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Orthopedics
- 2  **Differential Diagnosis**
  - Fracture
  - Ligament Injury
  - Dislocation
  - Cartilage Injury
  - Apophysitis
    - Inflammation at growth plate at the site of a tendon insertion
  - Patellofemoral Pain
  - Osteochondral Lesions
- 3  **Differential Diagnosis**
  - Arthritis
  - Infection
  - Tumors – benign and malignant
  - Avascular Necrosis of the bone
  - Metabolic Disease
  - “Burnt out” athletes with somatic complaints
  - Referred Pain Mimicking an Injury -- Slipped Capital Femoral Epiphysis
  - Soft Tissue Injury or Muscle deconditioning
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  -
- 4  **Lower Extremity Injuries**  
**The Differential Diagnosis**
  - Fracture
  - Soft Tissue Injury
  - Referred Pain Mimicking an Injury -- Slipped Capital Femoral Epiphysis
- 5  **What are growing pains?**
  - Nondescript pain
  - Often at the end of the day – may complain at night but usually complaining at bedtime
  - Usually involves the legs
  - Usually is bilateral – not always at the same time
  - We think it is related to muscle, and nerve growth triggered by bone growth
  - Many children with growing pains are “tight”
    - Not flexible – for example they cannot touch their toes
  -
- 6  **What are NOT growing pains?**
  - Joint Swelling
  - Limp
  - Loss of motion of a joint
  - Gowers sign – having to use arms on legs to “push” themselves up from a sitting position on the floor
  - Night Pain – waking up in the middle of the night consistently
  - Pain related to activity
  - Constitutional Symptoms such as fever
- 7  **The History**
  - How, When and Where ?
  - Swelling?
  - Ability to Ambulate?
  - Did you hear or feel a Pop?

- Did you Relocate an Injured part?
  - Waking up at night?
  - What makes it feel better?
  - Activity Related?
- 8  **Warning Signs and Symptoms**
- Systemic Symptoms- fever, weight loss
  - Trunk Shift
  - Neurologic Deficit
  - Night Pain
  - Pain with Cough or Valsalva
  - Functional Disability
  - Joint Swelling or Warmth
  - Cellulitis
  - Muscle Atrophy
  - Asymmetric Joint Motion
- 9  **The Physical Examination**
- Have the patient demonstrate the area of maximal tenderness
  - Use one finger to localize tenderness
  - Is the tenderness located over the bone or the soft tissues?
- 10  **Orthopaedic Clinical Anatomy**
- Parts of a growing bone
- Epiphysis
  - Physis
  - Metaphysis
  - Diaphysis
- 11  **Physeal Fracture Patterns**
- 12  **Injury Terms:**
- Sprain vs. Strain
- 13  **Spine Anatomy**
- 14  **14 y.o. girl – cheer with back pain**
- Constant
  - Worse after activity
  - Pain at rest
  - Waist shift
  - Told she has scoliosis
  - Night Pain
  - Neuro exam preserved
  - Complains of leg pain below knee to foot
- 15  **PA radiograph with waist shift**
- 16  **Osteoblastoma of Posterior Elements**
- 17  **Osteoblastoma of Posterior Elements**
- Treatment is Surgical Excision
- 18  **9 y.o. girl cheer with back pain**
- Has missed school
  - Has stopped her activities
  - Very stiff
  - Rest does improve the pain
  - Ibuprofen little help
  - No leg pain
  - Started after back flips
  - Pain for 2 months
- 19  **9 y.o. girl cheer with spondylolisthesis**

- 20  **9 y.o. girl cheer with spondylolisthesis**
- Rest
  - Boston Overlap Brace
  - Core Strengthening
  - Rarely surgical intervention
- 21  **14 year old boy with back pain**
- Pop with long jump landing
  - Immediate pain – more on left than right.
  - Relieved somewhat with rest
  - Very stiff on exam with slight forward lean with ambulation
  - Neuro exam intact but very tight hamstrings
- 22  **14 year old boy with back pain- edema in pedicle**
- 23  **15 y.o. boy lifting weights**
- Immediate pain
  - Down both legs
  - Stiff
  - Tight hamstrings
  - Constant Pain
  - Neuro exam is preserved
- 24  **15 y.o. boy lifting weights**
- 25  **15 y.o. boy lifting weights. Apophyseal Central Disc Herniation**
- 26  **14 y.o. girl Basketball.**
- 27  **Discitis and Vertebral Osteomyelitis**
- Late MRI years later
- 28  **Little League Shoulder**
- Tenderness over the proximal humerus – inflammation and bone resorptions at the physis – the growth plate
- 29  **Little League Shoulder**
- Tenderness over the proximal humerus
  - Rest from throwing for an average of 3 months
  - Shoulder strengthening
  - Throwing Mechanics
- 30  **Little League Elbow**  
**(Medial Epicondylitis)**
- - Repetitive valgus stresses cause microfractures in the apophyseal cartilage (weak link)
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  - Common in 10-13 year olds
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  - Avulsion fractures may occur suddenly when throwing
- 31  **Throwing Motion Forces**
- 4 distinct areas affected:
    1. Medial tension on medial epicondyle and MCL
    2. Lateral compression on radiocapitellar joint
    3. Posteromedial shear forces on posterior articular surface
    4. Extension overload forces on lateral restraints
- 32  **Little Leaguer's Elbow**
- Medial epicondyle apophysitis
  - X-ray findings
    1. Comparison views

