Hip Clicks, In-Toeing, Bow Legs, Knock Knees, Flat Feet

Who should be referred?

Presented by: Dr. Thierry Benaroch

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Objectives

- Understand the difference between hip clicks, hip instability and indications for hip ultrasound.

Congenital Dislocation of the Hip (CDH)

- Now referred to DDH
- Implies hip is dislocated at birth
- Neonatal screening should; therefore, pick up all cases

History

- The 4 “**F**’s”

History

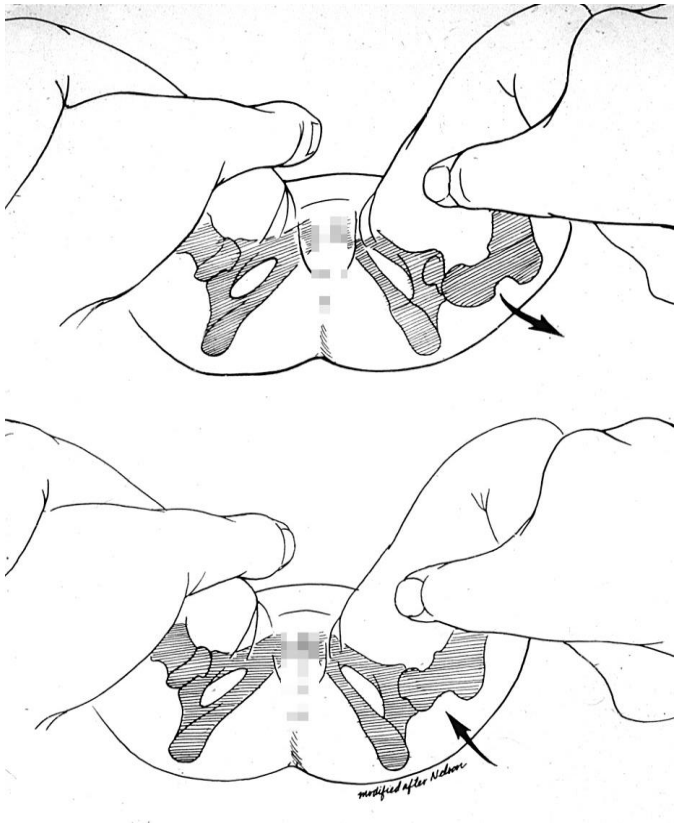
- First born
- Female (13:1)
- Frank breech (hips flexed, knees extended)
- Family history

Physical Exam

- Baby must be relaxed
- If crying, examine hip later
- Gentle exam

Physical Exam

- Barlow – dislocate reduced hip

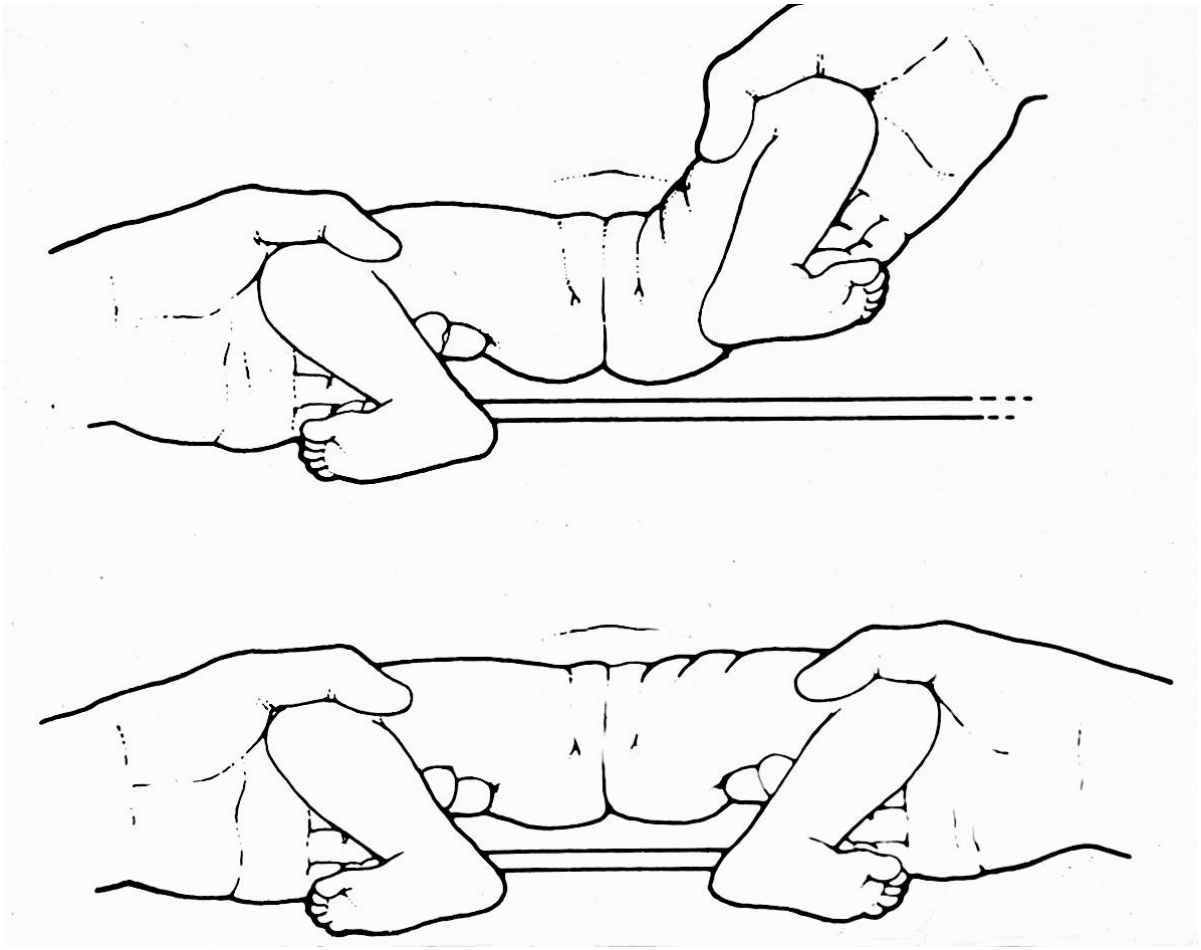


Dislocatable Hip: Natural History

- 1:60
- 60% will stabilize by 1 week
- 88% will stabilize by 2 months; therefore, 12% will end up dislocated

Physical Exam

- Ortolani $^{+ve}$ – reduce a dislocated hip
- Ortolani $^{-ve}$ – not able to reduce a dislocated hip



Dislocated Hip

- Dislocated in resting position
- May reduce with Ortolani manoeuvre; this will be lost
- Will not resolve without treatment (90 – 95%)

