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Giant Cell Tumor of the Distal Radius: Successful Reconstruction with Masquelet Technique and Freeze Dried Fibula

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Introduction

Giant cell tumor (GCT) of the distal radius is felt by some to represent a more aggressive form of the disease with a proclivity for local recurrence

- Increased rates of local recurrence often times require treatment with resection over curettage and can be associated with higher morbidity
- A wide resection with fixation and placement of a temporizing cement spacer Masquelet technique is described.
- After allowing a vascular pseudomembrane to form, the cement spacer is removed and the space is filled with a freeze dried fibula bone graft

Case #1



Figure 1. AP and lateral radiographs of left wrist demonstrating destructive lesion with extra-cortical expansion

- 64 year old right-hand-dominant female presents to orthopaedic tumor clinic with several month history of progressive wrist pain and recent pathologic fracture
- Imaging revealed large lytic lesion of distal radius with significant loss of bone continuity (Figure 1)
- Biopsy revealed GCT of bone without metastases
- Underwent radical resection, intercalary cement spacer placement, and preliminary bridge plating of residual radius to carpus (Figure 2)
- After allowing 6 months for a vascular pseudomembrane to form, the spacer was removed and replaced with a freeze-dried fibular graft.
- Progress toward union was noted 4 -5 months postoperatively and matured over time.



- At 48 months follow up, the reconstruction has remained durable and effective with maintenance of full elbow range of motion, with 45 degrees of supination and near full pronation. (Figure 3)

Figure 2. AP and lateral radiographs of the left forearm taken at the first post-operative visit demonstrating bridge plate fixation with cement spacer

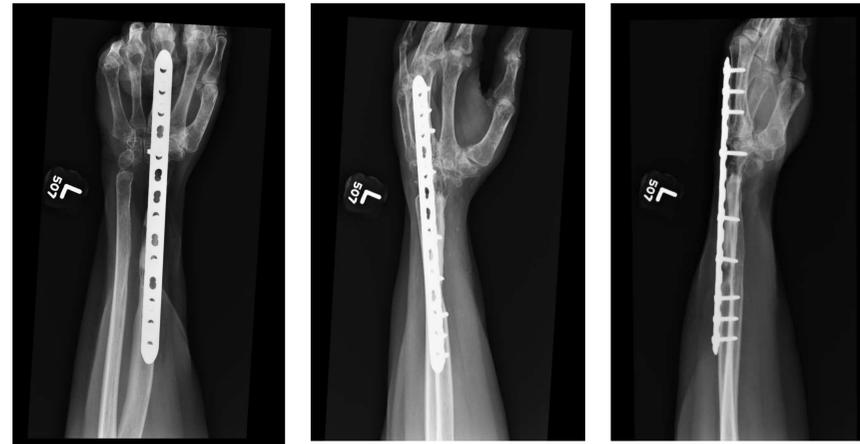


Figure 3. AP, oblique, and lateral radiographs of left wrist taken at 48 months follow up demonstrating incorporation of fibular allograft

Case #2



Figure 4. AP and lateral radiographs of right wrist with destructive lesion of distal radius

- 37 year old right-hand-dominant male presented with 3 month history of significant right wrist pain.
- Imaging revealed a destructive bone lesion of the distal radius with soft tissue mass. (Figure 4).
- Biopsy revealed GCT of bone.
- Started on denosumab for 3 months with improvement in pain and increased mineralization noted on imaging
- Underwent curettage and grafting after denosumab treatment with recurrence noted 8 months post-operatively (Figure 5)
- Subsequently (2 months post recurrence), he underwent wide resection, intercalary cement spacer and bridge plating of residual radius to carpus (Figure 6).
- 6 months later, the patient underwent conversion of intercalary spacer to freeze-dried fibula with early incorporation noted at 6 months and maturing by 15 months postoperatively (Figure 7).

Figure 5. AP and lateral radiographs of right wrist showing recurrence of disease with cortical irregularity and destructive lytic lesion of distal radius



Figure 6. AP, oblique, and lateral radiographs of right wrist following bridge plate fixation and cement spacer placement



- Patient maintained full elbow ROM with 30-40 degrees of supination and full pronation.

Figure 7. AP, oblique, and lateral radiographs of right wrist taken at 15 months follow up exhibiting bony incorporation of fibular allograft without evidence of disease recurrence



Conclusion

- Bridge plating and temporizing cement spacer with delayed freeze-dried fibula graft conversion appears to be an effective treatment with satisfactory functional and oncologic outcome.
- This technique allows for preservation of satisfactory range of pronation and supination and avoids the complexity of vascularized fibula grafts.
- In our experience, delayed implantation into the resection bed maximizes the opportunity for allograft success.

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