# Salvage of Chronic Therapy Resistant Bilateral Charcot Foot Osteoarthropathy with signs of Osteomyelitis

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## Introduction

Charcot foot osteoarthropathy is a rare, degenerative, and painless condition involving disease around the joints caused by diabetes. The condition affects 0.1% to 0.9% of diabetics and could occur bilaterally with an incidence rate of 30%. In this case, the patient was diabetic and presented with symptoms of ulceration, inflammation, redness, warmness to the touch. The case was unique as it presented with Charcot bilaterally and carried a high risk of osteomyelitis. Cases of Charcot foot complicated with osteomyelitis are 12x more likely to result in amputation. However, this patient was able to avoid amputation by undergoing midfoot exostectomy and adopting a multitude of pre and postoperative novel therapeutic modalities.

## Presentation

A 73-year-old female with history of Type II diabetes, hemoglobin A1c =5.6%, neuropathy and arthritis presented to the clinic with significant difficulty in walking and Achilles tightness with worsening bilateral foot ulcerations, for the past 2 years. The ulceration showed resistance to healing despite using a variety of off-loading modalities from orthotics, to CAM boots, topical antibiotics such as Regranex, and total contact casting. X-ray imaging demonstrated severe rocker-bottom flatfoot with end- stage midfoot osteoarthropathy. Upon physical examination, a rigid rocker-bottom Charcot foot deformity has developed bilateral along with plantar foot ulcers. The Charcot flatfoot was chronic and was in an inactive phase. The patient had bilateral foot swelling with bilateral foot ulcerations. The ulceration in her right foot appeared hypergranular with mild red peri-wound erythema, and an ulcer that probes towards the bone without cellulitis. The left foot had an ulceration, approximately the size of a quarter, also probing towards the bone with peripheral keratosis surrounding the wound without cellulitis. The patient's orthopedic exam confirmed the diagnosis of non-active Charcot foot with rocker-bottom flatfoot with palpable exostosis that has led to the ulceration. Wound culture of the midfoot prior to surgery detected proteus bacterial infection. This coupled with the fact that the ulcer probed towards the bone yielded an increased suspicion for potential underlying infection/osteomyelitis.

## Treatment & Progress

Preoperatively the soft tissue infection was treated with a combination of Doxycycline and Augmentin to prevent the proteus growth, coupled with off-loading orthotics and Regranex for continued wound care. This was followed by operative midfoot resection of exostosis bone overgrowth, as well as bilateral Achilles tendon lengthening. During the operation, an Integra graft was utilized to help the ulceration/skin deficit regrow new skin with minimal scarring. Post-operatively, the patient was placed in a short-leg fiberglass cast that was bivalved. The patient was then admitted postoperatively and kept on Lovenox to prevent blood clotting. Postoperative bone cultures were negative for osteomyelitis, and the patient was treated with a soft tissue course of antibiotics with IV Vancomycin/Cefepime by midline. Due to the bilateral surgery, the patient was discharged to an extended care physical therapy/rehab facility. Two weeks post-surgery, the Achilles tendon showed significant healing, progress, and the patient appeared to be recovering well. The wounds from the incisions were closing without infection and the ulceration appeared to be 30-60% healed bilaterally. Sutures were removed and an adaptic sterile Jones dressing, and a fiberglass posterior splint to control the swelling, were applied bilaterally. Five weeks post-operation, the patient made an excellent recovery with both of her feet, albeit at different healing rates. The swelling had completely diminished, and the ulcerations were essentially minimized. X-rays demonstrated clean resectioning of bone without any signs of infection. The patient was converted from posterior splints to CAM walkers with gradual progression of physical therapy. Both ulcers went on to completely heal. The patient was able to walk comfortably.


Healing Progress: The ulceration of the foot when first admitted (picture A) and the condition of the foot the day before the patient is discharged (picture D)

## Discussion

This case demonstrated an atypical presentation of Charcot foot, as the condition occurred bilaterally with increased suspicion for Osteomyelitis. An infection within the Charcot region is associated with high levels of amputation and longer durations of antibiotic therapy and immobilization. Upon presentation, the patient demonstrated inability to heal the ulcerations despite aggressive attempts to off-load the area and treat with local wound care. Surgical resection of the midfoot bone growth/exostosis was helpful in this case for two reasons. The resection of the sharp exostosis destressed and off-loaded the area, taking pressure off the skin and allowing the wound to heal without recurrence. In addition, resection of the bone allowed for a bone culture to help rule out osteomyelitis and determined the need and length of antibiotic therapy. Lengthening of the Achilles tendon helped destress the forces on the midfoot and minimize the potential for further breakdown and progression of the flatfoot. In addition, the patient's-controlled diabetes, played a significant role in the healing process as it limited the destructive effects of the disease on circulation. Postoperatively the patient had weekly dressing changes. The ulcerations were inspected and treated with Silvadene antibiotic cream and an adapted sterile dressing followed by a fiberglass well-padded posterior splint after the wound was thoroughly cleansed, in order to keep the tissue healthy and viable. This technique aided in preventing infection and promoting the hygiene of the wound. For rehabilitation management, a CAM boot was utilized to offer support for the Achilles tendon upon walking. Immobilization of the foot was important to ensure all the muscles were being supported and recovering properly. Furthermore, the patient was advised to limit weight-bearing activities and use a walker to avoid injuries while the muscles were still recuperating. Upon completion of rehabilitation, both sides of the patient's foot were completely healed with no swelling. The outcome achieved from this case is an important reference for future physicians treating bilateral Charcot foot deformity with resistant ulcerations. A multi-factorial process beginning with controlling blood sugar levels to specific sterile dressing techniques increased the success of the operation, shortened the duration of recovery, and improved the patient's long-term quality of life.

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