



FUNCTIONAL OUTCOME OF INTRA-ARTICULAR DISTAL RADIUS FRACTURES
TREATED WITH VOLAR LOCKING PLATE: A RETROSPECTIVE STUDY

Orthopaedics

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ABSTRACT

Background: Intra-articular distal radius fractures are complex injuries requiring anatomical reduction to restore wrist function. Volar locking plate fixation provides stable fixation and allows early mobilization. **Aim:** To evaluate the functional outcome, fracture pattern, and complications of intra-articular distal radius fractures treated with volar locking plate fixation. **Materials and Methods:** This retrospective study included 90 patients with intra-articular distal radius fractures treated with open reduction and internal fixation using a volar locking plate between 2024 and 2025. Functional outcome was assessed using the Gartland and Werley scoring system. **Results:** Excellent and good outcomes were achieved in 83.33% of patients. Complications were observed in 10% of cases. **Conclusion:** Volar locking plate fixation results in favorable functional outcomes with a low complication rate.

KEYWORDS

Distal Radius Fracture; Intra-articular Fracture; Volar Locking Plate; AO Classification; Functional Outcome

INTRODUCTION

Distal radius fractures are among the most common orthopedic injuries. Intra-articular fractures pose a challenge due to disruption of joint congruity and risk of post-traumatic arthritis. Volar locking plate fixation has emerged as a preferred treatment option, providing angular stability and permitting early mobilization.

AIMS AND OBJECTIVES

- 1. To analyze the demographic profile of patients.
- 2. To study fracture patterns using AO classification.
- 3. To assess functional outcomes following volar locking plate fixation.
- 4. To evaluate procedure-related complications.

MATERIALS AND METHODS

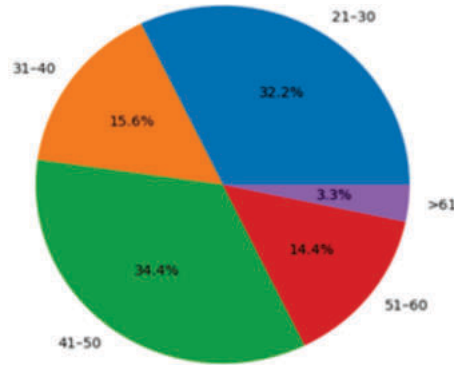
This retrospective observational study was conducted at the Department of Orthopaedics, J.L.N. Medical College, Ajmer, from January 2024 to December 2025. Ninety patients aged 20–70 years with intra-articular distal radius fractures treated with volar locking plate fixation were included. Open and pathological fractures were excluded. Functional outcome was assessed using the Gartland and Werley scoring system with a minimum follow-up of 6 months.

RESULTS

Age Distribution: Majority of patients were between 21 and 50 years.

Table 1: Age Distribution

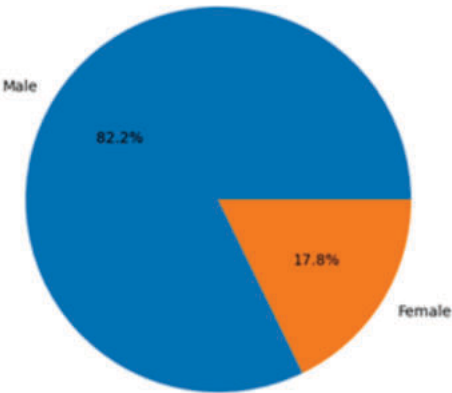
Age group	No. of cases
21–30	29
31–40	14
41–50	31
51–60	13
>61	3



Sex Distribution: Male predominance was observed.

Table 2: Sex Distribution

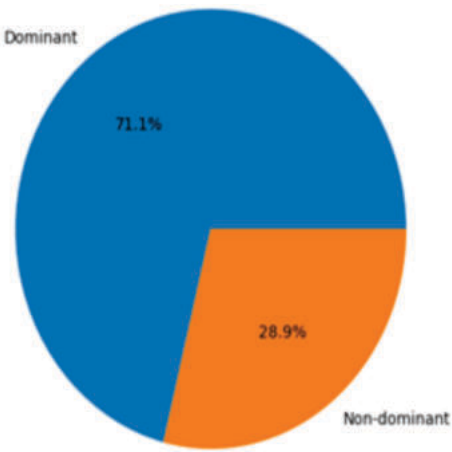
Sex	No. of cases
Male	74
Female	16



Side Involved: Dominant wrist was more commonly affected.

