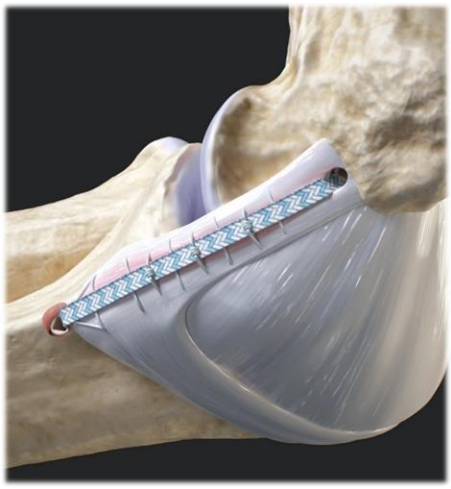
ULNAR COLLATERAL LIGAMENT (UCL) REPAIR WITH INTERNAL BRACE

Post-Operative Rehabilitation Protocol

This rehabilitation protocol has been developed for the patient following an ulnar collateral ligament (UCL) repair with internal brace. This procedure is normally performed on the overhead athlete or throwing athlete with severe instability or acute trauma to the UCL. The UCL repair differs from a UCL reconstruction (Tommy John) in that there is no graft utilized and the patient's own UCL is augmented with a collagen-dipped fibertape, known as an internal brace. This procedure allows for a somewhat accelerated approach to rehab with an expected return to sport between 6-9 months as opposed to 12-18 for the full reconstruction.

Understand that there is a significant amount of trauma that occurs in the region during this surgery, especially to the forearm flexor/pronator musculature. Healing is occurring in more than just the ligament, be mindful of surrounding soft tissue.

Concomitant procedures can include ulnar nerve transposition, osteophyte excision, and potential open reduction internal fixation of the medial epicondyle or olecranon process in younger athletes. **Communication with the surgeon and review of the operative note are necessary to understand procedures performed and possible alteration in the rehabilitation timeline.**



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Rehab timelines will vary depending on demands of the sport, level of play, and the patient's desired functional goals. Physical therapy should be initiated 10-14 days post-op, to be decided by the surgeon. The supervised rehabilitation is to be supplemented by a home exercise program provided by the Physical Therapist. Initiation of a return to throwing program should occur no earlier than 12 weeks post-op and should be guided with skilled supervision with special consideration to position-specific demands. Return to sport is achieved once the patient has completed the following rehabilitation protocol, return to throwing program, and has been cleared for return by the operating surgeon.

The overall goals of UCL repair and its corresponding rehabilitation are to:

- Control pain and inflammation
- Allow for adequate tissue healing and maturation
- Regain normal upper extremity range of motion and strength
- Correct postural/mechanical faults and maximize consistency with proper movements
- Achieve the patient's desired level of function and performance

There are not a lot of things that we can do to speed the process of healing, but there ARE things that we can do to slow it down.

- **Be mindful of forceful gripping or wrist flexion for 4-6 months** (deadlifts, pull-ups, bicep curls, etc.)
- Avoid valgus stress, especially in early stages – do not attempt to throw other objects
- Do not push through pain

TYPICAL REHABILITATION TIMELINE

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
WOUND CARE																										
RANGE OF MOTION																										
STRENGTH																										
PLYOMETRICS																										
THROWING																										
HITTING																										

The dark bar indicates times of main focus for the corresponding category. A gradient bar indicates a continued focus of that activity.

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Post-Operative Rehabilitation Protocol

The following rehabilitation protocol is divided into five phases. Each phase is adaptable based on the individual and special circumstances. If any questions arise throughout the process, please the surgeon's staff or physical therapists for clarification.

PHASE 1 (0-2 weeks)	**Acute Post-Op**

Important Considerations	• Be very mindful of the healing soft tissue structures in addition to the ligament
	  ○ **NO FORCEFUL GRIPPING**
	• Monitor wound healing and refer back to MD if the following occur in the patient
	  ○ Excessive swelling of the elbow, abnormal/night pain, hypersensitivity or nerve irritation, severe limitations in ROM, redness of incision site, abnormal/excessive wound drainage

