



# Providence Virtual Pediatric Grand Rounds: Breech Deliveries and Developmental Dysplasia of the Hip

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# Conflicts of interest

Katie Fuchs MD, Stefanie Rogers MD, and the Planning Committee do not have relevant financial relationships with commercial interests to disclose



# Objectives

1. Understand incidence and management of breech pregnancy and delivery with specific attention to how in-utero environment affects hip development.
2. Understand evaluation and referral for developmental dysplasia of the hip.
3. Understand management of developmental dysplasia of hips.
4. Share how Providence is working to enhance adherence to best practice guidelines for patients and providers.

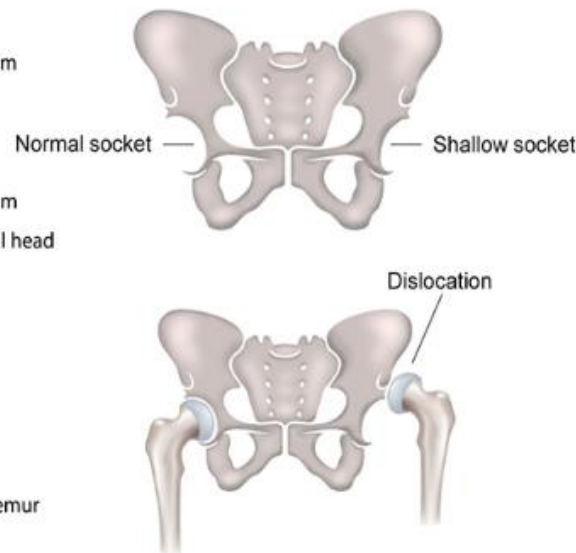


# What is Developmental Dysplasia of the Hip

The Hip Joint



Hip Dysplasia



Developmental dysplasia of the hip (DDH) is a condition in which an infant's hip joint is not **forming** properly. It is a spectrum of disorders of the acetabulum and femoral head.

Previous terms:  
Congenital  
dislocation



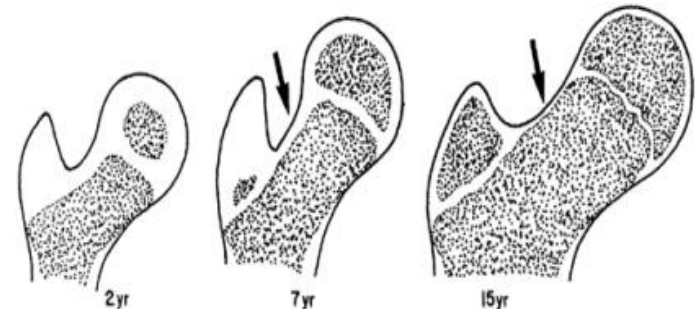
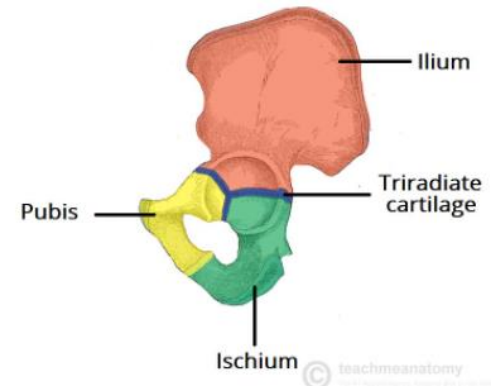
# Developmental dysplasia of the hip

- Mild hip instability is frequently noted in newborns, typically resolves
  - Intervention not recommended in first 4 weeks of life
  - “clicks” are most frequently tendon or ligament movement and not concerning
- True dislocatable hips and hips with severe or persistent dysplasia occur in 1 to 3 per 1000 children
  - Incidence is highest in Native populations
  - Incidence is lowest in African American population
- Bilateral disease in 37%
- Left hip is more likely to be affected
- DDH more common females, first born, family history, breech
- The earlier DDH is detected, the simpler and more effective the treatment and the better the long-term outcome



