

# Distal End Radius Fracture Treatment by Different Modalities: A Comparative Study at Tertiary Hospital In Western Maharashtra

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## ABSTRACT

**Background:** A retrospective study was conducted in the department of orthopaedic surgery in a tertiary care hospital of western Maharashtra. **Methods:** Data of all the patients with fracture of distal end radius with or without ulna fracture who were admitted in our centre over a period of 4 years were recorded from case files, casualty admission register and operative records. A total of 204 patients were included in our study and mode of treatment was compared among the various available treatment modality such as cast/slab; percutaneous fixation with k-wire, external fixation & plate osteosynthesis. **Results:** Out of the total number of cases (n=204) for fracture distal end radius, nearly 10% case were managed with cast (n=21), 22% with percutaneous fixation with k-wire (n=45), 23.5% with external fixator (n=48), 19% with both external fixator and k-wire (n=38) and 25% with plate osteosynthesis (n=52). Hence when we assess the modality of treatment of distal end radius year wise from 2011 to 2014, the incidence of surgery by plate osteosynthesis has increased over a span of period. **Conclusion:** Retrospective study conducted at our tertiary care hospital concludes that incidence of plating for distal end radius fracture has increased over a period of time as compared to cast, percutaneous k-wire fixation and external fixator.

**Keywords:** Distal radius, Fixation, Fracture, osteosynthesis.

## INTRODUCTION

Fractures of distal end radius represent approximately 16 % of all fractures treated by orthopaedic surgeons. [1] It is a common injury of upper extremity. Fracture of distal radius usually occur as a result of high energy trauma in younger individual with good bone density and are associated with substantial articular and periarticular tissue injury. [2] Besides, this fractures are also reported in elderly osteoporotic patients. [3] If these fractures are not assessed properly and not treated on time, angulation, shortening and articular incongruity may lead to permanent deformity and loss of function. Degree of disability latter correlates with degree of residual deformity. Management of this fracture has undergone extraordinary evolution over the preceding few years. [4] The fracture of distal end radius can be treated conservatively using a plaster cast or by other methods such as external fixation, percutaneous fixation with K-wires or plates osteosynthesis or combination all above.

as to minimise the risk of post traumatic arthritis. The present study was conducted with an aim to compare the changing trends in different modality of treatment of distal end radius over the time at our tertiary care hospital in western Maharashtra.

## MATERIAL AND METHODS

This study consist of all the patients admitted to our centre for treatment of fracture of distal end radius with or without ulna bone fracture. The retrospective study was conducted over a period of about 4 years and detail analysis of different modality of treatment of distal end radius was conducted at our centre. Data of all the patients of distal end radius fracture were extracted from case records, casualty admission register and operation records. All the data were then analysed with reference to various modality of distal end radius fracture treatment ie, conservatively managed by cast/slab; per-cutaneous fixation with k-wire, external fixation, locking compression plate.

## RESULTS

Out of the total number of cases (n=204) for fracture distal end radius, nearly 10% case were managed with cast (n=21), 22% with percutaneous fixation with k-wire (n=45), 23.5% with external fixator (n=48), 19% with both external fixator and k-wire (n=38) and 25% with plate osteosynthesis (n=52). Hence when we assess the modality of

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Primary goal of treatment of distal end radius is to obtain anatomical reduction and stable fixation so

treatment of distal end radius year wise from 2011 to 2014, the incidence of surgery by plate osteosynthesis has increased over a span of period

in our tertiary centre Mumbai Maharashtra .[Table-1, Figure-1,2,3].

