis is associated with several medical conditions and treatments, including:

Smoking, disorders of blood clotting, and high blood fat levels may also contribute in some people. A risk factor raises the chance of osteonecrosis but does not prove what caused an individual case.

- Sickle cell disease and some other blood conditions
- Lupus and certain autoimmune conditions
- Gaucher disease, a rare inherited condition
- Organ transplantation
- Radiation treatment
- HIV infection and some related treatments
- Decompression illness linked to diving or compressed-air work

Diagnosis

A healthcare professional will ask where the pain occurs, when it started, and whether you have had an injury. They may also ask about corticosteroid use, alcohol, medical conditions, and previous treatments.

During an examination, they will check joint movement, tenderness, walking, and which movements reproduce the pain.

Imaging is used to confirm osteonecrosis and assess its stage:

Blood tests do not confirm osteonecrosis. They may be used to look for an associated condition or another explanation for the symptoms.

If one hip is affected without a clear injury, imaging of the other hip may sometimes be considered because early osteonecrosis can be present without pain.

- X-rays can show bone collapse and arthritis, but they may look normal early on.
- MRI scans can detect early changes before they appear on an X-ray. MRI also shows how much bone is affected.
- CT scans may provide more detail about the shape of the bone or joint surface.

- Bone scans are used less often but may help when MRI is unsuitable.

Treatment and management

Treatment aims to reduce pain, protect the joint, and prevent or manage bone collapse. The best approach depends mainly on the affected joint and whether its surface has already collapsed.

Reducing weight or pressure on the joint may ease symptoms. Crutches, a walking stick, or changes to higher-impact activities can help for a time. However, avoiding weight-bearing by itself does not reliably stop the condition from progressing.

Pain medicines may be offered according to your health and other medicines. Physical therapy can help maintain movement and strengthen nearby muscles. It cannot restore dead bone, but it may improve function and support recovery before or after surgery.

Some medicines, including drugs that affect bone turnover or blood clotting, have been studied for selected cases. Evidence is mixed, and there is no medicine that reliably reverses osteonecrosis. Do not stop corticosteroids suddenly. If they may be contributing, discuss their risks and benefits with the professional who prescribed them.

Surgery may be considered when symptoms persist or imaging shows a meaningful risk of collapse.

Before collapse, options may include:

These procedures are intended to preserve the natural joint, but they do not always prevent further damage.

After major collapse or advanced arthritis, joint replacement may provide more reliable pain relief and movement. Hip replacement is the most common example. The damaged joint surfaces are removed and replaced with artificial parts.

- Core decompression , in which one or more channels are drilled into the affected bone to reduce pressure and encourage new blood vessels
- Bone grafting , which places healthy bone or bone-supporting material into the damaged area
- Osteotomy , which reshapes or repositions bone to move weight away from the damaged area

Complications

The main complication is collapse of the weakened bone beneath the joint surface. Once the joint loses its normal shape, cartilage can wear down and arthritis may develop.

Possible long-term effects include persistent pain, stiffness, reduced mobility, muscle weakness, and difficulty with work or daily activities. Osteonecrosis affecting both hips or several joints can have a greater effect on mobility.

Surgery also has risks, and artificial joints can loosen or wear over time. Your surgical team can explain the expected benefits and risks of a proposed procedure.

Prevention

Osteonecrosis cannot always be prevented. It may follow an unavoidable injury, occur as part of another condition, or develop without a known cause.

You may be able to reduce some risks by limiting heavy alcohol use and avoiding smoking. Follow established safety procedures for diving and compressed-air work to reduce the risk of decompression illness.

Take corticosteroids only as directed. Do not lower the dose or stop them without medical advice, because sudden withdrawal can be dangerous. If you need long-term treatment, discuss concerns about bone and joint health during routine reviews.

Managing conditions such as sickle cell disease cannot guarantee prevention, but regular care may help identify joint symptoms earlier.

Living with it and what to expect

Osteonecrosis can remain stable for a time or progress over months or years. The course is influenced by the size and location of the damaged area, whether the joint has collapsed, and any underlying cause. It is not possible to predict the course from pain alone.

Early-stage osteonecrosis may be monitored with examinations and repeat imaging. Some people continue normal daily activities with adjustments, while others need a joint-preserving procedure. If collapse occurs, pain and stiffness are more likely to increase, and joint replacement may eventually be considered.

Use any walking aid as instructed. Low-impact activities such as swimming or stationary cycling may be easier on an affected hip or knee, but activity advice should match the joint involved and its stage.

Plan routine follow-up if pain, movement, or walking changes. Follow-up is also important after

surgery and when osteonecrosis is linked to another medical condition.

The condition can affect sleep, work, exercise, and mood. Practical changes, physical therapy, and support with persistent pain can help you remain active. Many people regain useful movement after treatment, although some need more than one procedure over their lifetime.

When to get medical help

Arrange a routine appointment if you have joint pain that persists, repeatedly returns, or limits movement. Seek assessment sooner if you have risk factors such as previous joint trauma, prolonged corticosteroid treatment, sickle cell disease, or heavy alcohol use.

Contact your healthcare team promptly if known osteonecrosis suddenly becomes more painful or you develop a new limp. A noticeable loss of movement also needs review because it may indicate progression.

Seek urgent medical care if you:

Call emergency services after a major injury if a limb looks deformed, becomes pale or cold, or feels numb. These signs may indicate a fracture, dislocation, or loss of circulation rather than routine progression of osteonecrosis.

- Suddenly cannot stand or bear weight
- Develop severe joint pain after a fall or other injury
- Have a joint that becomes hot, red, swollen, and very painful
- Have fever with severe joint pain

Common questions

Is osteonecrosis the same as avascular necrosis?

Yes. Avascular necrosis, AVN, and osteonecrosis are names for bone tissue death caused by inadequate blood flow. Some sources also use the term ischemic bone necrosis.

Can osteonecrosis heal on its own?

Dead bone tissue does not return to normal on its own. The body may repair small areas to some degree, but larger areas can weaken and collapse. Early treatment may help preserve the joint, while advanced damage may require joint replacement.

Does osteonecrosis always need surgery?

No. Small or early areas may be monitored and managed with activity changes, pain relief, and

physical therapy. Surgery is more likely when pain continues, the damaged area is large, or the joint surface is at risk of collapse.

How quickly does osteonecrosis progress?

There is no single timeline. Some areas remain stable for years, while others progress over months. The affected bone, size of the lesion, underlying cause, and presence of collapse all influence the course.

Can I walk or exercise with osteonecrosis?

Many people can remain active, but the safest level of weight-bearing is different for each joint and stage. High-impact activity may worsen pain or place more stress on weakened bone. A healthcare professional or physical therapist can help you choose suitable activities.

Will I need a hip replacement?

Not everyone does. Hip replacement is usually considered when the top of the thigh bone has collapsed or arthritis is causing substantial pain and loss of function. Earlier joint-preserving treatment may delay or avoid replacement in some cases.

Sources

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