Common Pediatric Musculoskeletal Conditions and Injuries

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Disclosures

• I have no disclosures for this talk.
Our Goals For Today!

• Review why kids aren’t little adults!
• Review common pediatric orthopedic conditions
• Review common causes of the limping child
• Review common musculoskeletal injuries in young athletes
Brief Anatomy Lesson

Blue=Cartilage
White=Bone
Yellow=Growth Plate
Brief Radiology Lesson

X-ray of a Child's Hand

- Diaphysis
- Epiphyseal plate
- Epiphysis
- Epiphyseal plates
Brief Radiology Lesson

X-ray of a Child's Hand

- Diaphysis
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- Epiphysis
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Kid vs Adult Hand Xray
Developmental Dysplasia of the Hip (DDH)

- Acetabular Dysplasia
- Femoral Head Subluxation
- Femoral Head Dislocation
Developmental Dysplasia of the Hip (DDH)

- Risk Factors
  - First born
  - Female
  - Breech
  - Family History

- PE
  - LLD
  - Abduction
  - Ortolani/Barlow
  - Galeazzi
  - Asymmetric Thigh Folds?
Developmental Dysplasia of the Hip (DDH)

- Ultrasound at 6-8 weeks
  - Alpha Angle
  - %Femoral Head Coverage

- Treatment
  - Pavlik up to age 6 months
  - Repeat US for improvement
Differential Diagnosis of Limping Child

- Rheumatologic
  - Transient Synovitis
  - JIA
  - Rheumatic Fever
- Oncologic
  - Bone primary (ie Osteosarc)
  - Blood primary (ie Leukemia)
- Infectious
  - Septic Arthritis
  - Osteomyelitis/Periosteal Abscess
- Traumatic
  - Acute Fracture
  - Stress Fractures
- Musculoskeletal
  - SCFE
  - Perthes
  - DDH
Important History Questions

• How long has the limp been ongoing?
• Will the child put ANY weight on the leg?
• Painless vs painful limp?
• Does the child localize pain to any location?
• History of fever? Weight loss? Night pain?
• Trauma?
• Recent illness? Infection?
• Other joints involved?
• Previous episodes of limping?
• Reliability of parents/family?
Common Hip Pathology

- Transient Synovitis vs Septic Hip
- Hip Flexor Tendonitis/Snapping Hip
- Slipped Capital Femoral Epiphysis (SCFE)
- Avulsion Fractures
- Dysplasia
- Legg-Calve-Perthes
- Tumor
- Stress Fractures

Common

Rare
Helpful Hip Physical Exam Maneuvers: Palpation

Bone Landmarks

Muscles
Supine

• What position is the leg held in?

• Log Roll
  • How irritable is the hip?

• Range of Motion
  • Flexion
  • Flexed IR
  • Flexed ER
  • Abd
Transient Synovitis vs Septic Hip

- **Transient Synovitis:**
  - Inflammation within the hip joint
  - Related to recent viral illness
  - No long term sequela

- **Septic Hip:**
  - Infection within the hip joint
  - Inflammatory response to bacteria causes chondral damage
  - Surgical emergency
Transient Synovitis vs Septic Hip: Work Up

• **Xrays:**
  - AP Pelvis and Bilateral Frog Lateral
  - Look for hip effusion, osteomyelitis, soft tissue swelling/abscesses

• **Labs:**
  - CBC
  - ESR
  - CRP
  - BMP
Transient Synovitis vs Septic Hip: Work Up

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• **Labs:**
  - CBC
  - ESR
  - CRP
  - BMP

Labs for any infection work up!
Kocher Criteria

Criteria
• Refusal to Weight Bear
• Fever>38.5
• ESR>40
• WBC>12K

Probability of Septic Arthritis
• 1 Positive: 3%
• 2 Positives: 40%
• 3 Positives: 93%
• 4 Positives: 99%
Treatment

When to Treat: 1 Positive Criteria

• Observation
• NSAIDs
• Education of family, close follow up

When to Refer: 2+ Positive Criteria

• Referral to ED, Ortho Eval
• Ultrasound for effusion
• Aspiration if effusion found
• MRI Pelvis for associated infections
• OR for aspiration, I&D
Slipped Capital Femoral Epiphysis (SCFE)

- Weakness of the proximal femoral physis
- Obesity, 10-14yo
- Younger patients with endocrinopathies
- Limp with ER of foot
- Pelvis Xrays
  - AP and bilateral frog lateral
- Surgical Urgency
Acute Knee Pain: Not just a “sprain”

ALWAYS CHECK THE HIP!!!
Operative Treatment
Common Knee Pathology

- Fracture
- Patellofemoral Syndrome/Anterior Knee Pain/Osgood-Schlatters
- Patella Dislocation/Patella Sleeve Fracture
- Meniscus or Ligament Tear
- Septic Knee! Infection!
- Tumors/Osteochondritis Dissecans

Common

Rare
Red Flags for Knee Injuries

**Bring to ER/Urgent Care:**
- Deformity
- Something out of place
- Cuts/large skin breaks
- Unable to walk on leg
- Unable to move knee
- Large amount of swelling
- Intolerable pain

