

Developmental Dysplastic Hip (DDH)

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Developmental Dysplasia of Hip Joint

DDH

congenital dislocation of the hip joint

The term developmental dysplasia of the hip (DDH) has replaced congenital dislocation of the hip because it seems more accurately in reflecting the full spectrum of abnormalities that affect the immature hip



Definition

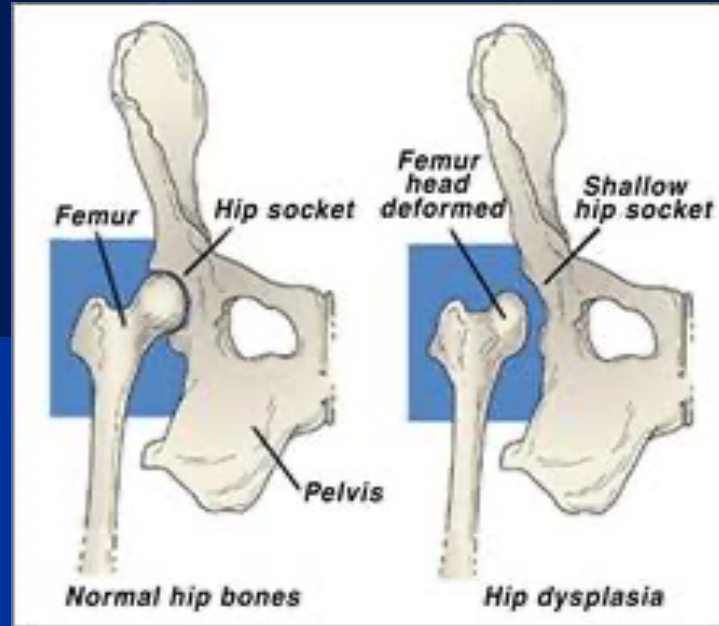
Hip dysplasia

refers to an abnormality in the size, shape, orientation, or organization of the femoral head, acetabulum, or both.

Acetabular dysplasia

is characterized by an immature, shallow acetabulum

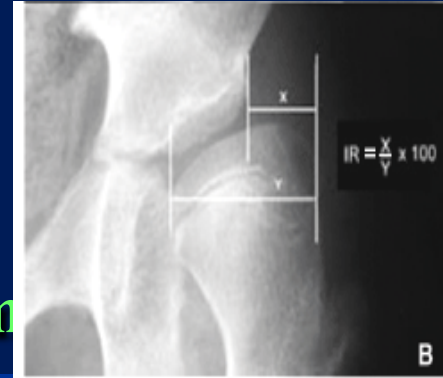
That can result in subluxation or dislocation of the femoral head.



Types of dysplastic hip

1) In a subluxed hip

the femoral head is displaced from its normal position but still makes contact with a portion of the acetabulum



Figures 1 A and B - Illustration of X-ray analysis for acetabular index (A) and Reimers' index (B).

2) A dislocated hip

there is no contact between the articular surface of the femoral head and the acetabulum.



3) An unstable hip

is one that is reduced in the acetabulum but can be provoked to subluxate or dislocate



Congenital Dislocation of Hip

- Incidence: 1 or 2 per 1000 infants
- Girls are more commonly affected
- First born
- Association with breech presentation
- Left hip is more often affected
- Family history
- Other congenital abnormalities

Epidemiology and Etiology

The **incidence of DDH** is variable and depends on many factors. **Approximately one in 1,000 children is born with a dislocated hip & 10 in 1,000 may have hip subluxation.....**

Risk Factors

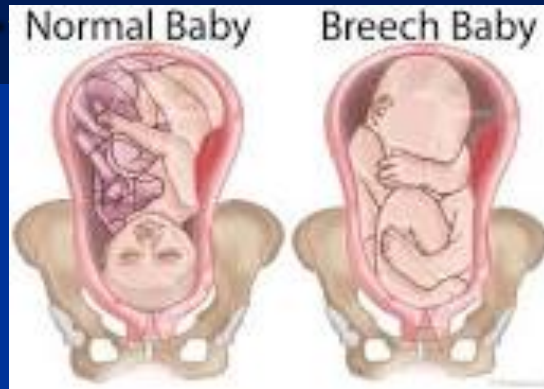
contributing to DDH

include:-

1) breech presentation, ...

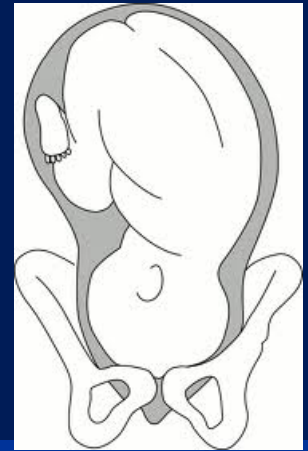
2) female sex, 80% of children with DDH are females. This is related to the effects of additional estrogen produced by the female fetus, which increases ligamentous laxity.

