433 Teams

ORTHOPEDICS

L4- Common Pediatric Hip Problems

Color index:

Team 432 & Slides

Important

Doctor's Notes

UpToDate

Apley's System of Orthopedics

Team's Notes

Explanations

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Objectives (From student's Guide)

To be able to outline the clinical features; to specify the symptoms and signs; to outline the assessment and investigations; to propose a differential diagnosis and; outline the principles of management of pediatric patient with conditions including **Hip Conditions:-**

- Slipped Capital Femoral Epiphysis (SCFE)
- Developmental Dysplasia of the Hip (DDH)

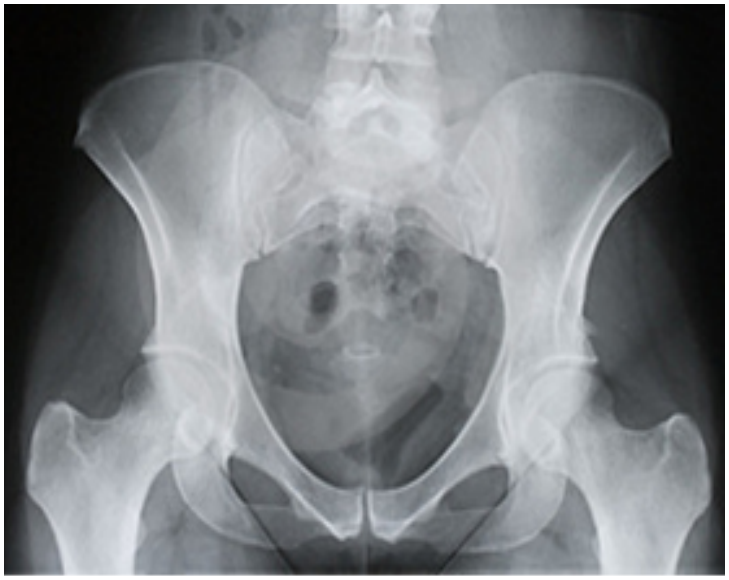
Nomenclature:

CDH : Congenital Dislocation of the Hip (this is an old name but it's still acceptable to use in the medical filed)

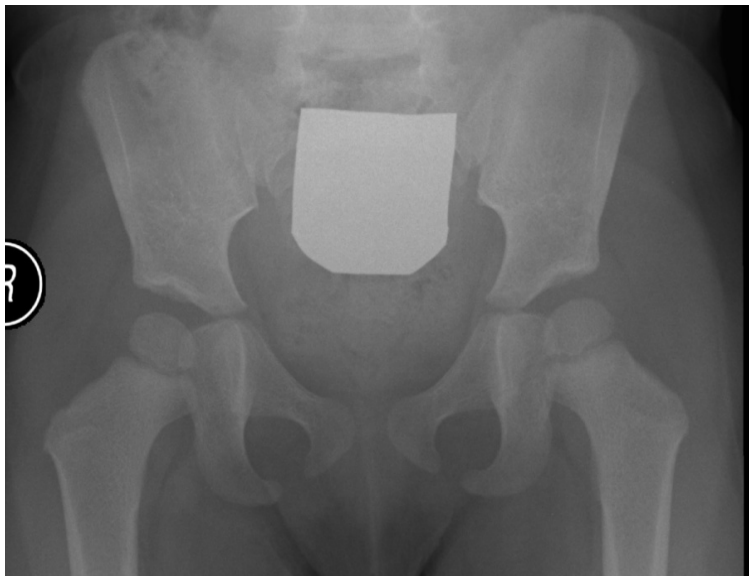
DDH : Developmental Dysplasia of the Hip

Introduction to Pediatric Orthopedics:

Normal Pelvis:



Adult Pelvis



Child Pelvis

You can see that there is different in size, the space between the joints and the connection between head of femur to the neck!!

1st: Developmental Dysplasia of the Hip (DDH):

Pediatric Hip Dislocation Types:

1- Idiopathic

- Isolated pathology

2- Teratologic

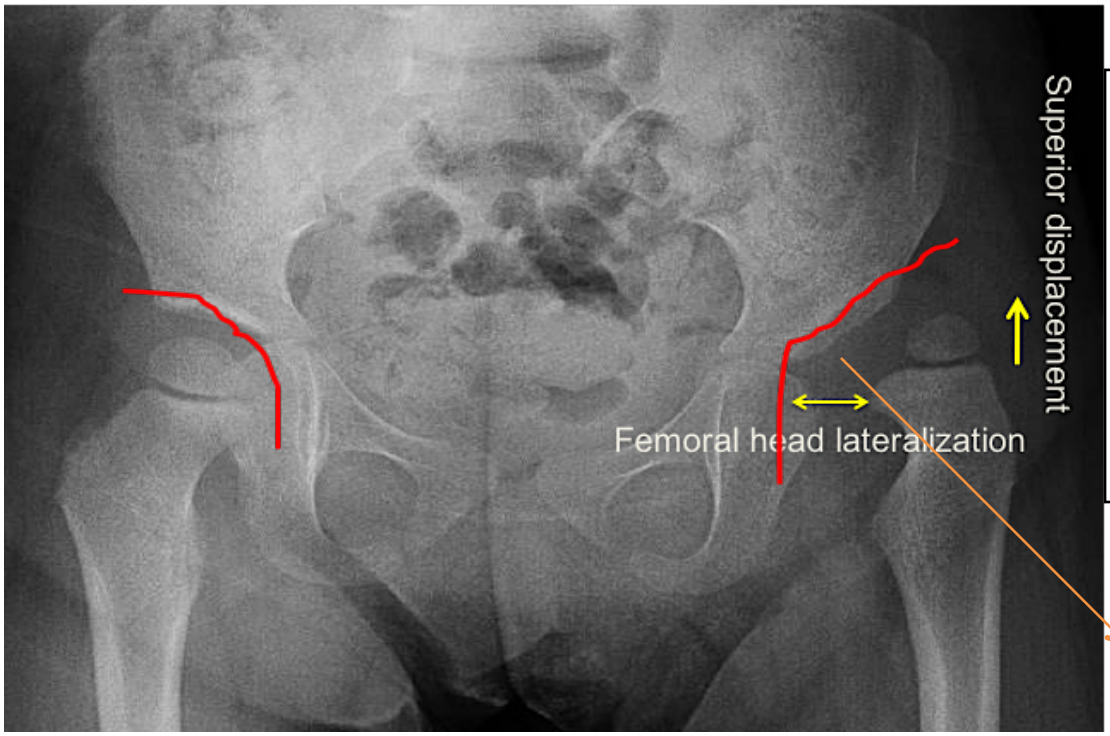
- **Neurologic:** patients with cerebral Palsy or Myelomeningocele (a neural tube defect in which the bones of the spine do not completely form)
- **Muscular:** Arthrogryposis
- **Syndromatic:** Larsen's syndrome (It is a rare skeletal dysplasia characterized by congenital dislocation of large joints, foot deformities, cervical spine dysplasia, scoliosis, spatula-shaped distal phalanges and distinctive craniofacial abnormalities, including cleft palate)

3-Miscellaneous

- Complication to hip septic arthritis
- **Traumatic**

- Note: delivery in its self (OBGY Dr.) does not dislocate a hip.
- Teratologic usually in the 1st trimester.
- DDH occurs in the 3rd trimester.

Normal hip Dislocated hip



DDH pathology is of 2 components:

1- Femoral head position (The yellow arrows)

2- Acetabular development (The red lins)

Shallow Acetabulum

X-Ray Note:

- The head of femur is not articulating/attached to the acetabulum
- The acetabulum is shallow (dysplastic acetabulum) not curved (cannot hold the head).

