The Limping Child

- DDX
- Normal Gait
- Abnormal Gait Patterns
- Common causes
HOW OLD IS THE CHILD?

IS THE CHILD IN PAIN?
PAINLESS

Coxa vara
DDH
Leg length difference
Cerebral palsy
Muscular dystrophy

PAINFUL

Perthes
SCFE
Discoid meniscus
Transient synovitis
Septic arthritis
Osteomyelitis
JRA

DON’T FORGET TO LOOK AT HIP FOR KNEE PAIN!!
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## Normal Gait

<table>
<thead>
<tr>
<th>STANCE</th>
<th>SWING</th>
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<tbody>
<tr>
<td>Weight acceptance</td>
<td>Limb advancement</td>
</tr>
<tr>
<td>Initial contact</td>
<td>Initial swing</td>
</tr>
<tr>
<td>Loading response</td>
<td>Midswing</td>
</tr>
<tr>
<td>Midstance</td>
<td>Terminal swing</td>
</tr>
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Efficient ??
Gait Analysis

[Images and graphs showing gait analysis data]
Toddler vs. Mature Gait

- Stride length
- Left step length
- Right step length
- Step time
- Cadence
- Walking velocity
Abnormal Gait

Patterns

• Antalgic
• Trendeleburg
• Proximal weakness
• Spastic
• Short limb
Antalgic Gait

Antalgic gait = shorten stance phase
(amount of time affected limp on the ground)
PAINFUL

quick, soft steps
Trendelenburg Gait

Trendelenburg gait = body leans over weak abductors

NOT PAINFUL*

* Trendelenburg + pain = coxalgic gait
Proximal Weakness Gait

Weak hamstrings = lordosis
Weak abductors = Trendelenburg

1st symptom might be toe walking!
Spastic Gait

Gross Motor & Functional Classification

Delayed walkers?
Short Limb Gait

- Oblique pelvis
- ASIS to medial malleolus
- Femur vs. tibia vs. both
COMMON CONDITIONS
### Toxic Synovitis

- 4 – 10 yo
- Hip pain, limp
- Recent illness (URI)
- Low grade temps
- Slightly elevated labs
- NSAIDs
- Symptoms 1-2 weeks

### Septic Arthritis

- Refusal to bear weight
- NOT ALLOW MOTION
- Fevers (>38.5°)
- ↑ WBC (>12K)
- ↑ ESR (>40)
- ↑ CRP (>2)
- Hematogenous spread
- Aspirate
  - Gram Stain, WBC>50K
- Surgical emergency!!

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**MOTRIN CHALLENGE**

**ULTRASOUND** (both have effusion)

**ASPIRATION**
Osteomyelitis

- Bone infection
- Hematogenous
- S. aureus
- MRI vs. bone scan

X-ray changes 10-14 days
Diskitis

- 1-5 yo
- back/abdominal pain
- refusal to bear weight
- X-ray usually normal
- S. aureus
- IR vs. surgery for abscess
DDH – dislocated hip

Unilateral ≠ bilateral

Trendelenburg

painless
Acetabular Dysplasia
Coxa Vara
Legg-Calvé-Perthes

- Boys > girls
- 4 – 11 years old
- Loss of abduction and internal rotation
- < 6 yo do well
- > 8 yo do poor

www.perthesdisease.org
Legg-Calvé-Perthes

WHAT IS THE FUTURE OF PERTHES TREATMENT??
Bisphosphononates

Preserves integrity but no new bone formation

(Kim 2005)
BMP

Trabecular bone preserved
Osteoblasts lining trabeculae

(Kim 2011)
Non weight-bearing

(Kim 2012)
NWB + BMP + IB

(Kim 2014)
Slipped Capital Femoral Epiphysis

- Movement thru physis
- Hip/thigh/knee pain
- Obese
- Obligate ER
- AP & frog x-rays
- Admit!! → surgery
- < 10 yo → work-up
  - Renal, hypothyroid, GH
SCFE – Epidemiology

- Database review
- 10.8/100,000
- Males 1.65x

OBESITY PLAY A ROLE?
80% >95th percentile in weight

<table>
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<tr>
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<tr>
<td>Combined</td>
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<tr>
<td>Northeast</td>
</tr>
<tr>
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</tr>
<tr>
<td>South</td>
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All incident rates are number of cases per 100,000 kids. Significant differences exist between all regions except between the Midwest and the South for combined data ($P < 0.001$). Incident rates were adjusted to account for outpatient SCFEs.
SCFE

Incidence of SCFE

Percentage of Overweight kids
SCFE

mild

chronic

acute, unstable

severe
SCFE

Is there a newer way??
But is it better?
Long list...

discoid meniscus

OCD

toddler fx

tarsal coalition
### PAINLESS
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- DDH
- Leg length difference
- Cerebral palsy
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Thank you!

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