3) positive family history ..positive in 25% of the patients .



4) Intrauterine position ,

The left hip is affected in 60 % of children, the right hip in 20 %, and both hips in 20 %... The left hip is more commonly involved because it is adducted against the mother's lumbosacral spine in the most common intrauterine position (i.e., **left occiput anterior**)



5) miscellaneous factors include

A) first born status, are affected twice as often as subsequent siblings, presumably because of an unstretched uterus and tight abdominal structures in the mother , oligohydramnios.

B) Race. < Less common in black people >.

C) The postnatal extrauterine environment also plays a role in DDH. The incidence of DDH is high in Native American cultures & in the north of IRAQ that use swaddling, which forces the hips into adduction and extension









1



2



3



4



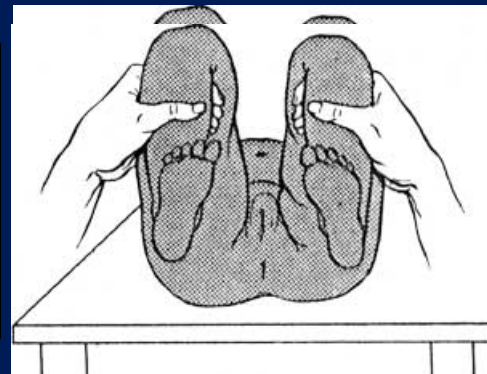
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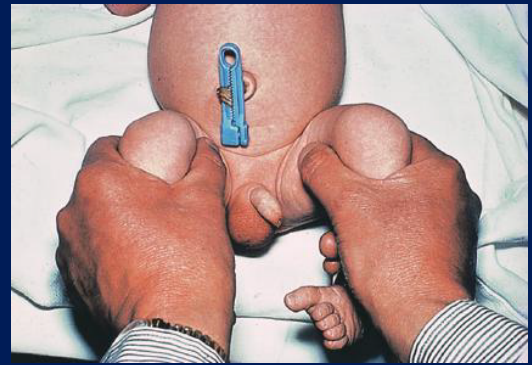
Physical Examination



A careful physical examination is recommended as a **screening tool**, particularly for high-risk infants. Evaluation of the hip begins with observation of both lower extremities. The diaper should be removed and the infant relaxed. Each hip must be examined separately. The child should be supine with the hips flexed to 90 degrees.



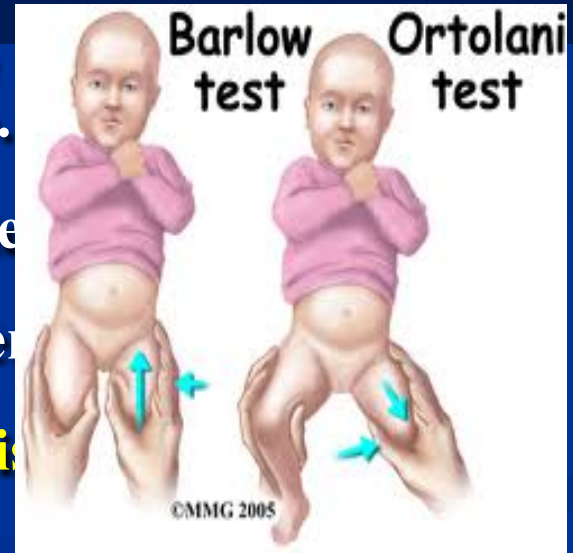
1) examiner should place his or her index and long fingers laterally over the child's greater trochanter with the thumb medially along the inner thigh near the groin crease.



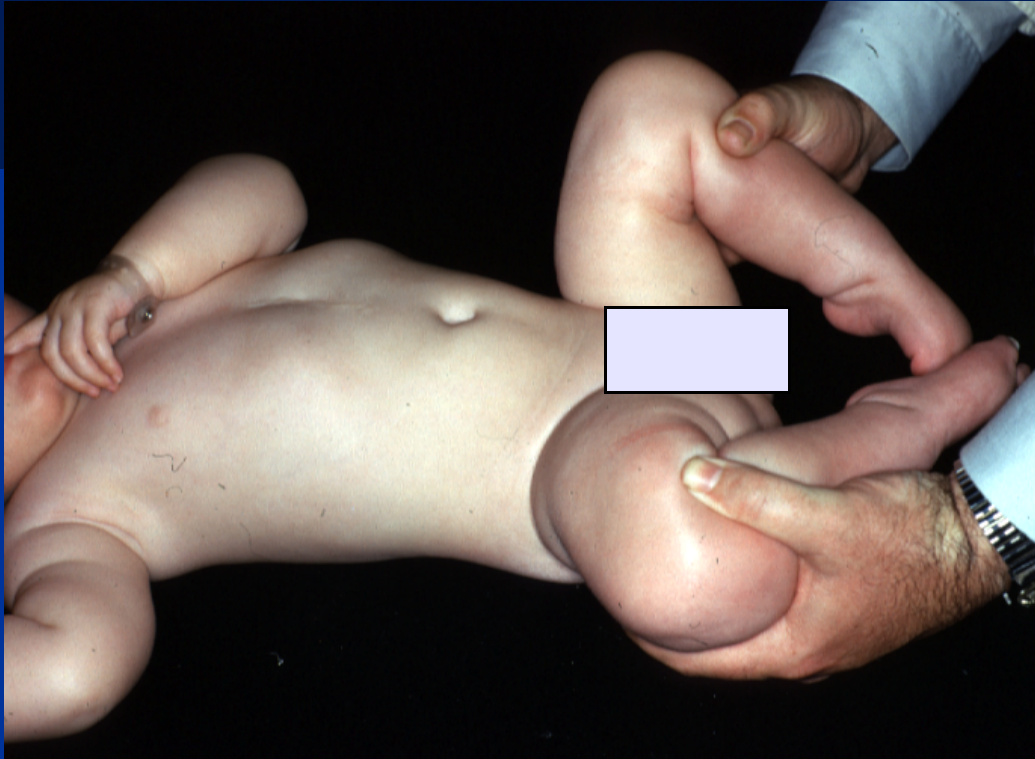
2) The examiner stabilizes the child's pelvis by holding the contralateral hip still while the opposite hand examines the hip.

