# ACTA SCIENTIFIC ORTHOPAEDICS (ISSN: 2581-8635)

Volume 5 Issue 12 December 2022

Research Article

# Silent Elbow Joint Relocation - A Red Flag for Medial Collateral Ligament Instability Needing Repair

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### Abstract

**Background:** This case report is to highlight the red flag for ligamentous injury in elbow dislocation cases which reduce into position without much effort. All cases of easily reducible elbow dislocations warrant a CT scan and dynamic examination using an image intensifier to identify the torn ligaments. This aids in early reconstruction of the torn ligaments and better rehabilitation. **Patient and Method:** An office going young lady sustained injury to her right elbow. She was diagnosed with posterior elbow dislocation which reduced into position with just a gentle push on the olecranon. She underwent dynamic radiological examination which revealed an unstable medial support with coronoid fracture. She was assessed for surgery and underwent open reduction and fixation of the coronoid fragment, followed by medial collateral ligament repair.

Result: At 6 months follow up she has regained full range of movements with no instability.

**Conclusion:** Easy reduction of dislocated elbow is a red flag for bony avulsion/ligamentous injury and warrants complete radiological workup including dynamic x rays. Prompt and early ligament reconstruction re-establishes the stability of the joint.

Keywords: Elbow Instability; Elbow Dislocation; Elbow Ligament Reconstruction; Coronoid Fracture

# Abbreviations

MCL: Medial Collateral Ligament; LCL: Lateral Collateral Ligament

### Introduction

Even skilled elbow surgeons find it tough to treat complex elbow instability. To identify all lesions that may arise in complicated elbow instability, the preoperative radiographs should be carefully examined. To get the best results, it's essential to recognise all potential lesions. The following are the injury types that are most prevalent: (1) Trans olecranon fracture-dislocation; (2) Coronoid fractures and lateral collateral ligament lesions; (3) Terrible Triad; (4) Radial head fractures associated with lateral and medial collateral ligament lesions (with or without elbow dislocation); (5) Monteggia-like lesions; and (6) Humeral Shear fractures associated with lateral and medial collateral ligament lesions (with or without elbow dislocation). In a fracture dislocation scenario, the reconstruction of bones and Lateral collateral ligament has been found important. Medial collateral ligament reconstruction has not been mandatory for good results [1].

The medial collateral ligament (MCL) is not regularly repaired after suffering damage, which have been reported in 50% to 60% of terrible triad injuries [2]. Recent research suggests that if there is still instability after treating the coronoid and radial head fractures and the LCL, the MCL may need to be repaired [3-6].

In numerous earlier research, the mechanism of complicated elbow dislocation has been outlined. Recent research based on magnetic resonance imaging (MRI) results in elbow dislocations revealed significant MCL injury, dislocation will occur with simultaneous fracture of the coronoid process when forearm external ro-

Citation: RM Vignesh Karthik. "Silent Elbow Joint Relocation - A Red Flag for Medial Collateral Ligament Instability Needing Repair". Acta Scientific Orthopaedics 5.12 (2022): 169-176. tation occurs without full disengagement of the coronoid process [7]. Additionally, coronoid process fracture quantitative analysis revealed that the volumes of the fracture fragments varied significantly amongst dislocation patterns [8].

In a biomechanical cadaveric study by <u>Shuo Chen., et al.</u> [9] they noted that type-II coronoid process fractures with AMCL Deficiency can cause posterolateral rotatory instability of elbow, so the coronoid process and the AMCL should be repaired or reconstructed to restore posterolateral rotatory stability as well as valgus stability.

The severity of MCL injuries and osseous injury patterns in terrible triad injuries, however, have been linked in only a hand full of clinical studies. Hence this case report gains an important part in planning management.

#### **Material and Methods**

A young office going lady of age 32 presented to our hospital emergency department with complaints of pain right elbow, inability to flex the joint following a fall on outstretched hand. She had extensive ecchymosis in the medial aspect of elbow extending to forearm (Figure 1) along with posterior prominence of the olecranon, tenderness in the anterior and medial aspect of the elbow. Distal neuro vascular status was found intact.

A gentle cursory examination revealed posterior dislocation of the elbow. With a gentle push on the olecranon the joint reduced into position, on testing for rage of movement it posteriorly dislocated on attempting extension from 90-degree flexion. The joint was easily reduced and radiological examination followed.

Plain radiograph in 90-degree flexion was unremarkable, a CT scan (Figure 2-5) of the elbow revealed a comminuted fracture involving both facets of the coronoid process of the ulna, with the largest fragment measuring 12X9 mm and a 4x1 mm osseus loose body in the radio humeral joint. It was a type 2 Regan and coronoid fracture (Table 1).

The nature of instability was appreciated by the patient. With her consent dynamic stressing on the elbow was done under image intensifier guidance. The postero-medial dislocation was seen at Figure 1

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Figure 2

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Figure 5

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Regan and Morrey Classification	
Type 1	Coronoid process tip fracture
Type II	Fracture of 50% or less of height
Type III	Fracture of more than 50% of height

**Table 1:** Regan and Morrey Classification of Coronoid fracture.

the 40 – 50 degrees of extension from 90-degree flexion. On holding it reduced a valgus stress demonstrated excessive opening of the medial joint space, medial dislocation without resistance at end point, while a varus stress test demonstrated a laterally firm end point without subluxation (Figure 6-8).

