HIP DISLOCATION

MANAGEMENT AND COMPLICATIONS

Introduction…

- Nowadays…In the highways,in the factory, in the sports every where SPEED…SPEED…SPEED
- We are in a world speed
- Because of this high speed, hiigh voilence, even the HIP which is inherenty more stable, could not escape.
- Mostly with other injuries/ fractures

Define… ***DISLOCATION***

- *Complete loss of articular congruity(contact)*

Historical review…

- In olden days tarumatic dislocations very rare.
- One paper puplished after first world war,mentioned about the rarity of he condition

HIP - Anatomy

- Multi axial spheroidal **(Ball and socket joint**),synovial joint.
- Made of *acetabulam, head of femur*

CAPSULE

- Capsule attachment,

  Antreriorly

  At intertrochantric line

  Posteriorly,

  one cm medial to the intertrochantric crest

Ligaments

- **Four Ligaments**

  Illio – femoral ligament

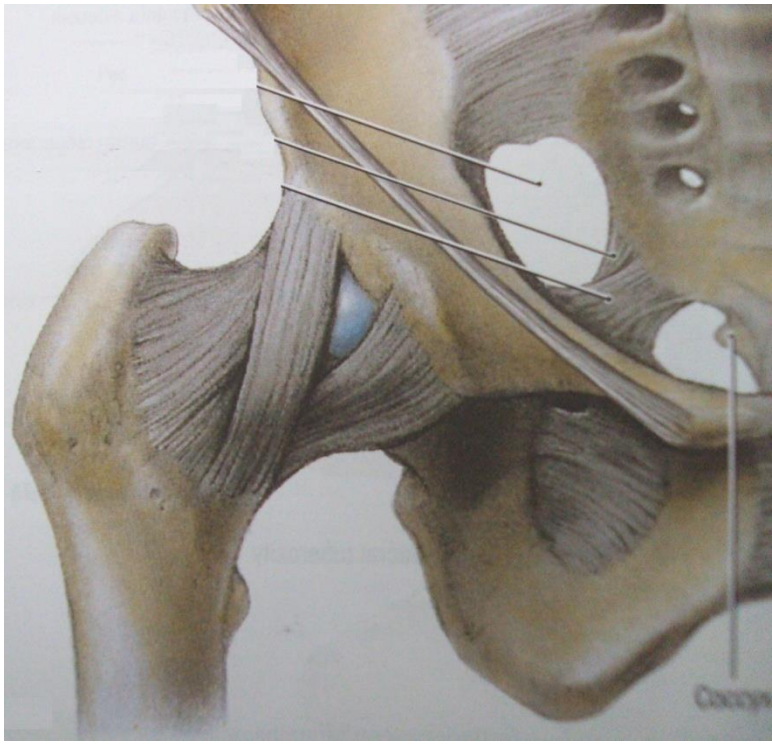
  Ischio femoral ligament

  Transverse acetabular ligament

  Ligamentum teres

Iliofemoral Ligament

- Inverted "Y" ligament or ***Ligament of Bigelow*** (or) Berting ligament (or) Hipsiloid Ligament.
- ***Apex*** – Attached between and acetabular rim and AIIS
- ***Base*** – Diverges from the apex as medial and lateral bands



Contd….

- ***Medial band*** – vertical, attached to infero medial portion intertrochantric line.
- ***Lateral Band*** – Attached to a tubercle at supero lateral part of Inter trochantric line
- One of the strongest ligament
- *Prevents the trunk from falling backwards* in standing position.

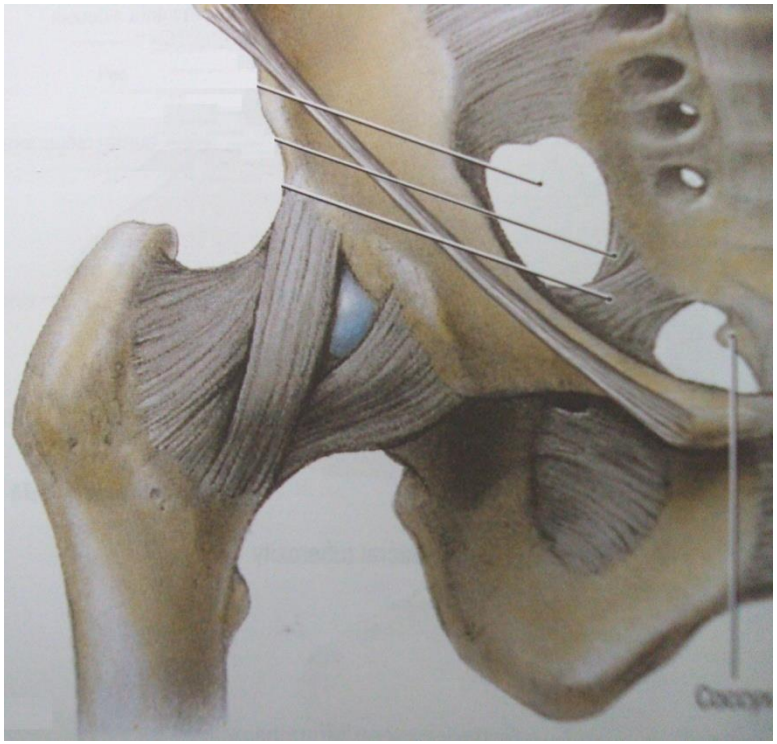
Pubofemoral Ligament

Triangular

Base –Illiopubic eminence,obturator membrane,obturator crest.

