



E-ISSN: 2395-1958  
P-ISSN: 2706-6630  
IJOS 2023; 9(1): 10-12  
© 2023 IJOS  
<https://www.orthopaper.com>  
Received: 13-10-2022  
Accepted: 16-12-2022

**Dr. Rajesh Kishanrao Ambulgekar**  
HOD, Department of Orthopaedics, Dr. SCGMC, Nanded, Maharashtra, India

**Dr. Shivkumar Sadashiv Thorat**  
Jr3, Department of Orthopaedics, Dr. SCGMC, Nanded, Maharashtra, India

## Functional outcome of proximal humerus fracture fixation in elderly managed with percutaneous K wire fixation: Observation study of 28 patients

**Dr. Rajesh Kishanrao Ambulgekar and Dr. Shivkumar Sadashiv Thorat**

DOI: <https://doi.org/10.22271/ortho.2023.v9.i1a.3268>

### Abstract

**Introduction:** Proximal humerus fracture represents the second most common fracture in upper extremity in elderly. Percutaneous fixation has reported to have good functional outcome and has lesser complications rate. In our study we have tried to observe the functional outcome and complication rates of percutaneous fixation for proximal humerus fracture in elderly with Neer type I, II & III.

**Aim:** This study aimed to observe the functional outcome and complication rates of percutaneous fixation for proximal humerus fracture in elderly with Neer type I, II & III.

**Materials and Methods:** This study included 28 patients aged between 55 to 80 years having proximal humerus fracture Neer Type I, II and III presenting to our institute between June 2021 and September 2022. Patients were evaluated clinically and radiological evaluation was done in the form of Xray and CT scan. All patients fulfilling the inclusion criteria were managed with percutaneous K-wire fixation. Post-operative check Xray was done and physiotherapy was advised. Patient were followed up for minimum 10 months and evaluated for radiological union and function outcome using the DASH score.

**Results:** All patients had radiological union in mean 8.2 months. DASH core was used to evaluate shoulder function. DASH score was excellent in 20 patients and was good in 6 patients while it was fair in 2 patients. Out of 28 patients 22 patients did not have any major complications 7 had k wire backout, 2 patients had entry point infection and 1 patient had K-wire migration.

**Conclusion:** K wire fixation of proximal humerus fracture in elderly with Neer type I, II and III, gives a good radiological and functional outcome comparable with other modalities of treatment with low complication rate.

**Keywords:** Proximal humerus fracture, K wire fixation, neer's classification, DASH score

### Introduction

Fractures of the proximal humerus accounts for approximately 4 – 5% of the fracture attendance at the hospital <sup>[1]</sup>. The female and male ratio is 2:1 <sup>[2]</sup>. They occur more commonly in elderly patients, after cancellous bone of the humeral neck has been weakened by age related osteoporosis. These fractures can cause extreme disability; hence their management demands experienced surgical skills. The preferred treatment depends on various factors including the patient's age, bone quality, the patterns of fracture and the patients' expectations and physical demands.

### Patients and Method

We included patient aged between 55 years to 80 years with Neer type I, II or III proximal humerus fracture presenting at our institute between June 2021 to September 2022, who were not having any severe comorbidities and who were fit for surgery. All fractures were fixed with 3 or 3.5mm threaded k wire. Post operative check X-ray was done and physiotherapy was started. Patients were evaluated in follow up for radiological union and functional outcome using the DASH score.

### Radiological Evaluation

Preoperative X-ray of injured shoulder Antero-Posterior view and trans-axillary view were taken. CT scan of the involved shoulder was done in all patients to understand the pattern of fracture.

**Corresponding Author:**  
**Dr. Shivkumar Sadashiv Thorat**  
Jr3, Department of Orthopaedics, Dr. SCGMC, Nanded, Maharashtra, India

### Surgical Procedure

Patients who were fit for surgery were taken for fixation. Patients were operated under supraclavicular block in beach chair position. Manipulation was done to attain reduction under image intensifier. Threaded K wire of 3 or 3.5mm were used. Two or three K wire were passed in multiple planes from proximal humerus shaft into the head till the subchondral region and two k wire were passed from the greater tuberosity into proximal humerus shaft into the medial cortex. Post fixation reduction was confirmed under image intensifier.

Arm was kept in abduction post operatively and physiotherapy was started from post-operative day 2.

### Follow up

Patients were followed up for minimum 12 months and evaluated for radiological union on X-ray AP lateral view of the shoulder and functional outcome was evaluated using DASH score and graded as excellent, good, fair and poor.

