Pediatric Hip

* DDH :-

Definition :- spectrum of anomalies , the main Problem in them is Acetabular dysplasia .

1. Subluxation : Partial loss of Contact btw joint surfaces .
2. Dislocation : Complete loss of Contact btw joint surfaces .
3. Instability : Ability to subluxate or dislocate .

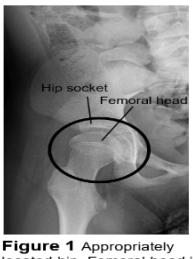


Figure 1 Appropriately located hip. Femoral head is well positioned in the pelvis.

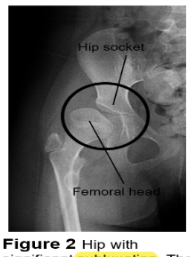


Figure 2 Hip with significant subluxation. The femoral head is not correctly positioned in the pelvis.

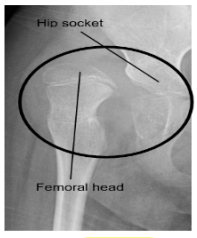
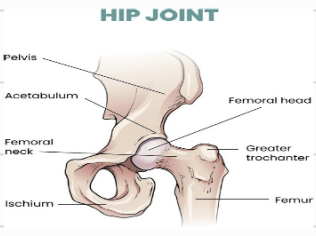


Figure 3 Dislocated hip. Femoral head is not positioned in the pelvis.

- DDH Can affect both hips , but **left** is more Common.
- It was misnamed as Conginital dislocation of hip (CDH) .
- It is more Common in **females** .

Pathophysiology :- DDH is disease of **acetabulum** .



Shallow acetabulum Can't hold the femur head Properly .
This Cause abnormal ossification & abnormal growth → if untreated Cause Limping & shortining of the affected limb .

Risk factors :- "10 F's"

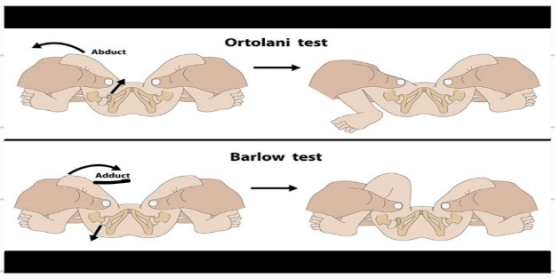
1. Frank breech Position (MC)
2. Female sex
3. First born
4. Family Hx
5. Fluid abnormality (oligohydramnios)
6. Fetal anomalies
7. Swaddling

Signs & symptoms :

1. Asymetrical groin folds 
2. Limited abduction of the affected hip (most sensitive in infants older than 6 months).
3. Galeazzi sign  (only in unilateral).

⟹ In older child :- Limping

* Examination :- (*) Positive Ortolani & Barlow tests.

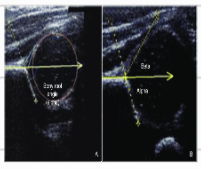


- Important notes :-

1. Never do Barlow test bcz you induce dislocation.
2. Negative ortolani at birth doesn't rule out DDH
   you should investigate at age of 6week (US) or x-ray (3months).
3. The miror of DDH is Acetabulum, if it normal then there is no DDH.
4. ortolani جاي

Investigations :-

1. US (on 6 weeks) :-



α angle : Acetabular roof angle, normally > 60°
β angle : Labrum Cartilage roof angle, normally < 55°
The amount of femoral head Coverage should be > 50%

* Normally the femoral head is in lower medial quadrant
* In DDH it will be in upper lateral quadrant

2. X-ray (on 3months) :-

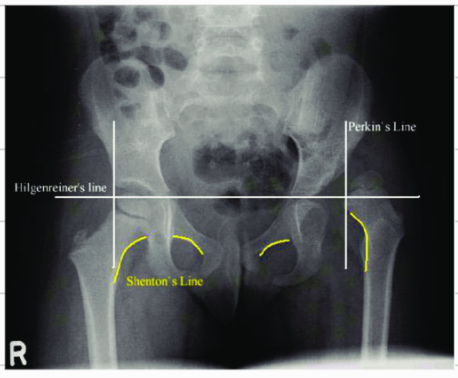
Hilgenreiner line : through each triradiate cartilags.
Perkin line :- Perpendicular on H line.
Shenton line : Semiluner line from medial femur to Pubic ramus
↳ gives false positive in newborns

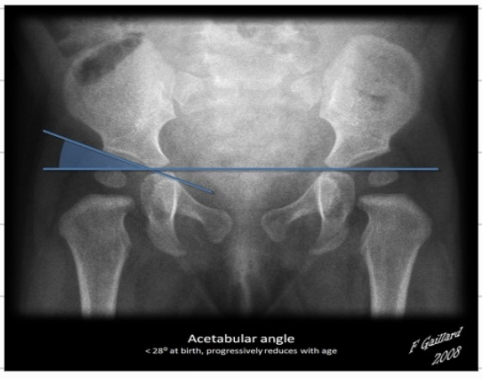
(*) Acetabular Index Angle (AIA) : Miror of DDH

- Tow lines form this angle , H Line & oblique line from outer edge of acetabulum.

