

Overview on Overuse Injuries in Baseball

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- Discuss factors that influence overuse injuries in baseball
 - Focused on upper extremity
- Review common overuse injuries
 - Presentation & evaluation
 - Treatment

About Me

- College and Med School – Chicago
- Pediatric residency – Milwaukee
- Primary care sports medicine fellowship – Akron
- Children's Hospital of Wisconsin
 - Only pediatric & adolescent patients



Starts With Youth Sports

- Estimated 5 million + participants in organized youth baseball organizations annually
 - Many kids participate on multiple teams
- Multiple studies find about half of all pediatric sports medicine visits are due to overuse injuries
- Push for earlier involvement with sport and training – bone and muscle strengthening
 - Don't have a clear “best age” to begin structured conditioning activities
 - Growing bones cannot handle as much stress as mature bones of adults

Decline of “Free Play” to Blame?

- Free play is self-regulated
 - Enjoyment, physical level of tolerance
 - Poor conditioning plays a primary role in sports injury
- Organized sport is “adult regulated”
 - Unreasonable training/competition schedules
 - Train in long practice sessions
 - Compete in tournament events (often across multiple days)
 - Inadequate rest, nutrition, hydration between bouts

Long Term Consequences of Injury

- Decreased sports participation in later life
- Loss of function
- Chronic pain
 - Lohmander et al 2007, 50% of ACL & meniscus patients report OA w/ pain and impairment 10-20 years later
 - Not great studies on pediatric/adolescent population that follow through to adulthood



Injury Surveillance

- Pediatric data is sparse
 - High School RIO
 - NEISS – based on ER visits
- 2008 USA baseball report
 - Injury risk: P, C, fielder > runner & batter
 - As age increases
 - Decreased fielder risk
 - Increased C and P risk
 - P most likely non contact (vs hit by ball)

- Overuse (p4)
 - P>>>C>left side of field
 - Location
 - Shoulder #1 50%
 - Elbow #2 33%
 - Back #3 5.5%
- Identification is difficult
 - Bone v muscle
- 1/3 in preseason
- 13-17% recurrent (shoulder & elbow)
- >8.5% needed surgery





- Repetitive microtrauma from chronic submaximal loading of tendons, muscles, and bones
 - Beyond the level required for fitness and conditioning gains
 - Without adequate rest for positive adaptation
- Stress of exercise causes remodeling of tissue
 - Breakdown followed by rebuilding
 - Too much breakdown

Kids Are NOT Just Little Adults

- Pediatric & adolescent overuse is more likely to affect bone
 - Especially during times of growth
- REMEMBER
 - Puberty and skeletal maturity are a better marker of maturity than chronologic age



Extrinsic Factors

- Training errors*
 - Excessive intensity, duration
 - Seasons are too long
 - Inflated competition demands
 - Inadequate rest
- Over scheduling
- Improper training of technique
- Equipment & surface
- Early specialization



Intrinsic Factors



- Inadequate skill level
 - Poor mechanics
- Muscular imbalances
 - Strength & flexibility
- May not recognize signs of injury
- May not correlate fatigue and poor performance with injury
- Incomplete rehab of prior injury

Recovery Time

- Multifactorial – time needed for adequate recovery
 - Duration
 - Intensity
 - Environmental conditions
 - Nutrition status (hydration, carbohydrate, etc)
 - Psychosocial factors
- Why adequate recovery time doesn't happen
 - Increasing competition/training
 - Playing time opportunities
 - Use of sports facilities

Overuse Injuries of Arm



- Large number of throws/pitches
 - Maximal effort
- Insufficient rest
- Poor mechanics
- Poor muscular fitness
- Throwing with pain or fatigue

Presentation

- Patients often present after weeks of symptomatic activity
 - Increase with exercise, decrease with rest
 - When performance is affected
 - When discomfort happens in daily life
- The earlier these problems are caught, the easier they are to treat



