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## Introduction

Charcot neuroarthropathy (CN) is a pathologic entity of the foot presenting with compromised peripheral vasculature and loss of sensation. The Sanders and Frykberg Classification describe the bone and joints involved in CN deformity noting midfoot Charcot being the most prevalent, consisting of 60% CN deformities. This case series presents our protocol for the treatment of midfoot Charcot ulcerations with tendon lengthening, osseous resection of the sagittal plane deformity and implantation of cryopreserved umbilical cord with percutaneous anchoring also known as the “parachute technique”.

## Methodology

In this case series, 15 patients presented with midfoot Charcot ulcerations, with minimal healing noted after completing 4 weeks of the standard of care. All patients were then treated with Achilles lengthening, exostectomy of the sagittal plane deformity and application of cryopreserved umbilical cord via the Placental Parachute Technique.



Figure 1. Implantation zone shown above. The graft is tagged medially and slid into the implantation zone then percutaneously anchored.

## Procedure

All patients underwent an Achilles lengthening and a debridement in which tissue samples were sent to micro and pathology. An exostectomy in the sagittal plane under intraoperative fluoroscopy was performed and all offending bone was sent to pathology for further evaluation. Upon completion of the debridement and exostectomy, we then proceed to outline the implantation zone by drawing a square that extends beyond the dimensions of the wound. We measure the dimensions of the square to determine our graft size. Next we proceed with undermining the subcutaneous layer from the dermis to all borders of the implantation zone. Using two absorbable sutures the graft is tagged on each in end, slid into the implantation zone and percutaneously anchored to its respective near corner on the square. We then proceed with percutaneously anchoring the graft to its respective far corners laterally. Upon completion the graft is noted securely seated between the subcutaneous and dermal layer, with a suture in each of the corners of the marked square, resembling a parachute. Any residual ulceration may be grafted with the traditional external application method. The surgical site is dressed with a non adherent wound contact layer, an antimicrobial foam dressing, and standard compressive outer layer dressing. Patients are instructed to remain minimal weight bearing until the wound is healed with camwalker or Total contact cast.

## Case Photos



Figure 2. Image A: Pre operative radiograph noting sagittal plane deformity. Image B and C: Pre operative images noting plantar ulceration. Image D and F: Post operative week 1. Image E: Post operative radiograph noting sagittal plane correction. Image G and H: Post operative week 12 noting healed plantar ulceration.

## Discussion

Lower extremity wounds in the diabetic patient population are a challenge to heal. Those patients who present with Charcot ulcerations pose increased risk of infection and/or amputation. It has been reported that the risk of amputation with Charcot neuropathic ulcers is 12 times higher than those with Charcot neuropathy alone. At this time there is a myriad of surgical applications involving use of amniotic tissues in wound care. This case series presents a novel technique for treatment of difficult to heal ulcerations in patients with stable midfoot Charcot deformity.

## Conclusion

This case series examines a novel surgical technique for treating midfoot Charcot ulcerations in conjunction with Achilles lengthening, exostectomy and offloading. All patients who underwent the Placental Parachute procedure, experienced accelerated wound healing with healthy regenerative tissue and no reoccurrence of the ulceration. The Placental Parachute is a novel technique for treatment that promotes rapid healing in difficult to heal wounds in patients with stable midfoot ulcerations.

## REFERENCES

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