CONDITION

Osteomyelitis

Osteomyelitis is an infection in a bone that can cause pain, inflammation, and bone damage.

WHAT IT IS
Infection and inflammation of bone

BODY SYSTEM
Bones and joints

MAIN SYMPTOMS
Bone pain, swelling, warmth, fever

WHAT CAUSES IT
Bacterial infection, rarely fungal infection

HOW IT IS DIAGNOSED
MRI, blood cultures, often bone biopsy

MAIN TREATMENT
Antibiotics, with surgery when needed

CAN IT BE CURED?
Sometimes - acute cases often clear completely

IS IT AN EMERGENCY?
Sometimes - sepsis signs or rapidly worsening illness

LONG-TERM OUTLOOK
Most recover; chronic infection may recur

Overview

Osteomyelitis is an infection in a bone. It is usually caused by bacteria, although fungi can occasionally be responsible. The infection triggers inflammation and may damage bone if it is not treated.

Germs can reach a bone through the bloodstream, spread from nearby infected tissue, or enter directly through an injury or operation. Osteomyelitis can affect any bone. The long bones of the arms and legs are often affected in children, while adults are more likely to have infection in the spine, feet, or bones near an operation site.

An infection that develops over days or weeks is often called acute osteomyelitis. Chronic osteomyelitis is longer-lasting infection, sometimes involving areas of dead bone or repeated flare-ups.

Prompt treatment matters because antibiotics like amoxicillin or doxycycline may have difficulty reaching damaged or dead bone. Some people need surgery as well as antibiotics. Many acute infections clear with treatment, but chronic infection can be more difficult to eliminate and may return.

Symptoms

Symptoms differ according to the bone involved, how the infection began, and whether it is acute or chronic.

Possible symptoms include:

Spinal osteomyelitis often causes persistent back or neck pain. The pain may be present at rest or during the night and may not improve with usual measures. Fever is not always present.

In babies and young children, signs can be less specific. A child may be irritable, avoid moving an arm or leg, limp, or refuse to walk.

People with reduced feeling in their feet, known as neuropathy, may have little pain even when an infection is serious. This is particularly important for people with diabetes. Swelling, skin breakdown, drainage, or a deep foot ulcer may be more noticeable than pain.

Chronic osteomyelitis may cause milder symptoms that come and go. A wound can repeatedly open and drain, or pain and swelling may return after a symptom-free period.

- Pain or tenderness over the affected bone
- Swelling, warmth, or redness of nearby skin
- Fever, chills, tiredness, or feeling generally unwell
- Reduced movement or difficulty putting weight on a limb
- An open wound that does not heal
- Pus or fluid draining through the skin

Causes and risk factors

Most osteomyelitis is caused by bacteria. Staphylococcus aureus is a common cause, but several other organisms can infect bone. The likely organism is influenced by how the infection started and a person's health history.

There are three main routes into bone:

Factors that can increase the risk include diabetes, poor blood flow to the limbs, reduced

feeling in the feet, long-lasting wounds, and previous bone surgery or major injury. Dialysis, injected drug use, and a weakened immune system may also increase risk.

Joint replacements, plates, screws, or other implanted devices can provide a surface where bacteria attach. This does not mean that most implants become infected; implant-related infection is uncommon, but it can be difficult to treat when it occurs.

Osteomyelitis is not caused by ordinary exercise or minor muscle strain. However, pain from an infection may initially be mistaken for an injury.

- Through the bloodstream: Germs from an infection elsewhere travel in the blood and settle in a bone. This is called blood-borne or hematogenous osteomyelitis.
- From nearby tissue: A deep pressure injury, diabetic foot ulcer, or other infected wound spreads to the bone underneath.
- Direct entry: Germs enter during an open fracture, deep puncture wound, bone operation, or procedure involving metal hardware.

Diagnosis

A healthcare professional will ask about pain, wounds, recent infections, operations, injuries, implanted hardware, and health conditions. The examination may include checking the skin, movement, circulation, sensation, and areas of tenderness.

Blood tests can look for inflammation, including C-reactive protein and the erythrocyte sedimentation rate. A white blood cell count may also be checked. These results can support the diagnosis and help track treatment, but normal results do not always exclude osteomyelitis.

Blood cultures test whether bacteria are growing in the bloodstream. They are ideally collected before antibiotics when this can be done without delaying necessary treatment.

Imaging helps locate the infection and assess bone or nearby tissue:

A bone biopsy involves taking a small sample of bone or infected tissue. Laboratory testing can identify the organism and show which antibiotics are likely to work. Examination of the sample under a microscope can also support the diagnosis. A biopsy is not required in every case, particularly when blood cultures and imaging already provide clear evidence.

Doctors also consider other causes of bone pain or abnormal imaging, such as fractures, arthritis, reduced blood supply, or tumours. These conditions can sometimes resemble infection.

- X-rays may show bone damage, but early infection can look normal
- MRI is usually the most sensitive imaging test for early bone infection
- CT can show damaged bone and help plan a biopsy or operation
- Nuclear medicine scans may be used when MRI is unsuitable or unclear

Treatment and management

Treatment aims to eliminate the infection, preserve healthy bone, and restore movement or function. Care may involve infectious-disease specialists, orthopaedic surgeons, wound-care teams, and other professionals.

Antibiotics are the main treatment for bacterial osteomyelitis. The first antibiotic may cover several likely bacteria. Treatment can then be narrowed when blood, bone, or wound culture results identify the organism.

Antibiotics may be given through a vein, by mouth, or as a planned combination of both. Treatment commonly lasts several weeks, but the route and duration are based on the affected bone, organism, surgery, response to treatment, and whether infected or dead tissue remains. Missing doses or stopping early can make treatment less effective.

