Prevention of Overuse Shoulder Injuries for the Incoming Collegiate Athlete Participating in Overhead Sport

Erin R. Variano
Utah State University

Follow this and additional works at: https://digitalcommons.usu.edu/gradreports

Recommended Citation
https://digitalcommons.usu.edu/gradreports/168
Prevention of Overuse Shoulder Injuries for the Incoming Collegiate Athlete Participating in Overhead Sport

Erin R. Variano
Utah State University

Follow this and additional works at: http://digitalcommons.usu.edu/gradreports

Recommended Citation
The Importance of Maintaining Good Position of the Shoulder Complex in the Overhead Throwing Athlete

- Overhead athletes are required to throw or perform movement at high velocities to achieve success in their particular sport.
- Biomechanical abnormalities will develop from repetitive throwing motions and from generating increased amounts of force through speed and power changes in your sport.
- It is crucial to work on shoulder complex range of motion, stability, and neuromuscular control to perform and train in optimal position and in turn generate the most force during overhead movement.

What is Scapular Dyskinesis?

- Athletics and chronic overhead use of the shoulder requires the shoulder to undergo unique positions, in which musculature of the shoulder complex needs to fire accordingly to protect the joint.

- Good movement patterns result in the implementation of proper posture

- An asymmetrical body in any direction causes stresses to occur from ground forces, gravity, and external forces coming from participating in a sport.

- When the body is trying to perform movements in athletic competition, postural asymmetry will create a negative response through the body.

- Scapulohumeral rhythm is the relationship between the shoulder blade and how it moves in relation to the arm and rib cage.

- The shoulder complex has potential to greatly vary under dynamic conditions. Exercises to target areas to create sufficient scapulohumeral rhythm and optimal shoulder motion will improve mechanics and increase performance.

- Scapular dyskinesia is thought to be the causative factor in ultimate shoulder joint integrity, laxity (how loose the joint is), or muscular changes due to overcompensation over time. Limiting dyskinesia will lead to injury prevention.
Movements of the Scapula

- **Upward/Downward Rotation**
- **Anterior/Posterior Tilt**
- **External/Internal Rotation**

Normal Scapular Motion

*Picture: Scapula at rest and in upward rotation*

*Picture: Scapula at rest & external rotation from a superior view*

*Picture: Scapula at rest and posterior tilt in lateral view*
Abnormal Scapular Motion (Dyskinesis)

Arcadia University has developed a training tool for athletic trainers as well as other health care professionals to go through in order to understand how to detect dyskinesis.

- As athletes participating in overhead sports, it is important to have a general knowledge of how the scapula should move, and that abnormal movement could predispose you to injury.

- The following exercises will help target different areas that contribute to abnormal shoulder motion, and restore normal movement so the athlete will be able to train efficiently in good position.
**Restore Range of Motion for Shoulder Internal Rotation**

- Throwing athletes tend to lack internal rotation in the shoulder and are more flexible in the external rotation phase due to repeated throwing mechanism in the cocking phase and lack of stability and follow through in the deceleration phase.
- Tight first rib musculature could contribute to loss of internal rotation
- Posterior Capsule tightness (Muscles in the back around the shoulder blade) develops with repeated overhead motion
- Must restore full access to lower scapular stabilizers (muscles in the low back and between the spine and scapula)
- Abdominals must be activated during throwing to maintain good posture with no tilting or overextension in the back
- The ribs act as a stable platform for the upper extremity, and it is important to be sure that the musculature acting on the ribs is stable, mobile, and has efficient neuromuscular control.

**Mobility Exercises to Improve Internal Rotation Flexibility**

- Wrap the band around the shoulder joint to add distraction (opening of the joint)
  - Walk forward to a comfortable position
- The band will be pulling your humeral head into the back of the socket creating a good position to stretch
- This allows to protect the tissues in the front of the shoulder by not allowing the humeral head to come forward into those tissues
• Place the arm behind the back and move hand up towards the scapula as much as possible
• Make sure you are in good posture with your torso in good position and your core activated

• Turn your head towards your armpit of the opposite shoulder being stretched
• This will target the levator scapula of the neck and enhance the overall stretch
• This muscle is a scapular elevator and tightness will result in raising the scapula into a compromised position during movement
• Tightness will impeded you from getting full internal rotation
• Add force by pushing down on the head to create a better stretch

• Contact and relax in this position for a total of 2 minutes each arm
• If 2 minutes cannot be achieved, begin at a lower goal and work up to 2 minutes
Myofascial Release Techniques Improving Internal Rotation

• Use a lacrosse ball, golf ball, or tennis ball to place on the musculature along the lower scapular stabilizers and between the spine and the scapula.
• The softer the ball the less painful the release. Start with a tennis ball and build up to a golf ball.
• Find an area of musculature that is tight and allow your body to sink into the ball and disperse the energy through the tight musculature in order to loosen it.

