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CASE REPORT/CME ARTICLE

Nonoperative Management of Complete Lateral Elbow Ligamentous Disruption in an NFL Player: A Case Report

Mark S. Muller, MD · Mark C. Drakos, MD · Brian Feeley, MD · Ronnie Barnes, MA, ATC · Russell F. Warren, MD

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Statement of Need

The purpose of this article is to review the anatomy of the lateral side of the elbow as it relates to injury and instability. The reader is expected to be able to apply these concepts to correctly diagnose and treat lateral-sided elbow injuries in athletes.

Target Audience

This activity is targeted at primary care physicians, rehabilitation specialists, orthopaedic surgeons, rheumatologists, general medicine physicians, physiatrists, pain physicians, residents, and fellows.

Objectives

Hospital for Special Surgery professional education activities are intended to improve knowledge, competence, and performance of our learners and to lead to better patient care. At the conclusion of the activity, the participant should be able to:

- Describe the anatomy of the lateral side of the elbow as it relates to instability and injury.
- Recommend and prescribe an appropriate treatment plan for lateral-sided elbow injures.

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Abstract Disruptions of the lateral soft tissue restraints of the elbow, including the lateral ulnar collateral ligament, are a well-recognized clinical entity which may result in chronic elbow instability. When symptomatic, most authors recommend surgery to reconstruct the LUCL. We report on a case of a professional football player who sustained complete disruption of the lateral collateral ligamentous complex from the lateral humeral epicondyle with extension of his injury into his common extensor origin. He was treated conservatively and returned to play after 4 weeks. Treatment algorithm and a review of the literature are discussed.

Keywords elbow instability · lateral elbow ligamentous disruption · acute elbow injury

Introduction

Disruptions of the lateral soft tissue restraints of the elbow, including the lateral ulnar collateral ligament, are a well-recognized clinical entity which may result in chronic elbow instability. O'Driscoll and colleagues asserted that disruption of the lateral ulnar collateral ligament (LUCL) was the "essential lesion" which can produce posterolateral rotary instability (PLRI) [1]. In effect, the LUCL acts as a restraint to varus stress and a buttress to prevent subluxation of the radial head posteriorly and laterally. However, cadaveric studies have questioned its role as the essential stabilizer of the lateral elbow [2–8]. The data suggest that damage of multiple structures may be necessary to induce instability. Once these ligaments are disrupted, PRLI can lead to a variety of symptoms including clicking, locking, weakness, and functional disability. When symptomatic, most authors recommend surgery to reconstruct the LUCL [1, 9, 10].

The most common causes of lateral ligament disruption are elbow dislocation and iatrogenic surgical release [10]. Although medial elbow ligamentous injuries are commonly associated with sports, particularly overuse injuries in throwing athletes, lateral ligament injuries have rarely been described in competitive athletes. Furthermore, with few numbers, there is no consensus on how to treat these patients particularly when issues such as operative vs. nonoperative management, hand dominance, position, and return to play are considered. A previous study reported only 2.9% of elbow injuries in the National Football League (NFL) over a 5-year period were identified as lateral ligament sprains [11]. We are unaware of any previous reports on the management and natural history of lateral elbow ligamentous disruption in a professional contact athlete. We present a case report of a NFL player with an acute complete lateral elbow ligament disruption managed nonoperatively with no long-term sequelae.

Case

A 25-year-old NFL wide receiver sustained a right upper extremity contact injury in the third quarter of a mid-season game resulting in varus load to his dominant elbow. He had significant lateral elbow pain and swelling and was unable to return to the game. Physical examination revealed lateral

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elbow tenderness and swelling with limitation of motion secondary to pain. As pain and swelling resolved, marked lateral elbow opening was noted with varus stress at 30°. No fractures were seen on X-ray; however, MRI revealed complete disruption of the lateral capsular ligamentous restraints from the distal humerus (Fig. 1) and avulsion to the common extensor origin (Fig. 2). In addition, images revealed medial trochlear impaction injury further confirming the extent of varus stress applied to the elbow (Fig. 2). The elbow, and specifically the radiocapitellar joint, was reduced indicating static stability to the joint (Fig. 3). The player was treated with ice, ultrasound, electrical stimulation, anti-inflammatory medication, and placed in a hinged elbow brace. He began a progressive flexibility and strengthening program with limitations placed on his extension and supination. This was done to avoid elbow stiffness and posterolateral subluxation while allowing the lateral ligamentous complex and common extensor tendon origin to heal in an anatomic position.

One month after injury, the player was noted to have extension–flexion range of motion from 15° to 110°. On the left side, he had 0–125° of flexion. He had full, symmetric supination and pronation. He reported no pain at that time and had no varus instability at 20–30° of flexion. He was noted to have minimal tenderness and swelling. He returned to play in an elbow brace as a wide receiver and on the special teams unit for the remainder of the season and had no difficulties with his right elbow. He missed a total of three games and was limited for 16 practices. He returned to play 28 days after injury. The player was elected to the Pro Bowl at the termination of the season. He is currently playing in the NFL over 2 years after the injury with no limitations. He has no lateral elbow pain, and examination now reveals symmetric range of motion. There is no varus or posterolateral instability on stress examination.