**Table-1:** Showing yearly pattern of modality of management by various mean.

Year	Cast	K-wire	Ex-fix	Ex-fix + k-wire	Plating	No of surgery
2011	9	12	19	11	5	56
2012	3	15	9	9	8	44
2013	7	13	9	7	17	53
2014	2	5	11	11	22	51
<b>Total no.</b>	21	45	48	38	52	204

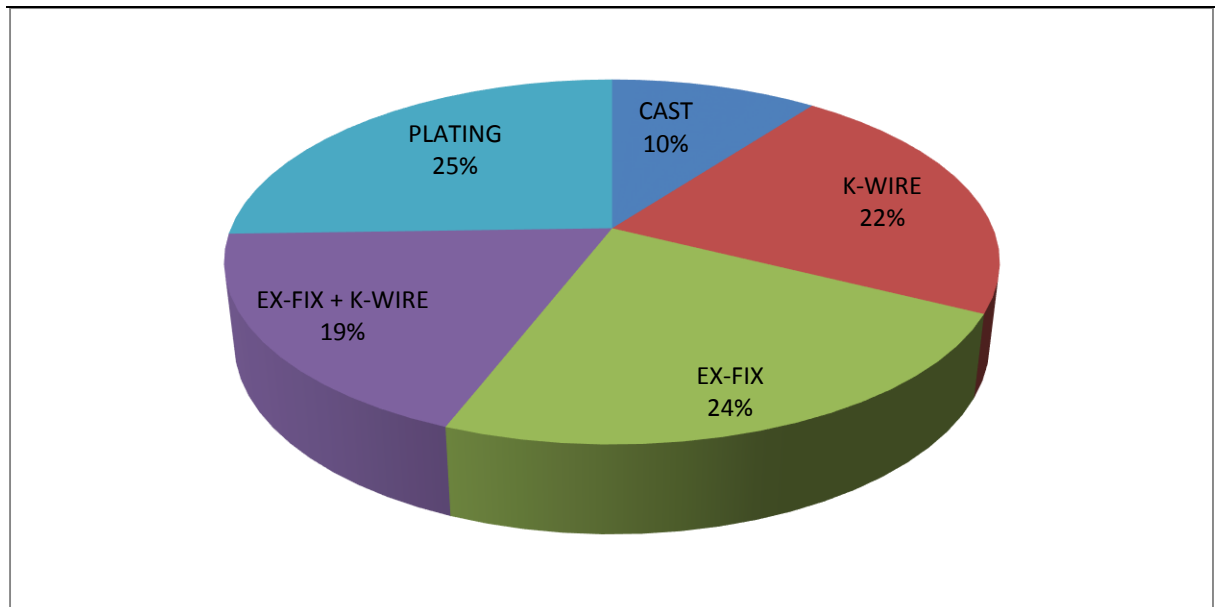


Figure 1: Modality of treatment of distal end radius year wise from 2011 to 2014

**Statistical analysis:** The change in trends amongst all intervention over the years is statistically significant at chi square 30.36, degree of freedom 12, the P value is 0.0025.

## DISCUSSION

Distal radius fractures are the most common fractures of the upper extremity and constitutes of nearly one sixth of all fractures treated in emergency [5] and has an approximately incidence of 1:10,000. Treatment for the fracture of distal radius varies from most common traditional method of close reduction and immobilization in a plaster cast to other invasive procedures such as

External Fixation/ distarctor and Percutaneous Fixation with K-wires and relatively more complex operative maneuvers with Locking Compression Plate.

The conservative management by close reduction is a widely used treatment for fracture distal radius. Well fitted cast with three point fixation is must for adequate immobilisation. Although cast application can avoid surgery and other complication related to it, it is been associated with inadequate fixation and loosening of the reduction. [6,7] Also it cannot maintain the distraction to correct length or control the rotation of distal fragment in case of communication. Previous studies have observed a high incidence of displacement deformity in plaster cast treatment. [8]