Bottom Line

Barlow or Ortolani positive hip

↓

Unstable hip

↓

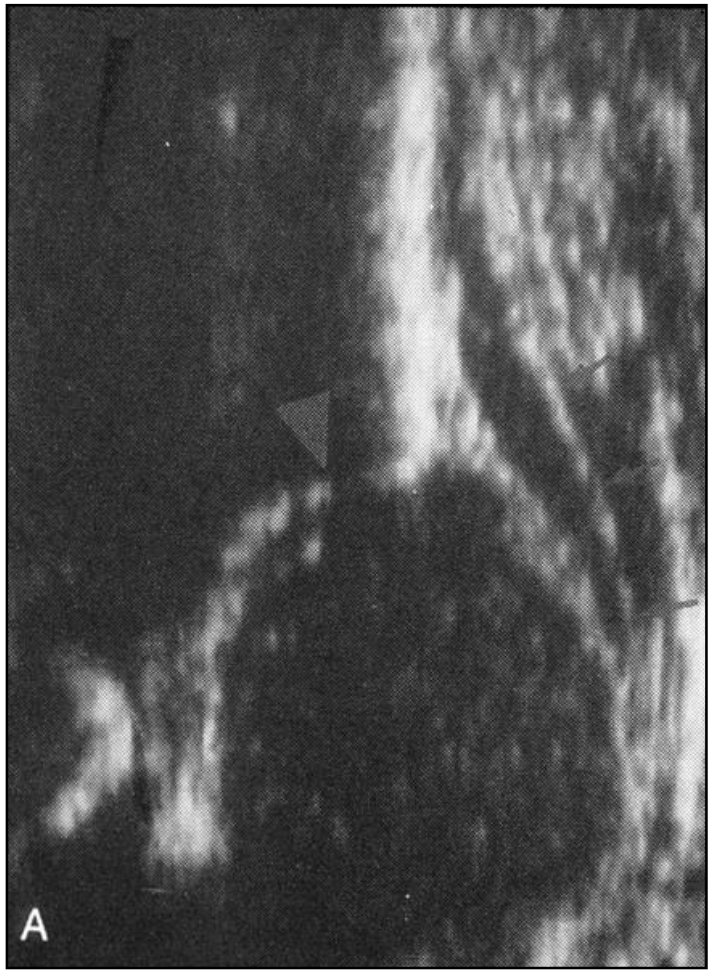
Refer to Pediatric Orthopedic Surgeon

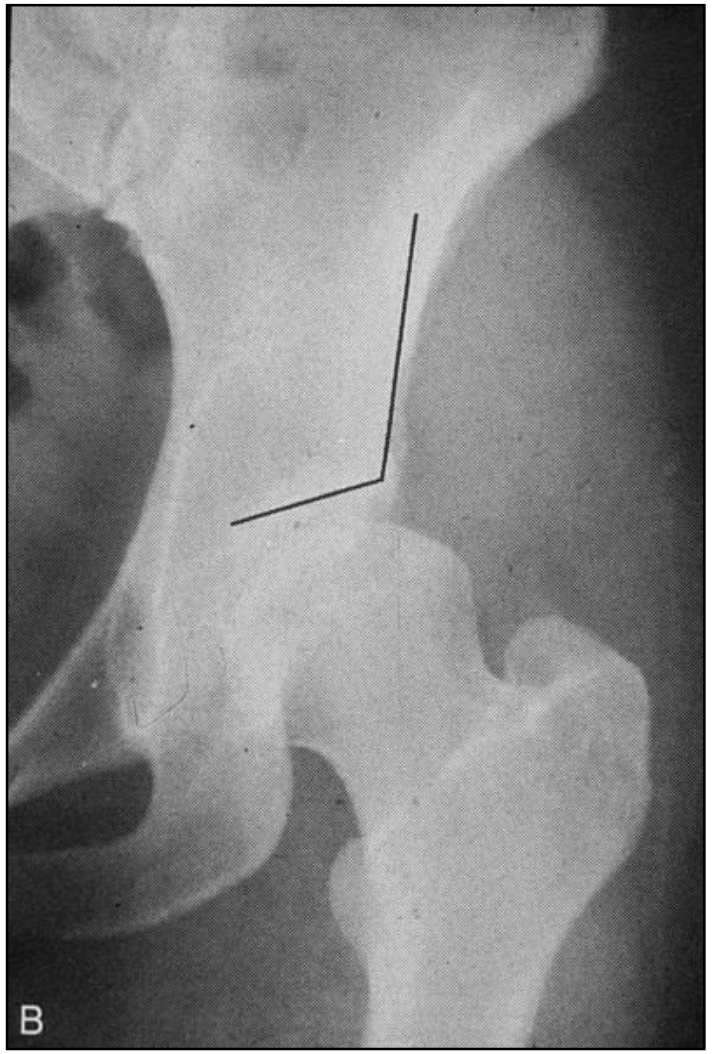
Ultrasound (U/S)

- Femoral head cartilaginous (radiolucent) at birth
- Ossification starts
  - 3 to 4 months for females
  - 5 to 6 months for males
- Delayed ossification in DDH

Ultrasound (U/S)

- Fills “imaging gap” for hip dysplasia (0 – 6 months)
- Able to visualize soft tissue and unossified cartilaginous structures of the immature hip


A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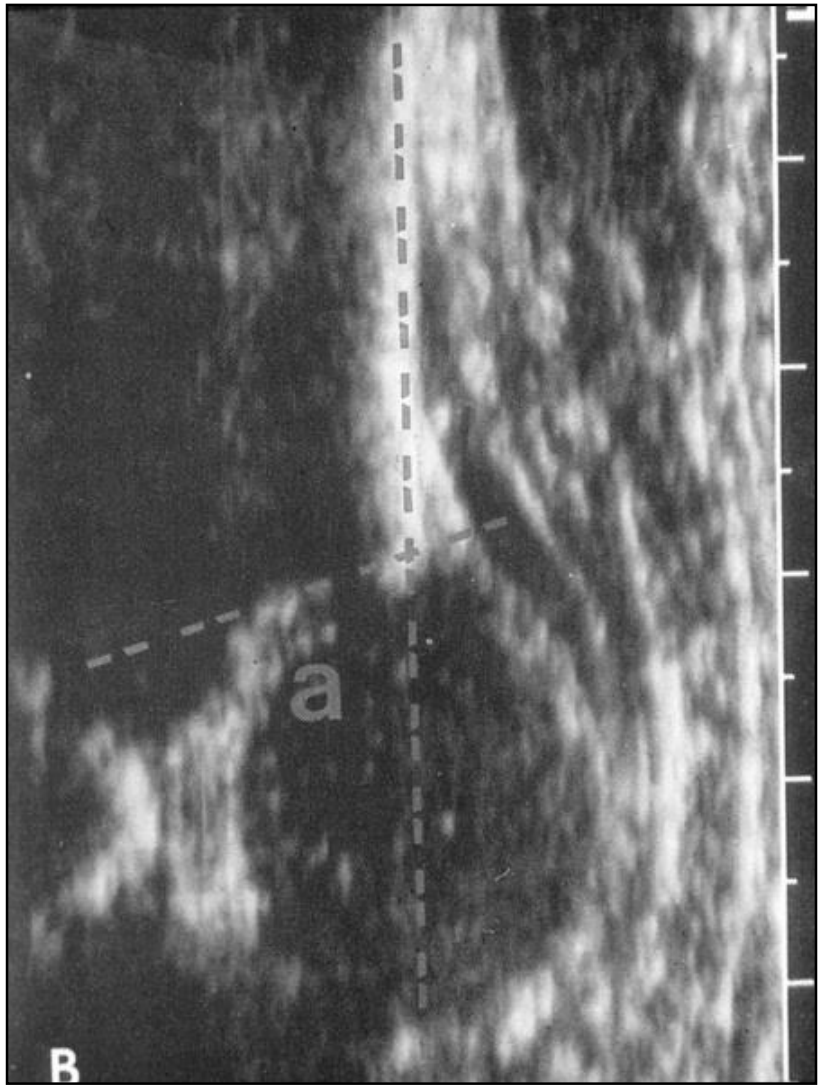
a
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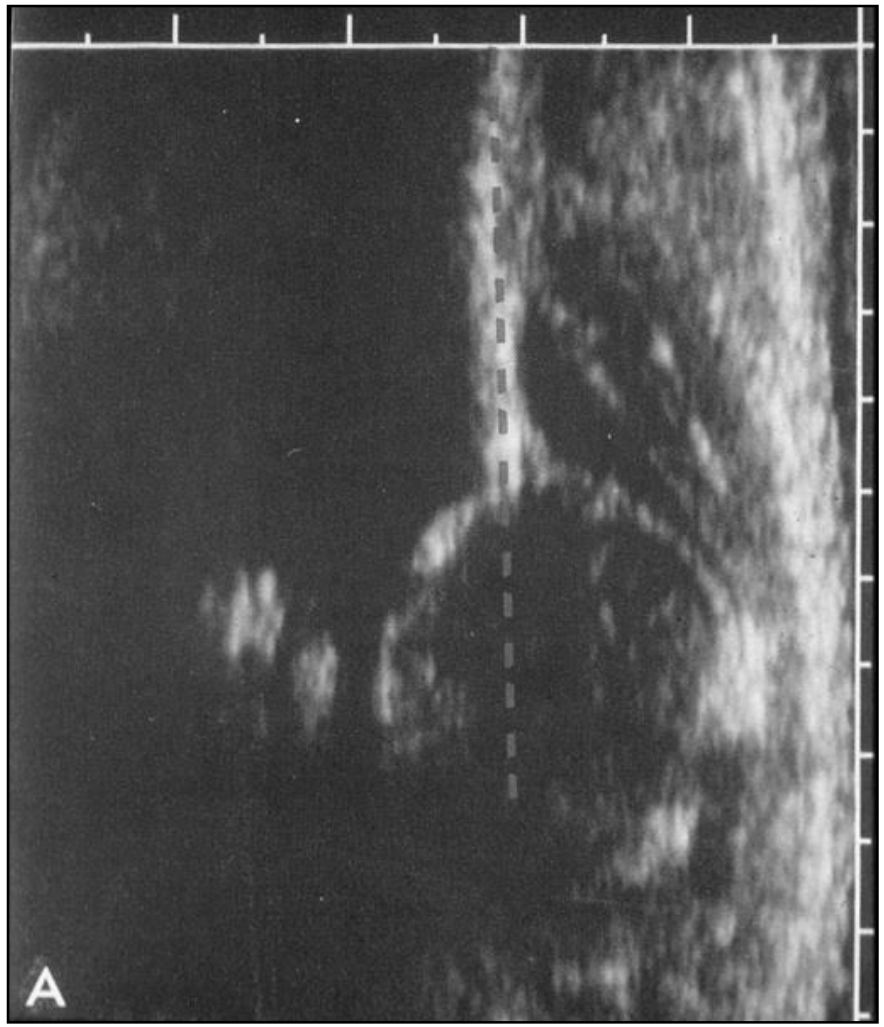
Alpha Angle

