

Pediatric Orthopedic Sports Injuries: 2018 update

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Disclosure

Paid Speaker for DJO Surgical

Pediatric Sports Medicine



- Estimated that over 30-45 million children ages 6-18 participate in athletics annually
- Nearly ¾ of US households have at least one child that participates in organized sports
- Sports participation is more accessible with increased variety
 - Increasing sports specialization
 - More year round and concurrent sports
- Drive for success, college scholarships, going professional
 - NCAA stats demonstrate that less than 0.5-1.6% of high school athletes will earn partial scholarships to D1 schools
 - 1% of college athletes go professional

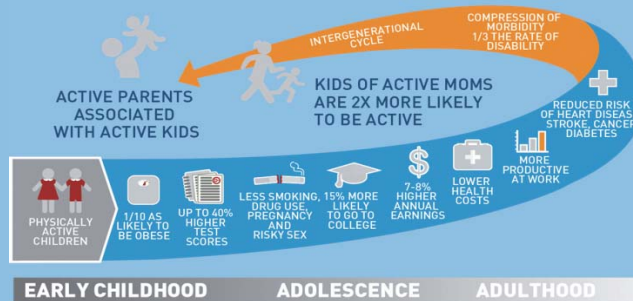
Pediatric Sports Medicine

- Over 1/2 of children under age 14 who seek medical care for injuries are due to overuse injuries
 - Most common injuries
 - sprains, strains, bone or growth plate injuries, repetitive motion and overuse injuries, heat related illness
 - 62% of injuries occur during practice
- Over 1 in 10 will have an emergency room visit for a sports related injury



BENEFITS OF SPORTS PARTICIPATION

ACTIVE KIDS DO BETTER IN LIFE
WHAT THE RESEARCH SHOWS ON THE COMPOUNDING BENEFITS



Degree of Specialization	Risk of Injury	Risk of Serious Overuse Injury	Risk of Acute Injury
Low specialization (0 or 1 of the following): Year-round training (>8 months per year) Chooses a single main sport Quit all sports to focus on 1 sport	Low	Low	Moderate
Moderately specialization (2 of the following): Year-round training (>8 months per year) Chooses a single main sport Quit all sports to focus on 1 sport	Moderate	Moderate	Low
Highly specialization (3/3 of the following): Year-round training (>8 months per year) Chooses a single main sport Quit all sports to focus on 1 sport	High	High	Low

SPECIALIZATION IS COSTLY

- **Privately insured** young athletes are **twice** as likely as publicly-insured athletes to be highly specialized in one sports
- Rate of serious overuse injuries in athletes who come from families that can afford **private insurance** is **68 percent higher** than the rate in lower-income athletes who are on **public insurance** (Medicaid).
- research presented in April 2014 by Loyola University at International Olympic Committee World Conference on Prevention of Injury and Illness in Sport

SPECIALIZATION SUPPORTED BY MYTHS NOT FACTS

Parents / Coaches think it will help their kids: **Have fun**

- #1 reason why kids say they play sports (Michigan State survey 1989)
- Yet 21% of kids "pressured to play" with an injury at least once (Minnesota Amateur Sports Comm 1993)
- athletic role can become so consuming and controlling that their childhood essentially disappears (Malina, 2010; Mostafavifar 2013).

Have a lot of friends

- Specialized athletes end up socially isolated from her family, peers, other community. (Weirsmas, 2000).

Stay active / healthy

- AAP recommends 60 minutes of moderate- and vigorous physical activity
 - But NOT getting solely from participating in organized youth sports (Leek 2010)
- children who spend more time in free, unstructured play suffer significantly fewer overuse injuries per research at Loyola University
- specialization reduces the chance that children will stay active as adults (Difiori 2014)

Lower Extremity Injuries

Hip



This is a 13 year old male who playing basketball was sprinting and felt a pop in his hip. Was unable to continue to play the game and had trouble weight bearing.

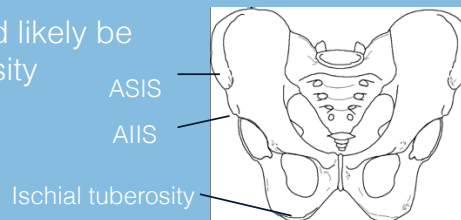
Where was the pop?