# How does the hip joint develop?

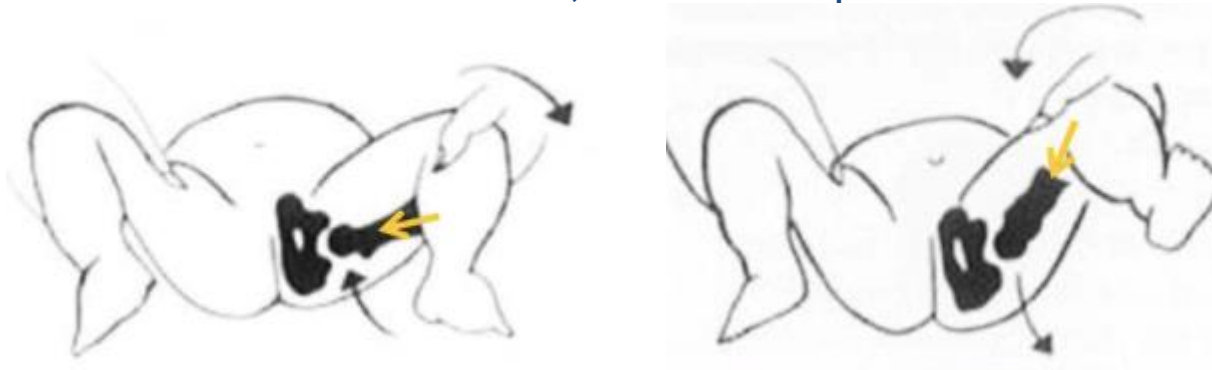
- Embryology:
  - Limb buds begin to form 3 weeks after fertilization
  - Differentiation of femoral head and acetabulum noted by 7 weeks
  - 11-12 weeks—fetal legs rotate medially
  - 18 weeks—hip muscles develop
  - 20-40 weeks hip joint enlarges and matures
- Acetabulum formed by fusion of 3 bones—triradiate cartilage
  - Ossification *begins* at 2-10 mo
  - Growth plates closed by 15-19 yrs





# How does the hip joint develop?

- Both in utero and after birth, the acetabulum requires contact and pressure from the femoral head to develop its shape into a deep socket
  - Abducted position maximizes the force of the femoral head on the acetabulum
  - Adducted position may result in shallow acetabulum
  - If femoral head is dislocated, there is no pressure on the acetabulum







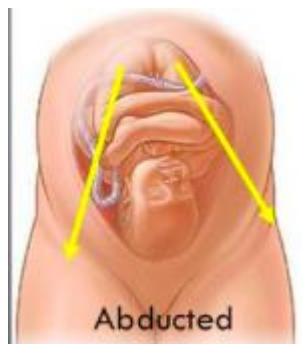
# Breech Presentation

- Prevalence of breech presentation
  - 20 to 25% at <28 weeks
  - 7 to 16% at 32 weeks
  - 3 to 4% at term
- Increased risk for congenital malformations and mild deformations, torticollis, and developmental dysplasia of the hip.
- Complications during delivery such as entrapment and umbilical cord prolapse are more common. Complications lead to increased risk of asphyxia and traumatic injury.
- ACOG Position statement 745 (2018):
  - “There is a trend in the United States to perform cesarean delivery for term singleton fetuses in a breech presentation. The decision regarding the mode of delivery should consider patient wishes and the experience of the health care provider...obstetric care providers should offer external cephalic version as an alternative to planned cesarean for a woman who has a term singleton breech fetus, desires a planned vaginal delivery of a vertex-presenting fetus, and has no contraindications”





# Impact of breech on hip development



Abducted

Variations of the breech presentation



Complete  
breech



Incomplete  
breech



Frank  
breech

- Term children noted to be in breech presentation on at least one visit had a twofold higher risk of developing DDH (OR 2.01; 95% CI [1.28, 3.15]).
- The strength of the association increased with duration of breech presentation (5–8 weeks: OR 2.65; 95% CI [1.36, 5.18]; 9–12 weeks: OR 3.63; 95% CI [1.82, 7.24]).



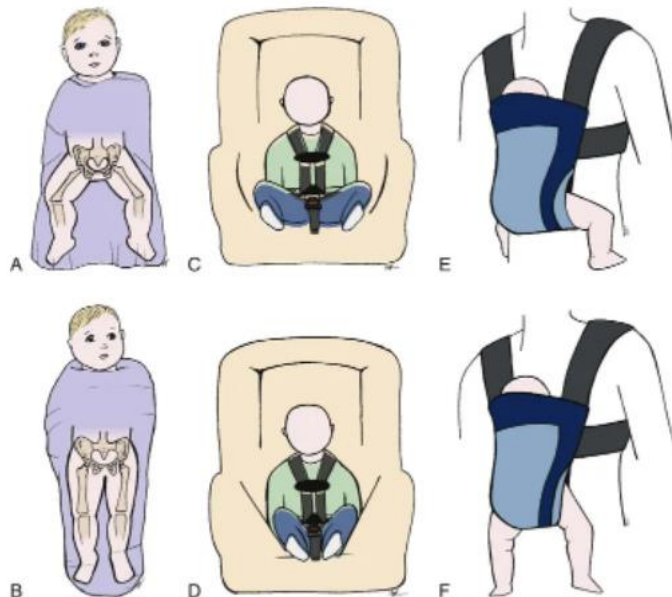
## But its more than just breech...

