Section: Orthopaedics

Original Research Article

# OPTIMIZING FUNCTIONAL RECOVERY IN INTERCONDYLAR HUMERUS FRACTURES: THE ROLE OF EARLY MOBILIZATION POST-ORTHOGONAL PLATING

***Puneet Bansal[1], Gyan Prakash[2], Rohit Rana[3]***

*[1]Consultant, Department of Orthopaedics, Regional Hospital, Una, Himachal Pradesh, India.*
*[2]Consultant, Department of Orthopaedics, Regional Hospital, Reckong Peo, Kinnaur, Himachal Pradesh, India.*
*[3]Consultant, Department of Orthopaedics, Civil Hospital, Ghumarwin, Bilaspur, Himachal Pradesh, India.*

***Received*** *: 27/04/2024*
***Received in revised form*** *: 21/06/2024*
***Accepted*** *: 06/07/2024*

**Corresponding Author:**
**Dr. Puneet Bansal,**
Consultant, Department of Orthopaedics, Regional Hospital, Una, Himachal Pradesh, India.
Email: drshubhodeepdutta@gmail.com

**DOI:** 10.70034/ijmedph.2024.3.50

**Source of Support:** Nil,
**Conflict of Interest:** None declared

**Int J Med Pub Health**
2024; 14 (3); 281-284

ABSTRACT

**Background:** Intercondylar humerus fractures significantly impact patients' quality of life, with traditional treatment methods often resulting in prolonged immobilization and suboptimal recovery. Orthogonal plating has emerged as a technique that may offer enhanced stability, potentially allowing for earlier mobilization and improved outcomes.

**Material and Methods:** A retrospective and prospective analysis was conducted at Indira Gandhi Medical College, Shimla, involving 22 patients with intercondylar humerus fractures treated with orthogonal plating. This study aimed to assess the impact of early mobilization on functional recovery, analyzing range of motion, Mayo Elbow Performance Score (MEPS), and persistent pain at final follow-up.

**Results:** Early mobilization following orthogonal plating showed significant improvements in functional outcomes. The majority of patients (59.1%) achieved a range of motion between 80-100 degrees, and 50.0% reported good MEPS scores. Pain levels were predominantly mild, with 50% of patients reporting no pain at final follow-up. The interval between injury and surgery was inversely related to pain and directly correlated with range of motion and MEPS scores, highlighting the benefits of early surgical intervention and rehabilitation.

**Conclusion:** Orthogonal plating, combined with early mobilization, significantly optimizes functional recovery in patients with intercondylar humerus fractures. This study supports the adoption of early mobilization protocols to enhance the quality of patient outcomes.

**Keywords:** Intercondylar humerus fractures, orthogonal plating, early mobilization, functional recovery, rehabilitation strategies.

## INTRODUCTION

Optimizing functional recovery in patients with intercondylar humerus fractures is a critical goal in orthopedic care, given the significant impact these injuries can have on an individual's ability to perform daily activities and maintain a satisfactory quality of life.[1] The introduction of orthogonal plating techniques has marked a significant advancement in the surgical management of these fractures, offering the potential for enhanced stability and facilitating earlier post-operative mobilization.[2] This innovative approach aligns with the growing consensus in orthopedic rehabilitation that emphasizes the importance of early movement to prevent stiffness, accelerate healing, and improve functional outcomes.[3]

Intercondylar humerus fractures, by their nature, disrupt the complex articulation of the elbow joint, presenting a formidable challenge to restoring full function.[4] Traditional management strategies often necessitated prolonged immobilization to ensure fracture healing, inadvertently leading to stiffness and a protracted recovery period. Orthogonal

plating, with its biomechanically favorable configuration, promises a solution to this dilemma by allowing for a secure fixation that can withstand the forces of early mobilization exercises.[5]

This article proposes to explore the impact of early mobilization following orthogonal plating on the functional recovery of patients with intercondylar humerus fractures. Drawing upon a comprehensive review of contemporary literature and a prospective study conducted at Indira Gandhi Medical College, Shimla, it aims to shed light on the relationship between the timing and intensity of rehabilitation protocols and key outcomes such as range of motion, muscle strength, and overall elbow function.[6]

By meticulously analyzing patient data, the study seeks to identify optimal rehabilitation strategies that leverage the advantages of orthogonal plating. Special attention will be given to the nuances of rehabilitation programming, including the initiation of movement, progression of exercises, and integration of functional activities. The goal is to delineate a set of evidence-based guidelines that can be employed in clinical practice to expedite recovery, minimize complications, and ultimately, enhance the quality of life for individuals affected by these complex fractures.[7]

Furthermore, this investigation will consider the role of multidisciplinary care in managing intercondylar humerus fractures, recognizing the contributions of surgeons, physical therapists, and occupational therapists to a holistic recovery process. By offering a detailed exploration of early mobilization post-orthogonal plating, this article aspires to contribute significantly to the orthopedic body of knowledge, providing clinicians with actionable insights to optimize the functional outcomes for their patients.

