

# Migration of A K Wire in A Pediatric Floating Elbow Managed by Percutaneous Pinning-A Case Report

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**Abstract** Simultaneous ipsilateral fracture of the elbow and forearm is an uncommon injury. In such injuries, the elbow is effectively dissociated from the rest of the limb. Hence this injury is also called 'the floating elbow'. It is an indicator of a high energy injury and requires aggressive operative management. We present a unique case of a pediatric floating elbow in a nine year old boy. The supracondylar fracture was reduced under general anesthesia and fixed by percutaneous pinning with two crossed Kirshner (K) wires and the forearm fracture post reduction was managed conservatively by a Plaster of Paris long arm back slab. At 4 weeks post op, the slab was removed but only the lateral K wire could be visualized and removed. The child subsequently complained of pain in the upper arm and a prickly feeling in the skin. On examination, a sharp tip could be palpated in the upper arm and radiographs confirmed that the medial K wire had migrated into the upper arm. The K wire was removed under anesthesia and the patient started on range of motion exercises. He made an uneventful recovery with no residual side effects.

**Keywords:** *floating elbow, percutaneous pinning, K wire, migration*

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## 1. Introduction

A floating elbow is a relatively uncommon injury wherein dissociation of the elbow joint from the anchoring humerus and radius/ulna occurs [1]. This is a serious injury usually caused by high velocity trauma which has a higher risk of complications like compartment syndrome and neurovascular complications [2,3]. The chances of compartment syndrome due to the extensive soft tissue injury are very high in such patients. The assessment of neurovascular status of the extremity is difficult due to extensive swelling. The maintenance of reduction is a problem with treatment with plaster alone [2]. Due to severe edema the cast with elbow in acute flexion is hazardous because of the risk of ischemia. If the elbow is not flexed the chances of loss of reduction is high [3]. Since such injuries are often accompanied by considerable swelling, the reduction of fractures needs some form of internal splintage to prevent redisplacement. This mostly takes the form of K wires which may be used in supracondylar and/or forearm pinning. These wires are usually placed percutaneously under image intensifier control while taking care not to cause any neurovascular damage since due to marked swelling in such injuries, this is not very easy and subsequent to subsidence of edema, there are always chances of displacement of these wires. [1,2,4].

## 2. Case Report

A 9 year old boy had a fall while cycling and fell on the sidewalk with his left forearm trapped in the handle of his bike. He reported to the casualty room with deformity of his forearm and elbow with swelling and pain. However, there was no neurovascular compromise. The radiographs revealed a Gartland type III supracondylar fracture of the humerus with an ipsilateral mildly displaced fracture of the radius and ulna (Figure 1). The patient was taken to the operating room where, under image intensifier, closed reduction and percutaneous pinning of the supracondylar fracture was done with two crossed K wires (medial and lateral); the forearm fracture was treated conservatively with closed reduction and a long arm POP back slab. The immediate post operative period was uneventful (Figure 2, Figure 3). At 4 weeks follow up, the POP slab was removed. The lateral K wire was removed but the medial one could not be seen. The patient due to some urgency at his home could not stay in the hospital and left. However, two weeks later, the child returned with complaints of pain in the upper arm and a feeling of pricking in the skin. On palpation, a hard tip was felt under the skin in the upper arm and radiographs confirmed that the medial K wire had migrated into the upper arm (Figure 4). The subcutaneous K wire was removed under anesthesia with a small incision (Figure 5) and the patient started on range of motion exercises. He made an uneventful recovery with no sequelae.

### 3. Discussion

The term 'floating elbow' for a childhood injury when there is a supracondylar fracture of the humerus with ipsilateral fracture of both bones of the forearm was coined by Stanitski [1]. This being a very severe injury, usually following a fall from a height produces severe soft tissue damage which can result in neurovascular compromise or compartment syndrome. Palmer et al [2] in their analysis of 78 supracondylar fractures found four ipsilateral fractures of the radius and ulna, two ipsilateral fractures of the radius alone and one ipsilateral mid shaft ulna fracture. In the true sense floating elbow should include fracture supracondylar humerus with fracture of both bones forearm. However, various reports have included association of single bone fracture also in floating elbow [1,3]. Flynn et al [4], in their series of 331 supracondylar fractures reported one such case. The treatment of this injury varies from conservative management of all injuries, single bone fixation to aggressive emergency fixation of all components. Reed [5] treated all such injuries by conservative methods. Williamson and Cole [6] treated these fractures with traction and delayed manipulation with percutaneous pinning if severe elbow swelling was present. Fowles [7] managed all such cases by pinning of the supracondylar fracture and closed reduction and cast immobilization of the forearm fracture. Stanitski [1] recommended closed reduction and percutaneous K wire fixation of the supracondylar fracture first followed by reduction and stabilization of the forearm fracture. We employed the same technique in our case. We used two crossed K wires; the medial one was passed without any hyperflexion of the elbow after proper palpation of the ulnar nerve in order to prevent iatrogenic ulnar nerve injury. In hindsight, after reviewing the post operative radiographs, we found that the medial K wire was placed more anteriorly and penetrated the anterior cortex rather than the lateral cortex. Possibly, this K wire had loosened and migrated upwards and with helpful contractions of the biceps brachii, had migrated into the arm. Such cases have been mentioned earlier as well. Lyons and Rockwood [8] mentioned 49 cases K-wire migration (including 17 to major vascular structures and 8 deaths). The mechanism of this migration was loosening of the K-wire secondary to the movement of shoulder girdle over the pin ends. The movement along tissue planes was felt to be due to muscle action and the effects of gravity in various studies [8,9]. Distant migration such as migration of K-wire into right ventricle, intrathoracic migration into main pulmonary trunk, cardiac arrhythmia, Brown-Sequard syndrome, pericardial tamponade, haemoptysis due to migration of a fractured K-wire to bronchial tree, false aneurysm of brachial artery have similarly been reported [8-13]. An important and easy remedy which we should have used was simply bending the K wire end after insertion or using a stopper. This simple trick would have avoided the complication from arising in the first place.

