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## Pediatric floating elbow: A case report

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### Abstract

Pediatric floating elbow is a rare injury. It may be closed or open injury and it carries a high risk for compartment syndrome. Most injuries are treated with operative fixation rather than conservative management. This case reports a 7-year old male with ipsilateral supracondylar fracture and distal both bone forearm fracture.

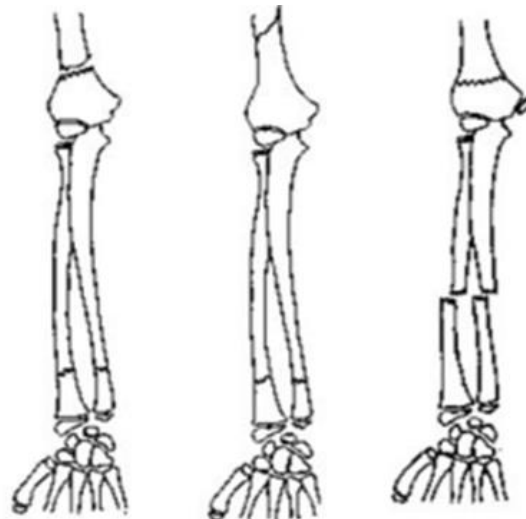
**Keywords:** Floating elbow, pediatric, supracondylar, fracture

### Introduction

Pediatric floating elbow is defined as a fracture of the humerus and both bone forearm and distal radius fracture [1]. This injury is considered to be relatively rare in pediatric age group and it is associated with high energy impact on the bone and surrounding soft tissue leading to increase probability of open fracture and compromised neurovascular bundle [2].

Although there is no consensus about the classification of such injury, Cuéllar ER *et al.* suggested a prognostic classification describing the injury based on duration of the injury, fracture level and whether it is an open or closed injury [3]. Table 1, figure 1

<b>Type 1:</b> Distal metaphyseal fracture of the humerus with metaphyseal or diaphyseal fracture of the radius and/or ulna, with less than 20 degrees volar angulation and less than 90 degrees lateral angulation.
<b>Type 2:</b> Humerus diaphyseal fracture with metaphyseal or diaphyseal fracture of the radius and/or ulna, with greater than 20 degrees angulation and independent lateral displacement.
<b>Type 3:</b> Humerus metaphyseal fracture and metaphyseal or diaphyseal fracture in ulna and/or radius with more than 20 degrees volar angulation and 90 degrees lateral angulation.
<b>Type 4:</b> Open fracture in Types I, II, or III with neurovascular compromise.
<b>Type 5:</b> Open fracture in Types I, II, or III within less than 6 hours.
<b>Type 6:</b> Open fracture in Types I, II, or III within more than 6 hours.



**Table 1/ Fig 1:** the table and figure illustrate the classification of floating elbow injury according to Cuéllar ER *et al.*, from left to right starting from type 1 reaching type 3.

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Simultaneous ipsilateral humerus and both bone forearm fractures leads to functional dislocation of the elbow from the rest of the body which will result in “floating elbow”. The term “floating elbow” also includes intraarticular distal humerus fracture and elbow dislocation along with forearm shaft fractures, because such injuries also lead to functional dislocation of the elbow joint [4].

### Case presentation

A 7-year old male was brought to the emergency department after falling down from 2-meter height on his left side. ATLS protocol was initiated and the patient was stable with left upper limb injury.

Findings include; left elbow and forearm gross deformity with a puncture wound at the distal forearm.

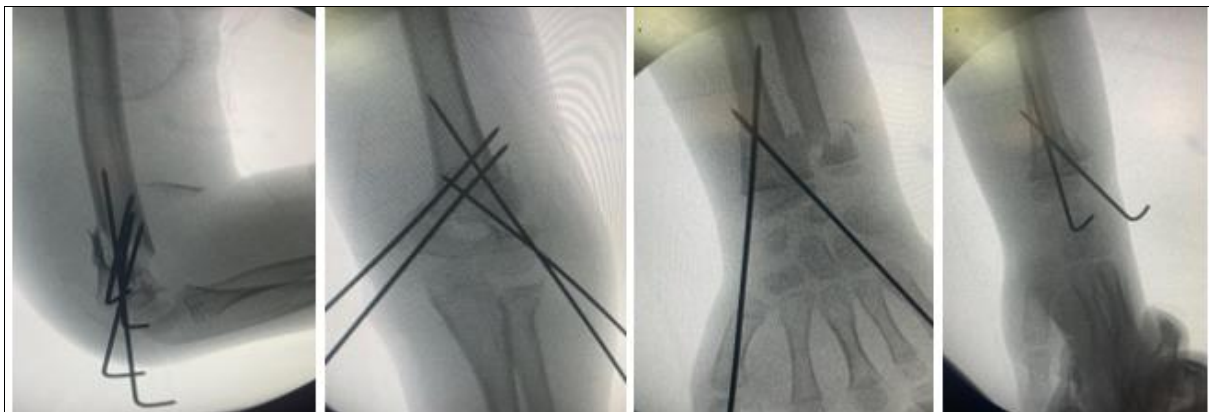
X-rays showed left supracondylar and distal forearm both bone fracture. Figure 2



**Fig 2:** Showing initial X-rays taken at time of presentation.

Vascular examination showed diminished pulses with the suspicion of ulnar artery injury. However, vascular injury was excluded by the upper limb angiogram study. Preoperative proper neurological examination was inhibited by pain but further assessment demonstrated intact

neurological assessment. The plan was to reduce and fix both fractures with k-wires in the presence of the vascular team. Reduction and fixation was done for the supracondylar fracture then for the distal both bone fracture. Figure 3



**Fig 3:** Shows intraoperative radiographs.

Fixation of the supracondylar fracture was done in closed manner except a slit skin incision was done for the medial k-wire to protect the ulnar nerve. Traction at forearm was used to aid in the reduction of the supracondylar fracture with the support of the distal both bone fracture by a towel underneath. Intra-operative radiographs showed severe comminution at the supracondylar fracture. Forearm fracture was fixed using retrograde k-wires in the distal radius fracture and re-alignment of the ulnar fracture done and left without fixation as it showed accepted parameters.