Table 3: Side Involved

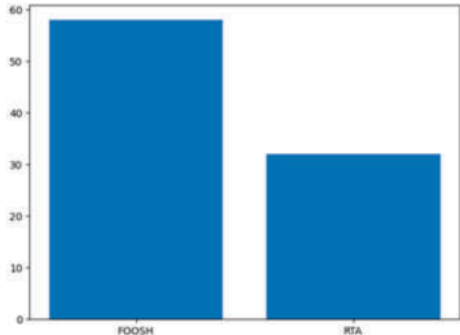
Side	No. of cases
Dominant	64
Non-dominant	26



Mode of Injury: Fall on outstretched hand was the most common cause.

Table 4: Mode of Injury

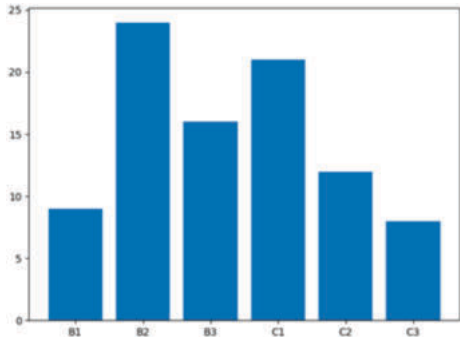
Mode	No. of cases
FOOSH	58
RTA	32



Fracture Pattern: AO type B2 fractures were most frequent.

Table 5: AO Classification

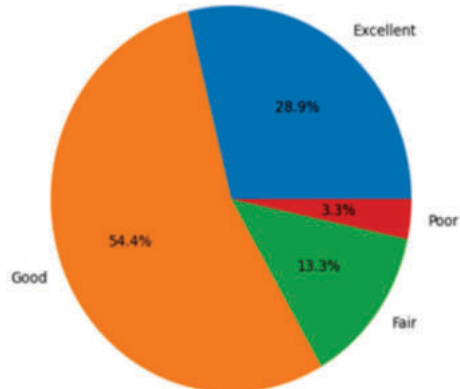
Type	No. of cases
B1	9
B2	24
B3	16
C1	21
C2	12
C3	8



Functional Outcome: Majority achieved excellent to good results.

Table 6: Functional Outcome

Outcome	No. of cases
Excellent	26
Good	49
Fair	12
Poor	3

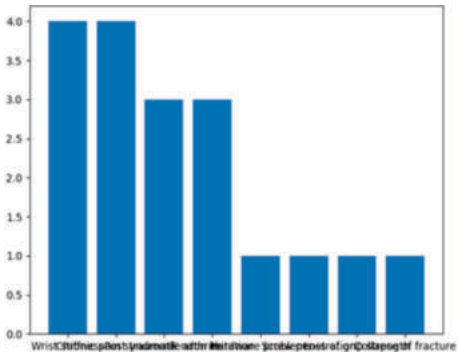


Complications: Overall complication rate was low.

Table 7: Complications

Complication	No. of cases
Wrist stiffness	4

Chronic pain syndrome	4
Post traumatic arthritis	3
Tendon irritation	3
Hardware problems	1
Screw penetration	1
Loss of grip strength	1
Collapse of fracture	1



DISCUSSION

Volar locking plate fixation provides stable fixation and permits early mobilization in intra-articular distal radius fractures. The functional outcomes observed in this study are comparable with previously published literature, and complication rates were acceptable.

CONCLUSION

Volar locking plate fixation is a reliable and effective treatment option for intra-articular distal radius fractures, resulting in good to excellent functional outcomes with minimal complications.

REFERENCES

1. Aggarwal AK, Nagi ON, et al. Open reduction and internal fixation of volar Barton's fractures: A prospective study. *Journal of Orthopaedic Surgery*. 2004;12(2):230–234.

2. Anderson R, O'Neil G. Comminuted fractures of the distal radius. *Surgery Gynecology and Obstetrics*. 1994;78:434–440.

