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**Post-Operative Rehabilitation Protocol Following Ulnar Collateral Ligament (UCL)
Reconstruction – Palmaris Longus Graft or Allograft**

This protocol guides a progressive return to full activity beginning **at 9-12 months** if all other criteria are achieved. If the criteria are met sooner, the patient must restrict his/her activity level until cleared by the surgeon. **Return to full participation in baseball may vary based on primary position. Please consult with surgeon and rehabilitation team.**

While this protocol is specifically designed for throwing athletes, it may be appropriately adapted for individuals undergoing UCL reconstruction regardless of sport or activity level.

Early Phase (Weeks 0-4)

Weeks 0-2

- Long arm splint at all times
- NWB through involved side

Week 2:

- Brace: 30-100 degrees

Goals:

1. Initiate sub-maximal wrist isometrics
2. Initiate sub-maximal / pain free elbow isometrics (flexion/extension)
3. Initiate stationary bike for cardio & can start bodyweight LE exercises
 - a. Body squats
 - b. Single leg squats – focus on trunk control / frontal plane control of knee

Week 3:

- Brace: 15-110 degrees

Goals:

1. Gradually increase brace 5 degrees of extension / 10 degrees of flexion per week

Intermediate Phase (Weeks 4-8)

Weeks 4-8:

Goals:

1. Brace: 10-120 by 4 weeks post op
2. Brace: 0-130 by 6 weeks post op
3. Discontinue brace by week 6 if ROM is appropriate

4. Full elbow extension ROM

Exercises initiated weeks 4 - 5:

- wrist curls, extension, pronation, supination with 1-2# weight
- AAROM / AROM elbow flexion and extension
- Progress shoulder isometrics to isotonic for rotator cuff
 - o AVOID RESISTED SHOULDER ER

Exercises initiated weeks 6 - 8:

- AROM out of the brace from 0-145
- Initiate shoulder ER with resistance in neutral shoulder position
- Progress strengthening of shoulder and elbow with gradual increase in weight/resistance
 - o Bicep curls
 - o Resisted triceps
 - o Prone rows
 - o Lat pull downs
 - o Throwers Ten Program – Open Chain strengthening ONLY

Criteria to Advance - Week 8 assessment

- **Surgeon clearance:** Assessment to be completed at CHOP Sports PT location prior to surgeon office visit.
- **Full elbow ROM**

Intermediate Strengthening Phase (9-12)

Weeks 9-12:

Goals:

1. Increase UE strength / endurance.
2. Initiate running

Exercises:

- Forearm strengthening.
 - o Flexion / extension
- Elbow Strengthening
 - o Eccentric flexion and extension
 - o Varied resistance and speed to contraction
- Shoulder Strengthening

Criteria to Advance - Week 12 assessment

- **Surgeon clearance:** Assessment to be completed at CHOP Sports PT location prior to surgeon office visit.
- **No pain or swelling in the involved elbow.**
- **Strength:** Elbow (flexion/extension), shoulder (IR and ER at neutral), and wrist (flexion/extension) strength >85% LSI measured with handheld dynamometry

Advanced Strengthening Phase (12-16 weeks)

Weeks 12-20

Goals:

1. Normalize strength of UE
2. Gradual initiation of sport/functional exercises
3. Initiate return to hitting: Week 12 – SEE ATTACHED
4. Advanced UE weightlifting, caution to avoid elbow valgus stress (i.e. no chest flies)
 - a. Bench Press
 - b. Overhead Press
 - c. Machine Strength Training
5. If both hitting progression and advanced strengthening tolerated well, can progress to plyometric progression as noted below at week 16.

8 week Plyo Progression	
Week 16	TK Chest pass 3 x 12
Week 17	TK Chest pass 3 x 12, overhead pass 3 x 12, underhand scoop toss 3 x 10
Week 18	HK Chest pass 3 x 12, overhead pass 3 x 12, overhand shot-put toss 3 x 10
Week 19	Standing Chest pass 3 x 12, overhead pass 3 x 12, overhand shot-put toss 3 x 10
Week 20	2 Hand + 1 Hand: ER @ neutral wall dribbles 2 x 10, wall dribble circles 2 x 5, wrist flips 2 x 12, T-flips 3 x 12
Week 21	2 Hand + 1 Hand: ER @90 wall dribbles 3 x 12, wall dribble circles 3 x 5, reverse throws 1ILB 3 x 10, wrist flips 3 x 12, T-flips 3 x 12
Week 22	2 Hand + 1 Hand: ER @90 wall dribbles 3 x 12, wall dribble circles 3 x 5, reverse throws 1ILB 3 x 10, HK throws 7-9oz 2 x 10, wrist flips 3 x 12, T-flips 3 x 12
Week 23	2 Hand + 1 Hand: ER @90 wall dribbles 3 x 12, wall dribble circles 3 x 5, reverse throws 1-2ILB 3 x 10, rocker throws 7-9oz 2 x 10, wrist flips 3 x 12, T-flips 3 x 12

