Pediatric Hip Disorders- DDH and a little SCFE

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Disclosures

- I operate on children for a living, some may call that a disclosure (adapted from Fred Dietz)

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Objectives

- DDH:
  - Understand the normal growth and development of the hip
  - Understand risk factors for DDH
  - Understand the way we make the diagnosis
  - Understand the natural history if not treated
- SCFE:
  - Understand the etiology of the abnormal physis
  - Understand the risk factors
  - Understand how we diagnose SCFE
  - Understand the natural history

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Developmental Dysplasia of the Hip

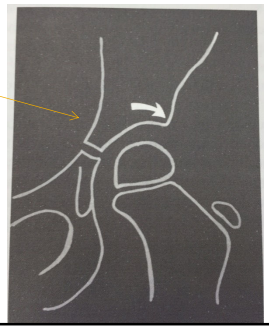
- What is it?
  - Abnormal formation of one or both hips during the gestational period
- Who gets it?
  - Five Fs of dysplasia
- Why do we care?
  - Left untreated very high risk of early degenerative joint disease

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What is it?

- Femoral head and acetabulum rely on each other to develop
- In utero and in early childhood the femoral head applies pressure to the tri-radiate cartilage encouraging normal hip joint development

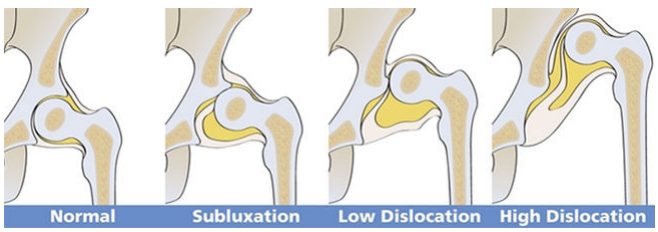




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What is it?

- With DDH the femoral head does not apply proper pressure to the acetabulum
- Acetabulum becomes shallow and flat and the femoral head subluxes



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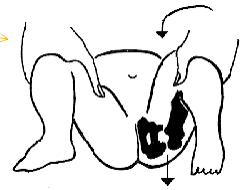
Who gets it?

- 5 Fs of DDH
  - **Frank Breech** *Highest risk
    - (Infant pelvis forced into maternal pelvis causes external compression on the hips)
  - Female
    - (joint laxity)
  - First Born
    - (small maternal uterus, less room)
  - Family History
    - Maternal or paternal side
  - Foot deformities
    - (other packaging issues)
- Other associations
  - Torticollis

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How do you diagnose it?

- All infants should have a hip exam at the newborn visit and subsequent visits for a few weeks
- Barlow (sublux the reduced hip)
- Ortolani (reduce the subluxed hip)
  - These findings go away after about 3 months of age





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How do you diagnose it cont.

- Galeazzi (knee height difference)
  - Later finding than the others
- Limitation or asymmetry in hip abduction
- Thigh fold asymmetry is not diagnostic



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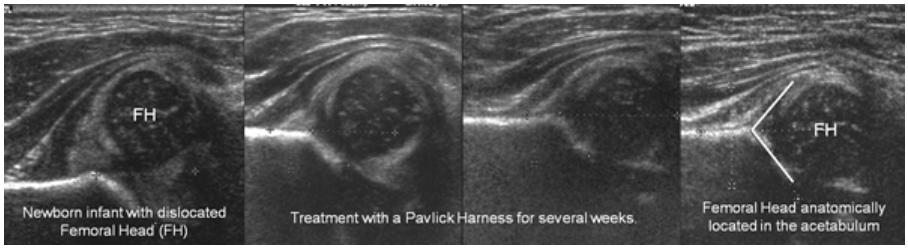
DDH exam by age

Age at Presentation	Clinical Features
Birth to 3 months	**Diagnostic**: Hip instability demonstrated by positive Ortolani or Barlow tests **Suggestive**: Asymmetric leg creases (inguinal, gluteal, thigh, popliteal), apparent shortening of the femur Associated findings: metatarsus adductus, clubfoot, torticollis, plagiocephaly, extension contractures of the knee
3 to 12 months	Limitation of hip abduction in 90° of flexion Apparent shortening of femur Laterally rotated posture of lower limbs Marked asymmetry of leg creases
After the child begins to walk	Excessive lumbar lordosis if bilateral. Prominent greater trochanter. Gluteus medius lurch. Positive Trendelenburg sign Short leg limp, with toe-heel gait and out-toeing Increasing adduction contracture of the hip