INJURIES

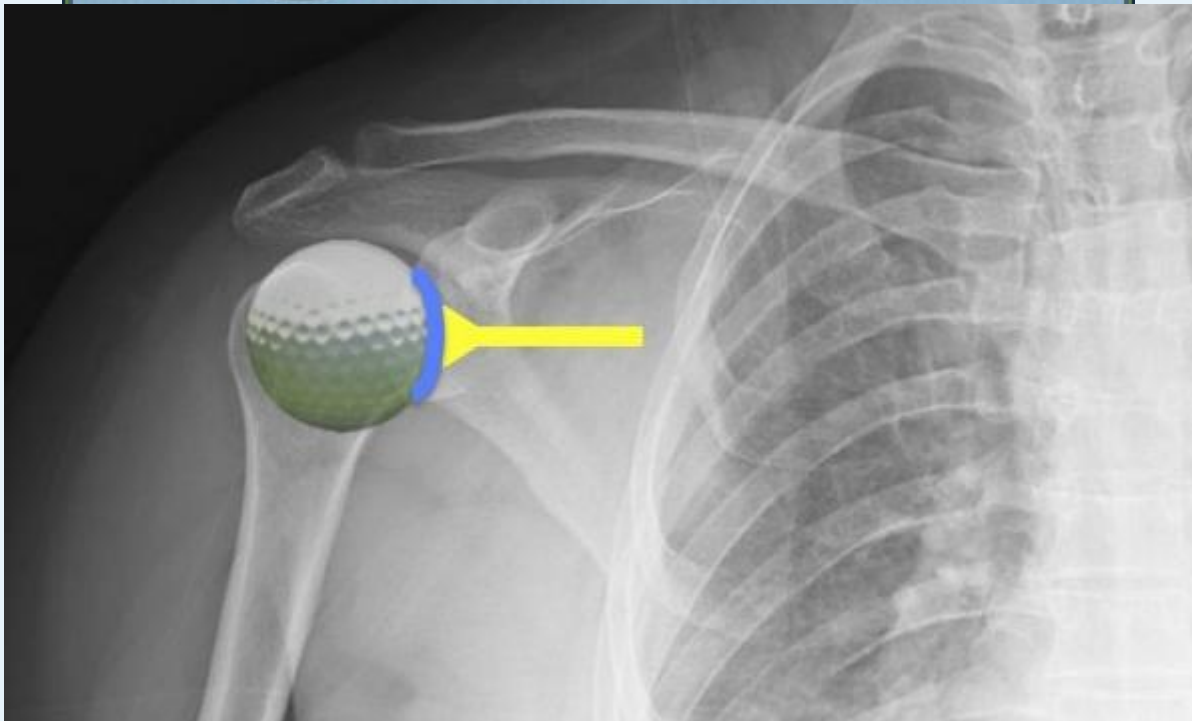
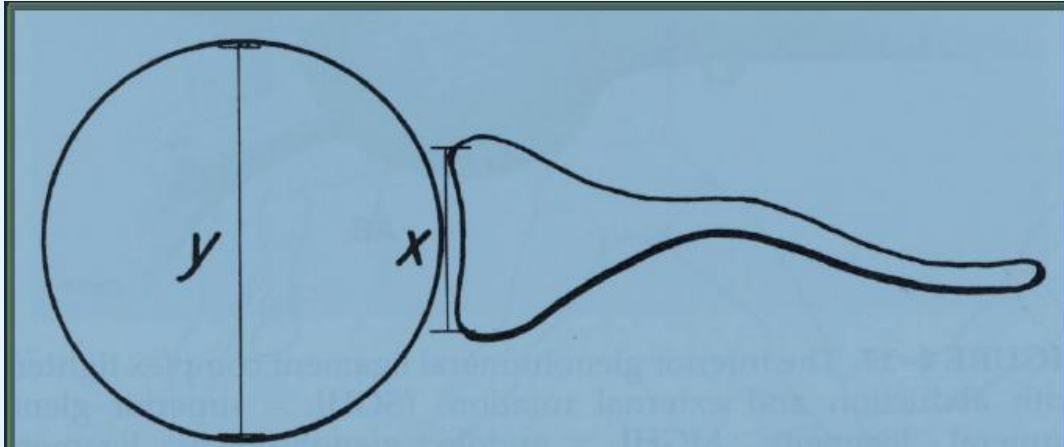
Apophysis

