# Ulnar Collateral Ligament Reconstruction Rehabilitation Protocol

<table>
<thead>
<tr>
<th>Phase I</th>
<th>Range of Motion</th>
<th>Immobilizer</th>
<th>Exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6 weeks</td>
<td>0-1 weeks: None</td>
<td>0-1 weeks: splint</td>
<td>0-1 weeks: wrist motion and hand motion, gripping exercises, shoulder ROM (<em>no external rotation of shoulder</em>), biceps isometrics</td>
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<tr>
<td></td>
<td>2 weeks: elbow 30-100°</td>
<td>2 weeks: brace 30-100°</td>
<td>2 weeks: active ROM shoulder, scapular isometrics, elbow flexion/extension isometrics</td>
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<td>3 weeks: elbow 15-110°</td>
<td>3 weeks: brace 15-110°</td>
<td>3 weeks: Elbow AROM progress to 10-125° Begin wall squats, lateral slide, single leg squats, leg press (no use of operative arm) hip and core exercise (no use of operative arm).</td>
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**Before Phase II:** Must have 10-120°, minimal pain, good testing of: wrist flexion; shoulder internal and external rotation, scapular abduction

<table>
<thead>
<tr>
<th>Phase II</th>
<th>Range of Motion</th>
<th>Immobilizer</th>
<th>Exercises</th>
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<tbody>
<tr>
<td>4-8 weeks</td>
<td>4 weeks: elbow 10-120°</td>
<td>4 weeks: brace 10-120°</td>
<td>4-6 weeks:</td>
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<tr>
<td></td>
<td>6 weeks: elbow 0-140°</td>
<td>6 weeks: brace 0-130°</td>
<td>• Begin light resistance exercises for arm (1 lb) wrist curls, extensions pronation/supination elbow extension and flexion</td>
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<td>Progress to full ROM</td>
<td>Discontinue Brace at 6-8 weeks</td>
<td>• Progress shoulder program emphasize rotator cuff strengthening</td>
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<td>• Shoulder IR strengthening exercise permitted through full ROM</td>
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<td>• Shoulder ER strengthening permitted through limited arc of motion – <em>limit the amount of ER ROM until 6 weeks</em></td>
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<td>• Initiate scapular neuromuscular control exercises</td>
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<td>• Progress shoulder ROM &amp; stretching exercises to normalize motion</td>
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<td><strong>Starting Week 6:</strong></td>
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<td>• Initiate Throwers Ten program for shoulder</td>
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<td>• Avoid any valgus stress on elbow until minimum 2 months post operatively</td>
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**Before Phase III:** Must have full, nonpainful elbow AROM, no pain or tenderness, appropriate clinical examination, completion of Phase II exercises without difficulty or pain.
### PHASE III
9-13 weeks

**Week 9:**
- Initiate eccentric elbow flexion/extension
- Continue forearm and wrist isotonic program
- Continue shoulder Throwers Ten Program
- Manual resistance diagonal patterns
- Emphasize scapular and core exercises

**Week 11:**
- May begin light activities such as golf and swimming

**Week 12:**
- Initiate plyometrics – 2 hand drills only
- May initiate interval *hitting* program for baseball players

To advance to Phase IV: must have full elbow, wrist, and shoulder ROM; no pain or tenderness; functional or isokinetic test that fulfills criteria for goal activity; appropriate clinical examination, completion of Phase III exercises without difficulty

### PHASE IV
14+ weeks

**Weeks 14:**
- Progress to 1-hand plyometrics: 90°/90° ball throw, 0° ball throw
- Continue with Advanced Throwers Ten program
- Initiate side plank with shoulder ER strengthening exercise
- Continue Phase III exercises

**Weeks 16 to 22:** (if meets Criteria for Starting Interval Throwing):
- Continue ROM and stretching programs
- Continue Advanced Throwers Ten program
- Continue plyometrics
- Begin interval throwing program progressing from 45ft to 90 ft.
- Distance level may be increased ONLY when:
  - No pain or stiffness while throwing
  - No pain or stiffness after throwing
  - Strength is maintained and fatigue is minimal after completion of final set
  - Throwing motion is effortless with appropriate mechanics
  - Accuracy and throwing lines are consistent
- Athletes may progress through ITP at different rates/paces
- Expected to complete throws of 0 to 27 m (0-90 ft) within 3 weeks of starting ITP and throws of 0 to 37 m (120 ft)

**Months 6-9**
- Initiate ITP phase 2 (off the mound) when phase 1 is complete and athlete is ready
- Pitchers may begin mound throwing after completing 120 ft distance. NO flat ground pitching. Start with catcher moved forward when throwing from the mound and progress to full distance.
- Perform dynamic warm-ups and stretches
- Continue Advanced Throwers Ten program
- Initiate gradual return to competitive throwing (estimated 7-9 months post-operatively)
- Return to competition decision based on physician and rehabilitation team assessment
Return to play may occur when all conditions are met:
- Trunk, scapula, shoulder motions are normal
- Normal trunk, scapular, shoulder, and arm muscle strength are normal
- No pain while throwing
- Throwing balance, rhythm and coordination are normal

**ROM:** range of motion. Note: Some players may require additional time for return to play. These times serve as the recommended minimums for healing and progression.