### Statistics and Result

In our study, total 28 patients were included of which 16(57.1 %) were female and 12(42.9 %) were male. Mode of trauma for most patient was fall from standing height (23[82.1%]) followed by road traffic accident (4[14.3%]) while 1 patient (3.6%) had fracture following convulsion. Mean follow up months was 10.2 months. All 28 patients had radiological union in mean 8.2 months. DASH score was excellent in 20 patients and was good in 6 patients while it was fair in 2 patients. Out of 28 patients 22 patients did not have any major complications 7 had k wire backout which were reintroduced if presented early, 2 patients had entry point infection which were managed with debridement and 1 patient had K-wire migration into shoulder joint which was later taken out. Shoulder stiffness was noted in 8 patients and terminal restriction of abduction and internal and external rotation.



Fig 1: Post op xrays



Range of motion on follow-up

Fig 2: Clinical photo

### Discussion

Un-displaced proximal humeral fractures can be treated conservatively. However, displaced fractures require surgical treatment for better outcomes. The treatment goal is to achieve a painless shoulder with full range of motion. Many different fixation techniques such as nonabsorbable bone suture, tension band wiring, percutaneous K-wire fixation, T-plate fixation, intramedullary device, and hemiarthroplasty have been used for these difficult fractures. However, all the techniques have a persistent rate of mechanical failure and may increase the complication rates [3].

Percutaneous pinning is a minimally invasive technique with limited indications. Amenable fracture patterns include 2-part proximal humerus fractures, ideally of the surgical neck, and 3- or 4-part fractures with adequate bone stock [4]. Theoretically, this technique limits iatrogenic vascular compromise, postoperative pain, operative time, and blood loss while improving cosmesis.

Good outcomes can be achieved 70% of the time in 2-part fracture patterns [5]. Comparison of percutaneous techniques in all fracture patterns revealed, as one may expect, that 4-part fractures had the poorest results [6]. Better outcomes are reported using percutaneous fixation in patients with good bone quality, an intact medial calcar, lack of proximal shaft comminution, and stable fixation under dynamic fluoroscopy [7]. Reported complications of this technique include pin track infections, avascular necrosis of the humeral head, and pin migration with resultant loss of reduction [4].

Treatment of displaced proximal humeral fractures can be challenging. Although conservative treatment leads to good results in mildly displaced fractures, outcomes following operative treatment of displaced fractures is heterogeneous. Open reduction and internal fixation is the most frequently performed operative procedure for treatment of displaced proximal humeral fractures [8]. Fixation by use of locking implants has become an established treatment and results have improved in comparison to conventional fixation techniques [9]. However, complication rates following open reduction and internal fixation of displaced proximal humeral fractures still account for up to 30% and numerous studies investigated factors associated with poor outcome [10-14].

Several studies evaluated risk-factors of complications and unsuccessful functional outcomes after locked plating of proximal humeral fractures [15-18]. Comorbidities and the integrity of the medial hinge have been shown to significantly influence clinical outcome and should be assessed for indication preoperatively [15, 17].

Dolfi *et al.* [18] operated Type II, Type III, and Type IV fractures of proximal humerus using distally threaded dynamic hip screw guide pins, 2 mm K-wires, or 2.5 mm distally threaded Schantz pins. In their study, all patient with Neer's Type IV fractures did not respond to fixation and three had avascular necrosis (AVN), irrespective of the type of pin used. They concluded that stable fixation with early motion and subsequently good results can be obtained using percutaneous fixation in patients with Type II and Type III fractures; however, terminally threaded pins must be used and smooth K-wires must be avoided. Resch *et al.* [19] reported a technique of closed reduction and percutaneous fixation for displaced proximal humerus fractures. Resch reported an AVN rate of 0% in three-part fractures and 11% in four-part fractures.

In our study, we used threaded K-wire to fix proximal humerus fracture of type I, II & III and found 100% union rate with some patients developing complications which were amenable to treatment in most cases. There were no cases of non union, AVN (avascular necrosis) or loss of reduction post fixation. Functional outcome was comparable with other modalities of treatment like open reduction and internal

fixation with PHILOS plating.

### Conclusion

In our study we concluded that fixation of proximal humerus fracture of Neer type I, II, III with threaded K-wire gives good radiological and functional outcome with minimal complication which are amendable to treatment in most cases. Hence, K wire fixation of proximal humerus fractures can be considered as a good alternative treatment with less invasive technique and less blood loss in elderly patients.

