



Keeping the
Throwing Athlete
in the Game

**Research on throwing injuries, common
injuries, & preventative approaches**

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What is the parent's main concern?



Prevalence of Sport-Related Injuries

- 1/3 of all childhood injuries are sports-related (Brenner, 2006)
- In the US, 775,000 children are treated in the emergency room for sports-related injuries (Lucile Packard Children's Hospital, 2007)
- Over 50% of the 15-18 million youth injuries annually are due to overuse injuries (AAP, 2001)

Baseball Injuries

- There was a 4-fold increase in collegiate pitchers & 6-fold increase in high school pitchers when comparing elbow injuries requiring surgery from 1994-1999 and 2000-2004 (ASMI, 2006)
- The most commonly reported injuries in pitchers were shoulder pain (32%) and elbow pain (25.5%) (JPERD, 2002)
- “Tommy John Surgery”
 - Before 1997, only 12% were teenagers
 - In 2005 alone, teenagers accounted for 1/3 (Doyle, 2008)

Softball Injuries

- Overuse injuries accounted for 70% of reported injuries in softball pitchers were due to overuse,
 - Most being the shoulder and low back (Marshall, 2007)
- 50% of 1989 College World Series Softball Pitchers reported time lost due to overuse injuries (Werner, 2005)
- Barrentine, et al reported that over 50% of injuries to softball pitchers affect the shoulder & elbow joints (Flyger, 2006)

Is softball pitching as stressful as baseball?

- Common **misconception** is that the windmill motion puts less stress on the arm than baseball pitching
- Werner, et al reported that the stresses occurring in softball pitching are comparable to those in baseball
- Average pitches per 3 days (Werner, 2005)
 - Baseball - approximately 100-150 pitches
 - Softball – approximately 1200-1500 pitches
- Regardless difference, they still create an **OVERUSE** problem