Distally – Blends with the capsule and illio femoral ligament

- ***Supports the joint infero medialy***



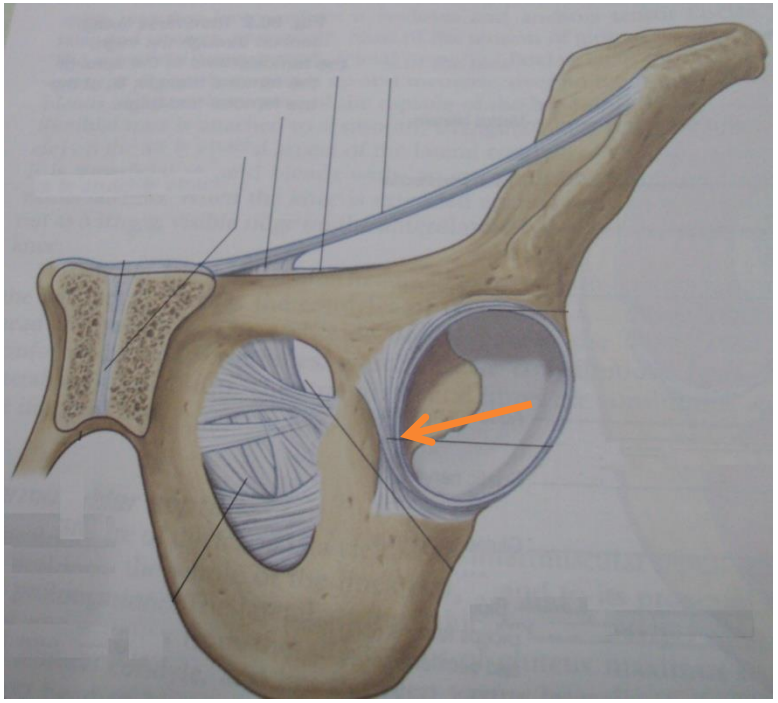
Ischiofemoral Ligament

- Thickening of the capsule.
- Three parts
  - Central
  - Lateral
  - Medio – Inferior

Reatively weak,supports the joint posteriorly

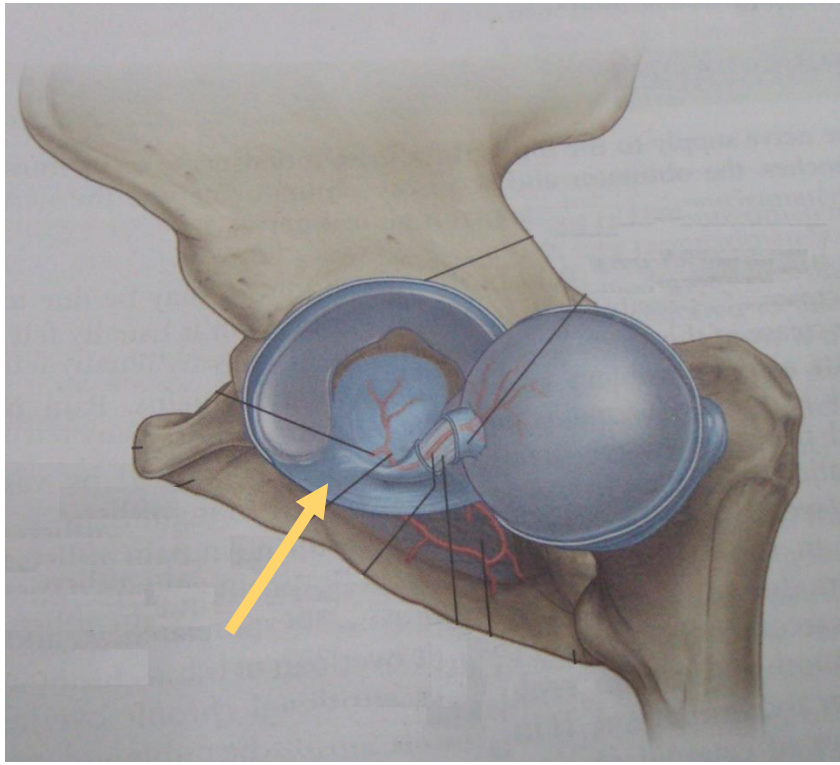
Transverse Acetabular Ligament

- Cross the acetabular notch, forming a foramen through which neuro-vascular structures enter the joint.



Ligamentum Teres

- Triangular flattened ligament
- ***Apex*** – Antero – superior part of the fovea centralis
- ***Base*** – Both edges of acetabular notch
- ***Tense – When Hip semiflexed, adducted***
- ***Relax – When abducted***



Stablity….

- Depends upon..
- 1. Depth of the Acetabulam
  2. Narrowing the rim by labrum
     (10% coverage to the head)
  3. Strong Ligaments
  4. Strength of the surrounding muscles.
  5. Length and obliquity of the neck

At any moment of the ROM, 50% Contact (Unlike shoulder, not more than 25%)

