



## ***Overhead Athlete Rehabilitation Guideline***

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This document is designed to be used as a guideline in the rehabilitation of the athlete playing overhead sports, mainly baseball and softball, but also including swimming, tennis and volleyball players. It is not meant as a rigid course of rehabilitation and is meant to be fluid in nature with modifications made depending on the specific patient and the expertise of the clinician.

This guideline can be used as a **supplement** with any protocol for a patient post-surgically (**based on healing guidelines and physician approval**) as well as with any patient being treated conservatively. Suggested interventions more specific to the unique needs of the overhead athlete are listed alongside the criteria to advance for each of the outlined phases.

# General Considerations:

- Overhead athletes (baseball, softball, volleyball, swimming, etc) move at a high rate of speed and depend on muscular endurance to sustain this during their respective sport. Shoulder internal rotation velocity can reach up to 3400-7500°/sec in youth to elite baseball pitchers. For perspective, this is equivalent to completely rotating the arm roughly 10-20 times in one second. Focus of last phases of recovery should be on attaining higher-speed movements with no pain or fatigue.
- ROM:
  - Anatomical GIRD is normal in overhead athletes and is defined as a loss of IR less than 20° with symmetrical total rotational motion bilaterally.
  - Pathological GIRD is defined at a loss of IR >20° with a >5° difference in total rotational motion bilaterally.
  - It has been shown that a >5° difference in shoulder flexion or >5° difference in total rotational PROM is a 2.4-2.8x increased risk of injury.
- Consider lower extremity and lumbopelvic dynamic control and strength exercises in early phases.
  - Hamstrings, lumbar extensors, obliques and hip adductors have higher injury rate in baseball/softball.
- Complete upper extremity return-to-sport testing prior to return to sport (see guideline).
- Consider other functional strength testing for overhead athletes.
- When athlete is ready to resume throwing, see Interval Throwing Program Guideline for further information.

# High Ankle Sprain Rehabilitation Guideline

PHASE	SUGGESTED INTERVENTIONS	GOALS/MILESTONES FOR PROGRESSION
<p><b>Phase I</b> <i>Acute Phase</i></p>	<p><b>Suggested Interventions:</b></p> <ul style="list-style-type: none"> <li>• <b>Modalities as indicated</b></li> <li>• <b>Activity modification as needed</b></li> <li>• <b>Flexibility and stretching with the goal of improving shoulder IR and horizontal adduction</b> <ul style="list-style-type: none"> <li>- Sidelying genie horizontal adduction stretch (scapula stabilized)</li> <li>- Prayer stretch</li> <li>- Elbow extension stretching</li> <li>- Wall slide</li> </ul> </li> <li>• <b>Gentle shoulder flexion and ER stretching</b></li> <li>• <b>Scapular strengthening (retraction and depression)</b></li> <li>• <b>Neuromuscular control exercises:</b> <ul style="list-style-type: none"> <li>- Multiangle rhythmic stabilizations</li> <li>- IR/ER alternating isometrics in scapular plane</li> <li>- Pain-free isometrics in supine at end-range ER</li> <li>- Manually resisted scapular protraction</li> </ul> </li> <li>• <b>Quadruped or tripod closed chain perturbations</b></li> </ul>	<p><b>Goals of Phase:</b></p> <ol style="list-style-type: none"> <li>1. Diminished pain and inflammation</li> <li>2. Improved flexibility/range of motion</li> <li>3. Reestablished dynamic muscle control, balance and proprioception</li> </ol> <p><b>Criteria to Advance to Next Phase:</b></p> <ol style="list-style-type: none"> <li>1. Pain-free daily activities</li> <li>2. Minimal pain with initial resisted exercises</li> </ol> <p><b>3. Physician approval to progress per healing guidelines (if post-surgical)</b></p>

