

## **PERTHES' DISEASE**

### **Epidemiology**

Boy: Girl 4:1

Age: 4-7 years

20% Bilateral

Caucasians more than Blacks

Socioeconomic: Low, Passive smokers; urban

Affected children are of short stature and have delayed bone age

### **Pathogenesis**

Not known

Peculiar vascularity between 4-8 [obturator artery] makes them liable.

Skeletal growth retardation with a Hormonal theory or Dysplasia theory is possible

### **Pathology**

Avascular necrosis: healing by creeping substitute

Stress concentration and subchondral fracture.

When fracture head can collapse

### **Differential diagnosis**

Infection and Tuberculosis

Multiple epiphyseal dysplasia

Hypothyroidism

Gaucher's disease

## X ray

AP

Lowenstein (Frog leg )

: Flexion, Abduction and external rotation

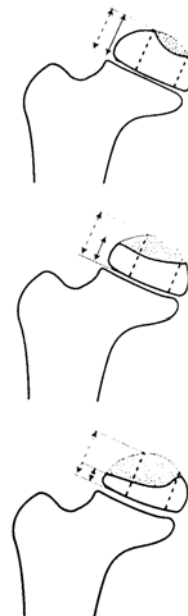
Avascular necrosis of the head with radiodense and flattened head



## Herring's Classification

Based on the lateral pillar: is the area in the Lateral 30% of the femoral head on a true AP film and compared with opposite hip

- A: No involvement of lateral pillar
- B: > 50% of pillar height
- C: < 50% of pillar height

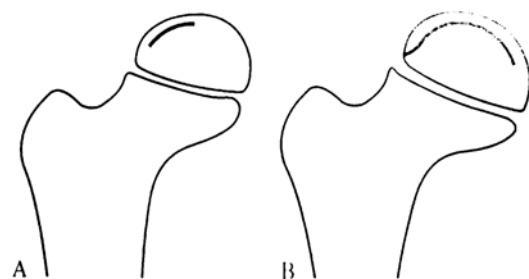


## SALTER'S CLASSIFICATION

Group A: < ½ of the head

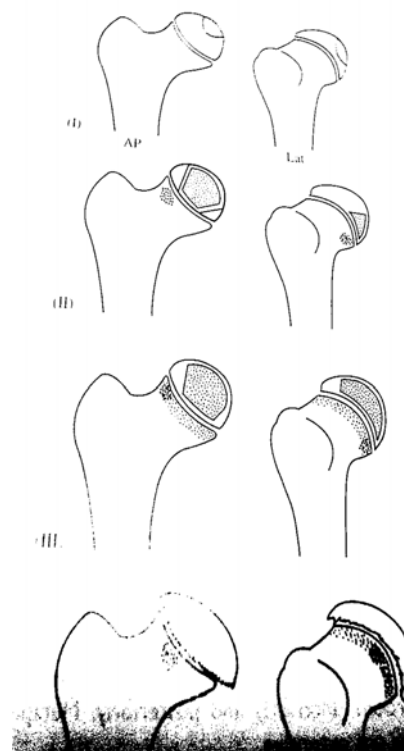
Group B: > ½

However subchondral fracture may not be visible in 2/3 of patients



## CATERALL'S CLASSIFICATION

STAGES			
IA	II	III	IV
SMALL PART OF THE ANTERIOR EPIPHYSES	HALF OF ANTERIOR EPIPHYSES	MOST OF EPI (MED/LAT EPI=N)	WHOLE OF EPIPHYSIS
NO COLLAPSE	+/- COLLAPSE	+++ HEAD IN HEAD CRESCENT SIGN	+++
NO SEQUESTRUM	+ SEQUESTRUM	+	+
NO METAPHYSIS CHANGES	METAPHYSIS +/-	+++ BROAD NECK	++++



## CATERALL'S HEAD AT RISK SIGN

### Clinical

Progressive loss of movement  
Adduction contracture  
Heavy child

### Radiological

Lateral Subluxation of head (head partially uncovered) - Most important  
Whole of head involved  
Calcification lateral to epiphysis  
Metaphyseal cysts  
Gage's sign: lateral V defect at superior epiphysio-metaphyseal junction  
Horizontal physis



## Lateral subluxation

Important sign

Perpendicular distance from the Perkins line and the line at the lateral edge of the head

This distance: normal =  $< 2$  mm good and Abnormal =  $> 6$  mm Poor

Is due to loss of height of the femoral head and gain of breadth

With increasing lateral Subluxation, there is progressive adduction deformity

Can give rise to hinge abduction

## TREATMENT

1. Supervised neglect: No treatment

2. Containment treatment: Contraversial

**Non-op:** Atlanta Scottish Rite brace: hardly used.

**Surgical:** Varus derotation

Salter's Pelvic osteotomy

3. Salvage Procedure:

Valgus (Hinged abduction)

Chiari's osteotomy

Chielectomy

Distal and lateral transfer of trochanter



### Caterall's indication for surgery

Stage I	No treatment needed
Stage II & III	
< 7 Y	No treatment needed unless head at risk signs present
>7 y	Aged more than 7 years or 'head at risk' signs -> containment
Stage IV	At any age containment unless undue force required

Choice between operative and non-operative treatment may not alter natural history of disease. The containment procedures like Pelvic or femoral osteotomies have similar results. Present trend is offer containment surgeries for Herring Type II and III in patients over 7 years.

### Results

Group I: 100%

II: 75%

III: 50%

IV: 25%



Shape of the head following healing of Perthe's disease, using Mose's rings

If head fits to a perfect circle results in good outcome

If head varies from perfect circle by no more than 2mm results in fair outcome

If head varies by more than 2mm in any plane results poor outcome