

# Divergent Elbow Dislocation Associated with Ipsilateral Fractures of Ulnar Diaphysis and Radial Styloid Process in Adult: A Case Report

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## Learning Point of the Article:

Diagnostic and therapeutic particularities of divergent elbow dislocation associated with ipsilateral forearm fractures, requiring different techniques and procedures performed at the same time, in the same limb.

## Abstract

**Introduction:** The divergent elbow dislocation represents a rare lesion where the proximal radioulnar joint is torn and the distal part of the humerus goes between the radius and the ulna, the forearm dislocates posteriorly.

**Case Report:** We report the case of a 37-year-old male patient who had a traumatic divergent dislocation of the left elbow, associated with ipsilateral fractures of the ulnar diaphysis and the radial styloid process. The elbow joint was reduced under general anesthesia with internal fixation of the ulnar diaphysis fracture and a pinning of the radial styloid fracture. At 3 years of follow-up, the fractures were consolidated and the elbow was stable with a satisfying mobility.

**Conclusion:** The aim of our case report is to underline the diagnostic and therapeutic challenges of this complex lesion.

**Keywords:** Elbow dislocation, forearm, fracture, radio-ulnar joint, ulna.

## Introduction

Traumatic divergent elbow dislocation is a rare injury usually occurring in children, an adult case is very rare. We identified a few previously published case reports of divergent elbow dislocations in adults [1, 2, 3]. The first divergent elbow dislocation was described by Delee in 1981 in a case of a 6-year-old boy [4]. In 2003, Moritomo et al. described the first report of divergent dislocation in adults [5]. It was an unusual complication of the Sauve-Kapandji procedure in patients with rheumatoid arthritis. The association of divergent elbow dislocation to other ipsilateral forearm fractures is very rare. Therefore, the aim of our case report is to underline the diagnostic and therapeutic particularities of this uncommon

complex lesion.

## Case Report

A 37-year-old man, right-handed driver, presented to the emergency department for a closed trauma of his left upper extremity after landing on the wrist with an out-stretched elbow following a fall. Initial physical examination revealed swelling and transverse widening of the left elbow. The forearm and the wrist were deformed. No open wounds were found. The radial head and the olecranon were palpable laterally and medially. The patient's hand was well perfused without neurologic abnormalities. Plain radiographs showed a divergent left elbow dislocation associated with ipsilateral ulnar diaphysis fracture, a

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## Author's Photo Gallery



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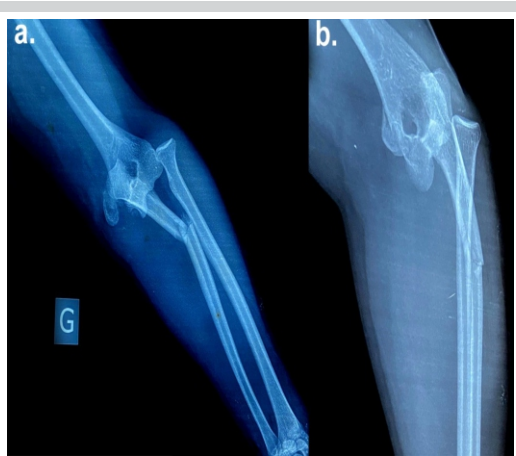
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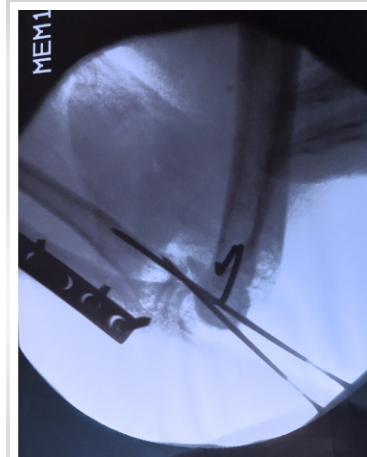
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**Figure 1:** Anteroposterior (a) and lateral (b) radiographs of the left elbow demonstrating a divergent elbow dislocation associated with a tearing of epitrochlea and an ipsilateral ulnar diaphysis fracture.



