



A PROSPECTIVE STUDY TO ASSESS THE OUTCOME OF FRAGMENT SPECIFIC FIXATION OF DISTAL RADIUS FRACTURE

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Introduction:

Fourteen percent of all extremity fractures and seventeen percent of all fractures treated in emergency rooms are distal radius fractures. These statistics mostly hinge on the quantity of patients who have their fractures treated. Due to the general increase in life expectancy, it is reasonable to assume that distal radius fractures will rise in frequency. Distal radius fractures tend to be bimodal, with higher energy upper extremity trauma occurring more frequently in younger patients and lower energy injuries occurring more frequently in older patients. Distal radius fractures are more common in younger persons compared to elderly overall. There is a significantly higher prevalence of the disease among elderly women than among older men. Look no further than the elderly to see this truth in action. Most fractures in young individuals are caused by car accidents, while most fractures in the elderly are caused by falls.¹

Internal and exterior fixation techniques and devices have become increasingly sophisticated during the past two decades. The treatment of distal radius fractures has progressed thanks to the development of percutaneous pin fixation, external fixation devices that allow for distraction and palmar translation, and internal fixation using plates and locking screws. In this respect, percutaneous pin fixation has been especially useful.

Surgeons who specialize in treating the upper extremities find distal radius fractures more frequently than any other type of upper extremity injury. When it is required to maintain the stability of specific articular segments, fragment-specific fixation may be utilized as an alternative choice for the method of fixation that is utilized. Stabilizing radial styloids, volar rims, dorsal walls, dorso-ulnar corners, and impacted intraarticular fragments can be accomplished with the help of implants that are fabricated specifically for the individual fragments in question. Even though these procedures can be difficult to perform technically, they can be used either on their own or in conjunction with other fixation methods to achieve precise reductions and positive functional outcomes.²

Prolonged immobilization with POP causes stiffness of hand. K wire fixation provides early mobilization but doesn't provide rotational stability. Open reduction internal fixation with plating for distal radius fracture provides accurate reduction, rigid fixation, early mobilisation,

rotational stability, avoids stiffness and early rehabilitation. Hence, we set out to analyze, with this prospective observational study, the role of outcomes of fragment specific fixation in distal radius fractures.

Aim: To conduct a prospective observational study and to assess the outcome of fragment specific fixation of distal radius fracture

Materials And Methodology

This is a non-randomized control trial conducted in SREE BALAJI MEDICAL COLLEGE AND HOSPITAL, Chromepet, Chennai. Patients were recruited from November 2022 to June 2023. The study included 31 patients that fit the inclusion criteria i.e any patient over the age of 18 with a distal radius fracture. The study excluded those patients with neurovascular injury or patients that were comatose. For all the patients in the study, basic demographic details, clinical evaluation and DASH score, Constant-Murley score, Quick DASH score was calculated.

Results

The study included 21 patients that satisfied the inclusion criteria. It was observed that 22.6% 24-30 years, 29% 31-40 years, 41-50 years 25.8% and 22.6% 51-60. Mean age of the study participants was 39.90 ± 10.84 years.

Amongst the 31 study participants, 45.2% were females and 54.8% males.

The mode of the injury can help determine the type of distal radius fracture, thereby guiding the surgeon in the management. In this study, we found that 74.2% had road traffic accident and 25.8% slip and falls.

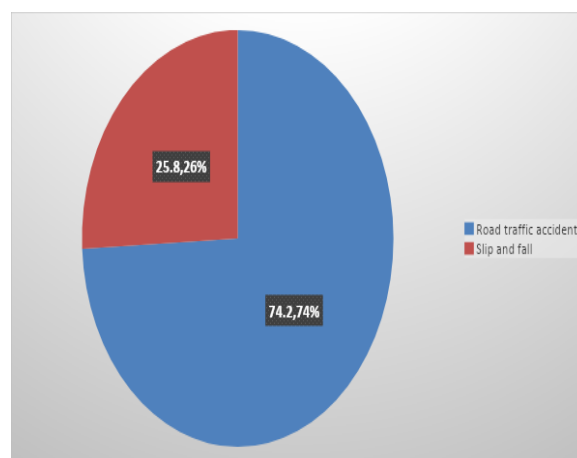


Figure 1:- mode of injury

When we observed laterality, it was noted that 45.2% had involvement of left side and 54.8% had involvement of right side.

