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**Dr. Niranjan Tadvi**  
Associate Professor, Department  
of Orthopedics, PIMSR (Parul  
Institute of Science and  
Research), Vadodara, Gujarat,  
India

## Surgical treatment of extra articular supra condylar fractures of distal humerus in old aged patients with using closed reduction and fixation with 4mm cc screws

**Dr. Niranjan Tadvi**

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### Abstract

**Background:** This study evaluate clinical, radiological, functional outcomes and complications with a long follow-up of extra articular supracondylar fracture in elderly patient treated with closed reduction and fixation with using 4mm cc screws.

**Methods:** This study was conducted in Parul institute of medical science and research (PIMSR) vadodara, between January 2017 to December 2019, During that period Total 20 consecutive elderly patients 12 female and 8 male with extra articular supracondylar fracture treated with closed reduction and fixation with using 4mm cc screws. The clinical outcome was measured with pain levels, range of motion, and the Mayo Elbow Performance Score. Radiographs at latest follow-up were assessed for union, delayed union, nonunion, and hardware failure.

**Results:** At most recent follow-up, The mean Mayo Elbow Performance scores were 92. According to Mayo Elbow Performance Index 16 patients had excellent outcome, 2 had good, 1 had fair and 1 had poor outcomes. Complications included nonunion, delayed union, implant backout screws required revision surgery with removal of implant + Open reduction plating and bone grafting.

**Discussion:** Operative time was very less , all fracture were treated in manner of closed reduction so no much blood loss which were again helped in post of recovery of patient and added biological fixation advantages to fracture which further giving early consolidation of fracture in elderly patients with early mobilization and better outcome with very less complications.

**Keywords:** Extra articular distal humeral fracture, supracondylar fracture, low transcondylar fracture, closed reduction and internal fixation with 4 mm cc screw

### Introduction

Fracture of supracondylar in young adults occur mostly from high energy trauma, sideswipe injuries, motor vehicle accidents, fall from height and gunshot wounds but In elderly persons with more osteoporotic bone most of these injuries occur from falls on outstretched hand with elbow in hyperextension with forearm either in supinated or pronated positions.

Surgeons who treat fracture of the distal humerus frequently have realized the challenges that arise related to poor bony quality, varying patterns of distal humeral fractures are common in adults. Malunion and nonunion are also common.

### Aim of study

The purpose of this prospective study was

- to evaluate clinical, radiological, functional outcomes and complications with a long follow-up of extra articular supracondylar fracture in elderly patient treated with closed reduction and fixation with using 4mm cc screws

### Material and method

This study was conducted in Parul institute of medical science and research (PIMSR) vadodara, between January 2017 to December 2019, during that period Total 20 consecutive elderly patients 12 female and 8 male with extra articular supracondylar fracture treated with closed reduction and fixation with using 4mm cc screws.

**Corresponding Author:**  
**Dr. Niranjan Tadvi**  
Associate Professor, Department  
of Orthopedics, PIMSR (Parul  
Institute of Science and  
Research), Vadodara, Gujarat,  
India

**Inclusion criteria**

1. Age more than 60 years
2. Only extra articular, displaced closed supra condylar distal humerus fracture
3. Without nerve injury,
4. Multiple trauma patient.

**Exclusion criteria**

1. Age less than 60 years
2. Malunion & nonunion with preoperative stiffness
3. Intra articular supra condylar distal humerus fracture,
4. Open fractures

All were closed injuries without nerve injury, eight patients had medical or other systemic diseases.

8(40%) patients were male and 12 (60%) were female and The average age at the time of injury was 67 years (range 62-85).

The mechanism of injury was RTA in 4 (20%), Direct trauma in 6(30%) and Fall from height in 10 (50%).

9 patient (45%) fractures involved the left elbow of which one was dominant and 11 (55%) were right elbow all of which were dominant.

one with fracture shaft of femur, one with both bone leg, one with fracture shaft of humerus and the last with superior and inferior pubic ramii and two had ulnar nerve neurapraxia which recovered later in two months.

Four patients had associated diabetes mellitus, one had systemic hypertension and one had both.

According to AO/OTA fracture classification

- A2: simple
  - A2.2 oblique - 3 Patients
  - A1.3 transverse - 11
- A3: wedge or multifragmentary
  - A3.2 intact or fragmentary wedge - 5 Patients
  - A3.3 multifragmentary - 2 Patients

**Descriptive Statistics based on Type of Fracture****Preoperative evaluation**

On admission details history taken from patient and relatives regarding mode of injuries, associated injuries and comorbidity, patients were examined clinically for that. local examination for skin and soft tissue injuries, evidence of fracture displacements, deformity and neurovascular status.

