



acumed®

Bone Graft Harvesting System and Acu-Loc® Wrist Spanning Plate

Two-Stage Masquelet Technique with Distal Ulna Resection

Case Study

Mihir J. Desai, MD

A 54-year-old female with a history of distal radius fracture and subsequent wrist deformity was treated successfully with the Acumed Bone Graft Harvesting System and Acu-Loc Wrist Spanning Plate.



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We are dedicated to developing products, service methods, and approaches that improve patient care.

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Two-Stage Masquelet Technique with Distal Ulna Resection

Patient History

The patient is a 54-year-old female with a history of distal radius fracture that was originally stabilized with ORIF and volar locked plating. Her clinical course was complicated with a postoperative infection that required several debridements. The patient developed osteomyelitis of the entire distal radius and underwent extensive resection of the distal radius metaphysis and epiphysis. She was treated 3 years after the original incident for an obvious deformity and pain.

Treatment

The patient's primary problem was a substantial deformity with some pain but an otherwise well-functioning hand. She had a large defect that needed reconstruction with bone graft. The options included free vascularized fibula grafting, Masquelet technique, distal ulna transfer, and/or allograft reconstruction. Each has their merits, but the Masquelet technique was chosen because of the mild morbidity associated with the technique versus free fibula grafting, which requires in-patient hospitalization and a long procedure.

The Masquelet technique allows for a staged reconstruction that can be done as an outpatient procedure and can be seen with good results and minimal donor site morbidity.¹ The induced pseudosynovial membrane is also rich in bone-forming growth factors due to its highly vascularized nature.² The Acumed Bone Graft Harvesting System allows for harvesting of an adequate supply of bone graft with a small incision and minimal postoperative donor site morbidity.

Following the steps of the technique, a methylene blue-dyed polymethyl methacrylate (PMMA) spacer was placed in the gap with one gram of vancomycin followed by rigid bridging with the Acumed Wrist Spanning Plate. After 8 weeks the cement was removed, with attention paid to carefully preserve the induced membrane around the cement. Bone graft was then harvested, using the Acumed system, from the patient's Iliac crest and placed within this contained membrane, allowing for containment of the cancellous bone.

Postoperative Care

After bone grafting, the patient was placed in a cast for 4 weeks followed by brace immobilization. Review of the 10 months post-op radiographs indicated full fusion at the patient's graft site. The patient has full pronation and supination as well as complete use of her hand. The Acu-Loc® Wrist Spanning Plate is designed to provide temporary fixation for the wrist and should be removed once the graft has fully incorporated. After the temporary plate is removed it can be replaced with a permanent implant if deemed clinically appropriate. The patient presented in this case study will likely get her temporary plate removed after another year, about 1.5–2 years post-op from the Masquelet procedure, if desired.

Discussion

The Acumed Bone Graft Harvesting System facilitates safe, rapid harvest of morselized autogenous graft from the iliac crest, distal radius, and distal femur. Using it for this patient's treatment avoided the morbidity of taking her fibula or other distant autologous graft when substantial defects were present. The use of the Wrist Spanning Plate provided the necessary stabilization to allow clinically acceptable bone formation at the repair site.

References

1. Careri S, Vitiello R, Oliva MS, Ziranu A, Maccauro G, Perisano C. Masquelet technique and osteomyelitis; innovations and literature review. *Eur Rev Med Pharmacol Sci.* 2019;23(2 Suppl.):210–216.
2. Han W, Shen J, Wu H, Yu S, Fu J, Xie Z. Induced membrane technique: advances in the management of bone defects. *Int J Surg.* 2017;42:110-116.



Prior to bone grafting, PMMA spacer (dyed blue) with Wrist Spanning Plate



X-ray of spacer and dorsal spanning plate



Clinical photo of harvesting cancellous bone manually



10 months later: Iliac crest bone graft with Acumed Bone Graft Harvester



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Acumed® Headquarters
5885 NE Cornelius Pass Road
Hillsboro, OR 97124
Office: 888.627.9957
Fax: 503.520.9618
www.acumed.net

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