The front would likely be some apophyseal avulsion

- ASIS
- AIIS

The back would likely be

- Ischial tuberosity

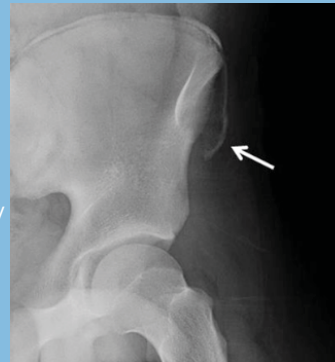


These apophyses can be pulled by excessive muscle contraction during sport activity.

Treatment

The lesion will heal spontaneously, only symptomatic treatment is needed.

- Rest and decrease activity.
- NSAIDs
- Return to sports when patient has no pain (indicating healing of the avulsion fracture).

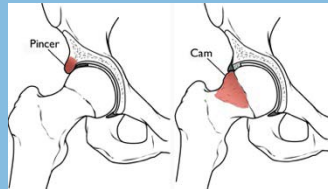


Femoroacetabular Impingement

A Cause for Osteoarthritis of the Hip

Reinhold Ganz, MD*; Javad Parvizi, MD**; Martin Beck, MD*;
Michael Leunig, MD*; Hubert Nörzli, MD*; and Klaus A. Siebenrock, MD*

- 67, asymptomatic, collegiate male football players
- 95% of the 134 hips had a sign of CAM or Pincer
 - 77% had more than one sign
- 50% all hips had at least one sign of CAM and Pincer



FAI

- Why do we talk about the labrum so much?
 - The first recognized pathologic consequence to deformity
 - Multiple biomechanical functions
 - Injury to labrum now recognized as a marker of significant underlying pathology



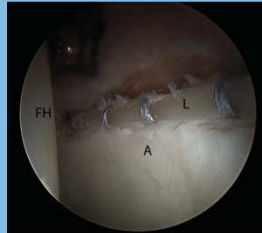
Hip Pain: Patient Assessment

- Prevalence of FAI 10-15%**
Anterior hip pain (C-sign)
Pain:
 Protracted sitting
 With ambulation
 & catching arising from seat
Difficulty:
 In and out of car
 on/off shoes and socks



FAI Treatment

- Physical therapy for Gluteus Medius Weakness and core strengthening
- NSAIDs, Rest
- Injections
- Last resort Arthroscopic treatment (typically out of season)



- 16 yo adolescent female presents after falling directly onto her left knee while playing tennis.
- Felt a Pop
- Swelling about knee and bruising over the patella
- Sense of instability, no popping, no locking/catching
- Could not finish Match



- Knee is the most commonly affected joint in sports injuries.
- Injury to the knee in skeletally immature children can lead to injury to the physis.
- Simple X-ray can rule out major injuries to the physis in a patient who can not weight bear.





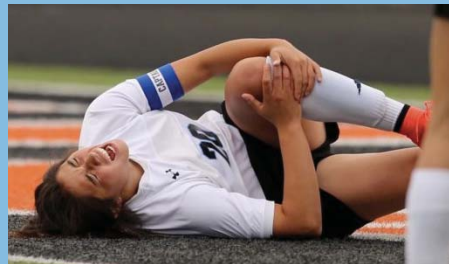
Five causes of traumatic knee effusion:

1. Occult fracture
2. Patella dislocation
3. Cruciate ligament injury (ACL/PCL)
4. Collateral ligament injury (MCL/LCL)
5. Meniscus injury

Evaluation of the knee after sport injury:

Initial Assessment:

- Thorough history of present illness.
- Attempt to establish exact mechanism of injury if possible
- Ability to continue playing and/or weight bearing after injury.



Physical Exam

- Inspect the knee
 - Note Effusion or swelling
 - Alignment
- Palpate joint and physis for tenderness
- Assess Range of motion
- Test ligaments



Imaging

- Xray
- 4 Views



MRI

- Typically helpful if concerns for soft tissue pathology, occult fracture or ligamentous instability



Patellar instability

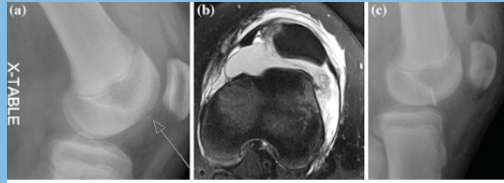
- Spectrum of disease characterized by static and dynamic malalignment of the patella; range from acute instability due to trauma to chronic subluxation.
- Occurs more commonly in female athletes.