After thorough clinical evaluation traction x-ray of the affected elbow was taken in both AP and lat view including mid third humerus and proximal third forearm to assess the geometry and configuration of fracture fragments to decide about the implants and method of fixation.

Out of 20 patient 7 patient need 3D CT scan to rule out intra articular extension.

The limb was immobilized in above elbow slab with positioning the forearm in supination or mid prone according to the site of fracture with sling.

The patients were taken up for surgery after routine investigations.

Some of our patients had associated medical problems and associated injuries were diagnosed, they were started on treatment.

Medical fitness was obtained prior surgery after treating for

surgical and medical comorbidities all the patients & assessed for general or regional anaesthesia to each patient regarding the operative procedure and the possible complications associated with the surgical procedure and that the result of the procedure considerably depends on the patients own motivation to regain full function and the detailed written and informed consent was obtained.

**Surgical technique**

All 20 patients were operated under regional anaesthesia, under tourniquete in supine position under C-arm (IITV) in side by table.

Reduction achieved with traction with counter traction and closed manner manipulation, once reduction achieved & confirmed in AP and Lateral view of C- arm, fracture were temporarily fixed with 2 mm k wires, Again reduction confirmed in Ap and Lateral view of C-arm.

Medially small incision of sized 1.5 putted to insert guide wire and screws under vision to protect ulnar nerve.

Guide wire of 4 mm cc screw were inserted in crisscross direction one from from the lower medial edge of the trochlea to the lateral cortex of the distal humerus and the other from the lower lateral edge of the capitellum to the medial cortex of the distal humerus, After drilling, fully threaded cannulated screws (4. mm in diameter) were inserted along the each guide wire.

Reduction, stability checked under C arm, all were stable.

After thoroughly wash closure done in layers, and AE slab given.

**Post-operative care**

All post op patient given AE slab immobilization, no one patient had neurovascular deficiency in post op.

After 48 hours, the first post-operative dressing was done, the subsequent dressing was kept light and firm, Patients were discharged by 6<sup>th</sup> to 8<sup>th</sup> post op day and advised to come for review on 12<sup>th</sup> to 14<sup>th</sup> post op day for removal of suture. The patient was advised at the time of discharge to continue the slab, arm pouch, oral antibiotics and shoulder mobilization.

**Follow up**

Patients were kept under regular followup. All post op patient given AE slab immobilization till 25 -30 days.

After that patient were started active gentle mobilization of operated limb till pain permit with active and passive physiotherapy to all patient till 1 -3 months.

Full activity was allowed at three to four months as fracture consolidation occurred.

**Results and analysis**

Post operatively patients were reviewed every two weeks for the first two months and monthly for the next two months, then every two months until fracture healing or full range of motion was regained.

All the fractures united radiologically with the average union time being 12 weeks (9 – 16wks)

Functional outcome was assessed with Mayo Elbow Performance scores.

This index divides 100 points among a physician assessment of 4 Criteria.

**Table 1:** Mayo elbow performance index

Criteria		Points
	Pain	Pain
Ulna humeral motion		20
Stability		10
Functional task		25
Pain	No pain	45
	Mild	30
	Moderate	15
	Severe	0
Ulna humeral motion	Flexion-extension arc < 100°	10
	Flexion-extension arc > 100°	20
Stability	Stable	10
	Unstable	0
Functional task	Toileting	5
	Dressing	5
	Eating	5
	Writing	5
	Driving	5
Rating of mayo elbow performance score		
Excellent : 90-100 points		
Good : 75-89 points		
Fair : 60-74 points		
Poor : Less than 60 points		

The mean operation time was 45 min (range 40-90 min).  
The average follow-up duration was 25 months (range 12 -34 months).

The mean Mayo Elbow Performance scores were 92 (range 85 - 99). The elbow extension-flexion arc was 120° -125° The mean pronation-supination angle was 70° -75°.

According to Mayo Elbow Performance Index 14 (70%) patients had complete pain free movements at the end of three months, 4(20%) had mild pain, one (5%) moderate and one (5%) had severe pain.

Among 20 patients 19(95%) patients had stable fixation and that one(5%) patient having instability is mainly due to implant failure and nonunion.

