



Evaluation of Operative Management of Intra-Articular Fractures of the Distal End of the Humerus

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ABSTRACT

Intra-articular fractures of the distal humerus are challenging injuries that often require operative intervention to restore joint function and stability. This study evaluates the clinical, radiological, and functional outcomes of surgical management of these fractures using open reduction and internal fixation (ORIF). A total of 50 patients with intra-articular distal humeral fractures were treated and followed up for 12 months. Outcomes were assessed using the Mayo Elbow Performance Score (MEPS) and fracture union rates. Results showed a mean MEPS of 85, with excellent-to-good outcomes in 80% of patients. Complications included stiffness (10%) and ulnar nerve neuropathy (8%). The study highlights the importance of anatomical reduction, stable fixation, and early rehabilitation in achieving favorable outcomes.

Keywords: Intra-articular fractures, Distal humerus, Open reduction, Internal fixation, Functional outcomes

INTRODUCTION:

Fractures of the distal humerus account for approximately 2% of all fractures and pose unique challenges due to the complexity of the elbow joint anatomy and the involvement of the articular surface (1). These injuries often result from high-energy trauma such as road traffic accidents or low-energy mechanisms like falls in osteoporotic patients (2).

The primary goals of treatment include restoring articular congruency, achieving stable fixation, and enabling early mobilization to prevent stiffness and maintain function (3). Nonoperative management has historically been associated with poor outcomes due to malunion, joint stiffness, and loss of function (4). Consequently, operative management using ORIF has become the standard approach for displaced intra-articular distal humerus fractures (5).

Despite advancements in surgical techniques and fixation devices, achieving optimal outcomes remains challenging. Complications such as nonunion, infection, ulnar nerve injury, and elbow stiffness can compromise functional recovery (6). Early mobilization and physiotherapy are critical for preventing joint stiffness and ensuring a good range of motion (7).

This study aims to evaluate the outcomes of operative management of intra-articular distal humeral fractures,

focusing on fracture union, functional recovery, and complications.

Aim

To evaluate the outcomes of operative management of intra-articular fractures of the distal end of the humerus.

Objectives

1. To assess the functional outcomes of surgical treatment using the Mayo Elbow Performance Score.
2. To evaluate fracture union rates and identify postoperative complications.

Materials and Methods

This prospective study was conducted on 50 patients with intra-articular distal humeral fractures treated using ORIF at a tertiary care hospital.

Inclusion Criteria:

- Patients aged 18–70 years with closed intra-articular distal humeral fractures.
- Fractures classified as AO Type C.
- Patients willing to provide informed consent and comply with follow-up visits.

Exclusion Criteria:

- Open fractures or pathological fractures.
- Patients with preexisting elbow deformities or arthritis.
- Those medically unfit for surgery.

All patients underwent surgical fixation using a dual plating technique under general anesthesia.

Postoperatively, patients were immobilized for 2 weeks, followed by physiotherapy. Follow-ups were conducted at 6 weeks, 3 months, 6 months, and 12 months to assess union via radiographs and functional recovery using the MEPS.

Results

Table 1: Fracture Union Time

Fracture Union Time (Weeks)	Patients (n=50)	Percentage (%)
<12 weeks	35	70.0
12–16 weeks	10	20.0
>16 weeks	5	10.0

Table 2: Functional Outcomes (MEPS)

Outcome Category	Patients (n=50)	Percentage (%)
Excellent	20	40.0
Good	20	40.0
Fair	8	16.0
Poor	2	4.0

Discussion

The operative management of intra-articular fractures of the distal humerus using ORIF has demonstrated favorable outcomes in this study. Restoration of articular congruency and stable fixation were achieved in most cases, enabling early mobilization and functional recovery.

The majority of patients (80%) had excellent-to-good functional outcomes as assessed by the MEPS, consistent with previous studies reporting similar success rates (8). The mean union time of 12–16 weeks was within the expected range for such fractures (9).

Complications such as elbow stiffness (10%) and ulnar nerve neuropathy (8%) highlight the technical challenges of the procedure. Ulnar nerve transposition performed in select cases helped mitigate neuropathy but did not completely eliminate the risk (10). Early physiotherapy was instrumental in reducing stiffness and improving the range of motion, emphasizing its critical role in postoperative care (11).

While dual plating provides stable fixation, proper implant placement is essential to avoid hardware-related complications. Limitations of the study include a small sample size and short-term follow-up. Further studies with larger cohorts and long-term outcomes are

needed to validate these findings and refine surgical techniques.

Conclusion

Operative management of intra-articular distal humeral fractures using ORIF is an effective treatment modality, providing stable fixation and enabling early mobilization. The procedure yields excellent-to-good functional outcomes in most patients, with a high rate of fracture union. Complications such as stiffness and ulnar nerve neuropathy, though relatively infrequent, underscore the importance of meticulous surgical technique and comprehensive rehabilitation. This approach remains a cornerstone in the management of these complex fractures, significantly improving patients' quality of life and elbow function.

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