The Limping Child

Meryl Ludwig, MD
Pediatric Orthopaedic Surgeon
Pediatric Specialists of Virginia

I have nothing to disclose.
Outline

- Normal Gait
- Evaluation
- Causes of Limp
- Treatments
Normal Gait

- Toddlers: wide base of support, short asymmetric steps
Normal Gait

• 3-5 year olds: symmetric strides, reciprocal arm motion
Normal Gait

- 7 year olds: coordinated, longer stride length, decreased step cadence
Questions to Ask

1. Is there pain?
2. Onset: sudden or gradual?
3. Is the child sick?
4. What type of limp?
5. Can it be localized?
6. Is the limp getting better/worse/same?
LIMP

- Trauma
- Infection
- Developmental
- Neurologic
- Neoplasm
# Limp by Age

<table>
<thead>
<tr>
<th>Toddler (1-3 years)</th>
<th>Child (4-10)</th>
<th>Adolescent (11-15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transient synovitis</td>
<td>Transient synovitis</td>
<td>SCFE</td>
</tr>
<tr>
<td>Septic arthritis</td>
<td>Septic arthritis</td>
<td>Overuse syndromes</td>
</tr>
<tr>
<td>Toddlers fracture</td>
<td>LCP</td>
<td>Hip dysplasia</td>
</tr>
<tr>
<td>Cerebral palsy</td>
<td>Leg length discrepancy</td>
<td>Sports injuries</td>
</tr>
<tr>
<td>Muscular dystrophy</td>
<td>Leukemia</td>
<td>Osteochondritis dissecans</td>
</tr>
<tr>
<td>DDH</td>
<td>Kohlers disease</td>
<td>Tarsal coalition</td>
</tr>
<tr>
<td>JIA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Clinical Evaluation

• History
• Physical exam
• Diagnostic Testing
History

• Bear weight?
• Pain?
• Recent trauma?
• Sports?
• Fever?
• Rashes?
• Travel?
Physical Exam

• Start with nonpainful side
• Observe gait
• Standing
• Supine
Testing

- Radiographs
- US
- MRI
- Labs
Toddler Fracture

- 110-190 in 10,000
- Minor twisting injury or fall
- Typically no swelling / deformity
- XR may only be positive after 10 days
- Cast or wee walker boot for 3-4 weeks
Evaluating Fracture

- Not all fractures seen on Xray
- Examining young child is hard:
  - “One finger at one spot at one time”
Seymour Fracture

- Displaced fracture of great toe
- OPEN fracture
- Concealed by infolded nailbed
- Treatment: irrigation/debridement, repair nailbed, stabilize, and antibiotics
Puncture Wounds

- Glass, splinters
- XR or US
- Surgery may be needed
- Antibiotic coverage for Staph and Strep, Pseudomonas if sneakers
Overuse Injuries

Osgood Schlatter
Stretch Quad

Severs
Stretch Achilles
Septic Arthritis

• Critical diagnosis!!

• Damage to hip cartilage and blood supply of femoral head w/in 6-12 hours of infection

• SURGICAL EMERGENCY
Kocher Criteria

- * Temperature > 38.5
- WBC > 12,000
- ESR > 40 mm/h
- Inability to bear weight
- (CRP > 2 mg/dL)
• Want to see right away!

• Aspiration vs. MRI vs. OR
Transient Synovitis

- 85% of kids with atraumatic hip pain and limping
- Pain
- Preceding viral infection (URI)
- *Close follow up & anti-inflammatories
Lyme Disease

- Tick bite
- NE US
- Rash?
- Knee most common site
- Lab tests: ELIZA and Western blot
Predictive Factors for Differentiating Between Septic Arthritis and Lyme Disease of the Knee in Children

Keith D. Baldwin, MD, MSPT, MPH, Christopher M. Brusalis, BA, Afamefuna M. Nduaguba, MD, and Wubdhav N. Sankar, MD

Investigation performed at The Children’s Hospital of Philadelphia, Philadelphia, Pennsylvania

- Predictive of Septic Arthritis:
  - Pain with short arc of motion
  - CRP > 4
  - History of fever
  - Age < 2 years

- Risk increases with # of factors
Osteomyelitis

• +/- Fever
• Limping
• MRI
• Medical management (most of the time)
Juvenile Idiopathic Arthritis

• Autoimmune
• Chronic
• Stiffness in AM
• Labs not dx
• Referral to rheumatology
Developmental

- DDH
- Perthes
- SCFE
DDH

• Check all infants hips!
• Bilateral missed: wide based waddling gait
• Unilateral missed: limb length discrepancy
• Asymmetric abduction
• Late treatment = surgery
Legg-Calve-Perthes

- Boys ~6-8 yo
- Idiopathic AVN of femoral head
- Painful limp and limited hip motion
- XR for diagnosis
- Symptomatic, protected WB
- Goal = Containment
Slipped Capital Femoral Epiphysis

- Obese, 10-14 years old
- Males, Pacific Islanders
- Complain of knee pain → check HIP
If you hear “knee”... Think “hip”

14 day interval between images
SCFE

• 1st step XR

• 2nd MRI if suspect diagnosis

• Stable SCFE: NWB and send to ER for surgery

• Unstable SCFE: equivalent to hip fracture, ER

→ surgery ASAP
Leg Length Discrepancy

- Examine clinically!
- Scoliosis?
- Standing alignment XR
Neurologic

• Should be considered if child not ambulating by 18 months

• Prenatal, perinatal, postnatal history important
Cerebral Palsy

- Static encephalopathy
- History is important!
- Gastrocnemius spasticity
- Hip surveillance
Muscular Dystrophy

- Boys 2-5 years old
- History of stumbling, falling, difficulty with stairs
- Proximal muscle weakness, Gowers sign
- Making diagnosis is important!
MSK Tumor Evaluation

• Benign conditions uncommon cause of limp
• PAIN (at night)
• Systemic signs (lethargy, fever, weight loss)
Benign

- Osteochondroma
- Osteoid Osteoma
- UBC
- NOF
Malignancies

• Osteosarcoma
• Ewings Sarcoma
• URGENT referral to orthopaedic oncology
Leukemia

- Most common cancer in children < 16
- Normally 2-5 years old
- Lethargy, pallor, bruising, 20% MSK sx
- *LABS* → Anemia, ↑ or ↓ peripheral leukocyte count, ↑ ESR
- Referral: Ped Heme-Onc!!
Limp Summary

• Adult gait pattern established after age 7
• Wide variety of causes of limp
• 6 questions are helpful
• Orthopaedic evaluation with any concerns!
THANK YOU
Sources

- Special thanks to George Gantsoudes, MD.