- > 60 degrees is normal
- < 50 degrees is pathological
- 50 – 60 degrees represents a physiologically immature acetabulum only in infants < 3 months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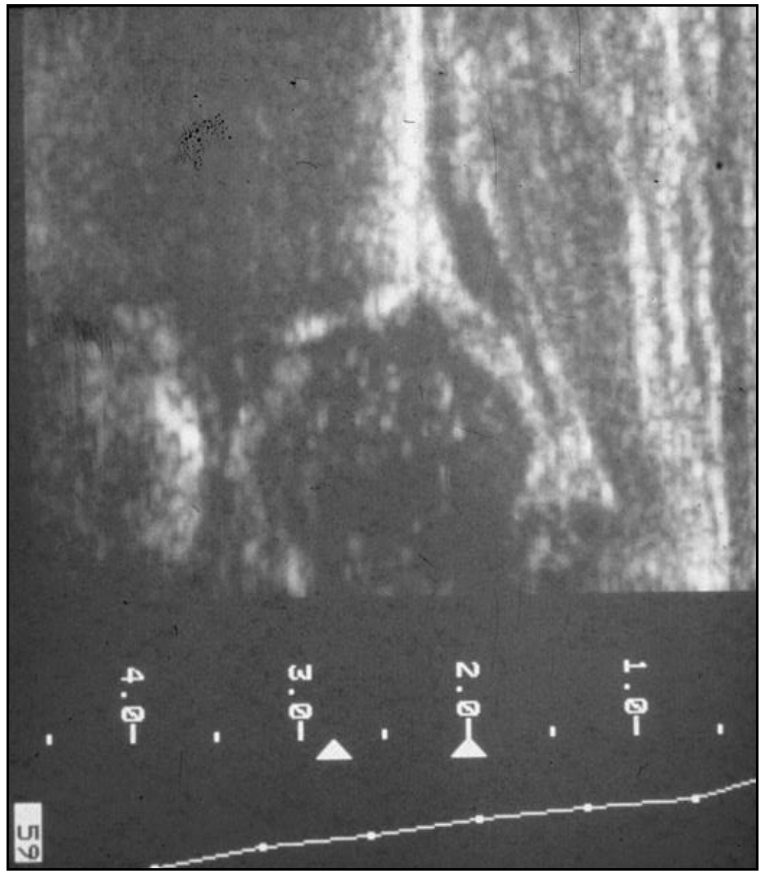
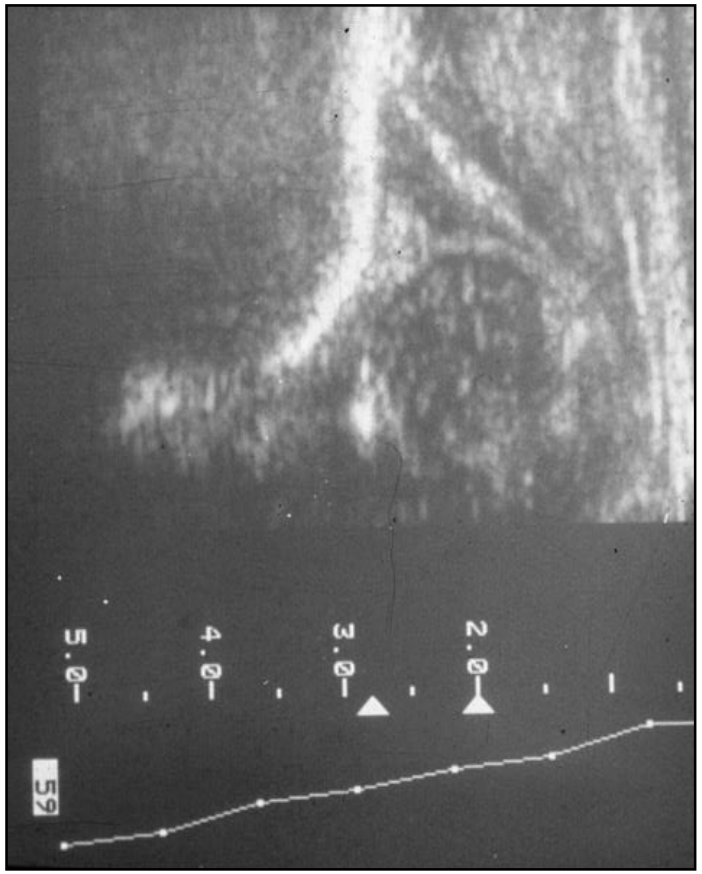
Percentage Coverage

- > 50% is normal
- < 40% is pathological
- 40 – 50% may be a normal finding up to 3 months of age


4.0
3.0
2.0
1.0
59


5.0
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3.0
2.0
59

U/S Advantages

- Non-invasive and painless
- No ionizing radiation
- Visualization of cartilaginous components
- Monitors treatments with Pavlik harness

U/S Disadvantages

- Operator dependent
- Too sensitive
  - (i) detects laxity which is not apparent on clinical exam
  - (ii) identifies acetabula that are more physiologically immature (potentially dysplastic)
  - (i) & (ii) lead to overtreatment

Physical Exam

Click:

- Benign
- Not a “clunk”
- No significance

Physical Exam

- Barlow, Ortolani → up to 4 – 6 weeks of age
- Click → up to 4 – 6 months of age

Physical Exam

- If dislocated hip not picked up by 4 – 6 weeks of age then generally lose Barlow, Ortolani manoeuvre.

