CONDITION

Charcot foot

Learn how Charcot foot affects bones and joints, which warning signs need prompt care, and how offloading and follow-up can help prevent deformity.

WHAT IT IS
Nerve-related damage to foot or ankle bones and joints

BODY SYSTEM
Bones, joints and nerves

MAIN SYMPTOMS
Swelling, warmth, redness, mild pain

WHAT CAUSES IT
Nerve damage and repeated physical stress

HOW IT IS DIAGNOSED
Weight-bearing X-rays or MRI

MAIN TREATMENT
Immobilization and pressure offloading

CAN IT BE CURED?
Sometimes - active disease can resolve

IS IT AN EMERGENCY?
Sometimes - sudden pale, blue, or cold foot

LONG-TERM OUTLOOK
Reduced risk with early treatment but possible permanent deformity or amputation

Overview

Charcot foot is a condition in which bones, joints, and supporting tissues in the foot or ankle become weakened and damaged. It is also called Charcot neuro-osteoarthropathy. It develops in people with peripheral neuropathy, meaning reduced feeling in the feet caused by nerve damage.

Because sensation is reduced, a person may continue walking on an injured foot without feeling the amount of pain that would usually limit activity. Repeated stress can then cause fractures, joint dislocation, and collapse of the foot's shape.

Charcot foot is most often associated with diabetes-related nerve damage, but it can occur with other causes of neuropathy. It usually affects one foot at a time, although the other foot remains at increased risk.

Early Charcot foot can look like infection, gout, a blood clot, or a simple sprain. The foot may be warm, red, and swollen but only mildly painful. Early X-rays can also appear normal. For these reasons, diagnosis may be delayed.

Prompt treatment matters because keeping weight and pressure off the foot can limit further damage. Without effective treatment, the arch may collapse or another part of the foot may become misshapen. The resulting pressure points can lead to skin breakdown, ulcers, infection, and difficulty walking.

Symptoms

Active Charcot foot often begins with inflammation. Symptoms may appear after a minor injury, such as twisting the ankle or walking farther than usual, but there may be no remembered injury.

Possible symptoms include:

Pain can still occur despite neuropathy. However, the amount of pain may seem surprisingly small compared with the swelling or bone and joint damage.

In later stages, the inflammation may settle but leave a permanent change in shape. The middle of the foot may collapse, creating a rounded or "rocker-bottom" appearance. Bony areas may become prominent and rub against shoes or the ground.

A warm, swollen foot in someone with neuropathy needs prompt medical assessment, even if there is little pain and the skin is unbroken. Until assessed, avoid unnecessary weight-bearing and do not assume the problem is only a sprain.

Seek urgent medical care for an open wound, drainage, rapidly spreading redness, worsening swelling, or new skin discoloration. Fever, chills, confusion, severe weakness, or feeling seriously unwell with a foot problem may signal a significant infection and requires emergency evaluation. A foot that suddenly becomes pale, blue, cold, or numb also needs emergency care because blood flow may be reduced.

- New swelling of the foot or ankle
- Increased warmth compared with the other foot
- Redness or a change in skin color
- Mild aching, discomfort, or pain
- A feeling that the foot is unstable
- A change in foot shape as damage progresses

Causes and risk factors

Charcot foot develops through a combination of nerve damage, repeated physical stress, inflammation, and weakened bones or joints.

Peripheral neuropathy reduces the ability to feel pressure, pain, temperature, and injury. It may also affect balance and the small muscles that support the foot. A person may therefore keep walking after a fracture or joint injury. Each step can add more damage.

Diabetes is the most common underlying condition. Risk rises when diabetes has been present for many years and has caused significant neuropathy. Kidney disease related to diabetes may add to the risk. A previous ulcer, foot surgery, fracture, or Charcot foot in the other foot may also be relevant.

Less commonly, neuropathy associated with heavy alcohol use, spinal cord disease or injury, certain infections, or other neurologic conditions can contribute.

Not everyone with neuropathy develops Charcot foot. A triggering event may be minor or may not be noticed. Examples include a fall, a twisted foot, an increase in walking, or recent foot surgery.

Reduced bone strength may play a role, but Charcot foot is not simply osteoporosis. It is an active process involving inflammation, mechanical stress, and instability in a foot that has lost protective sensation.

Diagnosis

Diagnosis begins with a history and physical examination. A clinician will ask when the warmth or swelling started, whether there was an injury, and whether the person has diabetes or another cause of neuropathy.

The examination may compare both feet for temperature, color, swelling, shape, pulses, wounds, and areas of pressure. Sensation may be tested with a thin nylon filament or other simple tools. The clinician may also check the ankle and lower leg.

Weight-bearing X-rays can show fractures, shifted joints, bone fragments, or collapse. However, X-rays may not show changes during the earliest stage. A normal early X-ray does not always rule out active Charcot foot.