**Growth
Plate**



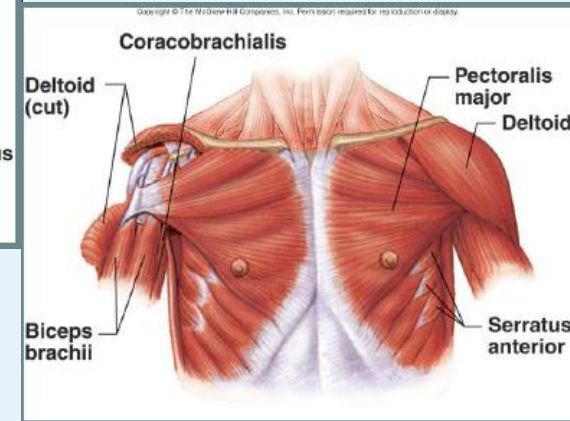
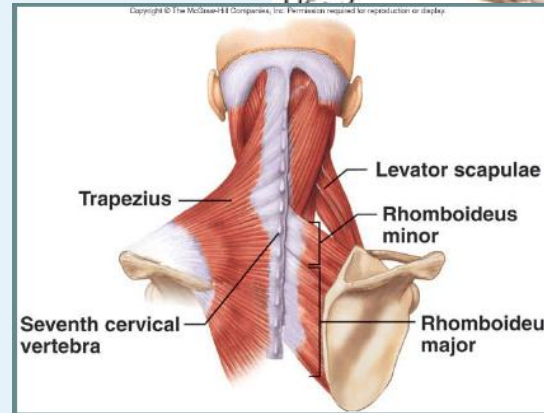
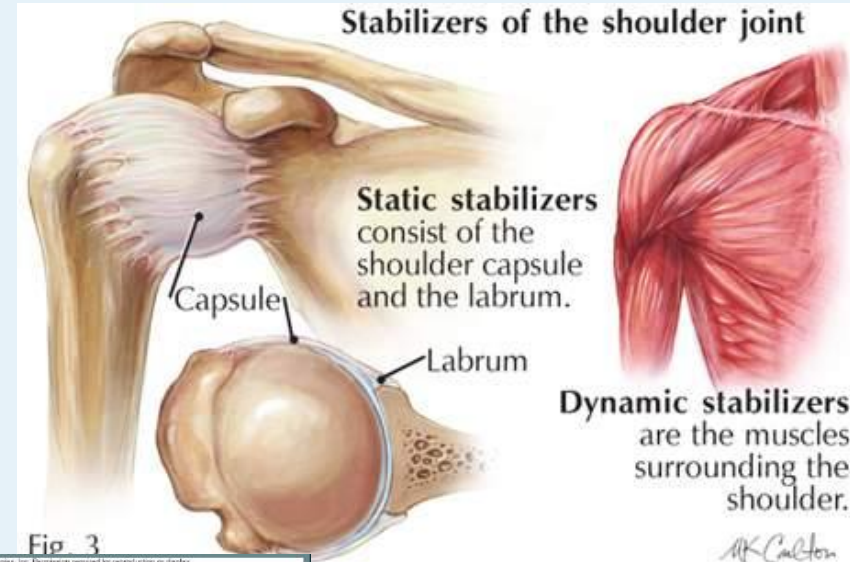
Apophysis





Shoulder Stabilizers

- Static stabilizers
 - Ligaments
 - Labrum
- Dynamic stabilizers
 - Rotator cuff
 - Scapular stabilizers
 - Trapezius
 - Rhomboids
 - Serratus anterior
- (Don't forget about lower extremity and core strength)



Fatigue Increases Risk

- Continuing to throw with muscular fatigue decreases stability of shoulder
 - Alters mechanics & increases pressure on elbow and shoulder
 - Risks injury to ligaments, muscle/tendon, labrum & bones
 - Rotator cuff tendonitis
 - Biceps tendonitis



Shoulder Instability



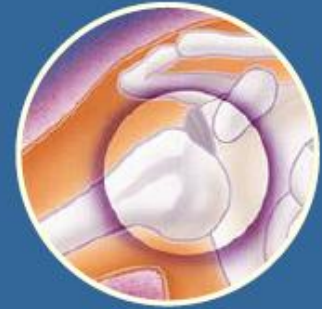
Laxity

Generalized joint
“looseness”



