

## Case Report

# Outcome of segmental distal 1/3rd humeral fracture with radial nerve palsy managed by triple plate fixation in a resource-limited

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## ABSTRACT

Distal humerus fractures caused by high energy injury is not uncommon with radial nerve palsy, but distal 1/3rd segmental humeral fracture extremely rare presentation and management is challenging, especially in resource-limited settings. This case report showed that a 28-year-old male daily laborer by occupation presented with distal 1/3rd segmental humeral fracture with radial nerve palsy post RTA managed by single paratricipital approach combined with available triple plate fixation. This case contributes to the literature by demonstrating that thoughtful surgical planning, creative use of available implants and preserved extensor mechanism soft tissue can lead to excellent functional outcome in a resource-limited setting.

**Keywords:** Segmental distal humerus fracture, Radial nerve palsy, Paratricipital approach, Triple plate fixation, Resource-limited settings

## INTRODUCTION

Distal humerus fracture accounts approximately 2% of all fractures in adults elbow fracture. Majority of the fracture with high velocity injury result in comminuted intraarticular fracture but their limited documentation on rare segment 1/3rd distal humerus fracture. Radial nerve palsy after fracture of the shaft of the humerus occurs in 11.8% particularly Fractures of the middle and distal parts of the shaft had a significantly higher association with radial nerve palsy. Management options vary from conservative to surgical, with anatomical plate fixation being preferred for complex or unstable fractures for better result in terms of functional and radiological outcomes. In developing countries there is significant shortage appropriate size and types of implants. But, in this case report managing with available resources result in successful outcome for extremely rare presentation of segmental distal 1/3rd humeral shaft fracture with radial

nerve palsy by single posterior approach with a triple plate fixation in resource limited settings.

## CASE REPORT

### *Patient details*

A 28-year-old male daily laborer by occupation presented to Debreberhan University, Hakim Gizaw Hospital with pain, swelling, and deformity of the left arm following toad traffic accident (RTA). There was no prior medical illness.

### *Clinical examination*

Swelling and tenderness over the distal third of the humerus with overlying skin bruise. Visible deformity with abnormal arm length and radial nerve palsy evidenced by wrist drops and loss of wrist and finger extension. Distal neurovascular status intact elsewhere.

## Management

### Preoperative planning

In resource-limited settings, fixation with multiple plates was selected due to lack of appropriate size and anatomic plates and fracture complexity. The Para tricipital approach was preferred to minimize soft tissue damage.

### Surgical technique

Under ultrasound guided supraclavicular block, the patient was positioned right lateral side. A posterior longitudinal incision was made, exposing the humerus via the left Para tricipital approach, preserving the triceps insertion. Fracture fragments were identified, radial nerve was contused but intact anatomical integrity, tagged and carefully protected. Fracture reduction and stabilization was achieved with three plates: two orthogonal 3.5 mm reconstruction plate for extra articular distal fracture line and lateral side, a 3.5 mm limited contact dynamic compression plate (LC-DCP) for distal 1/3rd shaft fracture (Figure 1) using single surgical approach to stabilize this extremely rare segmental patterns of the fracture. Hemostasis was secured and the wound was closed in layers.



**Figure 1 (A and B): X-rays revealed a segmental fracture with extraarticular supracondylar and distal third of the humeral shaft fracture lines.**