↓

- Late physical signs of dislocated hip appear, but only by 4 – 5 months of age.

Physical Exam: Late Signs

Decreased hip abduction

Physical Exam: Late Signs

- Apparent short leg
  - Galeazzi sign
    - Asymmetrical thigh folds

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Pearl

Asymmetrical thigh fold with symmetrical abduction highly unlikely to be DDH.

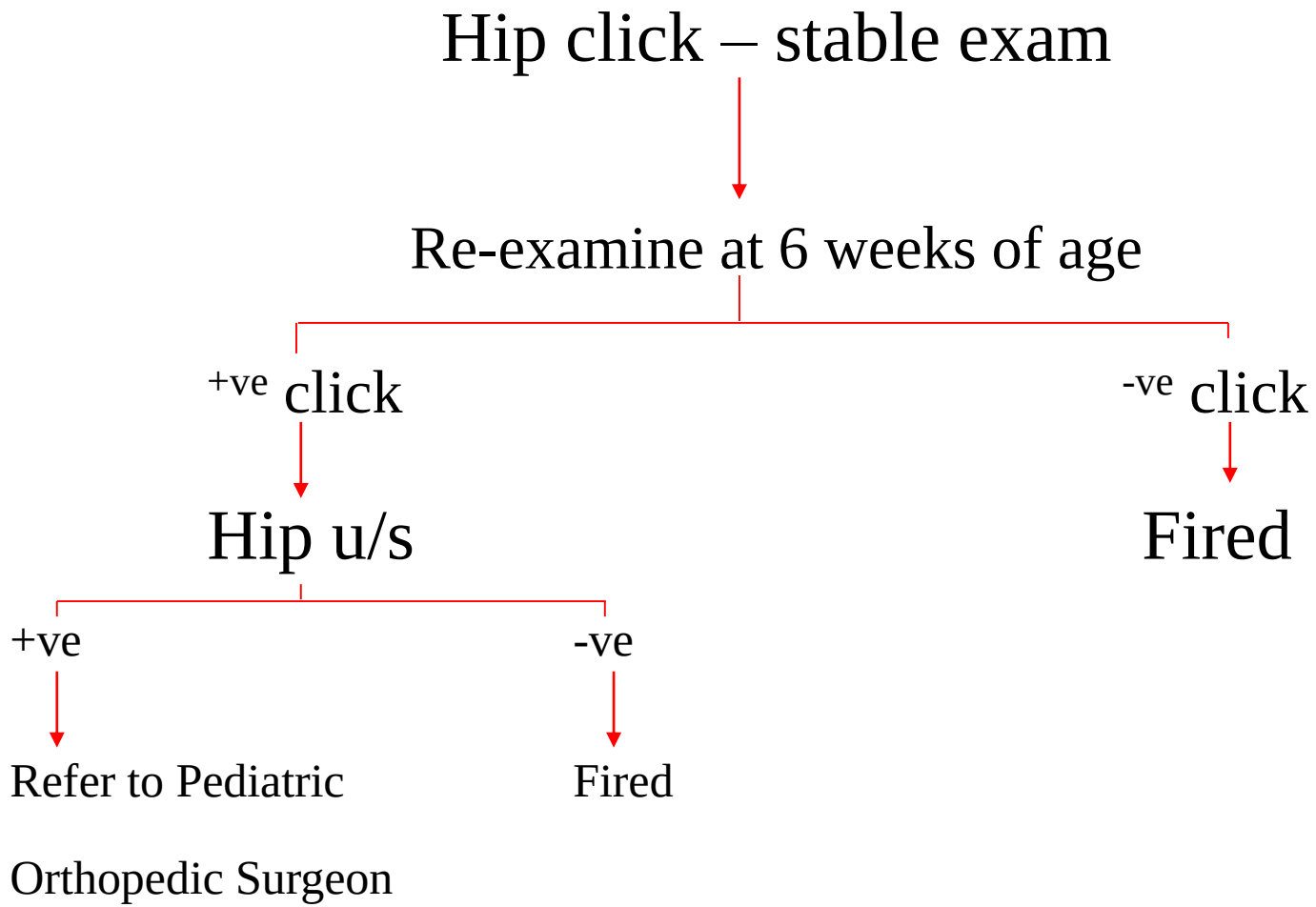
Bottom Line

Detect unstable hip (Barlow, Ortolani)

↓

Refer to pediatric orthopedic surgeon

Bottom Line


Hip click – stable exam
Re-examine at 6 weeks of age
+ve click
-ve click
Hip u/s
Fired
+ve
-ve
Refer to Pediatric Orthopedic Surgeon
Fired

Bottom Line
Screening Hip U/S

If 40-50% coverage/alpha angle 50-60°

↓

Repeat Hip U/S in 6-8 weeks

If no improvement

↓

Refer

If improvement,

↓

AP Pelvis X-ray at 1 yr

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Bottom Line

If Alpha angle >60° and coverage 50%

↓

AP Pelvis X-ray at 1 yr

Bottom Line

If Alpha angle <50° and coverage <40%

↓

Refer to Pediatric Orthopaedic Surgeon

Ultrasound Screening at the Shriners Hospital

Breech
Family history

} U/S at 6 weeks

Instability noted
by pediatrician

} U/S < 2 weeks

If ultrasound is normal, all get an AP-Pelvis at 1 year of age

Intoeing Objectives

- Anatomical
- Chonological
- Refer?

