Society for Pediatric Radiology
2015
Hands on Session

DDH: Pitfalls and Practical Tips
Michael A. DiPietro, M.D.

John F. Holt Collegiate Professor of Radiology
Professor of Pediatrics and Communicable Diseases

Pediatric Radiology - C.S. Mott Children’s Hospital
University of Michigan
Ann Arbor, MI
Missed DDH
“Good judgment comes from experience.

Experience... well that comes from poor judgment”
Future Lawyers of America

What's in it for me?

What's in it for me?

What's in it for me?

What's in it for me?
Hips

DDH
DDH

Orientation to anatomy

Static and dynamic aspects
Pediatric Musculoskeletal Ultrasound

DDH
“Clicks / Clunks”
Lax hips
Breech
Torticollis
Clubfoot / Metatarsus adductus
Family History
Developmental dysplasia of the hip

dislocated hip

dislocatable hip

subluxed/subluxable hip

hip laxity (physiologic)

acetabular dysplasia

Static and dynamic aspects
Static (morphology) and Dynamic (stability/laxity) aspects
TWO VIEW “MINIMUM” EXAM PROPOSED 1993

Combines the Harcke and Graf techniques

Accepted as STANDARD by ACR (1998)
DDH
Pediatric Musculoskeletal Ultrasound
Orientation Orientation Orientation Orientation
Technique Technique Technique Technique
Coronal scanning

AE Schlesinger
Coronal view
Analogous to AP X-ray of left hip

“Ball in a socket”
Coronal US orientation compared with AP radiograph

US shows cartilage
“Ball in a socket”

Is the ball in the socket? (located)
Does the ball stay in the socket? (laxity)
Is the socket well formed? (acetabulum mature)
“Ball in a socket”

Is the ball in the socket? (located)
Does the ball stay in the socket? (laxity)
Is the socket well formed? (acetabulum mature)
Coronal US orientation compared with AP radiograph as appears on US screen

Key concept
Normal
Slightly subluxed

coronal
Subluxing right hip

Case A.  coronal
Dislocated right hip

Case B. coronal
Coronal dislocated hip

- Femoral head
- Greater trochanter
Coronal – acetabulum immature
Coronal – posterior cartilaginous acetabulum
Newborn - Bilateral dislocated “teratologic” hips
Coronal – dislocated
note ilium
Coronal – dislocated
note ilium
Coronal – dislocated
note posterior acetabular cartilage
Transverse US compared with axial CT

Key concept
Axial CT
Axial CT
Transverse US orientation compared with axial CT as appears on US screen.

Key concept
Subluxing left hip

Lateral

Transverse

Posterior
Subluxed hip
transverse view
Coronal – posterior acetabular cartilage
Transverse – posterior acetabular cartilage
Transverse – posterior acetabular cartilage
Transverse – posterior acetabular cartilage
Trans Normal  abd/add  - cine
Testing for laxity - Barlow maneuver
Testing for laxity - Barlow maneuver
Dynamic case studies
Coronal Normal - cine
1. Right CORONAL slight laxity 1 DO
3. Left CORONAL 1 mo old
   Does not reduce fully
2. Left TRANSVERSE 7 do abduction – adduction NORMAL
3. Lax and does not reduce fully
Another View

Anterior Approach
Testing for laxity
Barlow maneuver
Lt. Anterior view cine
Lt. Ant view

cine
Ortolani maneuver

dislocates

reduces “clunk”
Anterior View - Ancillary

- Not as substitute for standard
- Confirmation
- Illustrative
- Education
Anterior View - Ancillary

- Save for the end of the study
- Babies cry
- Don’t get pee’d on
DDH ULTRASOUND

- Not Too Early
- Not Too Often
- Not Too Badly

HTHarcke, M.D.
Some Pitfalls
Transducer misalignment
Coronal false abnormal - true normal - cine
Older patient
14 MTH / F
R/O HIP DYS
OUT TOEING
HM
Coronal
14 mo Normal Coronal - cine
Impressions

1. Normal findings, see above discussion.
2. No evidence of DDH at this time. Acetabula appear mature. At this age, acetabular maturity is better assessed by radiography.
3. No gross laxity is apparent, but dynamic evaluation is limited as described above.
4. I doubt that this patient’s out toeing has anything to do with DDH.
5. The parents were present throughout the study and were told the findings.
Hip flexion contracture or bowing
Right hip - in or out ??
bowed femur - healing fracture
2 month old
Error
Right hip thought to be out
(greater trochanter * mistaken for femoral head)

coronal sonogram
Arthrogram
right hip - in
DDH
Interpretative pitfall due to hip contracture or proximal femoral deformity
e.g.
Arthrogryposis
PFFD
Bowing (coxa vara)
(be aware of plain radiograph)
Illustration of infant wearing a Pavlik harness

The information on this Web page is provided for educational purposes. You understand and agree that this information is not intended to be, and should not be used as, a substitute for medical treatment by a health care professional. You agree that Lucile Salter Packard Children's Hospital
13 days old
11 days old - Coronal
11 days old - Trans
Doppler - Tran - Adducted

6 wk old
Doppler - Tran - Abducted
Cine loop
Tran – Abduction - Adduction
Doppler – Coronal - Adducted
Doppler – Coronal - Abducted
Cine loop
Coronal – Abduction - Adduction