Mechanism of Dislocation

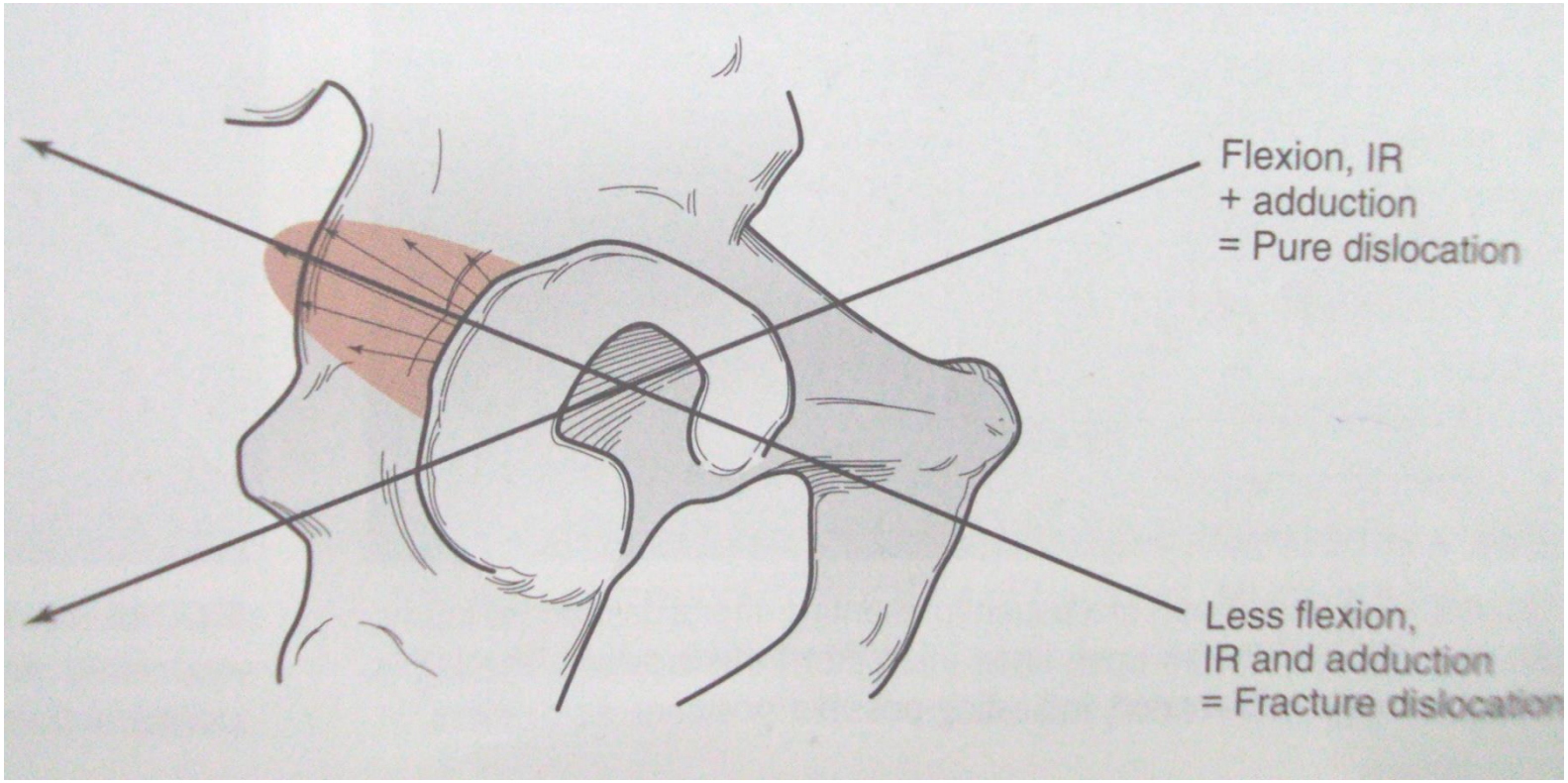
- Posterior Dislocation
  - RTA
  - Deceleration dash board injury in which the occupant's flexed knee hit against the dash board with ***flexed, adducted internally rotated*** hip.

Letournal vector analysis

- Either pure dislocation (or) fracture dislocation?

Pure Dislocation	Fracture Dislocation
More flextion and adduction, during injury. **Decreased Anterverion (Head more posterioly)**	**Less adduction and internal rotation** **Increased antoversion (Head anteriorly)**

Letournal vector analysis



Mechanism of Ant.Dislocation

- RTA
- Deceleration injury in which the occupant's hip in ***flexed / extended, abducted, externally rotated.***

Signs….

- ***Posterior dislocation,***

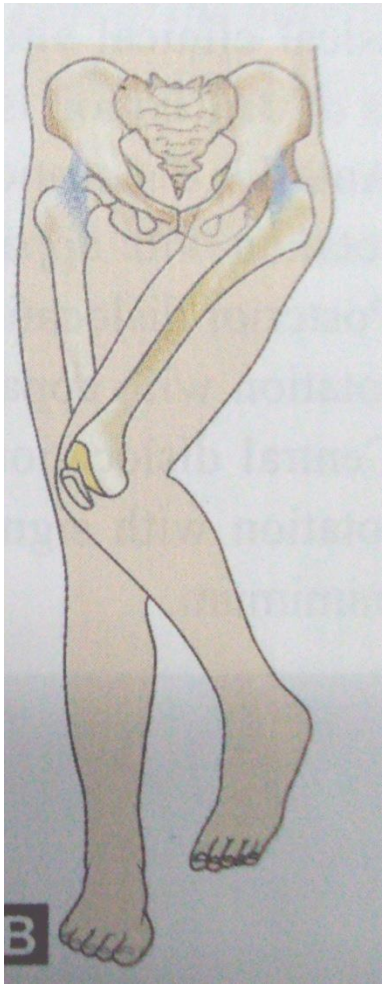
  limb shortening

  Flextion

  Adduction

  Internal rotation

- ***Vascular sign of narath positive***

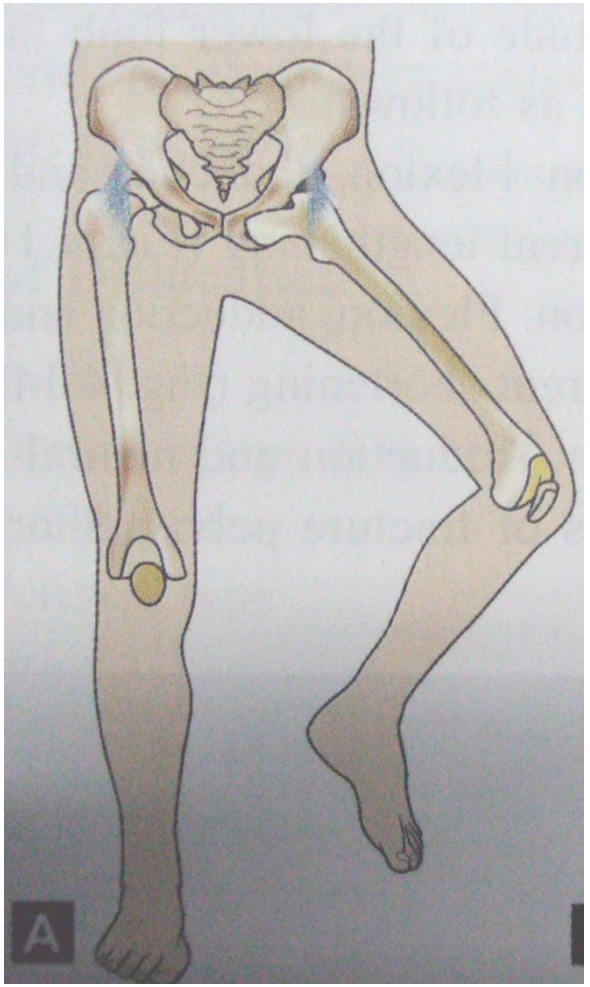


Posterior dislocation patho-anatomy

- Capsule ruptured posteriorly
- Shearing force acting on hip
- Anteromedially oriented fragment of head in Type 5

In anterior dislocation…

- Apparent lengthening
- Flextion –Obturator type
- Extension-pubic type
- Abduction
- External rotation



In Ant. Dislocation

- Capsule ruptured Inferiorly – (or) Antero inferiorly.
- Impaction type of Injury to Head
- ***Head – having indentation mark on antero superior aspect*** due to head resting on sharp margins of acetabulam.

