

Spring 2017

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Recommended Citation

Nicholson, Emily and Webber, L, "Rehabilitation of a Post-Surgical Ulnar Collateral Ligament Repair" (2017). *Thinking Matters*. 69.
http://digitalcommons.usm.maine.edu/thinking_matters/69

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Rehabilitation of a Post-Surgical Ulnar Collateral Ligament Repair

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Introduction

An ulnar collateral ligament (UCL) tear in overhead throwing athletes is a common occurrence due to the repetitive, large, valgus stress that is placed on the elbow. This is a difficult injury for any overhead athlete to endure and it requires an intensive rehabilitation process to return to play.

The surgery for the ulnar collateral ligament that we are investigating includes taking the palmaris longus muscle and using the tendon portion to attach to the humerus and ulna to serve as stabilization for the medial elbow. Post-surgical patients will be placed into a hinge brace that will progress from limited to full elbow extension for 5-6 weeks. The most successful post-surgical rehabilitation protocols include progressions through range of motion, stability, neuromuscular control, strength and a sport-specific throwing progression.

Research has shown a large variation in statistics in athletes returning to play successfully, 33%-78%, for various reasons such as the surgical method used as well as the rehabilitation protocol proceeding surgery⁵. The purpose of this literature review is to identify a science-based protocol to a quick, safe, successful recovery from a reconstruction surgery for an ulnar collateral ligament tear using the palmaris longus graft.

Purpose

The purpose of this literature review is to demonstrate a plan for the rehabilitation of ulnar collateral ligament tear post-surgery and return to play quickly and safely. This poster will demonstrate a protocol to follow for an athlete post reconstruction of their UCL to regain range of motion, to strengthen, to stabilize and to prepare the shoulder joint to return the athlete to an overhead throwing sport.

Background

The UCL connects the humerus and the ulna. The ulnar collateral ligament is a main stabilizer on the medial side of the elbow and stabilizes the elbow during valgus stress placed on the joint. The UCL is placed in the greatest amount of valgus stress while during an overhead throwing action. The repetitive nature of most overhead throwing sports causes the elbow to be more susceptible to UCL injuries due to the large stress played on this ligament repeatedly.



Left: Elbow Hinge Brace used for immobilization and adjustable range of motion post surgery

Exercise Protocol

A progressive post surgical is essential for return to play in throwing athletes. The exercise protocol begins with restoring the athletes range of motion and progresses into strength training of the upper extremity. The goal is to return any flexibility, strength, and neuromuscular control lost during injury and post surgically. Below are examples of progressive range of motion and strength exercises per each phase of rehabilitation.

Phase	Exercises	Example
Immediate Postoperative Phase (Weeks 1-3)	The goal of this phase is to increase range of motion and stop muscle atrophy. Elbow range of motion can be done in the brace (30°-105°). Gripping exercises with resistance such as a therapy hand ball to strengthen the forearm. Shoulder range of motion and isometrics are done here.	
Intermediate Phase (Weeks 4-7)	Here the goals is to obtain full elbow range of motion and can discontinue the elbow hinge brace. Using light weight (1lb to start) wrist curls, extension, supination, and pronation further strengthen the forearm and improve range of motion. Rotator cuff strengthening exercises using resistance bands include internal and external rotation, both abducted and adducted.	
Advanced Strengthening Phase (Weeks 8-14)	This phase is going to increase strength and power in the elbow and shoulder. Maintaining elbow range of motion is crucial in this phase. Plyometric exercises that resemble sport activities, such as chest passes and soft throws, increase strength and power as well as improving neuromuscular control. Trunk and scapular strengthening further increase stability of the upper limb as a whole.	
Return-To-Sport Phase (Weeks 14-52)	A throwing progression can begin around three months post surgery. This sports specific program progresses patient by gradually increasing the distance of throws and the frequency of training. Specific to baseball, patients are able to throw from the mound by week 6 of the throwing progression.	

Discussion

After analyzing multiple studies that discussed protocols and results, we determined that a protocol that involved limiting flexion and extension of the elbow in the hinge brace for 5-6 weeks had the most successful results. During the first 5-6 weeks, the range of motion is gradually increased while in the hinge brace because early range of motion is crucial to nourish tissues and limit the effects of immobilization. This phase also wants to limit the amount of muscle atrophy by performing small forearm exercises.

The next phase introduced and emphasized the strengthening of the rotator cuff and forearm. Also, during this phase the athlete should regain full range of motion at the elbow joint. It is important to incorporate the shoulder in to UCL rehabilitation because weakness and limitations around the elbow can cause accommodations at the shoulder that can affect proper biomechanics.

The following phase should include a large increase in shoulder, scapula, and trunk strengthening exercises and begin to incorporate plyometrics. These exercises should help maintain range of motion of all upper body joints especially the elbow and improve neuromuscular control.

The final phase of the rehabilitation is sport specific and includes a throwing progression until the athlete can progress to a pain free ability to throw from their respective distance.

Conclusion

Throughout our research we found that the variety of success rates depended largely on the individual athlete's reaction to the surgery and ability to progress. Although, 97% of athletes in one study examined had excellent or good results with this style of rehabilitation.² In this study, 90% of patients post surgery were able to compete at same or higher level than before injury.² Further research is needed for sport-specific recoveries. In baseball, there may be a correlation between the mound and increased stress on the UCL.

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