

Abstract

Background: This was a Level 3 case study focused on the diagnosis, treatment, and impending recovery of a baseball pitcher with a UCL rupture. UCL tears are common in baseball athletes. Evidence has indicated that the incidence of UCL tears varies depending strongly on biomechanics; however, the incidence of a bone spur as a precursor to UCL ruptures is not well recorded. Research suggests that insufficient healing or laxity of the UCL results in elbow instability, which increases valgus stress and compressive forces. **Patient:** Athlete is a 19-year-old (185.42 cm and 74.84 kg) male NJCAA baseball pitcher. The athlete stated he had no prior medical history of elbow or other injuries. Athlete was participating in a game when he felt a tear in his medial right elbow. The onset was immediate with sharp pain with generalized aching and stiffness. Athlete noted his pain as a 6 out of 10 (10 point pain scale). He stated that he removed himself from the remainder of the game and notified the Athletic Trainer (ATC). The ATC instructed the athlete to utilize ice and NSAIDs to inhibit the pain cycle until further evaluation. Upon arrival to the athletic training room two days post injury, the athlete presented with tenderness upon palpation centered on the ulnar collateral ligament (UCL) and with full AROM. The Milking Maneuver, used to detect a partial tear of the UCL of the elbow, was positive with a reproduction of symptoms. The Valgus Stress Test, used to detect elbow instability, was positive with a reproduction of pain medially and a compression pain laterally in the elbow joint when the valgus stress was applied. The Golfer's Elbow Stress Test, used to detect medial epicondylitis, and Tinel's Sign, used to detect an irritated ulnar nerve, were both negative. No neurological symptoms were noted. The athlete was referred to the team physician for further evaluation. The orthopedic surgeon's evaluation led to a conclusive finding of an olecranon osteophyte, which had formed after repetitive throwing over a long period of time. An MRI revealed a complete rupture of the ulnar collateral ligament at the sublime tubercle attachment of the right elbow. **Differential Diagnosis:** medial epicondylitis, ulnar nerve neuropathy, UCL sprain, UCL rupture. **Intervention or Treatment:** The athlete received UCL reconstruction surgery. The palmaris longus was the choice for tendon graft and the surgeon removed the bone spur. The athlete is following Andrew's post-operative rehabilitation protocol. **Outcomes or Other Comparisons:** The athlete is currently in Phase I of his rehabilitation protocol. **Conclusions:** This was a Level 3 exploration case with concentration on the diagnosis, treatment, and impending recovery of an athlete with a complete UCL rupture preceded by a bone spur. This case highlighted the unique findings of an osteophyte that may have predisposed the athlete to the tendon rupture. This case provides as an instance of the uncommon, poorly documented precursor to UCL injury, bone spur. After UCL reconstruction and removal of the olecranon osteophyte, the rehabilitation of the elbow remains the same as the typical presentation; however, it is important to monitor the athlete once the throwing program begins. **Clinical Bottom Line:** A bone spur may manifest as a precursor to UCL injury.

Introduction

The sport of baseball has been around for decades, but injury to the ulnar collateral ligament in its throwing athletes has been on the rise in recent years (Redler, Degen, McDonald, Altchek, & Dines, 2016). While the evidence suggests that repetitive overhead throwing may be a risk factor for UCL injury in baseball athletes, bone spurs have not been well documented as a precursor for UCL injury as well. However, it is a known fact that the olecranon and humerus get twisted and pushed against each other during the throwing movement. This in turn can lead to a valgus extension overload (VEO). This type of deterioration in the elbow can eventually lead to the development of a bone spur. Therefore, it stands to reason that a correlation between a bone spur and a UCL injury may indeed exist (Hoogenboom, Voight, & Prentice, 2013). This study serves as a resource for baseball and throwing athletes alike who present with a bone spur. These athletes should be made aware that a preexisting bone spur could manifest as a precursor to UCL injury in the future.

Purpose

The overall purpose of this research is to explore the incidence of an olecranon bone spur as a precursor to ulnar collateral ligament injury in baseball athletes. Because the ulnar collateral ligament is located on the medial aspect of the elbow, it is particularly susceptible to valgus stress. When the force on the ulnar collateral ligament exceeds the physiological limits of the ligament, significant injury can occur (Hibberd, Brown, & Hoffer, 2015). Bone spurs that have developed in the elbow joint can cause additional irritation to the surrounding tissue, thus leaving the overhead throwing athlete in an even greater state of injury vulnerability. Surgical intervention along with a complete and consistent rehabilitation program is required for baseball athletes who wish to return to sport and minimize long-term effects. In this review, the evidence will reveal the possible correlation between a bone spur and an ulnar collateral ligament injury.

