



Orthopaedics

FRACTURE UNION AND FUNCTIONAL OUTCOME OF BOTH BONES FOREARM FRACTURES TREATED WITH DYNAMIC COMPRESSION PLATING: A PROSPECTIVE STUDY

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ABSTRACT **Background:** Fractures involving both bones of the forearm are common orthopaedic injuries that can significantly impair upper limb function. Restoration of anatomical alignment and stable fixation is essential to achieve satisfactory functional outcomes. Dynamic Compression Plate (DCP) fixation remains the gold standard for the management of adult diaphyseal forearm fractures. **Materials and Methods:** A prospective observational study was conducted on 50 patients with both-bone forearm fractures treated with open reduction and internal fixation using DCP. Patients were evaluated based on age, gender, fracture type, fracture site, mode of injury, complications, rehabilitation duration, pain assessment using the Visual Analog Scale (VAS), and functional outcome using Anderson scoring criteria. **Results:** The majority of patients belonged to the age group above 39 years. Males were predominantly affected. Road traffic accidents were the most common mode of injury. Middle-third fractures were the most frequent anatomical location. Excellent functional outcomes were observed in 70% of patients, while complications were minimal and manageable. Rehabilitation was completed within 3–6 months in most patients. **Conclusion:** Dynamic Compression Plate fixation is a reliable and effective treatment modality for both-bone forearm fractures, providing stable fixation, early mobilization, high union rates, and excellent functional recovery with minimal complications.

KEYWORDS : Dynamic Compression Plate, ORIF, Functional Outcome.

INTRODUCTION

Forearm fractures involving both the radius and ulna are among the most common long-bone injuries encountered in orthopaedic practice. These fractures are unique because the radius and ulna function together as a single anatomical and biomechanical unit responsible for pronation and supination of the forearm. Even minimal malalignment may significantly impair upper limb function.

Conservative treatment of displaced adult forearm fractures often results in malunion, non-union, and restriction of forearm rotation. Therefore, anatomical reduction and stable internal fixation are essential for restoring functional movement.

Dynamic Compression Plate fixation provides rigid stabilization, preservation of radial bow, and early mobilization, thereby improving union rates and functional outcomes. Open Reduction and Internal Fixation (ORIF) using DCP has become the standard method for managing adult both-bone forearm fractures.

This study was conducted to evaluate the clinical and functional outcomes of DCP fixation in both-bone forearm fractures.

AIMS AND OBJECTIVES

- To study the fracture union of both bones of forearm treated with Dynamic Compression Plating.
- To study functional outcome
- To produce rigid internal fixation.
- To maintain the length, apposition, axial and rotational alignment and to facilitate early mobilisation.

MATERIALS AND METHODS

Study Design: Prospective observational study.

Study Setting: Department of Orthopaedics.

Study Duration: Study conducted over a period of two years.

Sample Size: 50 patients.

Inclusion Criteria

- Adults with diaphyseal fractures of both forearm bones.
- Closed fractures and selected Grade I open fractures.
- Patients willing for surgical management and follow-up.

Exclusion Criteria

- Pathological fractures.
- Pediatric fractures.
- Severe neurovascular injury.
- Patients unfit for surgery.

Surgical Procedure

All patients underwent open reduction and internal fixation using 3.5 mm Dynamic Compression Plates under appropriate anesthesia. Separate surgical approaches were used for the radius and ulna. Fracture reduction was achieved anatomically, and fixation was performed according to AO principles.

Postoperative Management

- Limb elevation and pain control.
- Early finger mobilization.
- Physiotherapy initiated after wound healing.
- Periodic radiographic evaluation.

Outcome Assessment

Functional outcome was assessed using Anderson scoring criteria. Pain was evaluated using the Visual Analog Scale (VAS). Rehabilitation duration and complications were documented.

Methods of Data Collection

Data for this prospective observational study were collected from patients presenting with both-bone forearm fractures to the Department of Orthopaedics at the study institution during the study period. A total of 50 adult patients who fulfilled the inclusion criteria and underwent open reduction and internal fixation using Dynamic Compression Plate (DCP) were included after obtaining informed consent.

