

# Results of Operative Management of Radial Head Fractures by Internal Fixation - A Study of 25 Cases

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**Abstract:** *Aim and Objective: To study the clinical and functional outcome of radial head fractures managed by internal fixation. Material and Methods: The prospective study will be done from July 2019 onwards. Sample will be taken from the patients treated in P.D.U. Medical College and Hospital having radial head fracture on basis of plain radiograph and CT scan, Mason classification and treatment plan will be decided on that basis. Follow up taken on 1 month, 3 months and 6 months. Results: In Our study of 25, 3 patients having a Mason type 1 and 21 patients of Mason type 2 and 1 patient of Mason type 3 radial head fracture treated by open reduction and internal fixation. Out of all the patients treated by 20% of patients present with stiffness of elbow joint and 8% of patients presented with infection. Conclusion: From our perspective, functional and clinical outcome by open reduction internal fixation of radial head fracture appears to be providing excellent function.*

**Keywords:** Radial Head Fracture

## 1. Introduction

It has been found that radial head fracture account for 1.7% to 5.4% of all fractures and one third of all elbow fractures. Radial head fractures are the most frequent fracture around the elbow many question still unanswerable regarding epidemiology and management of these injuries<sup>[1]</sup>. It has been documented to occur in isolation with other associated bony and soft tissue injuries, Diagnosis is made with plain radiographs, other imaging techniques such as CT Scan with an aim to better understand the injury patterns. Mason classification is commonly used system to classify these injuries throughout the literature. Management includes non-operative treatment for isolated stable radial head fractures (Mason type 1), with a variety of operative techniques used for the unstable fracture patterns (Mason type 2 and type3). There has been an increased appreciation for the role of the radial head in elbow stability. Though extensive research into these injuries, controversies still exist regarding the role of further imaging modalities, the use of non-operative management, as well as the indication and technique for operative intervention. There is a lack of prospective short and long-term patient reported outcome data for the simple isolated radial head and neck fractures, which clearly defines the indication and outcome following the non-operative management of these injuries.

## 2. Aims

To study the clinical and functional outcome of radial head fractures managed by internal fixation.

## 3. Objectives

- 1) To assess the clinical outcome of radial head fractures managed by internal fixation.
- 2) To assess the functional outcome of radial head fractures managed by internal fixation.
- 3) To analyze the complications associated with radial head fractures managed by mean of internal fixation.

## 4. Literature Survey

The first description of a radial head fracture may be attributed to Beard, who, in 1834, noted the presence of this injury at autopsy. In 1891, Hoffa described two types of radial head fractures, displaced and un-displaced. In the early twentieth century, radial head resection became the treatment of choice for displaced radial head fractures<sup>[2], [3]</sup>.<sup>[4]</sup> In 1940 Murray rest the injured limb in a sling of plaster-of-Paris back-slab for one to three weeks, depending on the severity of the lesion<sup>[5]</sup>. In 1949 Gaston et al consider that the operation should be performed within twenty-four hours, and active exercises commenced the following day<sup>[6]</sup>. In 1954 Mason et al. stated that excises if the segmental fracture is more than one-quarter of the head or if there is even minimal tilting<sup>[7], [8]</sup>. In 1955 Wagner et al, stated that operative procedure can be considered if the fracture fragment interfere with movement. In 2001 Beingessner et al., stated that Small partial articular fractures may not require surgery, but fragments that involve 25% or more of the radial head require operative repair. In 2009 Mathew et al., stated that Nonoperative treatment may be considered if the elbow is able to extend to at least 30° before becoming unstable after reduction.

## 5. Materials and Methods

This prospective study was conducted from 2019 to 2020 for which sample patients taken from P.D.U. Civil Hospital, Rajkot. The fractures were classified under MASON classification and managed by internal fixation Results were assessed on the basis Mayo Elbow Score at 1 month, 3 month, 6 month.

### Inclusion Criteria

Includes patients having closed fracture of radial head having Mason type 1, 2, and 3 fractures in the age group of 15 to 60 years

### Exclusion Criteria

Includes patients having age <15years and age >60years and gave negative consent to participate instudy, having Polytrauma, Neurovascular injury, Mason type 4 radial head fracture, pregnancy or having pathological conditions.

