

Understanding Injury and Rehabilitation of the Throwing Athlete

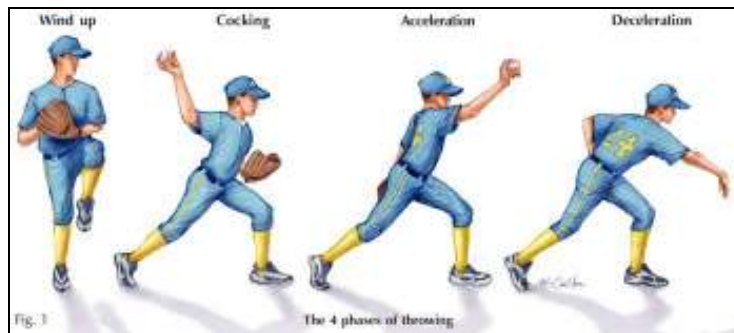
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Did you know that the overhead throw is the fastest human movement, taking place in just 0.5 seconds?¹ That snowball you just threw will quickly turn into a baseball or softball as the snow melts from the diamonds. If your throwing arm begins to ache, what should you do? This article will provide you with the information about the shoulder complex anatomy, the potential origin of throwing injuries and, most importantly, the prevention of injury.

The Should Complex: The Anatomy and How It Relates to Throwing

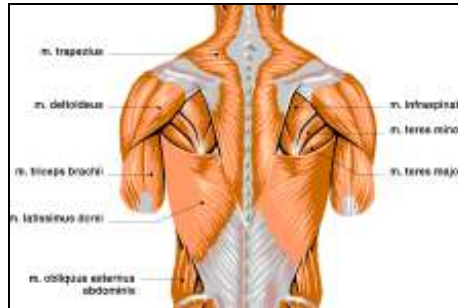
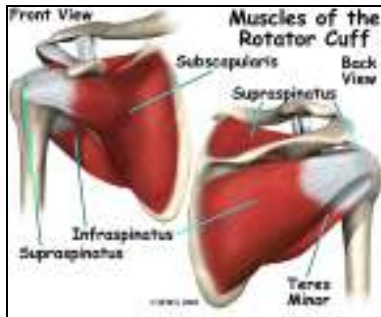
The shoulder complex consists of three joints: the sternoclavicular, the acromioclavicular, and glenohumeral joints, as well as the relationship of the shoulder to the ribs (scapulothoracic). There are also many key muscles and ligaments that stabilize and move the shoulder during the throwing motion.

A throw is divided into five phases: wind-up, cocking, acceleration, release and deceleration, and follow-through.¹



Graphic: http://www.hughston.com/hha/a_16_1_1.htm

1. **Wind-up** begins when the thrower shifts the shoulder away from the direction he/she will throw the pitch.¹
2. **Cocking** the shoulder is raised to shoulder height (abduction to 90 degrees), rotated behind the body (external rotation to 90+ degrees) and brought behind the body (horizontal abduction to 30 degrees). The major muscles responsible for this phase include the deltoid and rotator cuff muscles.¹
3. The **acceleration** phase begins at the extreme of the cocking phase and lasts until the ball is released. As the thrower's body comes forward energy is transferred to the arm. The main muscles that generate the velocity for this movement are the pectoralis major and latissimus dorsi.¹
4. **Release and deceleration** phase actually involves forces that are twice as great as to the acceleration phase. The rotator cuff muscles act to slow down the arm. This is known as an eccentric contraction.¹
5. **Follow-through** is when the body moves forward with the arm and the forces decrease.¹



Rotator Cuff Graphic: http://www.medicalmultimedigroup.com/pated/shoulder_problems/cufftearold.html
 Back Muscles Graphic: http://orgs.jmu.edu/strength/KIN_425/kin_425_muscles_lats_traps.htm

Injury to the Throwing Shoulder

There are many causes of shoulder injury, including incorrect throwing mechanics, tired muscles, muscle weakness or imbalance, and excessive laxity of the joint.²

The high number of throws that an individual completes in a given practice, game or season also can lead to injury. Specifically for youth baseball, the USA Baseball Medical and Safety Advisory Committee issued a position statement in 2006 making recommendations for minimizing risk for injuries to pitchers. One statement from the advisory committee states that “Baseball pitchers should compete in baseball for no more than nine months in any given year... for at least three months a year, a baseball pitcher should not play any baseball or stressful overhead activities.”³ The Little League has established a list of pitching regulations for baseball divisions that is divided into league ages and pitches per day as well as rest requirements.⁴

If your shoulder or elbow symptoms are a result of trauma, or the pain is severe, or does not improve with rest, please seek the advice of a medical professional.

Injury Prevention and Rehabilitation

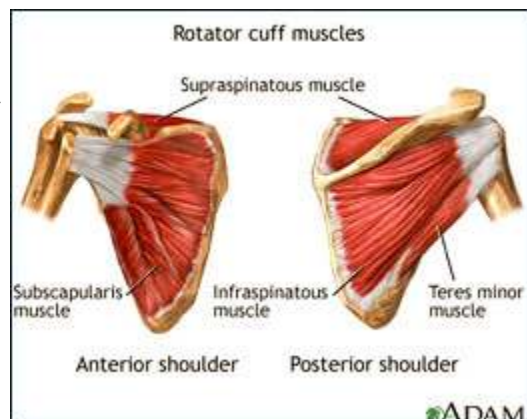
When discussing rehabilitation of a thrower it is important to address the whole body and not just the shoulder and or elbow. The hip, abdomen, back, and legs are all important muscle groups to consider. Areas to address in rehabilitation include aerobic conditioning, muscle strength, flexibility, throwing mechanics and a progressive return to throwing.

Shoulder complex muscles that should be included in a strengthening program include the rotator cuff as well as the muscles that surround and control the shoulder blade. There are a variety of strengthening equipment that can be used such as elastic tubing, free weights, and plyometric activities such as throwing a weighted ball at a trampoline.

There are established strengthening programs such as the Thrower’s Ten Program available.⁵ However, it is important to consider each thrower as an individual and understand the specific areas that need to be addressed. A rehabilitation specialist, such as a physical therapist or certified athletic trainer, can begin the process.

Prevention starts with education on a year-round conditioning program as well as instruction on when to begin a throwing program to prepare for the next competitive season.² During the competitive season there may also be specific regulations for pitchers.

Shoulder injuries in the throwing athlete are common and require a comprehensive examination as well as an individualized rehabilitation program in order to successfully return to the athlete to sport. Prevention of throwing injuries requires the athlete, parents, and coaches to take an active role. A physical therapist can provide guidance and resources to ensure healthy participation.



References:

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