K-wire fixation is one of the easiest available and forgiving techniques for fixation of majority of the fractures in children and adults. However, due to their inherent smooth nature, K-wires are prone to migrate. Complications are part of operative procedures and it is important to determine what causes them in order to take

preventative measures. Pre-operative planning, intra-operative proper pin placement, using stoppers or bending the wire end and postoperative patient compliance (including patient and parental education not to engage in inappropriate activity prematurely) are important factors to reduce such occurrence. It is pertinent to always keep in mind that K-wires are versatile but not inherently benign.



**Figure 1.** AP and lateral radiographs of the injured limb showing a Gartland type III supracondylar fracture of the humerus with an ipsilateral fracture of the radius and ulna



**Figure 2.** Immediate post operative radiograph showing acceptable reduction



**Figure 3.** Radiograph at 4 weeks showing migration of the medial K wire



**Figure 4.** Radiograph at 6 weeks showing the migrated K wire in the arm



**Figure 5.** Photograph showing the K wire being removed from the arm

## Conflict of Interest

Each author certifies that he has no commercial associations (e.g. consultancies, stock ownership, equity interests, patent/licensing arrangements, etc) that might pose a conflict of interest in connection with the submitted article.

## References

- [1] Stanitski CL, Micheli LJ. Simultaneous ipsilateral fractures of the arm and forearm in children. *Clin Orthop Relat Res* 1980; 153:218-222.
- [2] Palmer EE, Niemann KM, Vesely D, Armstrong JH. Supracondylar fracture of the humerus in children. *J Bone Joint Surg Am* 1978; 60: 653-656.
- [3] Templeton PA, Graham HK. The 'Floating elbow' in children-Simultaneous supracondylar fractures of the humerus and of the forearm in the upper limb. *J Bone Joint Surg Br* 1995; 77: 791-796.
- [4] Flynn JC, Mathews JG, Benoit RL. Blind pinning of displaced supracondylar fractures of the humerus in children. Sixteen year's experience with long term follow-up. *J Bone Joint Surg Am* 1974; 56: 263-72.
- [5] Reed FE Jr, Apple DF Jr. Ipsilateral fractures of the elbow and forearm. *South Med J* 1976; 69: 149-51.
- [6] Williamson DM, Cole WG. Treatment of ipsilateral supracondylar and forearm fractures in children. *Injury* 1992; 23: 159-61.
- [7] Fowles JV, Kassab MT. Displaced supracondylar fractures of the elbow in children. A report on the fixation of extension and flexion fractures by two lateral percutaneous pins. *J Bone Joint Surg Br* 1974; 56: 490-500.
- [8] Lyons FA, Rockwood CA., Jr Migration of pins used in operations on the shoulder. *J Bone Joint Surg Am.* 1990; 72: 1262-7.
- [9] Fowler AW. Migration of a wire from the sternoclavicular joint to the pericardial cavity. *Injury.*1981; 13: 261-2.
- [10] Loncan LI, Sempere DF, Ajuria JE. Brown-Sequard syndrome caused by a Kirschner wire as a complication of clavicular osteosynthesis. *Spinal Cord.* 1998; 36: 797-9.
- [11] Asavamongkolkul A, Ruangsetakit C. False aneurysm of the brachial artery in supracondylar fracture treated with Kirschner wire fixation: a case report. *Injury.* 2001; 32: 256-7.
- [12] Fang RH, Chang TL. Watch out for the K-wire: painful experiences in two cases. *Br J Plast Surg.*2002; 55: 698-9.
- [13] H Sharma, GR Taylor, NMP Clarke. A Review of K-wire Related Complications in the Emergency Management of Paediatric Upper Extremity Trauma. *Ann R Coll Surg Engl.* 2007 April; 89(3): 252-258.