

# Concomitant Elbow and Perilunate Dislocation: Floating Forearm

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## Citation

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## Abstract

Concomitant ipsilateral elbow and perilunate dislocation - "floating forearm"- is an extremely rare injury. The reported risk of missed initial diagnosis in perilunate dislocations is as high as 25%, which can increase with an obvious elbow dislocation after high-energy trauma. The potential for missed concomitancy and adverse outcome is further compounded in an intoxicated patient, especially if the initially obvious elbow dislocation is reduced and immobilised in an above elbow back slab. Then, if the patient complains of pain and paraesthesiae, it is essential to entertain a high index of suspicion of coexistence of compartment syndrome and carpal tunnel compression and safer to combine fasciotomies and carpal tunnel decompression with reduction of dislocations and stabilisation of carpus. We highlight the risk in an illustrative intoxicated patient with ipsilateral elbow and perilunate dislocation. We proceeded to forearm fasciotomies in conjunction with carpal tunnel decompression, which facilitated reduction of perilunate dislocation.

## INTRODUCTION

Lunate and perilunate dislocations are uncommon and constitute 10% of carpal injuries. The reported incidence of missed initial diagnosis in perilunate dislocations<sub>2</sub> is as high as 25%, which can rise steeply in case of an obvious concomitant elbow dislocation in high-energy trauma. We are reporting an extremely rare combination of concomitant ipsilateral elbow and perilunate dislocation, in effect a "floating forearm".

## CASE REPORT

A 30-year old man was brought by ambulance to the Accident Department on a Friday night with history suggestive of fall from a tree after alcoholic intoxication. He was seen by a passer-by to be climbing a tree earlier, but paramedics found him sitting on a bench in a park. The patient could not describe what happened. He complained of pain, swelling and deformity of the non-dominant left elbow. He had past history of depression, but denied taking any antidepressants currently.

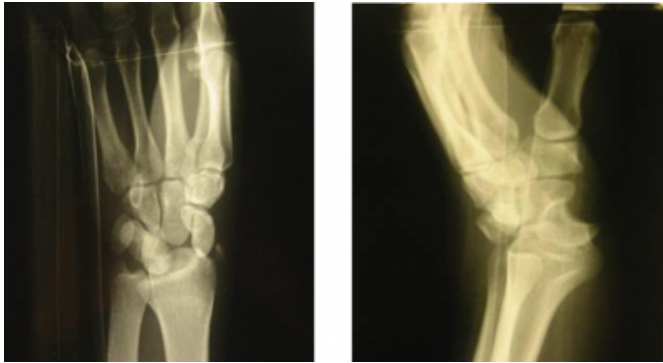
He was conscious, but confused and was smelling of alcohol. He appeared intoxicated and comfortable. He had no evidence of external head injury and was haemodynamically stable. On examination of left elbow, there were marked swelling, tenderness and deformity with no obvious neurovascular symptoms or signs within the

limitations of intoxication. Apart from superficial abrasions over left shin, he had no other apparent injuries. Radiographs of left elbow revealed posteromedial fracture-dislocation of elbow in association with a chip fracture from the radial head. The elbow dislocation was easily reduced in Accident unit and immobilised in an above elbow back slab. He was admitted for elevation of left arm and observation for any neurovascular problems

On review in the morning, he was fully conscious, alert and appeared comfortable with no neurovascular symptoms or signs. By evening, about 21 hours after injury, he started complaining of pain in left forearm, wrist and hand and paraesthesiae of fingers and was not happy to move fingers fully. On assessment out of back slab, he had diffuse swelling and tenderness of left elbow, forearm and wrist. He could not move the wrist and also had restriction of movements of fingers. Passive stretch of fingers was painful. Slight altered sensation was encountered in median nerve distribution. Radial and ulnar pulses were well- felt, capillary circulation was brisk and oxygen saturation in fingers was 96%. X-rays of left elbow, radius and ulna and wrist not merely confirmed reduction of fracture-dislocation of elbow with a chip fracture of the radial head, but also revealed dorsal perilunate dislocation with a chip fracture from radial styloid.

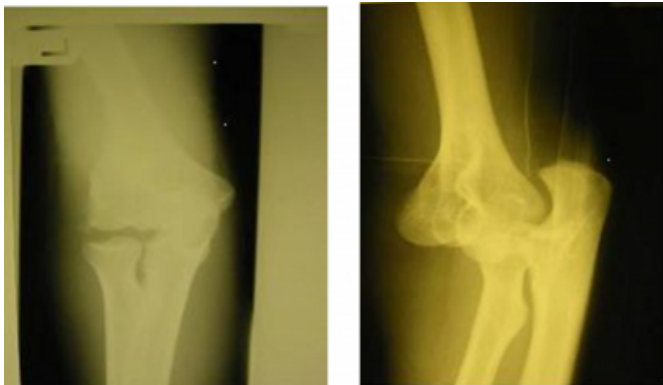
**Figure 1**

Figure 1: Radiographs showing dorsal perilunate dislocation and a chip fracture of radial styloid.



**Figure 2**

Figure 2: Radiographs of left elbow with dislocation and a chip fracture of radial head.