Regarding flexion extension arc 17(85%) patients had more than 100 degrees of FE arc 3(15 %) patients had less than 100 degrees of FE arc.

Regarding functional activities of daily living, 15 patients could be able to do all activities (Toileting, Dressing, Eating, Writing, Driving).

3 could be able to do all except toileting, 1 all except driving & toileting, 1 all except toileting & eating.

3 patients whom had poor FE arc could not be able to do anything except writing. According to most patients writing was the most easiest task and toileting was the most difficult task to do.

According to Mayo Elbow Performance Index

16 (80%) patients had excellent outcome,

2 (10%) had good,

1 (5%) had fair and

1 (5%) had poor outcomes.

Patient who had associated nonunion with implant backout screws required revision surgery with removal of implant + Open reduction double column plate and bone grafting.

### Discussion

Due poor bone stock in elderly patient management of extra articular supra condylar fracture challenging for good outcome.

Supine position of the patients with the folded towel beneath elbow and arm and forearm held by assistant by the side

not only gives convenient access to the anaesthetist but also to the surgeon.

Moreover flexion of the elbow in this position was observed good.

C arm easily placed on side by table and AP and lateral view can seen by easily rotating elbow.

Operative time was very less, all fracture were treated in manner of closed reduction so no much blood loss which were again helped in post of recovery of patient and added biological fixation advantages to fracture which further giving early consolidation of fracture in elderly patients with early mobilization and better outcome with very less complications.



### Conclusion

In geriatric patients with transcondylar fractures of the distal humerus, a crisscross fixation with two cannulated screws provides satisfactory results that allow a nearly full range of elbow motion with minimal surgical morbidity.

From this study we arrive at the following conclusion:

- closed reduction and internal fixation of extra articular supra condylar fracture of distal humerus with fully threaded 4 mm cc screws gives good result with nearly full range of motion of elbow motion.
- very less surgical morbidity
- minimal complication like mild impinging of head of screw

### References

1. Keon Cohen BT. Fracture of the elbow. J Bone Joint Surgery. 1966;48A:1623.
2. Miller WE. Communitated fracture of the distal end of the humerus in the adult. AA OS Instructional Course Lectures. J Bone Joint Surgery. 1964;46A:644.
3. Aitken GK, Rorabeck CH. Distal humeral fractures in the adult. Clin Orthop Relat Res. 1986;(207):191-197
4. Ackerman G, Jupiter JB. Non-union of fractures of the