Detailed demographic data including age, gender, occupation, and mode of injury were recorded using a predesigned proforma. Clinical examination and radiological evaluation were performed at admission to determine the type and site of fracture. Preoperative investigations were carried out according to institutional protocol.

All patients underwent surgical fixation with Dynamic Compression Plates under standard aseptic precautions. Intraoperative findings and postoperative details were documented systematically.

Patients were followed up at regular intervals postoperatively. Clinical and radiological assessments were performed to evaluate fracture union, range of motion, pain, and complications. Pain was assessed using the Visual Analog Scale (VAS). Functional outcome was evaluated using the Anderson scoring criteria. Duration of rehabilitation and time taken to achieve functional recovery were also recorded.

The collected data were entered into Microsoft Excel and analyzed

using appropriate statistical methods. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used for data interpretation.

RESULTS

A total of 50 patients with both-bone forearm fractures treated with Dynamic Compression Plating were evaluated. Most patients were aged above 39 years, with a predominance of males. Road traffic accidents were the commonest mode of injury. Middle-third fractures were most frequently observed, and radius fractures were slightly more common than ulna fractures. Transverse and segmental fractures were more common on the left side, while comminuted fractures predominated on the right side ($p = 0.016$).

Table 1: Demographic and Fracture Characteristics

Variable	Observation
Common Age Group	>39 years
Gender	Male predominance
Common Mode of Injury	Road traffic accidents
Common Fracture Site	Middle third
Most Involved Bone	Radius
Significant Fracture Pattern	Left – transverse/segmental; Right – comminuted ($p = 0.016$)

Table 2: Complications

Complication	Left n (%)	Right n (%)	P Value
Delayed Union	4 (15.4%)	9 (37.5%)	0.302
Non-Union	6 (23.1%)	4 (16.7%)	
Superficial Infection	8 (30.8%)	7 (29.2%)	
None	8 (30.8%)	4 (16.7%)	

Most complications were minor and managed conservatively without long-term disability.

Table 3: Functional Outcome and Patient Satisfaction

Outcome	Left n (%)	Right n (%)	P Value
Functional Outcome (Anderson Score)	0.681		
Excellent	17 (65.4%)	18 (75.0%)	
Good	7 (26.9%)	4 (16.7%)	
Fair	2 (7.7%)	2 (8.3%)	
Patient Satisfaction			
Excellent	8 (30.8%)	7 (29.2%)	0.440
Good	7 (26.9%)	3 (12.5%)	
Fair	6 (23.1%)	10 (41.7%)	
Poor	5 (19.2%)	4 (16.7%)	

Most patients reported minimal postoperative pain and completed rehabilitation within 3–6 months, with overall excellent to good functional recovery and patient satisfaction

DISCUSSION

Both-bone forearm fractures require precise anatomical reduction because the forearm functions as a coordinated rotational unit. Restoration of radial bow, alignment, and length is crucial for normal pronation and supination.

In the present study, males were more commonly affected, which correlates with previous studies reporting increased exposure of males to high-energy trauma and occupational injuries. Road traffic accidents were the most common mechanism of injury, consistent with modern trauma epidemiology.

The majority of fractures involved the middle third of the forearm, which is biomechanically vulnerable during direct trauma and falls. Dynamic Compression Plate fixation provided rigid stabilization and allowed early mobilization, resulting in excellent functional recovery in most patients.

Complications such as delayed union and superficial infection were observed but remained manageable with proper postoperative care. Low pain scores and satisfactory rehabilitation duration further demonstrate the effectiveness of DCP fixation.

The present findings are consistent with studies by Kumar et al., Saikia et al., and other authors who reported high union rates and favorable functional outcomes with compression plating.

Dynamic Compression Plate fixation is an effective and dependable treatment option for both-bone forearm fractures in adults. It provides stable fixation, restores anatomical alignment, preserves forearm rotation, and facilitates early rehabilitation. The procedure yields high union rates, excellent functional outcomes, low complication rates, and high patient satisfaction when performed according to standard surgical principles.

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CONCLUSION