Presentation

- Acute:
 - Most cases auto reduce or done on field
 - Rapid effusion and inability to bear weight
- Recurrent instability:
 - Anterior knee pain and feeling of giving way or knee “dislocating”
 - Exam significant for patellar apprehension and tenderness along the medial patella





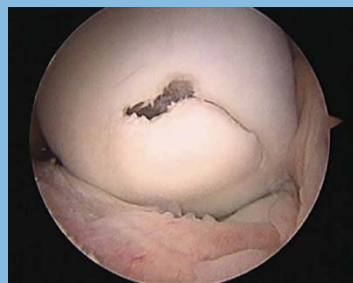
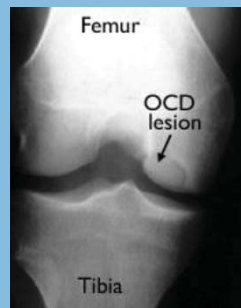
Imaging

- AP, Lateral and sunrise X-rays to rule out fracture and show patella in groove
- MRI helps to see chondral injuries or disruption to MPFL

Treatment

- Acute:
 - Reduce Patella with gentle extension and medial force
 - Immobilize in extension with knee immobilizer.
 - RICE
 - NSAID's
 - Weight bearing as tolerated
 - PT for strengthening
 - Possible surgery
- Recurrent
- Surgery

Osteochondritis Dissecans



Presentation

- Typically occurs in adolescence, most commonly around the lateral aspect of the medial femoral condyle
- bilateral in 20%
- Mild activity related effusion, focal tenderness over bone
- can lose ROM if loose fragment



Imaging

- X-ray can show lesion
- MRI helps with characterizing the lesion



Management

- Depends on Stage of lesion and skeletal maturity
- Immature patients with intact lesions
 - Rest, activity modifications, weight bearing restrictions, NSAIDS
- More severe lesions require orthopedic evaluation for possible fixation



ACL Tear

Most common ligamentous knee injury; in US alone 250,000 a year

- Increasing incidence in adolescent population due to increased sports participation at a younger age.
- More common in Females (multiple reasons)
- More common in cutting movement sports
- Often non contact injury
- May have associated injuries within the knee



Clinical Presentation

- Recent trauma or twisting
- Child will describe injury followed by "Pop" and immediate swelling
- Positive Lachman and drawer testing



Imaging

- Xrays to rule out fracture
- MRI
 - Diagnostic
 - Also assess integrity of menisci, collateral ligaments and chondral surfaces.

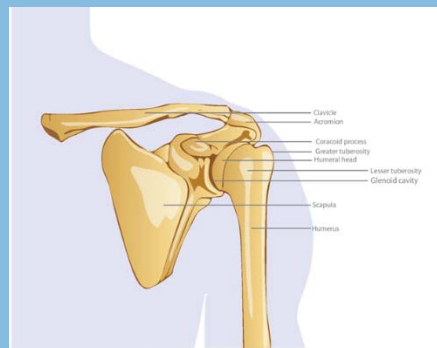


Management

- Rest, Ice, NSAIDs,
- Physical Therapy
 - many loose motion and need to get back before surgery
- Early referral to surgeon for possible options

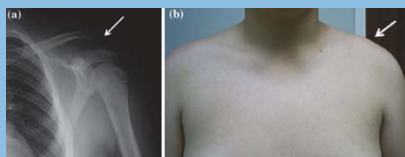


Upper Extremity Injuries



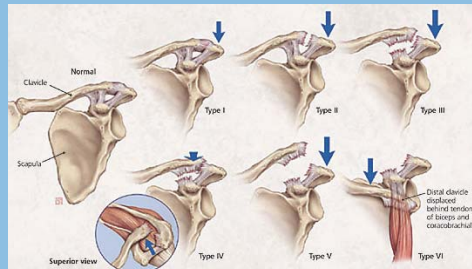
13 year old Male who fell onto shoulder during football practice. Pain and feels like arm is dead.





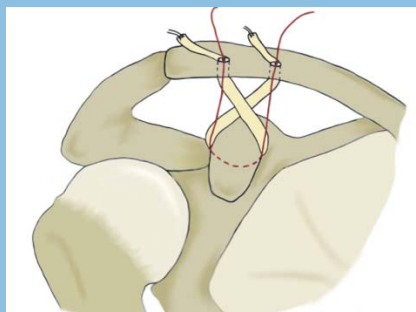
AC separation

• Grades



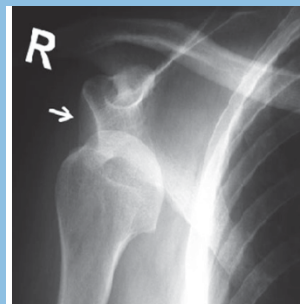
Management

- If no bump
 - treat conservative
- If there is a bump
 - refer due to the controversial treatment that is constantly changing