2. widened apophysis

33  **Little Leaguer's Elbow**


➤ Medial epicondyle apophysitis

34  **Olecranon Apophysitis/Stress Fractures**

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- Activity related pain and tenderness over the olecranon process
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- X-rays fragmentation or persistent widening of the olecranon process

35  **Elbow Pain**

- Little League Elbow
  - Medial epicondyle

36  **Injury prevention in the throwing athlete**

- 
- Recommended pitch counts:
  1. In competition or game intensity workouts

37  **Injury prevention in the throwing athlete**

- Seasonal Participation
  - Limit to 9 MONTHS per year
  - 3 months off from pitching
  - Limit to ONE TEAM per season!
  -
- Pitch Type
  - Emphasize proper mechanics of fastball/change up
  - NO breaking balls (slider, curveball) until skeletal maturity (age 14-16)

38  **Injury prevention in the throwing athlete**

- 
- Number of pitches per season may be more important than mechanics
- Harder throwing kids are at increased risk
- “No pain, no gain” is not appropriate for skeletally immature athletes. A parent or coach can ruin a kid’s elbow with this philosophy.

39  **Pelvic Injuries**

- 
- Iliac apophysitis
- 
- Anterior superior iliac spine
- 
- Anterior inferior iliac spine
- 
- Ischial tuberosity
- 
- Slipped capital femoralepiphysis (SCFE)

40 

41  **Referred Hip Pain**

- Anterior Groin
- Anterior Thigh and Knee
- Related to Obturator Nerve Sensory Distribution

42  **Bone Cyst**

- 6 year old with persistent limp, thigh and knee pain with activity, thigh atrophy

43  **Physical Exam - Atrophy**

44  **Physical Exam – Loss of Rotation**

- 45  **Physical Exam – Loss of Rotation**
- 46  **Trendelenburg**
- 47  **Obligatory External Rotation with hip flexion**
- 48  **Slipped Capital Femoral Epiphysis**
- 49  **SCFE: Radiographs**
- 50
- 51  **Insitu Screw Fixation for SCFE**
- 52
- 53  **SCFE - Crescent Sign**
- 54  **Perthes**
- 55  **Apophysitis**
- Patella – Sinding Larsen Johannson
  - Tibia – Osgood Schlatter
  - Calcaneus - Severs
- 56  **Osgood Schlatter**
- Apophysitis of Tibial Tubercle
- 57  **Osgood Schlatter**
- 15% of boys
  - 10% of girls
  - Traction Apophysitis
- 58  **Sinding-Larsen-Johannson**
- Apophysitis of Inferior Pole of Patella
- 59  **Patellofemoral Articulation**
- 60  **Chondromalacia of Trochlear Groove Femur**
- 61  **Patellofemoral Pain**
- Typically Complain of
    - Dull aching pain, anterior knee, but hard to localize
    - Increased with activities but present at other times
    - Occasional “swelling” - puffiness, not effusion
- 62  **Patellofemoral Pain**
- Typically Complain of
    - Often several months of pain
    - Increases with stairs and prolonged sitting
    - New running sport or other activity just prior to onset
- 63  **Differentiating Septic Arthritis and Transient Synovitis**
- History of Fever
  - Non-weight bearing
  - ESR greater than 40 mm/hour
  - WBC greater than 12,000
- 64  **Differentiating Septic Arthritis and Transient Synovitis**
- Four Predictors 99.6%
  - Three Predictors 93.1%
  - Two Predictors 40.0%
  - One Predictor 3.0%
  - Zero Predictor 0.2%
- 65
- 66