Rehabilitation Goals	• Promote healing of tissue **especially of the flexor mass** • Control pain and inflammation • Patient education & independence with home exercise program
Precautions	• Incision should be kept clean, dry, and dressed (do not submerge incisions) • No valgus stress to affected upper extremity • No lifting, twisting, pulling with affected upper extremity • Functional brace worn at all times except during physical therapy • Careful with PROM during this phase as overpressure can cause patient guarding, resulting in increased valgus stress and effusion at elbow
Frequency	• Supervised Physical Therapy 1-2x/week
Bracing/ROM	• Days 0-7: post-op splint or brace locked at 90° • Days 7-14: hinged functional brace 30-100° (should fit snugly but not be overconstrictive)
Therapeutic Activities	<u>Range of Motion</u>: • AROM with forearm bolstered on table/surface: wrist flexion/extension, wrist radial/ulnar deviation, forearm pronation/supination, finger intrinsics/opposition • Elbow flexion/extension (**within ROM precautions**) <u>Strengthening</u>: • Scapular stability: scapula squeeze, shoulder rolls, shoulder shrug <u>Education</u>: • Good posture • Post-op restrictions: avoid valgus stress, no lifting, keep incision clean and dry • Functional brace donning/doffing • Wound care/signs of infection • Home exercise program
Manual Therapy	• Soft tissue massage (STM) to biceps, triceps with careful consideration of incision along medial elbow and graft site incision (**no direct manipulation of flexor/pronators**) • If an ulnar nerve transposition was performed, avoid medial forearm altogether • Edema control as necessary • Shoulder STM if needed: latissimus dorsi, rotator cuff, upper trap, rhomboids, pec major/minor
Modalities	• Ice as needed for pain modulation
Progression Criteria	• Pain is controlled w/ no sensation deficits or paresthesias • Incision is approximated and healing • Patient demonstrates understanding of home exercise program and precautions • Full wrist ROM • Good posture (very important throughout)

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Post-Operative Rehabilitation Protocol

PHASE 2 (2-4 weeks)	Subacute Post-Op
Important Considerations	• Wounds and incisions should appear healthy/healing throughout, allow steri-strips to fall off when ready • **Be mindful when transitioning back to ADL's** (shaking hands, picking up bags, opening doors, etc.) as they can exert stress to the medial elbow and the forearm muscles
Rehabilitation Goals	• Promote continued tissue healing (the graft actually weakens as it begins to restructure) • Control pain and inflammation • Initiate light muscle contraction of upper extremity – **maintain caution with flexor mass** • Maintain adequate strength in lower extremity and abdominal musculature
Precautions	• No lifting >5lbs with affected upper extremity • Avoid resisted internal rotation (IR) movements until <u>after 6 weeks</u> • Avoid heavy sweating until incisions are closed
Frequency	• Supervised Physical Therapy 2x/week

Bracing/ROM	• Week 3: hinged functional brace unlocked to 10-120°
	• Week 4: hinged functional brace unlocked to full
	• Weeks 5: look to discharge brace if full, pain-free ROM
	  ○ If full extension is not achieved with a gravity-assisted hang by week 4, incorporate a low-load, long-duration stretch with 1-2lb dumbbell or cuff weight x5-10min (do NOT force manually)
	  ○ Pitchers commonly lack full 0° extension, check op note for range under anesthesia

Therapeutic Activities	<u>Range of Motion</u>: • Continue Phase 1 activities within progressive ROM ranges • Shoulder AROM: flexion, scaption, abduction to 90° elevation with brace ○ May add 1lb cuffs or dumbbells at **week 3** (increase 1lb/week, not to exceed 5lb) <u>Strengthening (avoid extremes of ROM):</u> • Continue Phase 1 activities, may progressively add light resistance (1lb) for wrist/forearm activities at **week 3** (increase 1lb/week, not to exceed 5lb) • Active gripping: utilize varying grips with putty, stress ball, or grip trainers (**little-to-no resistance until week 4!**) • Submaximal isometrics: shoulder flexion/abd/ext/add, biceps/triceps • Shoulder tubing/band exercises at **week 3**: rows, extensions, ER (**no IR**) • Prone rows, extensions, horiz abduction (emphasis on mid/low trapezius) – unresisted • Wall angels (maintain ROM precautions) • **Blood flow restriction (BFR) activities may be considered weeks 4-6 if no edema** <u>Cardio</u>: • Stationary recumbent bike can be implemented once incision has closed (sweat) • Upper body ergometer (UBE) can begin weeks 4-6 once full ROM is achieved <u>Proprioception</u>: • Rhythmic stabilization, PNF patterns – avoid valgus stress (no resistance distal to elbow) <u>Core Stabilization</u>: • Dead bugs, leg lifts, hollow holds, windshield wipers, flutter kicks, scissor kicks • Avoid WB through affected UE <u>Lower Extremity</u>: • Clamshells, bridges, lateral band walks, monster walks, leg press, squats (not barbell), calf raises, single leg balance, step ups – overall, emphasize single leg control <u>Education</u>: • Maintaining healing precautions and brace use, avoiding adverse stressors

