

# Chopart Amputation with Tibio-Talo-Calcaneal Arthrodesis: A Case Series



**Foot & Ankle Specialists of Ohio**

Podiatric & Sports Medicine  
Reconstructive Foot & Ankle Surgery

Naren Patel DPM, AACFAS<sup>1</sup>, Melissa Gulosh, AACFAS<sup>2</sup> Benjamin Savasky DPM<sup>3</sup>, Stephen Frania<sup>4</sup>

<sup>1</sup>Fellow, FASO, <sup>2</sup>Past-Fellow, <sup>3</sup>Resident, UH Regional Hospitals, <sup>4</sup>Fellowship Director, Foot & Ankle Specialists of Ohio,

## Statement of Purpose

The purpose of this study was to describe a novel limb salvage method including TTC fusion with external fixator in select high risk population.

## Background:

Amputations of the lower extremity are one of the most common and oldest surgical procedures to date. Approximately 185,000 amputations occur in the United States each year, and there are currently nearly 2 million people living with limb loss in the United States.

The main causes of limb loss are vascular disease (54%), which includes diabetes and peripheral arterial disease, trauma (45%) and malignancy (<2%). In 2009, hospital costs associated with amputation totaled more than \$8.3 billion. Nearly half of the individuals who have an amputation due to vascular disease will die within 5 years, which is higher than the five-year mortality rates for breast cancer, colon cancer, and prostate cancer. Of persons with diabetes who have a lower extremity amputation, up to 55% will require amputation of the second leg within 2-3 years.

The level of amputation is very critical to preserving function of the foot and the leg. Distal amputations such as transmetatarsal amputation seems to have better function compared to lis-franc or chopart amputation. Another benefit of a more distal amputation level is the decreased oxygen consumption and less energy requirement for postoperative ambulation. These salvage techniques provide improved function, better prognosis for the patient, increasing the patient's life span and quality of life.

Here we describe case reports of modified Boyd fusion as an alternative to a below knee amputation in select patients

A modified Boyd fusion is a functional limb salvage technique that consists of a Chopart disarticulation at the midtarsal joint in conjunction with a tibiotalar calcaneal fusion. We surmise that the Boyd Modification affords the patient a stable and functional platform that maintains a maximal limb length weight-bearing surface for ambulation.

**Method:** Between 2013 and 2016, 4 patients underwent a combination of the two procedures including a Chopart amputation and a tibiotalar calcaneal fusion. The procedures were performed separately or as an adjunct to a previous procedure.

Inclusion criteria included any patient that had received a Chopart amputation in the past or who subsequently received one. Two of the patients had received a Chopart amputation and developed chronic non-healing wounds to the plantar aspect of the foot due to the unbalanced equinovarus deformity. These two patients underwent TTC fusion in an attempt to salvage the distal stump. Two patients underwent a Chopart amputation and subsequent planned TTC fusion.

**Discussion:** Two of the patients had the Modified Boyd fusion planned with the Chopart amputation at or around the same time as the TTC fusion, where the other two patients had had a previous Chopart amputation with the development of chronic non-healing wounds where the TTC fusion was done to alleviate the varus deformity that was attributing to the wounds.

All the patients had an external fixation frame placed at the time of the intramedullary nail for stabilization. All the patients eventually healed any residual wounds and had custom orthotic brace made. All patients were able to ambulate ulcer free. One patient was subsequently lost to follow up and was found to have a BKA at another facility of the same lower extremity with the TTC fusion.

The Modified Boyd fusion, which consists of the Chopart amputation and an ankle and subtalar joint fusion with an IM nail, is a good limb salvage procedure to have in your repertoire for a specific subset of the population. It affords the patient a functional and stable platform and helps maintains a maximal limb length and weight-bearing surface for ambulation. This construct eliminates the equinovarus deformity normally seen in the Chopart amputation alone and increasing the patient's life span and quality of life by reducing the energy expenditure needed to get around. Future studies with long term follow up, larger populations, energy expenditure data and morbidity and mortality specific to this procedure would be an invaluable tool to help determine the benefit of this procedure.