• Once the ball is in the area of a trigger point, begin putting your arm through different movements.
• Advance this exercise by using the body blade for dynamic stabilization work across the body

• This movement will challenge the neuromuscular system while releasing tight musculature contributing to a limit in internal rotation

Click Here For Video Demonstration
Exercise to Improve Deceleration/Internal Rotation

- Deceleration Ball Toss
- Have the elbow and shoulder at 90 degrees and maintain that position throughout the exercise
- Anticipate catching the ball in a good position and decelerating the force
• Bring the ball through full internal rotation of the shoulder while keeping your shoulder blade down and back
  • Advance this exercise by sitting on the stability ball
  • Engage your core and make sure you are sitting straight up with shoulders back through the entirety of the exercise

• Complete the exercise by tossing the ball back to your partner while finishing in external rotation and at 90 degree

Click Here For Video Demonstration
**How to Account for Muscular Imbalances in the Shoulder**

- Often times the upper trapezius muscle is activated more than the lower and middle trapezius muscle in the overhead athlete
- It is important to keep a muscular balance as to not compensate with the more stable musculature in movements that require stability in those muscles that are not as efficient
- This efficiency ratio is improved with more frequent activation of the lower trapezius and non-activation of the upper trapezius
- The neuromuscular system must be targeted to create these improvements
- Improve imbalances, postural deviations, faulty movement patterns
- Correcting for this reestablishes stability
- Results in an increase in mobility because the brain is sensing a stable joint
- Other muscles surrounding a muscle with ‘weak’ neuromuscular connection detect the instability and tighten up (guard) in order to protect the joint

**Mobility Exercises to Improve Flexibility in the Front of the Shoulder**

- Lock your hand in the band, grab it and walk out to find distraction in the joint as well as a stretch from the hand, through the biceps, into the pectoralis major, and into the neck
• Turn the neck towards the opposite direction to find a deeper stretch of all the connecting tissue
• Stretching this musculature in the front of the shoulder helps restore normal motion and keep the shoulder from coming forward in a bad position
• This will help in resetting the shoulders and loosening muscles in the back that you want to target in more advanced exercises to correct for imbalances

Myofascial Release Techniques for the Back

• The foam roller helps target tight musculature in the back in order to regenerate and improve muscle tightness before advancing exercises
• Here lay on the foam roller and allow your body to sink into it and find the tight areas by staying in a position, and then rolling back and forth over the area
• Add to this exercise by placing a bar overhead and go through the movement of achieving full overhead flexion in the shoulders
• Hold this overhead position while moving on the foam roller in order to achieve good shoulder positioning and muscular control in the back that contributes to the throwing mechanism

Click [Here](#) For Video Demonstration

• Place the foam roller in line with the spine and let the arms fall to the side to get a good stretch in the front of the shoulders, as well as lengthening all involved musculature
Exercises Activating the Lower Trapezius

- Lay on a table with the arm fully extended and about 45 degrees out from your head

- Raise the arm activating your lower trapezius and squeezing at the top
- Hold this for a few seconds to get activation of the muscle; lower the arm and repeat
• Progress this exercise by adding resistance with a band

• Progress further by adding unstable surfaces with the bosu ball and dynadisc, maintaining good position while executing the exercise

Click [Here](#) For Video Demonstration
• Activate the lower trapezius through ‘Y’ chain pulls
• Have arms at 45 degrees from the head in a forward flexed position

• Make sure the back and core are engaged and stable so the ribs do not tilt and create extension in the spine
Both arms should finish in a symmetrical position