The examiner should gently abduct the hip being tested while simultaneously exerting an upward force through the greater trochanter laterally

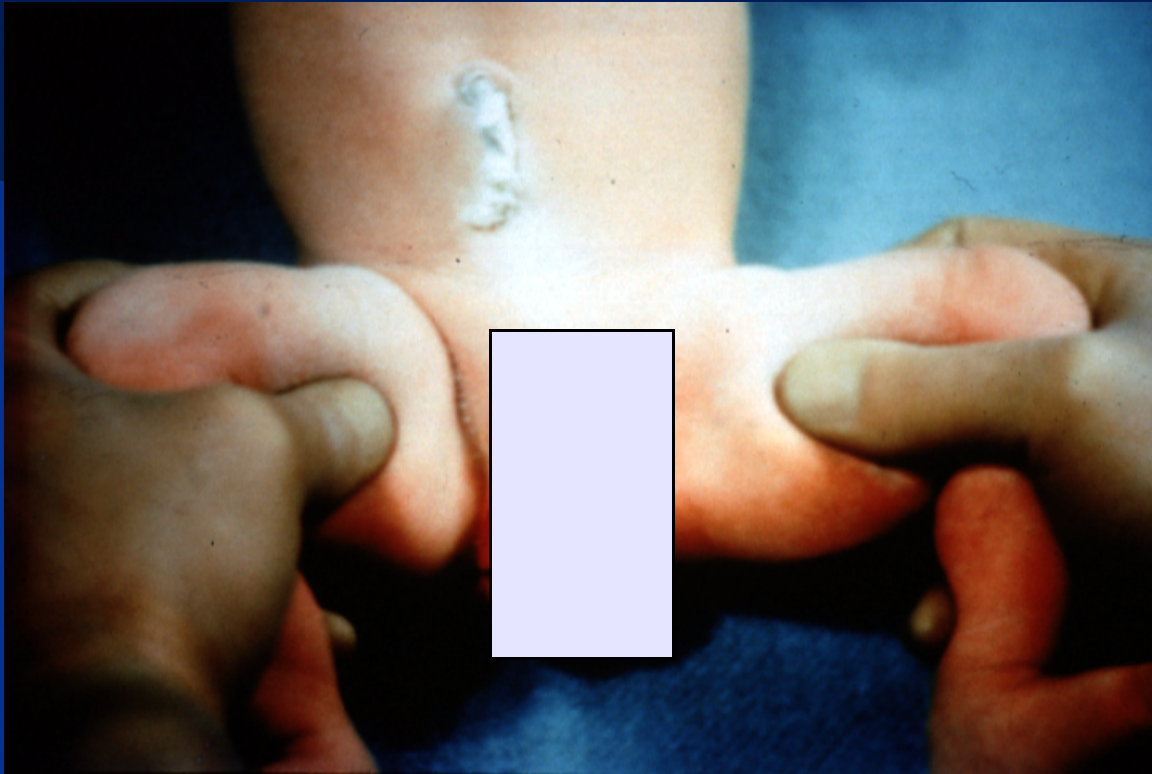
The sensation of a palpable "clunk" is a positive Ortolani test ((represents the reduction of a dislocated hip into the bony acetabulum.))