Instability

- Traumatic Instability
 - Shoulder is the most mobile joints in the body, but comes at the expense of stability.
 - Greater than 90% of cases are anterior
- Exam
 - Obvious deformity with the child holding the arm in splinted position, with inability to move.
 - Assess for axillary nerve-sensation over lateral shoulder



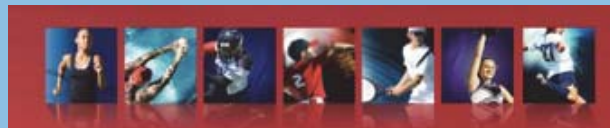
Treatment

- Reduce and immobilize for 2 weeks and then start motion and physical therapy if in season.
- Return to play guidelines are that the athlete must regain full range of motion and strength.
- May need brace
- Out of season or end of season or recurrent
- Referral for surgical treatment



The *Lasting* Problem

- Overuse injuries account for half of all sports injuries in middle school and high school.
(Source: Safe Kids USA)



The *Lasting* Problem

70% of kids participating in sports drop out by the age of 13 because of:

- Adults
- Coaches
- Parents



*These children lose the benefits of exercise,
teamwork and healthy competition!*

What is Overuse?

- Overuse injuries = **Repetitive** strain to tissues
- “Too Much, Too Fast”
- In children, this rarely occurs in free-play activity, common in organized sports



Pediatric Athletes Are Unique!

- Skeleton is **immature**
 - Growth plates are open
 - “weak link”
- **Year-round** play at young ages
- **Skill levels** at greatest discrepancy



Overuse Injuries

The Pediatric athlete is UNIQUE:

- **Growth spurts** play a role

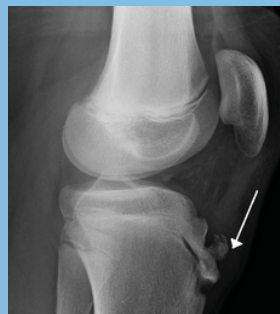
	<u>BOYS</u>	<u>GIRLS</u>
<u>Reach Puberty</u>	Later	Earlier (1-2 years sooner)
<u>Grow taller and heavier</u>	Later	Earlier (12-14 yo)
<u>Reach Adult Height</u>	18yo	16yo

- No joint in the body is more affected by overuse injuries that the knee



Osgood-Schlatter Disease

- Overuse injury to the attachment of the patellar tendon
- **The most common overuse injury of the knee**



Patellar Tendinitis

“Jumper’s Knee”

- Associated with:
 - **Repetitive jumping**
 - An increase in activity
- Occurs during a period of **growth** acceleration



- Inflammation of the patellar tendon
- **Tender** to the touch
- **Stiff** and limited flexion due to pain
- Generally **no swelling**
- Slightly older kids –
Growth plates closed



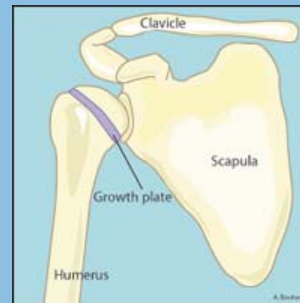
Shoulder Overuse

- Who is at risk?
- Throwing or overhead athletes (baseball, softball, swimming, volleyball, lacrosse, javelin)
- Age groups - middle school - at higher risk of growth plate injury



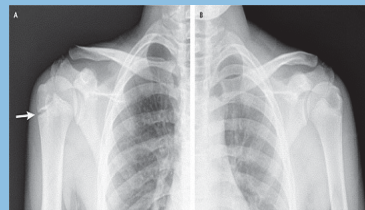
LITTLE LEAGUER'S SHOULDER DIAGNOSIS

- Proximal humeral epiphysitis
- Salter Harris type 1 physeal injury
- Occurs most commonly between 11 and 16 years old
- Most prominent symptom is lateral arm pain in the upper arm when throwing



LITTLE LEAGUER'S SHOULDER DIAGNOSIS

- Tenderness to palpation around the upper arm and some loss of flexibility
- X-rays are usually normal during the initial phase
- May progress to stress fracture of the proximal humeral growth plate
- Loss of range of motion and global muscle weakness



- Symptoms:
- Deep aching around shoulder muscles
- Persists to next workout
- Can't lift arm overhead
- Numbness or weakness down the arm