Above protocol adapted from:
Exercises in the Throwers Ten Exercise Program

- Diagonal-pattern D2 extension
- Diagonal-pattern D2 flexion
- Shoulder external rotation at 0° of abduction
- Shoulder internal rotation at 0° of abduction
- Shoulder abduction to 90°
- Shoulder scapular abduction, external rotation ("full cans")
- Side-lying shoulder external rotation
- Prone shoulder horizontal abduction
- Prone shoulder horizontal abduction (full external rotation, 100° of abduction)
- Prone rowing
- Prone rowing into external rotation
- Press-ups
- Push-ups
- Elbow flexion
- Elbow extension
- Wrist extension
- Wrist flexion
- Wrist supination
- Wrist pronation

All exercises performed against resistance to improve strength.

Full description:
Wilk KE, Arrigo CA, Hooks TR, Andrews JR. Rehabilitation of the overhead throwing athlete: there is more to it than just external rotation/internal rotation strengthening. PM R. 2016; 8: S78–S90.
Exercises in the Advanced Throwers Ten Exercise Program

**Elastic Tubing/Band Resistive Exercises**
- Shoulder external rotation at 0° of abduction while seated on a stability ball*
- Shoulder internal rotation at 0° of abduction while seated on a stability ball*
- Shoulder extensions while seated on a stability ball†
- Lower trapezius isolation while seated on a stability ball†
- High row into shoulder external rotation while seated on a stability ball†
- Biceps curls/triceps extensions while seated on a stability ball†

**Isotonic Dumbbell Resistive Exercises**
- Full can while seated on a stability ball†
- Lateral raise to 90° while seated on a stability ball†
- Prone T's on stability ball†
- Prone Y's on stability ball†
- Prone row into external rotation on stability ball†
- Sidelying shoulder external rotation
- Wrist flexion/extension and supination/pronation

*Contralateral sustained hold performed during exercise
†Exercises are performed in 3 distinct continuous movements per exercise: bilateral active exercise, alternating reciprocal movement, and a sustained contralateral hold
10 - 15 repetitions performed for each movement successively, without rest, to complete 1 set. Goal: perform 2 full cycles of the entire program without pain, using sound technique and no substitution.

Full description:
Criteria to Initiate Phase 1 Interval Throwing (Long Toss)

- Full, painless ROM
  - Shoulder total ER/IR ROM in 90° of shoulder abduction within 5° of nonthrowing shoulder
  - Shoulder horizontal adduction of 40° or greater on throwing shoulder
  - Glenohumeral IR deficit < 15°
  - Elbow and wrist passive ROM within normal limits
- Shoulder, elbow, and wrist strength based on manual muscle test, handheld dynamometer, or isokinetic testing
  - ER/IR ratio of 72% - 76%
  - ER/abduction ratio of 68% - 73%
  - Throwing-shoulder IR > 115% compared to nonthrowing shoulder
  - Throwing-shoulder ER > 95% compared to nonthrowing shoulder
  - Throwing-arm elbow flexion/extension 100% - 115% compared to nonthrowing arm
  - Throwing-arm wrist flexion/extension and forearm pronation/supination 100% - 115% compared to nonthrowing arm
- Satisfactory clinical examination
  - No pain, tenderness, or effusion
  - Negative laxity testing: prone valgus stress and milking maneuver
  - Negative special test for other elbow or shoulder pathology
  - Physician and rehabilitation team clearance
- Successful completion of all steps in the rehabilitation process
- Satisfactory functional test scores
  - Prone ball-drop test (throwing side 110% or greater compared to the nonthrowing side)
  - One-arm ball throws against the wall using a 0.9 kg (2 lb) plyoball for 30 seconds without pain and exhibiting the ability to maintain 90°/90° arm position without compensation (throwing side greater than 90% of nonthrowing side)
  - Throwing into plyoback rebounder with 0.45-kg (1-lb) plyoball for 30 seconds with no pain, normal mechanics (without substitution) with good control
  - Single-leg step-down for 30 seconds, controlling pelvis and lower extremity alignment for both sides (limb symmetry: 95%+)
  - Prone plank test for time
- Minimum Kerlan-Jobe Orthopaedic Clinic throwers' assessment score of 85

ER: external rotation; IR: internal rotation; ROM: range of motion.

Adapted from: