

Foot & Ankle Advanced Techniques for Complex Reconstruction and the Management of Charcot Neuroarthropathy

Patrizia Salvaterra

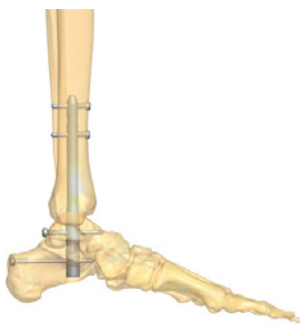
Scientific writer and journalist, the University of Milan

Joint arthrodesis, different options.

Joint arthrodesis, also known as joint fusion, may be indicated in patients with an increased level of instability, chronic pain, walking dysfunction, and osteomyelitis.

Tibiotalocalcaneal fusion is especially indicated in the presence of ankle arthritis and subtalar arthritis, severe deformity caused by the Charcot Foot Disease, and obese diabetic patients. Generally considered a risky surgery, the expert prefers to apply **intramedullary nailing**, as it allows load sharing, **compression and dynamization without angulation**, and is a *"more biologically friendly procedure"*. Nailing procedures can be done through **small incisions**, with low soft tissue complications. Regarding the **post-surgery** phase, he asks for minimal or **no weight bearing for 4-6 weeks**.

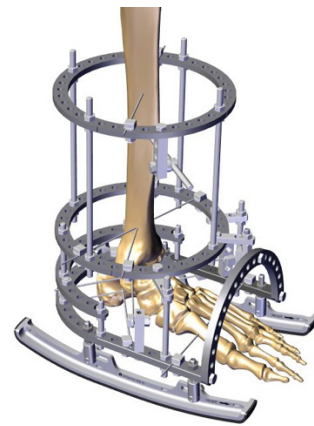
Advanced technical features of the Orthofix Ankle Hindfoot Nailing System (AHN) include: stability with the capacity of both internal and external compression, simplicity with the internal compression mechanism already pre-assembled within the nail, an independently locked talar screw increasing the amount of fixation, and a wide range of sizes.



Ankle fusion with the Orthofix Ankle Arthrodesis Nail (77000 series)

Dane Wukich ¹, highlights the main goal of surgery when managing a foot and ankle deformity or fracture: a well-aligned and stable foot, pain free and plantigrade. When performing small joint arthrodesis of a midfoot Charcot, he utilizes the **beaming technique**. For him, **in midfoot treatment** *"beaming is like rebar in concrete: it reinforces the biomechanics of what you are creating."*

Joint fusion with **external fixation** in ankle and midfoot **treatment**: surgery can be performed with a pre-built frame or a frame prepared during surgery.



Ankle fusion with TrueLok Fixator and TL RockerRail



Ankle fusion using TL-HEX frame and TL RockerRail

The adopted treatment strategy may be surgery with a **combination of internal and external fixation**. A surgeon should leave space to insert an internal device later. To lower the risk of infection, **internal and external fixation elements must not be in contact with one another**.

When applying a circular frame on the ankle, wires must always be tensioned at the same times to add grip and guarantee **stability**. After frame removal, **early rehabilitation** (which has a major effect on functionality) and **full weight bearing** are crucial.

Dynamic hexapod external frames—which allow gradual correction of bone deformities and post-operative gradual fine-tuning—have changed the surgical approach to foot and ankle problems. These techniques are a valid solution for **Equinus, complex rotational deformities, and calcaneal fractures**, allowing the patient an **earlier weight-bearing** with a positive impact on **quality of life**.

“TL-Hex is a useful device, and a surgeon should not be afraid of using it with the right expertise and for the right indications.” Because foot deformity management might be very complex, one should not underestimate the potential of a software-guided procedure in supporting the decision-making process. It's crucial to **accurately pre-plan** not only the surgical intervention (on CT imaging and weight bearing foot radiographs) but also the post-operative phase. Finally, it is important to verify the **patient's full compliance with the recommended therapy**. **Communication between doctor and patient plays a fundamental role.**

Charcot foot and ankle, various reconstruction methods.

Charcot Neuroarthropathy remains a significant cause of morbidity for patients with diabetes mellitus, whose rates have quadrupled worldwide in the last decades. In the near future, orthopedic surgeons will have to deal with diabetic foot and ankle issues, as the number of patients is growing in the USA, in Europe and the rest of the world. It is a difficult challenge both in terms of prevention and therapy—from an early diagnosis to prevent osteomyelitis and bony collapse, to the most appropriate method of reconstruction for the patient.

The condition is characterized by **progressive and multiplanar deformity, limited treatment options, and high rate of amputations.**

Charcot treatment involves a **multidisciplinary approach**: numerous studies have proved that a team approach to the Charcot foot treatment works both in preventing amputation and in reducing healthcare costs. **Offloading frames** in the acute phase seems to reduce the plantar foot pressure and to

avoid ulcers and the risk not to have revascularization—since most of the Charcot patients do not feel any pain and go on walking until the foot is compromised.

Surgical reconstruction of Charcot foot and ankle has been examined as a method to preserve the foot. The choice of surgical approaches, osteotomies, and fixation devices should be based on the pattern of the foot and ankle deformities, surgeon's level of experience, and patient's preferences: *“We are fully aware that this type of neuropathy increases the rate of surgical site infection and non-union, but **primary surgical treatment** can be advantageous for the patient's well-being.”*

After bone debridement, the first goal of reconstructing a Charcot foot is to **obtain a correction** (e.g. **acute or gradual** soft-tissue correction and osseous realignment), and the second one is to **maintain the correction** (e.g. arthrodesis or stabilization), **with the use of an external frame.**

In the case of a Charcot **midfoot** reconstruction, beaming, nailing and/or plating with external fixator are the available treatments.



G-beam™ Fusion Beaming System

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