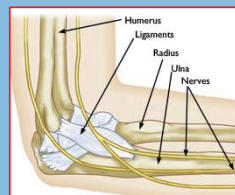


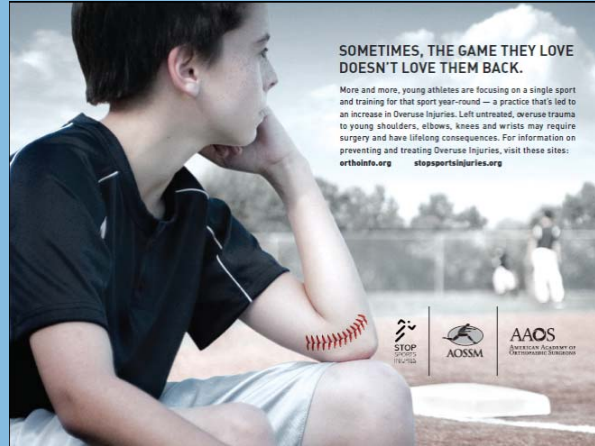
Elbow Injuries

- Why are we so concerned about elbow injuries?
- *Because elbow injuries are...*
 - **Common:** >50-75% of youth baseball players
 - **Increasing:** Elbow surgery has increased 50% in high school pitchers in the past 5 years.
 - **Preventable:** Fewer pitches = Longer Career
 - Only 4 Little League World Series pitchers have made it to the MLB
 - Why? Overuse injuries & Early burnout!

Common Elbow Conditions

- Ligament & Tendon Injuries
 - UCL (Ulnar Collateral Ligament)
 - Tommy John
 - Medial & Lateral Epicondylitis
- Bone & Growth Plate Injuries
 - Occur in Growing children
 - Medial Apophysitis
 - "Little Leaguer's Elbow"





SOMETIMES, THE GAME THEY LOVE DOESN'T LOVE THEM BACK.

More and more, young athletes are focusing on a single sport and training for that sport year-round — a practice that's led to an increase in Overuse Injuries. Left untreated, overuse trauma to young shoulders, elbows, knees and wrists may require surgery and have lifelong consequences. For information on preventing and treating Overuse Injuries, visit these sites: orthoinfo.org stopsportsinjuries.org



Risk Factors for Elbow Injuries

- Number of Pitches
 - Pitch Count: #1 Risk Factor for Elbow Injuries
 - Year round baseball, Multiple teams
- Pitch Types
 - Fast Ball should be mastered first
 - ?Breaking pitches should be taught later (>14 yrs)
- Mechanics
 - Strength supports form, form supports speed
 - Fatigue leads to poor mechanics

Pitch Counts & Rest

Pitch Counts

Age	Pitches/ Game
7-8	50
9-10	75
11-12	85
13-16	95
17-18	105

Rest Days

Age 7-16	Age 17-18	# Rest Days
61+	76+	3
41-60	51-75	2
21-40	26-50	1
1-20	1-25	0



GUIDELINES FOR YOUTH PITCHERS

1. No competitive baseball pitching for at least 4 months per year
2. Pitch no more than 100 innings per year
3. Avoid pitching on multiple teams with overlapping seasons
4. Do not play both pitcher and catcher
5. Play other sports
6. Discontinue pitching if complaints of elbow or shoulder pain

Diagnosing Elbow Overuse

- Pain is **NOT** a sign of a strength deficit.
- Common Symptoms
 - Loss of form, accuracy, or velocity
 - Takes longer to loosen up
 - Early Fatigue
 - Pain
 - Stiffness
 - Swelling



Treatment:

- Overuse injuries respond well to REST
- Activity modification
- Short term anti-inflammatory agents
- Ice
- Stretching
- If they don't respond to these treatment then refer.



Treatment:

- OK to resume normal activities once the symptoms resolve
- Return to play varies (chronicity)



What Can We Do to Prevent Overuse and Trauma Injuries?

Promote injury prevention on multiple levels, including:

- Learning about the STOP Sports Injuries campaign and visiting www.STOPSportsInjuries.org for resources
- Take the Pledge on the website to prevent injuries
- Holding ongoing discussions about the importance of rest with athletes
- Mandating pre-season physicals
- Enforcing warm-up and cool down routines
- Encouraging proper strength training routines

What Can We Do to Prevent Overuse and Trauma Injuries?

Additional tips:

- Drink enough water based on activity and temperature levels
- Educate athletes on proper nutrition for performance
- Supervise equipment maintenance
- Encourage kids to speak with an athletic trainer, coach or physician if they are having any pain.

Questions?