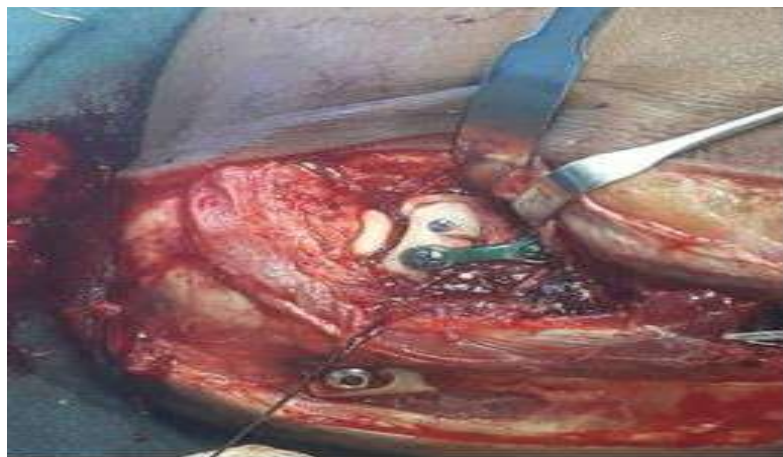
Radial head fractures were identified and classified on the basis of Anteroposterior and Lateral view radiographs of Elbow and in some cases additional Greenspan view was also taken. In some patients CT Scan can also be used to assess fracture comminution and fragment displacement which helps in preoperative planning and one should also be looking for Essex Lopresti lesion in case of radial head fractures.

**Table 2: Materials Used**

1	Knife Handle
2	No. 23 and no. 15 knife
3	Tissue Retractor
4	Kirschner wires
5	T-Handle
6	Power Gun
7	Herbert Screw
8	Proximal radius buttress plate
9	Rush nail

### Surgical Procedure

On simple table, patient is made to lie in supine position with affected limb rested on forearm stand which provide good radiological evaluation and application of traction. Intra-operatively first expose radial head and neck with a Kocher's approach. In Kocher's approach make a 5cm longitudinal or gently curved incision based off the lateral epicondyle and extending distally over the radial head. Then incise deep fascia in line with skin incision and make a plane between extensor carpi ulnaris and anconeus. Keep the arm in prone position to move Posterior Interosseous Nerve away from field. Split proximal fibers of supinator, staying on the posterior cortex of the radius away from Posterior Interosseous Nerve and capsule is advised to incise longitudinally. Avoid dissecting distally or anteriorly maintain dissection in mid radio capitallar plane<sup>[9]</sup>. Once the fracture is opened try to reduce with the help of Kirschner's wire not to disrupt periosteum. If needed release origin of Lateral Collateral ligament. After achieving anatomical reduction use Herbert screw and radial head buttressing plate to achieve stable fixation. Before starting surgical procedure tourniquet is applied to the arm and exsanguinate the arm by elevation and inflate the tourniquet.



**Figure 1: Kocher's Approach for Radial Head Fracture Fixation**

### Mayo Elbow Score <sup>[10]</sup>

The Mayo Elbow Performance score is a utility tool to assess the limitations, caused by pathology, of the elbow during activities of daily living (ADL). This specific test uses 4 subscales:

#### Part 1: Pain

Depending upon severity, 45 points are given for patients not having pain, 30 points to patients having mild pain, 15 points for having moderate pain and patients with severe pain get 0 points.

#### Part 2: Range of motion

The patient's elbow is fully extended and then flexed. 20 points are to be given if the arm reaches more than 100° flexion, 15 points if the angle is between 100°-50° and 5 Points when the elbow bends less than 50°.

#### Part 3: Stability

Stable elbow is given 10 points, mildly unstable elbow is given 5 points and an unstable elbow is given 0 points.

#### Part 4: ADL

Based on 5 ADL's i.e. Combing hair, Performing personal

hygiene, putting on shirts and shoes and Eating, each one is given 5 points.

In Mayo Elbow Score, patients with >90 score are rated Excellent and <60 are rated poor.