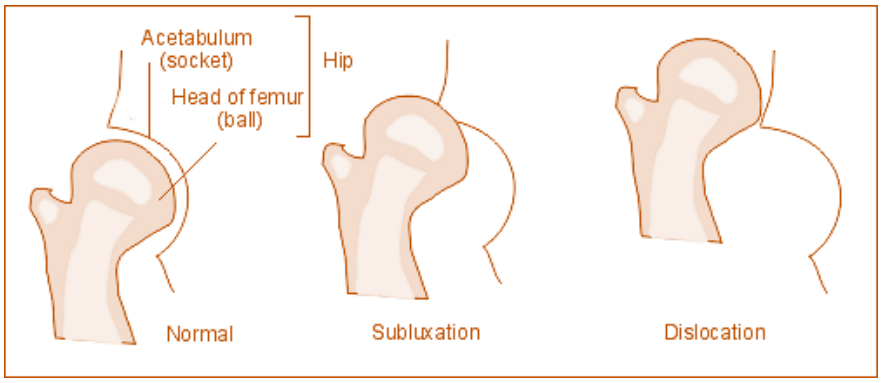
What is DDH ?

DDH describes a spectrum of conditions related to the development of the hip in infants and young children. It encompasses abnormal development of the acetabulum and proximal femur and mechanical instability of the hip joint. (It's the relationship between the acetabulum and the head of femur NOT like the SCFE epiphysis and the neck of femur)

- DDH is not due to an injury during delivery (not congenital) because even when there is an insult of any kind, it will cause fracture before causing dislocation.

Patterns of Disease:

1. Dislocated: There is a complete loss of contact between the femoral head and the acetabulum
2. Dislocatable: high risk of dislocation. The femoral head is reduced (ie, within the acetabulum) at rest, but can dislocate in other positions [ex: walking] or with examination maneuvers. This is a hip with instability.
3. Sublaxated: The femoral head is partially outside of the acetabulum but remains in contact
4. Acetabular Dysplasia: The acetabulum is shallow and "dish shaped" rather than "cup shaped." The upper portion (roof) of the acetabulum is obliquely inclined outward rather than having the normal horizontal orientation.



Causes: (Multi-focal, but mostly UNKNOWN)

Normal hip joint development depends upon normal contact between the acetabulum and the femoral head promoting mutual induction. Abnormal development is a result of abnormal contact, which may result from multiple factors, which are as follow:

1- Hormonal:

- ✓ Relaxin: (Is secreted during the 3rd trimester to relax the Sacroiliac joint & symphysis pubis leading to enlargement of the pelvis. However, a Female fetus also has Receptors to relaxin>> this will lead to widening of the hip joint capsule>> pushing femoral head up & thus, it is more common in girls than in boys!)
- ✓ Oxytocin

2- Familial: Ligament Laxity disease.

3-Genetics: Female x4-6 and twins ↑ 40%.

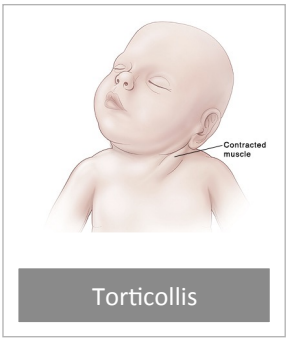
4- Mechanical cause:

- ✓ ***Pre-Natal:*** Breach, Oligohydrominus (=Low Amionatic Fluid Index), Primigravida(= first pregnancy) , Twins:1-torticollis (a twisted neck in which the head

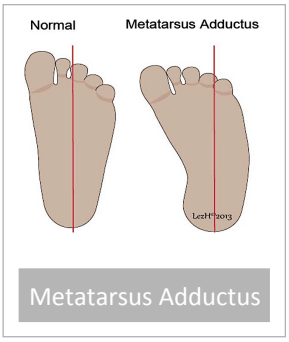
is tipped in on side. When you find Torticollis you need to check the hip, femur and foot deformity and neck deformity), 2- Metatarsus Adductus.

Q: How do these factors cause DDH? By the 11th week of gestation, the hip joint is fully formed. The femoral head is spherical and deeply set within the acetabulum. However, the femoral head grows at a faster rate than the acetabulum, so that by the end of gestation the femoral head is less than 50 percent covered by the acetabular roof. During the final four weeks of gestation, the hip is vulnerable to mechanical forces, such as adduction, that direct the femoral head away from the central portion of the acetabulum . Conditions that limit fetal mobility, including breech positioning, accentuate these mechanical forces. This results in eccentric contact between the femoral head and the acetabulum.

✓ ***Post-Natal:*** Swaddling, Strapping: ligamentous laxity at that age makes the developing hip susceptible to other external mechanical forces. Positioning with the hips extended (eg, swaddling) can result in eccentric hip joint contact as the femoral head glides within or moves outside of the acetabulum.



Torticollis



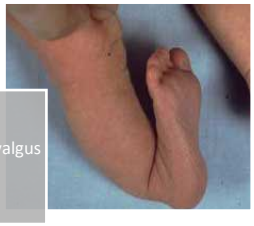
Metatarsus Adductus


Swaddling


This's healthier

High Risk Infants:

- Parents who are relatives (consanguinity)
- Positive family history: x10
- 1ST child
- Breach presentation: x5-10
- Oligohydrominus
- Twins: 40%
- A baby girl: x4-6 (Apley's say it's x7)
- Torticollis: CDH in 10-20% of cases
- Foot deformities:
  - Calcaneo-valgus
  - Metatarsus adductus
- Knee deformities:
  - hyper-extension and dislocation


Calcaneo-valgus Foot


hyperextension of Knee

When risk factors are present, the infant should be reviewed:
1- Clinically 2- Radiologically

Symptoms: An observant mother would come to you saying that she noticed one of the following on her baby:

- Legs of different lengths.
- Uneven skin folds on the thigh.
- Less mobility or flexibility on one side
- Limping, toe walking, or a waddling, duck-like gait
- Difficulty in applying the diaper because of limited abduction.

Clinical Examination:

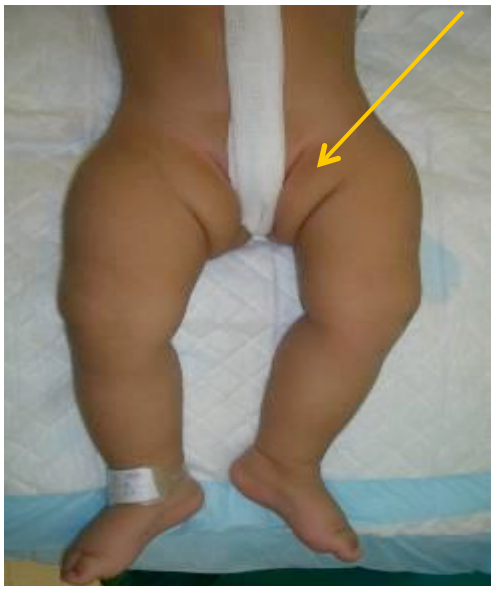
- ✓ Before starting the examination, make sure that the infant is:
  Quiet, In NO pain, Comfortable.