Loss of abduction

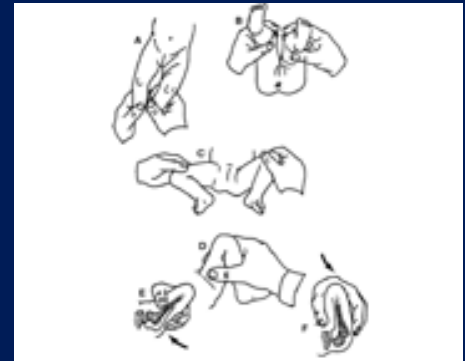


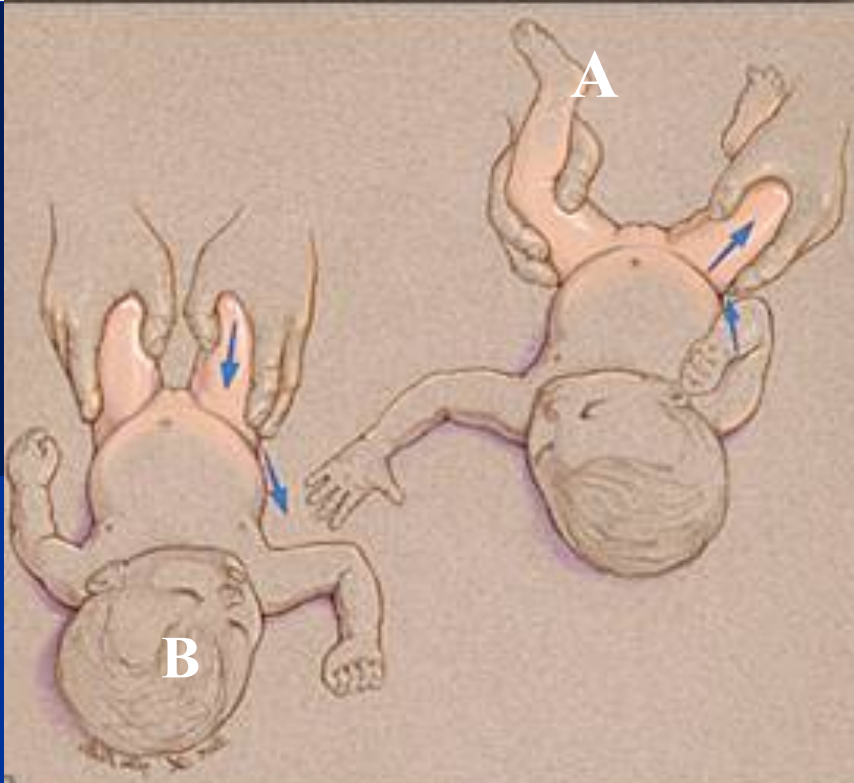
Barlow/Ortolani tests



3) To perform the Barlow test, the pelvis is stabilized and the patient is positioned similar to the Ortolani test position. The difference is that the examiner adducts the child's hip and exerts a gentle downward force in an attempt to subluxate or dislocate an unstable hip posteriorly.

These tests are only useful in infants three months or younger.

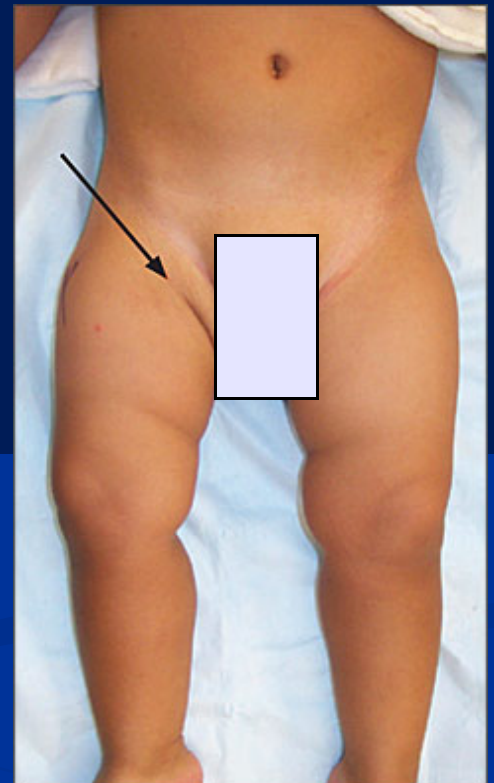




Tests commonly used to assess hip stability.

(A) Ortolani maneuver. A gentle upward force is applied while the hip is abducted.

(B). Barlow maneuver. A gentle downward force is applied while the hip is



A 21-month-old child with right hip dislocation.

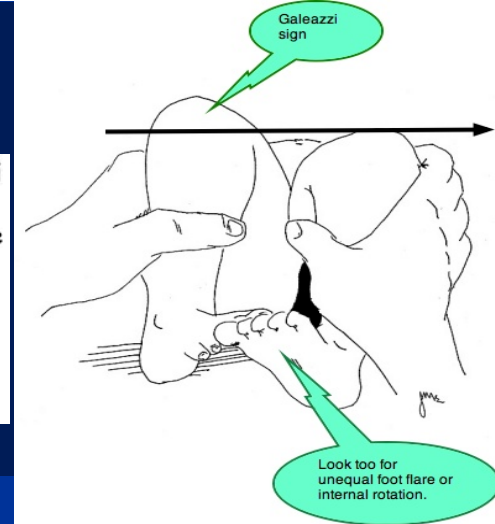
Note the asymmetric skinfolds in the upper thigh.



