

# Introduction to Common Shoulder Injuries and Preventive Techniques

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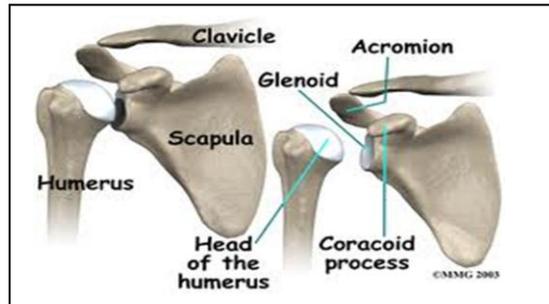
## Shoulder Basics

The shoulder complex is the most complicated region of musculature of the body. Due to its unique anatomical structure, the shoulder complex has a great degree of mobility. The shoulder has very poor stability, thus making the shoulder susceptible to injury. Many sport activities that involve repetitive overhead moments such as throwing, swimming, tennis and volleyball place a great amount of stress on the supporting structures.

## The Shoulder Complex:

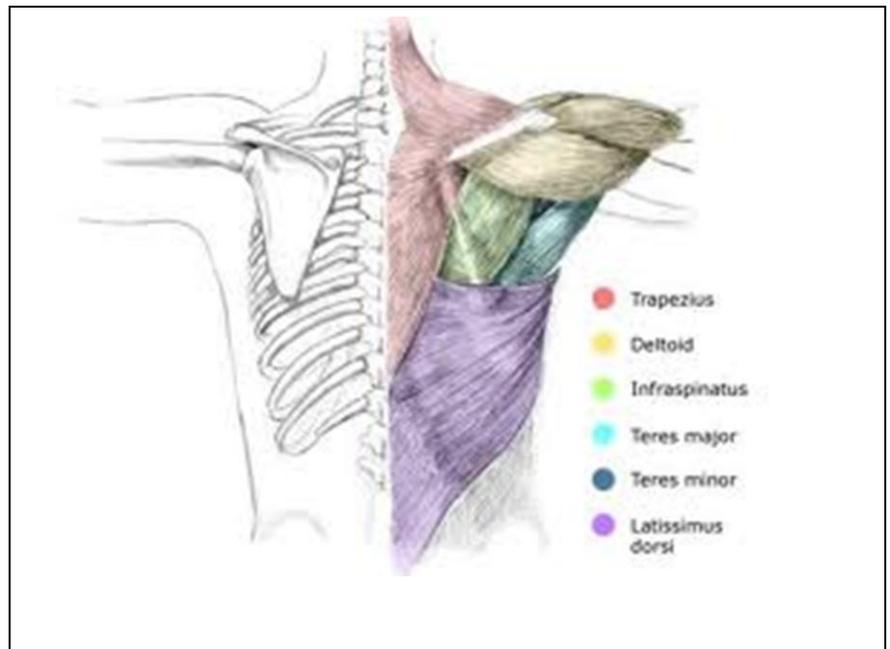
### **Bony Landmarks of the shoulder**

- Clavicle
- Acromion
- Humerus
- Scapula
- Glenoid



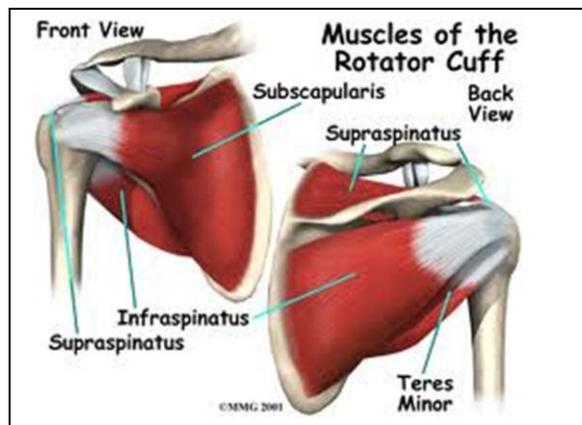
### **Muscles of the Shoulder**

- Pectoralis major/minor
- Latissimus dorsi
- Deltoid
- Supraspinatus
- Infraspinatus
- Subscapularis
- Teres major/minor
- Trapezius
- Rhomboideus major/minor
- Levator scapulae
- Serratus Anterior



### **The Rotator Cuff Muscles**

- Infraspinatus (ER)
- Supraspinatus (ER)
- Teres Minor (ER)
- Subscapularis (IR)



## Throwing Mechanics

### **Wind Up Phase**

- Also known as the preparation phase, lasts for the first movement until the ball leaves the gloved opposite hand. The lead leg strides forward, both shoulders abduct, externally rotate, and horizontally abduct.