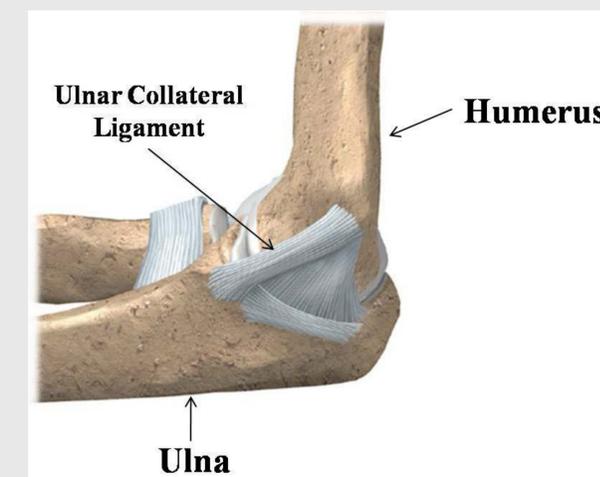
Anatomy

The ulnar collateral ligament (UCL), also known as the medial collateral ligament (MCL) of the elbow, is located on the inside of the elbow joint. The elbow is a synovial hinge joint comprised of three articulations: the humeroulnar, the radiohumeral, and the radioulnar. These articulations provide great stability to the elbow and are supported by several muscles and ligamentous structures. These include the radial collateral on the lateral aspect, the ulnar collateral on the medial aspect, the annular ligaments, and the anterior capsule (Sherman, 2014). The ulnar collateral ligament complex composes three portions: the anterior oblique ligament, the posterior oblique ligament, and the transverse ligament. The anterior oblique ligament is thicker than the posterior oblique ligament and plays a primary stabilizing role against a valgus force. "The transverse ligament, also known as the oblique ligament, does not cross the elbow joint and is generally believed to confer no stability against a valgus force" (Weeks & Dines, 2015). Additionally, it is crucial to note "the fan-shaped UCL is functionally the most important ligament in the elbow for providing stability against valgus stress" (Dutton, 2012).

Treatment

Non-operative treatment is one available option to all baseball players with this injury. Athletes who present with a bone spur and want to prevent further injury to the elbow, or in particular, the ulnar collateral ligament, should know that conservative treatment is one possibility for them. Rest, non-steroidal anti-inflammatory drugs, and bracing are the introductory forms of attention for this condition (Redler, Degen, McDonald, Altchek, & Dines, 2016). Nonsurgical treatment includes strengthening the surrounding musculature and increasing the hinge joint's range of motion. Massage and an extensive list of therapeutic modalities, such as electrical stimulation and ultrasound, can be used in a variety of combinations. This can help to decrease pain and improve functional mobility. However, most bone spurs are not found in athletes until being evaluated by a health care professional following an injury to the elbow.

Operative intervention may be warranted when an ulnar collateral ligament injury presents. Additionally, if a bony abnormality is identified, then surgery is required if the baseball athlete wishes to return to full competition. Surgical reconstruction of the medial elbow ligament's instability is most often performed in grade two or three tears and is referred to as "Tommy John" surgery (Hibberd, Brown, & Hoffer, 2015). "In this procedure, the flexor-pronator muscle mass is detached from its attachment on the medial condyle, while a submuscular ulnar nerve transposition is performed, and function of the anterior band of the UCL is restored by drilling bone tunnels and weaving figure-of-8 graft at the medial elbow" (Hibberd, Brown, & Hoffer, 2015). The palmaris longus or plantaris is most often used as the tendon graft source for ulnar collateral ligament reconstruction (Redler, Degen, McDonald, Altchek, & Dines, 2016). Since the first successful repair in 1974 on pitcher Tommy John, there have been several other modifications to Dr. Frank Jobe's technique. However, what is most important is the post-operative rehabilitation following the reconstruction. It is essential for baseball athletes who wish to return to sport to adhere to the appropriate therapy phases outlined by the attending surgeon. The gold standard for the most comprehensive rehabilitation protocol comes from the Andrews Sports Medicine Institute. It is composed of four distinct phases. Phase I (0-3 weeks), the immediate post-operative phase, is geared towards protecting the healing tissue, decreasing pain and inflammation, delaying muscular atrophy, and protecting the graft site to allow healing. Phase II (4-8 weeks), the intermediate phase, focuses on a gradual increase in ROM, promoting healing of repaired tissue, and regaining and improving muscular strength. Phase III (8-14 weeks), the advanced strengthening phase is aimed towards increasing strength, power, and endurance, maintaining full elbow ROM, and gradually initiating sport activities. Phase IV (14-32 weeks), the return to activity phase, continues to increase strength, power, and endurance of upper extremity musculature and return to sports activities with the introduction of an interval throwing program. In most instances, after following this program, baseball athletes will return to throwing in an estimated 11.6 months post-surgery (Hibberd, Brown, & Hoffer, 2015).



Discussion

The presented case study and literature review outlines and provides as an instance of the uncommon, poorly documented precursor to ulnar collateral ligament injury, bone spur. Because osteophyte formation is rarely documented prior to a physical examination being warranted, baseball players are unaware of their underlying medical condition. Therefore, these athletes are not taking the appropriate preventative and conservative treatment measures to avoid injuring the ulnar collateral ligament. Additionally, there is no way of knowing without question that the bone spur did not cause the medial elbow injury. After careful review, it can be concluded that a bone spur may manifest as a precursor to ulnar collateral ligament injury in baseball athletes.

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