Return to Play Following Ulnar Collateral Ligament Reconstruction

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KEYWORDS

• UCL • UCL tear • UCL reconstruction • Outcomes after UCL reconstruction
• Return to play after UCL reconstruction • UCL rehab • UCL complications

KEY POINTS

- The incidence of Ulnar collateral ligament (UCL) surgery has been increasing particularly in younger athletes involved in year-round pitching for multiple teams without well-defined and enforced pitch counts.
- A standardized evaluation of athletes with medial elbow pain including thorough history, comprehensive physical examination and appropriate imaging studies are essential to make the diagnosis of UCL tear.
- There have been several surgical techniques described for UCL reconstruction, many of which have had good to excellent results in returning overhead throwing athletes back to their sport.
- Transient ulnar neuritis is the most common postoperative complication and is relatively common. Major complications are relatively rare and include need for revision UCL reconstruction and fracture.

INTRODUCTION

Nontraumatic ulnar collateral ligament (UCL) injury is most commonly seen in overhead athletes, with baseball pitchers at the highest risk of developing UCL insufficiency. UCL dysfunction typically presents as pain with loss of velocity and control. Some patients will present with an acute injury, whereas many will report a more insidious onset of symptoms with progressive pain with throwing and decreased performance. Treatment ranges from nonoperative rehabilitation to ligament reconstruction. Reports show overall good return to previous level of competition in those who undergo surgery.[1] Recently, investigators have documented a significant rise in these elbow injuries in young athletes, especially pitchers.[2]

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ANATOMY AND BIOMECHANICS OF THE ULNAR COLLATERAL LIGAMENT

The UCL provides the primary restraint to valgus stress at the elbow. Its 3 main components are the oblique, posterior, and anterior bundles.[3] The oblique bundle, or transverse ligament, both originates and inserts on the ulna and does not provide true stability to the elbow joint.[4] The posterior bundle is a fan-shaped thickening of the capsule that provides minimal, if any, stability to the elbow.[4] The anterior bundle provides the main valgus restraint in the pitching motion and is the main restraint to valgus stress from 30 to 120° of elbow motion.[5] The anterior bundle originates on the anteroinferior edge of the medial humeral epicondyle (**Fig. 1**), with a mean footprint of 45.5 mm^2 and inserts an average of 2.8 mm distal to the ulna articular margin (**Fig. 2**), with a mean footprint length of 29.2 mm on the sublime tubercle of the ulna[5] (**Fig. 3**). The mean length of the UCL is 53.9 mm, with a mean width of 5.8 to 9.2 mm.[5] The anterior bundle inserts onto the sublime tubercle with a ridge that separates the bundle into anterior and posterior bands of equal size. The anterior band of the anterior bundle provides primary valgus restraint especially at 60° to 90° of flexion and its repair is crucial to adequate reconstruction.[4] The posterior band of the UCL provides secondary restraint to valgus force at the elbow at 90 to 120° of elbow flexion.[4]

Biomechanical studies have shown valgus forces at the elbow to be as high as 64 Newton-meters (N-m) during the late cocking and acceleration phases of throwing.[6] Varus torque moments are needed to counteract these forces and are typically generated from the UCL, flexor-pronator muscles, capsular tissue, and bony constraints of the elbow joint. Morrey and An[7] determined in a cadaver model that the UCL generated 54% of the resistance to a valgus force with the elbow at 90° of flexion. During active pitching, this value is likely reduced due to simultaneous muscle contraction, but if one assumes the UCL bears 54% of the maximal load, the UCL must be able to withstand 34 N-m. The UCL can withstand a maximum valgus torque between 22.7 and 34 N-m[6]; therefore, during pitching, the UCL frequently is at or above its failure load.

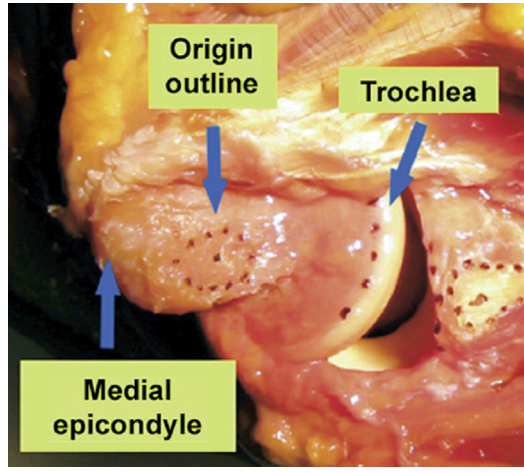

Fig. 1. The origin of the UCL has been carefully dissected from its bony attachment. Its outline has been marked. There is no attachment to the trochlea. (*From* Dugas JR, Ostrander RV, Cain EL, et al. Anatomy of the anterior bundle of the ulnar collateral ligament. J Shoulder Elbow Surg 2007;16(5):658; with permission.)