Associated Injuries – Must Look for

- Fracture Head of Femur
- Fracture Neck of Femur
- Fracture Shaft of Femur
- Acetbulam / Pelvic Fractures
- Knee / Pattella Injuries

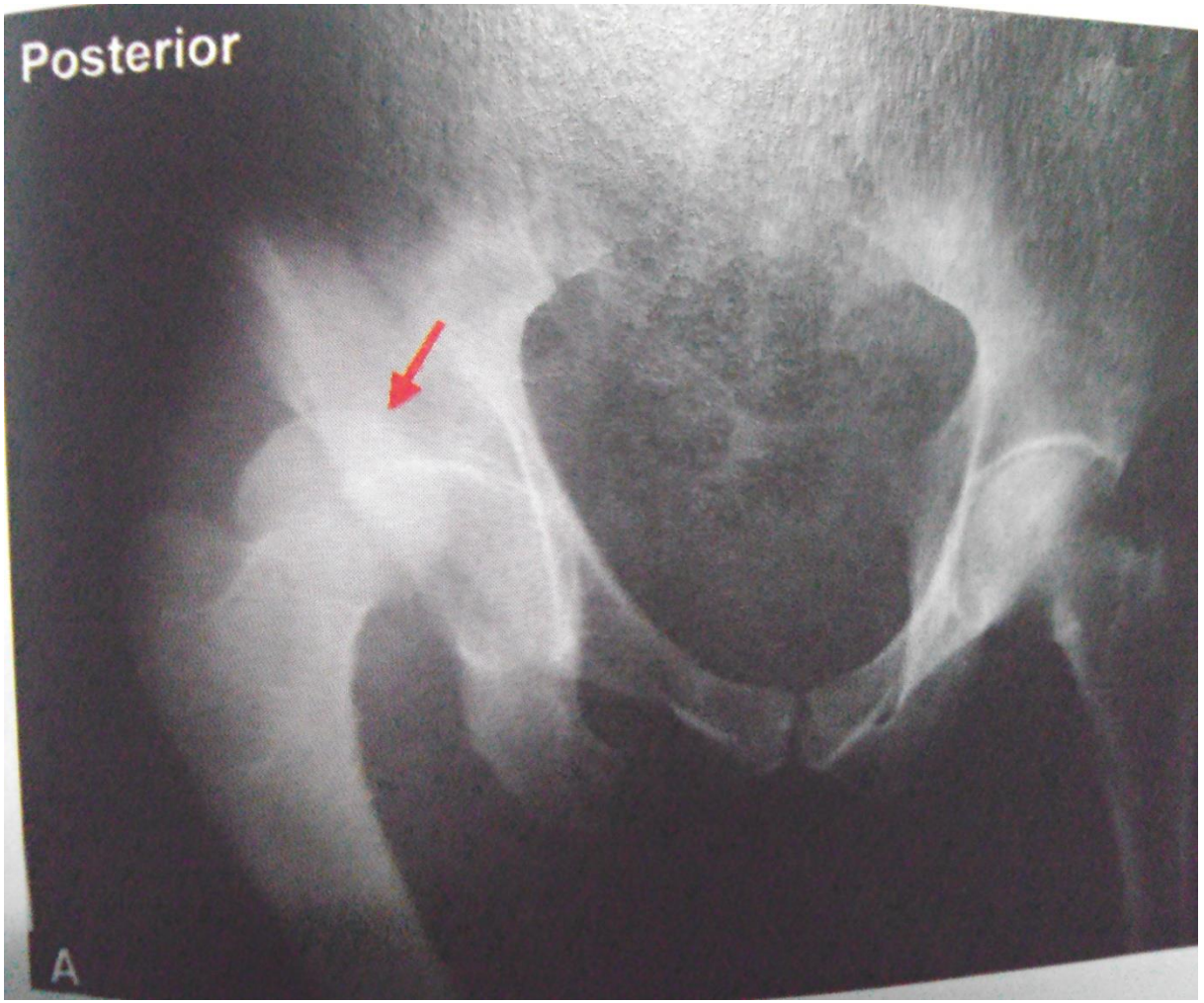
Imaging-

- X-ray – Views

  AP, Two oblique views, inlet views

  In Posterior Dislocation

- Loss of congruity with
  - **Small Head**
  - **Head overlapping over the root of acetabulam.**
  - **Lesser trochanter not apparently visible.**