**Figure 2:** Lateral radiograph of the left wrist showing a fracture of the radial styloid process.



**Figure 3:** Intraoperative X-ray showing the radiohumeral stabilization with 2 Kirschner wires.

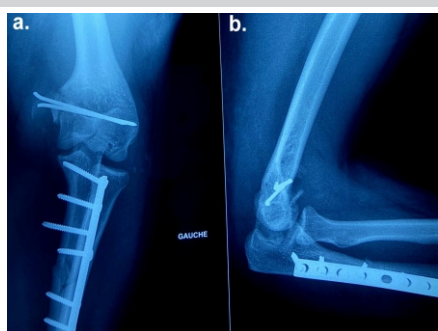
tearing of epitrochlea (Fig. 1), and a fracture of the radial styloid process (Fig. 2). The elbow joint was reduced under general anesthesia. Because of the radiohumeral instability, the reduction was stabilized with two Kirschner wires through the distal part of the humerus into the radius (Fig. 3). A reinsertion of the medial collateral ligament was performed and the epitrochlea was fixed with two Kirschner wires (Fig. 4).

The ulnar diaphysis fracture was reduced and fixed by a screwed plate (Fig. 4) with Kirschner wire-fixation of the radial styloid process (Fig. 5). Postoperatively, the elbow was placed in 90° of flexion and immobilized with a posterior splint for 3 weeks, and then the radiohumeral Kirschner wires were removed. An articulated elbow orthosis was placed; supervised forearm rotation and gentle passive elbow flexion and extension were initiated after the 3rd week. Full extension of the elbow was not aggressively executed until 6-week postoperatively. At that time, the orthosis immobilization was discontinued and the Kirschner wires of the radial styloid process were removed. The patient continued to work on range of motion with a 3 times per week physical therapy. At 4-month postoperatively, all fractures were united (Fig. 6 and 7) and the patient continued to show

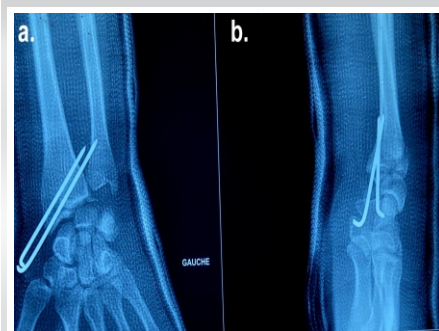
improvement in range of motion with an elbow flexion-extension arc of 30° to 140°. At 3 years of follow-up, the patient was asymptomatic, with 10° of limitation in elbow extension and a full flexion of 145° (Fig. 8), he also recovered 80° of pronation and 30° of supination (Fig. 9), the patient was satisfied with the clinical outcome.

**Discussion**

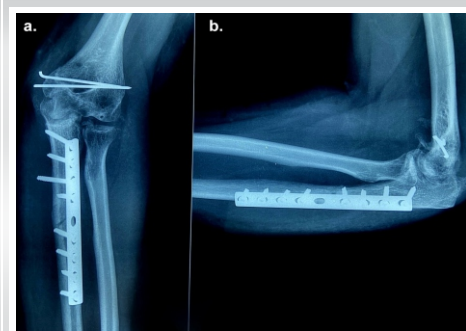
The previously reported cases of transverse divergent dislocations of the elbow occurred in children [6, 7]. Elbow dislocations are usually associated with fractures around the elbow joint such as epicondylar fractures, radial head fractures, or coronoid fractures. Kazuki et al. [1] reported on a case of traumatic divergent fracture dislocation of the elbow combined with Essex-Lopresti lesion in an adult 41-year-old man, where the radial head and the coronoid process were fractured. Casstevens et al. [2] published another case report involving an adult in 2012, distal part of the humeral shaft fracture and an open perilunate dislocation were associated. However, elbow dislocations with concurrent fractures of both the ipsilateral radius and ulna are very rare. Greene et al. [3] reported a case of



**Figure 4:** Anteroposterior (a) and lateral (b) radiographs of the left elbow showing trochlea pinning with 2 Kirschner wires and fixation of the ulnar shaft with a screwed plate.