TK: Tall kneeling // HK: Half kneeling

Week 24/6 months

Criteria to Advance: 6 months//Advance to Initiation of Interval Throwing Program

- **Surgeon clearance:** Assessment to be completed at CHOP Sports PT location prior to surgeon office visit
- **No pain or swelling in the involved elbow**
- **Strength:** Elbow (flexion/extension), shoulder (IR and ER at neutral), and wrist (flexion/extension) strength >90% LSI measured with handheld dynamometry
- **UQ Y balance test:** Medial reach distance >95% of limb length, >90% limb symmetry, <4 cm difference, composite score 70-80%
- **Single Arm Seated Shot-Put Test:** >90% limb symmetry if non-dominant arm is involved, >105% if dominant arm is involved.
- **Closed Kinetic Chain Upper Extremity Stability Test:** >17 average touches with good neuromuscular control

Additional goals to consider for Throwers:

- **Range of motion:**
 - Total arc of motion/rotation at 90° within 5° of non-throwing shoulder
 - ≤20° loss of internal rotation ROM at 90° compared to non-throwing shoulder
 - <5° loss of flexion ROM compared to non-throwing shoulder
 - <15° loss of horizontal adduction ROM compared to non-throwing shoulder
- **Strength:** ER/IR strength ratio 66-76%

Initiation Interval Throwing Program (Month 6)

If your sport does not involve overhead throwing, consult with your surgeon and rehabilitation provider to appropriately initiate sport-specific activities that align with the healing constraints of your UCL reconstruction.

Month 6-7

Interval Throwing Program – SEE ATTACHED

Progression of strength and endurance training

Focus on Pre-Throwing / Post-Throwing mobility and flexibility

- Thoracic spine

- Posterior Cuff

Month 7-9

Return to Pitching Program – SEE ATTACHED

- If not, pitcher follow specific position throwing protocol

Sports Medicine and Performance Center at the Children's Hospital of Philadelphia

Specialty Care Center in King of Prussia
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Buerger Center for Advance Pediatric Care
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Specialty Care Center in Chalfont
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Specialty Care at Virtua
Health and Wellness Center, 2nd Floor
200 Bowman Dr. Suite D-260
Voorhees, NJ 08043
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Interval Hitting Progression Program

Instructions

- Each step should be performed in succession; starting with Step 1 performed on Day 1, Step 2 performed on Day 2, and so forth
- *Each training day should have one day of rest in between steps to ensure proper recovery and adaptation to the stimulus of hitting.*
- *All other exercises, such as a home exercise program, should be performed on the same day and after the completion of hitting.*
- Perform Lower & Upper Extremity Warm-ups prior to performing each step. Please refer to Appendix 2 for these warm-ups
- Please follow the soreness rules for advancing to each step included in this Appendix

Phase 1: Basic hitting off a tee

Step 1:

- Tee set- up: ball placement middle of the plate and at waist height
- Perform 25 swings at 50% effort
- Concentration should be placed no addressing mechanics of the baseball swing

Phase 1 Continued: Hitting off a tee- Direction of challenge

Step 2:

- Tee set up at waist height
- 50% effort
- 15 swings middle of the plate
- 15 swings tee set up inside corner of the plate
- 15 swings tee set up outside corner of the plate

Step 3:

- Tee set up at waist height
- 75% effort
- 15 swings middle of the plate
- 15 swings tee set up inside corner of the plate
- 15 swings tee set up outside corner of the plate

Step 4:

- 75% effort:
- 20 swings middle of the plate consisting of:
 - 5 swings letters/chest height
 - 10 swings waist height
 - 5 swings just above knees
- 20 swings tee set up inside corner of the plate consisting of:
 - 5 swings letters/chest height
 - 10 swings waist height
 - 5 swings just above knees
- 20 swings tee set up outside corner of the plate consisting of:
 - 5 swings letters/chest height
 - 10 swings waist height
 - 5 swings just above knees

Step 5:

- Repeat step 4
- 90-95% effort
- 20 swings middle of the plate consisting of:
 - 5 swings letters/chest height
 - 10 swings waist height
 - 5 swings just above knees
- 20 swings tee set up inside corner of the plate consisting of:
 - 5 swings letters/chest height
 - 10 swings waist height
 - 5 swings just above knees
- 20 swings tee set up outside corner of the plate consisting of:
 - 5 swings letters/chest height
 - 10 swings waist height
 - 5 swings just above knees

Phase 2: Basic soft toss- **Prior to performing each step in phase 2 perform 10-15 swings off a tee as warmup**

Step 6:

- Soft toss (underhand toss) 25 swings at 50% effort with partner, set-up at 45 degrees away from hitter. Hitter will be hitting into net or cage
- Placement of ball should be at waist and middle of plate
- Concentration should be placed on addressing mechanics of the baseball swing

Phase 2 Continued: Direction of challenge

Step 7:

- 50% effort
- 10 swings with ball placed at waist height & middle of plate
- 10 swings with ball placed at letters height & middle of plate
- 10 swings with ball placed just above the knee & middle of plate

Step 8:

- Repeat step 7
- 75% effort
- 10 swings with ball placed at waist height & middle of plate
- 10 swings with ball placed at letters height & middle of plate
- 10 swings with ball placed just above the knee & middle of plate

Step 9:

- 75% effort
- 30 swings middle of plate consisting of:
 - 10 swings waist height, middle of plate
 - 10 swings ball chest/letters height, middle of plate
 - 10 swings ball just above knees, middle of plate
- 10 swings with ball placed for outside corner
- 10 swings with ball placed for inside corner

Step 10:

- 90-95% effort
- 30 swings middle of plate consisting of
 - 10 swings waist height, middle of plate
 - 10 swings ball chest/letters height, middle of plate
 - 10 swings ball just above knees, middle of plate
- 15 swings with ball placed for outside corner
- 15 swings with ball placed for inside corner

Phase 3: Basic- Stimulated hitting

****Prior to performing each step in phase 3, perform 10-15 swings of soft toss***

****The partner should use an "L" screen for protection***

Step 11:

- This phase should be performed in a batting cage or on the field
- 30 swings of fastballs consisting of: 10 inside, 10 outside, 10 middle of plate
- Height of pitch can be left randomized
- Perform at 50% effort

Phase 3 Continued: Stimulated hitting- Pitch type challenge

Step 12:

- 75% effort
- In cage/on field
- 25 swings against fastballs; Randomized placement
- 15 swings at change-ups; Randomized placement

Step 13:

- 75% effort
- In cage/on field
- 25 swings against fastballs; Randomized placement
- 15 swings against change-ups; Randomized placement
- For ages 14 and above add in 15 swings against curveballs

Step 14:

- 90-100% effort
- 25 swings against fastball; Randomized placement
- 15 swings against change-ups; Randomized placement
- For ages 14 and above add in 15 swings against curveballs

Suggested Warmup Prior to Hitting Progression:

Rotational arm movements:

The athlete starts with both palms pointed towards the ceiling, then the feet are rotated to the right and left arm will perform internal rotation (keeping arms at shoulder level). Rotate to the opposite direction doing the same movement.

Perform 2 sets of 10 repetitions each side**

Side lumberjack chops:

First pivot and rotate away from the direction you will actually be performing the lumberjack chop. Use a light ball (such as a volleyball): The ball should be above your head with both arms extended, and the back foot should be pivoting facing the same direction.

Then take the ball from the top of this motion in a diagonal pattern/ across the body and perform a lunge in the opposite direction while pivoting again on both legs (back and head should be straight and be sure that the front knee is behind your front foot).

Perform 2 sets of 10 repetitions each side**

Hitters Throw:

Assume a batting position and hold the ball as if you were holding a baseball bat.

Then throw a light ball (such as a volleyball) simulating the baseball swing toward a wall or open field

Perform 2 sets of 10 repetitions**