### Postoperative care

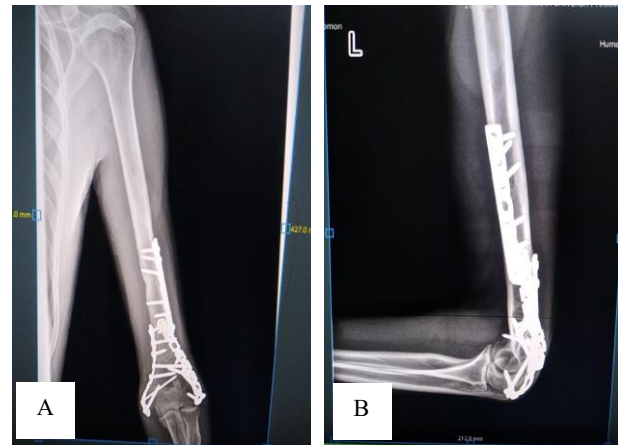
#### Outcome and follow-up

Immobilized with arm sling for 14 days and early passive flexion and extension initiated at 2 weeks; active exercises started at 6 weeks. At 4 months fracture union confirmed radiographically; radial nerve function returned gradually, with complete wrist and finger extension recovery noted at 6 months (Figure 2, 3 and 4). At 12 months full range of motion in the shoulder, elbow and wrist; no pain or deformity and excellent DASH score in functional

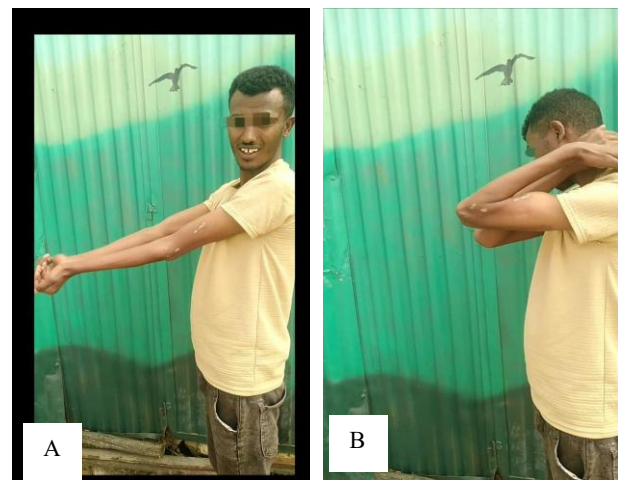
outcome and return to previous activity of daily life (ADL).



**Figure 2 (A and B): Immediate post-operative control X-ray.**



**Figure 3 (A and B): At 1 year of postoperative AP and LAT control X-ray showed well healed fracture sites.**



**Figure 4 (A and B): At 1 year follow-up full elbow range of motion with well recovered radial nerve palsy.**

## DISCUSSION

Majority of distal humerus fracture resulting from high velocity trauma with unstable intraarticular fracture patterns. This case showed extremely rare presentation distal 1/3rd segmental humeral fracture due high energy trauma and there are limited literatures particularly like this fracture patterns. Management of distal humerus fracture with proper implants and rigid fixation of the distal articular fragments and compression at the supracondylar segment yields better fracture healing with reducing post-operative complications. Even though olecranon osteotomy improves the exposure of distal humeral articular surface but has its own disadvantage and should be avoided if possible. The paratricipital approach provides both medial and lateral windows along the side of triceps to preserve extensor mechanism and reducing soft tissue damage resulting in excellent outcome due to extensor sparing surgical technique.

In resource-limited settings, surgical options are constrained by availability of appropriate implants and facilities. This case report demonstrated successful outcome for rare presentation of segmental distal 1/3rd humeral shaft fracture with radial nerve palsy managed by single posterior approach with available triple plate fixation in resource limited developing countries, where advanced fixation systems may be unavailable.

In humeral shaft fracture patients with radial nerve palsy at presentation or post operatively functionally improved in 94% and 89%, respectively. In this distal 1/3rd segmental humeral fractures with intraoperatively identified radial nerve contusion completely recovered over a period of 6 months despite the fracture pattern, single aparatricipital surgical exposure and use of multiple plates for biomechanical stability.

### *Limitations*

This is a single case report, and further studies are required to allow generalization of the findings.

## CONCLUSION

In resource-limited environments, the paratricipital approach with triple plate fixation offers a viable surgical

option in both distal 1/3rd segmental humeral shaft fracture healing and radial nerve palsy, resulting in excellent functional recovery.

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