Learning Objectives

1. List the management recommendations for clavicle fractures
2. Recognize the diagnosis and management of nursemaid's elbow
3. Diagnose and manage a limp in a child (SCFE, LCP, toxic synovitis)
4. Cite the principles of traction apophysitis and describe common locations
5. List the current recommendations for limiting athletic participation

How Many?

• 35,000,000 youth participate in sports
• 56% of students play on school sports teams (2008)
• >3.5 million injuries / year in those < 15 yo
  >1,000,000 require physician visit
  ~90,000 require hospitalization

What’s Changing?

• Sprain & strain injury rates are stable
• ACL injuries are rising
• Overuse injuries are on the rise

1. 11-yo female presents with the following radiograph and you recommend…

A. An MRI of the shoulder  
B. A sling  
C. Immediate surgical referral  
D. A shoulder abduction brace

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Clavicle Fractures

- Most commonly fractured bone
- 85% occur in middle third
- XR = AP and 45° cephalic tilt views
- Treat with sling or figure 8

Surgical referral for skin tenting or NV compromise

2. 17-yr football player presents with his first anterior shoulder dislocation. You recommend which of the following to reduce his risk of recurrence?

A. Sling and swathe for 6 weeks
B. Surgical intervention
C. NSAIDs and sling until no pain, followed by physical therapy
D. Corticosteroid shoulder injection

Anterior Shoulder Dislocation

- 70% of all shoulder dislocations

For younger (<25 yr) patients with a first anterior shoulder dislocation, surgical treatment results in fewer subsequent dislocations and decreased likelihood for an unstable shoulder.

Cochrane 2003

3. The best initial treatment for nursemaid’s elbow is…

A. Traction to the arm
B. Hyperpronation of the forearm
C. Flexion and supination of the forearm
D. A sling
Nursemaid's Elbow

- 2-3 yo most common
- Traction injury
- Elbow held in extension & pronation, or at side
- Radiographs recommended if concern for fracture or if initial reduction(s) fail

Hyperpronation required fewer attempts, was more successful initially, and often successful when supination/flexion failed (A).


4. A 10-yr child presents to your office with left elbow pain after a fall at school earlier today. He is able to fully flex the elbow but unable to fully extend it. The parent inquires about radiographs. Your advice to the parent is that...

A. Radiographs are not recommended
B. Radiographs are not recommended at this time
C. Radiographs are recommended
D. Follow up in one week and if still symptomatic then radiographs are appropriate

In acute elbow injuries, the inability to fully extend the elbow was associated with an elbow fracture in all cases.


5. What is the most likely diagnosis of a new limp in a 7-year-old male?

A. Legg-Calve-Perthes osteochondrosis
B. Transient synovitis
C. Slipped capital femoral epiphysis
D. Femoral neck stress fracture

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Transient Synovitis

- Ages 4-11
- Antalgic gait
- Limited ROM
- Radiographs
- CBC, ESR/CRP

Use of ibuprofen in the treatment of transient synovitis of the hip shortened the duration of symptoms (B).

Kocher et al. JBJS 1999

Slipped Capital Femoral Epiphysis (SCFE)

- Ages 11-16
- Males, AA, & obese considered higher risk
- Radiographs
- Acute = immediate referral
  2nd risk of AVN (30%)
- Chronic = referral for non-emergent surgical reduction

Legg-Calvé-Perthes

- Ages 4-10
- Insidious onset of groin-anterior thigh pain
- Intermittent limp
- Radiation of pain to knee
- Radiographs (may repeat)
- Early referral

Increased risk in children with perinatal HIV infection
Gaughan et al. Pediatrics 2002

Legg-Calvé-Perthes Poor Prognostic Factors

- Age > 6 years at onset
- Greater extent of femoral head deformity
- Hip-joint incongruity
- Decreased hip ROM

AFP 2011; 83(3)

6. Which of the following is a true statement regarding overuse injury?

A. OI accounts for approximately 1/3 of all youth sports injuries
B. Recovery time from OI is equivalent to that of an acute injury
C. Strength and flexibility are nonmodifiable intrinsic risk factors
D. Frequency and intensity of training are common training errors predisposing to OI
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7. Which statement about traction apophysitis is most correct?