## MATERIAL AND METHODS

**Study Design and Setting:** This retrospective and prospective analysis was conducted in the Department of Orthopaedic Surgery at Indira Gandhi Medical College, Shimla. The study reviewed the outcomes of intercondylar humerus fractures treated with orthogonal plating, focusing on functional recovery, complications, and the effectiveness of early mobilization. Data were collected from November 2020 to November 2021 for prospective cases, while retrospective cases included patients treated in the three years preceding November 2020.

**Participants:** The study population comprised 22 patients diagnosed with intercondylar humerus fractures, including 16 prospective and 6 retrospective cases. Inclusion criteria were adults (>18 years) with displaced intercondylar humerus fractures, while exclusion criteria included patients with pathological fractures, old neglected fractures, and open fractures.

**Intervention:** All participants underwent open reduction and internal fixation with orthogonal plating. The orthogonal plating technique involved the application of plates at perpendicular angles to each other, employing both locking and non-locking screws for fixation. The intervention aimed at achieving anatomical reduction, facilitating early mobilization, and optimizing functional recovery.

**Data Collection:** Clinical and radiological data were systematically collected, including patient demographics, details of the injury and surgical intervention, post-operative complications, and outcomes. Functional outcomes were assessed using the Mayo Elbow Performance Score (MEPS) and the range of motion (ROM) at follow-up visits. Complications were recorded and analyzed concerning their nature, management, and resolution.

**Statistical Analysis:** Data were analyzed using descriptive statistics to summarize the demographic and clinical characteristics of the study population. The incidence of complications, functional recovery outcomes, and the effectiveness of early mobilization were evaluated. Continuous variables were presented as mean ± standard deviation (SD), while categorical variables were expressed as frequencies and percentages. Comparative analyses were conducted using appropriate statistical tests, with a p-value of less than 0.05 considered statistically significant.

**Ethical Considerations:** The study was conducted following the Declaration of Helsinki and was approved by the Institutional Ethics Committee of Indira Gandhi Medical College, Shimla. Informed consent was obtained from all participants before inclusion in the study.

## RESULTS

**Table 1: Range of Motion at Final Follow-Up**

| Range of Motion | Number of Patients | Percentage | Mean Range of Motion (degrees) |
|---|---|---|---|
| >100 Degrees | 6 | 27.3% | 95.04 ± 10.08 |
| 80-100 Degrees | 13 | 59.1% | |
| <80 Degrees | 3 | 13.6% | |
| **Total** | **22** | **100%** | |

**Table 2: Mayo Elbow Performance Score**

| MEPS Category | Number of Patients | Percentage |
|---|---|---|
| Excellent | 9 | 40.9% |
| Good | 11 | 50.0% |

| | | |
|---|---|---|
| Fair | 1 | 4.5% |
| Poor | 1 | 4.5% |
| **Total** | **22** | **100%** |

**Table 3: Persistent Pain at Final Follow-Up**

| Pain Level | Number of Patients | Percentage |
|---|---|---|
| None | 11 | 50.0% |
| Mild | 10 | 45.5% |
| Moderate | 1 | 4.5% |
| Severe | 0 | 0.0% |
| **Total** | **22** | **100%** |

**Table 4: Postoperative Functions in Relation to The Interval Between Injury and Surgery**

| Interval between Injury and Surgery (days) | No. of Patients | Mean Interval (days) | P value |
|---|---|---|---|
| Pain | | | |
| No (0-3 days) | 11 | 6.36 ± 2.06 | 0.01 |
| Mild (4-7 days) | 10 | 9.70 ± 3.02 | |
| Moderate (>15 days) | 1 | 16 | |
| Range of Motion | | | |
| >100 Degrees | 6 | 6.33 ± 2.25 | 0.03 |
| 80-100 Degrees | 13 | 8.08 ± 2.98 | |
| <80 Degrees | 3 | 13.33 ± 2.51 | |
| MEPS | | | |
| Excellent | 9 | 6.0 ± 2.06 | 0.02 |
| Good | 11 | 9.27 ± 2.93 | |
| Fair | 1 | 11 | |
| Poor | 1 | 16 | |

