



COMPARISON OF FUNCTIONAL OUTCOMES BETWEEN PHILOS PLATE AND EXTERNAL FIXATOR IN PROXIMAL HUMERUS FRACTURES

Orthopaedics

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ABSTRACT

Background: Proximal humeral fractures account for nearly 4–5% of all fractures, particularly in elderly patients with osteoporosis. Selecting an optimal fixation method remains a challenge, with PHILOS plates and external fixators being widely used options. **Objective:** To evaluate and compare the functional outcomes of PHILOS plating and external fixation in the management of proximal humerus fractures. **Methods:** A retrospective comparative study was carried out in the Orthopaedic Surgery Department of Rohilkhand medical college and hospital, from march 2023 to February 2024. A total of 56 patients were enrolled, divided equally into two groups: Group A treated with PHILOS plates and Group B treated with external fixators. Functional outcomes were assessed 12 weeks postoperatively using the Constant Shoulder Score. Data were analyzed using SPSS v22, with significance set at $p \leq 0.05$. **Results:** Both groups were comparable in age (Group A: 44.36 ± 11.71 years, Group B: 44.88 ± 10.05 years). The mean Constant score was significantly higher in the external fixator group (69.05 ± 13.20) than in the PHILOS plate group (61.45 ± 17.55 ; $p = 0.011$). In Group A, 44.6% achieved excellent outcomes compared to 64.3% in Group B. Stratification analysis revealed that age was the only demographic factor significantly influencing outcome ($p < 0.05$). **Conclusion:** External fixation provided superior functional outcomes compared to PHILOS plating in patients with proximal humerus fractures. Given its minimally invasive nature and favorable recovery profile, external fixation may be considered the preferred treatment option in routine orthopedic practice.

KEYWORDS

Proximal humerus fracture, PHILOS plate, External fixation, Functional outcomes, Constant score

INTRODUCTION

Proximal humerus fractures (PHFs) represent approximately 4–5% of all fractures and are especially common among older patients with osteoporotic bone. Their rising incidence has been attributed to increased road traffic accidents and high-energy trauma. Although nonoperative management is often sufficient for minimally displaced fractures, unstable or complex fractures usually require surgical intervention.

Several surgical techniques have been developed, including PHILOS (Proximal Humerus Internal Locking System) plating, external fixation, percutaneous pinning, intramedullary nailing, and hemiarthroplasty. The choice of procedure depends on fracture pattern, patient age, bone quality, and surgeon experience. PHILOS plates provide angular stability and strong fixation in osteoporotic bone, whereas external fixators offer a minimally invasive, cost-effective option with shorter operative time and lower morbidity.

Despite their widespread use, evidence comparing the outcomes of PHILOS plates versus external fixation remains limited in the local context. This study was designed to compare functional results between these two methods using the Constant Shoulder Score.

MATERIALS AND METHODS

Study Design And Setting: This retrospective comparative study was conducted in the Department of Orthopaedic Surgery, Rohilkhand medical college and hospital, from march 2023 to February 2024. Ethical approval was obtained, and informed consent was secured from all participants.

Sample Size And Selection: A total of 56 patients with proximal humerus fractures were included, with 23 patients allocated to each group. Inclusion criteria comprised skeletally mature patients aged 20–80 years with acute proximal humerus fractures. Exclusion criteria included open physis, revision surgeries, and patients lost to follow-up.

Surgical Technique:

- Group A (PHILOS Plate):** Open reduction and internal fixation were performed via the deltopectoral approach. Anatomical reduction was achieved under direct visualization, and PHILOS plates were applied with locking screws.

- Group B (External Fixator):** Closed reduction was performed under image intensifier guidance. Schanz pins were inserted percutaneously in the safe zones and connected with rods to stabilize the fracture.

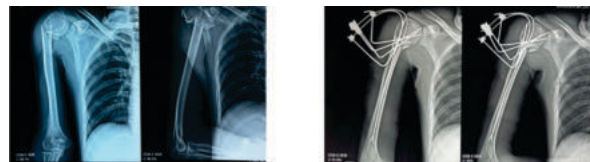


Fig. 1 Pre and Post op X rays of proximal humerus fracture Male 34yr age managed by external fixator



Fig. 2 Pre and post p x ray of proximal humerus fracture Male 40yrs managed by PHILOS plate

Postoperatively, both groups underwent early mobilization as tolerated.

Outcome Assessment: Functional outcome was assessed at 12 weeks using the Constant Shoulder Score, which evaluates pain, daily activity, range of motion, and strength. Outcomes were categorized as Excellent ≥ 70 , Very Good 60–69, Good 40–59, Fair 30–39, and Poor < 30 .

Statistical Analysis: Data were analyzed using SPSS v22. Continuous variables were expressed as mean $\pm$ SD, while categorical variables were reported as frequencies and percentages. The chi-square test was used for categorical comparisons. A p -value ≤ 0.05 was considered statistically significant.

RESULTS

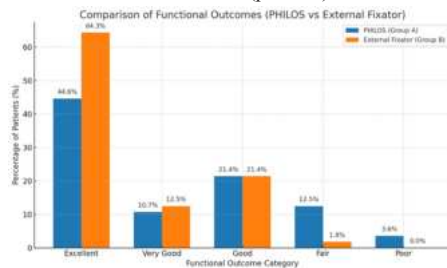
Demographics: The mean age was similar in both groups (Group A: 44.36 ± 11.71 years; Group B: 44.88 ± 10.05 years). Males predominated (Group A: 18, Group B: 21). Right-sided fractures were

more frequent in both groups (67.9% vs 73.2%). The mean BMI was significantly higher in Group B (28.89 ± 3.77) compared to Group A (24.29 ± 4.23 ; $p < 0.001$).

Functional Outcomes: The mean Constant score was higher in Group B (69.05 ± 13.20) than Group A (61.45 ± 17.55 ; $p = 0.011$).

- **Group A (PHILOS):** 44.6% excellent, 10.7% very good, 21.4% good, 12.5% fair, 3.6% poor.
- **Group B (External Fixator):** 64.3% excellent, 12.5% very good, 21.4% good, 1.8% fair.

Age stratification showed significantly better outcomes in older patients treated with external fixators ($p = 0.01$).



DISCUSSION

This study compared PHILOS plating and external fixation in proximal humerus fractures. Our findings demonstrate superior functional results with external fixation at 12 weeks. The mean Constant score was significantly higher in the external fixator group, consistent with prior studies reporting favorable outcomes in elderly patients with osteoporotic bone.

PHILOS plating remains effective, particularly in younger patients with good bone quality, offering stable fixation and anatomical alignment. However, it is associated with higher complication rates, longer operative times, and increased cost. External fixation, by contrast, is minimally invasive, avoids extensive soft tissue dissection, and facilitates early mobilization with fewer complications.

These results align with studies by Gupta et al. and Monga et al., who reported excellent to good outcomes in a majority of patients treated with external fixators. Our study further supports external fixation as a viable and often superior alternative to PHILOS plating in selected patients.

Limitations: This study was retrospective in design with a relatively short follow-up period (12 weeks). Larger randomized controlled trials with longer follow-up are needed to confirm these findings.

CONCLUSION

External fixation achieved better functional outcomes than PHILOS plating in proximal humerus fractures, particularly in older patients. Given its minimally invasive approach, lower morbidity, and favorable results, external fixation should be considered a preferred treatment option in routine orthopedic practice.

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