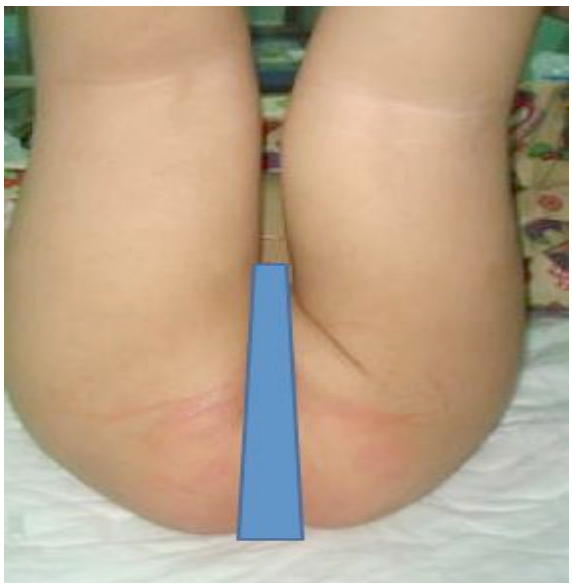
1st: Look: (Anterior and posterior)

- ✓ External rotation of the leg.
- ✓ Lateralized contour.
- ✓ Shortening of the leg (if unilateral DDH)
- ✓ Asymmetrical skin folds (if unilateral DDH)
- ✓ Abnormally wide perineal gap (if **Bi**lateral dislocation)

Contrary to popular belief, late walking is not a marked feature; nevertheless, in children who do not walk by 18 months dislocation must be excluded

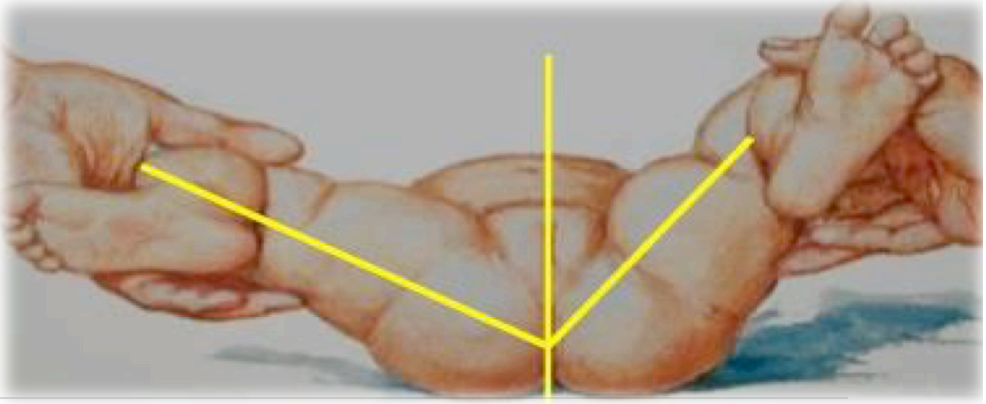
*** Most accurate way is:** to check the buttock creases, if it is asymmetrical it highly suggests DDH.





2nd: Move:

-Limited abduction

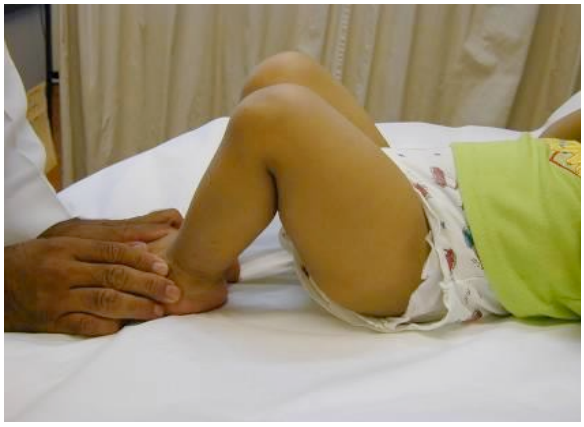


3rd: Special test (depending on the age):

- Galiazzi sign
- **Ortolani and Barlow test →** only till 4-6 m of age (you can't do it for babies older than 6 month!!)
- Hamstring Stretch test
- **Trendelenburg Test →** In walking-aged children with unilateral DDH
- Limping:
  - ✓ Unilateral → one sided limping
  - ✓ Bilateral → waddling gait (Trendelenburg gait)

1. Galiazzi Sign:

It is performed by flexing the infant's knees when he is lying down so that the feet touch the surface and the ankles touch the buttocks. If the knees are not level then the test is positive, indicating a potential congenital hip malformation

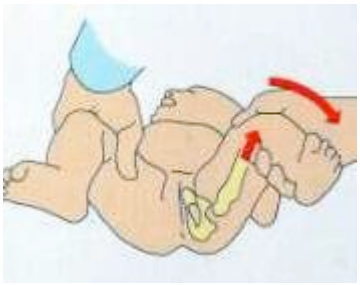


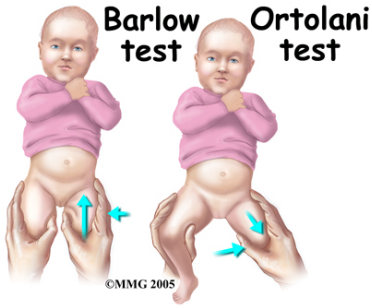
2. Ortolani Test: "for dislocated hip only"

The baby's thighs are held with the thumbs medially and the fingers resting on the greater trochanters; the hips are flexed to 90 degrees and gently **abducted**. Normally there is smooth abduction to almost 90 degrees. In congenital dislocation the movement is usually impeded, but if pressure is applied to the greater trochanter there is a soft 'clunk' as the dislocation reduces, and then the hip abducts fully (the '**jerk of entry**'). If abduction stops halfway and there is no jerk of entry, there may be an irreducible dislocation.

3. Barlow Test: "for dislocatable hip"

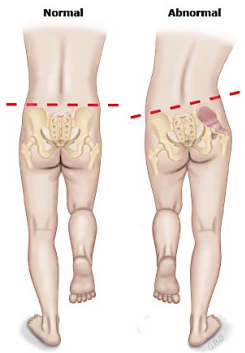
- Examiner's thumb is placed in the groin.
- Pull and **adduct**
- **if the hip can be popped out of socket with this maneuver - the test is considered positive**



4. Trendelenburgh's Test:

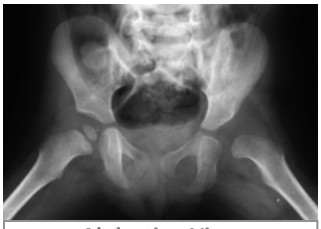
Inability to maintain the pelvis horizontally while standing on the ipsilateral leg. Normally, the pelvis stays level when a patient stands on one leg. When standing on the affected leg, the pelvis tilts downward toward the unaffected side (as pictured in the abnormal patient above) because of gluteal muscle weakness on the affected side (right side in abnormal patient above)



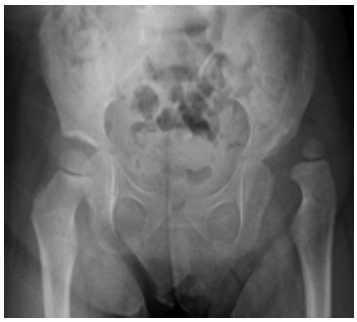
Physical Examination of DDH:

https://www.youtube.com/watch?v=FJgj2-v0_zA

Investigations:

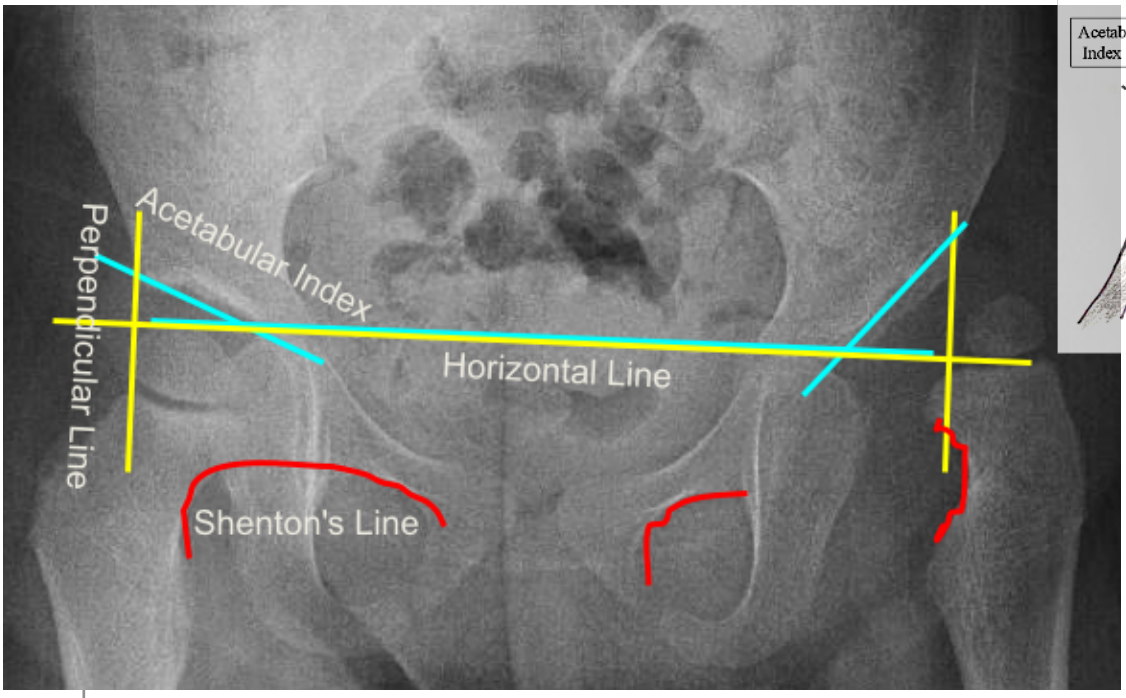
Age	3 weeks -3 months old	> 3months old	> 6 months
Method of choice	U/S	X-Ray Pelvis AP + Abduction	X-Ray
Why/Why not?	• X-Ray is not used for this age; because the acetabulum & femoral head are largely (or entirely) cartilaginous and therefore not visible on x-ray. • We do X-Ray after 3 weeks to give time to the body to get rid of the Relaxin hormone. it will be truly positive or truly negative.	 Abduction View	• Is when ossification centers normally appears (5-6m) of age • If delayed or did not appear it's one of the signs of DDH.

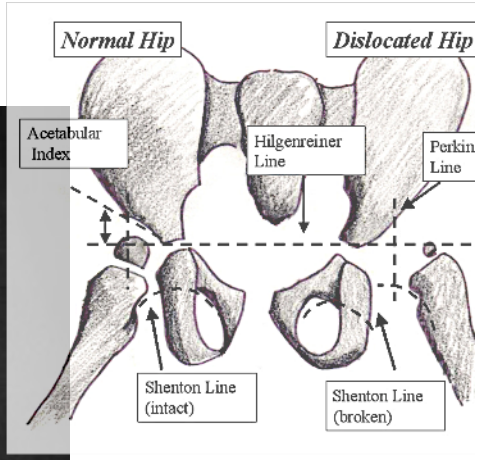
Radiology:



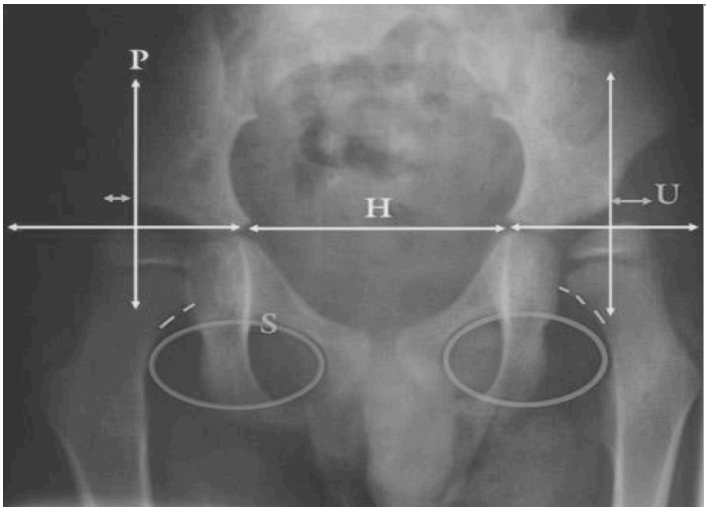
Five radiological signs of DDH: (See the next page for further explanation)

- Disrupted Shenton's line
- Wide acetabulum angel on Hilgeniner's line
- Shallow acetabulum
- Head of femur located on the top outer quadrant when Perkin's line is drawn
- Ossification center/head of femur is smaller than the one in the other limb





- Red: **Shenton Line** (disrupted in DDH) {MOST important ONE}
- Blue: **Hilgenreiner's line** (a horizontal line drawn between the two triradiate cartilage centers of the hips defines a horizontal planne and an approximation to flexion axis of the hips). Notice the angle marking the acetabulum.
- Yellow: **Perkin's Line** : it drawns vertically and prependiculat to hilgenreiner's line starts at lateral acetabulum
- Hilgenreiner's Line + Perkin's Line form four quadrant. In normal limb, the head of femur is found in the bottom inner quadrant, unlike the affected limb, where the head is in the top outer quadrant.



- H = a horizontal line drawn between the two triradiate cartilage centers of the hips defines a horizontal planne and an approximation to flexion axis of the hips. Hilgenreiner's Line
- P = a perpendicular line to the horizontal line drawn at the edge of the boney part of the socket (there's more in cartilage that can't be seen). Perkin's Line
- The center of the femoral head ought to be well within the lower inner quadrant of the drossing of those two lines.
- S = an oval that traces the lower pubis contour, ought to smoothly continue on to trace the lower edge of the neck of the femur. Shenton's Line. In this case, Shenton's line is off and discloses that the femur is migrating upward as these shallow hip sockets do not satisfactorily contain the ball in the sockets.
- U = uncovering. That's the amount of the femoral head that has no boney coverage.

Management:

1-Aim:

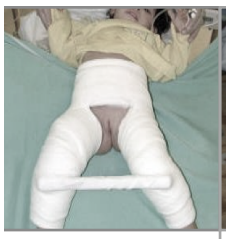
A concentrically, reduced, stable, painless, mobile hip joint:

- Obtain concentric reduction REDUCE
- Maintain concentric reduction STABELIZE
- In a non-traumatic fashion SAFELY
- Without disrupting the blood supply to femoral head (to avoid 2ndry AVascular Necrosis)
- **This is why** →Refer to pediatric orthopedic clinic
- **Parents educations is of high importance.**

2- Treatment in General:

- Method depends on age.
- The earlier started, the easier, better the results and non operative method
- Should be detected EARLY
- Could be surgical or non-surgical
- **If not treated:** OA, Stiffness, Pain, Limping, Spine problems, Difficult life.

3- Treatment Options:

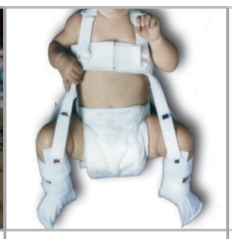


1- Hip Spica (H.S)

- From the nipple to the ankle with an opening to perianal area
- child can only semi-sit

2- Broom-Stick Cast (B.S)

- the child can sit and walk with it

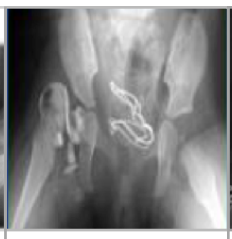


3- Pavlik haris

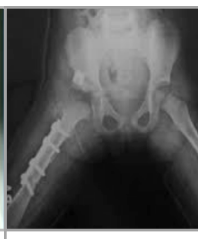
4- Abduction splint

The object of splintage is to hold the hips somewhat flexed and abducted; extreme positions are avoided and the joints should be allowed some movement in the splint.