- Fetal kicking and movements are important for musculoskeletal development
- Kick force, stress and strain were found to be significantly lower in cases of breech position, oligohydramnios and with firstborn
- TWINS had normal kick force
  - Twins don't appear to have higher incidence of DDH
- In limited data preterm breech infants appear to have similar incidence of DDH



## Postnatal positioning

- Proper swaddling, positioning, and carrying may be beneficial in preventing developmental dysplasia of the hip
- High incidence of DDH noted in populations that use cradleboard/papoose with legs extended/adducted (some populations as high as 337/1000)





# Screening for DDH

## Evaluation and Referral for Developmental Dysplasia of the Hip in Infants

Brian A. Shaw, MD, FAAOS, FAAP, Lee S. Segal, MD, FAAOS, FAAP, SECTION ON ORTHOPAEDICS

- Physical exams are strongly recommended
- AAP does not recommend universal radiographic screening
- Selective hip ultrasonography should be considered between the ages of 6 weeks and 6 months for “high-risk” infants without positive physical findings (*breech in third trimester, family history*)
- Radiography (anteroposterior and frog pelvis views) can be considered after 4 months of age for the high-risk infant without physical findings or any child with positive clinical findings. Age 4 to 6 months is a watershed during which either imaging modality may be used
- A referral to an orthopedist does not require ultrasonography or radiography. The primary indication for referral includes an unstable (positive Ortolani test result) or dislocated hip on clinical examination



# Screening for DDH

## Detection and Nonoperative Management of Pediatric Developmental Dysplasia of the Hip in Infants up to Six Months of Age

### Evidence-Based Clinical Practice Guideline

- Moderate evidence supports not performing universal ultrasound screening of newborn infants.
- Strong evidence supports performing an imaging study before 6 months of age in infants with one or more of the following risk factors: breech presentation, family history, or history of clinical instability.
- Limited evidence supports ultrasound in infants less than 6 weeks of age with a positive instability examination to guide the decision to initiate brace treatment.
- Limited evidence supports the use of an AP pelvis radiograph instead of an ultrasound to assess DDH in infants beginning at 4 months of age.



## Olivia

- HPI – 2m F, c-section for breech presentation presents with concern for left “hip click”
- PMH - Full term, 6lb 7oz, first child, normal birth, normal development
- FHx – No history of hip problems



## DDH Risk Factors: “The 5 Fs”

- First born
- Female (6:1)
- Breech (“feet first”)
- Family history
- Oligohydramnios (“low fluid”)





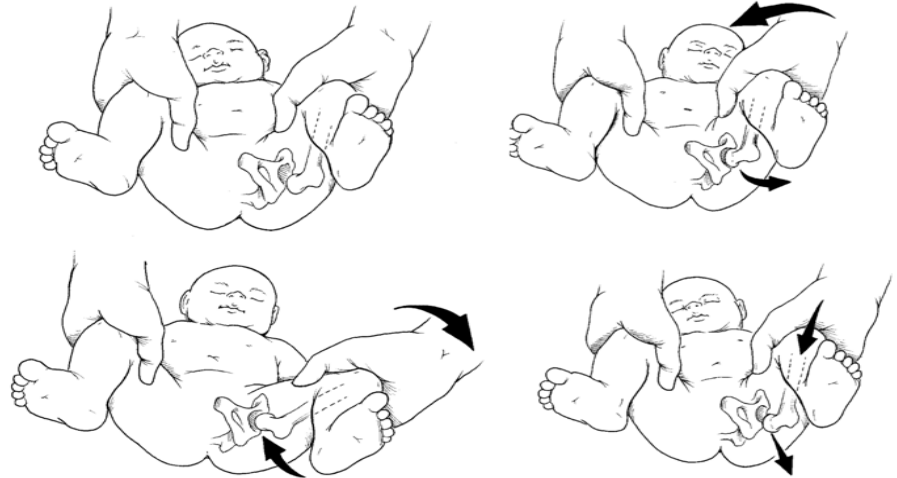
## Olivia

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- FHx – No history of hip problems