A positive Galeazzi sign

in a 7-month-old girl with left hip dislocation.

Note the apparent femoral shortening



If the Ortolani or Barlow test is equivocal or inconclusive on examination at birth, the physician should have the newborn return for follow-up in two weeks.

Asymmetric skinfolds or leg length inequality are common findings with unilateral hip dislocation, although asymmetric skin folds are not specific to DDH.

The Galeazzi sign is elicited by placing the child supine with both hips and knees flexed. An inequality in the height of the knees is a positive Galeazzi sign and usually is caused by hip dislocation or congenital femoral shortening.

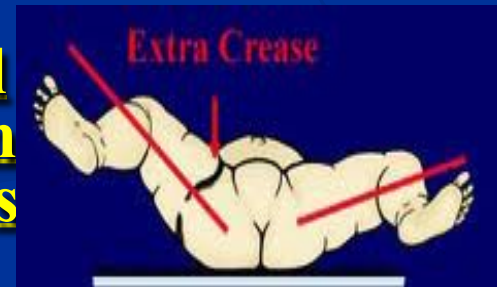


**A three-year-old with a
left hip dislocation.**

**Note the limited
abduction**



**An infant with hip dislocation will
develop limited hip abduction on
the affected side by three months
of age .**

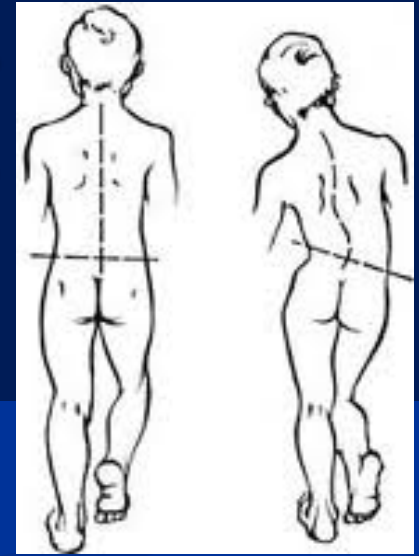


**Maximal abduction of the hips
should be greater than 60 degrees,
or a dislocated hip should be
suspected**



Physical signcont.

Trendelenburg's symptom (a limp on the affected side) may be the first sign of a dislocated hip. In children with established dislocations, the action of the gluteus medius in pulling the pelvis downwards in the stance phase is ineffective or weak because of a lack of a stable fulcrum. For a child with a right hip dislocation, the pelvis drops on the opposite side (i.e., left), causing instability. To restore the stability and prevent falls to the left, the body lurches to the right side and shifts the center of gravity over the stance side (i.e., right hip). The top of the greater trochanter telescopes upward and mechanically hitches on the ilium to stabilize the joint. This movement at every stance phase is called the Trendelenburg gait.



Radiographic Examination

Radiographs of newborns with suspected DDH are of limited value because the femoral heads do not ossify until four to six months of age.

Ultrasonography is the study of choice to evaluate for DDH in infants younger than six months because it is capable of visualizing the cartilaginous anatomy of the femoral head and acetabulum.

Plain radiographs are useful after (4-6) months of age

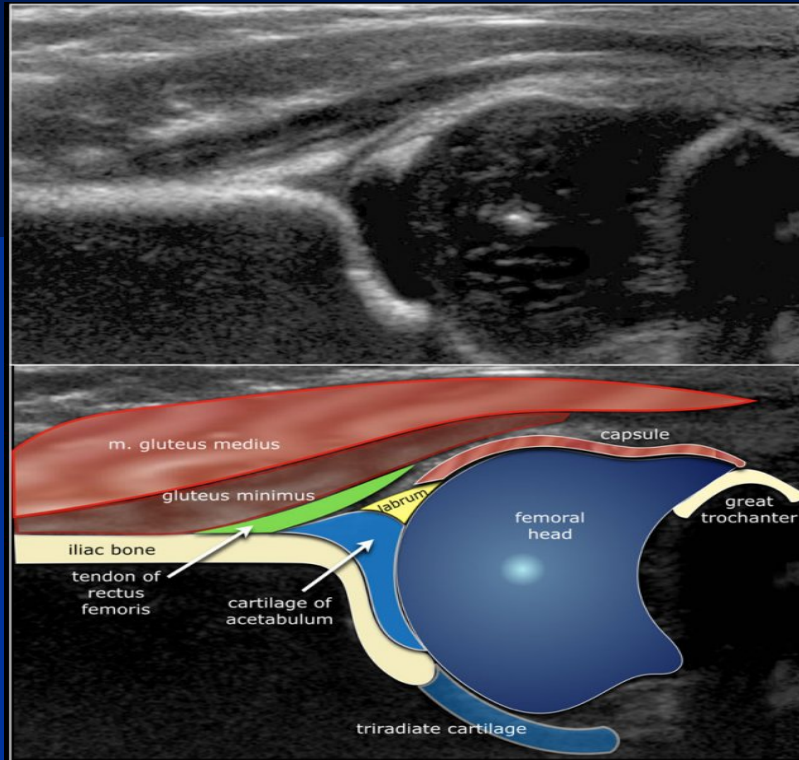
Hilgenreiner's line is drawn horizontally through the triradiate cartilages of the pelvis.