Subluxation

Symptomatic partial
loss of joint articulation



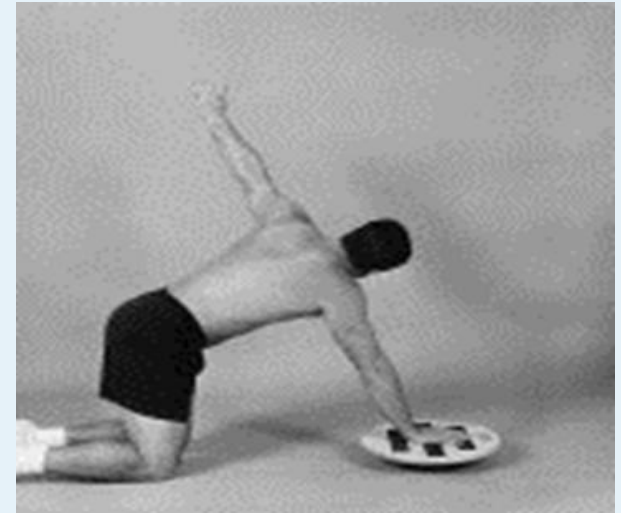
Dislocation

Complete loss of joint
articulation



Treatment of MDI/RCT

- Pain control
- Activity modification
- Rehab!
 - Improve strength of RC and Scap Stabilizers
 - Improve core strength
 - Improve proprioception
 - Gradual throwing program



Proximal Humeral Epiphysiolysis

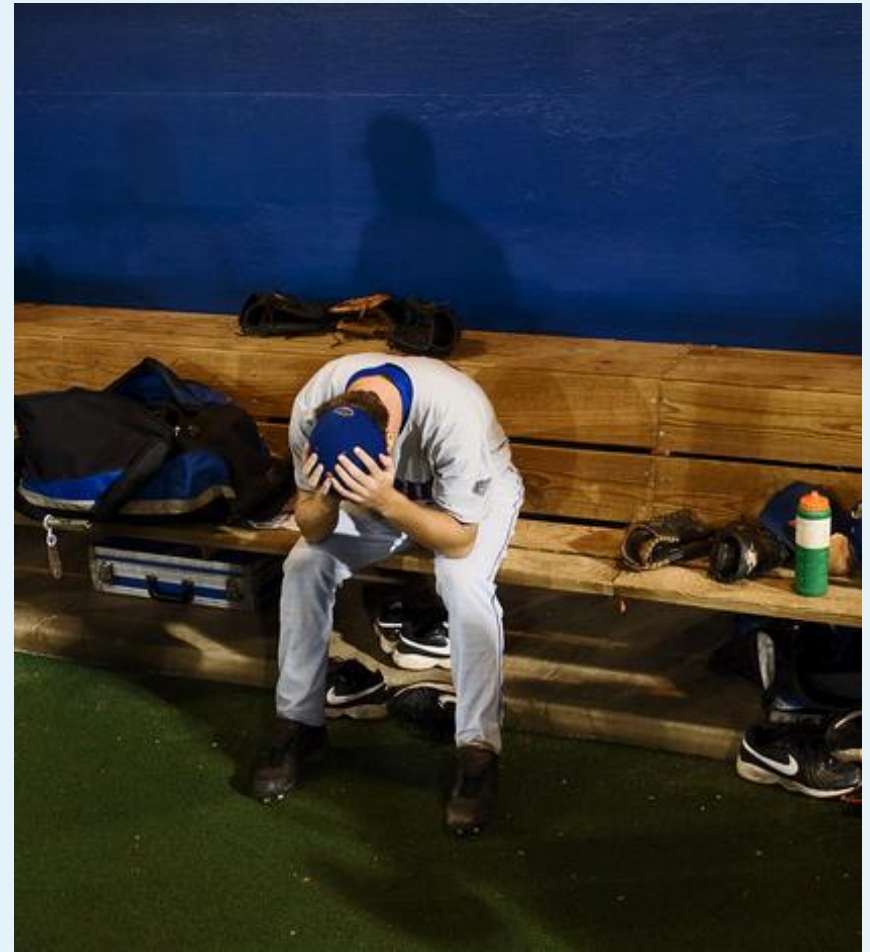
- Little Leaguer's Shoulder
 - 9-16 y.o.
 - Humerus growth plate injury
 - Stress/force begins to separate the growth plate
 - Potential to create growth deformity / arrest
- Gradual onset of shoulder pain in thrower
 - 7-8 months prior to dx
- Worse with throwing & better with rest