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Imaging

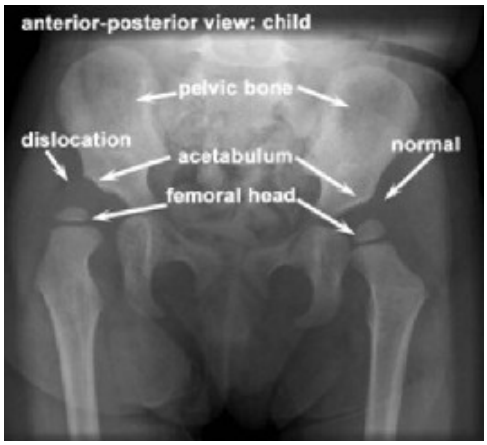
- Infancy: Confirm on ultrasound



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Imaging

- Older than 6 months: AP pelvis xray



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How do you treat it?



- Early infancy: Pavlik Harness



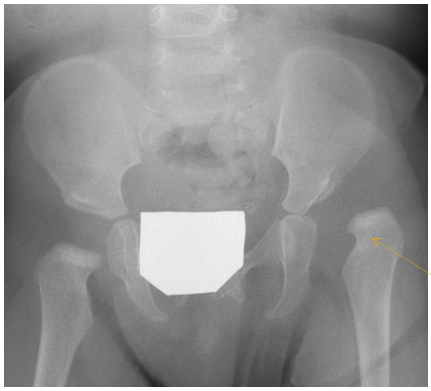
- Older child: open/closed reduction in the OR



- Adult: hip replacement

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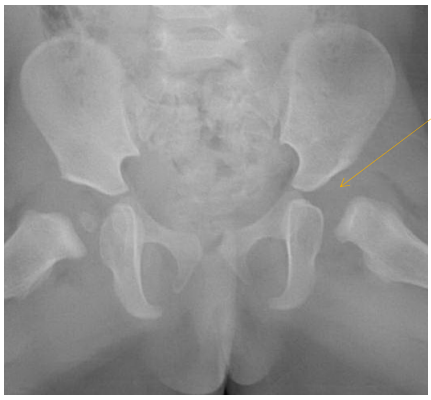
Case Example



- 10 month female presented with walking on her toes on the left
- First born, negative family history
- No associated foot deformity, not breech
- X-ray demonstrates dislocated left hip

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Post-operative

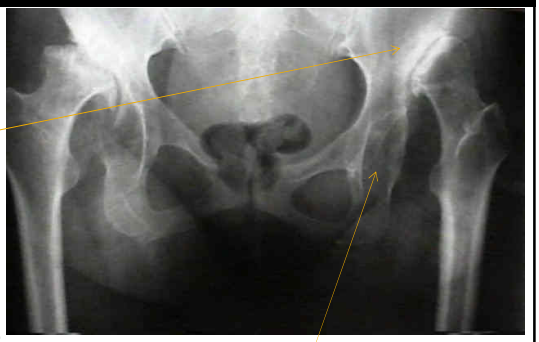


- Underwent open reduction in the OR
- Notice lack of ossific nucleus on the left
- Femoral neck now pointing at tri-radiate cartilage
- Excellent remodeling potential at this age

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Why do we care?

- Left untreated:
  - Develop pseudoacetabulum
  - If bilateral it may go unnoticed as a child
  - Go on to severe degenerative changes
  - Early joint replacement



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Slipped Capital Femoral Epiphysis (SCFE)

- What is it?
  - Displacement of the proximal femoral metaphysis through the growth plate
- Who gets it?
  - Obese males nearing the end of skeletal maturity
- Why do we care?
  - Orthopaedic urgency to maintain the blood supply to the femoral head

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What is it?

- SCFE is a misnomer: the femoral head actually stays in place, the metaphysis moves
- Pathology: abnormally wide zone of hypertrophy
- **Usually a prodromal period of hip/knee pain**



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Who gets it?

- 50% of patients are >95%ile for weight
- Females age 10-14
- Males age 10-16
- Male: female, 2.5:1
- L>R 2:1
- Higher incidence in African Americans and Hispanics
- Some studies have shown a seasonal variation (greatest in fall and spring)
- Some studies have shown a socioeconomic relationship (more common in lower SES groups)

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What causes it?