In Infants < 3months : normally <30°

At age of 6 months : normally = 25°





Managment : Depends on age

- ≤ 6 months : Pavlik harness
  - 6-12 weeks until AIA <30°.
  - Don't put it directly on skin.

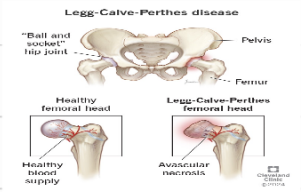
- 6 months - 2 years : closed reduction (casting)
  - 3 months
  - if baby is thin you can do Pavlik harness rather than casting.

- > 2 years : open reduction surgery.

Complications :

1. AVN ⟶ Early osteoarthritis
2. osteoarthritis in spine.
3. Gait abnormalities & Limp length abnormalities & Geno-valgum.

* you should follow up untill maturity , to treat Complication early if present.



* Legg - Calve - Perthes disease :-

Defintion : Non - inflamatory , ideopathic AVN of femoral head in growing child

- More Common in Males
- Mostly unilateral (90%) , it can occur bilaterally but never present in both hips are in same stage .

Pathophysiology :- Disease of femur head , Ideopathic

But there is some theories :-

1. Disruption of vascularity of femoral head
2. Hydrostatic Pressure theory :

Reactive synovitis ... infection → Capsuler distension → Compression on vesseles → AVN

Risk Factors :-

1. Male (MC)
2. Poor social class
3. short stature with delayed bone age .
4. Thin

* طفل عمره من ٣ - ٩ سنوات قصير و نحيف و ساكن في منطقة فقيرة ⟸ Limping و/or Hip Pain بيجي ب Perthes disease until proven otherwise

Signs & symptoms :-

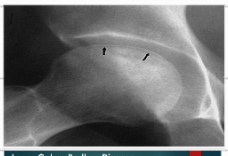
1. Pain in Groin or hip , refered to Knee .
2. Limping

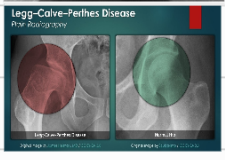
* Examination : ↓ Abduction & Internal rotation

Histo-Pathology :- Epiphysis & Physis (growth plate) are abnormal "Disorganized cartilagenous areas"

Investigations : X-ray :-

1. Cresent sign (Caffey's sign)





2. Flat femoral head.
3. increased joint space.
4. sclerosis (Dense bone).

* Stages of Perthes disease :-

6 months

1. Ischemic stage : Blood supply to femoral head stops.
   Bone appers dense (cresent sign may seen).

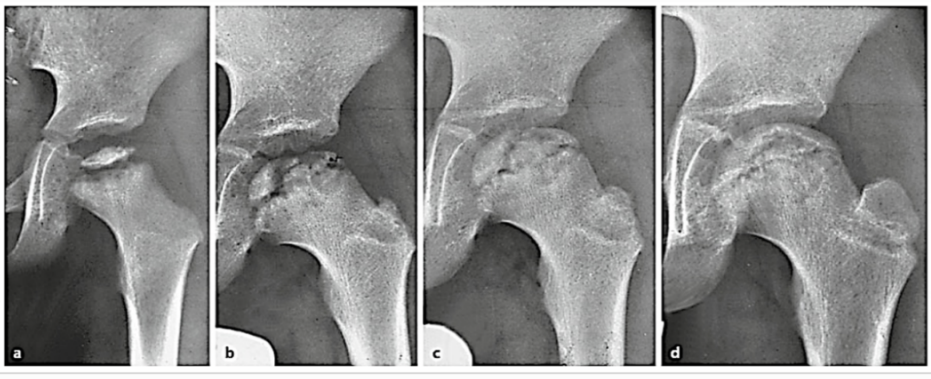
2. Fragmentation stage: Dead bone begins to break down.
   Femoral head is flat & irregular.
   Revascularization occurs.