Fig. 2. Coronal fast inversion recovery images show injury to the common extensor origin (*red arrow*) as well as a medial trochlear impaction injury (*yellow arrow*) indicative of a varus loading pattern

Fig. 1. Coronal fast inversion recovery images show complete disruption of the radial collateral and lateral ulnar collateral ligaments (*red arrow*) off the lateral epicondyle

Fig. 3. Sagittal fast spin echo image in extension shows no posterior subluxation of the radial head relative to the capitellum. On this image, the elbow does not appear fully extended which may be a secondary sign that there is posterolateral rotatory instability

Discussion

The primary stabilizers of the elbow joint are the static restraints, including the articular surface and capsular ligamentous complex [6]. According to Morrey and associates, resistance to varus stress is shared equally between these two static restraints (50% from articular surface and 50% from lateral capsular ligaments) [7]. The lateral elbow capsular ligamentous complex includes the radial collateral ligament, annular ligament, accessory annular ligament, and lateral ulnar collateral ligament. The relative function and importance of each of these structures is controversial [1–8, 12, 13]. The radial collateral ligament originates on the humeral lateral epicondyle and inserts on the annular ligament. The radial collateral ligament has been noted to lose tension after radial head resection despite the elbow retaining lateral stability. This observance led to the conclusion that the lateral ulnar collateral ligament was the critical restraint to lateral elbow stability. The lateral ulnar collateral ligament arises from the lateral epicondyle and attaches to the tubercle crista supinatoris of the ulna. O'Driscoll et al identified the lateral ulnar collateral ligament as the key lateral soft tissue restraint preventing posterolateral rotatory instability [1]. More recently, Seki and associates performed a cadaveric study and found that the lateral ulnar collateral ligament was the most important stabilizer to varus stress [8]. However, they found that the radial collateral ligament contributed to both varus and posterolateral stability. McAdams et al. in a separate cadaveric study with selected capsular ligamentous releases concluded that complete lateral elbow instability required transection of the radial collateral ligament, lateral ulnar collateral ligament, and common extensor origin [5].

There is little in the orthopedic and sports medicine literature regarding acute lateral elbow ligamentous injuries in contact athletes. This case was complicated by the disruption of the entire lateral ligamentous complex in the patient's dominant elbow. In a previous review of elbow injuries from the National Football League Injury Surveillance System from 1991 to 1996, only two of 91 elbow injuries (2.9%) were reported as lateral elbow sprains [11]. Hyperextension and valgus injuries were the most common mechanisms for acute elbow injuries in that series. There is an abundance of literature regarding medial elbow instability in athletes. In the previous review, there were 14 players identified with medial elbow ligamentous injury [11]. None of these players required surgical repair or reconstruction. The average lost time was 0.64 games (range, 0 to 4). The player who missed four games was a wide receiver whose medial collateral ligament sprain was classified as grade 3. Chronic medial elbow instability is a well-recognized problem in throwing athletes with a large body of literature supporting surgical reconstruction for persistent pain despite rest and modification of throwing mechanics. We are unaware of any studies reporting on the natural history or management of acute lateral elbow ligament disruptions.

In this case, a professional level contact athlete sustained complete disruption of the lateral collateral ligamentous complex from the lateral humeral epicondyle with extension of his injury into his common extensor origin. Because of the extent of soft tissue injury and the amount of laxity on initial examination, we initially considered operative intervention with lateral ligamentous repair. However, ultimately, we decided that the injury represented an extra-articular ligamentous disruption with a high likelihood for healing with adequate stability. In addition, persistent posterolateral instability could be treated with a reliable soft tissue reconstruction. We elected to treat his elbow nonoperatively with rest, ice, anti-inflammatories, and a rehabilitation program. In addition, the elbow was protected in a hinged elbow brace for the remainder of the season. In our case, the athlete was able to return to an elite level of competition within the same season with nonoperative treatment of his lateral elbow injury. He has played the past two seasons without a brace with no elbow pain. His examination 2 years from injury reveals no evidence of varus or posterolateral instability. He has symmetric motion and strength in his right elbow. In this case, nonoperative treatment and protection in a hinged elbow brace allowed rapid healing. If surgical management had been chosen, authors recommend return to contact sports after 6 months [10]. In the absence of clinical or radiographic evidence of PLRI despite the extent of his injury to his lateral elbow, we propose that the conservative management of this injury may allow a quicker return to pre-injury level of competition without long-term sequelae.

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Please read each question and circle the correct answer.

1) Injury to what structure has been described as the "essential lesion" of posterolateral rotatory instability?

   a. Radial Collateral Ligament
   b. Annular Ligament
   c. Common Extensor Tendon Origin
   d. Accessory Annular Ligament
   e. Lateral Ulnar Collateral Ligament

2) Which of the following is not part of the lateral elbow capsular ligamentous complex?

   a. Radial Collateral Ligament
   b. Annular Ligament
   c. Common Extensor Tendon Origin
   d. Accessory Annular Ligament
   e. Lateral Ulnar Collateral Ligament

3) All professional athletes with a complete avulsion of the lateral ligamentous restrains of the elbow should be managed surgically in order to return to competition.

   a. True
   b. False

4) Return to play after surgical reconstruction of the lateral ulnar collateral ligaments has been reported at

   a. 4 weeks
   b. 3 months
   c. 6 months
   d. 1 year

5) Athletes more commonly injure the lateral aspect of their elbow rather than the medial aspect.

   a. True
   b. False

6) Approximately what % of total injuries to lateral elbow sprains represent in football players?

   a. 30%
   b. 20%
   c. 10%
   d. <5%

7) The two most common causes of lateral elbow ligament disruption are:

   a. Elbow dislocation and iatrogenic release
   b. Degenrative tendinopathy and iatrogenic release
   c. Degenrative tendinopathy and Elbow dislocation
   d. Iatrogenic release and direct lacertation

8) Hyperextension and valgus injuries are the most common mechanisms for acute elbow injuries

   a. True
   b. False

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