- Trauma?
  - May be contributing factor
- Endocrine/Hormonal?
  - Reports of higher incidence of SCFE in patients with underlying endocrine abnormalities
    - Higher risk for contralateral hip, most advocate prophylactic pinning
  - Higher endocrinopathy relationship in younger kids
  - 78% occur during adolescent growth spurt
  - May be related to abnormal relationship between Growth Hormone and sex hormones

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How do you diagnose it?

- History
  - Pain in one leg with prolonged standing
  - Groin, hip, or Knee pain
  - Limping gait
  - Sudden pain and inability to weight bear without injury
- Exam
  - **Lack of hip internal rotation compared to other side**
  - "obligate" external rotation with hip flexion



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How do you diagnose it?

- AP pelvis xray
- If able to ambulate get frog lateral pelvis
- If unable to ambulate get cross table lateral of the involved side
  - This is so you do not manipulate the leg



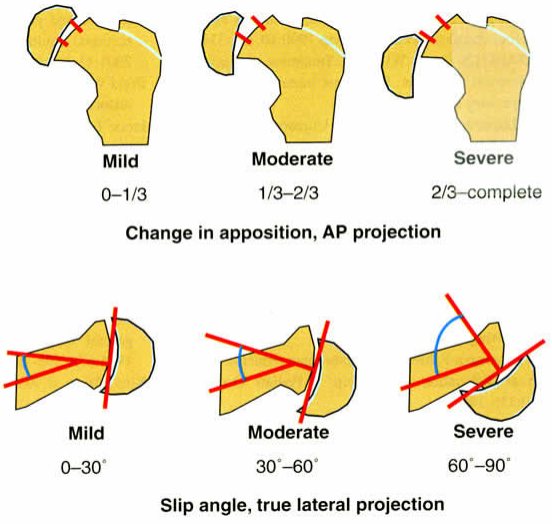
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Classification

- 2 major categories:
- Stable
  - Patient is able to ambulate with or without crutches
- Unstable
  - Patient unable to ambulate even with crutches
- Classic categories:
- Acute
  - Pain <2 weeks
  - Abrupt displacement of the physis
- Chronic
  - Pain for months
  - Limp on exertion
  - Symptoms come and go

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How do you diagnose it?



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- Case example:
  - 12 yo female seen at an outside hospital for hip pain and inability to bear weight on the left
  - About 4 days of laying in bed without being able to walk
  - Transferred to our hospital for further treatment





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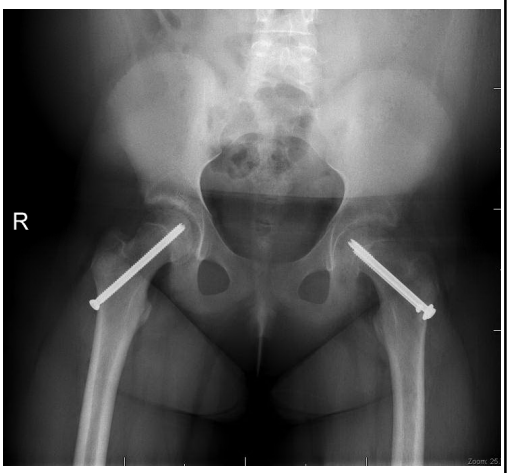
How do you treat it?

- **Surgical urgency!**
- DO NOT allow the child to walk
  - Weight bearing leads to worsening displacement
  - Worse displacement leads to higher complication rates

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How do you treat it?

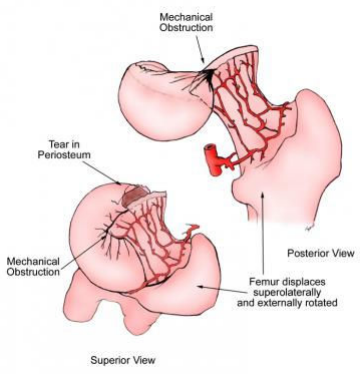
- In-situ screw fixation
  - Gold standard
  - Surgeon choice to prophylactic pin other hip in very young
- Open reduction
  - Newer method, still not universal
  - Only for unstable slips



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Why do we care?

- Severe slips and untreated slips lead to avascular necrosis
- Blood supply to the femoral epiphysis is from the medial femoral circumflex artery and the retinacular vessels



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Why do we care?

- Failure to treat SCFE will lead to avascular necrosis and head collapse
  - This may happen anyway with severe slips
- Outcome is then degenerative joint changes and early joint replacement



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Thank you!



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