

Common Pediatric Hip Problem

◆ Nomenclature:

- **DDH** : Developmental dislocation of the hip (**Affect the hip joint**)

Old names : **CDH** : Congenital Dislocation of the Hip

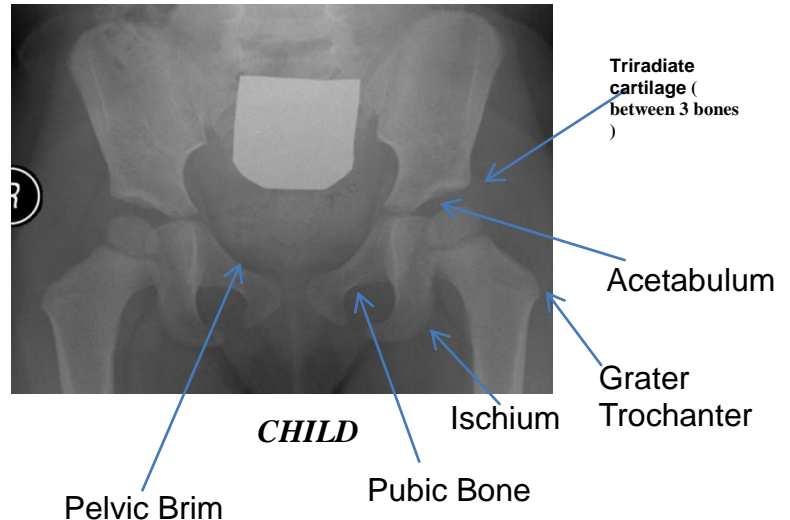
DDH : Developmental Dysplasia of the Hip

- **SCFE** : Slipped capital femoral epiphysis (**affect the growth plate**)
- **Perthes** (**affect the head of femur without dislocation**)

◆ Normal pelvis



ADULT
Lesser Trochanter



CHILD

✓ Notes:

- **Triradiate cartilage** (growth plate) connects three bones: acetabulum + ischium + pubic bone
- **Head of femur**: in children it's not called head of femur (because not fully developed) only in adult (**and it start ossification from the center, that location called (center of ossification)**)
- **Arterial** supply of the femur anterior and posterior circumflex artery that supply the head of femur
- **Ligamentum teres** is attached to the inside of the head of the femur, the ligament also contains artery. So arteries inside and outside the bone

1- "DDH" :

Normal Hip

Dislocated Hip

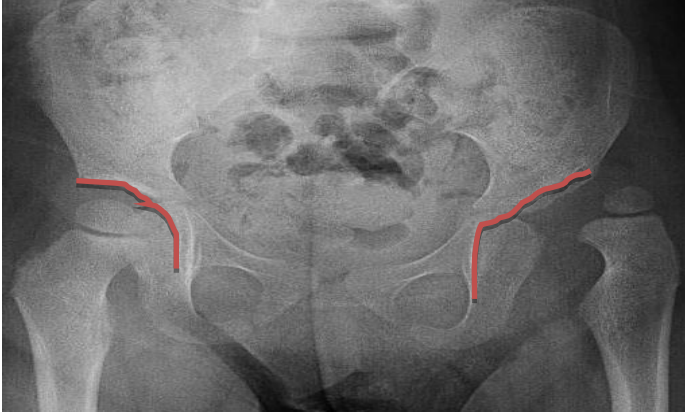


✓ Notes: Abnormalities :

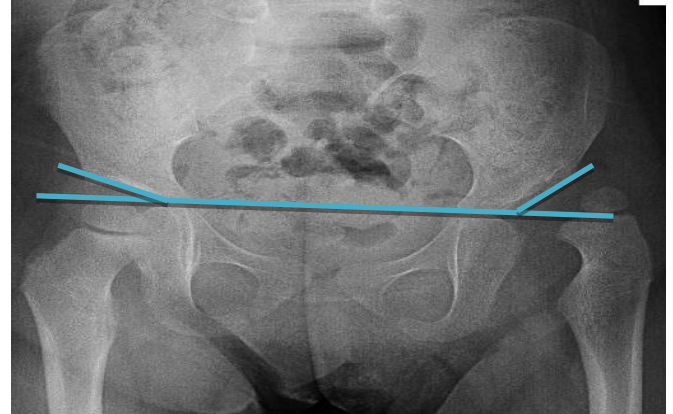
- The head of femur is not articulating/attached to the acetabulum. Notice the under developed epiphysis
- The acetabulum is shallow (dysplastic acetabulum) not curved (cannot hold the head)
- DDH is not due to injury during delivery (not congenital)
- Distrusted **Shenton line** **توضيح لاحقاً**