5- Hip Arthrogram Guided Reduction



6- Open Reduction & Acetabuloplasty



7- Open Reduction & Acetabuloplast & Femoral Shortening

Maximum to start →6m of age, if older use other method Is kept on for 6w continuous, then use a rigid abduction splint This is to achieve stable reduction. It's a dynamic splint.

Abduction splint it's a rigid splint used to maintain the reduction & wait for improvement of the acetabular cover to be **< 30° & with concavity**

In open Reduction in babies 3-6 m, the psoas tendon is divided; obstructing tissues (redundant capsule and thickened ligamentum teres) are removed and the hip is reduced.

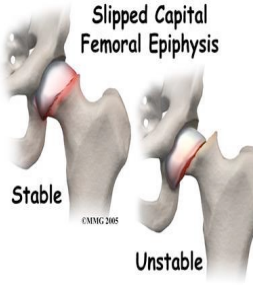
4- Treatment According To Age:

Birth – 6 months	**In OPD**: **Reduce** + maintain with Pavlik Harness **OR** hip Spica (H.S) (If a hip is dislocatable after birth but not dislocated, the baby is left untreated but Re-examined weekly; if at 3 weeks the hip is still unstable, abduction splintage is applied)
6-12 months	GA + Closed reduction + maintain with hip spica. Open reduction if not return
12-18 months	GA + Open reduction + maintain with H.S for 6w, then B.S cast for months
18 – 24 months	GA + Open reduction + Acetabuloplasty + maintain with hip spica for 6w, then B.S cast for 6w
2-8 years	GA + Open reduction + Acetabuloplasty + femoral shortening **(because there's too much fibrous tissue, we've to cut some of the femur)** + H.S for 6w, B.S for 4-6w (If >4years old, the risk of avascular necrosis and hip stiffness is reported as being in excess of 25%)
> 8 years	GA + Open reduction + Acetabuloplasty (advanced) + femoral shortening + H.S

Late Complications (If left untreated):

- Severe hip and/or back pain.
- Early hip arthritis
- Leg Length Discrepancy (LLD)
- Pelvic inequality
- Early Lumbar spine degeneration
- Secondary scoliosis

2nd: Slipped Capital Femoral Epiphysis (SCFE):

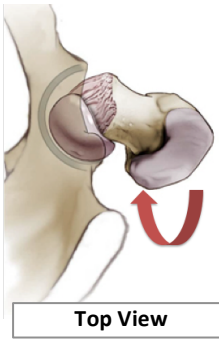


Where?

At level of growth plate [Physis] (separating the epiphysis from the metaphysis. it is Salter Harrison type 1 fracture (through the growth plate)

Why?

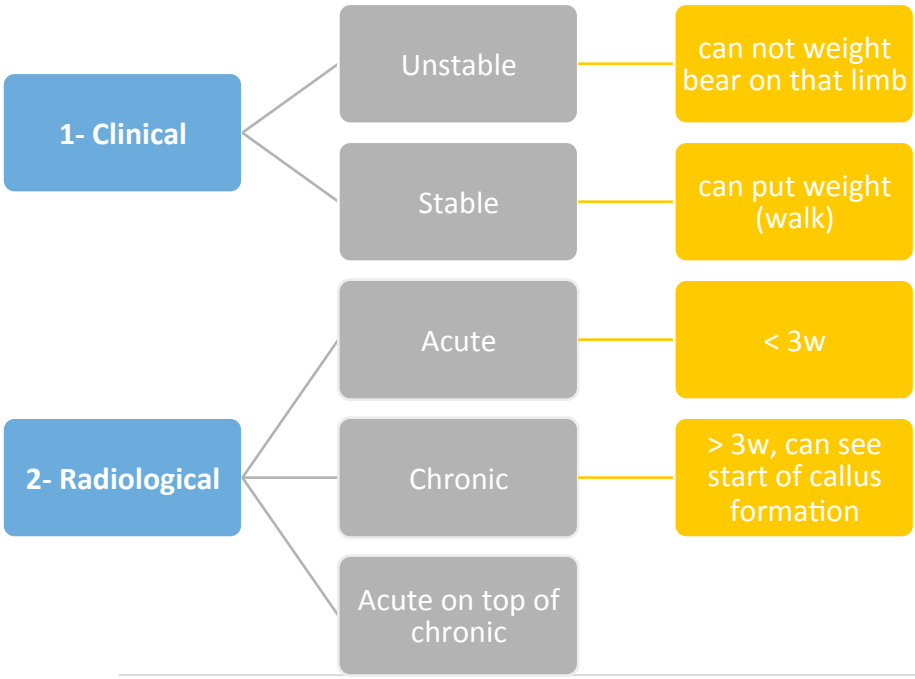
1- Hormonal (hypothyroidism, low growth hormone and hypogonadism)?
2- Metabolic (renal osteodystrophy).
3- Mechanical, obesity(usually)!!
4- Trauma (a minor trauma)?
5- Unknown

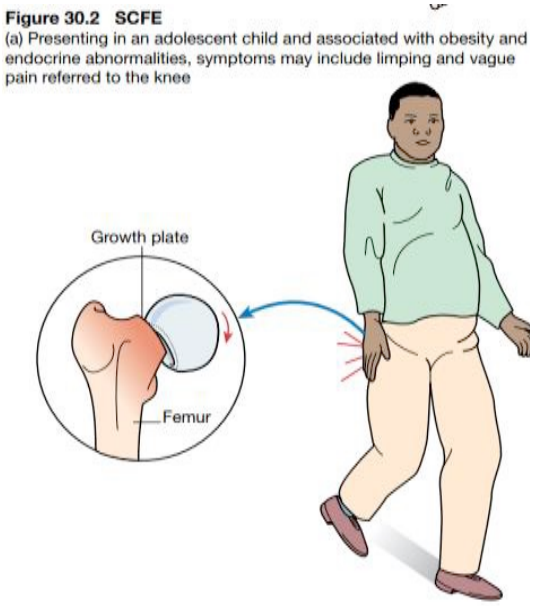


Whom?

- **8-12 %:** In males, obese and black.
- **20 - 25 %** chance that the other hip will be affected. And even when only one hip is affected, within **18m** the other hip will get affected

Types:





Slipped Capital Femoral Epiphysis

Hx

- **Pain →** hip, anterior thigh, **knee** (radiating through the **obturator nerve** that crosses 2 joints, so with any knee pain, do hip workup)

If the child stops playing, take it **seriously,** because playing is number 1 priority to them

- Duration of C/O (more or less than 3w)
- **Gait →** painful or painless
- **Limping (painful)**
- **Trauma →** Major ? Minor? or no Hx of it ?
- Any known hormonal or metabolic illnesses

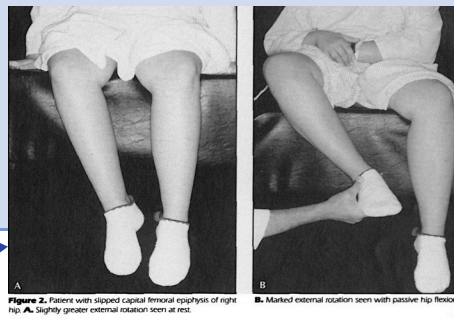


Figure 2. Patient with slipped capital femoral epiphysis of right hip. A. Slightly greater external rotation seen at rest. B. Marked external rotation seen with passive hip flexio