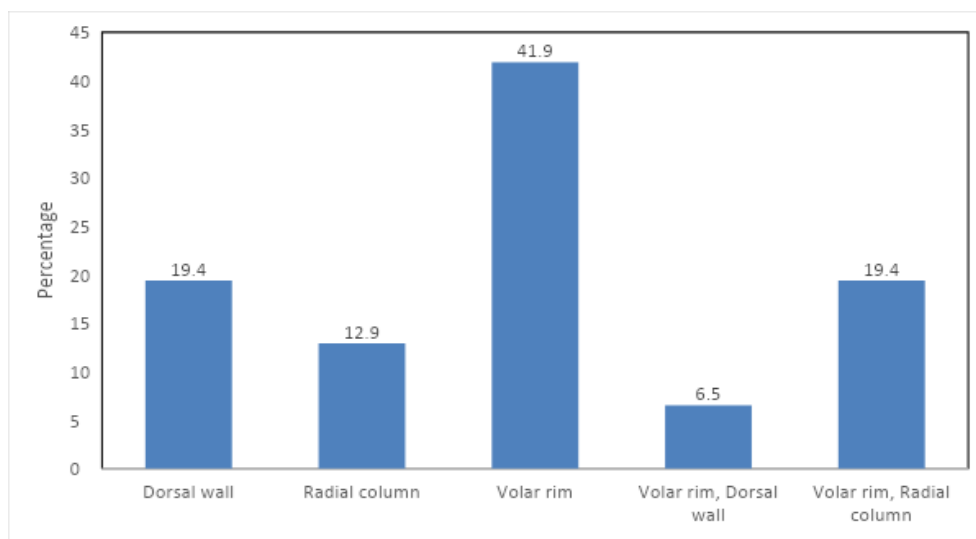


Figure 2: Distribution of medoff classification among the study participants (N=31)

We found that 41.9% had a volar rim, which was the most common in our study as per the Medoff classification.

Average duration of delay to surgery was 3.45 +/- 1.02 days.

S.NO	Type of fixation	Frequency	Percentage
1	Dorsal plate	6	19.4
2	Radial plate	4	12.9
3	Volar plate	15	48.4
4	Volar plate and Radial plate	6	19.4

Table 1: Distribution of type of fixation among the study participants (N=31)

When we analyzed the type of surgery performed, 19.4% had dorsal plate fixation, 12.9% had radial

plate fixation, 48.4% had volar plate fixation, and 19.4% had Volar plate with Radial plate.

It was observed that 9.7% had associated fractures and 16.1% had associated comorbidities.

S.No	Time of union in weeks	Frequency	Percentage
1	7-9 weeks	22	71
2	10-11 weeks	6	19.4
3	12-14 weeks	3	9.7

Table 2: Distribution of time of union in weeks among the study participants (N=31)

We noticed that following surgery, 71% had 7-9 weeks of union, 19.4% 10-11 weeks of union and 9.7% 12-14 weeks of union.

	Minimum	Maximum	Mean	Std. Deviation
Palmar flexion	51.00	64.00	56.77	3.51
Dorsiflexion	59.00	68.00	62.90	3.21
Radial deviation	13.00	24.00	17.39	3.11
Ulnar deviation	16.00	31.00	23.77	3.76

Table 3: Distribution of descriptive variables among the study participants (N=31)

Mean Palmar flexion in degrees 56.77±3.51, mean dorsiflexion in degrees 62.90±3.21, mean radial flexion in degrees 17.39±3.11 and mean ulnar deviation in degrees 23.77±3.76.

Around 71% had excellent results and 29% good results.

Discussion:

The necessity of restoring anatomical alignment and articular congruity in the treatment of distal radial fractures is generally recognised and accepted. Malalignment, on the other hand, can lead to lower grip strength, a limited range of motion, and instability. Intra-articular incongruity

has been shown to correlate with post-traumatic arthritis.

It is common knowledge that proper restoration of anatomical alignment and articular congruence is essential for the successful repair of distal radial fractures. Malalignment, on the other hand, might result in decreased grip strength, a restricted range of motion, and instability 36. Intra-articular incongruity has been demonstrated to correlate with post-traumatic arthritis. Fractures of the distal radius provide a unique set of fixation concerns that are distinct from those of most other sites. These problems cannot be solved by using the same methods as those used for other fractures.