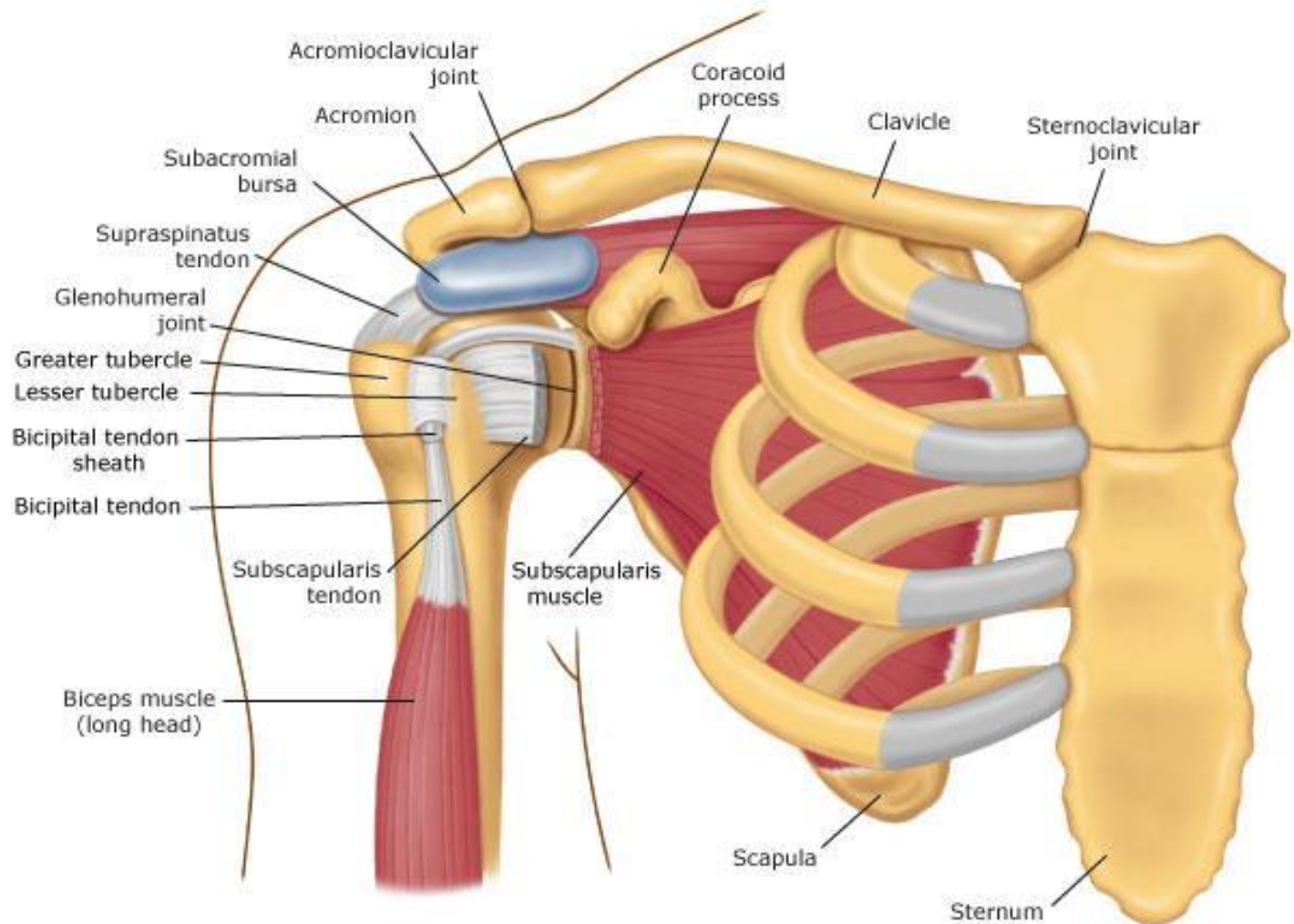
Throwing Athlete Injuries

- Problems in the shoulder normally affect the rotator cuff, labrum, & capsule
- Initially athlete reports
 - Reduced velocity & control
 - “Long warm-up time” with shoulder tightness
 - Pain in the back of the shoulder during late cocking/acceleration phase
 - Continued tight posterior capsule leads to anterior capsule laxity

Shoulder Impingement Syndrome

- “Shoulder impingement involves a mechanical compression of the supraspinatus tendon, the subacromial bursa, and the long head of the biceps tendon under the coracoacromial arch” (Arnheim & Prentice, 1997, p. 571)
- Symptoms include
 - diffuse pain around acromion
 - point tenderness over subacromial space
 - overhead activities increase pain
 - external rotators weaker than internal rotators
 - tightness in posterior and inferior joint capsules