Patterns of disease

- Dislocated → **Complete** (like the previous pic)
- Dislocatable → high risk of dislocation في مكانه ولكنه يدخل ويخرج
- Subluxated → **incomplete separation**
- Acetabular dysplasia → the problem here is in the Acetabular – the hip joint is normal (in general all the previous pattern has Acetabular dysplasia)



Shallow acetabulum. Notice the curvature



Larger angle in the dislocated hip
A dislocated hip is reduced (not healed) by abduction not adduction (increases the risk of dislocation)

NB : Acetabular index used to diagnose DDH and determine the type of the treatment مهم

Causes (multi factorial)

- Hormonal
 - Relaxin, oxytocin
- Familial
 - Lig.laxity diseases
- Genetics
 - Female 4 X male --- twins 40%
- Mechanical (**predisposing factors**) → increase the risk of the DDH
 - Pre natal
 - Post natal

Still Unknown the cause

Mechanical causes

- Pre natal اي شي يسبب حشر للطفل داخل الرحم
 - Breech , oligohydramnios , primigravida , twins
 - (torticollis , metatarsus adductus)
- Post natal
 - Swaddling , strapping المهاد

✓ **Notes:**

- **Breech:** The fetus head should be caudal in position and the legs should be cephalic in position. Any other position is called breech (renders the place tight)
- **Oligohydramnios:** little amniotic fluid
- **Primigravida:** first pregnancy (inflexible uterus)
- All of the abovementioned factors decreases the space for the fetus in the uterus → increased risk for DDH
- **Torticollis:** a twisted neck in which the head is tipped to one side
- **Metatarsus adductus:** foot deformity
- **Swaddling and strapping:** induces adduction of the hip (risk of dislocation, previously discussed)
- **The doctor should always ask the mother about these predisposing factors to predict DDH مهمه بالاولوسكي**

Infants at risk:

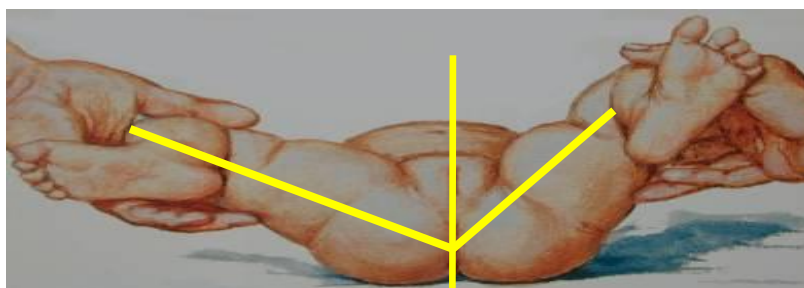
- Positive family history: 10X
- A baby girl: 4-6 X
- Breech presentation: 5-10 X
- Torticollis (head is in adduction position) : CDH in 10-20% of cases → هي علامه ظاهره تدل على مرض مخفي
- Foot deformities:
 - Calcaneo-valgus and metatarsus adductus
- Knee deformities:
 - hyperextension and dislocation
- When risk factors are present, the infant should be reviewed
 - Clinically
 - radiologically
- During history taking, ask about all of the risk factors من المهم كشفه مبرا – لانه اذا كشف في عمر مبكر يمكن علاجه بسهولة وبدون جراحه ولكن بعد ذلك يحتاج جراحه

Clinical examination

- The infant should be
 - quiet
 - comfortable
- Look:
 - External rotation
 - Lateralized contour
 - Shortening *of the affected limb*
 - Asymmetrical skin folds (in the affected limb)
 - Anterior – posterior



- Move
 - Limited abduction مهمه

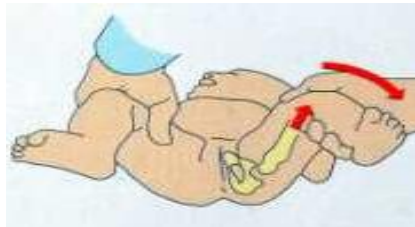


- Special test
 - Gaiiazzi
 - Ortolani , Barlow test (**only for babies < 6 mounths old – MCQ -**)
 - Trendelenburgh sign
 - Limping (waddling gait if bilateral) → **detected in walking age**