Perkin's line is drawn perpendicular to Hilgenreiner's line at the lateral edge of each acetabulum.

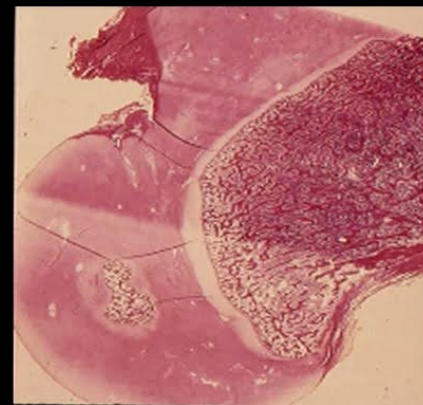
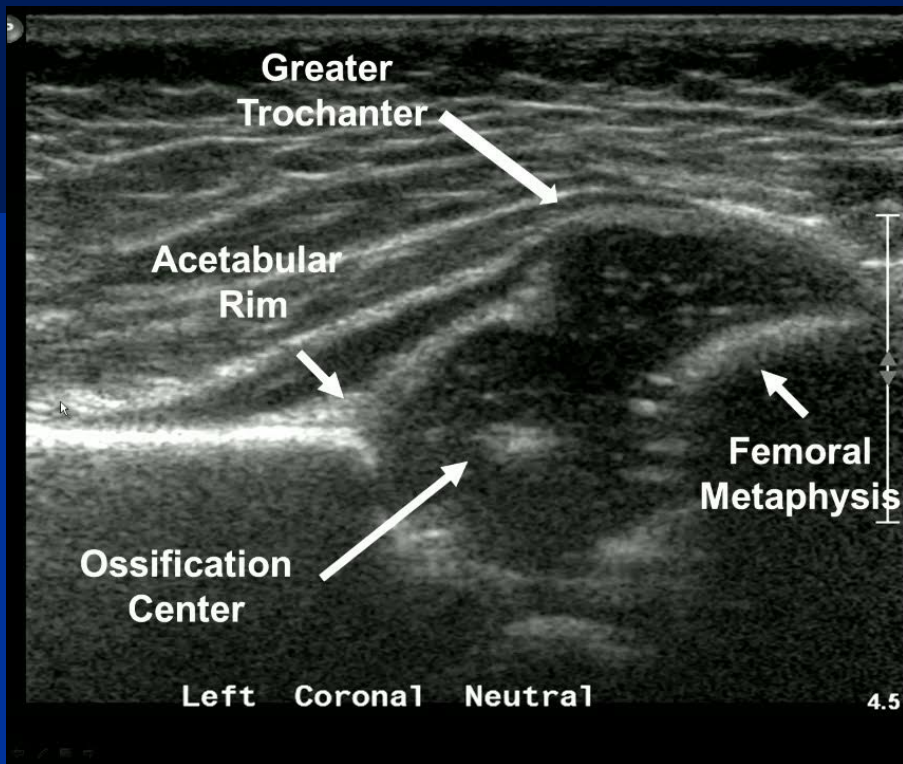
**(The femoral head should lie within the inferomedial quadrant formed by Hilgenreiner's and Perkin's lines).
In a dysplastic hip, the lateral edge of the acetabulum may be difficult to identify, and the femoral head may lie in the superior or lateral quadrants.**