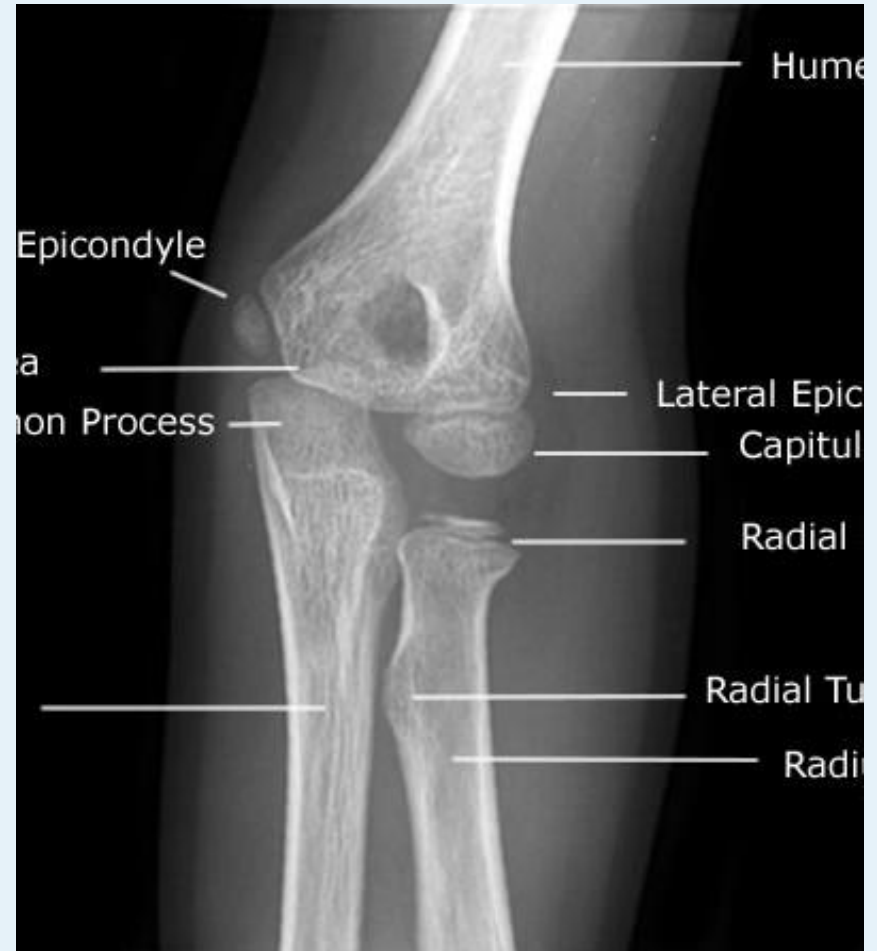
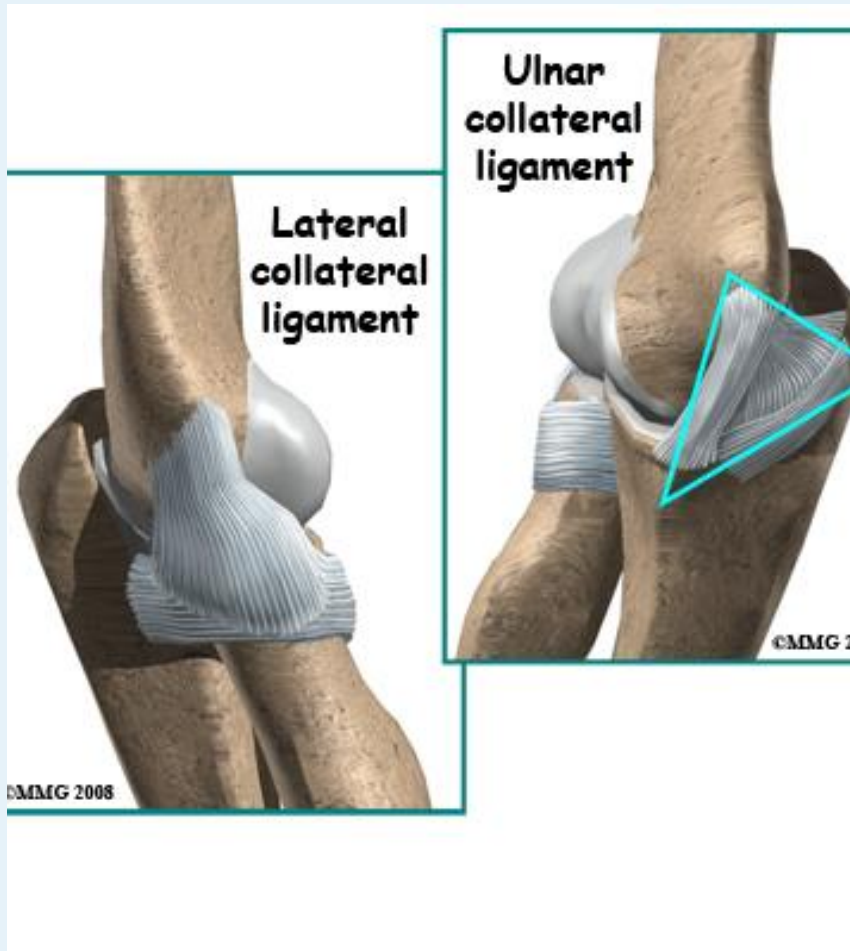