### Conflict of Interest

Not available

### Financial Support

Not available

### References

1. Constant CR, Murley AH. A clinical method of functional assessment of the shoulder. *Clin Orthop Relat Res*; c1987 Jan
2. Rockwood and Green's fractures in adults 6th ed., 1, p.1162-1180.
3. Rajasekhar C, Ray PS, Bhamra MS. Fixation of proximal humeral fractures with the Polarus nail. *J Shoulder Elbow Surg*. 2001;10:7-10.
4. Calvo E, de Miguel I, de la Cruz JJ, L'opez- Mart'ın N. "Percutaneous fixation of displaced proximal humeral fractures: indications based on the correlation between clinical and radiographic results," *Journal of Shoulder and Elbow Surgery*. 2007;16(6):774-781.
5. Tepass A, Blumenstock G, Weise K, Rolauffs B, Bahrs C. Current strategies for the treatment of proximal humeral fractures: an analysis of a survey carried out at 348 hospitals in Germany, Austria, and Switzerland. *Journal of shoulder and elbow surgery*. 2013;22(1):e8-14. <https://doi.org/10.1016/j.jse.2012.04.002> PMID: 22818893
6. Haasters F, Siebenburger G, Helfen T, Daferner M, Bocker W, Ockert B. Complications of locked plating for proximal humeral fractures-are we getting any better? *Journal of shoulder and elbow surgery* 2016;25(10):e295-303.
7. Spross C, Platz A, Rufibach K, Lattmann T, Forberger J, Dietrich M. The PHILOS plate for proximal humeral fractures risk factors for complications at one year. *J Trauma Acute Care Surg*. 2012;72(3):783-92. <https://doi.org/10.1097/TA.0b013e31822c1b5b> PMID: 22491570.
8. Moonot P, Ashwood N, Hamlet M. Early results for treatment of three- and four-part fractures of the proximal humerus using the PHILOS plate system. *The Journal of bone and joint surgery British volume*. 2007;89(9):1206-9. <https://doi.org/10.1302/0301-620X.89B9.18528> PMID: 17905959
9. Jaberg H, Warner JJP, Jakob RP. "Percutaneous stabilization of unstable fractures of the humerus," *Journal of Bone and Joint Surgery A*. 1992;74(4):508-515.
10. Alexa O, Puha B, Veliceasa B, Popia I. "Percutaneous pinning for proximal humerus fractures," *Revista Medico- Chirurgicala a Societatii de Medici si Naturalisti din Iasi's*. 2007;111(1):184-189.
11. Keener JD, Parsons BO, Flatow EL, Rogers K, Williams GR, Galatz LM. Outcomes after percutaneous reduction and fixation of proximal humeral fractures, *Journal of Shoulder and Elbow Surgery*. 2007;16(3):330-338.
12. Erasmo R, Guerra G, Guerra L. Fractures and fracture-dislocations of the proximal humerus: A retrospective analysis of 82 cases treated with the Philos((R)) locking plate. *Injury*. 2014;45 Suppl 6:S43-8. <https://doi.org/10.1016/j.injury.2014.10.022> PMID: 25457318
13. Sudkamp N, Bayer J, Hepp P, Voigt C, Oestern H, Kaab M, *et al*. Open reduction and internal fixation of proximal humeral fractures with use of the locking proximal humerus plate. Results of a prospective, multicenter, observational study. *The Journal of bone and joint surgery American volume*. 2009;91(6):1320-8. <https://doi.org/10.2106/JBJS.H.00006> PMID: 19487508.
14. Lee CW, Shin SJ. Prognostic factors for unstable proximal humeral fractures treated with locking-plate fixation. *Journal of shoulder and elbow surgery*. 2009;18(1):83-8. <https://doi.org/10.1016/j.jse.2008.06.014> PMID: 19095180.
15. Jost B, Spross C, Grehn H, Gerber C. Locking plate fixation of fractures of the proximal humerus: analysis of complications, revision strategies and outcome. *Journal of shoulder and elbow surgery*. 2013;22(4):542-9. <https://doi.org/10.1016/j.jse.2012.06.008> PMID: 22959524
16. Spross C, Zeledon R, Zdravkovic V, Jost B. How bone quality may influence intraoperative and early postoperative problems after angular stable open reduction-internal fixation of proximal humeral fractures. *Journal of shoulder and elbow surgery*. 2017;26(9):1566-72
17. Hertel R, Hempfing A, Stiehler M, Leunig M. Predictors of humeral head ischemia after intracapsular fracture of the proximal humerus. *Journal of shoulder and elbow surgery*. 2004;13(4):427-33.
18. Dolfi H Jr., Saunders DT, Johnson MP, Roy S, Thomas D. Percutaneous fixation of proximal humeral fractures. *Clin Orthop* 2000;375:97-104.
19. Resch H, Povacz P, Frhlich R, *et al*. Percutaneous fixation of three- and four-part fractures of the proximal humerus. *J Bone Joint Surg Br* 1997;79:295-300.

#### How to Cite This Article

Thorat SS, Ambulgekar RK. Functional outcome of proximal humerus fracture fixation in elderly managed with percutaneous k wire fixation: Observation study of 28 patients. *International Journal of Orthopaedics Sciences*. 2023;9(1):10-12.

#### Creative Commons (CC) License

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.