**Clinic Appointment Soon:**
- Inability to fully bend or straighten knee
- Pain continued past a few days
- Pain requiring around the clock meds
- Gradual swelling
- Swelling that remains past a few days
Acute Knee Pain: Not just a “sprain”

• **Soft Tissue Injury**
  - ACL
  - MCL
  - Meniscus
  - Patella dislocation

• **Fracture**
  - Growth Plate Fracture
  - Tibial Spine Fracture
  - Patella Fracture
  - Osteochondral Fracture
Acute Knee Pain: Not just a “sprain”

ALWAYS CHECK THE HIP!!!
Important Physical Exam Maneuvers

Palpation

Ballottement
Important Physical Exam Maneuvers

Patella Apprehension

Lachmans

Anterior Drawer
Important Physical Exam Maneuvers

- Patella Apprehension
- Lachmans
- Anterior Drawer
Important Physical Exam Maneuvers

Varus at 0º and 30º

Valgus at 0º and 30º
Follow Up

• Imaging
  • Xrays
  • MRI

• Treatment
  • Brace
  • Cast
  • Physical Therapy
  • Surgery
Chronic Knee Pain

• Growing Pains
• Overuse injuries
  • Osgood-Schlatter
  • Tendonitis
  • Patellofemoral Syndrome
• Osteochondritis Dissecans (OCD)
• Meniscus Tear
• Rheumatologic
• Neurologic
• Oncologic

MRI: OCD
MRI: Meniscus Tear
Patellofemoral Pain Physical Exam

- Able to perform straight leg raise?
- Hypermobility testing?
- Patella tendon/tib tub/patella TTP?
- Patella apprehension?
Chronic Knee Pain

When to Refer

• Correct referral is paramount!
  • Non-operative Sports Medicine
  • Physiatrist
  • Rheumatology
  • Chronic Pain Management
  • Psychiatrist
  • Orthopedic Surgeon
“Popping” Knee

• Red Flag
  • PAIN!! Or SWELLING!!

• Causes
  • Cartilage Damage
  • Patella Subluxation
  • Meniscus Tear/Discoid Meniscus
  • Loose Body

• Treatment
  • Brace/Physical Therapy
  • Surgery
Common Foot/Ankle Pathology

- Ankle Sprains/Fractures
- Severs/Achilles Tendonitis
- Infection! Osteomyelitis! Subperiosteal Abscess!
- Tarsal Coalition
- Accessory Navicular/Posterior Tibialis Tendonitis
- Tumors

Common

Rare
Helpful Foot/Ankle Physical Exam Maneuvers

Silverskiold

Anterior Drawer
Severs Disease

- Calcaneal Apophysitis
- Cause for toe walking
- Silverskiold Test
- Must r/o bone tumor if unilateral
  - xrays
- PT for Achilles stretching, heel cups, activity modification
Ankle Sprain vs Ankle Fracture

• **Sprain=**Ligament injury
  - Stretch or tear
  - Heals with scar tissue
  - High recurrence

• **Fracture=**Bone injury
  - Occurs through growth plate at distal fibula
  - Heals with bone/cartilage
  - Lower recurrence rate
How to Know the Difference?

**Ankle Sprain**
- **Symptoms**
  - Pain and swelling over anterior or lateral soft tissues
  - Improves in a few days
- **Treatment**
  - Ace wrap/ankle brace
  - Physical therapy
  - Return to activities: 3-8 weeks

**Ankle Fracture**
- **Symptoms**
  - Pain and swelling over the distal fibula (bone)
  - Pain continues longer than expected
- **Treatment**
  - Cast or walking boot x 4 weeks
  - Return to activities: 6 weeks
Infection vs Ankle Sprain

**Ankle Sprain/fracture**
- Blue/purple skin
- Focal tenderness
- Will attempt to move ankle

**Infection**
- Red, warm skin
- Diffuse tenderness
- Refusal to move ankle
- Fevers
Scoliosis

- Congenital/Syndromic
- Infantile
- Juvenile
- Adolescent
Physical Exam

• Shoulder/Waist Asymmetry
• Adams Forward Bend Test
• Leg Length Discrepancy
• Full Neuro Exam
• Skin Evaluation
• Maturity
Adolescent Idiopathic Scoliosis (AIS)

- **Assess Skeletal Maturity**
- **Observation**
  - Cobb Angle <30°
- **Bracing**
  - Cobb Angle 30-50°
- **Surgery**
  - Cobb Angle >50°
Top Five Take Home Points

• Knee pain can disguise HIP pathology
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• History and Physical Examination are the most important diagnostic tools
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• Radiographs and lab tests confirm H&P
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• Advanced imaging warranted in infections, soft tissue pathology, and complex cases
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• History and Physical Examination are the most important diagnostic tools
• Radiographs and lab tests confirm H&P
• Advanced imaging warranted in infections, soft tissue pathology, and complex cases
• Know when to refer to ER for immediate treatment vs Clinic
More Information?

• Santa Monica/UCLA Luskin Children’s Clinic
  • 1250 16th St
  • Santa Monica, CA
• Appointments:
  • 424-259-6593

• Orthopedic Institute for Children Center for Sports Medicine
  • 403 W Adams Blvd
  • Los Angeles, CA
• Ortho-institute.org
  • Appointments:
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Thank You