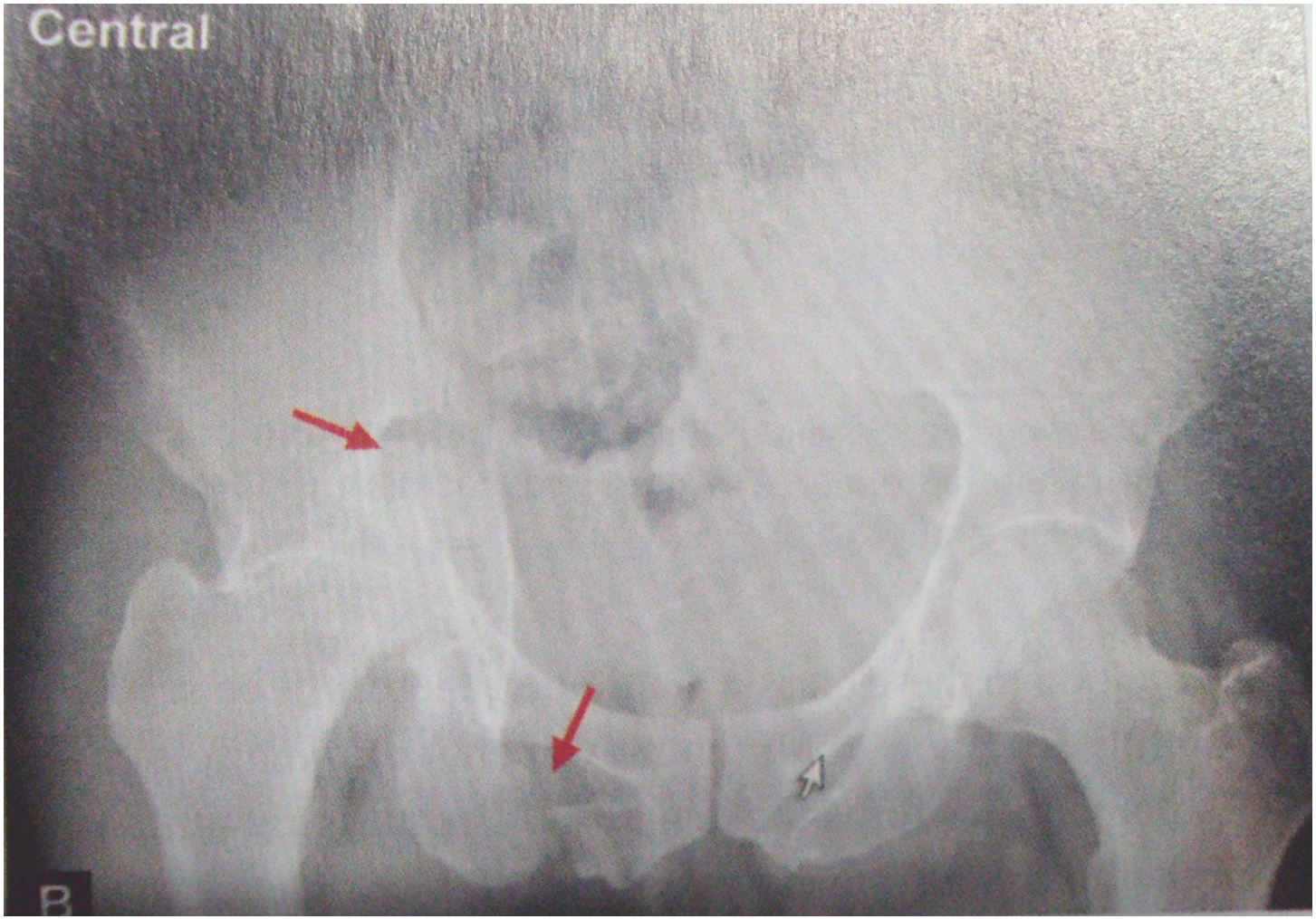

Posterior
A

Anterior Dislocation

- Loss of Congruity with
  - Large Head
  - Head medial and inferior to acetabulam.