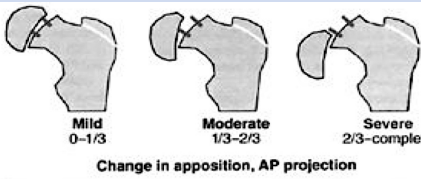
PEx

Hip PEx in ER:

- External Rotation
- With hip flexion the limb goes in **spontaneous external rotation**
- Limited internal rotation & Abduction
- Painful Range of Motion (Usually)
- Painful Limping
- Gait →can or can not (antalgic) weight bear on affected limb
  - **How can you know if the patient is faking it?** If the patient stands on (limp to) the leg that he claims to be the cause of the pain.
- Thigh muscle wasting (disuse): especially in chronic cases (>3 Weeks)

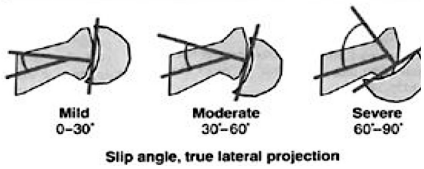
Investigation

1- **X-Ray Of Pelvis:** AP standing & frog lateral → (ask the patient to external rotate, abduct and flex the hips)
   - See the actual slip of the neck
   - Positive "Klein Line" (As in Calvin Klein)
   - Wide physis →pre slip phase
2- **X-Ray Of Knee:** normal
3- **MRI:** If not clear on X-Ray and still in doubt. It will look like a melted Ice-cream

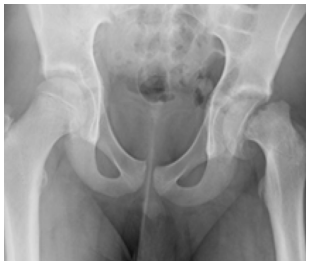


Severity

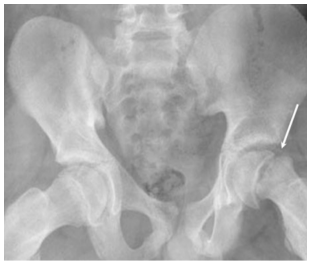
-Depends on degree of slip
-The metaphysis is divided to 3 (1/3)
-The more the slip the worsted the severity.



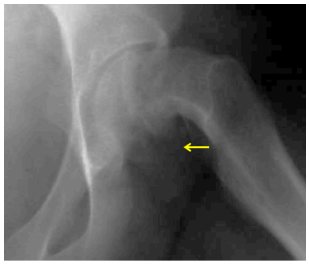
AP View



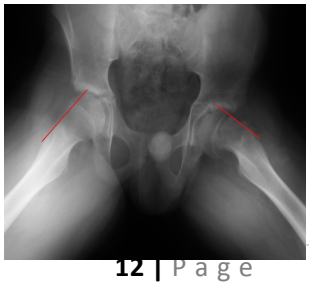
Frog lateral View



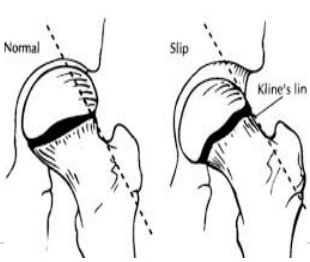
Chronic SCFE



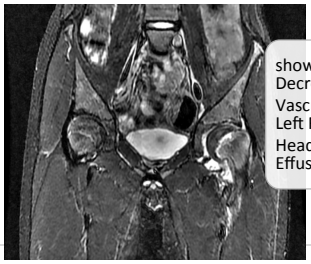
Kline's Line



Kline's Line

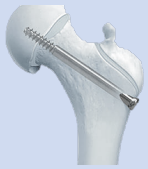


MRI



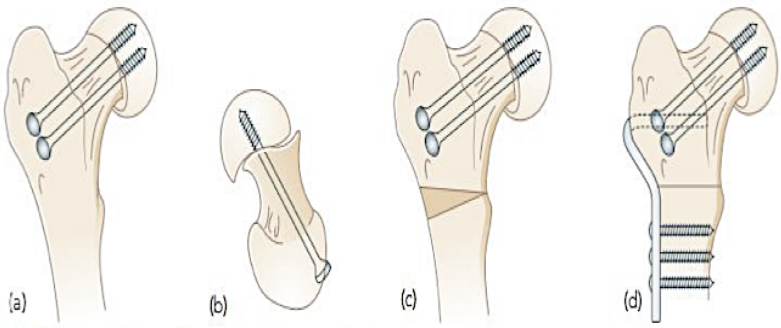
<table>
<tr><td rowspan="2">Treatment</td><td colspan="2">

Refer to orthopedics as emergency case.
Aim → prevent further slippage & fuse the physis. Fusion of the growth plates will not usually cause leg length discrepancy, because the growth happens around the knees.
Protected weight bearing for 3-4 weeks then full weight bearing and No sport for 6 months.

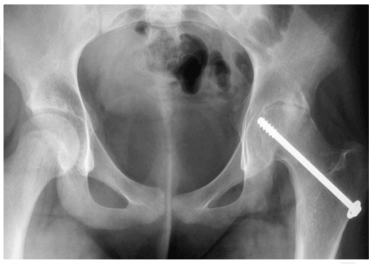
</td></tr>
<tr><td>1-Acute SCFE:</td><td>2- Chronic SCFE:</td></tr>
<tr><td></td><td>Emergency in-situ paining (no reduction done, if you do you will destroy the growth plate)
Using 1 or 2 (6mm, which is larger than the adult size, to anchor it) screws
Pin threads pass the physis, & stops 5mm before the articular surface to prevent “Chondrolysis”
Do hormonal essay → if any abnormality refer to endocrine</td><td>Salvage corrective osteotomies.
  </td></tr>
<tr><td>Complications</td><td>

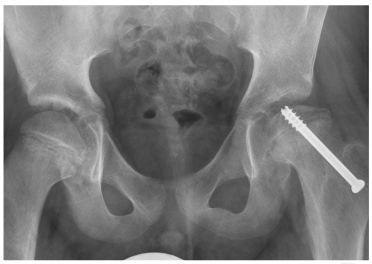
Chondrolysis →that causes early hip OA
Femoral AVN
Stiff hip joint
Pelvic obliquity
If not treated:
coxa vara
coxa valga

</td><td>Late Complications
Femoral Acetabular Impingement (FAI)
Premature (early) hip O.A.
Leg Length Discrepancy (LLD)
Pelvic inequality
Early Lumbar spine degeneration</td></tr>
</table>

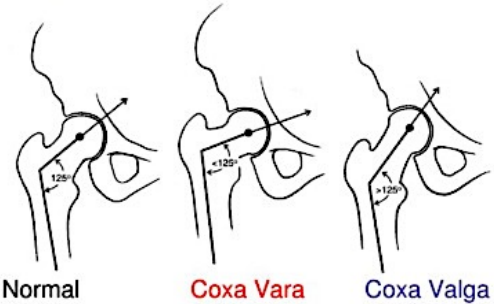


19.20 Slipped epiphysis - treatment (a,b) In this case slipping was minimal so no reduction was attempted, but further slipping was prevented by pinning the epiphysis in that position. (c,d) In more severe degrees of slip, the epiphysis should be fixed without attempting reduction and then, at a later stage, a complex compensatory osteotomy (d) can be performed to restore the normal position of the limb.