Intoeing

I. Hip/Femur - Femoral Anteversion

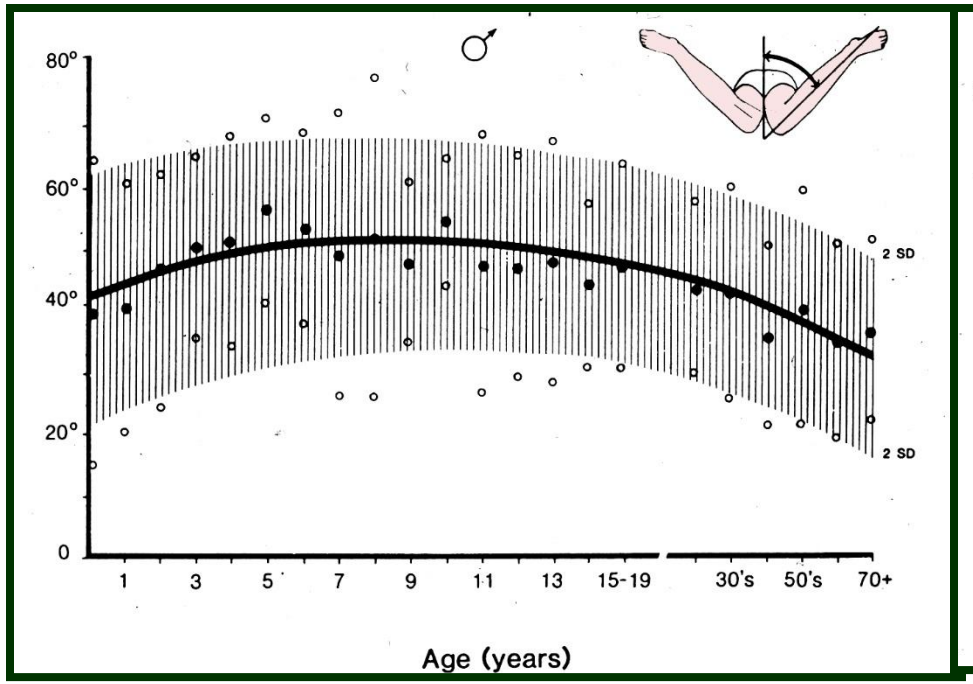
II. Tibia – Internal Tibial Torsion

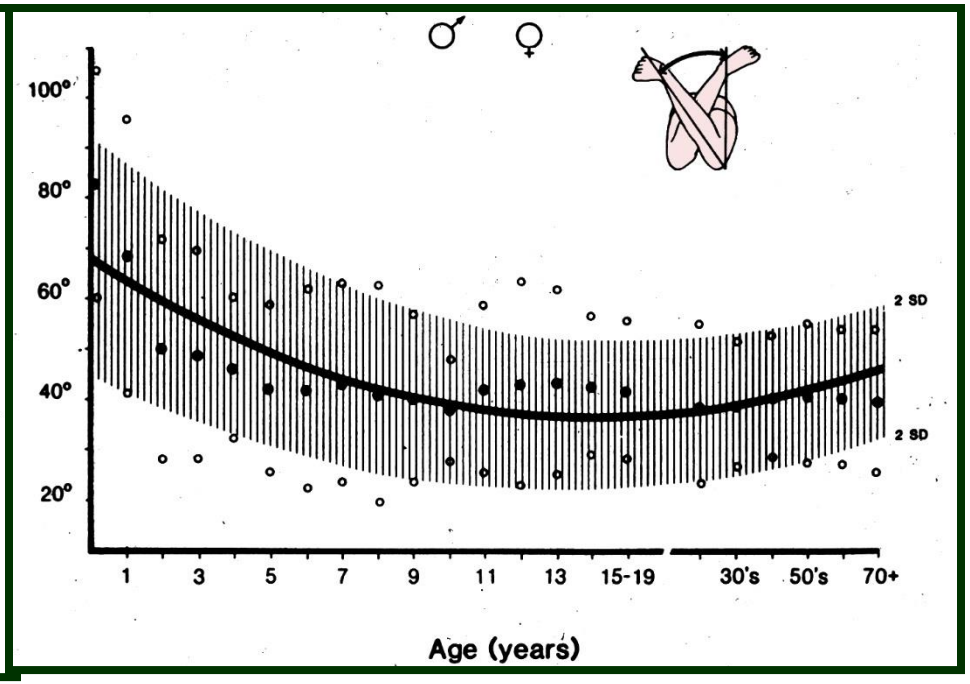
III. Foot - Metatarsus Adductus

or combination

Femoral Anteversion

- ↑ Hip internal rotation
- ↓ Hip external rotation
- Female
- Age: ~ 3 - 10





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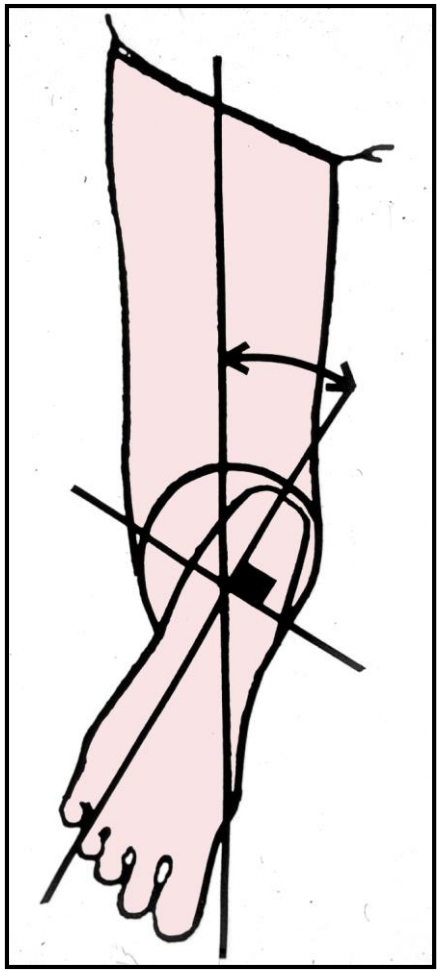
Femoral Anteversion

- Most cases of femoral anteversion will remodel by age 10 unless mom and dad still have it
- Cosmetic concern only
- No functional implications in later life!!!
- Therefore, NO treatment