LLS Treatment

- Pain control
- Rest
 - 3-6 weeks
 - Potential return to batting or 1B earlier
- Rehab!
 - Same principles

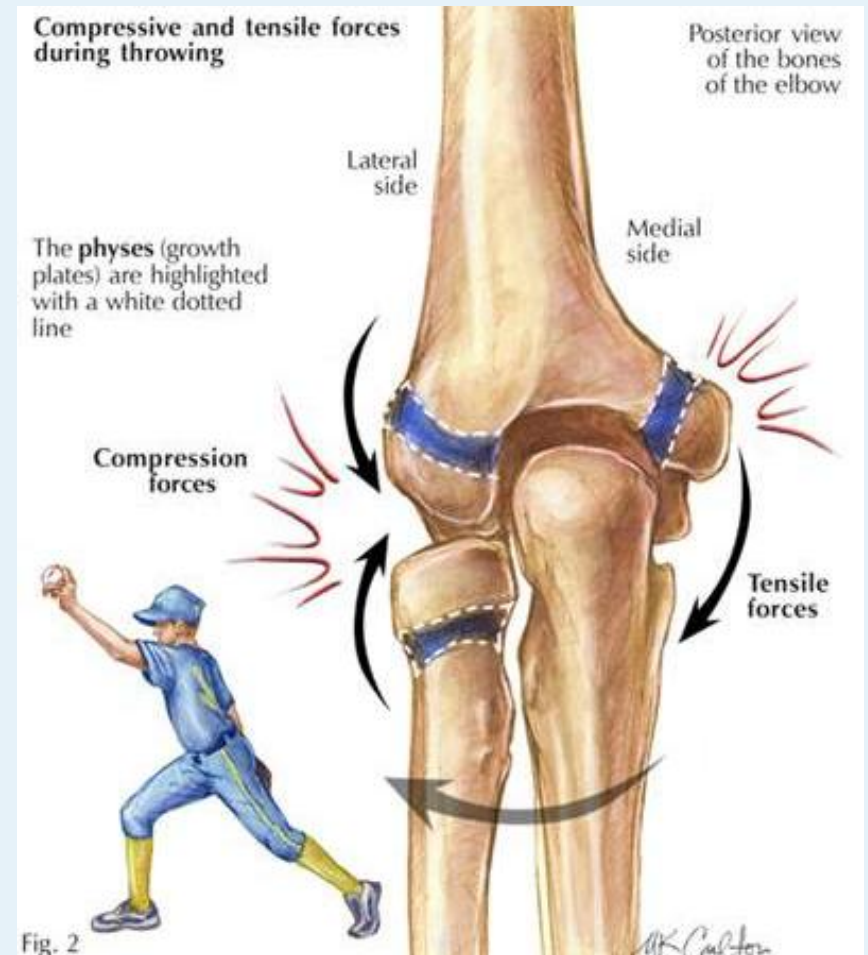


Anatomy

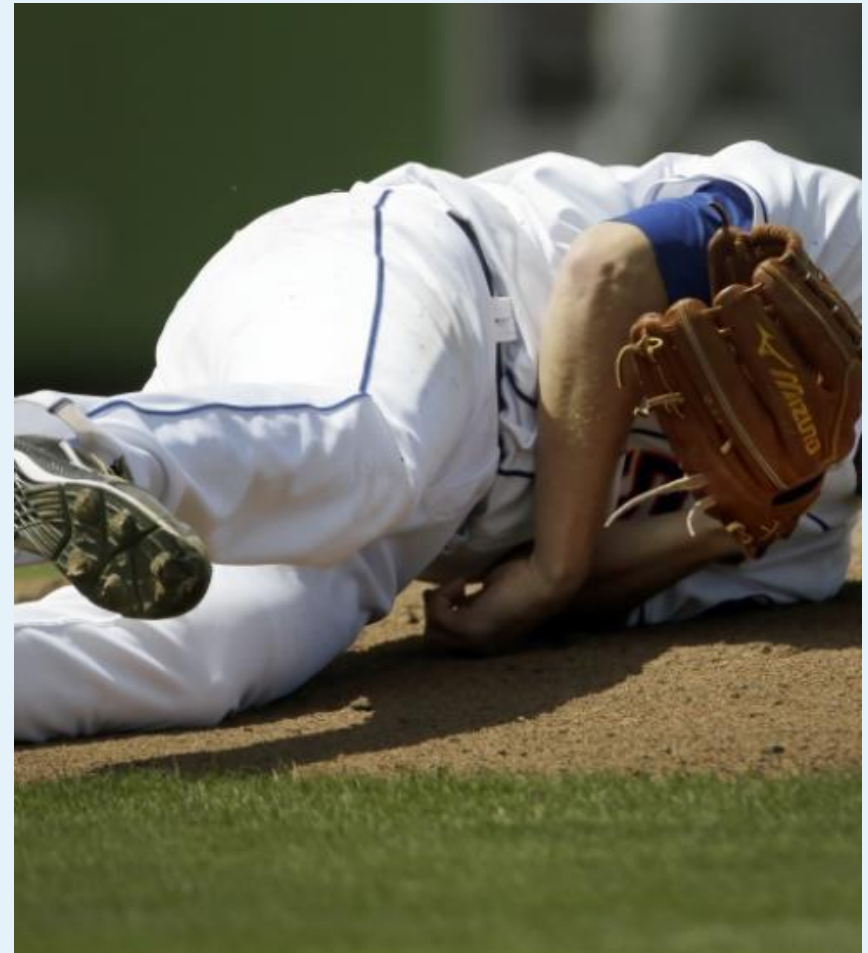


Little Leaguer's Elbow

- Term used for a variety of diagnoses
 - Medial humeral epicondyle apophysitis
 - Medial humeral epicondyle avulsion fracture