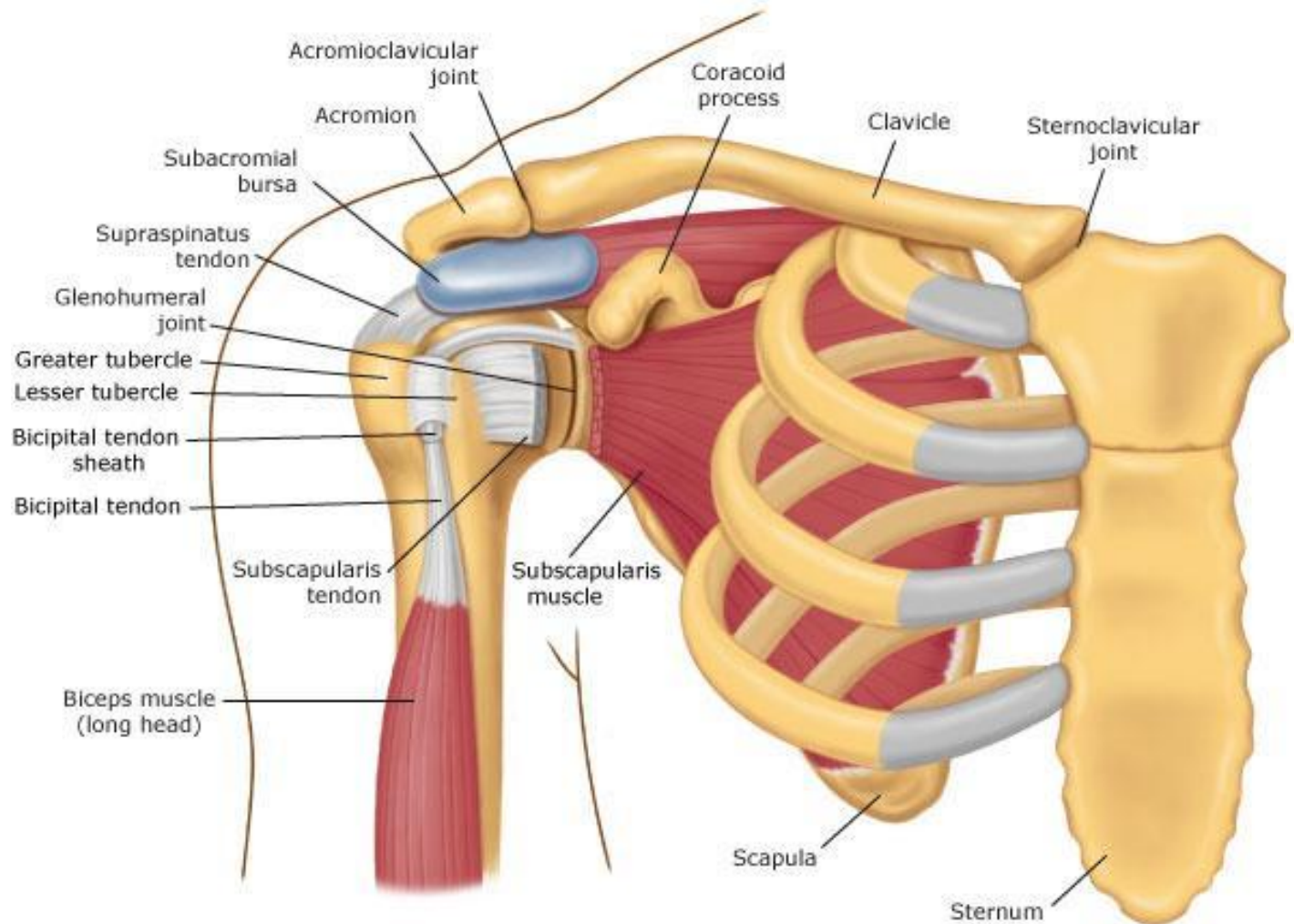
Shoulder Anatomy



Biceps Tendonitis/Tenosynovitis

- Repeated stretching of the long head of the biceps tendon causing an irritation of the tendon and/or the synovial sheath as it passes under the transverse humeral ligament in the bicipital groove (Arnheim & Prentice, 1997)
- Symptoms include
 - point tenderness over bicipital groove
 - inflammation, crepitus, and pain in overhead activities

Shoulder Anatomy



Thoracic Outlet Syndrome

- Compression or traction (stretch) of brachial plexus, subclavian artery, and subclavian vein (neurovascular bundle)
- Symptoms include
 - numbness, tingling, pain, or cold sensation
 - impaired circulation in fingers
 - muscle weakness and muscle atrophy

Other Shoulder Injuries

- Frozen shoulder (adhesive capsulitis)
- SLAP tear
- Peripheral nerve injuries
- Shoulder bursitis
- Biceps brachii rupture
- Chronic instabilities that may cause shoulder subluxation or dislocation

Ulnar Collateral Ligament Sprain

- Hyperextension or valgus forces to the medial collateral complex
 - anterior oblique bundle
 - posterior oblique bundle
 - transverse band
- Symptoms include
 - severe pain
 - inability to throw or grasp the ball
 - inflammation, point tenderness over UCL
 - may coincide with or be a flexor mass muscle strain