Internal Tibial Torsion

Most common cause of intoeing < 3 yrs of age



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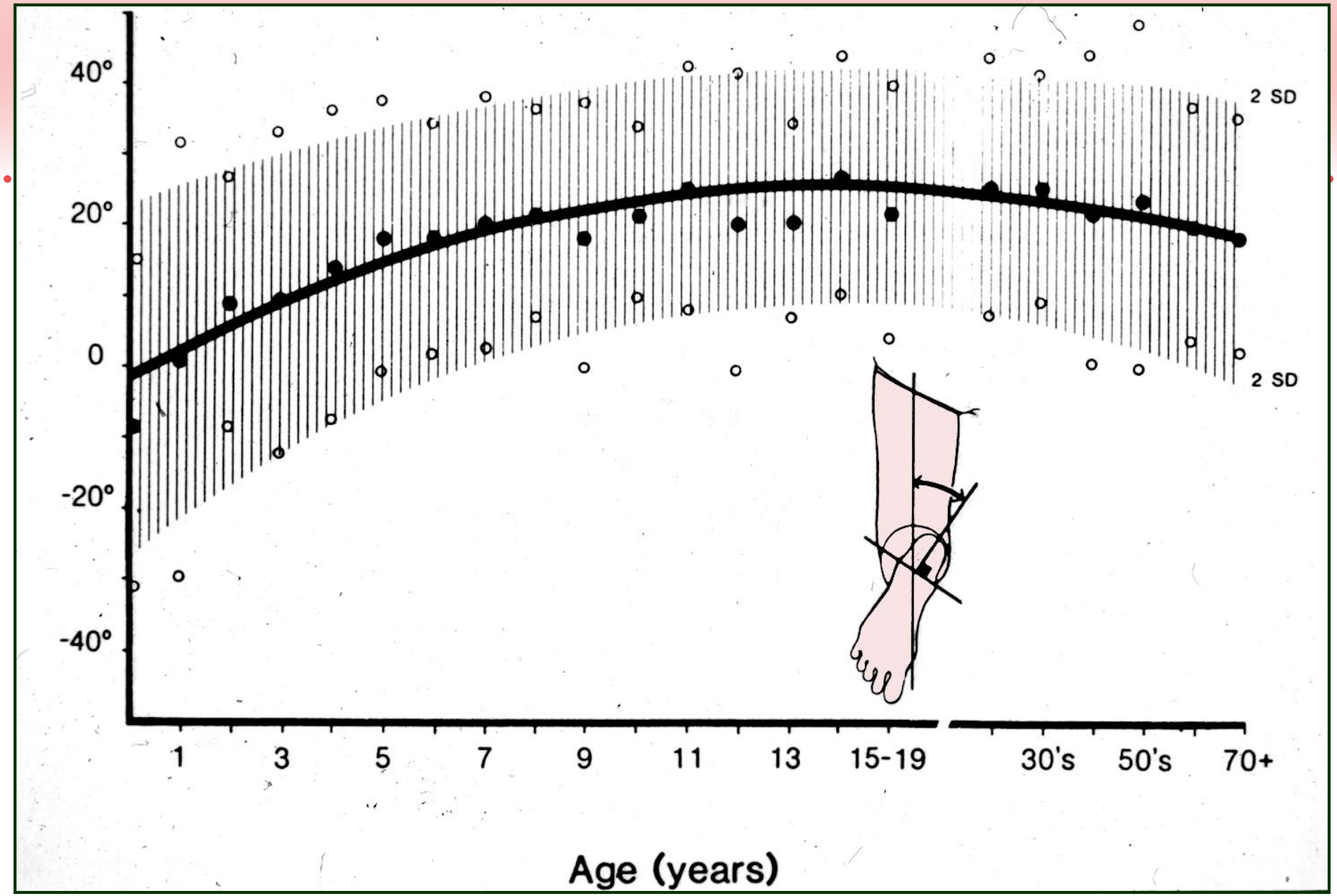
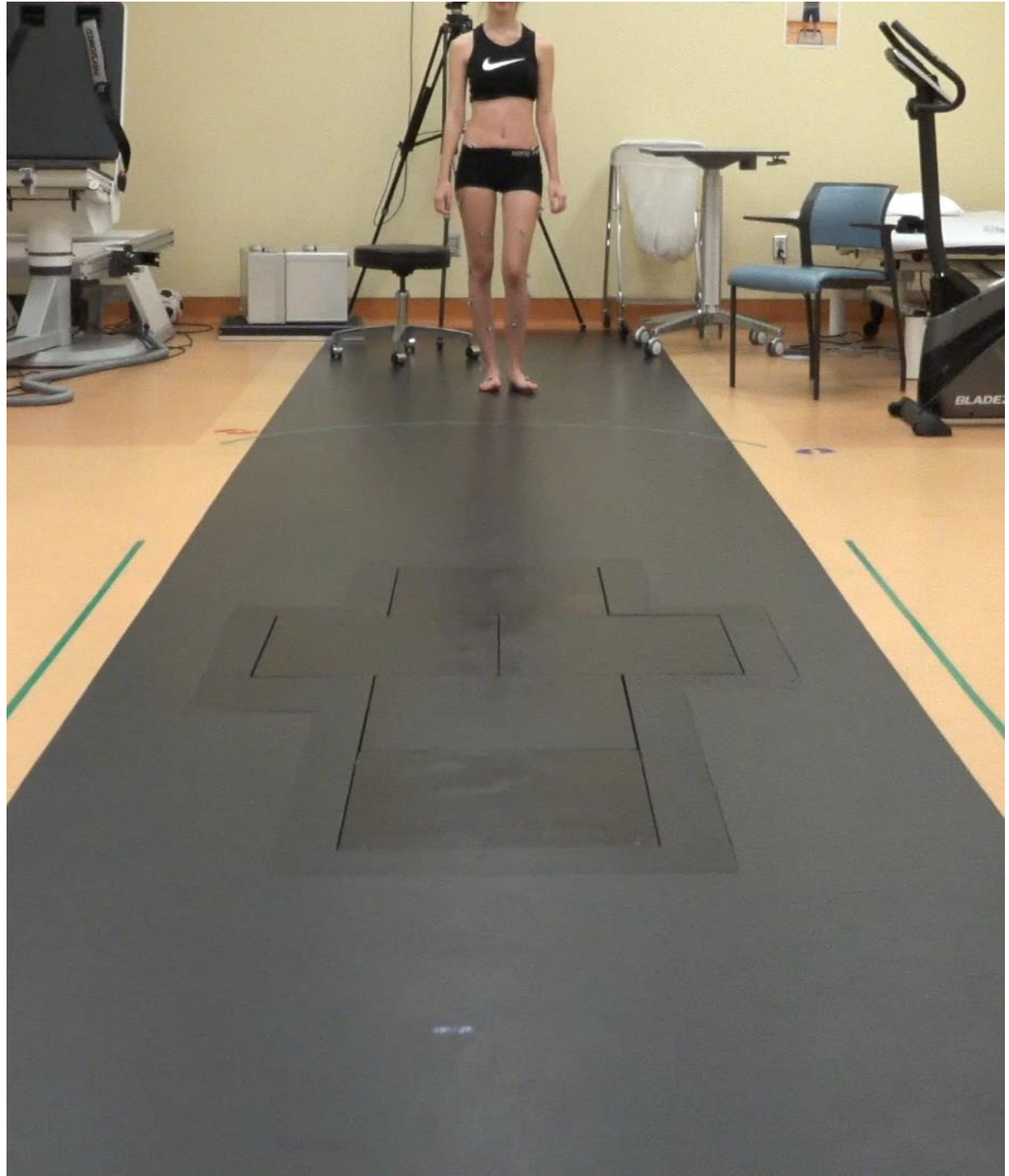

40°
20°
0
-20°
-40°
2 SD
2 SD
1
3
5
7
9
11
13
15-19
30's
50's
70+
Age (years)

Internal Tibial Torsion

- Usually symmetric
- Most cases will remodel by age 4
- May be associated with femoral anteversion
- Cosmetic concern
- No functional implications

Miserable Malalignment Syndrome

Femoral anteversion with compensatory tibial torsion



Metatarsus Adductus

- 0 – 18 months
- Forefoot pointing in
- Intrauterine fetal position
- Most respond to time, stretching, or casting
- Must differentiate from clubfoot (where hind foot is malpositioned and foot very stiff)

Metatarsus Adductus

Refer:

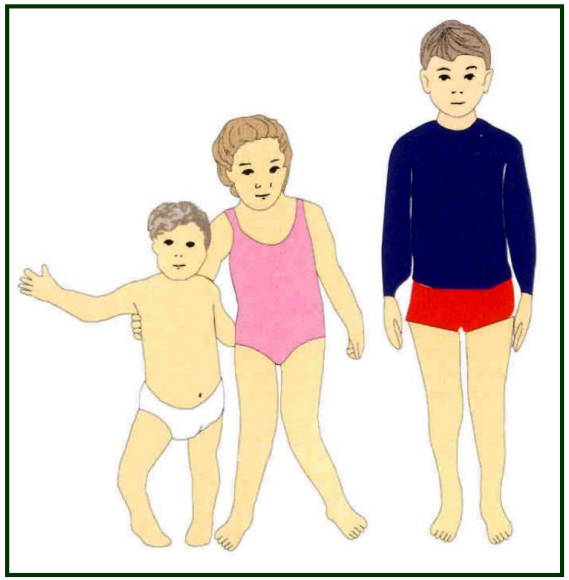
- Not flexible
- Very curved lateral border
- Deep medial crease
- < 8 months of age

Intoeing Summary

Refer:

- Very asymmetrical
- Abnormal physical examination
  - ↑ Tone
  - Clonus
  - Hyperreflexia
- Foot – Deep medial crease and rigid