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<p><b>Phase II</b> <i>Intermediate Phase</i></p>	<p><b>Suggested interventions:</b></p> <ul style="list-style-type: none"> <li>• <b>Thrower's ten</b></li> <li>• <b>Prone neuromuscular control exercises:</b> <ul style="list-style-type: none"> <li>- Horizontal Abduction</li> <li>- Scaption</li> <li>- ER in 15 degrees of scapular plane</li> </ul> </li> <li>• <b>ER wall push in scapular plane</b></li> <li>• <b>Standing ER at 45° abduction</b></li> <li>• <b>Standing ER holds at 90°/90°</b></li> <li>• <b>Weight-bearing: Push-ups, push-up with a plus</b></li> <li>• <b>Plyometrics: Trampoline plyos chest pass, side and overhead toss, 90°/90° toss, 90°/90° ball drop, prone/sidelying horizontal and ball toss</b></li> <li>• <b>PNF patterns with bands, cable column, manual resistance</b></li> <li>• <b>Scapular strengthening - serratus anterior, etc. (ex.: dynamic hug)</b></li> <li>• <b>Manual resisted exercises with rhythmic stabilizations:</b> <ul style="list-style-type: none"> <li>- Sidelying ER</li> <li>- Sidelying scaption</li> <li>- Sidelying row</li> <li>- Supine ER at 45° of abduction</li> <li>- Supine diagonals</li> </ul> </li> <li>• <b>End-range rhythmic stabilizations in various phases of throwing motions</b></li> <li>• <b>Lower abdominal training</b></li> <li>• <b>Plank progressions</b></li> <li>• <b>Static overhead pressing</b></li> <li>• <b>Any agility, speed work, running programs</b></li> <li>• <b>Progressions to above exercises should include:</b> <ul style="list-style-type: none"> <li>- Add single leg stance to any standing exercises</li> <li>- Add sitting or prone on physioball</li> <li>- Add isometric split squat hold in throwing position</li> </ul> </li> </ul>	<p><b>Goals of Phase:</b></p> <ol style="list-style-type: none"> <li>1. Improve muscular strength and endurance</li> <li>2. Progress to full active and passive ROM</li> <li>3. Improve total body proprioception and control</li> <li>4. Prepare the entire body for return to throwing</li> </ol> <p><b>Criteria to Advance to Next Phase:</b></p> <ol style="list-style-type: none"> <li>1. Full PROM <ul style="list-style-type: none"> <li>• Total PROM (IR and ER) is equal to opposite side <ul style="list-style-type: none"> <li>- Minimum of 100° of supine ER PROM</li> </ul> </li> <li>• Normalized latissimus dorsi muscle length (within 5°)</li> <li>• Normalized supine horizontal adduction with scapula stabilized</li> </ul> </li> <li>2. Full AROM <ul style="list-style-type: none"> <li>• Prone 90°/90° ER exercise <ul style="list-style-type: none"> <li>- approx. 85% of supine passive ER without compensatory movements</li> </ul> </li> <li>• Equal back-to-wall flexion test</li> </ul> </li> <li>3. Full strength and proprioception <ul style="list-style-type: none"> <li>• 5/5 seated serratus anterior test</li> <li>• 5/5 middle and lower trapezius tests</li> <li>• ER/IR Ratio &gt;75%</li> </ul> </li> <li>4. LE Y balance assessment <ul style="list-style-type: none"> <li>• Within 5% side to side</li> </ul> </li> <li>5. Subjective measurement tool <ul style="list-style-type: none"> <li>• Minimum FOTO score of 80</li> <li>• Alternate - Quick DASH</li> </ul> </li> </ol>
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<p><b>Phase III</b> <i>Advanced Strengthening</i></p>	<p><b>Suggested interventions:</b></p> <ol style="list-style-type: none"> <li><b>1. Continue with overall strengthening program</b></li> <li><b>2. Consider SHARP Program (if available)</b></li> <li><b>3. Med ball tosses</b></li> <li><b>4. High-speed band exercises</b></li> <li><b>5. Pre-throwing drills</b> <ul style="list-style-type: none"> <li>• Half-kneeling throwbacks</li> <li>• 90°/90° ball drop and catch in supine</li> </ul> </li> <li><b>6. Introduction to weight training with modifications as indicated</b> <ul style="list-style-type: none"> <li>• Bench press to neutral, no barbell to begin</li> <li>• No military pressing behind head</li> <li>• No lat pull-downs behind head</li> <li>• Consider limiting or modifying back squat</li> <li>• Consider limiting depth for triceps dips</li> </ul> </li> <li><b>7. Begin Interval Throwing Program or appropriate sport-specific interval program (see guidelines)</b></li> </ol>	<p><b>Goals of Phase:</b></p> <ol style="list-style-type: none"> <li>1. Return to strength training with appropriate modifications</li> <li>2. Improve muscular power, speed and agility</li> <li>3. Ensure proper throwing mechanics with pre-throwing drills to reduce risk for re-injury</li> <li>4. Complete specific rotator cuff strengthening with no compensatory movements</li> </ol> <p><b>Criteria to Advance to Next Phase:</b></p> <ol style="list-style-type: none"> <li>1. All above still met</li> <li>2. Consider upper extremity return-to-sport testing</li> <li>3. Consider other functional strength testing with goal of 90% LSI: <ul style="list-style-type: none"> <li>• Single arm seated shot put throw for distance</li> <li>• Prone horizontal abduction medicine ball drop test (2# ball, 30 sec)</li> <li>• Prone medicine ball drop test at 90/90 (2# ball, 30 sec)</li> <li>• Half-kneeling medicine ball 90/90 rebound test (2# ball, 30 sec)</li> </ul> </li> </ol>
<p><b>Phase IV</b> <i>Return to Performance Phase</i></p>	<p><b>Suggested interventions:</b></p> <ol style="list-style-type: none"> <li><b>1. SHARP Program (if available)</b></li> <li><b>2. Progression of total body strength training program</b></li> <li><b>3. Progression of Interval Throwing Program</b></li> <li><b>4. Sport- or position-specific drills, or appropriate Sport Specific Interval Program</b></li> </ol>	<p><b>Goals of Phase:</b></p> <ol style="list-style-type: none"> <li>1. Progression of interval throwing program to prepare for return to competitive throwing with proper throwing mechanics</li> <li>2. Development of individualized maintenance program in preparation for discontinuation of formal rehabilitation.</li> </ol> <p><b>Criteria for Return to Sport:</b></p> <ol style="list-style-type: none"> <li>1. Successful progression of interval throwing program to 180 ft with no pain.</li> <li>2. Consider throwing mechanics assessment</li> <li>3. ER/IR Ratio &gt;75%</li> <li>4. Successful completion of upper extremity return-to-sport testing (refer to Upper Extremity Testing Guideline)</li> </ol>
<p><b>Phase V</b> <i>Return to Full Activity</i></p>	<p><b>Suggested interventions:</b></p> <ol style="list-style-type: none"> <li><b>1. Development of individualized maintenance program based on timing of season and needs of the patient</b></li> <li><b>2. Recommendations on return to sport, including pitch limits, or innings limits consistent with the patient's goals and progress. Communication with ATC, coaches and/or parents as needed.</b></li> </ol>	

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