- distal end of the humerus. *J Bone Joint Surg Am* 1988;70(1):75-83
5. Watson Jones P. Fractures and joint injuries. 4th ed. Living stone, Edinburgh, 1947.
  6. Muller ME, Allgower M, Willenegger H. Technique of internal fixation as fractures. New York, Springler, 1958.
  7. Grantham SA, Tietjen R. Transcondylar fracture-dislocation of the elbow. A case report. *J Bone Joint Surg Am* 1976;58(7):1030-1031.
  8. Jupiter JB, Neff U, Holzach P, Allgower M. Intercondylar fractures of humerus: an operative approach. *Am J Bone Joint Surgery*. 1985;67A:226-31.77
  9. Gupta R (1996) Intercondylar fractures of the distal humerus in adults. *Injury* 27(8):569–572.
  10. Brain J. Holdsworth, Mossad MM. Fractures of the adult distal humerus - Elbow function after internal fixation. *Br J Bone Joint Surgery* 1990;72B:362-5.
  11. Job N. Doornberg, David Ring. Pain dominates measurements of elbow function and health status. *J Bone and Joint Surgery*. 2005;87-A:1725-31.
  12. Mickae Mikee *et al.* Re construction after malunion and non-union of intra-articular fractures of the distal humerus. Methods and results in 13 adults. *JBJS* 1994;763:614-21.
  13. Snell RS. Clinical anatomy. 7th ed. Lippincott Williams and Wilkins, 2004.
  14. Helfet DL, Kloen P, Anand N, Rosen HS. Open reduction and internal fixation of delayed unions and nonunions of fractures of the distal part of the humerus. *J Bone Joint Surg Am* 2003;85-A(1):33-40
  15. Horne G. Supracondylar fractures of the humerus in adults. *J Trauma* 1980;20(1):71-74.
  16. Imatani J, Ogura T, Morito Y, Hashizume H, Inoue H. Custom AO small T plate for transcondylar fractures of the distal humerus in the elderly. *J Shoulder Elbow Surg*. 2005;14(6):611-615.
  17. Jupiter JB. Complex fractures of the distal part of the humerus and associated complications. *Instr Course Lect*. 1995;44:187-198.
  18. Jupiter JB, Neff U, Holzach P, Allgower M. Intercondylar fractures of the humerus. An operative approach. *J Bone Joint Surg Am* 1985;67(2):226-239.
  19. Kaiser T, Brunner A, Hohendorff B, Ulmar B, Babst R. Treatment of supra- and intra-articular fractures of the distal humerus with the LCP Distal Humerus Plate: a 2-year follow-up. *J Shoulder Elbow Surg*. 2011;20(2):206-212.
  20. Kalogrianitis S, Sinopidis C, El Meligy M, Rawal A, Frostick SP. Unlinked elbow arthroplasty as primary treatment for fractures of the distal humerus. *J Shoulder Elbow Surg* 2008;17(2):287-292.
  21. McKee MD, Veillette CJ, Hall JA, *et al.* A multicenter, prospective, randomized, controlled trial of open reduction—internal fixation versus total elbow arthroplasty for displaced intra-articular distal humeral fractures in elderly patients. *J Shoulder Elbow Surg*. 2009;18(1):3-12.
  22. Miller WE. Comminuted fractures of the distal end of the humerus in the adult. *J Bone Joint Surg Am*. 1964;46:644-657.
  23. Morrey BF. Fractures of the distal humerus: role of elbow replacement. *Orthop Clin North Am* 2000;31(1):145-154.
  24. Paryavi E, O'Toole RV, Frisch HM, Andersen RC, Eglseider WA. Use of 2 column screws to treat transcondylar distal humeral fractures in geriatric patients. *Tech Hand Up Extrem Surg*. 2010;14(4):209-213.
  25. Pereles TR, Koval KJ, Gallagher M, Rosen H. Open reduction and internal fixation of the distal humerus: functional outcome in the elderly. *J Trauma*. 1997;43(4):578-584.
  26. Perry CR, Gibson CT, Kowalski MF. Transcondylar fractures of the distal humerus. *J Orthop Trauma*. 1989;3(2):98-106.
  27. Popovic D, King GJ. Fragility fractures of the distal humerus: what is the optimal treatment? *J Bone Joint Surg Br* 2012;94(1):16-22.
  28. Puchwein P, Wildburger R, Archan S, Guschl M, Tanzer K, Gumpert R. Outcome of type C (AO) distal humeral fractures: follow-up of 22 patients with bicolumnar plating osteosynthesis. *J Shoulder Elbow Surg* 2011;20(4):631-636.
  29. Robinson CM, Hill RM, Jacobs N, Dall G, Court-Brown CM. Adult distal humeral metaphyseal fractures: epidemiology and results of treatment. *J Orthop Trauma* 2003;17(1):38-47.
  30. Shimamura Y, Nishida K, Imatani J, *et al.* Biomechanical evaluation of the fixation methods for transcondylar fracture of the humerus: ONI plate versus conventional plates and screws. *Acta Med Okayama* 2010;64(2):115-120.
  31. Simone JP, Streubel PN, Sanchez-Sotelo J, Morrey BF. Low transcondylar fractures of the distal humerus: results of open reduction and internal fixation. *J Shoulder Elbow Surg* 2014;23(4):573-578.
  32. Soltanpur A. Anterior supracondylar fracture of the humerus (flexion type). A simple technique for closed reduction and fixation in adults and the aged. *J Bone Joint Surg Br* 1978;60-B(3):383-386.
  33. Voloshin I, Schippert DW, Kakar S, Kaye EK, Morrey BF. Complications of total elbow replacement: a systematic review. *J Shoulder Elbow Surg* 2011;20(1):158-168.
  34. Waddell JP, Hatch J, Richards R. Supracondylar fractures of the humerus—results of surgical treatment. *J Trauma* 1988;28(12):1615-1621.
  35. Wong AS, Baratz ME. Elbow fractures: distal humerus. *J Hand Surg Am* 2009;34(1):176-190.
  36. Yamaguchi K, Sweet FA, Bindra R, Morrey BF, Gelberman RH. The extraosseous and intraosseous arterial anatomy of the adult elbow. *J Bone Joint Surg Am* 1997;79(11):1653-1662.