Rehabilitation Guidelines for Ulnar Collateral Ligament Injury

Background

The ulnar collateral ligament (UCL) is a ligament on the medial (inside) aspect of the elbow that consists of anterior, posterior and transverse portions. The anterior band has been identified as the most important for the stability of the elbow. The origin of the UCL is on the medial epicondyle of the humerus (the bone of the upper arm) and attaches to the ulna (one of the bones in the forearm).

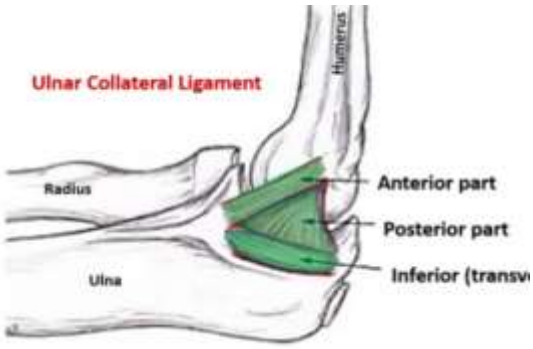

Image 1: Anatomy of the UCL at the elbow

Injury to the UCL structure occurs from a repetitive valgus stress on the elbow. This is especially common in overhead in athletes who use their arms for overhead activities and participate in throwing sports, however it can also be stressed in sports like gymnastics. UCL injuries can also be traumatic in nature in which a sudden valgus stress is applied at the elbow – this type of injury can result in either an avulsion fracture (in which the piece of bone at the ligamentous origin/insertion detaches) or a purely ligamentous injury.

Symptoms

Symptoms of a UCL injury include but are not limited to:

1) A pop or sudden sharp pain along the inside of the elbow with the inability to continue an overhead activity or throwing

2) A gradual onset of progressive pain and discomfort with a feeling of instability along the inside of the elbow after a period of throwing or overhead activity.

Pain with throwing associated with UCL injury is most experienced just prior to releasing the ball. This pain can also be associated with tingling and a feeling of numbness in the small and ring fingers. This would indicate irritation of the ulnar nerve. This nerve lies in close proximity to the UCL and can be irritated during an injury to this structure.

Diagnosis

Diagnosis of a UCL injury involves a combination of imaging and a thorough physical exam. During the physical exam, your healthcare provider will likely examine a combination of the following: 1) ligamentous instability using a valgus stress test; 2) elbow and wrist range of motion; 3) forearm, wrist and shoulder strength; 4) potential ulnar nerve involvement/irritability.

Associated imaging will likely include radiographs (x-rays) of the elbow and a potential MRI to aid in diagnosis and treatment planning. Sometimes your healthcare provider may elect to inject dye into the elbow prior to MRI in order to more specifically characterize the tear.

Treatment

Treatment can involve both operative and non-operative management. Both treatment plans involve highly skilled rehabilitation plans that address not only elbow function, but the shoulder and entire kinetic chain. This type of approach is vital for a successful return to pre-injury level of function and performance.

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Non-Operative Treatment

Non-operative management is typically reserved for low-grade injuries of the UCL, and involves a rigorous physical therapy / rehabilitation program and gradual return to function. Non-operative intervention can be effective in restoring full elbow function and decreasing the likelihood of recurring injury, while avoiding the inherent risks of surgery.

Operative Treatment

Operative management requires repair vs. reconstruction of the involved UCL.

If the tendon is avulsed (pulled off) of the bone as opposed to being torn in the middle, and the tendon appears to be of high quality, then repair may be considered. Repair of the involved UCL requires suturing the torn ligament back to its original location. UCL repair is usually accompanied by a strong internal fiber tape to act as brace for additional support of the healing ligamentous structure.

Image 2: Image of repair with internal brace example

Reconstruction of the involved UCL requires replacing the torn UCL with a different tendon. This graft is often from the patients own body (allograft)and can be taken from the forearm, hamstring, knee or foot. Your surgical plan will be developed with your healthcare team and individualized to your specific injury and goals.