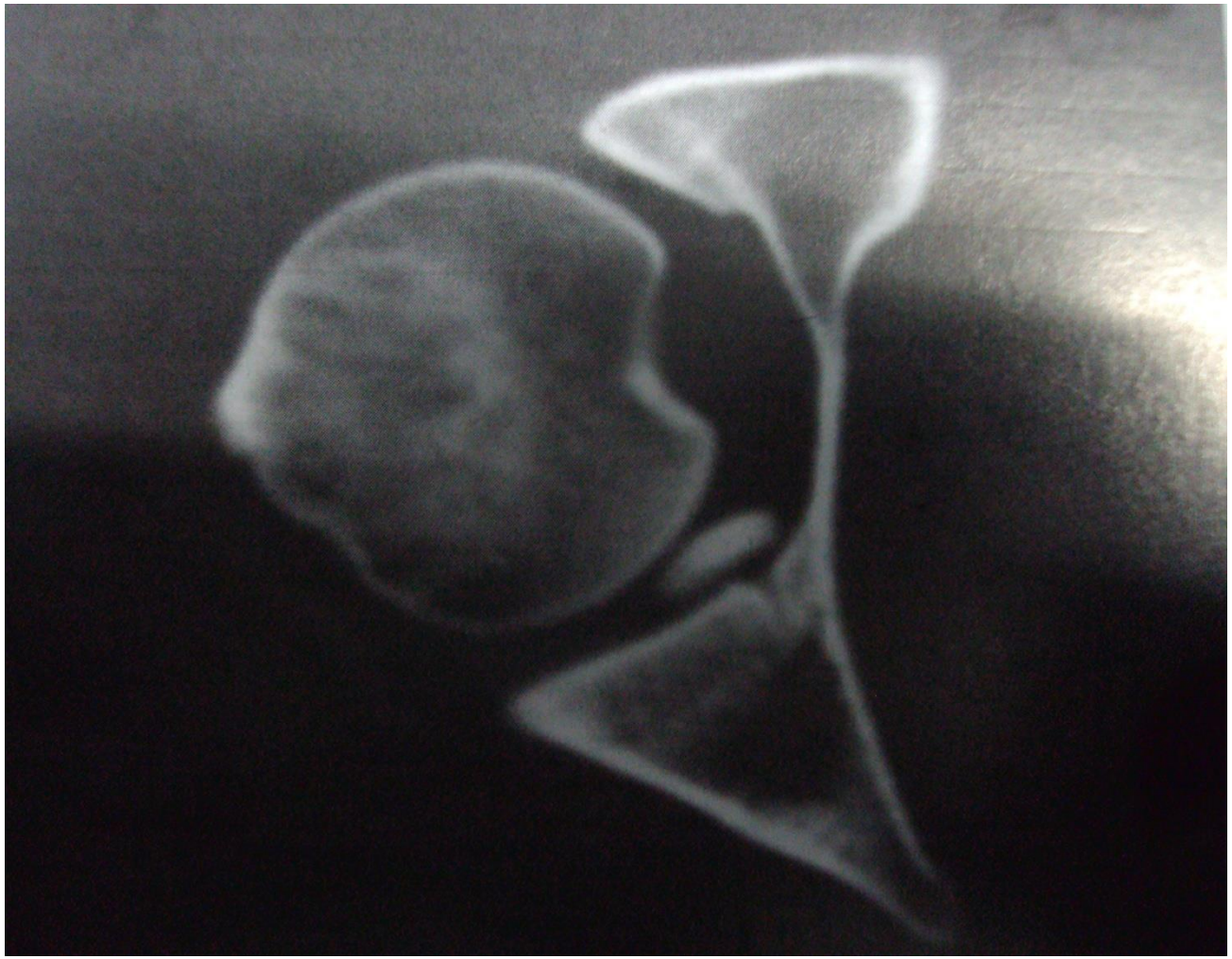
CENTRAL DISLOCATION

- Transverse (or) Bicolumnar fracture of acetabulam.
- Margin of head medial to the Illio pectineal line.


Central
B

ROLE OF CT SCAN

- 2mm / 3mm cuts
- Intra articular fragments better visualized
- Head in the centre of subchondral ring of acetabulam – visible as a Bull's eye
- Difference as much as 0.5mm in the distance from the anterior articular surface – subluxation.



ROLE OF MRI

- Useful in evaluation of Post tramatic osteonecrosis

SPECT SCAN

- Single photon emission computed tomography.
- To evaluate the difference between ***AVN and Impaction injuries***

Anatomical classification

- Posterior
- Anterior
  - Pubic
  - Obturator
  - pereneal
- Central # Dislocation

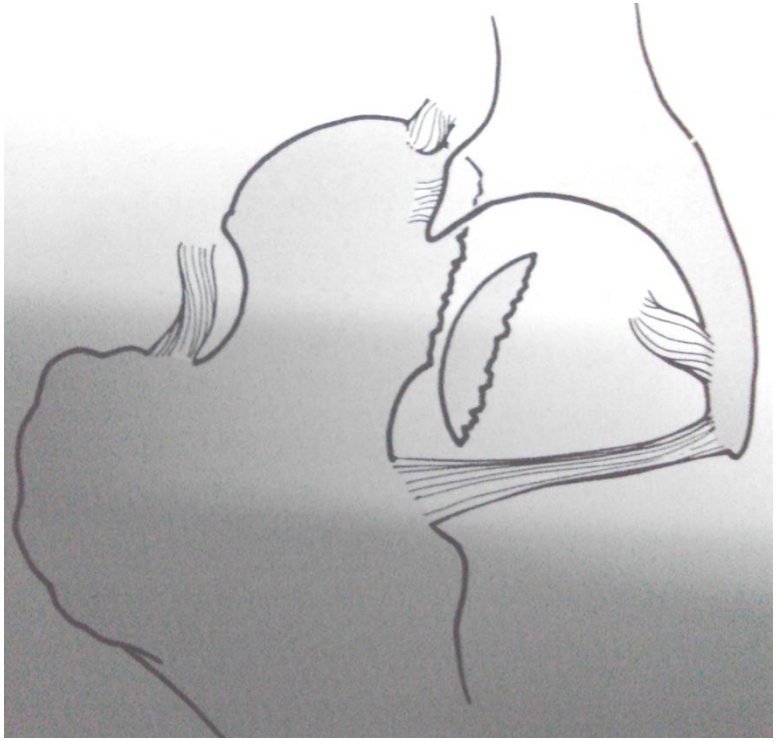
CLASSIFICATION

- Thompson – epstein
  - **Type 1** – Pure dislocation with (or) without minor fracture of posterior wall
  - **Type 2** – Dislocation with single fracture fragment
  - **Type 3** – Dislocation with comminution of the posterior wall
  - **Type 4** – Dislocation with fracture acetabular floor
  - **Type 5** – ***Dislocation with fracture femoral head.***

Pipkin Classification

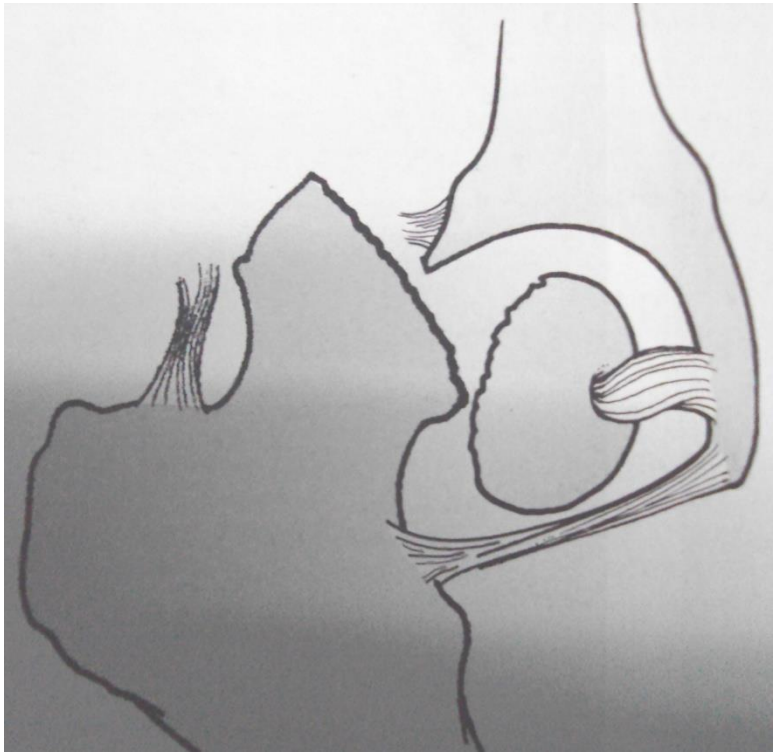
- **Type I**

  posterior dislocation with femoral head # inferior to fovea.