3. Axelrod TS, Paley D, Green J, McMurtry RY. Limited open reduction of lunate facet in comminuted intra-articular distal radius fractures. *Journal of Hand Surgery*. 1988;13A:372–377.

4. Axelrod TS, McMurtry RY. Open reduction and internal fixation of comminuted intra-articular fractures of the distal radius. *Journal of Hand Surgery*. 1990;15A:1–11.

5. Bacorn RW, Kurtzke JF. Colles' fracture: A study of two thousand cases. *Journal of Bone and Joint Surgery Am*. 1953;35-A:643–658.

6. Sahito B, Tariq SM, et al. Outcome of ORIF of volar Barton fracture treated with buttress plate. *Rawal Medical Journal*. 2015;40(4).

7. Bain GI, Hunt J, Mehta JA. Operative fluoroscopy in hand and upper limb surgery. *Journal of Hand Surgery Br*. 1997;22:656–658.

8. Bain GI, Richards RS, Roth JH. Wrist arthroscopy: Indications and technique. In: Peimer CA (ed). *Surgery of the Hand and Upper Extremity*. McGraw-Hill; 1996:867–882.

9. Barton JR. Views and treatment of an important injury to the wrist. *Philadelphia Medical Examiner*. 1838;1:365–368.

10. Biyani A, Simison AJM, Kienerman L. Fractures of the distal radius and ulna. *Hand Surgery*. 1995;20B:357–364.

11. Bohler L. *The Treatment of Fractures*. 5th ed. New York: Grune & Stratton; 1956:796–811.

12. Carlos RME. Plaster cast versus percutaneous pin fixation for comminuted distal radius fractures. *Journal of Orthopaedic Trauma*. 1997;11(3):212–217.

13. Chapman DR, Bennett TB, Bryan WJ, Ruilos HS. Complications of distal radius fractures: Pins and plaster treatment. *Journal of Hand Surgery*. 1982;7:509–512.

14. Chavhan AN, Dudhekar UJ, Badole CM, Wandile KN. Functional and radiological outcome in distal radius fractures treated with locking compression plate. *Int J Res Med Sci*. 2017;5:574–582.

15. Chung KC, Shauver MJ, Yin H. Treatment of distal radius fracture in US Medicare population. *Journal of Hand Surgery*. 2011;36A:1288–1293.

16. Colles A. On fractures of the carpal extremity of the radius. *Edinburgh Medical Journal*. 1814;10:182–186.

17. Fernandez DL. Should anatomic reduction be pursued in distal radial fractures? *Journal of Hand Surgery*. 2000;25B:523–527.

18. Fernandez DL, Geissler WB. Treatment of displaced articular fractures of the radius. *JBJS Am*. 1991;16A:375–384.

19. Fernandez DL. Fracture distal radius operative treatment. *Injury*. 2000;31:75–79.

20. Fitoussi F, Ip WY, Chow SP. Treatment of displaced intra-articular distal radius fractures with plates. *JBJS Am*. 1997;79:1303–1311.

21. Fok MW, Klausmeyer MA, Fernandez DL, Orbay JL. Volar plate fixation of intra-articular distal radius fractures. *Journal of Wrist Surgery*. 2013;2(3):247–254.

22. Netter FH. *Atlas of Human Anatomy*. 4th ed. Philadelphia: Saunders Elsevier; 2006.

23. Frykman G. Fracture of the distal radius including sequelae. *Acta Orthop Scand Suppl*. 1967;108:1–155.

24. Fujitani R, Omokawa S, Akahane M, Iida A. Predictors of DRUJ instability. *Journal of Hand Surgery*. 2011;36A:1919–1925.

25. Gartland JJ, Werley CW. Evaluation of healed Colles' fractures. *JBJS Am*. 1951;33A:895–907.

26. Gehrman SV, Windolf J, Kaufmann RA. Distal radius fracture management in elderly. *Journal of Hand Surgery*. 2008;33A:421–429.

27. Jupiter JB, Fernandez DL, Toh CL, Fellman T. Operative treatment of volar intra-articular fractures of distal radius. *JBJS Am*. 1996;78:1817–1828.