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PHASE 2 (2-4 weeks)	Subacute Post-Op, cont'd
Manual Therapy	• Continue STM as needed for shoulder/elbow • Neural mobility for peripheral nerves as needed (**caution with ulnar n. transposition**) ○ Manual-directed work can cause significant irritability to the ulnar nerve and the fascial repair (nerve is moved over the proximal flexor insertion) • Joint mobilizations as needed: grade I-II (reduce pain), grade III-IV (regain mobility) • No dry needling to elbow or forearm musculature!
Modalities	• Ice as needed for pain modulation
Progression Criteria	• No pain or inflammation • Full elbow, wrist, shoulder ROM

PHASE 3 (4-8 weeks)	**Intermediate: Integrated strength**
Important Considerations	• Deficits in balance and kinetic chain strength are correlated with increased injury risk during pitching. It is vital to include glute and core stabilization along with shoulder and elbow strengthening in this phase to better prepare the athlete for a safe return to sport.
Rehabilitation Goals	• Maximize strength and endurance with proper mechanics and movement quality • Maximize proprioception and arthrokinematics • Progress power and strength of lower extremity/core musculature
Precautions	• Begin graded valgus stress to affected upper extremity • Begin gradual/controlled weight bearing through upper extremity ○ **Full body weight bearing through affected upper extremity is not recommended until 8-10 weeks post-op**
Frequency	• Supervised Physical Therapy 2x/week
Bracing/ROM	• Discharge from brace, full ROM

Therapeutic Activities	Range of Motion:
	• Continue PHASE 1-2 range of motion exercises
	• Maintain adequate ranges in lower extremity musculature
	Strengthening:
	• Continue PHASE 1-2 activities as appropriate
	  ○ *Do not neglect the basic "boring" exercises for overly-complex, fad-based activities*
	  ○ A progressive approach should be taken to resistance training, ensure **quality of movement** prior to adding load
	• Initiate light eccentric elbow flexion/extension exercises
	• Utilize dynamic neuromuscular stabilization exercises to prime patient for movement
	• Progress periscapular exercise with emphasis on rotator cuff, serratus anterior, mid/low trapezius muscles (**continually emphasize good scapula posture**)
	  ○ Full can, prone/standing IYTs, sidelying ER/flexion, banded ER/IR, prone ER, scapular punches, serratus walks, D2 flexion/extension
	  ○ Wall angels
	  ○ Eccentric activities (sidelying decels, banded 90/90 ER, scaption plane decels, etc.)
	• Progress core stabilization exercises (be mindful of weight-bearing, hold until 8 wks)
	  ○ Dead bugs, V-ups, stir-the-pots, planks, side planks, plank plus, etc.
	• Progress lower extremity strengthening with single leg balance
	  ○ Single leg tap downs, single leg squats, single leg RDLs, single leg lawnmowers, single leg bridge, bird dogs
	• BFR can be utilized to maximize strength return with lower loads (ensure exercise quality; **maximum total tourniquet time of 20min per session**)
	Cardio:
	• Same as PHASE 2, progressing intensity levels and interval training when appropriate
	• Progressive intensity on UBE
	• May begin jogging at 6 weeks post-op; sprinting at 12 weeks post-op
	  ○ Minimize risk of falling!

Manual Therapy	• As needed for active release of shoulder, arm, and forearm musculature • Initiate manual resistance PNF patterns
Modalities	• Ice, dry needling as needed
Progression Criteria	• Minimal to no scapular dyskinesis • Strength testing can be performed > week 12, ideally approaching 50-60% ER:IR ratio