 - Osteochondritis dissecans of the capitellum
 - Olecranon apophysitis



- 8-15 y.o.
- Medial elbow pain
 - Worse with throwing,
better with rest
- Most common during
times of growth
- No UCL pathology



Apophysitis Treatment



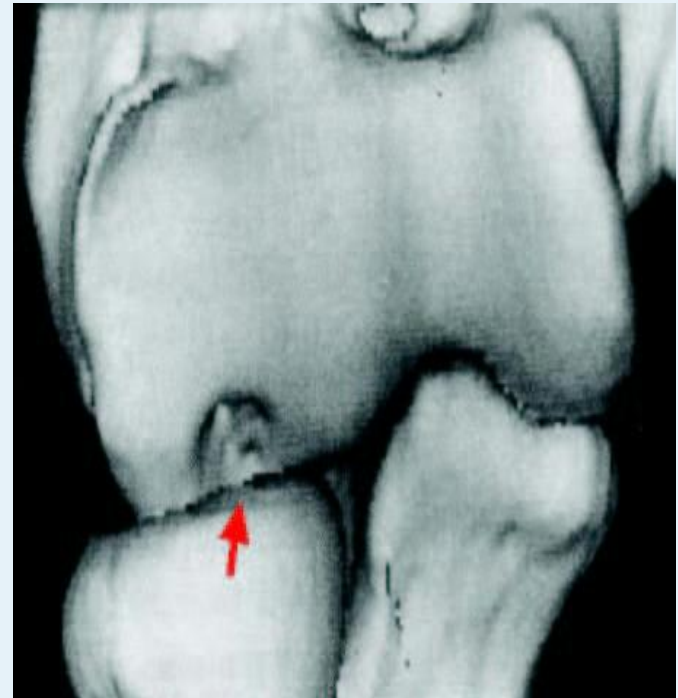
- X-rays can be normal
- Pain control
- Rest
 - 2-4 weeks
 - Batting?
 - Return to 1B sooner?
- Rehab!
 - Same principles