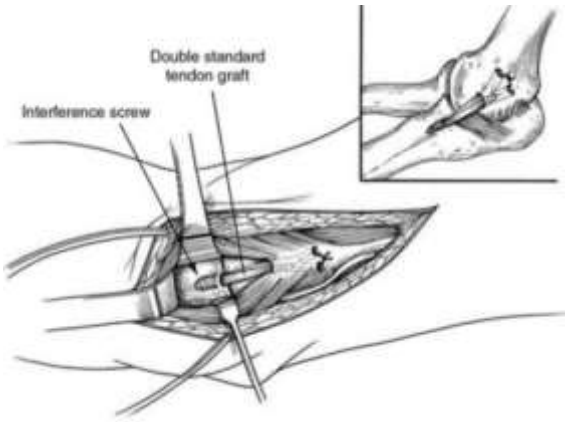

Image 3: Image of reconstruction example

<u>Surgical Appropriateness Criteria:</u>

1) Severity / degree of ligamentous involvement
2) Location of tear
3) Activity-related goals of function and sport

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Rehabilitation Following a UCL Repair / Reconstruction:

Patients undergoing rehabilitation following a UCL repair / reconstruction can expect to progress through 6-8 months of formal rehabilitation, broken up into 5 major phases. The collective goal of these phases is to progress you back to daily activities, hobbies, and sports. The goals of each individual phase are outlined below:

Phase 1: Immediate Post-operative / Protection

Goals: to protect the healing tissue & reduce pain/inflammation

Phase 2: Intermediate Phase

Goals: to progress elbow, wrist and forearm range of motion as guided by your specific operation, and to begin more proximal upper body strength training (RTC and scapular strength with load/resistance placed proximal to involved elbow), while continuing to protect the repair; you will progress out of your brace during this phase

Phase 3: Advance Strengthening Phase

Goals: to maintain full elbow, wrist and forearm range of motion and to progress upper body strength, endurance and muscular control; you will begin to progress general conditioning during this phase

Phase 4: Functional Activity Phase

Goals: to continue strength, endurance and muscular control progressions; to introduce job and sport-specific lifting and plyometric demands

Phase 5: Return to Practice / Performance Phase

Goals: gradual re-introduction of sport-specific tasks involving but not limited to: throwing, swinging, pushing/pulling, contact, etc.

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Phase 1 (0-4 weeks) Immediate Post-op / Protective Phase	
Appointments	Surgeon / Physician Assistant follow-up: day 1 and day 14 post-op Physical Therapy appointments: formal rehab appointments start 1-2 weeks after surgery – frequency of appointments will be developed by you and your rehabilitation provider. As a patient, you are expected to perform your prescribed home exercises daily, as determined by your rehabilitation provider.
Rehabilitation Goals	1) Protect healing repair / reconstruction in elbow brace locked at 90 degrees of elbow flexion 2) Control inflammation and pain 3) Restore functional range of motion at shoulder and wrist
Wound Care	1) Keep sterile gauze at incision site 2) Monitor brace placement for irritation of incision site 3) May wear compression garment at elbow if discussed with physician
Post-Op Bracing	Hinged: Week 1-2: locked at 90 degrees Week 2-3: open from 30-90 degrees elbow flexion Week 3-4: open from 10-110 degrees of elbow flexion **OR** Custom: Set for support in available ROM
Range of Motion	Gentle and non-painful range of motion exercise starting **no earlier than week 1** Week 1-2: • Wrist AROM (flexion/extension and radial/ulnar deviation) • Shoulder PROM and AROM (avoid valgus stress at elbow) • Elbow/forearm PROM (defer to surgeon for ROM precautions) Week 2-3: • Wrist AROM (flexion/extension and radial/ulnar deviation) • Shoulder PROM and AROM (avoid valgus stress at elbow) • Elbow/forearm PROM (5º flexion – 125º flexion) Week 3-4: • Wrist AROM (flexion/extension and radial/ulnar deviation) • Shoulder PROM and AROM (avoid valgus stress at elbow) • Elbow/forearm PROM (progress as tolerated – avoid elbow pinch)
Therapeutic Interventions ***(Examples, but not limited to…)***	Education • Education on post-operative care & rehab timeline • Management of immobilization device (brace and ROM progressions) • Precautions with surgical repair – valgus stress (gripping; distraction forces; overall arm positions) Modalities *limit modalities with concomitant ulnar nerve transposition to minimize potential reactive nerve irritability • Cryotherapy and light compression • Electrical stimulation for swelling management Strength Week 1-2: • Gripping isometrics • Shoulder isometrics (EXCEPT adduction and internal / external rotation) • Thoracic extension and rotation drills • Stationary bike with low resistance – no upper extremity support