Chondrolysis


AVN

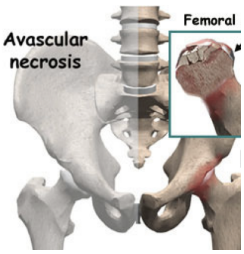
The typical inclination angle is 125 degrees.
- Coxa vara (less than 125 deg)
- Coxa valga (greater than 125 deg)



3rd: Perthe's Disease (Legg Calvé Perthes Disease)

Definition:

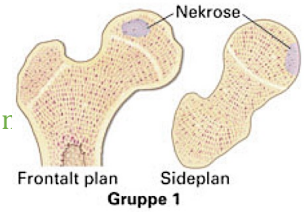
It is the decrease of vascularity of head of the femur (Avascular Necrosis) of an **unknown** cause. So, if a patient with Sickle Cell Anemia has femoral AVN, It is **NOT** Perth's disease.

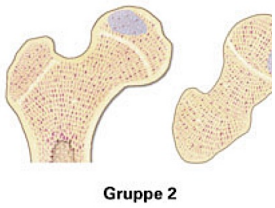


- ✓ **It affects children** 4-8 years of age (Younger than SCFE)
- ✓ More in males, obese.
- ✓ Bilateral in 10 – 12% of patients

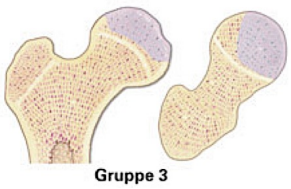
Theories of its causes:

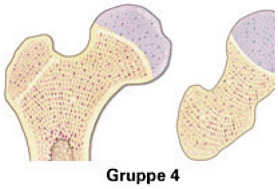
- Minor trauma (hyperactive child)
- Arterial-Venous malformation
- Virus infection (Upper Respiratory Tract infection
- **Most agree** → its multifactorial





Severity:



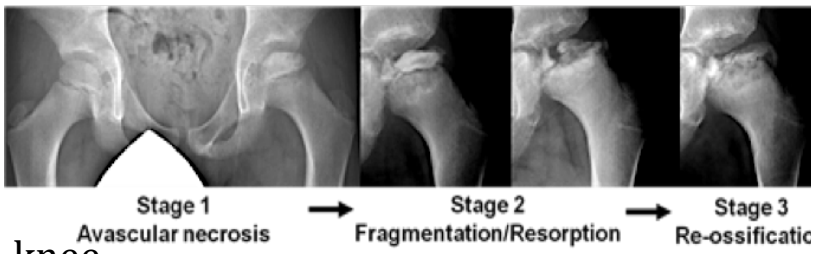


Severity of the disease depends on:

- The amount of femoral head involvement
- The more the head involvement, the more severe the condition and the worse the outcome.

Stages: (weeks-years per stage):

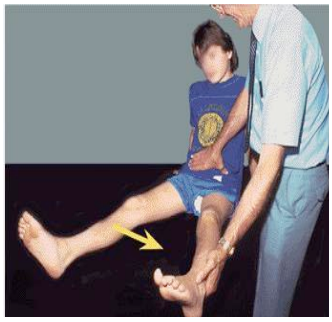
1- Vasculitis (Acute phase)
2- Fragmentation (because of the synovial fluid go inside the bone)
3- Re-Ossification (Healing)
4- Re-Ossified (Healed)



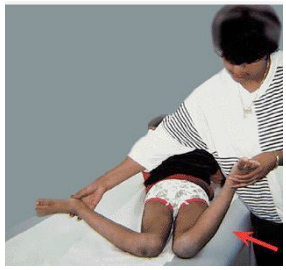
History:

- **Pain** →hip, anterior thigh, knee
- **Antalgic gait**
  C/O since weeks to months
- **Trauma** → minor? None?
- **URTI:** few weeks earlier (Very important to ask about!!)
- The usual presentation: Hx of minor trauma few months ago with initial antalgic gait and pain, now pain is better but still limping
- Ask about the activity of the child, did it decrease?

Physical Examination:



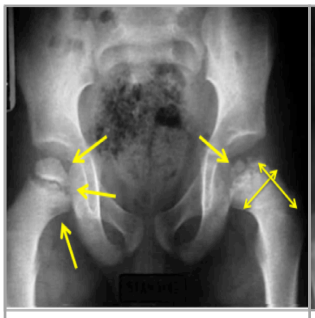
- Decreased Abduction.
- Decreased internal rotation.
- Decreased and painful range of motion in all directions.
- Limping (painful).
- Thigh muscle wasting (disuse).



Investigation:

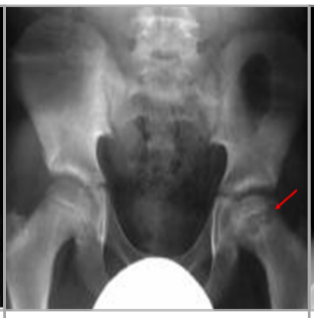
- **Knee X-Ray:** normal.
- **Pelvis X-Ray** "AP standing & frog lateral": decreased head size (irregular shape). If early: X-ray might not show anything.
- **MRI:** for unusual presentations **and** in vary early stages even before classical X-Ray changes show up.

Ossification nucleus is destroyed and damaged · Femoral head collapse is due to necrosis (AVN) >>> then it will re-vascularize (the blood is full of calcium) >> so it will heal maintaining this collapsed shape usually · Usually it doesn't go back to normal but in some cases it does; therefore, the outcome is unpredictable.



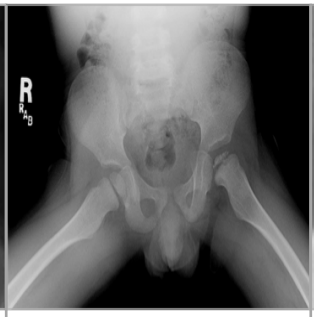
AP standing X-Ray

- **Findings:** the epiphysis is fragmented, the neck is short, the growth plate is rdiolucent



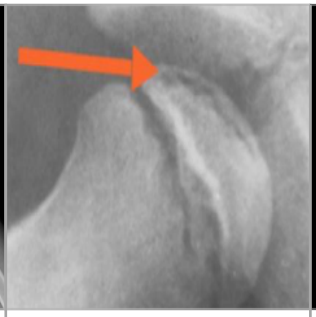
AP Standing X-Ray

- **Findings:** Metaphyseal cysts



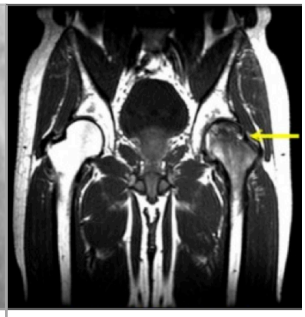
Frog Lateral X-Ray

- **Findings:** saucer sign (the head of the femur looks like a flying saucer)



Frog Lateral X-Ray

- **Findings: Subchondral fracture**, one of the 1st signs, best seen in Frog lateral X-Ray

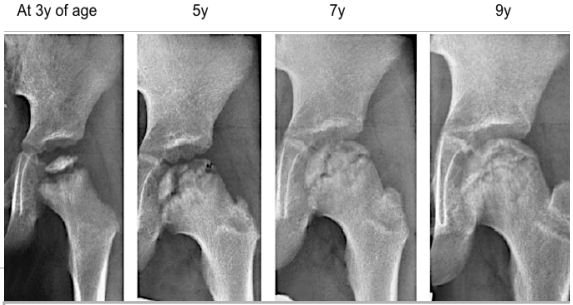


MRI

- Decreased Head Vascularity (right femur)

Prognosis:

- **< 6 years of age:** Good prognosis (heals well).
  Usually conservative treatment (very close observation, every 4 weeks)
- **6-9 years of age:** Various outcomes:
  Majority of patients present in this age group
- **> 9 years of age:** Usually **bad** prognosis.
  Needs surgical treatment (may be >1 operation).