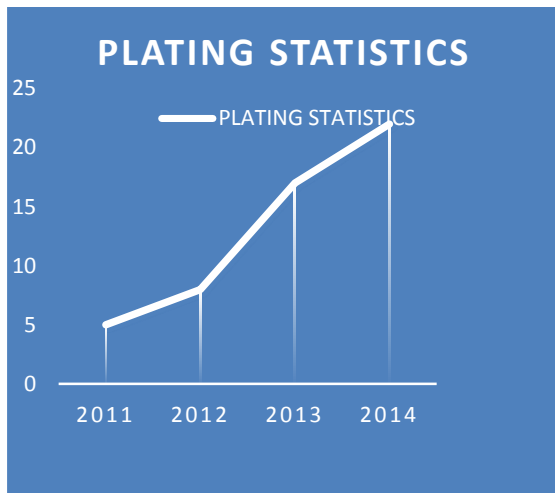


Figure 2: Plating statistics from year 2011- 2014

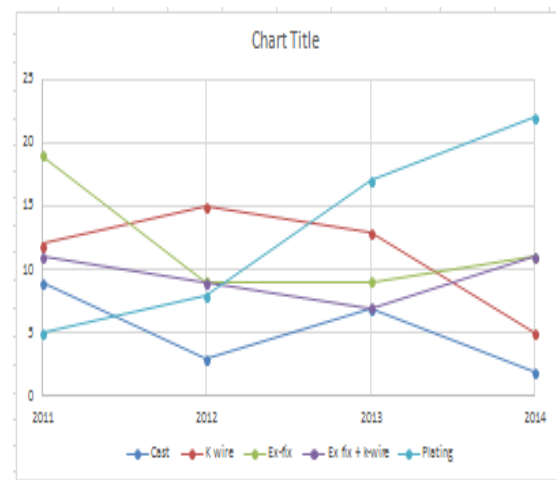


Figure 3: Change in modalities from 2011 - 2014

External fixation was thus, considered as one of the better treatment option.<sup>[2]</sup> Better restoration of normal wrist anatomy can be achieved by external fixation [9] in case of severely comminuted fracture. External Fixator was found to maintain the radial length best due to the sustained counter-traction utilising the principle of ligamentotaxis. The procedure of external fixation is often accompanied with percutaneous fixation with K-wires to maintain the reduction of articular fragments. However, these are frequently associated with pin-track infections, loss of reduction, complex regional pain syndrome and stiffness of joints.<sup>[10,11]</sup> Margaliot et al<sup>[12]</sup> performed a meta-analysis on and concluded that there was no evidence to support that the use of Open Reduction and Internal Fixation is superior to External fixator. However, there were significantly higher rates of postoperative neuritis, infections, pins loosening and hardware failure in the External Fixator group. Westphal et al<sup>[12]</sup> performed a retrospective comparative study and found no differences between External Fixator and Open Reduction and Internal Fixation outcomes. Open reduction and plate fixation as a treatment for fracture distal end radius has gained popularity over the years. This surgical technique involves either a volar or a dorsal incision. A combined volar and dorsal approach has also been used in the treatment of fracture distal radius depending on the extent of displacement and comminution of fracture.<sup>[1]</sup> In cases of fracture of distal radius, open reduction and internal fixation with volar T-plate radius locking and unlocking in adults is shown to restore articular congruity and restore excellent wrist function.<sup>[5]</sup> Open reduction and plate fixation is often considered as the treatment of choice for fracture of distal radius especially in mild comminuted fractures and intra-articular involvement.<sup>[12,13]</sup> Kapoor et al<sup>[12]</sup> in 2000 concluded that ORIF provided the best anatomical

restoration with patients least likely to develop arthritis. However ORIF should be avoided in severe comminuted fractures as the fixation may not be stable and would likely result in poor functional outcomes

Treatment of distal end radius fracture is still controversial despite continue refinement in the treatment. There are no customised solution for all the fracture of distal end radius. Treatment is based on fracture type, patient's demand and characteristics, financial status and on treating surgeon's experience and preference.

Despite having pros and cons of each treatment as per the study conducted in our tertiary health care hospital in western Mumbai, incidence of distal end radius fracture plating has increased over a span of time. Modality of treatment has shifted from conservative to surgical management and especially plate osteosynthesis.

There may be multiple reasons behind increase incidence of surgery of distal end radius with plate osteosynthesis in our setup that is, patient want anatomical fracture reduction, early mobilisation, and rehabilitation and most important, affordability of patient. Our institute, being a private setup, most of the pt are able to afford for costly implant which may not possible for general common population who usually prefer conservative mode of treatment with cast & other cheaper treatment modality in other cheaper setup. So, the results may vary and must be interpreted accordingly.

## CONCLUSION

As per the retrospective study conducted in our tertiary health care hospital in western Mumbai, incidence of distal end radius fracture plating has increased over a span of time. Modality of treatment has shifted from conservative to surgical management and especially plate osteosynthesis.

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