Galiazzi test

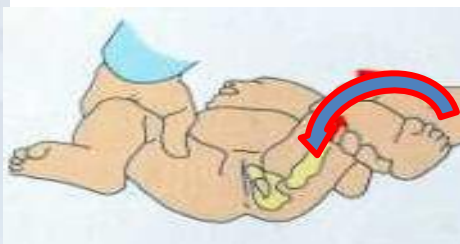


Ortolani test



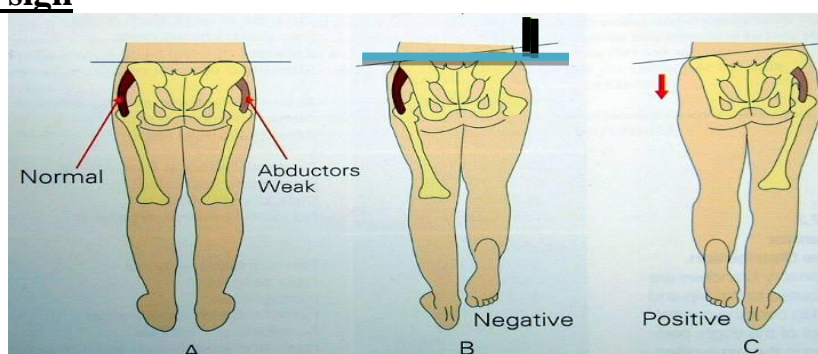
- Pull and **abduct**
- A **clunk** will be felt after reduction. The hip will soon be dislocated again (not a treatment, just to test for DDH)
- Cannot be done on dislocatable DDH → Do barlow test

Barlow test → **it completion of the Ortolani and it used to measure the stability of the joint**



- Pull and **adduct**

Trendelenburgh sign



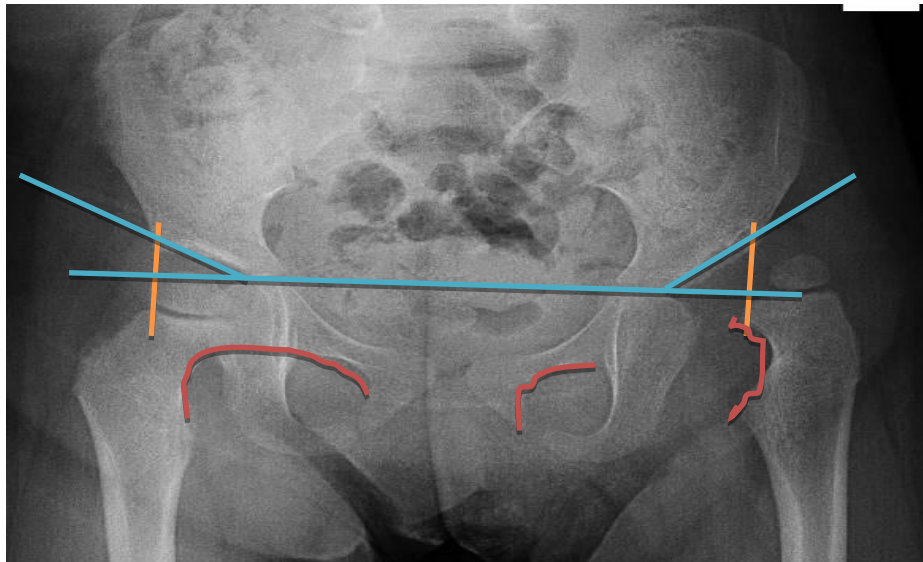
Investigations العمر مهم

- -3 months U/S: most of the head and neck are cartilage (not clear on x-ray)
- > 3 months X-ray pelvis AP + abduction



Radiology – MCQs -

- After 6 months: reliable



✓ Notes

- **Red: Shenton line** (disrupted in DDH)
- **Blue: Hilgenreiner's line** (through the triradiate cartilage). Notice the angle marking the acetabulum
- **Orange: Perkin's line**: it divides vertically and perpendicular to **Hilgenreiner's line** starts at the lateral acetabulum → **Above the central line and lateral to the central line**
- **Hilgenreiner's line + Perkin's line** form four quadrants. In the normal limb, the head of the femur is found in the bottom inner quadrant, unlike the affected limb, where the head is in the top outer quadrant.
- Five signs of DDH on x-ray: **MCQ**
 1. Disrupted **Shenton's line**
 2. Wide acetabulum angle on **Hilgenreiner's line**
 3. Head of femur located on the top outer quadrant when **Perkin's line** is drawn **مهم**
 4. Shallow acetabulum
 5. Ossification center/head of femur is smaller than the one in the other limb