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Therapeutic Interventions (cont) ***(Examples, but not limited to…)***	Week 2-3: • Manual resisted rhythmic stabilizations in positions of elbow flexion/extension within post-operative precautions • Scapular strength progressions (use band for resistance proximal to elbow) • Bodyweight lower body strength work (no holding weights in involved upper extremity; avoid isolated hamstring work if gracilis graft) Week 3-4: • Progress previous week strength loading • Introduce core strength / muscular control tasks (avoid any upper extremity stress)
Criteria for progression to next rehabilitation phase	✓ No sooner than 4 weeks post-op ✓ Meeting appropriate range of motion progressions *Follow-up with physician to outline criteria for weaning from brace as relevant in next phase of rehabilitation*

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Phase 2 (4-8 weeks) Intermediate Phase	
Appointments	Physical Therapy appointments: frequency of appointments at this point will be determined by you and your rehabilitation provider. As a patient, you are expected to perform your prescribed home exercises daily, as determined by your rehabilitation provider.
Rehabilitation Goals	1) Continue to protect healing repair / reconstruction with elbow brace allowing progressive mobility through 6 weeks post-op 2) Continue to manage inflammation and pain 3) Restore full elbow and forearm AROM and achieve improved symmetry across upper extremity strength
Bracing	Hinged: Week 4-5: open from 10-120 degrees of elbow flexion Week 5-6: open through full, available elbow AROM Week 6+: wean from brace if full elbow flexion/extension AROM **OR** Custom: Set for support in available ROM
Range of Motion	• Full passive and active AROM as tolerated *Low load, long duration stretching with neutral forearm (if lacking elbow extension mobility)*
Therapeutic Interventions ***(Examples, but not limited to…)***	Manual Therapy: • Scar tissue mobilization as tolerated • Forearm muscle soft tissue mobilization as indicated Strength Week 4-5: • Introduce band / dumbbell resisted wrist and forearm strength tasks (wrist flexion/extension and forearm pronation/supination) • Progress scapular and global shoulder region load with resistance proximal to elbow • Progress grip volume, duration and load as tolerated • Introduce shoulder internal and external rotation ISOMETRICS in neutral • Continue lower body and core strength programs (avoid isolated hamstring work if gracilis graft) Week 5-6: • Progress side-lying shoulder ER with dumbells / standing ER in neutral with band resistance • Continue isometric shoulder IR • Isometric biceps and triceps loading Week 6-8: • Introduce progressive closed-kinetic-chain activity (start with quadraped and/or incline on table) • Introduction of low load, low volume valgus stress – utilize isometric / rhythmic stabilizations into IR/ER at 90 deg abd • Begin progressive hamstring loading and jogging if gracilis graft used
Criteria for progression to next rehabilitation phase	✓ No sooner than 8 weeks post-op ✓ Full shoulder, elbow / forearm and wrist AROM (symmetrical to non-surgical side and/or relative to pre-operative baseline) ✓ Isometric hand-held dynamometer shoulder strength assessment ≥ 85% compared to non-operative arm and/or of baseline (IR in neutral, ER in neutral, flexion, and horizontal abduction)

