

# Calcaneal Osteotomy as Treatment for Calcaneal Pressure Ulcer Secondary to Charcot Neuroarthropathy

*Enrique Rosario Aloma, DPM, PhD*

*Mohaned Eltabir, DPM*

*Jesus Garcia, BS*

*Luis A. Rodriguez Anaya, DPM*

*Thomas Merrill, DPM*

### INTRODUCTION

Charcot neuroarthropathy is considered a late complication of diabetes mellitus as a result of loss of sensation. It is a severe joint disease of the foot and ankle that can result in fractures, permanent deformity, massive osseous destruction, and/or limb loss (1). The massive osseous degeneration caused by constant weightbearing in the absence of protective sensation causes a destruction that leads to deformities in weightbearing bones that can result in ulcers, infections, and a high incidence of amputation (2).

The progression of Charcot foot is still not well understood. However, it has been established that the midfoot is generally the first aspect of the foot to be affected. In a study performed in 2013, it was revealed that the most degenerative changes occur primarily in the medial column. These changes can become so severe that if aggressive treatment is not provided, limb-threatening complications such as soft tissue infection, osteomyelitis, and loss of limb or loss of life can quickly arise (3).

It is important to note, that such treatments include conservative bracing, or surgical intervention. The purpose of bracing is to immobilize and offload the foot, particularly

in the active stages of Charcot. Surgery is recommended for an already severe deformity and is used primarily to reconstruct alignment and stabilization of affected joints that cause the foot to collapse (4). One of the most common manifestations of Charcot foot is a calcaneal ulcer. Such ulcers are very difficult to heal and require surgery to correct the deformity that is causing the plantar ulcer. In some cases, such as the one being presented, the surgical intervention used was a simple osteotomy to relieve pressure from the area.

### CASE STUDY

The patient is a 59-year-old female with a history of diabetes mellitus with peripheral neuropathy, peripheral vascular disease, previous right hallux amputation due to osteomyelitis, and right Charcot arthropathy. She has a cavus foot type with a chronic hyperkeratosis on the heel. One year ago, the patient had a right ankle pilon fracture secondary to Charcot. The patient was admitted to the hospital at the time, and the right ankle was reconstructed with an external fixation frame. The patient responded well to the surgery and was back bearing weight on the right lower extremity in approximately 6 weeks. Once the frame was removed, the patient received physical therapy and was able to return to her daily activities successfully.

The patient continued to follow-up at the office and was evaluated on a bimonthly basis. The patient continued to have Charcot arthropathy changes of the ankle. The patient continued to be very active. The patient was prescribed multiple orthopedic devices including: ankle foot orthosis, patellar weight-bearing brace, clam shell moon boot, Arizona brace, diabetic shoes, and plastazote orthotics.

The patient remained in good health and physical condition for about 6 months, at which point she developed a right calcaneal ulcer. The foot was noted to be cavus (Figure 1) and the ulcer was located in the center of the plantar aspect of the right heel (Figure 2). The patient received serial superficial debridements with weekly applications of



Figure 1. Preoperative cavus foot.



Figure 2. Two months before surgery.



Figure 3. One week before the surgery.



Figure 4. Preoperative radiograph.



Figure 5. Postoperative radiograph.

endoform and hydrofera blue. The area was also offloaded with a CAM walker and a plastazote orthotic with a heel cut-out at the ulcer site. The ulcer improved significantly in size, but it never closed completely, at one point it became infected. The soft tissue infection was quickly controlled with Ciprofloxacin and Bactrim. The calcaneus was biopsied with the pathology and culture both negative for osteomyelitis.

The ulcer was determined to be caused by localized pressure in the right heel during weightbearing (Figure 3). As previously indicated, the foot was noted to be in cavus position and radiographs showed a high angle of inclination with an obvious point of pressure just under the ulcer site (Figure 4). At this time, surgical intervention was advised since all conservative treatments failed to close the wound. It was explained to the patient that pressure needed to be relieved from the area with a sliding calcaneal osteotomy in order to close the ulcer. The patient agreed, and she was scheduled for surgery.