PHASE 4 (8-12 weeks)	**Advanced: Plyometrics, Pre-Throwing**
Important Considerations	• The throwers readiness inventory (TRI) is a comprehensive battery of tests to help in determination of return to throw timelines. This battery includes assessment of shoulder range of motion, shoulder strength, core strength, single leg squat form, scapulohumeral rhythm, psychological readiness, and adherence to the rehabilitation process • Administration of TRI should be assessed ~**12-16 weeks** • Scores should be recorded and communicated with other members of the interdisciplinary care team to aid in the decision for commencement of the return to throw program
Rehabilitation Goals	• Maximize power, strength, and endurance of upper extremity, core, and lower extremities • Completion of plyometric training program • Develop readiness for return to throw
Precautions	• One-handed plyometrics should only be introduced after pain free completion of two-handed plyometrics
Frequency	• Supervised Physical Therapy 2x/week

Therapeutic Activities	Range of Motion:
	• Ensure normalized elbow and shoulder mobility in all planes
	Strengthening:
	• Continue PHASE 1-3 activities as appropriate and as time allows, don't neglect kinetic chain
	  ○ Weight room activities: safety bar squat, leg press, goblet squats/lunges – **avoid heavy bar grip**
	• Two handed plyometrics (weeks 8-10): med ball chest pass, overhead throw, scoop toss, overhead dribble, rotational shot-put throw, slams (progressive loads)
	  ○ Incorporate more dynamic, full-body movements after ~2 weeks of isolated plyometrics: squat to throw, single leg RDL to throw, split lunge slams
	• One handed plyometrics (weeks 10-12+): wall dribble, kneeling decelerations, reverse throws, ball drops, dynamic body blade movements

Manual Therapy	• Soft-tissue massage, joint mobilizations, active release, other manual techniques as warranted for mobility and recovery
Modalities	• As needed

Progression Criteria	• Completion of throwers readiness inventory (TRI) with acceptable measures in all categories (**16+ weeks**):
	  ○ ER:IR strength ratio > 67% (or ER at 0° approaching 20-25% of body weight)
	  ○ Side plank > 45 sec bilaterally
	  ○ Good single leg squat form
	  ○ No pain with valgus stress testing
	  ○ Throwing initiation generally averages 14 weeks from surgery

❖ Throwing programs and other resources can be found at www.readytothrow.com

PHASE 5 (12-24+ weeks)	Return to Sport Preparation

Important Considerations	• Adherence to the structured interval to throwing program is crucial for safe and effective return to sport – this process should not be rushed
	• After competition of a traditional return to throwing program, the athlete will perform position specific return to throwing or mound program
	• Before discharge and return to sport, your athlete should have a good understanding of warm up and cool down exercises to be performed on throwing days
	• Understand that the initial phases of throwing (first 1-2 months) are to <u>condition</u> the healing structures of the repaired ligament and elbow
	  ○ **Velocity/location are not important at this time – prioritize mechanics and consistency!**
	  ○ All throws should be intentional, ensure meaningful mechanics at all times

Rehabilitation Goals	• Return to position/sport-specific activities • Gradual/progressive return to competitive throwing and/or hitting
Precautions	• **Hitting and throwing should not commence at the same time** • Communicate with your athlete to assess preference and implement programs accordingly
Frequency	• Supervised Physical Therapy 1-2x/week

Therapeutic Activities	• Continue PHASE 1-4 activities as appropriate and as time allows
	• Interval throwing program and/or hitting program
	  ○ Observe mechanics or refer to specialist who may be able to address fault
	• It is vital to maintain rotator cuff/scapular strength through this phase
	  ○ Easy to forget/neglect the "basics", but ensure that the simple things are maintained 2-3x/week
	• Monitor ROM changes about the elbow/shoulder as tightness may develop
	<u>Education</u>:
	• Observe soreness rules and progression through interval programs
	  ○ Significant muscle soreness >24 hours warrants an extended day of rest to recuperate
	  ○ Do not skip throwing days – discuss how to adjust program as necessary
	• Warm up and cool down exercises prior to and after throwing performance
	  ○ Important to establish a repeatable routine
	• Risk reduction for future elbow and shoulder injury
	• Strength and conditioning programming for in-season vs off season

Manual Therapy	• Soft-tissue massage, joint mobilizations, active release, other manual techniques as warranted for mobility and recovery • Important to maintain focus (~1x/week): FDS, pronator, extensors, FCU • Be mindful if ulnar nerve transposition was performed
Modalities	• As needed
Progression Criteria	• Pain-free completion of interval throwing/hitting programs • Good and repeatable mechanics • Clearance for return to sport by MD

- ❖ Full clearance only to be provided by operating surgeon
- ❖ Maintain open communication with all stakeholders involved in rehabilitation team (AT, PT, MD, coaches, S&C, parents)

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