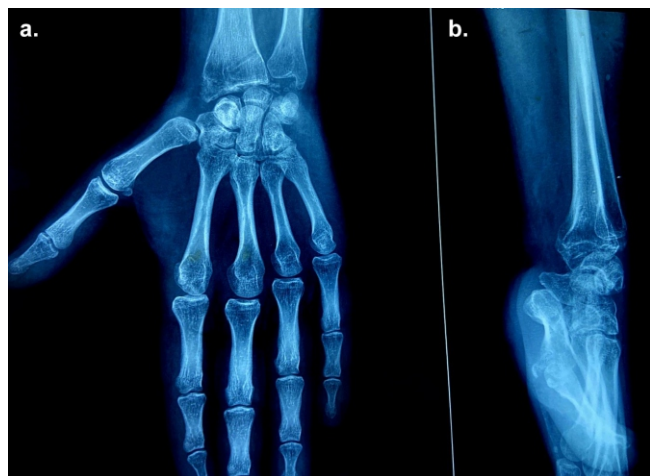


**Figure 5:** Anteroposterior (a) and lateral (b) radiographs of the left wrist showing wire-fixation of the radial styloid process.



**Figure 6:** Anteroposterior (a) and lateral (b) left elbow radiographs showing osseous consolidation at 4-month postoperatively.





**Figure 7:** Anteroposterior (a) and lateral (b) left wrist radiographs showing osseous consolidation of the radial styloid process at 4-month postoperatively.



**Figure 8:** Clinical photo of the patient showing a 3-year follow-up flexion-extension range of motion.



**Figure 9:** Clinical photo of the patient showing pronation and supination range of motion at 3 years of follow-up.

a 49-year-old man who sustained a traumatic avulsion injury of the distal side of the left forearm. The radiographs showed a divergent elbow dislocation associated with an ipsilateral ulnar shaft fracture. The reconstruction of the ulnohumeral joint was the chosen therapeutic option to ensure a stable elbow flexion, extension, and prosthetic fitting.

The mechanism of injury that produces dislocations of the posterior part of the elbow begins by unlocking the intrinsic stability with extreme supination of the forearm as the body rotates in an internal direction relative to the fixed extremity [8]. Cooperatively, the patient may have rupture or avulsion fracture of the medial collateral ligament or medial epicondyle [9]. In contrast to this mechanism, we hypothesize that the fracture of the ulnar shaft caused rotational instability of the elbow in our patient. This instability may have allowed interposition of the distal part of the humerus between the radius and ulna, and disruption of the proximal radioulnar joint.

The essentials of managing such a complex elbow injury are restoration of joint congruity, bone stabilization as well as ligamentous reconstruction with careful manipulating of soft tissues around the elbow joint. Considerable injury to soft tissues including the interosseous membrane during this type of

dislocation could result in the development of compartment syndrome [10].

### Conclusion

Elbow dislocation with ipsilateral ulnar shaft and radial styloid process fractures is rare. A considerable force must be applied to cause this pattern of injury. Our case focuses on the point that in every elbow dislocation case, the wrist joint and the forearm need to be evaluated both clinically and radiologically. The radiographs of an elbow injury case should always include that of the wrist and vice versa. The acceptable 3-year clinical and radiographic outcomes indicate that this approach was an effective treatment for this case of divergent elbow dislocation that was associated with ulnar shaft and radial styloid process fractures.

### Clinical Message

Elbow dislocation, associated with ipsilateral ulnar shaft and radial styloid process fractures in adult, is a rare complex lesion that requires a surgical treatment and a long-term physical therapy to obtain satisfying clinical and radiological outcomes.

**Declaration of patient consent:** The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

**Conflict of interest:** Nil **Source of support:** None

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**Consent:** The authors confirm that informed consent was obtained from the patient for publication of this case report

## How to Cite this Article

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