## 6. Results and Discussion

In our study, 52 % patients had radial head fractures due to fall from standing, 20 % due to sports related injuries, 8 % due to fall down from stairs, 8 % had motor vehicle accident, 4 % had fall from height, 4 % had twisting injury and 4 % resulted from direct blows. The average age of patients was found to be 41.2 years with Standard Deviation of 11.2 with maximum number of patients seen between 30-39 years of age. Out of 25 patients 60 % were female and

rest male. In our study youngest patient was 18 years of age and oldest was 57 years of age. Out of all, 64 % patients appeared to have fracture on right side while rest had left sided. Out of all the patients 68 % had fracture in dominant limb and rest in non-dominant limb. In our study, 84 % were of Mason type 2 followed by Mason type 1 (12 %) followed by Mason type 3 (4 %). In our study, functional and clinical outcome of surgery is assessed by Mayo Elbow Score. In this score, 70 % of total score was occupied by subjective parameters of pain and activity of daily living (ADL) while only 30 % accounted for objective parameter like range of motion and stability. A higher score of 100 points accounted for better function and greater patient satisfaction while a score of '0' or nearer to '0' was associated with great functional disability.



Figure 2: Preoperative Radiograph



Figure 3: Immediate Postoperative Radiograph



Figure 4: Radiograph at 6 Months Follow Up

Table 2: Clinical and Functional Outcomes of Radial Head Fracture

Clinical and Functional Outcomes	Elias ET AL <sup>[11]</sup>		Our Study	
	No. of Patients	% of Patients	No. of Patients	% of Patients
Excellent	8	80	18	72
Good	1	10	4	16
Fair	1	10	3	12
Poor	0	0	0	0
Total	10	100	25	100

Based on our study we came to know that the patients treated by open reduction and internal fixation having excellent clinical and functional outcome with mean elbow score of  $94.5 \pm 12.25$  which appears to be promising.

### 7. Complications

In our study of 25 cases, 5 patients suffering from stiffness of elbow joint and 2 patients suffering from infection. There is no elbow instability or elbow dislocation. Other complications associated with radial head fractures includes postero-interosseous nerve palsy and anaesthesia related complications which has not been seen in our study.

Table 2: Complication of Radial Head Fracture in our Study

Complication type	Xiaon Chen Et al <sup>[21]</sup>	Our study
Stiffness	4	5
No Healing	1	0
Wound Infection	1	2

### 8. Conclusions

From our prospective, clinical and functional outcome of the patient having radial head fracture treated by open reduction and internal fixation appeared to provide greater function without any greater disability. In our study, we assessed clinical and functional outcome of different type of radial head fractures treated by means of Open Reduction and Internal Fixation which is the limitation of our study. In marginal fractures of radial head which are displaced and unstable with little or no soft tissue attachment which are obvious candidates for Open reduction and Internal fixation but one should know that operative treatment represents complications such as infections, wound problems, anaesthesia related complications which should be undertaken with care. There is a strong need for randomized

control trials for standardizing of fracture classification and clinical based and patient reported outcome measures in order to make results of treatment reported in literature comparable.

### References

- [1] KENNETH A. EGOL, KENNETH J. KOVAL, JOSEPH D.ZUCKERMAN(2011) FOURTH EDITION chap. 20 -246
- [2] Key JA. Treatment of fractures of the head and neck of the radius. J Am Med Assoc 1931 ; 96 :101-104.
- [3] Speed K. Fracture of the head of the radius. Am J Surg1924 ; 38 :157-159.
- [4] Speed K. Traumatic lesions of the head of the radius. Relation to elbow joint dysfunction. Surg Clin North Am 1924 ; 4 :651-666.
- [5] MURRAY, R. C. (1940). Brit. J. Surg.. 28, 106.
- [6] GASTON, S.R., SMITI, F.M., andBAAB, O.D.(1949).Amer.J.Surg., 78, 631.
- [7] MASON, J. A. (1943). Surg., Gynec. Obstet., 76, 731.
- [8] MASON, M. (1954). Brit. J. Surg., 42, 123.
- [9] ORTHOBULLET(2020) /approaches/12099/radial-head-lateral-approach.
- [10] Longo UG, Franceschi F, Loppini M, Maffulli N, Denaro V. Rating systems for evaluation of the elbow. British medical bulletin. 2008 Jun6;87(1):131-61.
- [11] Elias E. Khalfayan, Randall W. Culp, and A. Herbert Alexander; Mason Type II Radial Head Fractures: Operative Versus Nonoperative Treatment; Journal of Orthopaedic Trauma Vol.6, No.3, pp.283—289
- [12] Xiao Chen, Si-cheng Wang, Lie-hu Cao, Guo-qing Yang, Ming Li & Jia-can Su Comparison between radial head replacement and open reduction and internal fixation in clinical treatment of unstable, multi-fragmented radial head fractures, *International Orthopaedics* volume 35, pages1071–1076 (2011)