Extremely minute and periarticular distal pieces are detected. It is impossible to utilise substantial plates since they would be in close proximity to a thick network of tendons and retinal sheaths. The distal fragments do not have sufficient thickness to ensure adequate thread engagement for bone screws. The objective of the study is to investigate and evaluate the significance of the role that functional outcomes play in the success of fragment-specific repair of distal radius fractures.

The primary objective of treatment for intra-articular fractures is the anatomical reduction of the joint surface, which is then followed by rigid fixation of the fractured area. It has been proven that post traumatic arthritis can develop over the course of time from residual intra-articular incongruity. As a result of research carried out in recent years, there is now a greater comprehension of the anatomy and function of the wrist, which has led to an expansion of the range of conditions that can be treated surgically. In addition, patients now have higher standards for themselves, which has resulted in a rise in the number of people seeking surgical treatment for medical conditions.

In the present study, 22.6 percent of the participants were between the ages of 24 and 30, 29.0 percent were between the ages of 31 and 40, 25.8 percent were between the ages of 41 and 50, and 22.6 percent were between the ages of 51 and 60. The average age of the participants was 39.90 ± 10.84 years old. There were around 45.2 percent females and 54.8 percent males in the sample.

According to the findings of the research conducted by Paramesha KC³ and colleagues, the majority of cases in their study involved younger patients who required surgery as a result of high-energy trauma and RTA. These findings are comparable to the findings of our investigation. According to our research, approximately 74.2 percent of people have been involved in car accidents, and 25.8 percent have been injured in falls.

Robert Medoff and his colleagues⁴ developed a hybrid method of percutaneous wire and plate fixation to fix individual fracture pieces by the use of many tiny incisions. This method was named the "Medoff technique." According to the findings of our research, about 19.4 percent were classified as having a dorsal wall, 12.9 percent as having a radial column, 41.9 percent as having a volar rim, 6.5 percent as having a volar rim and a dorsal wall,

and 19.4 percent as having a volar rim and a radial column.

In a study that was conducted by Jawed et al⁵, the researchers discovered that 23 percent of patients developed difficulties. These consequences included malunion, chronic discomfort, stiffness, and paresthesia with tingling. Complications including complex regional pain syndrome, avascular necrosis, distal radioulnar joint syndrome, instability, and paresthesia were documented by Saw et al⁶.

When a conventional volar plate is employed, there is a possibility that up to 13 percent of lunate facet fractures will no longer reduce.⁷ In the event that a volar plate is utilised, it is possible that it will be necessary to position it at a great distance in order to collect the fragment. As a direct consequence of this, discomfort caused by the hardware is widespread in this region and may be present in as many as 41% of fractures⁸. According to the findings of our research, almost 19.4 percent of patients had volar plate fixation, 12.9 percent had radial plate fixation, 48.4 percent had dorsal plate fixation, and 19.4 percent had both volar and radial plate fixation.

In a study that was conducted by Paramesha³, it was shown that thirty-one patients had fracture union within three months, and thirty patients returned to their activity levels prior to the accident within six months. According to our research, 71% of respondents had unions that lasted 7-9 weeks, 19.4% had unions that lasted 10-11 weeks, and 9.7% had unions that lasted 12-14 weeks.

According to the findings of a study conducted by Mohan Ganesan and colleagues⁹, the average degree of palmar flexion was found to be 57.1 ± 3.5 , dorsiflexion was 63.3 ± 3.2 , radial deviation was 17.6 ± 3.0 , and ulnar deviation was 24.1 ± 4.4 . In our research, the mean palmar flexion was measured in degrees 56.77 ± 3.51 , the mean dorsiflexion was measured in degrees 62.90 ± 3.21 , the mean radial flexion was measured in degrees 17.39 ± 3.11 , and the mean ulnar deviation was measured in degrees 23.77 ± 3.76 .

Conclusion:

The minimally invasive and highly efficient treatment for displaced intra- and extra-articular fractures of the distal radius that do not include extensive articular and metaphyseal comminution is called fragment selective fixation of the distal radius. According to the findings of our research, fragment specific fixation is a versatile method that

offers functional outcomes that are superior to those obtained with traditional K wire fixation and comparable to those obtained with volar plating. In order to provide suggestions for the future, however, additional study with a bigger sample size is necessary.

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