- **Type 2;**

  posterior dislocation with femoral head # cephalad to the fovea.



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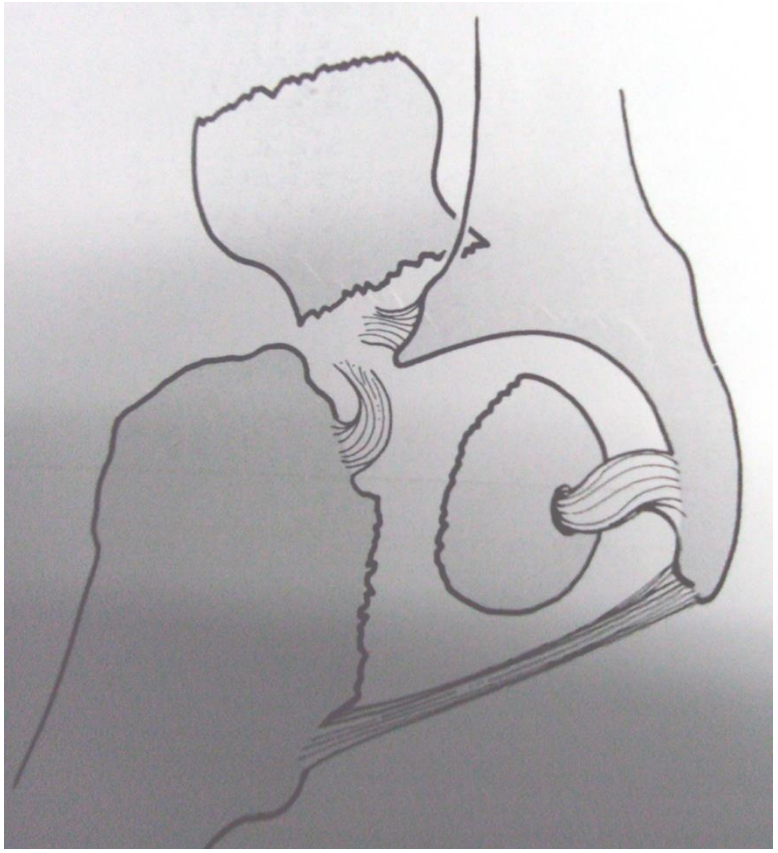
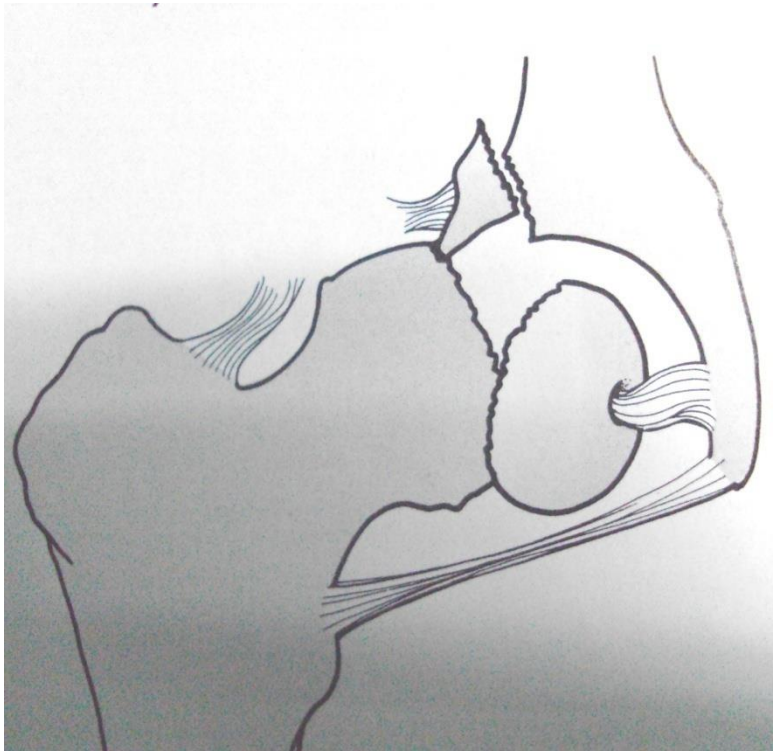
- **Type 3-**
- Femoral head # with # femoral neck



- **Type 4-**

  Femoral head # associated acetabular #



Stewart – Milford classification

- *Specially address the post reduction stability.*

- Type I Simple dislocation without any fracture
- Type 2 Dislocation with one (or) more fragment but with sufficient socket of acetaulam to maintain *GOOD post – reduction stability.*
- Type 3 Dislocation with fracture of the rim with *gross post – reduction* *stability.*
- Type 4 Dislocation with fracture Head (or) Acetabulam.

MANAGEMENT

Orthopaedic EMERGENCY!!!

Patients divided in to two groups

i) Pure dislocations

ii) Fracture dislocations

i) Fracture acetabulam

ii) Fracture Head of Femur

iii) Fracture shaft of Femur

MANAGEMENT OF PURE POSTERIOR DISLOCATION

- Methods for closed reduction
- Allis method
- Baltimore lift
- Bigelow's method
- Stimpson's gravity method

Principles….

