

# Multiple Applications of External Fixation Used for Medical Missions to Africa

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## INTRODUCTION

Podiatry Overseas Association (PODOA) is a traveling medical mission group that provides medical and surgical care to patients in underserved countries. Since the formation of the organization in 2013, PODOA has traveled to the Western African country of Togo on three separate occasions. We will describe cases in which the use of external fixation was appropriate for the treatment of a variety of lower extremity conditions.

### CASE 1. CHARCOT FOOT

This patient was a 55-year-old woman with diabetes mellitus. She had a past medical history of uncontrolled type II diabetes mellitus and benign essential hypertension. Two years prior to her encounter with PODOA, the patient fell from a height of 2 feet. The fall led to a bimalleolar fracture

that was not surgically corrected. Due to financial constraints, the patient underwent conservative treatment consisting of short term non-weightbearing with splinting. Radiographic evidence indicated that this incident precipitated Charcot joint deformation of the left ankle. Clinical evidence showed a completely medially displaced ankle joint, leading to direct fibular weightbearing. A Charcot foot reconstruction was performed on the left, lower extremity with autologous iliac bone graft and gastrocnemius recession (Figure 1).

### CASE 2. TIBIAL CALCANEAL ARTHRODESIS

A 43-year-old man sustained an ankle dislocation that broke the skin barrier. The dislocation was open reduced. Subsequently, septic ankle joint infection ensued. The patient had multiple incision and drainage procedures over several weeks of treatment prior to being seen by the PODOA team. It was determined that extensive debridement was necessary for limb salvage and a tibiocalcaneal fusion was necessary for stabilization. A tibiocalcaneal arthrodesis was performed and an external fixator was applied. At the 1 year follow-up, the ankle fusion was intact, and the skin was closed (Figure 2).

### CASE 3. OPEN TIBIA SHAFT FRACTURE

A 15-year-old male was struck from behind by a motorcycle one month prior to being seen by the PODOA group. The accident resulted in an open tibia-fibula fracture. The patient was in otherwise good general health. Wound healing to the anterior leg was without complication; however the delta frame previously applied by Togolese surgeons had loose components resulting in malposition of the left lower extremity. It was determined that removing the delta frame and applying an Illazarov external ring fixator frame would allow repositioning of the extremity and would additionally allow for axial compression. At 1-year follow-up, the patient was doing well (Figure 3).



Figure 1. Case 1. Charcot foot.



Figure 2. Case 2. Tibial calcaneal arthrodesis.

#### CASE 4 .TIBIALIS POSTERIOR TENDON TRANSFER

An 8-year-old boy had iatrogenic drop foot, secondary to a gluteal injection of the left sciatic nerve. The patient was otherwise in good general health. After a lengthy conversation with the patient's family about out of phase tendon transfers and the process of recovery, the father decided to go forward with the procedure. The affected left foot had a slight cavus deformity that was flexible in nature. While speaking with the patient's primary care physician, issues of compliance were discussed. The team decided to place an external fixation device to restrict motion at the ankle joint during the healing process of the dorsal transfer of the posterior tibial tendon to the medial cuneiform. A partial plantar fasciotomy and gastrocnemius recession were also performed to the left lower extremity to reduce soft tissue deforming forces (Figure 4).

#### CASE 5. ANKLE IMMOBILIZATION

A 12-year-old boy with a history of a complicated non-healing wound at the level of the ankle joint was seen by the PODOA group. The patient had undergone several sessions of surgical debridement; however he was noncompliant with wearing an immobilizing splint. After discussing the case with the Togolese surgeon and with the patient's mother, it was decided to apply an external fixator to immobilize the patient's activity over the area. A mini-rail was used to stabilize the ankle joint by inserting 2 pins into the talus and 2 pins into the tibia (Figure 5).



Figure 3. Case 3. Open tibia shaft fracture after a motorcycle accident.



Figure 4. Case 4. Tibialis posterior tendon transfer.



Figure 5. Case 5. Ankle immobilization.

## CASE 6. TENDON TRANSFERS FOR RESIDUAL CLUBFOOT

A 15-year-old male presented to the hospital with a left foot residual clubfoot deformity. The patient had been in an ankle-foot orthosis since early childhood after failed Ponseti method casting. After the flexibility of the patient's deformity was analyzed, it was determined that correction could be obtained without osteotomy. The PODOA surgical team decided to perform 2 separate tendon transfers from posterior to anterior, anchoring the posterior tibial tendon and the flexor hallucis longus tendon into the intermediate cuneiform. The patient was brought to the hospital by his father specifically for this correction after hearing about the group of American surgeons providing free care. The following procedures were performed: posterior tibial tendon transfer, flexor hallucis longus tendon transfer, flexor digitorum longus release, plantar fasciotomy, deltoid ligament release, gastrocnemius recession, and application of an Illizarov external fixation device (Figures 6A, 6B).



Figure 6A. Case 6. Tendon transfer for residual clubfoot deformity.

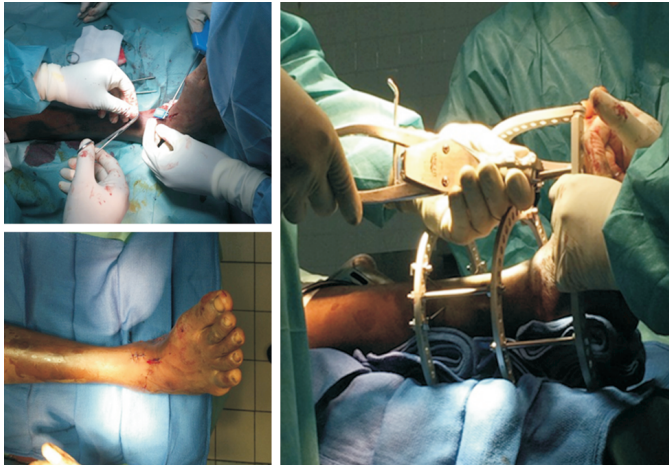


Figure 6B. Application of Illizarov frame for Case 6.