

## Case Report

# Primary ligament repair in unstable elbow dislocations: a case report

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### ABSTRACT

The second most commonly affected joint, when it comes to joint dislocations, is the elbow joint. These injuries can usually be treated non surgically, but the complexity of the injury can increase chronic pain and instability requiring surgical intervention. There isn't enough evidence-based recommendation on the ideal treatment approach in acute elbow dislocations, hence, we bring forth a case report on the same. A 54-year-old male presented with a left elbow dislocation from a road traffic accident experiencing a fall on an outstretched hand and elbow. The patient complained of pain and restricted movements of the left elbow, scoring a 7 out of 10 on the Visual Analogue Scale. Examination confirmed restricted movement and tenderness along with paraesthesia in the region of the left ulnar nerve supply. Vascular integrity was maintained distal to the injury. Imaging showed closed postero-lateral elbow dislocation. Closed reduction under anesthesia was performed which revealed joint instability, leading to the soft tissue surgical repair along with complete elbow reduction. A medial approach for repair of medial ligament and lateral approach for repair of lateral ligament complex and anterior capsule repair was undertaken. Four-week follow-up revealed to have restored range of motion at the elbow joint with significant improvements in joint stability. An ideal treatment approach to elbow dislocations has yet to be decided upon based on the literature. However, common consensus dictates that simple elbow dislocations with joint instabilities warrant surgical intervention to prevent chronic joint instabilities and recurrent dislocations.

**Keywords:** Elbow joint, Elbow dislocation, Ligament repair, Lateral collateral ligament, Medial collateral ligament

### INTRODUCTION

The elbow joint is one of the most commonly dislocated large joints, reportedly being the second most common large joint.<sup>1,2</sup> The incidence of elbow dislocations is reportedly 5.21 per 100000 person-years.<sup>1</sup> The elbow joint is relatively stable and needs extreme forces to cause it to dislocate. The mechanism of injury is well established which would either include a fall on an outstretched hand or a high trauma injury that would cause the dislocation. There remains ambiguity on the optimal treatment approach to acute elbow dislocations, especially postero-lateral dislocations which would help in minimizing long-term instability and achieving maximum range of motion

post treatment.<sup>3</sup> Here we report a case of unstable acute elbow dislocation which was operated upon.

### CASE REPORT

A 54-years-old male without any comorbidities visited the outpatient department of Orthopedic Surgery at our tertiary care hospital with complaints of pain and limited movement at the left elbow joint. He was involved in a road traffic accident 1 hour prior to his arrival at the hospital. He fell on his outstretched left hand while riding a two-wheeled motor vehicle after which he immediately started experiencing his presenting symptoms. Upon further inquiring, it was revealed that the pain was severe

and sharp shooting in nature, increased with movement and decreased with rest and analgesics. The patient denied any radiation of pain and confirmed his pain to be a 7 out of 10 on the Visual Analogue Scale. He further denied any history of loss of consciousness, vomiting, convulsion or head and neck bleeding. His past, personal, family and social history were unremarkable. Upon examination, he was conscious, cooperative and oriented to time, place and person. His vital signs included a pulse rate of 98/minute in the left radial artery, blood pressure of 130/80 mmHg in the right brachial artery, respiratory rate of 20/minute, temperature of 98.3°F and oxygen saturation of 98%.

Focused examination revealed bony deformity in the left elbow region, however, no open wound, pus discharge or other scars were visible. Palpation revealed tenderness over the local site and decreased sensation over the 5th phalanx but failed to demonstrate any crepitus at the local site or increased temperature. The range of motion at the left elbow joint could not be assessed due to pain, however, the left shoulder joint and left wrist joint demonstrated a full range of motion without any pain. X-ray of the left elbow showed closed postero-lateral dislocation with ulnar nerve neuropraxia. (Figure 1, 2).



**Figure 1: Left elbow antero-posterior view showing lateral dislocation of elbow joint.**

With a provisional diagnosis of left elbow dislocation and soft tissue injury involving the left ulnar nerve and intact vascular integrity, a decision to reduce the dislocated joint under anesthesia and examination was undertaken. Upon performing the procedure, it was seen that the reduced joint had gross instability with significant medial opening, lateral opening less than medial and dislocation in the

elbow range of motion. Hence, the patient was planned for surgery.



**Figure 2: Left elbow lateral view showing posterior dislocation of elbow joint.**

Medial Collateral Ligament was approached with a medial incision and repaired. A lateral incision to repair the lateral ligament complex and the anterior capsule was made as well and repaired. After performing successful repair of the ligaments, the patient was allowed early, active, assisted mobilization at 48 hours. Upon discharge, the patient had an Above Elbow slab with dressing, devoid of any soakage. The patient demonstrated active finger movements with a pulse oximetry reading of 100% in all fingers of both hands. The patient was followed up at 4 weeks and had complete restoration of range of movements at the left elbow joint and significant improvement in instability.

