



## CLINICAL STUDY AND FUNCTIONAL ACTIVITIES OF MEDIAL EPICONDYLE FRACTURES WITH INTRA-ARTICULAR ELBOW INCARCERATION IN PEDIATRIC PATIENTS.

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### ABSTRACT

Medial epicondyle entrapment after an acute fracture dislocation of the elbow is a not unusual finding within pediatric instances; its far remaining ossification middle to fuse within the distal humerus, making the clean avulsion fracture not possible to arise after the closure of the epiphyseal line. In this retrospective study, we file the clinical and purposeful activities of medial epicondyle fractures with intra-articular elbow incarceration in pediatric patients. A general of ten children who had a fracture of the medial epicondyle with the incarceration of the fragment in the elbow joint (kind III) has been surgically dealt with in our Hospital in Orthopedics Outpatients of Sree Balaji Medical College and hospital and SLIMS. All the fractures have been closed, resulting from a fall at the outstretched hand. One case was related to a posterolateral elbow dislocation. There were six male and four girl patients. The dominant arm changed into being involved in youngsters. The age at the time of injury ranged from 9 to 13 years, with a mean of eleven years. All of the patients were clinically reviewed a mean follow-up of 2years6months. X-rays confirmed the stable union in all sufferers. At the final examination, all the kids presented a remarkable variety of movements. The general ROM obstacle will become approximately 5\_ for flexion–extension and 2\_ for pronation–supination. The MEPS rating was amazing in all kids (98.3). Screw fixation proved to have fantastic scientific and practical effects for treating medial epicondyle fractures with intra-articular fragment incarceration to reduce the chance of possible complications..

**Key words:** Medial Epicondyle, Range Of Motion, Ulnar Collateral Ligament, Incarceration.

### INTRODUCTION

Usually, medial epicondyle entrapment after an acute fracture dislocation of the elbow is a common locating inside the pediatric cases; it is remaining ossification center to fuse in the distal humerus, making the easy avulsion fracture impossible to arise after closure of the epiphyseal line<sup>1</sup>. This fragment avulses caused by a traction force by means of the medial collateral ligament normally by multiplied valgus stress or frequently an elbow dislocation <sup>2</sup>. The important stabilize ligamentous shape within the elbow is the anterior band of the ulnar

collateral ligament; the posterior band most effective provides stability in flexion. The fractured fragment is typically displaced distally because of traction forces exerted by the use of its gentle tissue attachments<sup>3</sup>.

There are three viable mechanisms of harm: an instantaneous pressure implemented to the medial epicondyle, an avulsive pressure from valgus or extension loading, and an organization with elbow dislocation<sup>4</sup>.

Medial epicondyle fractures had been classified into four types relying on the volume of medial epicondyle

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displacement and the presence of a concomitant: a small degree of avulsion (type I); a non-entrapped avulsed fragment at the extent of the joint (kind II); a fraction incarcerated inside the joint (type III); a fracture related to elbow dislocation (type IV) <sup>5</sup>.

Whereas preceding studies have endorsed open reduction and internal fixation whilst the epicondyle is displaced by using 2–5 mm, numerous studies have recently said that nonsurgical remedy yields results that are much like or better than the ones of surgical treatment <sup>6</sup>.

Current absolute indications for open reduction and internal fixation of medial epicondylar fractures encompass incarceration of the epicondylar fragment within the elbow joint, suspected entrapment and disorder of the ulnar nerve, marked instability, and open fracture. Moreover, the surgical remedy have to be taken into consideration in cases of excessive-strength trauma, elbow laxity or instability, and giant fracture displacement <sup>7</sup>.

Intra-articular incarceration of the epicondylar fragment takes region in five–eighteen percentage of instances <sup>8</sup>. It calls for strong fixation to allow early movement on account that elbow stiffness is the most common hardship following medial epicondyle fracture. The observe pronounced medial epicondyle fractures with intra-articular elbow incarceration in pediatric patients.

**MATERIAL AND METHODS**

Total ten children who had a fracture of the medial epicondyle with incarceration of the fragment in the elbow joint (type III) were surgically treated in our Hospital in Orthopedics Outpatients of Sree Balaji Medical College and hospital and SLIMS. All the fractures were closed and resulted from a fall on the outstretched hand. One case was associated with a posterolateral elbow dislocation. There were six male and four female patients. The dominant arm was involved in two children. The age at the time of injury ranged from 9 to 13 years, with an average of 11 years.

Standard anteroposterior and lateral plain films of the injured elbow were obtained preoperatively for all patients. The operations were performed under general

anesthesia with the patient in the supine position and the injured elbow on an arm board. Operative treatment consisted of open reduction and internal fixation with a 4.0-mm cannulated screw under fluoroscopic control. When the epicondylar fragment was large enough, a second screw was used to provide rotational stability. The screws were placed up the medial column of the elbow, avoiding the olecranon fossa.