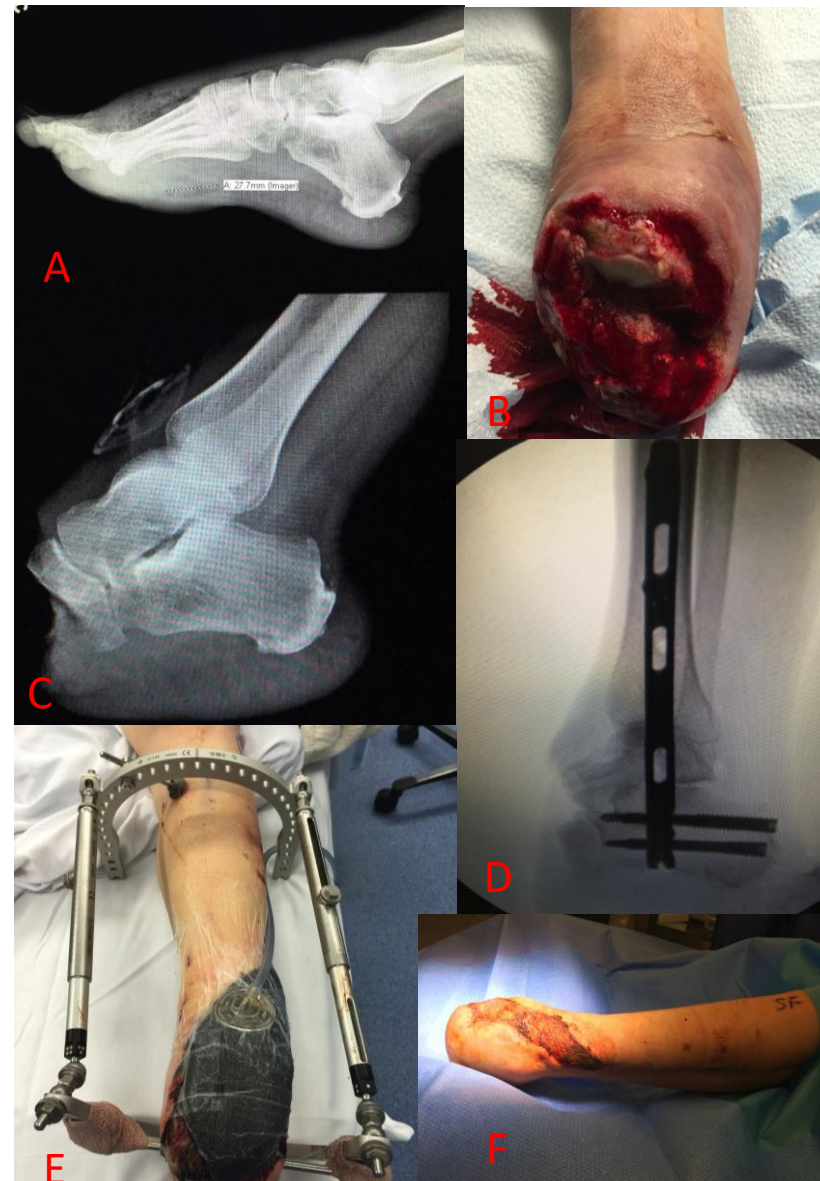


Figure 1. A. Radiographs showing patient with gas gangrene. B and C. Open Chopart amputation. D. Intramedullary nail placement. E Negative pressure wound therapy with static external fixator. F. After multiple wound debridement and skin graft patient healed.



Figure 2. A. Necrotic infected forefoot and midfoot. B. Amputation level due to necrosis. C. One stage chopart amputation with intramedullary nail. C. Immediate post operative appearance. D. Typical brace for patients to ambulate in after chopart amputation.