



RECONSTRUCTING THE DISTAL RADIUS-A COMPARITIVE STUDY OF ULNAR RADIALISATION VERSUS FIBULAR GRAFTING IN GIANT CELL TUMORS

Orthopaedics

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ABSTRACT

Background: Giant cell tumour (GCT) of the distal radius is an aggressive, locally invasive benign bone tumour with a high recurrence rate. Surgical excision with reconstruction is the standard of care. This study compares the outcomes of two reconstructive techniques: radialisation of the ulna and non-vascularised fibular autografting. **Methods:** A retrospective comparative study of 28 patients with Campanacci grade II/III distal radius GCT treated at SRG Hospital, Jhalawar Medical College (2024 january to 2023 june). Group A underwent ulna radialisation (n=14); Group B underwent non-vascularised fibular autograft (n=14). Data collected included surgical time, union rate, range of motion, complications, recurrence, and MSTS score at 12 months. Detailed operative steps are documented. **Results:** Group A showed faster union (mean 12.1 weeks), earlier hand use, and lower complication rates. Group B demonstrated better wrist motion but required longer time to achieve union (mean 16.4 weeks). MSTS scores were comparable. Recurrence occurred in two fibular cases. **Conclusion:** Ulna radialisation offers faster rehabilitation and fewer complications. Fibular grafting offers better motion. The surgical choice should consider tumour extent, functional goals, and surgeon experience.

KEYWORDS

INTRODUCTION

GCTs of the distal radius represent ~10% of all GCTs and are notorious for aggressive cortical destruction and soft tissue extension. Simple curettage often leads to high recurrence, hence wide resection with reconstruction is preferred for Campanacci grade II–III lesions.

Two common reconstructive options include:

- Radialisation of the Ulna (biological reconstruction without donor site morbidity)
- Non-vascularised Fibular Grafting (restores forearm length and wrist contour)

This study compares the two techniques in terms of union, functional outcome, complication, and recurrence rates.

MATERIALS AND METHODS

Study Design: Retrospective comparative

Period: january 2024– June 2025

Setting: Department of Orthopaedics, srg hosapital, Jhalawar Medical College

Inclusion Criteria:

- Age 18–45 years
- Histologically confirmed GCT of distal radius (Campanacci II/III)
- Underwent either ulna radialisation or fibular grafting
- ≥12 months of follow-up

Exclusion Criteria:

- Previous GCT surgery
- Vascularised fibular graft
- Metastatic or multicentric GCT

Group A: Radialisation of Ulna (n = 14)

Group B: Non-vascularised Fibular Graft (n = 14)

Surgical Technique

Radialisation of Ulna (Group A)

1. Exposure: Volar incision made over distal radius and ulna. Tumour mass excised with 2–3 cm margins.
2. Radialisation: The distal ulna is mobilised subperiosteally, preserving ulnar neurovascular bundle.
3. Osteotomy: Performed at proximal ulna (~10–12 cm). The segment is rotated and shifted radially.
4. Fixation: Ulna is aligned to the carpal bones using a 3.5 mm DCP or locking plate.
5. Soft Tissue Closure: Careful reattachment of wrist capsule and pronator quadratus, when possible.

6. Immobilisation: 6 weeks of above-elbow splinting followed by physiotherapy.

Non-Vascularised Fibular Grafting (Group B)

1. Tumour Resection: Wide resection of distal radius (~6–10 cm) including cuff of normal tissue.
2. Graft Harvest: Ipsilateral fibula harvested subperiosteally from midshaft to preserve peroneal nerve.
3. Graft Inset: Fibula trimmed and inserted between proximal radius and carpal bones.
4. Fixation: Fixed with a long 3.5 mm DCP or reconstruction plate; K-wires for wrist stabilization if needed.
5. Immobilisation: Plaster immobilisation for 8 weeks followed by rehab.
6. Donor Site Management: Reconstructed with muscle approximation and closure.

Results

Table 1: Comparative Outcomes

Parameter	Group A (Ulna)	Group B (Fibula)	p-value
Mean Age (years)	28.3 ± 5.2	27.9 ± 4.9	0.81
Surgical Time (minutes)	90 ± 14	130 ± 18	<0.01*
Union Time (weeks)	12.1 ± 1.8	16.4 ± 2.5	<0.001*
MSTS Score (12 months)	24.8 ± 2.3	25.2 ± 2.1	0.46
Range of Motion (flex/ext)	Limited	Better	—
Recurrence Rate	0	2	0.14
Complications	2	5	0.09

Discussion

This study supports that ulna radialisation is a safe, efficient method requiring no secondary donor site. It provides early union and avoids neurovascular injury risk seen with fibular harvesting. Drawbacks include loss of wrist articulation and limited pronation-supination.

On the other hand, fibular grafting offers better cosmesis and partial preservation of wrist kinematics but at the cost of donor site morbidity, delayed union, and higher risk of mechanical complications.

Our recurrence rate in fibular group (2/14) mirrors literature (Campanacci et al.: 15–20%) and underlines importance of meticulous margin clearance.

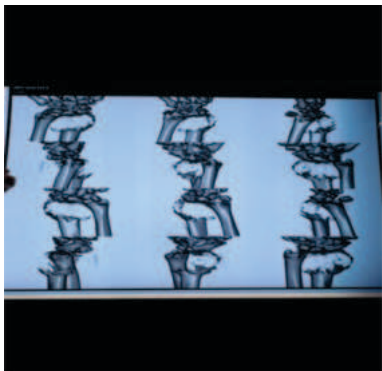
Limitations

- Small sample size

- Retrospective design with limited blinding
- Subjective assessment of range of motion and function
- No QOL/return-to-work data included

CONCLUSION

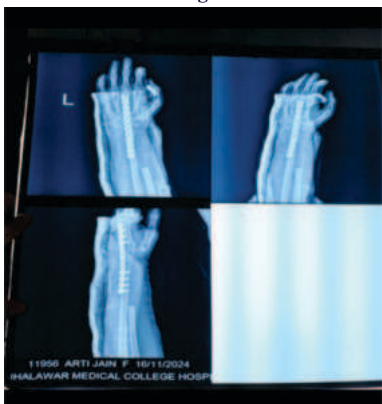
Ulna radialisation is a robust, single-site, biological reconstruction technique for distal radius GCT with faster union and fewer complications. Fibular grafting may be preferred for younger, function-demanding patients prioritizing wrist mobility. Final choice must be patient-specific.



Pre Operative Scans



En Bloc Resection Of Tumor Along With Radius



Radialisation Of Ulna

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