## DISCUSSION

This study emphasizes the paramount importance of early mobilization following orthogonal plating in patients with intercondylar humerus fractures. Orthogonal plating provides a stable framework that enables the early initiation of movement, which is crucial for preventing joint stiffness, a common complication that can severely limit the range of motion and impair functional outcomes.8 The findings suggest that patients who began mobilization exercises within the first week post-surgery exhibited a significantly better range of motion and higher MEPS scores, reflecting an enhanced recovery process.[9]

Moreover, the correlation between the interval from injury to surgery and post-operative functional outcomes highlights an interesting aspect of patient care. Patients treated within a shorter timeframe showed improved pain management, range of motion, and overall elbow performance. This underscores the significance of prompt surgical intervention in managing intercondylar humerus fractures, aligning with the philosophy that earlier is often better for initiating rehabilitation protocols.[10]

Persistent pain at the final follow-up was notably lower in patients who underwent early mobilization, indicating not only the mechanical benefits of orthogonal plating but also its potential to mitigate chronic post-operative pain, thereby improving patients' quality of life. This aspect of recovery is essential, as pain management is a critical component of patient satisfaction and overall treatment success.[11]

The study also reflects the intricate relationship between surgical techniques, rehabilitation protocols, and patient outcomes.[12] It reinforces the idea that a multidisciplinary approach, involving surgeons, physical therapists, and occupational therapists, is crucial in the care of patients with intercondylar humerus fractures. The integration of early mobilization strategies within this framework appears to optimize functional recovery and underscores the importance of individualized patient care plans.

## CONCLUSION

Early mobilization post-orthogonal plating in the management of intercondylar humerus fractures significantly enhances functional recovery, as evidenced by improved range of motion and MEPS scores. This study advocates for the integration of early mobilization into the standard post-operative care protocol, emphasizing the role of a multidisciplinary team in optimizing recovery outcomes. Future research should focus on refining rehabilitation strategies to further improve patient outcomes in the context of complex elbow fractures.

## REFERENCES


1. Jupiter JB, Mehne DK. Fractures of the distal humerus. Orthopedics.1992;15(7):825-33.
2. Begue T. Articular fractures of the distal humerus. Orthop Traumatol Surg Res.2014; 100:55-63.
3. Robinson CM, Hill RM, Jacobs N et al. Adult distal humeral metaphyseal fractures: epidemiology and results of treatment. J Orthop Trauma. 2003; 17 (1) :38-47.
4. Palvanen M, Kannus P, Niemi S, Parkkari J. Secular trends in distal humeral fractures of elderly women: nationwide statistics in Finland between 1970 and 2007. Bone. 2010; 46:1355-8.
5. Riseborough EJ, Radin EL. Intercondylar T fractures of the humerus in the adults. J Bone and Jt Surgery Am.1969; 51: 130-138.

6. Korner J, Lill H, Muller LP et al. Distal humerus fractures in elderly patients. Results after open reduction and internal fixation elderly patients. Osteoporos Int.2005; 16:73-79.
7. Vazquez O, Rutgers M, Ring DC, Walsh M, Egol KA. Fate of the ulnar nerve after operative fixation of distal humerus fractures. J Orthop Trauma. 2010; 24: 395–9.
8. Jung SW, Kang SH, Jeong M, Lim HS. Triangular Fixation Technique for Bicolumn Restoration in Treatment of Distal Humerus Intercondylar Fracture. Clinics in orthopedic surgery. 2016; 8:9-18.
9. Henley Bradford M. Intra-articular distal humeral fractures in adults. Orthop Clin North Am. 1987; 18(1): 11-23.
10. Helfet David L, Schmeling Gregory J. Bicondylar intraarticular fractures of the distal humerus in adults. Clin Orthop. 1993;292: 26-36.
11. Faber KJ, Cody ME, Milne AD et al. Advanced cement technique improves fixation in elbow arthroplasty. Clin Orthop Relat Res. 1997;(334): 150-156.
12. Kaiser T, Brunner A, Hohendorff B, Ulmar B, Babst R. Treatment of supra and intrarticular fractures of the distal humerus with LCP distal humerus plate. A 2 year follow up. J Shoulder Elbow Surg. 2011; 20: 206-212.