After that, assessment by the vascular team was done which showed intact distal pulses. The patient kept for 48 hours before discharge for observation for compartment and

intravenous antibiotics and the post-operative neurological exam showed intact median, ulnar and radial nerves. He left the hospital with above elbow back slab.

### Discussion

Pediatric floating elbow is a rare injury. For this reason, there is still no sufficient data in literature regarding its outcome, operative techniques, order of fixation and incidence of complications [2].

Distal both bone forearm fractures represent 23% of all pediatrics fractures and 5% of supracondylar fractures presents as a floating elbow. It was hypothesized that floating elbow is a result of high energy trauma, but many

authors showed that this injury may be a result of falling down in the playground or inside home as the same mechanism that isolated supracondylar or forearm fracture may present with <sup>[1]</sup>.

The term “floating elbow” may give the impression that the injury must have humerus and both bone forearm fracture, but many authors consider supracondylar fracture with distal radius or ulnar fracture as a floating elbow injury <sup>[5]</sup>.

Many studies showed that surgical fixation is the treatment of choice for such injuries as conservative management carries a higher risk for loss of reduction, non-union and compartment syndrome <sup>[6-9]</sup>.

Fixation of supracondylar fracture is agreed on to be fixed by k-wires, but conservative management for associated forearm fractures in floating elbow carries a higher risk for complications like compartment syndrome and loss of reduction as the casting will not hold the fracture as k-wires which will lead to the soft tissue compromise <sup>[2, 6]</sup>. Rogers *et al.* found that casting forearm fractures in floating elbow injury carries a high risk for non-union <sup>[6]</sup>.

The systematic review that was done by Ditsios *et al.* showed that there is still a controversy regarding the order of fixation in such injuries. Some surgeons prefer to address the more serious fracture and the others prefer to fix proximal fracture then the distal fracture <sup>[2]</sup>.

This injury carries a higher risk for nerve injury and compartment syndrome and the outcome is significantly affected by this association. In addition to that, having intra-articular extension will also negatively affect the outcome <sup>[2, 10]</sup>.

## Conclusion

Dealing with pediatric floating elbow injury should raise the suspicion of compartment syndrome and neurovascular compromise. Proper assessment and proper pre-operative planning should be done. In addition to that, rule out any associated fracture in the affected limb with supracondylar fracture.

## Disclosure

The authors have no conflicts of interest to declare.

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## References

1. Illingworth KD, Meisel E, Skaggs DL. The Pediatric Floating Elbow. *Operative Techniques in Orthopaedics*. 2019;29(1):43-48. <https://doi.org/10.1053/j.oto.2018.12.008>
2. Ditsios K, Christidis P, Konstantinou P, Pinto I, Christidis G, Ditsios T, *et al.* Floating Elbow in Adults: A Systematic Review and Meta-Analysis. *Orthop Rev (Pavia)*. 2022 Jan 29;14(1):31843. doi: 10.52965/001c.31843. PMID: PMC9036515.
3. Ríos EC, Lucio LN. Una propuesta de clasificación pronóstica del codo flotante en niños [A prognostic classification of the floating elbow in children]. *Acta Ortop Mex*. 2007 Nov-Dec;21(6):300-3. Spanish. PMID: 18386526.

4. Mishra Pankaj Kumar, Anshu Khare, Sanjiv Gaur, Ashish Gohiya. Paediatric Floating Elbow A Prospective Study. *Journal of clinical and diagnostic research* 2019 n. pag. <https://doi.org/10.7860/jcdr%2F2019%2F39579.12622>
5. Baghdadi, Soroush MD; CORTICES. Pediatric Floating Elbow Injuries Are Not as Problematic as They Were Once Thought to Be: A Systematic Review. *Journal of Pediatric Orthopaedics*. 2020;40(8):380-386. | DOI: 10.1097/BPO.0000000000001573
6. Rogers JF, Bennett JB, Tullos HS. Management of concomitant ipsilateral fractures of the humerus and forearm. *J Bone Joint Surg Am*. 1984 Apr;66(4):552-6. PMID: 6707033.
7. Duncan R, Geissler W, Freeland AE, Savoie FH. Immediate internal fixation of open fractures of the diaphysis of the forearm. *Journal of orthopaedic trauma*.
8. Levin LS, Goldner RD, Urbaniak JR, Nunley JA, Hardaker WT. Management of severe musculoskeletal injuries of the upper extremity. *Journal of Orthopaedic Trauma*. doi:10.1097/00005131-199012000-00012
9. Jones JA. Immediate internal fixation of high-energy open forearm fractures. *J Orthop Trauma*. 1991;5(3):272-279. doi:10.1097/00005131-199109000-00004
10. Ditsios K, Boutsiadis A, Papadopoulos P, Karataglis D, Givissis P, Hatzokos I, *et al.* Floating elbow injuries in adults: prognostic factors affecting clinical outcomes. *J Shoulder Elbow Surg*. 2013 Jan;22(1):74-80. doi: 10.1016/j.jse.2012.09.005. PMID: 23237691.

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