Treatment - Aims

- Obtain concentric reduction → By Ortelani
- Maintain concentric reduction
- In a non-traumatic fashion
- Without disrupting the blood supply to femoral head
- Method depends on age
- The earlier started, the easier it is
- The earlier started, the better the results are
- Should be detected EARLY → So we need screening program
- Either surgical or non-surgical
- **Way:** Refer to pediatric orthopedic clinic

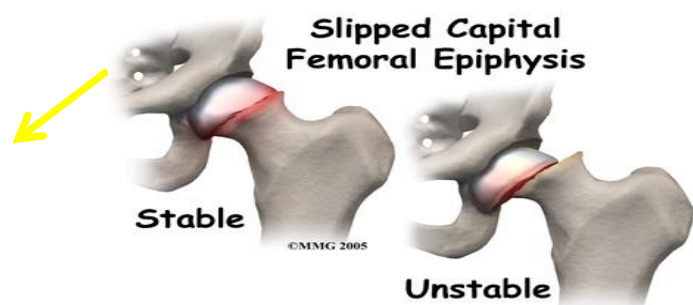
Treatment methods :

methods : Method depends on age

- The earlier started, the easier it is
- The earlier started, the better the results are
- Should be detected EARLY
- Either surgical or non surgical

After treatment

NB : surgical methods : Hip spika and public haress – MCQ -

2-"SCFE"

- **Slipped Capital Femoral Epiphysis.** In reality, it's not the capital of the femur that is slipped; it's the neck and shaft that are slipped. (problem in the Growth plate)
- Where → at level of growth plate
- Why →
 - ? Hormonal
 - ? Metabolic (as in osteoporosis, Hyper Parathyroidism etc.)
 - ? Mechanical, obesity
 - ? Trauma
 - ? Unknown
 - ? obesity

Group A1

- **Typical :** → **IMP in OSCE**

- 8-12
- ↑ in males
- ↑ in obese
- ↑ in black
- ↑ if other side affected

- **History:**

- Hip pain/knee pain (*radiating*)
- Minor trauma
- no trauma
- Limping (painful) → عكس المرض السابق – مهمه جدا

- **On Examination:**

- Hip in ER (external rotation)
- ↓ IR (internal rotation)
- ↓ Abduction
- Usually painful ROM (Range of motion)
- Limping (painful)

- **Investigation:**

- X-ray (pelvic AP and lateral)
 - Pelvis – slippage positive or

↑↑Growth plate space

[Pre slip phase]

- Knee
- If not clear but still doubtful MRI can help



- **Treatment:**

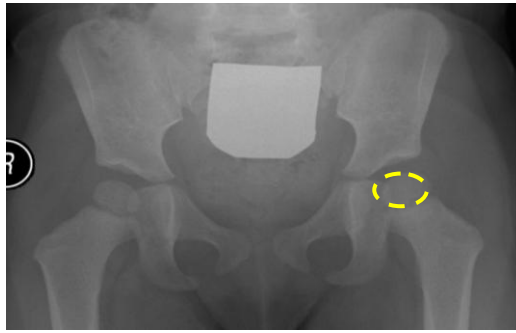
- Refer to orthopedic as emergency case مهمه جدا

What they will do?

- In situ pinning – to prevent further damage to the vascularity
- Protected weight bearing for 3-4 weeks then full weight bearing
- No sport for 6 months



3- "Perthe's Disease"



- **Where:** at the level of **head of femur**
- **Why:** ↓ vascularity of head of femur (avascular necrosis – MCQ – EMERGENCY) →
- **Cause**→**unknown**
- **Typical :**
 - 4-8 years (Younger age than SCFE)
 - ↑ in males
 - ↑ in obese

Severity of the disease depends on: the amount of femoral head involvement



History:

- Hip pain or knee pain
- Minor trauma or no trauma
- Painful limping

On Examination:

- ↓ Abduction
- ↓ IR (internal rotation)
- Usually painful range of motion ↓↓↓
- Limping (painful)

Investigation:

- X-ray: - knee
- Pelvis → ↓ head size (irregular shape)
- If early, MRI can help

Treatment:

- Very controversy غير متفق عليها
- Refer to pediatric orthopedics as an urgent case
- Guidelines of treatment: (MCQ)
 - Control pain
 - Maintain ROM
 - Hip containment



Treated DDH