

### Definition:

Charcot foot syndrome, also called Charcot Osteoarthropathy is an uncommon condition affecting people with dense sensory neuropathy, which can be caused by a number of conditions; including Type I and Type II diabetes. The condition is also seen in the renal patient where microvascular circulatory changes are prevalent.

Other conditions such as Osteomyelitis, venous thrombosis, Sprains, cellulitis, and gout should be excluded to aid diagnosis.

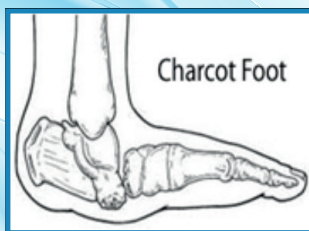
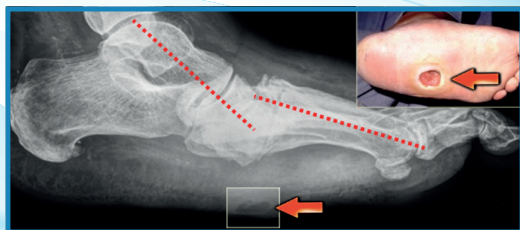
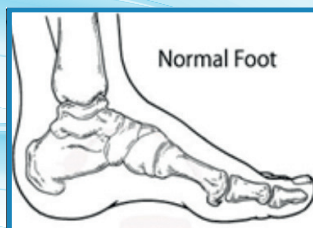
Because Charcot is rare it is often misdiagnosed, and so the prevalence cannot be clearly evaluated, it is said to be in the order of 20 cases per 20 000 people with diabetes. The condition is linked with an increased risk of heart attack, stroke, amputation and premature death.

The condition essentially has 3 phases

### i) The active phase

There is no clear definition, the condition is characterised by swelling in a neuropathic foot with inflammation and heat; it rarely affects both feet at the same time. Radiographically the bones of the foot affected can exhibit osteopenia, magnetic resonance imaging (MRI) may show soft tissue inflammation, and bone marrow oedema (which is highly suggestive of an active Charcot in a person that presents with inflammation without explanation). Pain in an otherwise insensate foot is also a feature.

There is often disruption of the tendinous and ligamentous attachments and also fracturing of the bones of the foot; this often leads to a change in the shape of the foot. The classic change is in the mid foot – leading to a rocker bottom shaped foot.



If left untreated the bony destruction can be devastating leading to soft tissue disruption and ulceration. Open lesions can lead to soft tissue and bone infection.

## ii) The Remodelling Coalescent phase

On suspecting a Charcot, the patient should be immediately referred to an appropriate multidisciplinary team.

Treatment is to off load the limb and immobilise the foot and ankle. The gold standard approach is to use a total contact cast, as pictured below. However not all patients can tolerate a cast, and so walker boots can be used instead as a second line approach.



**Total Contact casts**



**Walker boots**

Total contact casts should initially be changed on a regularly because of a rapid reduction in oedema. Then they can be left on for a longer period of time. Crutches or walking frames may also be required by the patient to help with mobility.

Early immobilisation and offloading should help to preserve the internal architecture and external shape of the foot.



**Foot shape preserved**



**Fore foot shape not preserved**

The duration of immobilisation is dependant of how quickly the inflammation and swelling subsides- there is no standard period of time for this process and so the affected foot is closely monitored, the temperature of the affected foot should be reduced to within 2 Celsius compared to the other foot (this is not valid if the patient is an amputee). Weight bearing plain film x rays should show no further interval changes in foot structure, and should show the bone density improving, and MRI will show less bone oedema. The bones will now coalesce into the new shape of the foot, and bone remodelling will occur.



**Bones Fractured**



**Bones coalesced**

### iii) The quiescent phase

When the Multidisciplinary team is satisfied that the condition is no longer active (quiescent) the patient can be taken out of the cast and referred for bespoke footwear which may be the shoe type or the bootie type. The patient may still have to use a walker boot to help protect the foot, if the foot is very deformed a Charcot Resistant Orthotic Walker (CROW) boot may have to be made.



**CROW boot to accommodate a large degree of deformity**



**Reconstructive surgery to reduce deformity, and aid mobility**

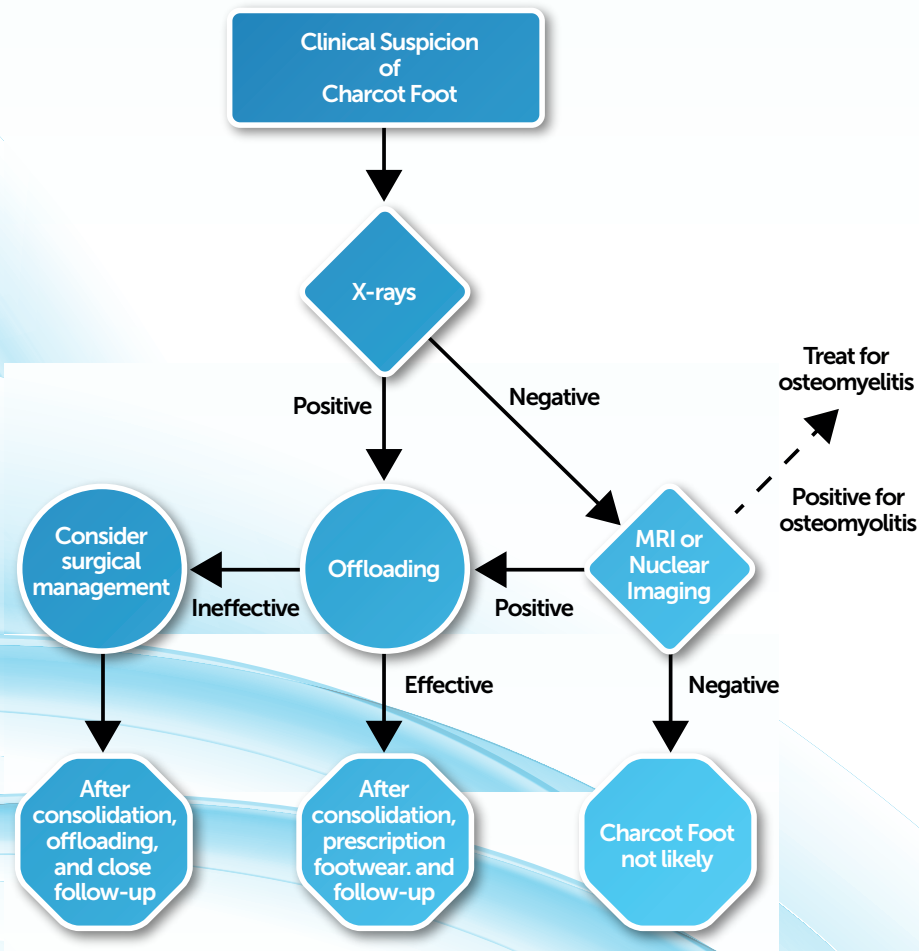
For feet which have coalesced in a poor shape the patient can be referred for reconstructive surgery. This surgery is performed at specialist centres only, the aim of surgery is to realign the foot and ankle to help facilitate standing, mobilisation, and minimise the risk of secondary ulceration.

Patients are often referred for footwear to help accommodate and protect the feet.



**Footwear for outdoors and indoors should provide protection for the feet**

## Suggested generic pathway for Charcot foot syndrome/ Osteoarthropathy



Know who to refer to in an emergency

Ensure patients inspect their feet and check for signs of Charcot recurrence

Patients should have ongoing Podiatry

Encourage good glycaemic control