### **Cocking Phase**

- This phase begins when the hands separate and ends when maximum external rotation of the humerus has occurred. During this phase the lead foot comes into contact with the ground.

### **Acceleration Phase**

- The acceleration phase lasts from maximum external rotation until ball release. The humerus abducts, horizontally abducts, and internally rotates at velocities that approach 7,000 degrees per second with forces approaching 800 N.

### **Deceleration Phase**

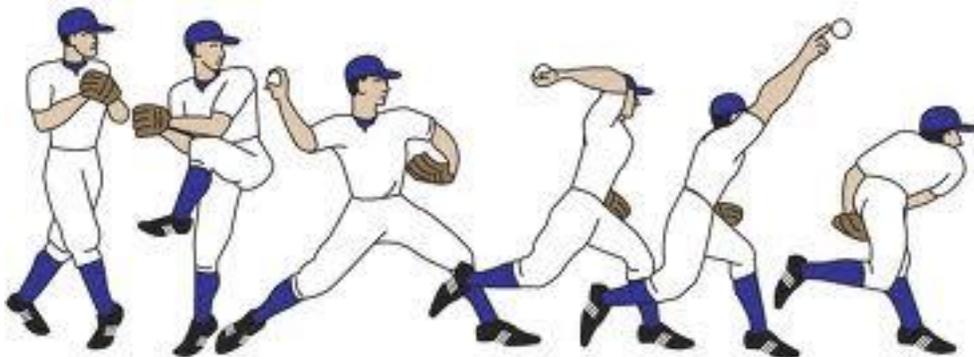
- The deceleration phase lasts from ball release until maximum shoulder internal rotation. During this phase, the external rotators of the rotator cuff contract eccentrically to decelerate the humerus. The rhomboids contract eccentrically to decelerate the scapula.

### **Follow-Through Phase**

- The follow-through phase last form the maximum shoulder internal rotation until the end of the motion, when the athlete is in a balanced position.

Most throwing injuries that happen to athletes occur during the deceleration and follow-through phases of throwing. Emphasis on good throwing mechanics should be essential when teaching athletes.

On the deceleration and follow-through phases the athlete should be cued to take the hand down the opposite pocket. This allows the body to help decelerate the arm taking some of the stress of the external rotators, the primary decelerators.



## Common Shoulder Injuries Among Athletes

### **Shoulder Dislocations**

Shoulder Dislocations are the most common sport injury among high school athletes. In most cases, dislocation occurs from falling on an out stretched arm or having an anterior force placed on the humerus when the shoulder is abducted and external rotated. When the humerus is displaced from the capsule it causes an abnormal increase in shoulder laxity. This typically leads to other injuries or chronic instability of shoulder.

## **Types of Shoulder Dislocations**

- Anterior Dislocation
- Posterior Dislocation
- Superior Dislocation
- Intra-Thoracic Dislocation

## **Signs and Symptoms**

- Sudden onset of severe pain, and often the feeling of that the shoulder is “popped” out
- Athlete will usually hold arm close to the body and resist moving it.
- Visually noticeable deformity, deltoid will lose its smooth rounded contour.
- If there is any nerve or blood vessel damage there may also be pins and needles, numbness or discoloration through the arm to the hand.

## **Treatment**

- Shoulder Reduction by a trained medical professional

Rehabilitation of the capsule and the muscles surrounding the joint will be necessary after a dislocation.

- Sling or immobilization of arm for 3-5 days
- Active range of motion exercise (shoulder ABC's, shoulder rolls, etc)
- Resistive range of motion exercise (rotator cuff work, band exercises)

## **Chronic Instability**

Chronic or recurrent shoulder instabilities occur after acute subluxation, dislocations, and repetitive overhead motions.

## **Types of Instability**

- Anterior
- Posterior
- Inferior
- Multidirectional

## **Signs and Symptoms**

- Pain or clicking
- Dead arm syndrome in the cocking phase of throwing
- Decreased range of motion in external rotation
- Positive Sulcus sign
- Positive Apprehension test

## **Treatment**

- Restore normal biomechanics to shoulder joint
- Strengthen the shoulder girdle
- Strengthen rotator cuff

## **Rotator Cuff Strains**

Rotator Cuff Strain occurs usually from poor throwing in the deceleration and follow-through phase of throwing.