# Physical Exam

- Barlow
- Ortolani
- Asymmetric thigh creases
- Galeazzi
- Abduction





# Olivia

- Physical Exam
  - Full, symmetric abduction
  - Negative Galleazi, symmetric thigh creases
  - Positive Barlow on the left
  - Positive Ortolani on the left



## Next Step? - Imaging

- Ultrasound
  - Benefits
    - Nonossified structures (<4-6mos femoral head ossification)
    - Dynamic
  - Drawbacks
    - Operator dependent
    - Cost
- Xray
  - Benefits
    - Easy
    - Familiar
  - Drawbacks
    - Radiation
    - Static
    - Nonossified structures



# Indications for screening?

- First born
- Female (6:1)
- Breech
- Family history
- Oligohydramnios



**DETECTION AND NONOPERATIVE  
MANAGEMENT OF PEDIATRIC  
DEVELOPMENTAL DYSPLASIA OF THE HIP IN  
INFANTS UP TO SIX MONTHS OF AGE**

**EVIDENCE-BASED CLINICAL PRACTICE  
GUIDELINE**

**Adopted by the American Academy of Orthopaedic Surgeons  
Board of Directors  
September 5, 2014**

*This guideline has been endorsed by the following organizations:*

American Academy of Pediatrics  
DEDICATED TO THE HEALTH OF ALL CHILDREN™





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# Indications for screening?

- First born
- Female (6:1)
- Breech
- Family history
- Oligohydramnios
- Clinical instability



# Pavlik Harness

## Keys

- <6 mos
- Reducible hip
- Normal muscle function
- 23/24h per day
- 6-12 weeks







# Alexis

- HPI – 2 wk old F in NICU for feeding with question of instability on PE
- PMH – born at 32 weeks following PROM, 4lb 5oz, 2nd child, breech until week 30, born via uncomplicated vertex vaginal delivery
- Fam HX – no history of hip problems



## Risk Factors?

- First born
- Female (6:1)
- Breech
- Family history
- Oligohydramnios



# Alexis

- Physical Exam
  - Wide symmetric abduction of hips
  - Negative Galleazi
  - asymmetrical thigh creases
  - Positive Barlow on the right
  - Negative Ortolani



## Thoughts?

- Dislocatable hip in premature infant
  - Common finding
  - Ligamentous laxity, small stature, relaxin
- Breech in third trimester = screening ultrasound at 6 weeks indicated (correct age for prematurity)
- Refer to pedi ortho



# Robbie

- HPI – 2w M, concern due to breech positioning
- PMH - 7lbs 7oz, full term, c-section, breech
- Fam Hx – no hip problems



# Robbie

- HPI – 2w M, concern due to breech positioning
- PMH - 7lbs 7oz, full term, c-section, **breech**
- Fam Hx – no hip problems



# Robbie

- Physical Exam
- Decreased abduction right leg
- Positive Galleazi, asymmetric thigh creases
- Negative Barlow on the right
- Negative Ortolani on the right







# Robbie

- Physical Exam – irreducible R hip dislocation
- Concerning exam = early Ultrasound
- Treatment?



## Pavlik Harness

# NO





## 4m

- PT, stretches, wait until ~6 m for closed vs open reduction
- Physical Exam
- Slight improvement in abduction right leg
- Positive Galeazzi and Negative Ortolani on the right



# Closed Reduction and Casting

- Keys
  - 6-18m
  - Refractory to bracing
  - Full sedation
  - 6w x 2 casts
- Complications
  - Osteonecrosis
  - Loss of reduction





# Open Hip Reduction

- Allows release of contracted tissue
- Improves outcomes
  - Less osteonecrosis
  - Less loss of reduction





## Review

- “5 Fs”
- Obtain bilateral hip u/s at 6 weeks if concerning exam, breech in third trimester or strong family history
- Pavlik is mainstay of treatment for reducible hips – 90% effective
- No Pavlik if fixed dislocated hip – delay surgery until 6 mo



## How is Providence helping clinicians (and patients) adhere to guidelines?

- Encouraging documentation if breech anytime during 3rd trimester
- BPA (“best practice advisor” or pop up” was added in 2021 prompting the provider to place an outpatient hip ultrasound order for 6 wks when breech delivery presentation is documented in the delivery summary
- All gestational ages
- Providers should select site





## Providence Pediatric Orthopedics in Collaboration with Shriners Children Portland





## Questions?

### **Providence Pediatric Orthopedics in Collaboration with Shriners Children Portland**

- Phone number: 503-216-6050
- Fax: 971-282-0103
- Epic code for internal referrals: REF62RR

### **Providence St. Vincent Medical Center NICU**

- Phone number: 503-216-7380



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