Lateral Epicondylitis (Tennis Elbow)

- Hyperpronation resulting in repetitive microtrauma to the extensor muscle inserting onto the lateral epicondyle
- Symptoms include
 - aching pain
 - point tenderness over the lateral epicondyle
 - decreased flexibility
 - decreased strength in wrist & hand

Other Elbow Injuries

- Flexor mass strain
- Medial epicondylitis (Pitcher's/Golfer's Elbow)
- Posterior impingement
- “Little League Elbow”
- Elbow neuritis

Adolescent Throwers

- Results of study of pitchers ages 9-14 (Lyman et al., 2002)
 - 52% increased risk of shoulder injury with curveball
 - 86% increased risk of elbow injury with slider
 - 29% increased risk of shoulder pain with change-up
 - Also, reported poor mechanics as contributor

High School/Collegiate Throwers

- Results of study of pitchers ages 14-20 (Andrews et al., 2002)
 - 5 times higher risk for surgery in players who played 8 months per year
 - Factors that increased risk for injury
 - # of pitches
 - Velocity
 - Player size
 - Participating in showcases

Key Risk Factors for Injury - Dr. James Andrews

1. Year-round baseball
2. Seasonal overuse (playing multiple positions)
3. Radar gun
4. Throwing breaking balls at an early age
5. Poor mechanics
6. Participating in showcases

The Real Take Home Message

“Kid who has an injury to a major joint has a 5-fold increased risk for the development of degenerative arthritis in that joint regardless of how well we can treat it today” (Andrews, 2005)

“Injuries that occur to the cartilage growth plates can cause damage in these young people that can affect the future health of their joints” (Cain, 2008)

“The idea is to prevent overuse” (Andrews, 2005)

Recommendations for Pitchers

- Avoid pitching with arm fatigue
- Avoid pitching with arm pain
- Avoid pitching
 - > 80 pitches/game
 - > 8 months/year
 - > 2500 pitches in competition/year
- Minimum of 3 months off from overhead sports

(Andrews et al, 2002)

Monitoring the Pitcher

- Regularly using anti-inflammatory medicine and ice to “prevent”, does not say anything about “developing” injury
- Starting pitchers. Increased # of pitches.
- Velocity > 85 mph
- Heavy and/or tall pitchers
- Warming up excessively
- Participating in showcases
- Cutting off pitches & showing no extension

Mechanics of Throwing – 5 Identifiers

1. Hand on top of the ball
2. Front shoulder points to target
3. Same arm angle after every throw
4. Good balance
5. Lack of follow-through (trunk flexion)

***Use video camera to identify problems during warm-up and after fatigued

Other Contributing Factors to Injury

- Lack of strength
- Lack of flexibility
- 6-year study found that baseball players lost an average of 9 degrees of total arc of motion & 6 degrees of internal rotation with around 70% reporting shoulder problems (Harrison, 2007)

Treatment Of Injuries

- RICE – rest time can vary (symptoms subside, how many episodes, injury history, etc.)
- ROM – improving internal rotation deficit and a stretching program focusing on internal rotation
- Strength – rotator cuff, trapezius, rhomboids serratus anterior, latissimus dorsi, etc. (whole kinetic chain)
 - *Core Screening Tip – Single-leg squat
- Progression into sport-specific exercises and then competition

What Can I Do Now?

- Parents/Coaches
 - Take a supportive interest in the athlete and note any changes in behavior
 - Monitor amount of throwing
 - Get them started on a program that includes: stretching, strengthening, core control, and throwing mechanics (video analysis)
- Consult a medical professional about any injury concerns
- Participate in occasional screenings to help prevent overuse injuries

OVERUSE INJURIES CAN BE PREVENTED!

Thank you



Together, we can make a difference!

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