### **Types of Strains**

- Grade 1: Some muscle fibers have stretched or torn. Some tenderness and pain with active range of motion, but full range of motion is usually possible
- Grade 2: A number of muscle fibers have been torn, and active contraction of the muscle is extremely painful. Usually a depression or divot can be felt in the muscle belly. Some swelling might occur
- Grade 3: Complete rupture of the muscle as occurred. Significant impairment of movement, if not total loss of movement

### **Sign and Symptoms**

- Sudden, tearing feeling in the shoulder, followed by severe pain through arm
- Limited movement of the shoulder due to pain or muscle spasm
- Specific tenderness over point of strain or tear

### **Treatment**

- Reduce initial pain and inflammation
- Regain full range of motion
- Strengthening of the rotator cuff muscles and other muscles surround the joint

## **Impingement**

Impingement syndrome is caused by compression of the supraspinatus tendon, the subacromial bursa, and the long head of the biceps tendon. Impingement is most commonly seen in athletes who perform repetitive overhead motions.

### **Types of Impingement**

- Primary impingement is caused by direct decrease in the subacromial space. Usually due to a hooked acromion process or weak infraspinatus and subscapularis that allows the humerus to compress the supraspinatus tendon.
- Secondary Impingement is caused by encroachment due to shoulder instability or muscle adhesions.

### **Sign and symptoms**

- Increased pain with overhead activity
- Diffuse pain around the acromion
- Weak external rotators

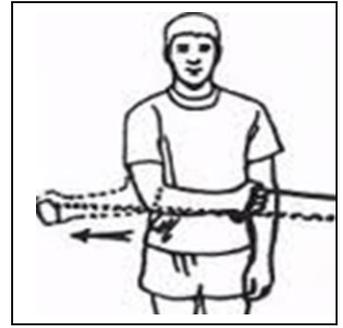
### **Treatment**

- Restore normal biomechanics to the shoulder joint
- Decrease inflammation
- Strengthen external rotators

## Shoulder Re/Pre-habilitation Exercises

### **Band External Rotation**

- Arm at 90 degrees of abduction, elbow bent to 90 degree
- Squeeze fist as tight on band
- Shoulder blade back and down
- Rotate ONLY at the shoulder, control arm back down to starting position



### **Band Pull Apart**

- Standing tall, abs tight/back tight
- Arms at 90 degrees of flexion, performing horizontal adduction
- Scapulas are performing adduction, squeezing tight in the middle of the back



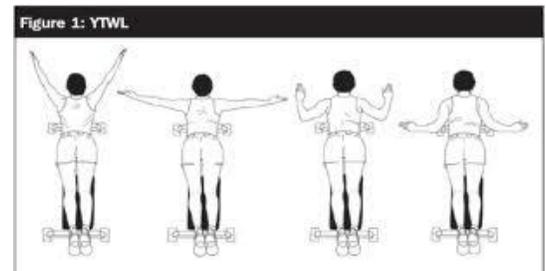
### **Full Can Raises**

- Standing tall, abs tight/back tight
- Shoulder blade backs and down
- Hand by the pocket, thumb up, squeezing weight tight
- Perform shoulder flexion at 45 degree angle
- Stopping when shoulder reaches 90 degree of flexion



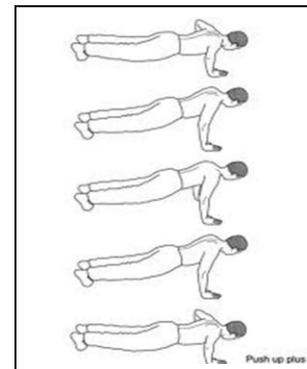
### **YTI Scapular Adduction/Stabilization**

- Laying on a bench or on the floor
- Squeeze shoulder blades back and down
- While scapula is in adduction, the arms can be raised in flexion, extension, and horizontal adduction (arms straight or elbows at 90 degrees)



### **Push Up Plus**

- Get into push up position, abs tight, butt tight
- Perform scapular adduction, then press into scapular abduction



### **Wall ABC's**

- Standing tall, abs tight/back tight
- Shoulder blade backs and down
- Arm at 90 degree of flexion
- Press ball into wall and write the alphabet (upper/lower case)