Example of good prognosis

Treatment:

- Vary controversy, depending on → age, stage & classification.
- Refer to pediatric orthopedics as an **urgent** case.
- **Aim →** to have a painless, contained, mobile hip joint

Basic Guidelines:

- **Pain relief →** admit, skin traction few days, analgesia
- **Increase hip ROM →**Physiotherapy, mobilize Partial Weight Bearing or Non Weight Bearing (we usually encourage mobility of children, but **not** in this case because we want to limit the amount of collapse)
- **Keep hips abducted:**
  - So head will mold better in the acetabulum, and less body weight on the femoral heads.
  - By →abduction splint or casting (or Spica cast)
- **While keeping the head contained:**
  - Do containment osteotomy in the fragmentation stage.
  - If came in late re-ossification stage wait till heals then do salvage surgery (Because you are dealing with a complication)
- Tight hip adductor **is a complication that you have to relieve it**

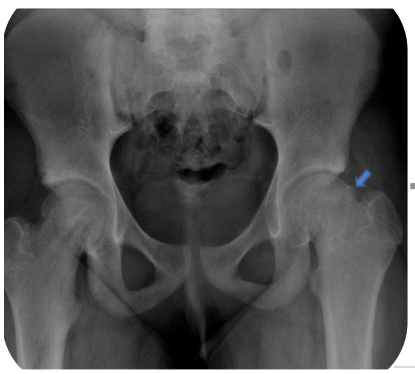
How to brings that head inside? You either increase the size of the head cover **(Pelvic osteotomy)** or cut some of the head & force it inside **(Femoral osteotomy)** or **Both.**

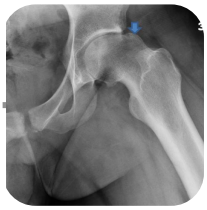
Complications:

- Abduction hinge →may need Chelectomy.
- Heals in coxa →magna (big), brevia (short), plana (wide).
- Stiff hip joint.
- Pelvic obliquity.
- Early hip OA.
- Early Lumbar spine degeneration.

Late Complications:

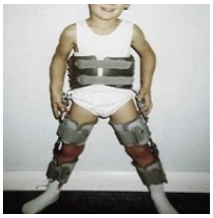
- Early arthritis.
- leg length discrepancy (LLD).
- Pelvic inequality.
- Early Lumbar spine degeneration.





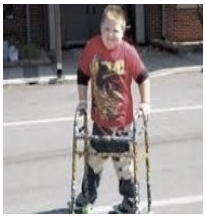
Abduction Hinge

Abduction splint



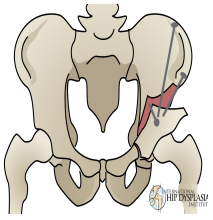
Broom-Stick cast

Frame-walker

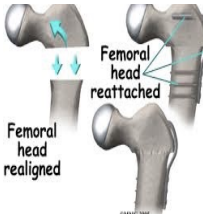


Full wieght bearing with crutches

Pelvic osteotomy



Femoral osteotomy



	DDH	Slipped Capital Femoral Epiphysis	Perthe's Disease
Characteristics	• It is a condition in which the femoral head does not lie congruently within the acetabulum. • **Risk Factors:** ✓ breech presentation ✓ Positive family history ✓ first baby ✓ oligohydramnios. ✓ female	• It's caused by a weakness in the growth plate of the femoral head resulting in the femoral neck slipping on the femoral head. • **Risk Factors :** 8-13 years+ obese + male + endocrinopathy	• Necrosis of the femoral head • Age = 4 to 8 years • More in obese and males • Bilateral in 10 – 12% of patients • **Stages:** 1- Vasculitis 2- Fragmentation 3- Reossification 4- Reossified
Clinical Presentation	**PEx:** • Gluteal fold asymmetry • Limited abduction • Barlow's test • Ortolani's test • Galeazzi test • Trendelenburgh Test	**Hx:** The child often presents with a limp and groin pain. The pain is frequently referred to the knee. **PEx:** • With hip flexion the limb goes in spontaneous external rotation • Limited internal rotation &Abduction • Painful ROM and limping	**Hx:** • Hip, anterior thigh, knee Pain • Antalgic gait (painful) • Hx of URTI weeks earlier • Abduction and Internal rotation are limited. **PE**x: • Decreased Abduction and internal rotation. • Painful and decreased ROM • Thigh muscle wasting (Chronic).
Imaging	• **Ultrasound:** (<3months) it shows cartilaginous structures, and it is dynamic test, meaning that real-time screening can be performed as the hip is moved around. • **X-Ray:** (>3months) **Shenton's line** can be traced and should be unbroken.	• **X-Rays Pelvis:** AP standing And Frog Lateral: **Klein Line** • **X-Ray Of Knee:** normal • **MRI**	• **X-Ray Pelvic:** show decreased head size of the femur • **MRI**.: In unusual presentation
Treatment	• **<6 m:** reduce and Pavlik harness. • **6-12 m:** GA + Open reduction + maintain with H.S 6w, then B.S cast for months • **12-18 m:** GA + Open reduction + maintain with H.S 6w, then B.S cast for months • **18-24 m:** GA + Open reduction + Acetabuloplasty + maintain with hip spica 6w, then B.S cast 6w • **2-8 Y:** GA + Open reduction + Acetabuloplasty + femoral shortening + H.S 6w, B.S 4-6w • **>8 Y:** GA +Open reduction + Acetabuloplasty (advanced) + femoral shortening + H.S	• **Aim:** prevent further slippage & fuse the physis. • **If Acute:** Do an emergency-In situ pinning • Protected weight bearing for 3-4 weeks then full weight bearing and No sport for 6 months • **If Chronic:** salvage corrective osteotomies	• **(< 6y) Of Age**: Usually conservative treatment. • **(> 9y) Of Age:** Needs surgical treatment (may be >1 operation). **Guidelines Of Treatment:** • Control pain • Maintain ROM • Hip containment.
Complications	**Late Complications** (If left untreated): • Severe pain (hip area, back) • Early hip arthritis • Leg length discrepancy • Pelvic inequality • Early lumbar spine degeneration	• Chondrolysis → that causes early hip OA • Femoral AVN • FAI (Femoral Acetabular Impingement) • If not treated → coxa vara or valga • Stiff hip joint • Premature (early) hip O.A. • LLI (leg length inequality) • Pelvic obliquity • Early Lumbar spine degeneration	• Abduction hinge • Heals in coxa → magna , brevia , plana • Stiff hip joint. • Leg length inequality. • Pelvic obliquity. • Early hip OA. • Early Lumbar spine degeneration.

MCQs

1) 9 years old black male came with his mother complaining of knee pain, which one of the following is the most likely diagnosis ?
a) Scefe
b) DDH
c) Perth's

2) Diagnosis was reached in a 3 months old female to have DDH, what shuld be the treatment for her in that age?
a) Pelvic haris
b) Open reduction if not return
c) Acetabuloplasty

3) Which of the following statements regarding Perthes' disease are true? (chose one or more)
a) Perthes' disease is a spontaneous avascular necrosis of the hip.
b) It is most common in boys around puberty.
c) The condition frequently settles spontaneously.
d) A similar problem can occur in children with sickle cell disease.
e) The prognosis is best in those children in whom the condition develops late.

Ans: Q1- A, Q2-A, Q3- A,C,D

Done By:

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Amjad Abalkhail

Revised By:

Amjad Abalkhail