On the day of the surgery, all preoperative protocols were followed and the patient was taken to the operating

room. The patient received a local nerve block on the right foot and a minimal 4-centimeter incision was performed on the lateral aspect of the right calcaneus. An oscillating saw was used to penetrate the lateral calcaneal cortex, while an osteotome was used to cut through the medial cortex. The direction of the osteotomy allowed the posterior calcaneus to slide posterior and dorsal. Using fluoroscopy, the posterior aspect of the calcaneal fragment was displaced dorsally in order to relieve pressure from the ulcer site as planned (Figure 5). The intact tendo Achilles and intact plantar fascia stabilized the osteotomy and no fixation was used. The patient was placed in a posterior splint and an attempt was made to encourage the patient to be non-weightbearing during the postoperative period.

The patient remained active during the postoperative period. The patient had no dehiscence or infection at the surgical site. At 2 weeks, the ulcer site had reduced to less than half its size. The sutures were removed 3 weeks after the surgery (Figure 6). At 4 weeks after surgery, the ulcer was completely closed (Figure 7). At 6 weeks, the patient



Figure 6. One week after surgery.



Figure 7. Four weeks after surgery.



Figure 8. Ten weeks after surgery.

was instructed to start transitioning to diabetic shoes with accommodative orthotics. The patient remains active with only diabetic shoes and insoles. The ulcer has remained closed at the 6 month follow-up (Figure 8). The patient was educated about the importance of diabetic shoes and the use of plastazote inserts to avoid future recurrence of pressure ulcers.

This case showed how a simple surgery is capable of closing a non-healing ulcer. In this case, it was determined that the ulcer was caused by pressure applied by the calcaneus, leading to the breakdown of soft tissue. Surgery

was recommended and performed in order to remove stress from the affected area. This calcaneal osteotomy is inherently stable and no fixation was needed. With a simple calcaneal osteotomy, even with a very active patient, the pressure was relieved, and it allowed for a more normal distribution of force during weightbearing in the plantar heel. In this patient, she continued to be very active during the postoperative period. It has been proven in previous studies that such surgery allows the readjustment of the position of the calcaneus, restoring the physiologic biomechanics of the rearfoot (5). This patient responded well and the ulcer closed rapidly after surgery was performed. It is expected that the patient will have no recurrence if she stays compliant and continues using diabetic shoes with the recommended orthotics. The patient will also need to continue to have regular lower extremity evaluations to prevent any future complication.

## REFERENCES

1. Guven, MF, Karabiber A, Kaynak G, Ogut, T. Conservative and surgical treatment of the chronic Charcot foot and ankle. *Diabetic Foot Ankle* 2013;4:10.
2. Younis BB, Shahid A, Arshad R, Khurshid S, Masood J6. Charcot osteoarthropathy in type 2 diabetes persons presenting to specialist diabetes clinic at a tertiary care hospital. *BMC Endocrine Dis* 2015;15:28.
3. Hastings MK, Johnson JE, Strube MJ, Hildebolt CF, Bohnert KL, Prior FW, et al. Progression of foot deformity in Charcot neuropathic osteoarthropathy. *J Bone Joint Surg* 2013;95:1206-13.
4. Sponer P, Kucera T, Brtkova J, Srot J. The management of Charcot midfoot deformities in diabetic patients. *Acta Medica (Hradec Kralove)* 2013;56:3-8.
5. Barg A, Horterer H, Jacxsens M, Wiewiorski M, Paul J, Valderrabano V. Lateral sliding osteotomy of the calcaneus. *Op Orthop Trauma* 2015;4:283-97.

# REDI- THOTICS®

More Comfort. More Performance.™

## Premium Podiatric OTC Orthotics



Metatarsalgia



Pronation



Plantar Fasciitis



Even KIDS OTC orthotics!

CALL 877-740-3668 OR EMAIL [CUSTOMERSUPPORT@REDI-THOTICS.COM](mailto:CUSTOMERSUPPORT@REDI-THOTICS.COM)

FOR SAMPLES, INFORMATION, AND ORDERS.