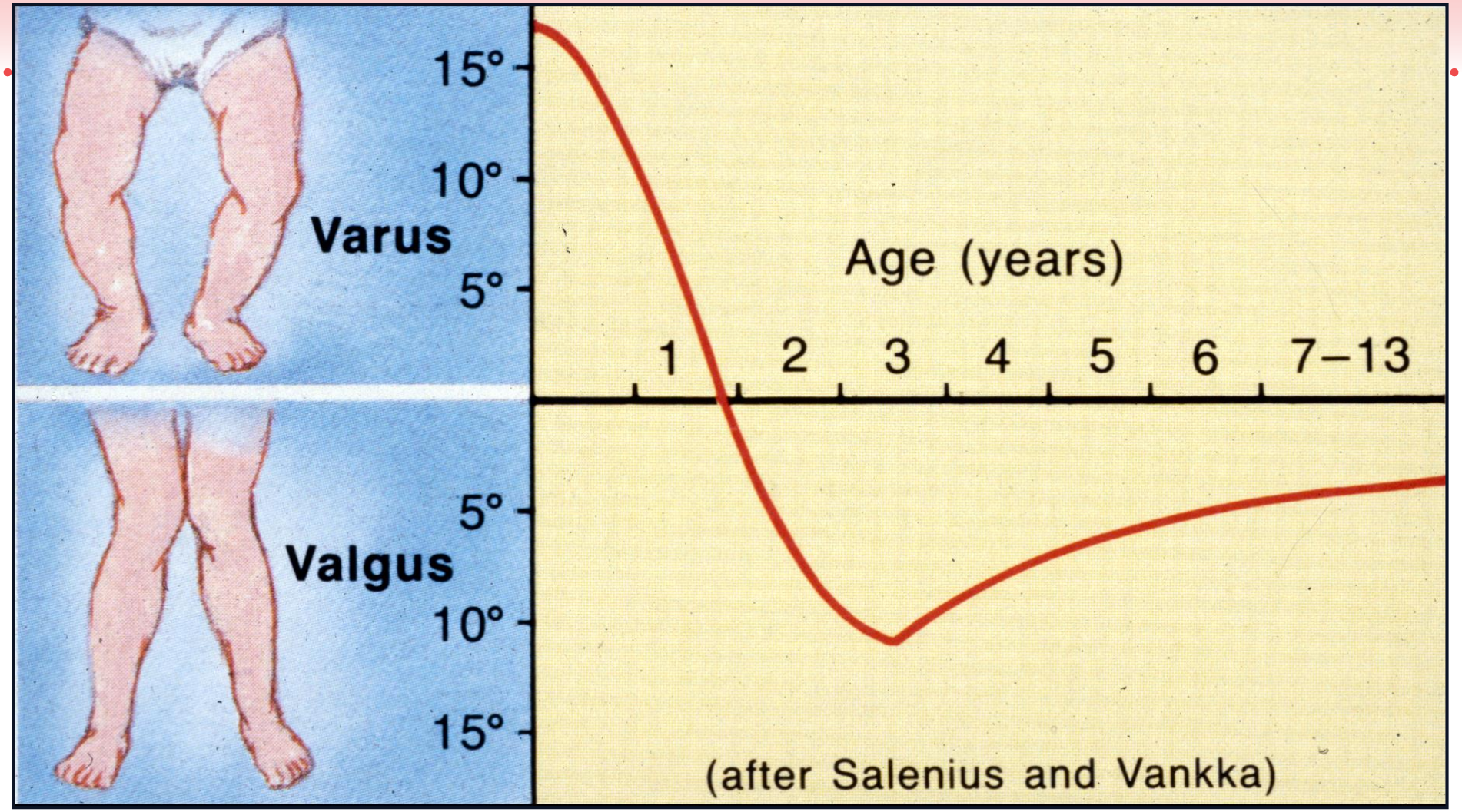
Angular Deformities in Children



Bowlegs = Genu Varum

Knock knees = Genu Valgum

- Usually physiological, needs no treatment
- But… do not miss pathological causes
- How to differentiate physiological from pathological angulation in children?


15°
10°
Varus
5°
Age (years)
1
2
3
4
5
6
7–13
5°
Valgus
10°
15°
(after Salenius and Vankka)

Approach to a Child with Angular Deformity

- Family history
- History of present condition
  - Progression
- Physical examination:
  - General (features of skeletal dysplasia)

Clinical Evaluation

- No evidence of pathological bone disorder
- Age of the child
  - Genu Varum = 1 – 3 years
  - Genu Valgum = 3 – 7 years

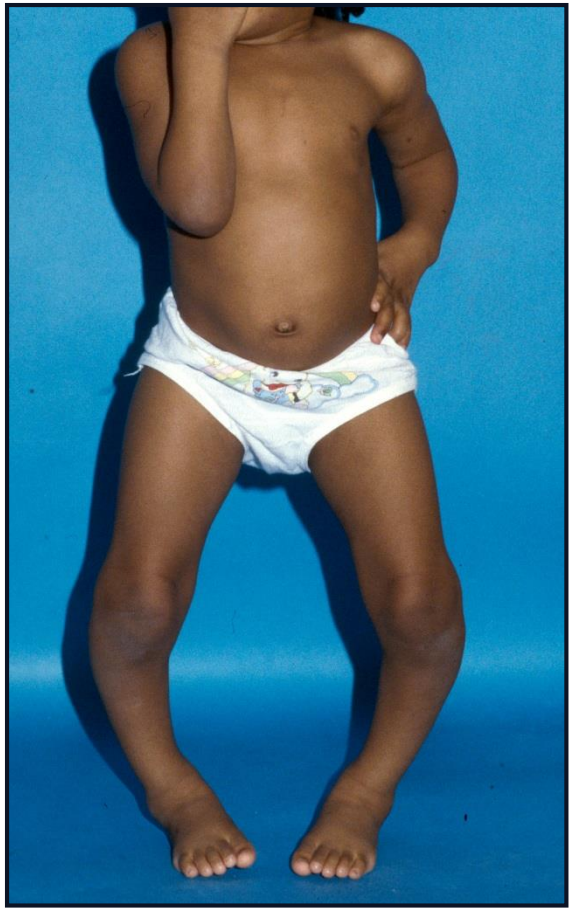
  Therefore, it is physiological – you do not need to refer the patient
- Follow-up appointment
- Clinical photographs

18 months

4½ years old

When should you refer a child with angular deformities?

- Deformities falling outside the age for physiological genu varum and valgum

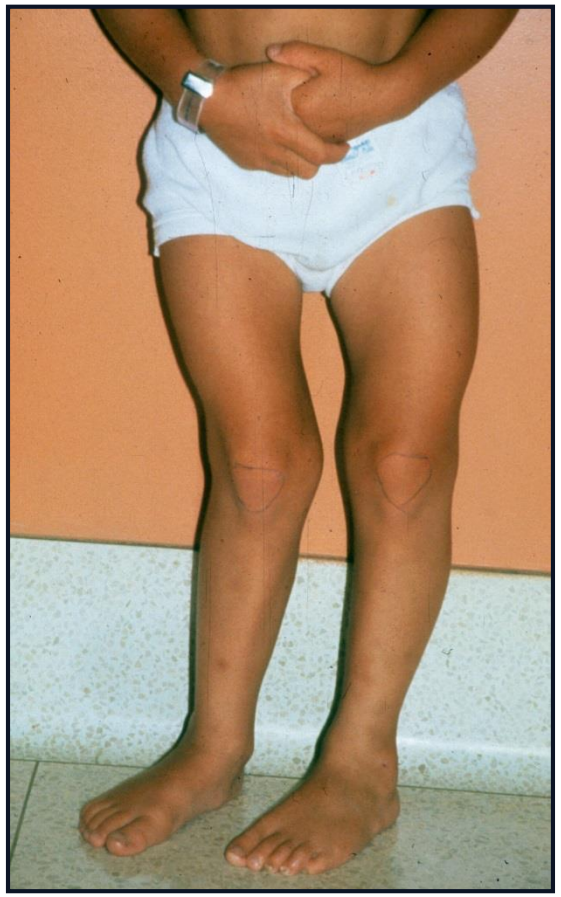


When should you refer a child with angular deformities?

- Unilateral

When should you refer a child with angular deformities?

- Asymetrical



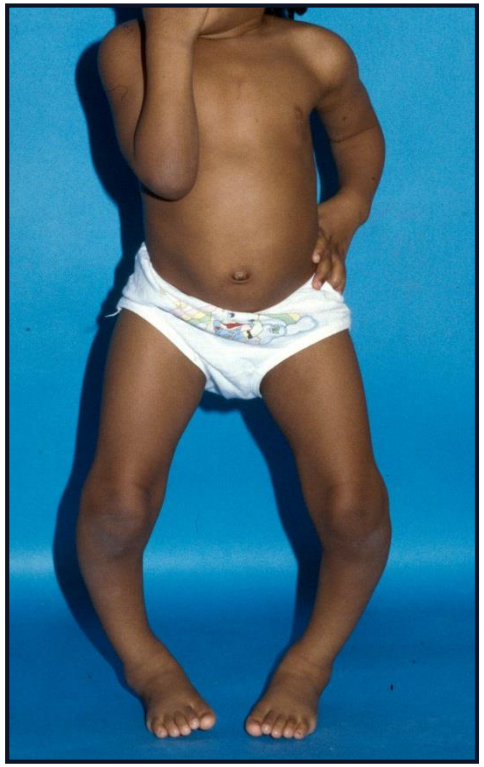
When should you refer a child with angular deformities?