**Improve External Rotation Neuromuscular Efficiency**

- The external rotators of the scapula along with the capsule are the stabilizers of the humeral head of the arm to the glenoid of the scapula
- The arm sits in the glenoid as compared to a golf ball sitting on a tee.
- This contributes to why the shoulder is the area of the body most predisposed to injury.
- This joint must be protected, and the external rotators must fire efficiently by having a good connection between the brain detecting stability in these muscles
- When a decline in this mechanism happens, neuromuscular inhibition occurs, and the firing rate of the muscle responding to external force in sport decreases
- This causes injury; so here are ways to make sure the external rotators are performing at their best
Myofascial Techniques for Lengthening External Rotators/Targeting Trigger Points

- Place the ball on the external rotators of the scapula, located on the outside portion of the shoulder
- Allow your shoulder to drop into the ball, and find areas of tightness

- Progress this by adding dynamic stabilization movement with the bodyblade in external/internal shoulder rotation

Click Here For Video Demonstration
Exercises Challenging Neuromuscular Control of External Rotators

- Perform this rotator cuff complex exercise starting and ending each segment in the same position without dropping the shoulders.

- Scapula needs to be down and back throughout the duration of the complex (must see video to understand how to execute this exercise).
Improving and Restoring Scapular Stabilization

- Stability of the entire shoulder complex lies in applying all of these concepts and understanding how they affect each other
- It is important to maintain good mechanics through all shoulder complex exercises in order to achieve optimal results
- Proprioception is the body's ability to detect where you move your extremities through space
- Working on improving this will help with overall shoulder complex activation
- This section will involve exercises that challenge your core and stabilization as well as your shoulder proprioception and mobility.
- All of these factors need to be utilized together in order to achieve optimal performance in your sport.
- Engaging your core will improve neuromuscular control and create a solid base upon how fluid the shoulder glides through movement
- This will help in overall power generation and force production.

Mobility Technique to Improve Scapular Stability

- Increase mobility and flexibility of the scapular musculature
- Wrap band around the hand and walk back to feel distraction at the joint
- Turn the hand facing upwards (externally rotate) and push down with the other hand to maintain this position throughout the stretch
- Look towards your shoulder while moving your neck into different positions to target multiple areas of the scapular complex
- Contract and relax for 2 minutes each side to see an improvement in motion
Exercises Challenging Core and Shoulder Complex Stability

- Use the slide board to challenge core and shoulder stability
- Begin in pushup position with hands on the slide board booties

- Slide one arm at a time out and back to starting position
- Make marks to hit on the board to account for overextension of the shoulder
• Stability ball walkouts challenge the core and shoulder
• Shoulder blades need to be down and back in the socket throughout the exercise

• Continue walking out till your feet are on the stability ball, then proceed to walk hands back in
  • Maintain a solid core
  • Do not drop hips or overextend the back
• Cable crossover drill starting overhead
• Step into the motion to simulate throwing

• Pull across the body keeping the core activated
• Alternate this movement by starting at a low position and moving overhead

• Finish in a controlled movement while rotating smoothly back to the starting position
• Challenge your core by stabilizing in the contraction phase of a pushup and holding in that position on suspension handles
  • Keep spine in neutral position
  • Do not drop hips or raise the head
• Keep shoulder blades down and back; this keeps the complex in a strong non-compromised position so the shoulders don’t rotate forward which could lead to injury

• Progress this exercise by adding instability under the feet with a bosu ball

Click Here For Video Demonstration
Note to the Injured Athlete and Athletic Trainer/Physical Therapist

It is important to understand that these exercises are geared towards prevention of injury, and helping athletes restore good muscle positioning and efficiency when mechanics begin suffering due to fatigue and instability. If you undergo an acute injury to the shoulder complex, consult your athletic trainer before trying to implement these exercises into your training regimen. Your athletic trainer can work with you to treat the injury, and progress you into these exercises once it is appropriate to do so. Trying to do any exercise with poor mechanics will not lead to optimal results. Remember that a joint is only healthy once you have full range of motion in all planes of motion. In terms of how many set and repetitions you should perform for the exercises provided, consult with your athletic trainer or health care professional. They will be able to guide you in terms of what you need to work on most on that particular day and where you are deficient. These exercises are not a protocol, but instead will allow you to target the areas needed no matter what stage of training you are involved in at the time.
References