The medial epicondyle was exposed using a medial longitudinal incision. The ulnar nerve was routinely identified and protected but not transposed. Postoperatively, patients were immobilized with a cast at 90\_ flexion and with the forearm in neutral rotation for 2 weeks. Patients were then placed in a posterior splint and encouraged to remove the splint to perform gentle passive and active range-of-motion exercises 3–5 times per day. The splint was removed after pain-free palpation of the medial epicondyle, usually at 1 month after surgery.

It is our routine practice to clinically evaluate all patients at 2 weeks and perform both clinical and radiological evaluations at 1 and 3 months. Moreover, we organized an additional clinical follow-up in October 2021. The postoperative clinical evaluation was performed by one of the authors and included analysis of passive and active range of motion (ROM), functional results based on the Mayo Elbow Performance Score (MEPS), pain levels during activities of daily life evaluated with a 10 cm Visual Analogue Scale (VAS), elbow stability, and early or late complications. Flexion–extension of the elbows and pronation–supination of the forearm were measured by a goniometer.

The uninjured elbows served as controls. We decided to use the MEPS as it can be completed quickly, it assesses elbow function and pain via questions and elbow condition via objectively measured clinical data, and all of its items are applicable to pediatric subjects.

The total MEPS score ranges from 5 to 100 points, with higher scores indicating better function.

The stability of the elbow was evaluated with a manual valgus stress test at 15\_ of flexion. Possible early or overdue complications have been assessed and recorded at each observe-up evaluation.

MEPS score	No of points	Results
	between 90 and 100 points	excellent
	between 75 and 89 points	Good
	between 60 and 74 points	Fair
	<60points	poor

**RESULTS**

All of the patients were clinically reviewed a mean follow-up of 2years6months. X-rays showed solid union in all patients. At the very last exam, all the children presented an amazing range of motion. The standard ROM obstacle becomes approximately 5\_ for flexion–extension

and 2\_ for pronation–supination. The MEPS rating was first-rate in all kids (mean 98.3).

Complications happened in four (40%) sufferers. There have been three cases of screw removal due in one instances to symptomatic screw head prominence and in one case to inflammation with partial lesion of the distal

triceps myotendinous junction caused by the protrusion of the screw tip posteriorly, due to impingement of the triceps tendon during elbow flexion–extension.

The latter case changed into completely asymptomatic for the primary four months after surgical treatment, but the patient complained of pain at some point of elbow flexion–extension after resuming wearing hobby (swimming). The medical exam revealed the presence of a painful swelling at the distal 1/3 of the humerus. The lateral X-ray projection confirmed that one screw was orientated posteriorly with the screw tip protruding barely from the bone floor, and echography validated a partial lesion of the myotendinous junction over the sticking out screw tip.

After screw removal and splint immobilization for two weeks, entire healing and pain relief were pronounced. Moreover, we determined continual median nerve signs and symptoms (anterior interosseous nerve syndrome with weakness of the flexor pollicis longus and flexor digitorum profundus muscle groups associated with ache centered over the antecubital fossa and increasing distally into the proximal forearm) after surgical treatment in one case associated with posterolateral elbow dislocation. In this case, the median nerve turned into entrapped inside the joint by means of the fragment and the medial collateral ligament after the trauma.

The median nerve become not explored during surgery and remained entrapped inside the joint. The patient underwent a 2nd surgical treatment which include osteotomy of the previously fractured fragment, median nerve release, and new fixation with one cannulated screw, main to relief from signs and symptoms inside 2 months. No other neurological complications have been observed. Pain at some point of activities of daily lifestyles become absent in all sufferers at the final clinical assessment, besides in the patient who changed into re-operated on for median nerve entrapment.

## DISCUSSION

Recent studies agree that fractures of the medial epicondyle with incarceration of the fragment in the elbow joint (type III) need to be surgically dealt with. Multiple techniques of surgical treatment were reported: a) fragment excision and sutures, b) closed reduction and percutaneous Kirshner wires c) open discount and Kirshner wires, d) open discount and sutures, e) open discount and easy pins, and f) open reduction and screws. The desires of operative fixation are to maximise the possibility of early return to full function and excessive-stage interest and to reduce past due deformity and the probability of stiffness (as with extended solid immobilization). Therefore, the fracture fixation approach hired should be relaxed enough to allow for early elbow mobilization<sup>9</sup>.

