Journal Homepage: www.ijarpr.com ISSN: 3049-0103 (Online)

International Journal of Advance Research Publication and Reviews

Vol 02, Issue 09, pp 335-337, September 2025

Comminuted Shaft of Humerus Fracture Fixed with Long PHILOS – A Deltoid's Nightmare – A Case Report

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ABSTRACT

Fractures of the humeral shaft present significant challenges due to comminution and instability. We present a case of a 64-year-old male who sustained a comminuted shaft of humerus fracture on the right side following a road traffic accident. The fracture was managed surgically through a deltopectoral approach using a fragment-specific fixation technique. Intraoperatively, six fragments were identified, each temporarily stabilized with K-wires, followed by fixation with interfragmentary screws, and final stabilization using a long PHILOS plate. During exposure, partial deltoid erasure was required, which may contribute to postoperative abduction weakness. The patient achieved good fracture healing and functional recovery, though some limitation in abduction was observed. This case highlights both the effectiveness and the challenges of PHILOS fixation in comminuted shaft fractures, emphasizing the need for further research to minimize postoperative functional deficits.

Keywords: Humerus shaft fracture, PHILOS plate, fragment-specific fixation, deltopectoral approach, abduction loss

Introduction

Humeral shaft fractures constitute approximately 1–3% of all fractures. Although many can be treated conservatively, comminuted fractures often require surgical stabilization. Various implants such as dynamic compression plates and intramedullary nails have been used. However, in cases of severe comminution, achieving stable fixation is challenging. The PHILOS plate, with its multiple locking screw options, offers biomechanical stability and has been successfully used beyond proximal humerus fractures. We report a case of a comminuted right humeral shaft fracture treated with fragment-specific fixation using long PHILOS, and discuss outcomes including postoperative abduction loss.

Case Report

A 64-year-old male presented to Sri Venkateshwara Medical College, Pondicherry, in August 2025 following a road traffic accident. On examination, there was swelling, deformity, and tenderness over the right arm. Radiographs revealed a comminuted shaft of humerus fracture.

After preoperative evaluation, surgical fixation was planned. The procedure was performed under general anesthesia using a deltopectoral approach. During exposure, partial deltoid erasure was necessary to access the fracture site. Intraoperatively, six fragments were identified. Each fragment was temporarily stabilized with K-wires, followed by definitive fixation with interfragmentary screws. Finally, a long PHILOS plate was applied to achieve stable fixation. Intraoperative fluoroscopy confirmed satisfactory alignment and fixation.

Postoperatively, the patient was started on early mobilization. At follow-up, the fracture demonstrated satisfactory healing. However, the patient exhibited some limitation of abduction, likely due to deltoid involvement during the approach.

Discussion

Comminuted humeral shaft fractures are difficult to manage due to instability and risk of non-union. Conventional fixation methods may fail in the presence of multiple small fragments. The deltopectoral approach provided adequate exposure for reduction, though deltoid detachment or erasure may compromise postoperative shoulder abduction.

Temporary stabilization with K-wires, followed by interfragmentary screws, allowed anatomical alignment before definitive fixation with the PHILOS plate. This fragment-specific fixation strategy provided both stability and preservation of biological healing potential.

While PHILOS fixation achieved union and functional use of the arm, abduction loss was observed. This highlights an important limitation of the approach and the need for refinement of surgical techniques to minimize functional compromise. Further research is warranted to explore alternative approaches or modifications that can preserve deltoid function.

Conclusion

Long PHILOS plates with fragment-specific fixation can be a reliable option for managing complex comminuted humeral shaft fractures. However, the deltopectoral approach with partial deltoid erasure may contribute to postoperative abduction loss. Careful technique and further research are needed to overcome this limitation.

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