With informed clinical consent the patient underwent open reduction and fixation of the coronoid fragment along with medial collateral ligament repair through the flexor carpi ulnaris muscle splitting technique. The medial collateral ligament was found torn in its mid segment. The comminuted coronoid fragments with the anterior capsular and MCL attachments was found in the anterior aspect of joint. By careful distraction of the joint the free fragments

Figure 4

were removed. The bed for reattachment of the coronoid fracture was prepared.

As the fracture fragment was very tiny for screw placement it was decided to reattach the fragment to ulna using a loop of no 5 ehtibond non absorbable suture to ulna. Under direct vision and fluoroscopy control two convergent tunnels were drilled from either side of the olecranon in posterior to anterior direction. The anterior capsule was tagged to the fracture fragments with ethibond and the free ends were passed through the bone tunnels by looping with thin cerclage wires passed from posterior to anterior in the tunnels (Figure 9-12).



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persistant laxity, hence MCL primary repair with augmentation by ethibond to medial epicondyle was done.

Post surgery the joint was found stable in full range of motion, and valgus strain, the lateral collateral ligament was inspected through the Kocher's approach and found intact. Post operatively the patient was placed in a posterior slab at 90 degrees with forearm in neutral position for 2 weeks. This was followed by suture removal and hinged elbow brace guided gradual range of motion exercises.

At 6 months post injury the patient had near full extension, functional flexion of elbow, complete pronation and supination of forearm (Figure 13-17).



Figure 14

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extension and found not to dislocate. Valgus stress test revealed

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### Figure 15



#### Figure 17

#### **Results and Discussion**

As knowledge of the biomechanics and osseous and ligamentous structures of the elbow joint has grown, satisfactory results for terrible triad injuries have been reported [10,11]. These studies have recommended using a systematic algorithm to determine the extent of restoration of damaged structures required. There is agreement that the LCL should be repaired in all terrible triad injuries when treating collateral ligament damage, although there is disagreement about whether the MCL should be reattached to the medial epicondyle. 22 patients with terrible triad injuries were effectively treated by Forthman, et al. [2] with coronoid fixation, radial head replacement or fixation, and LCL repair, but no MCL repair. However, every patient in their analysis had a coronoid fracture of Regan and Morrey type 2 or 3, indicating that the MCL injury was most likely not significant enough to cause persistent instability. According to Jeong., et al. [12], for patients with the terrible triad injury should consider repairing all damaged lateral and medial tissues through the lateral and medial windows because it produced good clinical and radiological results.

Although the treatment of MCL injuries is still debatable, the majority of authors recommended performing MCL restoration if there was any remaining instability following fracture stabilisation and LCL repair [2-4,11-14].

The MCL and radial head are the primary and secondary valgus stabilisers of the elbow from a biomechanical perspective [15,16]. As a result, radial head fractures and MCL injuries are tightly related [9,17]. Any connections discovered prior to surgery would assist assess the severity of the MCL injury that resulted in persistent elbow instability. By repairing this medial soft tissue, the primary and secondary valgus stability of the elbow joint was increased and maintained congruency and stability without the use of hinged external fixators.

Coronoid process fractures have been subjected to quantitative investigation in elbow fracture-dislocation cases. Mellema, *et al.* [8] used quantitative 3-dimensional CT modelling to study coronoid fractures and showed that there were changes in fracture volume depending on the kind of injury. In comparison to olecranon fracture dislocation and posteromedial injury values, the mean volume of the fractures associated with horrible triad injuries was 424 mm<sup>3</sup>, which was the lowest value. According to Doornberg., *et al.* [18], coronoid process fractures connected to terrible triad injuries showed a range of heights when coronoid fracture height was assessed on CT images. The causes of coronoid fracture heights in terrible triad injury patients, however, were not identified.

According to Rhyou and Kim [7], when forearm external rotation occurs without complete disengagement of the coronoid process, the coronoid process will fracture concurrently with the dislocation. These results imply that if the valgus force generating the MCL injury is powerful enough to separate the coronoid process, then the volume of the coronoid process fracture might differ in severe triad injuries, and it might not occur or it might be minor in size. Injury with high-grade MCL had lesser volumes of coronoid process fractures, according to a study conducted by Jae Sung Lee, *et al.* [19].

In making a decision regarding surgical treatment of the medial structures of a terrible triad injury, the focus should be on the coronoid fracture for cases in which the size of the coronoid process fracture is large, such as Regan Morrey type 3, and for an MCL injury for patients in whom the size of the coronoid process fracture is small.

In line with the literature reading this lady had a Regan Morrey type 2 fracture of the coronoid which was associated with mid substance tear in the MCL. Presented with an unstable elbow which was managed effectively with open reduction of coronoid and repair of MCL. Contrary to regular teaching MCL tears need to be addressed when they are contributing to significant instability in the elbow.

#### Conclusion

MCL repair with coronoid process reattachment in a case of unstable elbow is a definite procedure of need to establish a stable elbow and achieve full range of movements. This is one of the very few cases reported in literature on this fracture pattern and hence gains importance as a furtherance of cadaveric studies.

### **Conflict of Interest**

None.

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