- Severe

When should you refer a child with angular deformities?

- Progressive

18 months



4 years old

When should you refer a child with angular deformities?

- Any suspicion of pathological disorder

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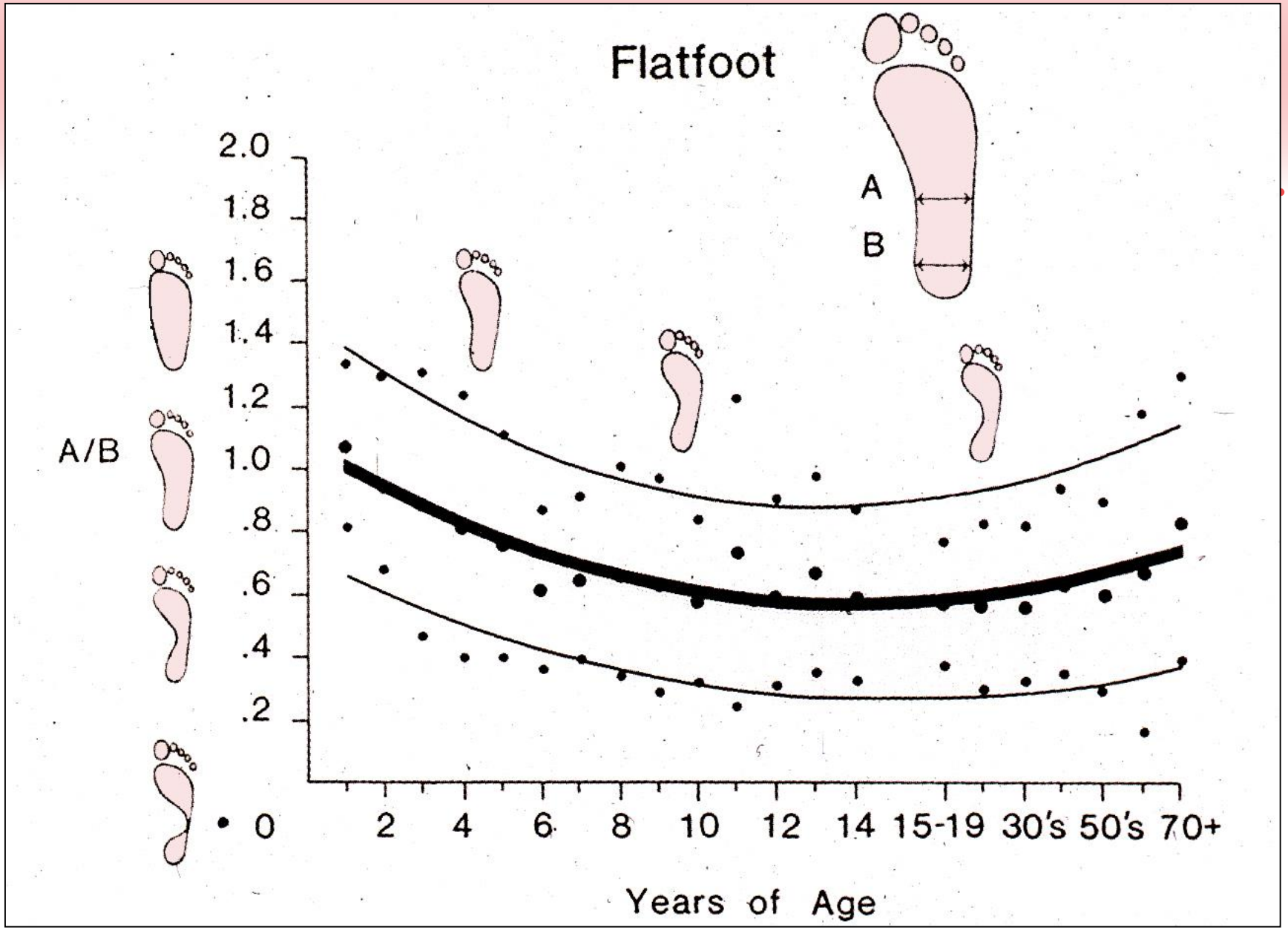
When should you refer a child with angular deformities?

- Deformities falling outside the age for physiological genu varum and valgum
- Unilateral
- Asymetrical
- Severe
- Progressive
- Any suspicion of pathological disorder

Flatfeet

Flatfeet

- Most always asymptomatic
- No correlation to back pain
- Major source of concern to parents


Flatfoot
A
B
A/B
2.0
1.8
1.6
1.4
1.2
1.0
.8
.6
.4
.2
0
2
4
6
8
10
12
14
15-19
30's
50's
70+
Years of Age

Corrective Shoes and Inserts as Treatment for Flexible Flatfoot in Infants and Children*

BY DENNIS R. WENGER, M.D.†, SAN DIEGO, DONALD MAULDIN, M.D.‡, GAIL SPECK, M.D.‡, DEAN MORGAN, C.PED.‡, DALLAS, TEXAS, AND RICHARD L. LIEBER, PH.D.†, SAN DIEGO, CALIFORNIA

From the Texas Scottish Rite Hospital, Dallas, and the Division of Orthopedics, University of California at San Diego, San Diego

Flatfeet

- Rigid vs flexible
- Painful
- Reforms arch with NWB
- ST joint mobility

Different Dx of Painful Rigid Flatfeet

- Tarsal coalition – unilateral or bilateral
  - –8 – 14 years of age
  - –Mechanical/no history of trauma
- JRA - bilateral
- Infection - unilateral
- Trauma - unilateral

Refer:

- Painful → flexible or rigid

Do not refer:

- Not painful, even if rigid
- Arch supports

Thank You ?

- Time

Toe Walking

History

- > 3 years of age
- Perinatal history/develpment
- Family history
- Timing
- % of time on toes

Physical Exam

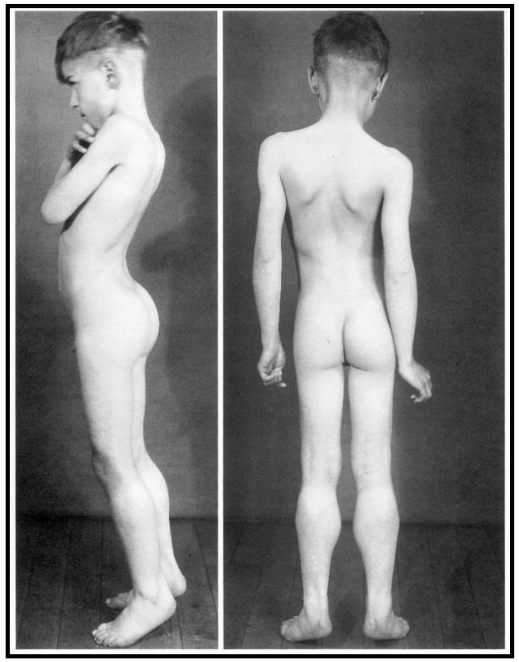
- Calf hypertrophy
- Gower sign
- Clonus, hyperreflexia
- Spine
- Squat test

- Ankle DF to be assessed with knee in EXT.

DF= -20°

DF= 0°

- DDx:
  - ❖Cerebral palsy
  - ❖Muscular dystrophies
  - ❖Tethered cord syndrome
  - ❖Diastematomyelia
  - ❖Other neuromuscular diseases
  - ❖Autism



TREATMENT:

Any ANOMALY on exam **REFER** →

- If left untreated, will persist or worsen
- Modalities:
  - Physio: Stretching
  - Night braces
  - Serial casts
  - Surgery

Thank you!

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