In the contemporary study, open reduction and internal fixation with one or cannulated screws furnished strong fixation, leading to a 100 % of bony union and

resulting in exceptional functional and scientific consequences in all patients, with early resumption of carrying sports. Which is correlated with those pronounced by using Lee et al.<sup>10</sup> who obtained true to amazing consequences at a mean observe-up of 27.2 months while critiques were accomplished primarily based on the Elbow Assessment Score of the Japanese Orthopedical Association in all surgically dealt with patients.

In particular, the mean rating changed into ninety eight.three points in patients who acquired screw fixation, ninety-six.Three for individuals who received Kirshner cord fixation, 94.Five points after tension band wire fixation, and 93.5 following interosseous suture. When the ROM opinions were taken into consideration, we calculated a mean lack of about 5\_ for flexion–extension and 2\_ for pronation–supination. Several researches within the literature evaluated the ROM in sufferers who have been surgically dealt with for medial epicondyle fractures. However, specific strategies of fixation were evaluated at the same time in this research, and exceptional fracture types had been frequently protected.

Louahem et al<sup>10</sup> retrospectively evaluated 139 sufferers who have been surgically dealt with with Kirshner wires in 129 cases and compressive screws in 10 instances, and reported ordinary elbow ROM at an average observe-up of three.9 years in 133 patients. The 3 with a type III and 3 with a type IV fracture had extension deficits of 20\_. The final medical end result became terrific in a hundred thirty sufferers and precise in 9 patients.

Complications, including hardware elimination, had been documented in 3 (30%) youngsters. Painful screw head prominence was stated in topics, and irritation with partial lesion of the distal triceps myotendinous junction resulting from the protrusion of the screw tip posteriorly turned into mentioned in one subject in our study. This have a look at indicates that particular attention should be paid while putting the screw, because it ought to be placed up the medial column of the elbow, averting the olecranon fossa, and any eventual screw tip protrusion ought to be checked for via monitoring distinctive fluoroscopic projections.

Moreover, we stated a case in which the median nerve was no longer explored for the duration of surgical procedure; it remained entrapped inside the joint, with consequent median nerve entrapment syndrome observed. Therefore, it is important to perform neurolysis of the nerve in addition to surgical exploration, especially inside the maximum complicated fractures—mainly the ones related to elbow dislocation.

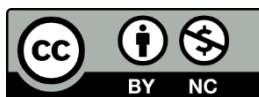
## CONCLUSION

In conclusion, open reduction and screw fixation proved exceptional clinical and useful consequences for the remedy of medial epicondyle fractures with intra-articular fragment incarceration. However, particular

interest must be paid while treating those potentially severe injuries to decrease the hazard of viable complications.

**REFERENCE:**

1. S. D. Dodds, B. A. Flanagan, D. D. Bohl, P. A. DeLuca, and B. G. Smith, "Incarcerated medial epicondyle fracture following pediatric elbow dislocation: 11 cases," *Journal of Hand Surgery*, vol. 39, no. 9, pp. 1739–1745, 2014.
2. [2] S. A. Khan and M. Zahid, "Dislocation of the elbow with intraarticular entrapment of the medial epicondyle in adults. Report of two cases," *Acta Orthopaedica Belgica*, vol. 68, no. 1, pp. 83–86, 2002.
3. Blount WP (1955) *Fractures in children*. Williams and Wilkins, Baltimore, pp 26–42.
4. Fowles JV, Slimane N, Kassab MT (1990) Elbow dislocation with avulsion of the medial humeral epicondyle. *J Bone Joint Surg Br* 72:102–104.
5. Papavasiliou VA, Crawford AH (1982) Fracture-separation of the medial epicondylar epiphysis of the elbow joint. *Clin Orthop Relat Res* 171:172–174.
6. Farsetti P, Potenza V, Caterini R et al (2001) Long-term results of treatment of fractures of the medial humeral epicondyle in children. *J Bone Joint Surg Am* 83:1299–1305.
7. Lawrence JT, Patel NM, Macknin J et al (2013) Return to competitive sports after medial epicondyle fractures in adolescent athletes: results of operative and nonoperative treatment. *Am J Sports Med* 41:1152–1157.
8. Chambers HG, Wilkins KE (1996) Fractures involving the medial epicondylar apophysis. In: Rockwood CA Jr, Wilkins KE, Beaty JH (eds) *Fractures in children*, 4th edn. Lippincott-Raven, Philadelphia, pp 801–819.
9. Wilkins KE (1991) Fractures of the medial epicondyle in children. *Instr Course Lect* 40:3–10.
10. Lee HH, Shen HC, Chang JH et al (2005) Operative treatment of displaced medial epicondyle fractures in children and adolescents. *J Shoulder Elbow Surg* 14:178–185
11. Louahem DM, Bourelle S, Buscayret F et al (2010) Displaced medial epicondyle fractures of the humerus: surgical treatment and results. A report of 139 cases. *Arch Orthop Trauma Surg* 130:649–655



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