

## Introduction

The purpose of our study is to emphasize the masquelet technique as a feasible salvage procedure for first ray osteomyelitis. The podiatric literature about salvage techniques for failed distal metatarsal osteotomies and procedural techniques is sparse. Though the rate of complications for these cases regarding osteomyelitis and/or AVN is generally low, revision techniques for many surgeons may be limited to partial ray amputations due to lack of sufficient evidence involving other forms of salvage. The masquelet technique has been reported as a successful treatment for bony defect present in long bones as a salvage procedure successfully throughout the orthopaedic literature over the past few decades. For these problematic cases of postoperative osteomyelitis secondary to distal metatarsal osteotomy, other viable salvage options were limited to either ray resection or vascularized fibular graft. Patients. Though masquelet technique is scarcely reported in foot and ankle, this approach specifically in distal metatarsal avascular necrosis or osteomyelitis in active patients, we believe it may be used as an alternative to primary partial ray resection.

## Technique

Our technique: utilization of mini-rail external fixation medially across the first ray after resection of the diseased bone and insertion of antibiotic spacer and induced membranes. After resection of diseased bone, The goal is to restore length and create an environment conducive for blood flow in an otherwise avascular region, by virtue of a pseudomembrane formation. This technique is popularized in long bone defects, especially in cases of tibial osteomyelitis and tumor resection. To our knowledge, not much has been reported in the foot and ankle. Two patients over the previous year had undergone masquelet salvage technique at Ankle and Foot care centers due to secondary osteomyelitis after distal metatarsal osteotomies for bunion correction which were done at another facility.



## Discussion

Complications of distal first ray surgery leading to bony defect, specifically osteomyelitis in our case, can successfully be treated using masquelet technique. This procedure has been scarcely reported in the podiatric literature and our case study is an example of masquelet technique as a viable alternative to partial ray resection in these difficult scenarios. Predicting the outcome of large bony defect reconstructions is ultimately very difficult and a long process which should be discussed with the patient. This technique is utilized as a salvage procedure and we believe more information about the subject should continue to be considered as patients with active lifestyles who experience complications of HAV surgery will be going through a potential life changing event. The importance of maintaining first ray function should not be taken lightly, though the patient should understand that the process will be a challenging one and may likely still result in partial ray amputation.

## Conclusion

The goal of our presentation of these cases is to continue to emphasize the surgical techniques available for these difficult situations where partial ray amputation is a high likelihood. Ultimately after attempted salvage through antibiotic spacer and pseudomembrane induction technique, both patients went on to partial first ray amputations

## Literature:

1. Bitterman A, Mathew C, Patel M, Gurtowski JP. Antibiotic Spacer Arthroplasty for Revision MTP Arthrodesis: A Novel Means to Build the Implant: A Case Report. *Muacevic A, Adler JR, eds. Cureus.* 2016;8(3):e537. doi:10.7759/cureus.537.
2. Ristiniemi, Jukka, and Pekka Jalovaara. "Traumatic First Metatarsal Bone Loss Treated with a Staged Method Using an Antibiotic Cement Spacer and Subsequent Autografting: A Case Report." *European Journal of Trauma and Emergency Surgery* 34.4 (2008): 418-420.
3. Oliver, Noah G., Corey M. Fidler, and John S. Steinberg. "Use of Antibiotic Beads and Antibiotic Spacers in Limb Salvage." *Osteomyelitis of the Foot and Ankle*. Springer International Publishing, 2015. 113-125.
4. Lee, Michael S, Grossman, Jordan P. *Complications in Foot and Ankle Surgery: Management strategies.* Complications of first metatarsophalangeal joint implants, p 201. Springer International Publishing 2017.
5. Makridis, Konstantinos G., et al. "Reconstruction of an extensive soft tissue and bone defect of the first metatarsal with the use of Masquelet technique: a case report." *Foot and Ankle Surgery* 20.2 (2014): e19-e22.
6. Myerson, Mark S., et al. "Staged arthrodesis for salvage of the septic hallux metatarsophalangeal joint." *Clinical orthopaedics and related research* 307 (1994): 174-181.
7. Huffman, Lanie K., John G. Harris, and Michael Suk. "Using the bi-masquelet technique and reamer-irrigator-aspirator for post-traumatic foot reconstruction." *Foot & ankle international* 30.9 (2009): 895-899.
8. Kanellakopoulou, Kyriaki, and Evangelos J. Giamarellos-Bourboulis. "Carrier systems for the local delivery of antibiotics in bone infections." *Drugs* 59.6 (2000): 1223-1232.
9. Kuhn, Michael A., et al. "Blood flow to the metatarsal head after chevron bunionectomy." *Foot & ankle international* 26.7 (2005): 526-529.