ULTRASOUND OF DDH



ULTRASOUND OF DDH



Normal Hip

Dislocated Hip

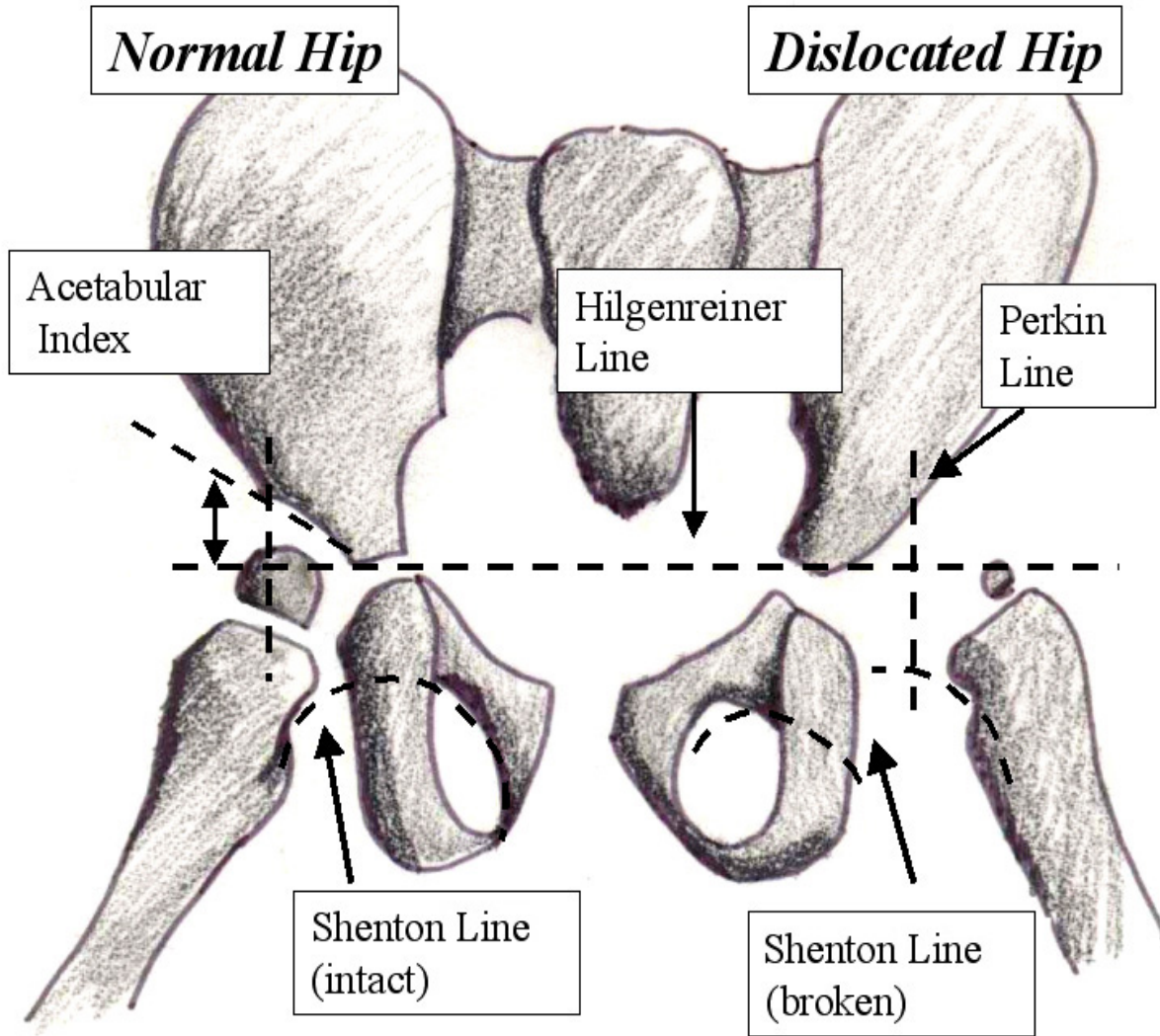
Acetabular Index

Hilgenreiner Line

Perkin Line

Shenton Line (intact)

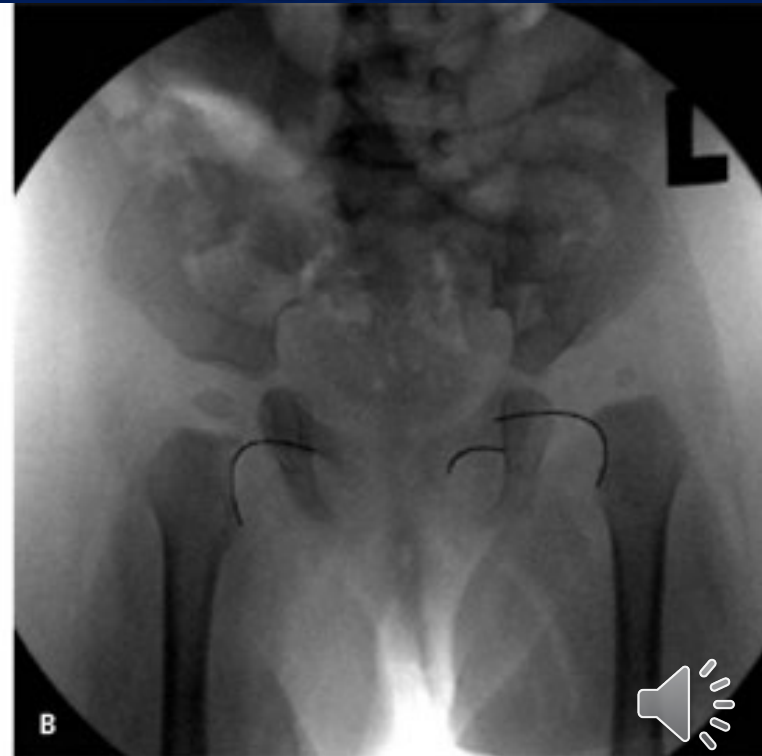
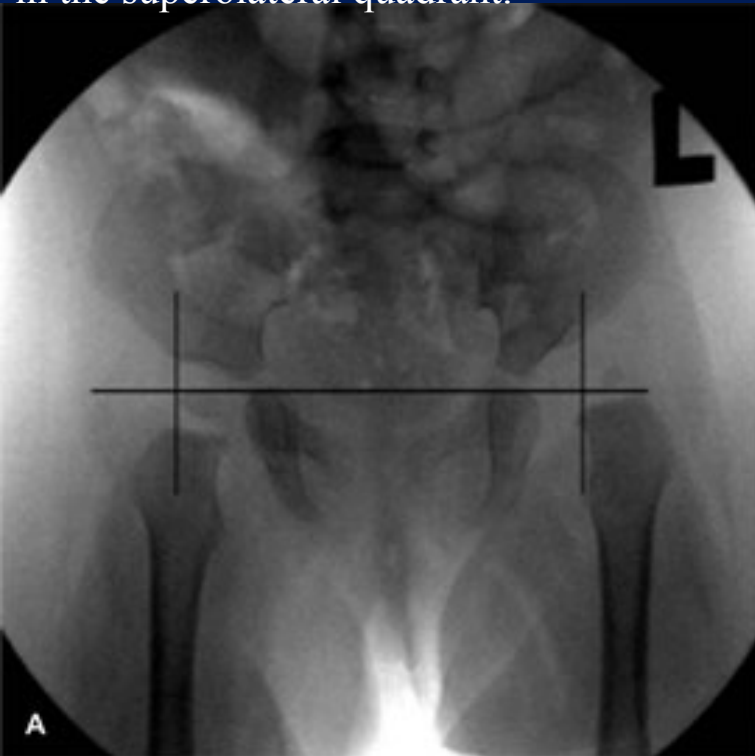
Shenton Line (broken)