Because of clinical possibility of compartment syndrome and median nerve symptoms and signs, we proceeded to fasciotomies of forearm through volar and dorsal incisions together with carpal tunnel decompression. The muscles in all compartments were healthy. Closed reduction of perilunate dislocation was easy after carpal tunnel decompression and stabilisation was accomplished by transfixation with two Kirschner wires- one from scaphoid to radius and the other from trapezoid to lunate and then into radius. Elbow was found to be stable under fluoroscopic control. Fasciotomy wounds were left open and an above elbow back slab was applied. The arm was elevated and finger exercises were encouraged. Fasciotomy wounds were closed sequentially without any tension after two and five days respectively.

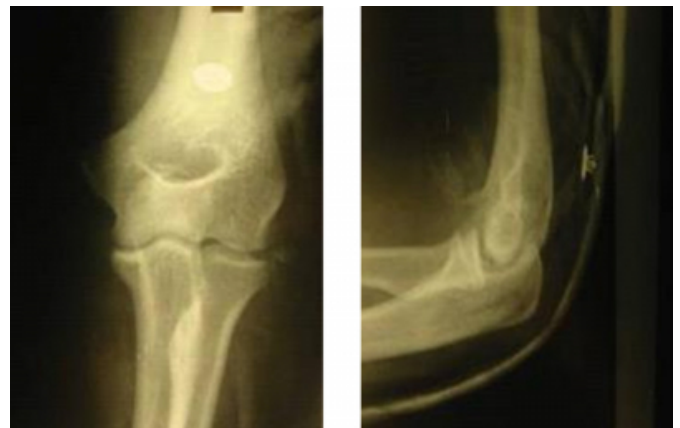
**Figure 3**

Figure 3: Radiographs of left wrist following reduction of perilunate dislocation and Kirschner wire stabilization.



**Figure 4**

Figure 4: Post-reduction radiographs of fracture-dislocation of left elbow.



Wounds healed well in two weeks. He was immobilised in an above elbow back slab for three weeks, which was then converted to below elbow back slab to facilitate elbow movements and physiotherapy. Kirschner wires were removed from the wrist at six weeks. X rays of left elbow and wrist were satisfactory. Intensive physiotherapy was advised because of stiffness of elbow and wrist as well as restricted supination and pronation. Sensory status of median nerve remained unchanged, but there were no motor signs. The patient was lost to further follow-up and attempts to recall him by letters, telephone and Family Physician were unsuccessful.

## DISCUSSION

“Floating forearm”- concomitant ipsilateral elbow and perilunate dislocation- is extremely rare. Chen,<sup>1</sup> reported three cases of concurrent elbow and perilunate dislocation after falls on outstretched hand. Closed reduction of elbow

dislocation resulted in excellent function in all cases. But anatomical reduction of perilunate dislocation was only achieved by open reduction and internal fixation in two cases with satisfactory functional recovery. Delayed diagnosis in the third case led to proximal row carpectomy and moderate pain after exceptional efforts. Waaziz et al added a further case report.

Masmejean and Cognet<sup>4</sup> reported a case of bifocal dislocation of forearm due to posterior dislocation of elbow and transscaphoid-retrolunate dislocation and fractures of radius and ulna. Emergency intervention involved reduction of elbow dislocation, plate osteosynthesis of radius and ulna and further combined anterior and posterior approaches for fixation of radial styloid, scaphoid and capitate by temporary scapholunate, triquetrolunate, scaphocapitate and radiolunate pinning. In a retrospective review of 61 patients with perilunate dislocation and carpal fracture-dislocation (FD), Lamas, Llusa and Mir<sup>3</sup> documented three cases of carpal fracture-dislocation in association with elbow dislocation.

Herzberg et al<sup>2</sup> undertook a multicentre study of 166 perilunate dislocations and fracture-dislocations from seven centres and found the incidence of perilunate fracture-dislocation was twice more common than perilunate dislocation. Displacement was dorsal in 161 (97%), 96% of which were dorsal transscaphoid perilunate fracture-dislocations. Open injury and delayed diagnosis adversely influenced the results. And the diagnosis was initially missed in a hefty 41 (25%) cases of isolated carpal injuries.

The spectrum of perilunate dislocation includes transscaphoid-perilunate, perilunate, transscaphoid-transcapitate-perilunate and trans-radial styloid in the order of frequency. Mechanism of injury is stress loading of carpus in hyperextension and ulnar deviation. The sequential destabilisation starts through the body of scaphoid with fracture or scapholunate interval with dissociation and dislocation of the rest of carpus around lunate and proximal scaphoid or lunette. Then the force transmits through the

space of Poirier between lunate and capitate with disruption of luno-triquetral articulation, resulting in dislocation of lunate into carpal tunnel. In trans-radial styloid perilunate dislocation, fractured radial styloid and rest of the carpus dislocates around lunate with further progressive sequential destabilisation distal to lunate through the space of Poirier or capitate with fracture or hamate and triquetrum or luno-triquetral interval<sup>6</sup>.

Our patient represents an extremely rare illustrative case of concomitant ipsilateral elbow and perilunate dislocation - a "floating forearm". The incidence of missed initial diagnosis of perilunate dislocation<sup>2</sup> is as high as 25%, which increases with an obvious elbow dislocation in high-energy trauma in an intoxicated patient. It is imperative to entertain a high index of suspicion of coexistence of compartment syndrome and carpal tunnel compression in concomitant elbow and perilunate dislocations. We consider it safer to combine forearm fasciotomies with carpal tunnel decompression, which facilitated easy reduction of perilunate dislocation and stabilisation of carpus.

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