18 months

3. Reossification stage : New bone forms (healing stage).

3 years

4. Remodeling stage : Bone heals completely
   Normal shape of femoral head



* Classification : Herring (Lateral Pillar) classification

"According to how much Lateral (Outer part) of the head is affected from Lateral view on X-ray".

1. Group A : Normal lateral pillar height.
2. Group B : <50% Loss
3. Group C : >50% Loss

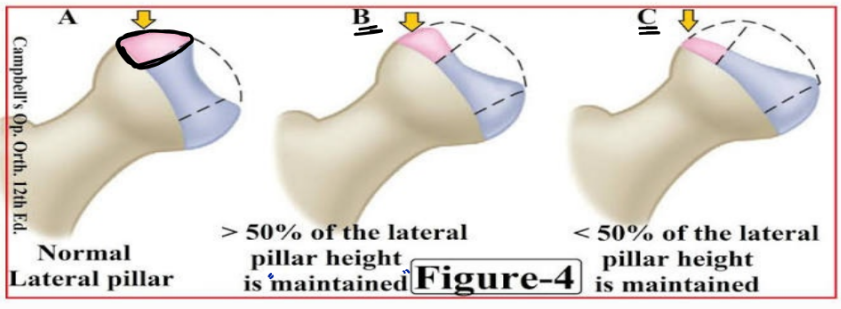


Figure-4

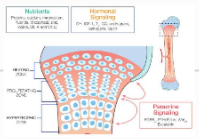
Managment :
- Conservative if head is inside the Pocket.
- Surgery if head is outside the Pocket.

Complications : Same as DDH

Poor Prognostic factors :
1. >6 years old
2. Female
3. obesity

* Slipped Capital Femoral Epiphysis :-

Definition : Displacment through the growth plate of the hip.
In hypertrophic zone of physis .
The femur head remines in the acetabulum ,
the neck displaced anteriory & rotates externally .



- More Gmmon in **Adult Male** .
- More Gmmon unilateral (80%) .

Pathophysiology : Disease of **Growth plate** (Physis)
- important note : it is not injury in growth plate like in fracture , it is disease of hypertrophic zone in growth plate .

Risk factors :-
1. obesity (MC)
2. Hypogonadisim
3. Tall

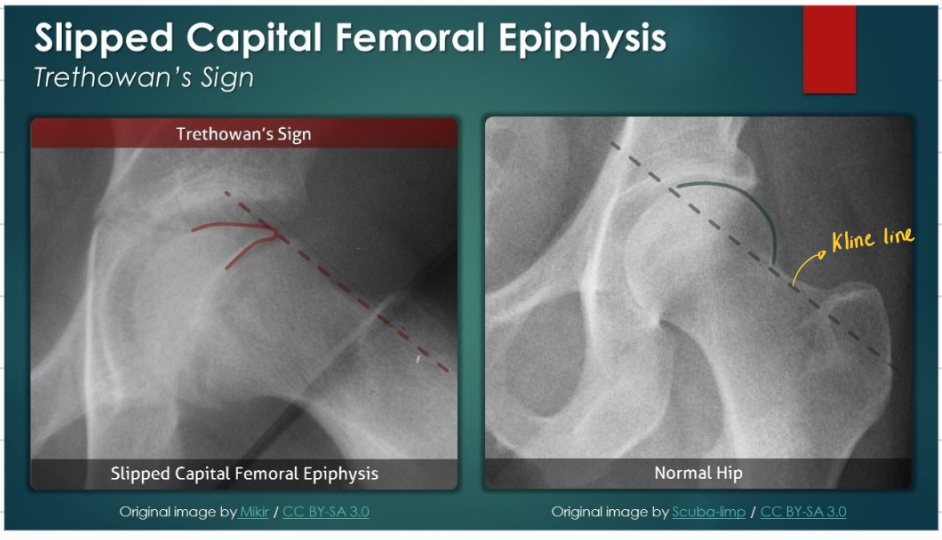
* طفل عمره 12-14 سنة ، سمين و طويل ، عنده Hypogonadism بيجي معه Hip & Knee Pain
و على الـ PEx عنده External rotation ، ما في Hx of truma .

Staging :-

- Stable : Can walk
- non-stable : Can't walk

Investigations : X-ray

1. normally , part of the Epiphysis should be above the Kline line.
   In this disease there is no part above Kline line .
   "Trethowan's sign"



2. wide growth plate (Early sign).

Managment : Screw fixation
- No manipulation for reduction bcz risk of AVN.

Complications :

1. osteonecrosis
2. chondrolysis
3. slip progression

✨ تنسونا من صالح دعائكم ✨ Done by : Mohamed Jarwan