The **horizontal line is Hilgenreiner's line**, and the **vertical lines are Perkin's lines**.

Note that the femoral (normal) head on the right lies in the inferomedial quadrant formed by these lines. The **left hip is dislocated**; its femoral head lies in the superolateral quadrant.

Shenton's line is It is defined by the medial border of the femoral neck and the superior border of the obturator foramen. A break in Shenton's line suggests displacement of the femoral head from the bony acetabulum



X-ray of DDH



Management

The goal of treatment in DDH is to achieve and maintain reduction of the femoral head in the true acetabulum by closed or open means.

The earlier treatment is initiated, the greater the success and the lower the incidence of residual dysplasia and long-term complication



Treatment

Treatment in the first (2- weeks) of life.

Subluxation of the hip at birth often corrects spontaneously and may be observed for two weeks without treatment. The double- or triple-diaper technique, which prevents hip adduction, . When subluxation persists beyond two weeks of age, treatment is indicated and the appropriate referral should be made



Treatment from ((2weeks -6 months)).

In newborns and infants up to
six months of age, closed
reduction and immobilization
in a Pavlik harness is the
treatment of choice The
Pavlik harness dynamically
positions the hips in flexion
and abduction while allowing
motion „((95 % success rate
for acetabular dysplasia and
subluxation. The success
rate drops to 80 % for
complete hip dislocation)),



Reduction of the hip should be confirmed by ultrasonography within three weeks of harness treatment. Treatment usually is continued for at least six weeks full-time and six weeks part-time in young infants. The end point of brace treatment is a stable hip with normal imaging studies.

If a dislocated hip is not reduced within three weeks, the harness should be discontinued and an alternative treatment selected, usually by ((closed reduction under anesthesia with hip spica))



Treatment in children

((6month – 2years of age))

In children older than six months, closed reduction under general anesthesia and hip spica casting is the treatment of choice. Postoperative computed tomography CT-scan or magnetic resonance imaging MRI should be used to confirm concentric reduction . Immobilization in the hip spica cast after closed reduction under GA. usually continues for at least 12 weeks .

If the hip is irreducible by closed means, or a concentric reduction is not achieved, successful treatment requires open reduction. ,,,



Treatment continue 6 months – 2 years

Open reduction of the hip in a child with DDH involves;-

1)lengthening tendons around the hip,

2)

removing obstacles to reduction ,fat pad,
inverted limbus of the capsule, transvers
acetabular lig, large lig.teres of fem.head
,Psoas muscle tendon

3)

tightening the hip capsule once reduction is



Treatment in children above 2years of age

Surgery becomes more technically demanding in older children with established dislocations. By 18 months, femoral osteotomies with or without pelvic osteotomies may be necessary to reconstruct and safely maintain the hip in a reduced position.



Take home message

In general, the goal of the family physician in examining for DDH should be early diagnosis and referral to an orthopedic surgeon . This is because treatment earlier in life, especially within the first six months, is safer and more successful than treatment after the child start walking.



Life is movement. Once you stop moving, you're dead. Choose life.

Eugen Sandow

Thank you