Magnetic resonance imaging, or MRI, can detect early changes in bone and soft tissue. It may be used when suspicion remains despite normal X-rays or when clinicians need to evaluate for infection. Other imaging tests are sometimes needed if MRI cannot be performed or if the diagnosis remains uncertain.

Blood tests may help assess inflammation, infection, kidney function, or diabetes control. There is no single blood test that confirms Charcot foot.

Several conditions can cause similar symptoms, including:

Bone infection can be especially difficult to distinguish from Charcot changes when an ulcer is present. The healthcare team may use the wound's appearance, blood tests, imaging, and sometimes a bone sample to clarify the diagnosis.

- Skin or bone infection
- Gout or another inflammatory arthritis
- A fracture or severe sprain
- A blood clot in a deep leg vein
- Poor circulation
- Swelling caused by heart, kidney, or vein problems

Treatment and management

The main treatment during the active phase is immobilization and offloading. Immobilization limits movement between damaged bones and joints. Offloading reduces the weight and pressure placed on the foot.

Treatment commonly uses a knee-high device, such as a carefully fitted total contact cast or another immobilizing walker. A total contact cast is shaped closely around the foot and lower leg to spread pressure more evenly. Non-removable devices are often preferred when they are safe and practical because they provide continuous protection. The exact device depends on foot shape, wounds, circulation, balance, skin condition, and the person's ability to use it safely.

Crutches, a wheelchair, or a knee scooter may be considered to reduce weight-bearing. These aids can also create a fall risk, so training and an individualized mobility plan are important. A clinician should advise how much weight, if any, can be placed on the affected foot.

Treatment often lasts for months rather than days or weeks. The device must be checked and adjusted as swelling changes. Skin inspection is important because neuropathy may prevent a person from feeling rubbing, pressure, or a developing sore.

The active phase is considered to be settling when warmth and swelling improve and imaging shows healing or stability. Temperature comparison between the feet may support this decision, but it should not be used alone.

After active disease resolves, the person usually moves gradually into protective footwear.

This may include custom insoles, extra-depth shoes, a custom boot, or a brace. The aim is to support the foot, accommodate its shape, and reduce pressure on vulnerable areas.

Good diabetes management supports overall healing and reduces the risk of other foot problems, although it does not replace offloading. Smoking cessation, adequate nutrition, and treatment of circulation problems may also support foot health.

Medicines have not been shown to reliably replace immobilization and offloading. Drugs that affect bone turnover are not routinely used solely to treat Charcot foot unless there is another medical reason for them.

Surgery is not needed for every person. It may be considered when the foot or ankle is severely unstable, the deformity cannot be safely accommodated in a brace or shoe, a bony prominence repeatedly causes ulcers, or effective immobilization is not possible. Procedures may realign or stabilize joints, remove a prominent area of bone, or address an associated wound. Surgery has important risks and is planned by a specialist team.

Complications

The main long-term complication is permanent deformity. A changed foot shape can concentrate pressure in areas that are not designed to bear weight. Because sensation is reduced, an ulcer may develop without causing much pain.

An ulcer can become infected. Infection may spread into deeper tissue or bone and can sometimes require surgery. Severe infection, extensive tissue damage, or loss of blood supply can increase the risk of amputation.

Other possible complications include chronic swelling, joint instability, difficulty fitting shoes, reduced mobility, falls, and loss of independence. Long periods of offloading may also weaken muscles or place extra stress on the other foot and leg.

These outcomes are not inevitable. Early recognition, effective immobilization, protective footwear, and ongoing foot care can reduce risk.

Follow up

During active treatment, follow-up is usually frequent. The team may examine the skin, check swelling and warmth, assess the cast or boot, and repeat imaging when needed. Report a loose, damaged, wet, or painful cast or device promptly.

Contact the treating team urgently if a cast or boot causes new rubbing, drainage, marked

swelling, worsening pain, or numbness. Toes that become cold, pale, blue, or difficult to move require immediate assessment.

After the active phase, lifelong foot surveillance is important. Routine care may involve a diabetes clinician, podiatrist, foot and ankle specialist, orthotist, wound team, or physical therapist.

Check both feet each day if possible. Look at the soles and between the toes, using a mirror or another person's help if needed. Watch for redness, warmth, blisters, cracks, calluses, drainage, or a change in shape. Avoid walking barefoot, including indoors.

Shoes and braces should be inspected for wear, rough seams, or objects inside. New footwear may need to be introduced gradually and checked by a foot-care professional. Calluses should not be cut at home, and over-the-counter corn removers can injure skin that has reduced sensation.

A new warm or swollen foot should not wait for a routine appointment. Seek prompt assessment and reduce weight-bearing until a clinician advises otherwise.

Sources

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