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Phase 3 (8-12 weeks) Advanced Strengthening Phase	
Appointments	Surgeon / Physician Assistant follow-up: 12 weeks post-op Physical Therapy appointments: frequency of appointments at this point will be determined by you and your rehabilitation provider. As a patient, you are expected to perform your prescribed home exercises daily, as determined by your rehabilitation provider.
Rehabilitation Goals	1) Maintain elbow, wrist and forearm AROM 2) Tolerate progressions of general conditioning 3) Progression of sport-specific UE strength training without s/s exacerbation
Bracing	None
Range of Motion	Maintain full ROM with increased UE loading
Therapeutic Interventions ***(Examples, but not limited to…)***	<u>Manual Therapy:</u> • Scar tissue mobilization as tolerated • Forearm muscle soft tissue mobilization as indicated <u>Strength</u> Week 8-10: • Introduce shoulder IR/ER loading in 90 deg abd – focus on time under tension • Gradual progression of biceps and triceps loading as tolerated • Introduce carry tasks – progress as tolerated • Continue closed chain stability progressions • Progress medial/lateral elbow and forearm loading through transitions from elbow flexion <> extension • Continue lower body and core strength programs (gradual hamstring loading if gracilis graft used) Week 10-12: • Incorporate into team dynamic warm-up tasks as indicated • Progress to OH and ABER and/or waiter carries • Overall UE strength progressions – avoid chest fly and bench-press / push-up tasks
Criteria for progression to next rehabilitation phase ***(No UE plyometrics prior to 12 weeks post-op)***	✓ Maintenance of full shoulder, elbow, forearm and wrist AROM (symmetrical to non-surgical side and/or relative to pre-operative baseline) ✓ See **Appendix E**

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Phase 4 (12-16 weeks) Functional Activity Phase	
Appointments	Frequency of appointments at this point will be determined by you and your rehabilitation provider. As a patient, you are expected to perform your prescribed home exercises daily, as determined by your rehabilitation provider.
Rehabilitation Goals	1) Maintain elbow, wrist and forearm AROM 2) Introduce UE plyometric tasks
Bracing	None
Range of Motion	• Maintenance with increased UE loading
Therapeutic Interventions *(Examples, but not limited to…)*	<u>Strength</u> Week 12+: UE plyometric progression • Double arm plyometric drills ✓ Chest pass ✓ Overhead squat to press throw ✓ Overhead squat to scoop toss ✓ Triple extension slams -> triple extension to lateral slam ✓ Step to rotational throw -> lateral shuffle to rotational throw • Single arm plyometric drills ✓ Forward facing wall dribbles: OH -> 90 deg abd ✓ Reverse D2 toss ✓ Reverse ER (90 deg abd) toss ✓ Forward facing IR/ER rebounder toss • Towel drills as indicated
Criteria for progression to next rehabilitation phase	✓ Maintenance of full shoulder, elbow, forearm and wrist AROM (symmetrical to non-surgical side and/or relative to pre-operative baseline) ✓ See **Appendix E**

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Phase 5 (16 weeks +) Return to Practice / Performance Phase	
Appointments	Frequency of appointments at this point will be determined by you and your rehabilitation provider. As a patient, you are expected to perform your prescribed home exercises daily, as determined by your rehabilitation provider.
Rehabilitation Goals	1) Maintain shoulder, elbow/forearm and wrist ROM 2) Gradual periodization of sport-specific UE demands
Bracing	None
Range of Motion	Maintenance with increased UE loading
Therapeutic Interventions ***(Examples, but not limited to…)***	Strength ****Physician clearance required for sport-specific activity initiation**** Workload management of team-based strength training, rehabilitation and throwing/sport specific activity Throwing Sports: • Reference Samaritan Athletic Medicine's **Return to Throw Progression** (time away from sport and position-specific) Overhead/Hitting Sports: • Gradual re-introduction of sport-specific OH instrument (raquet, bat, etc) o Reference Samaritan Athletic Medicine's **Return to Swing/Hit Progression** Contact / Collision Sports: • Gradual progression: 1) Planned closed-chain positions for endurance; 2) Planned positions with increased focus on speed / power; 3) Un-planned / unpredictable / reactive position progressions; 4) Sport-specific drilling (volume and intensity progressions)
Return to Full Practice and Competition Participation	See **Appendix E** Full, unrestricted sport participation: typically expected at 12 + months post-op

***Important to continue participation in ongoing preventative strength, power and motor control exercises at return to sport**

All physical therapy appointment frequencies are recommendations only. Your physical therapy provider will work with you to select an appointment frequency that best fits your individual needs.

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(Most recent review: September, 2024)