## DISCUSSION

Elbow dislocations are commonly encountered in practice. There is a relatively higher incidence of such injuries in Men as compared to women.<sup>1</sup> Elbow dislocations have been categorized into Simple and Complex dislocations. Simple dislocations involve only injury to either a ligament or a capsule, whereas complex dislocations involve fracture of the surrounding bony structure.<sup>4</sup> Furthermore, dislocations can be categorized based on the direction of dislocation. They are posterior, postero-lateral, postero-medial, anterior, medial and lateral, with postero-lateral being the most commonly encountered, like in our case.<sup>2</sup>

Posterior or postero-lateral dislocations occur commonly as concluded by Robinson et al, with various theories explaining the mechanism involved.<sup>5</sup> One of those theories, known as the valgus external rotation theory, states that a fall on a partially extended elbow causes a

combination of lateral rotation and valgus strain due to the medial surface of the trochlea.<sup>6</sup> This leads to the stripping of the lateral ligament as well as the tearing of the posterolateral capsule, allowing the radial head to rotate backward.<sup>6</sup> This theory was expanded upon by O'Driscoll et al, who proposed that falling onto an outstretched hand with the elbow extended makes the triceps eccentrically load, creating an external rotation moment and internal rotation torque, resulting in posterolateral rotatory subluxation.<sup>7</sup> O Driscoll et al, argued that the soft tissue injury initiates from the lateral to medial side, terming it the "Hori Circle", starting from partial disruption of the lateral ulnar collateral ligament (LUCL) to overt disruption of the medial ligament complex, resulting in various stages of elbow dislocation.<sup>7</sup>

In comparison, the valgus hyperextension theory, suggests that dislocations occur from a fall with the elbow in hyperextension, resulting in rupture or avulsion of the medial collateral ligament (MCL).<sup>8,9</sup> The coronoid process disengages as a result, initiating a postero-laterally directed dislocation.<sup>8,9</sup> MRI studies of posterolateral dislocations reveal more severe soft tissue injury on the medial side of the elbow as compared to the lateral side.<sup>5</sup> In addition, there are associated bone contusions in the radial head and capitellum observed as well. The injury begins medially, with soft tissue disruption and a distractive mechanism causing the coronoid to disengage, leading to a pathological forearm external rotation and eventual posterolateral dislocation.<sup>5</sup>

As evidenced in all studies, elbow dislocations involve a range of soft tissue injuries. It can be explained by a ladder system, where it starts from the medial ligament tear and progresses to a complete avulsion of the common extensor tendon.<sup>5</sup>

Joint stability is assessed after reducing the dislocation with or without sedation.<sup>1</sup> To assess stability, the elbow is subjected to flexion, extension, supination, pronation, varus as well as valgus range of motions. Radiological subluxation, non-congruence after reduction, instability during anesthesia or requiring extension limitation over 30-45 degrees to maintain reduction, warrants early ligament repair. In our case, after reduction under anesthesia, it was revealed that the patient had gross instability with a significant medial opening as compared to the right when subject to different maneuvers, Stable joints after a closed reduction can be managed conservatively with a sling and a follow-up X-ray to assess for any subluxation on the X-ray.

However, if there remains residual instability, joint incongruence on a post-reduction X-ray or open dislocation, patients should be subject to operative management.<sup>10</sup> Furthermore, if a patient is involvement in surrounding structures, particularly the neurovascular bundle, operative management and exploration is the ideal next step.<sup>1</sup> Ulnar nerve neuropraxia is the most commonly found neurovascular bundle complication.<sup>1</sup> However,

evidence by Jauffrit et al, suggested there is no real difference in outcomes between conservative or operative management in patients who underwent postero-lateral dislocation of the elbow.<sup>3</sup> We proceeded with operative management in our case because of significant findings of gross instability post-reduction as well as Ulnar nerve involvement.

Previously it was believed that post-surgery, the ideal duration of immobilization was 1 week. Recent literature suggests early mobilization results in better long-term outcomes, especially early active and assisted post-operative rehabilitation. This is achieved by placing the elbow in a sling and allowing motion as tolerated within 1 week of surgery.<sup>10</sup> We agree on this post-operative rehabilitation regimen and therefore, our patient underwent early active assisted mobilization 48 hours post-operatively. Prolonged periods of immobilization with static splinting are more likely to result in loss of range of motion, hence dynamic splinting with early range of motion exercises should be the ideal plan of care.<sup>1</sup>

Complications occur frequently in patients with acute elbow dislocations. Oftentimes, loss of range of motion is encountered on follow-up. Apart from prolonged periods of immobilization beyond 25 days, the literature suggests contracture of ligaments, articular incongruence or fragments can cause loss of range of motion, especially flexion or extension blocks.<sup>1</sup>

## CONCLUSION

Simple acute elbow dislocations are frequently encountered, however, treating with evidence-based medicine is a challenge because of the insufficient evidence and consensus on the optimal treatment approach. Furthermore, simple dislocations may involve ligament or capsule damage and may require surgical exploration even though reduction produces complete stability to prevent long-term neurovascular bundle damage. Hence, it remains a question as to include ligament and capsule damage in the definition of simple elbow dislocation or term it as complex because of the complexity it demands. Therefore, the authors believe large-scale randomized trials are the need of the hour for this second most commonly found joint dislocation to guide an optimal approach with the best outcomes.

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