

# Comparison of External Fixation vs Volar Plating for Comminuted Fracture of the Distal End Radius

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## ABSTRACT

**Aim:** To compare between the open reduction and internal fixation (ORIF) using a volar plate and external fixation with K-wire fixation for the treatment of unstable distal radius fractures.

**Methods:** This prospective study was carried out in the DG Khan for the period from 02.03.2013 to 01.03.2015. A total of 30 cases according to inclusion were included in the study.

**Results:** Open reduction and internal fixation with volar locking plate group has overall decrease incidence of complications significantly less radial shortening and significantly greater postoperative wrist motion when compared to external fixation.

**Conclusion:** Use of volar locking plate resulted in a faster recovery of function compared with external fixation. Use of volar locking plate resulted in better anatomical function and grip strength.

**Keywords:** Distal radius fracture, Volar plating, External fixation

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## INTRODUCTION

Fractures involving distal end of radius may lead to a serious morbidity. The incidence of these injuries is expected to increase with increasing age<sup>1</sup>. Which one is the best management option of treating such fractures is yet to be determined. The commonly performed procedures for fractures of distal end of radius are closed manipulation and reduction followed by casting<sup>2</sup> external fixation with K-wire fixation<sup>3</sup>, and open reduction and internal fixation (ORIF) with volar plating technique<sup>4,5</sup>. There has been a transition from using external fixation to treat distal radius fractures toward using internal volar plate fixation. Initially in earlier times many of these fractures were conventionally treated with closed reduction and casting<sup>6</sup> then external fixation with pinning was started. Later on the technology of volar plate was introduced, and management of such injuries was started with open reduction and internal fixation with volar plating. Literature shows that volar plating has got excellent results<sup>7-10</sup>. These plates can provide stability to both the dorsal and volar subchondral bones from the volar side of the radius. The benefits of this implant system include its ability of fixation of the intra-articular fragments securely. This allows early active wrist motion with preservation of articular congruency.

Major determinants for opting a particular treatment modality are injury pattern and choice of operating surgeon. There is no strict hard and fast rule of strict adherence to therapeutic algorithms mentioned in reference books.

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## MATERIALS AND METHODS

This prospective study was carried out in the DG Khan for the period from 02.03.2013 to 01.03.2015. A total of 30 cases according to inclusion were included in the study. Group-1 was having sixteen patients and were treated with ORIF, and 14 patients underwent pinning and external fixation these were included in Group-2. The Group-2 included eight males and six females. Their age range was (23-70) with the average age was 45 years. The average follow-up for this group of patients was 33 months (27-36). The Group-1 included six females and 10 males. The age range was 22-70) with average age of 48 years at the time of presentation, these patients were followed for 29 months (25-34).

## RESULTS

The demographic features of the two groups are being depicted in Table 1. Statistical analysis was done through computer software SPSS 16.0 version. The tests of significance were applied where ever felt appropriate and  $p < 0.05$  was considered significant. The radiological and clinical evaluation records are presented in simplified form in Tables 2 and 3. The final ranges of motion and grip strengths of both groups were almost the same. Wrist flexion and extension measured 64 and 69° in the Group-1 vs 59 and 63° respectively, in the Group-2. Radial and ulnar deviation averaged 23 and 34° respectively, in the Group-1, and 21 and 31° respectively, in the Group-2. There was no statistically significant difference between the groups with respect to wrist flexion, wrist extension, radial deviation or ulnar deviation at final follow-up ( $p > 0.05$ ).

Table-1: Demographic features of two groups

Variable	Group-1	Group-2
Sex ratio (M:F)	10.6	8.6
Average age (s)	48 (22-70)	45 (23-70)
Average follow up (months)	29 (25-34)	33 (27-36)

Table-2: Clinical results at final follow up

Variables	Group-1	Group-2
Pain (0-10)	1.7 (0-5)	2.1 (0-6)
Flexion (°)	64	59
Extension (°)	69	63
Radial deviation (°)	23	21
Ulnar deviation (°)	34	31
Pronation (°)	78	73
Supination (°)	76	76
Grip strength kg	26 (88%)	29 (90%)
Clinical healing (w)	5.5 (4-7)	5.8 (4-7)
DASH score	9	23 (P=0.015)
PWRE score	46	58

Table 3: Radiological outcome at final follow up

	Group-1 (n=16)	Group-2 (n=14)
Ulnar variation (mm)	-0.3 (-2-0)	1.3 (0.3-3)*
Articular step off (mm)	0.2 (0-1)	0.8 (0-2)
Volar tilt (°)	110 (3-20)	50 (3-12)**
Radial height (mm)	11 (7-13)	10 (6-12)
Radial inclination (°)	230 (18-27)	210 5-25

\*P=0.013    \*\* p=0.041

## DISCUSSION

Volar implants became popular in recent past over because of certain benefits that it carries including a relatively decreased incidence of complications associated external fixation technique moreover one can start early wrist motion exercises.<sup>11</sup> The overall outcome according to the Gartland and Werley scales<sup>3,12</sup> showed 10 excellent and 6 good results. The results of ORIF in the current study are similar to that mentioned in literature. It is associated with better clinical and radiographic outcome. In addition, there are comparatively less chances of complications in patients in whom open reduction and internal fixation is being performed.

With advent of volar plating system and the degree of stability and strength which it provides, early wrist joint mobility became possible and these are having better functional results for hand and finger<sup>13</sup>.

In our study, the group of patients who underwent ORIF resumed earlier wrist joint mobility than the external fixation patients which was quite encouraging for the patients. We also found that patients in the internal fixation group ultimately achieved more anatomic alignment radiographically than the external fixation group. This has been linked to better overall functional outcome in the literature<sup>14</sup>.

The results of our study are similar to that mentioned in literature as for as pain scores, ROM, and grip strength at 1 year are concerned. The patients who underwent ORIF had improved DASH and PRWE scores. Whereas, grip and ROM data were similar between these groups at 1 year, DASH scores, frequency of hand therapy visits, and some radiographic parameters were superior in patients treated with ORIF. These results suggest that volar plating is better treatment modality for fractures involving the distal radius.

## CONCLUSION

Use of volar locking plate resulted in a faster recovery of function compared with external fixation. Use of volar locking plate resulted in better anatomical function and grip strength.

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