Little League Elbow

AVULSION FRACTURE

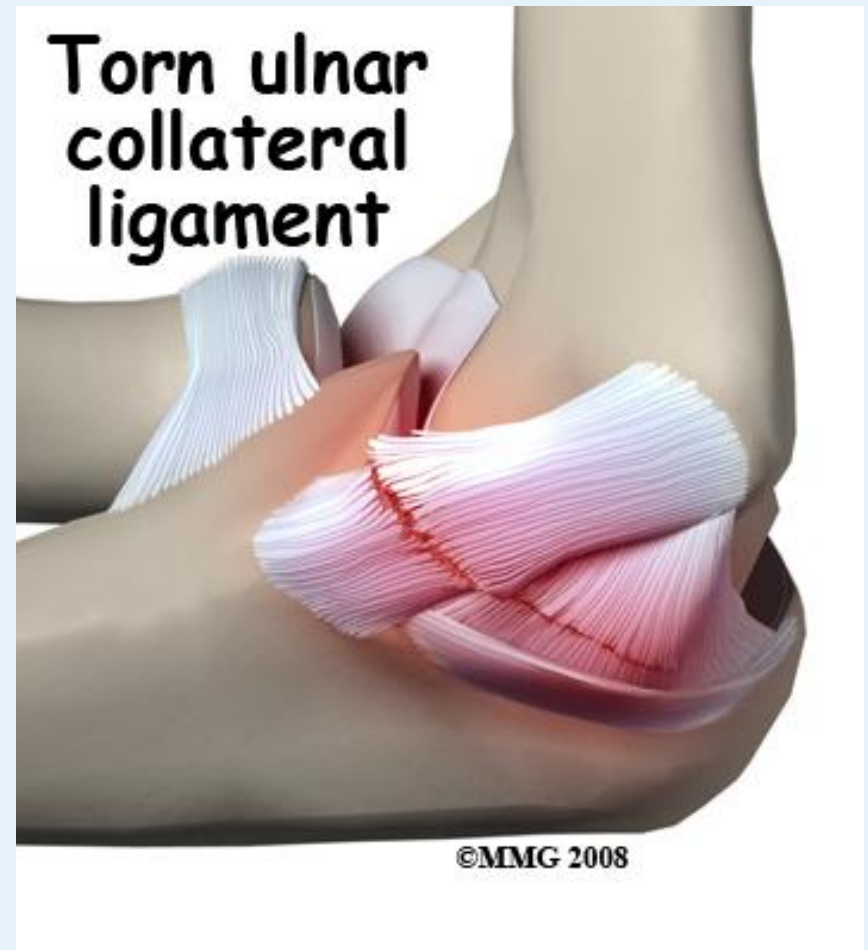


OSTEOCHONDRITIS
DISSECANS OF
CAPITELLUM



Ulnar Collateral Ligament Tears

- Acute
- Chronic
 - Repetitive use / overload
- Medial elbow pain
- Loose on exam
- MRI – arthrogram
- Surgical if dominant arm
 - Recovery over a year



UCL Injuries

- Non-surgical take months to recover
- Families think this is routine
 - That kids return just as well as MLB players
- Bionic arm
- 09-25-1974 (first ulnar collateral ligament reconstruction)



Lower Body Overuse

- Stress fracture
- Anterior knee pain
 - Patellofemoral Pain Syndrome
 - Osgood-Schlatter Disease
 - Patellar tendonitis
- Why?
 - Overuse
 - Poor flexibility
 - Poor hip strength
- Treat
 - Relative rest – no push through pain or limping
 - Pain control
 - Rehab!
- Stress fractures require rest and often immobilization prior to rehab

Is This a Problem?

- Yes!
- More injuries
 - Younger
 - Earlier
 - More frequent
- More injuries despite “pitch count era”
 - Velocity increase



AAP Possible Prevention Strategies

- Consideration given to pitch counts.
- Pitchers should develop proper mechanics as early as possible and include more year-round physical conditioning as their body develops. Master command & control. Work velocity and breaking pitchers after skeletal maturity.
- A pitcher should be prohibited from returning to the mound in a game once he/she has been removed as the pitcher.
- Baseball players – especially pitchers - are discouraged from participating in showcases due to the risk of injury. The importance of “showcases” should be de-emphasized, and at the least, pitchers should be permitted time to appropriately prepare.
- Baseball pitchers are discouraged from pitching for more than one team in a given season.
- Never play pitcher and catcher in the same season.
- Never throw with arm pain or fatigue.

Thank you! Questions?