A. It is most commonly an acute injury
B. Physical activity is not a prerequisite
C. It is related to the pre-adolescent or adolescent growth spurt
D. The physis of long bones are the most common sites of involvement
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Risk Factors for Overuse Injury

- Growth-related factors
  - At risk during growth spurts
  - Bone grows faster than muscle & tendon resulting in inflexibility & tension at tendon-bone junctions (apophyses)

Traction Apophysitis

- Overuse injury, insidious onset
- Often occurs at or after growth spurt
- Physical activity required
- Principles of rehabilitation include ice (pain), stretching (developmental inflexibility), and modification to activity (relative rest)

Little League Elbow

- Progressive medial elbow pain, diminished throwing effectiveness, decreased throwing distance
- Refrain from throwing for 3-6 weeks until pain-free & nontender then progressive return to throwing program

Pelvic Apophysitis

- ASIS
  - Sartorius
- AIIS
  - Rectus femoris
- Ischial tuberosity
  - Hamstrings

Osgood-Schlatter’s

- Most common type
- Tenderness over tibial tuberosity
- Clinical diagnosis
  - Stretch quadriceps, hamstrings and hip flexors; analgesics, ice
Sever’s Disease

- Posterior heel pain
- Calcaneal apophysitis
- Achilles attachment
- Stretch heel cord
- Add heel lift

Iselin’s Apophysitis

- Proximal 5th metatarsal
- Peroneus brevis attachment
- Stretch peroneals, heel cord, tibialis anterior/posterior
- May need to consider contralateral AP film if concern for fracture

8. During a preparticipation exam of a 16- yo fit female, which of the following would preclude her from participation in basketball?

A. HIV infection
B. A BMI of 41.4 kg/m2
C. Seizure disorder controlled on levetiracetam (Keppra)
D. Myocarditis

Disqualifying Medical Conditions & Sports

- Myocarditis
- Hypertrophic cardiomyopathy
- Diarrhea (unless mild)
- Fever
- Seizure (uncontrolled)

Conditional Medical Conditions & Sports

- Atlantoaxial instability
- Coagulopathy
- HTN
- Diabetes
- Single eye
- Hepatitis
- HIV
- Single kidney
- Seizure (controlled)
- Single ovary
- Cystic fibrosis
- Sickle cell disease
- Single testicle
- Acute splenomegaly

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9. You are a team physician for your local high school soccer team and you diagnose a player with a concussion during the game. Which statement is most correct regarding your next action?

A. The athlete may return to the game in 20 min or sooner if asymptomatic
B. After your initial sideline evaluation and diagnosis, you do not see the player until the following day
C. You add cognitive rest to your treatment plan
D. You have no special concerns if this adolescent athlete had a previous concussion last week

Concussion Management

- No RTP in the same game or practice
- Monitor for deterioration over initial few hours post-injury
- Medical evaluation post-injury
- Physical & cognitive rest
- RTP must follow a medically supervised stepwise process

Concussion Return-to-Play Guidelines

Rest until asymptomatic
Day 1 Light aerobic activity
Day 2 Sport-specific exercise
Day 3 Noncontact training drills
Day 4 Full contact after medical clearance
Day 5 Game play

If the athlete becomes symptomatic at any time, then drop back to previous activity after 24 hr rest and restart progression

Concussion Second Impact Syndrome

- Children & adolescents only
- Occurs when second concussion occurs prior to resolution of first
  - Rapid brain swelling
  - No reliable treatment
  - High rate of morbidity and mortality

Participation need not start with competition; instead, the child's choice to be competitive can evolve out of participation

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Answers

1. B
2. B
3. B
4. C
5. B
6. D
7. C
8. D
9. C