Surgery may be needed to:

A large area left after removal of infected bone may need reconstruction or a bone graft. In severe limb infection that cannot otherwise be controlled, amputation may be considered. It is not required for most people with osteomyelitis.

Pressure relief, wound care, and treatment of poor circulation are important when infection begins under a foot ulcer or pressure injury. Blood glucose management can support healing in people with diabetes.

Pain relief and rehabilitation may also be part of care. Activity or weight-bearing may need to be limited temporarily if the bone is weak. A rehabilitation plan can help restore movement and strength safely.

- Drain an abscess, which is a pocket of pus
- Remove dead or badly infected bone and tissue
- Improve blood flow to the area
- Stabilise a weakened bone
- Manage infected plates, screws, or joint implants

- Cover a wound with healthy tissue

Complications

Osteomyelitis can damage bone and nearby tissue. An abscess may form, or part of the bone may lose its blood supply and die. Dead bone can shelter bacteria from antibiotics and contribute to chronic infection.

Other possible complications include:

Complications are more likely when diagnosis is delayed, circulation is poor, dead bone remains, or the infection involves implanted hardware. Early assessment and completion of treatment reduce these risks but cannot remove them entirely.

- Infection spreading into a nearby joint
- A persistent opening that drains through the skin
- Bone weakness, deformity, or fracture
- Reduced growth when a child's growth plate is affected
- Ongoing pain or reduced movement
- Bloodstream infection and sepsis
- Limb loss in severe, uncontrolled infection

Prevention

Not every case of osteomyelitis can be prevented. Blood-borne infection may occur without an avoidable wound, particularly in children or people with certain health conditions.

You can reduce some risks by cleaning cuts and puncture wounds, covering them while they heal, and seeking care for deep, contaminated, or worsening wounds. Follow the wound-care instructions provided after an operation or major injury.

If you have diabetes, poor circulation, or reduced feeling in your feet, check your feet regularly for blisters, cracks, colour changes, and open areas. Properly fitted footwear and timely care for ulcers can help stop infection from spreading deeper.

Do not remove splinters or foreign objects from a deep wound by cutting into it yourself. A wound over bone, exposed bone, or a puncture through a shoe may need professional assessment.

Living with it and what to expect

Acute osteomyelitis often improves once effective antibiotics begin, but pain and swelling may take time to settle. Bone healing is slower than relief of fever or other general symptoms, so treatment and follow-up may continue after you feel better.

Follow-up may include examination, blood tests for inflammation, wound checks, and review of antibiotic side effects. Repeat scans are not always needed if symptoms and blood results are improving. Imaging changes can remain visible after the infection is controlled.

Recovery can involve weeks or months of reduced activity, wound care, or rehabilitation. How quickly you return to work, school, exercise, or full weight-bearing depends on the affected bone, the amount of damage, and whether surgery was needed.

Chronic osteomyelitis may have quiet periods followed by renewed pain, swelling, or drainage. Some people need further surgery or another course of antibiotics. Long-term suppressive antibiotics are used in selected situations when infected material cannot be removed, but they are not appropriate for everyone.

Most people can return to their usual activities after an uncomplicated acute infection. Those with chronic infection, poor circulation, or extensive bone damage may need continuing wound care, mobility support, or regular specialist follow-up.

When to get medical help

Arrange prompt medical assessment for persistent or worsening bone pain, especially when it occurs with swelling, warmth, fever, an open wound, or recent surgery or injury. A foot ulcer that is deep, draining, or not healing also needs timely review.

Contact your care team promptly during treatment if symptoms are getting worse, a wound starts draining again, or you develop possible antibiotic side effects. Routine follow-up is still important when you feel better because it helps confirm that the infection remains controlled.

Seek emergency medical help for:

These symptoms can suggest sepsis, rapidly spreading infection, or pressure on nerves in the spine.

- Confusion, fainting, severe weakness, or difficulty waking
- Trouble breathing or very rapid breathing
- Cold, mottled, or unusually pale skin

- Rapidly spreading redness or swelling
- Severe illness with fever, shaking chills, or a very fast heartbeat
- New leg weakness, loss of bladder or bowel control, or numbness around the groin with severe back pain

Common questions

Is osteomyelitis contagious?

Osteomyelitis itself is not usually passed from one person to another. The bacteria causing it may sometimes spread through contact with an infected wound, so follow any wound-covering and handwashing instructions.

Can osteomyelitis be cured completely?

Acute osteomyelitis can often be cured with appropriate antibiotics and, when needed, surgery. Chronic infection is harder to eliminate because dead bone, poor blood flow, or implanted hardware may allow bacteria to remain. It can recur after treatment.

How long does osteomyelitis treatment take?

Treatment usually takes several weeks and may take longer for chronic infection or extensive bone damage. The exact course is guided by the infection site, culture results, surgery, healing, and response to treatment.

Can I walk with osteomyelitis?

That depends on the affected bone and whether it has been weakened. Some people can continue gentle activity, while others need crutches, a brace, a protective boot, or temporary limits on weight-bearing. Follow the activity plan given by your treatment team.

Can osteomyelitis come back years later?

Yes. Chronic osteomyelitis can become active again months or years later, although this does not happen to everyone. New pain, swelling, redness, or drainage at a previously affected site should be assessed.

Does osteomyelitis always require surgery?

No. Some infections can be treated with antibiotics alone. Surgery is more likely when there is an abscess, dead bone, an infected implant, poor wound healing, spinal instability, or infection that is not responding to antibiotics.

Sources

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