

**Ulnar Collateral Ligament Repair With Augmentation Rehabilitation Protocol**

	<b>RANGE OF MOTION</b>	<b>IMMOBILIZER</b>	<b>EXERCISES</b>
<b>PHASE I</b> 0-6 weeks	<p><b>0-1 weeks:</b> None</p> <p><b>2 weeks:</b> elbow 30-110°</p> <p><b>3 weeks:</b> elbow 10-125°</p> <p><b>4 weeks:</b> elbow 0-145°</p>	<p><b>0-1 weeks:</b> splint</p> <p><b>2 weeks:</b> brace 30-110°</p> <p><b>3 weeks:</b> brace 10-125°</p> <p><b>4 weeks:</b> brace 0-145°</p>	<p><b>0-1 weeks:</b> wrist motion and hand motion  <b>2 weeks:</b> active ROM shoulder, scapular isometrics</p> <p><b>3 weeks:</b> 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).</p> <p><b>4-6 weeks:</b> Progress AROM and restore full ROM, Initiate wrist flexion and elbow flexion movements against resistance</p> <p>Start Throwers Ten Program (by ASMI below)</p>
<p><b>Before Phase II:</b> must have 0-145°, minimal pain, good manual muscle testing of: elbow flexion/extension; wrist flexion; shoulder internal and external rotation, scapular abduction</p>			
<b>PHASE II</b> 6-8 weeks	Progress to full ROM	Discontinue Brace at 6 weeks	<p><b>Starting Week 6:</b></p> <ul style="list-style-type: none"> <li>• Initiate Advanced Throwers Ten program</li> <li>• Initiate 2-hand plyometrics: chest pass, side to-side throw, and overhead pass</li> <li>• Initiate prone plank exercise</li> </ul> <p><b>Starting Week 8:</b></p> <ul style="list-style-type: none"> <li>• Progress to 1-hand plyometrics: 90°/90° ball throw, 0° ball throw</li> <li>• Continue with Advanced Throwers Ten program</li> <li>• Initiate side plank with shoulder ER strengthening exercise</li> <li>• No aggressive weightlifting until 12 weeks post operatively</li> </ul> <p><b>No chest flies or lifts stressing ligament</b></p> <p>Avoid any valgus stress on elbow until minimum 2 months post operatively</p>

**Before Phase III:** Must have full, nonpainful elbow AROM, no pain or tenderness, minimum 70% strength in shoulder and elbow compared to opposite side, appropriate clinical examination, completion of Phase II exercises without difficulty or pain.

**PHASE III**  
9-14  
weeks

**Week 9:** Continue all strengthening exercises, Advanced Throwers Ten program, plyometrics

**Week 10:**

- Seated chest-press machine
- Seated row machine
- Biceps/triceps machine or cable strengthening
- Interval hitting program

**Week 12** (if meets Criteria for Starting Interval Throwing):

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

**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 – 16:**

- Continue Phase III exercises
- Continue and progress interval throwing program.
- 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) within 8 weeks

**Weeks 16 to 20**

- Continue ROM and stretching programs
- Continue Advanced Throwers Ten program
- Continue plyometrics
- 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.

**Weeks 20+**

- Initiate gradual return to competitive throwing
- Perform dynamic warm-ups and stretches
- Continue Advanced Throwers Ten program

	<ul style="list-style-type: none"> <li>• Return to competition decision based on physician and rehabilitation team assessment</li> </ul> <p><b>Return to play may occur when all conditions are met:</b></p> <ul style="list-style-type: none"> <li>• Trunk, scapula, shoulder motions are normal</li> <li>• Normal trunk, scapular, shoulder, and arm muscle strength are normal</li> <li>• No pain while throwing</li> <li>• Throwing balance, rhythm and coordination are normal</li> </ul>
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**ROM:** range of motion. Note 6 month return to play is possible, but some players may require additional time.

Above protocol adapted from Dugas and Wilk:

*Wilk KE, Arrigo CA, Bagwell MS, Rothenmich MA, Dugas JR. Repair of the Ulnar Collateral Ligament of the Elbow: Rehabilitation Following Internal Brace Surgery. J Orthop Sports Phys Ther. 2019 Apr;49(4):253-261. Doi: 10.2519/jospt.2019.8215. Epub 2019 Mar 12. PubMed PMID: 30862273.*

### **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.*

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## 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:

*Wilk KE, Yenchak AJ, Arrigo CA, Andrews JR. The Advanced Throwers Ten Exercise Program: a new exercise series for enhanced dynamic shoulder control in the overhead throwing athlete.*

*Phys Sportsmed. 2011; 39: 90– 97.*

## **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:**

Wilk KE, Arrigo CA, Bagwell MS, Rothermich MA, Dugas JR. Repair of the Ulnar Collateral Ligament of the Elbow: Rehabilitation Following Internal Brace Surgery. *J Orthop Sports Phys Ther.* 2019 Apr;49(4):253-261. doi: 10.2519/jospt.2019.8215. Epub 2019 Mar 12. PubMed PMID: 30862273.