

EDITORIAL

Reconstruction of the Distal Radius After Resection of an Aggressive Giant Cell Tumor

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Giant cell tumor (GCT) is the third most common primary bone neoplasm, accounting for approximately 5% of all primary bone tumors.¹ About 12% of GCTs occur in the distal radius—a site characterized by complex anatomy and its proximity to joints and vital neurovascular structures—making it challenging to achieve adequate surgical margins without compromising wrist function.

The standard management of GCT typically involves extensive intralesional curettage followed by defect reconstruction with either bone graft or polymethylmethacrylate (PMMA) bone cement. In more aggressive presentations—particularly Campanacci grade 3 lesions characterized by cortical breach and extraosseous soft tissue extension—en bloc resection is generally recommended to minimize the risk of local recurrence.¹

Several reconstructive strategies have been described, including biological options such as vascularized and non-vascularized fibular grafts, and non-biological approaches such as 3D-printed prostheses, custom-made implants, and hemiarthroplasty.²⁻⁴ Each technique carries distinct advantages and inherent limitations, and the optimal choice is primarily determined by patient-specific factors, tumor characteristics, and the surgeon's expertise.

Ulnar translocation with wrist arthrodesis is a reliable reconstructive option for aggressive distal radius GCT, offering stable structural support with less technical complexity compared to other methods.⁵ By utilizing the patient's vascularized bone, it provides a biological solution that promotes union while eliminating the risk of future fracture.⁵ However, the described technique initially had notable limitations. Fixation relied primarily on an intramedullary pin, which was associated with a high incidence of nonunion at the radioulnar junction.⁵ Furthermore, the resultant narrowing of the distal

forearm and wrist was often deemed cosmetically unsatisfactory by patients. The most significant drawback, however, was the complete loss of wrist motion—including flexion, extension, and radial or ulnar deviation—movements that are both functionally critical and psychologically impactful.

Recent studies have introduced several modifications to address these limitations.^{6,7} One approach involves limited arthrodesis—specifically, ulno-scapholunate fusion—to preserve partial wrist flexion, extension, and deviation. The use of a T-shaped locking plate has also been advocated to improve fixation stability and reduce the risk of nonunion at the radioulnar junction. Furthermore, preservation of the triangular fibrocartilage complex and the distal ulnar remnant within the radioulnar joint helps maintain wrist contour and prevent distal forearm narrowing. Collectively, these refinements have transformed ulnar translocation into a more function-preserving and cosmetically favorable technique, broadening its applicability in distal radius reconstruction following tumor resection.

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References

1. Wysocki RW, Soni E, Virkus WW, Scarborough MT, Leurgans SE, Gitelis S. Is intralesional treatment of giant cell tumor of the distal radius comparable to resection concerning local control and functional outcome? *Clin Orthop Relat Res.* 2015;473(2):706-715. doi: 10.1007/s11999-014-4054-3.
2. Chobpenthai T, Poosiripinyo T, Warakul C. Reconstruction after en bloc resection of a distal radius tumor. An updated and concise review. *Orthop Res Rev.* 2023;151-164. oi: 10.2147/ORR.S416331.
3. Jamshidi K, Ammar W, Kargar Shooroki K, Mirzaei A. Outcomes of Megaprosthesis Reconstruction for the Salvage of Failed Osteoarticular Allograft Around the Knee implanted before Skeletal Maturity in Primary Bone Sarcoma: A Case-Series. *Arch Bone Jt Surg.* 2024;12(3):211-218. doi:10.22038/abjs.2023.74212.3434.
4. Jamshidi K, Sharifi Dalooei SMA, Bagherifard A, Mirzaei A. Total Synovectomy and Bone Grafting/Cementation after Curettage of the Bone Lesion in Diffuse Type of Tenosynovial Giant Cell Tumor: A Retrospective Cohort Study. *Arch Bone Jt Surg.* 2023;11(5):342-347. doi:10.22038/abjs.2023.67493.3203.
5. Agrawal AC, Garg AK, Choudhary R, Verma S, Dash RN. Giant cell tumor of the distal radius: wide resection, ulna translocation with wrist arthrodesis. *Cureus.* 2021;13(5).doi: 10.7759/cureus.15034.
6. Jamshidi K, Bagherifard A, Khabiri SS, Mirzaei A. Reconstruction of the distal radius using ulnar translocation with ulnocapholunate arthrodesis after giant cell tumour resection. *J Hand Surg Eur Vol.* 2025;17531934251347884.doi: 10.1177/17531934251347884.
7. Jamshidi K, Heidari M, Mirzaei A. Ulnar translocation with limited arthrodesis in the management of giant cell tumours of the distal radius. *J Hand Surg Eur Vol.* 2020;45(4):420-421. doi:10.1177/1753193419899830.