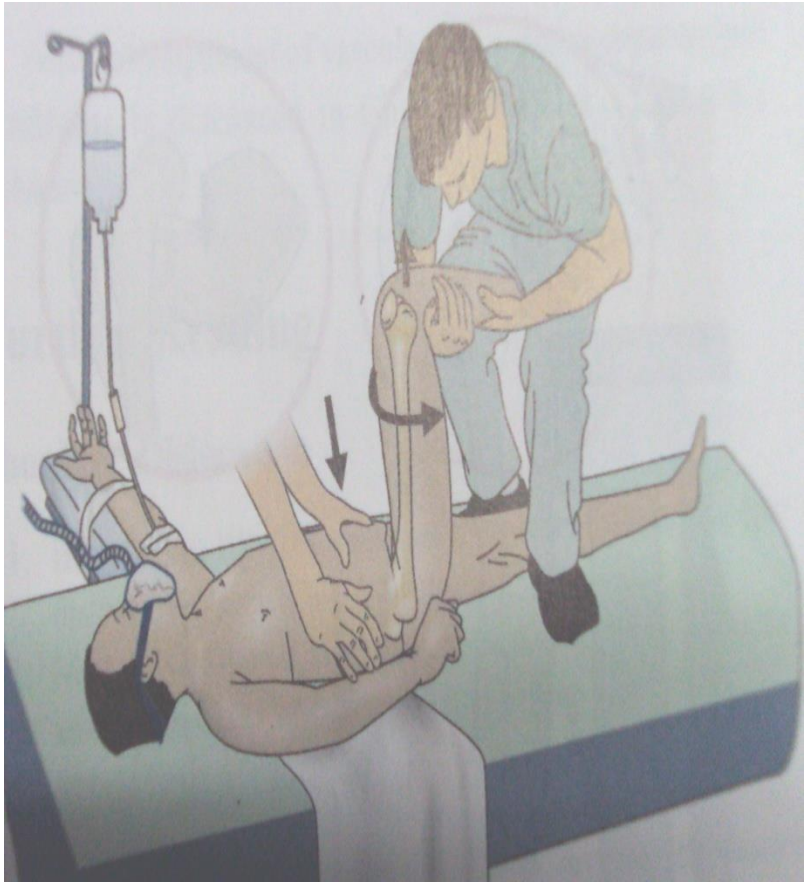
- Long term results depends severity of the initial injury
- *Reduction open or closed should be within 12 Hours.*
- *One or two attempts only for closed reduction*

Indications for closed reduction

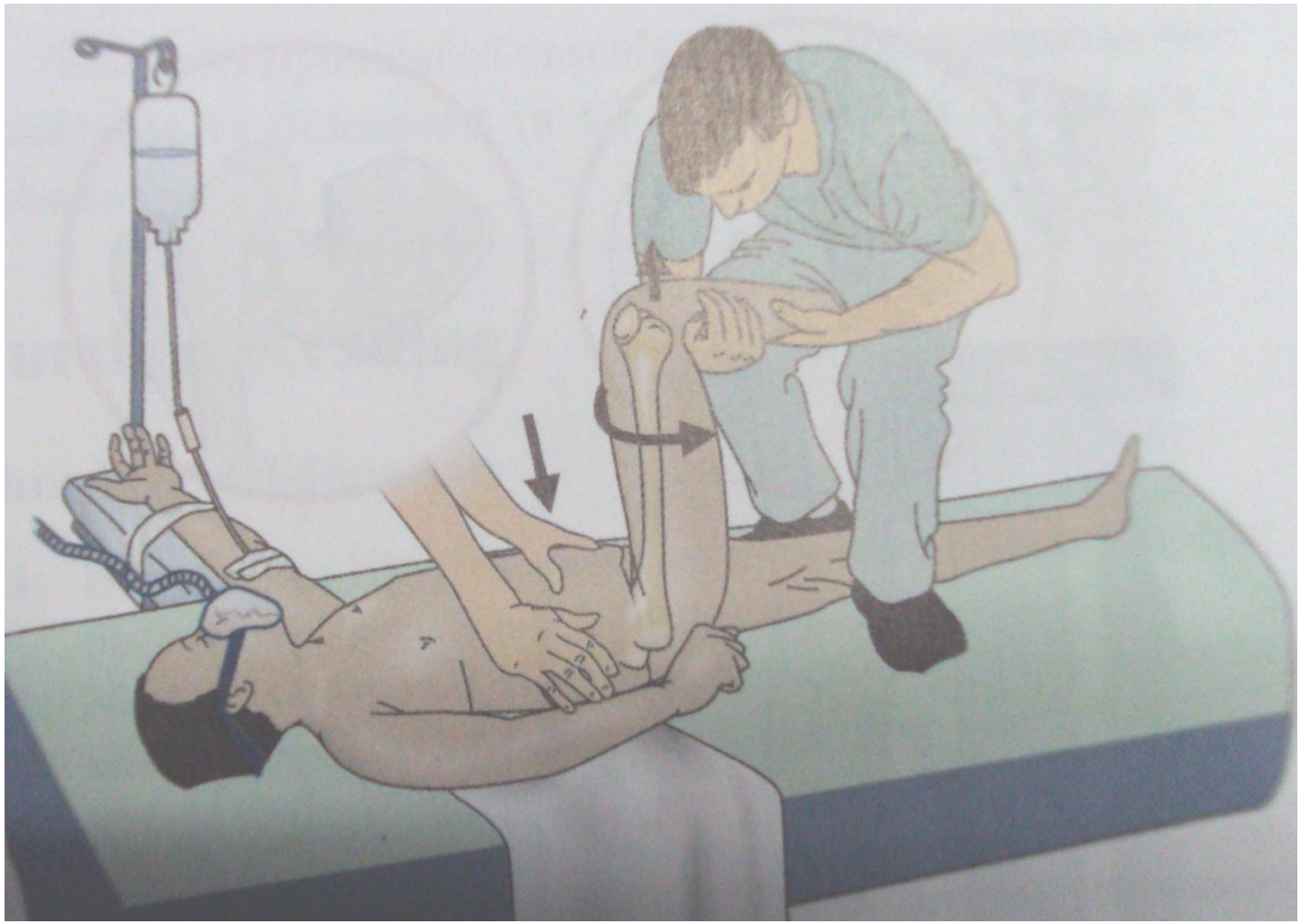
- Congruent reduction without any #
- Poterior wall # reduced with stable congruent reduction.
- Pipkin type1# with congruent reduction
- Pipkin type 2 # with anatomical,congruent reduction

ALLIS METHOD

- M.C. used
- Patient supine ↓, G.A.
- Hip, Knee – In flextion (Relaxing the Hamstrigs)



- Traction – in line with deformity
- Counter traction – pressure on ASIS
- While traction,additional inernal or external rotation to augment the reduction.
- Finally limb extented, abducted and externally rotated.



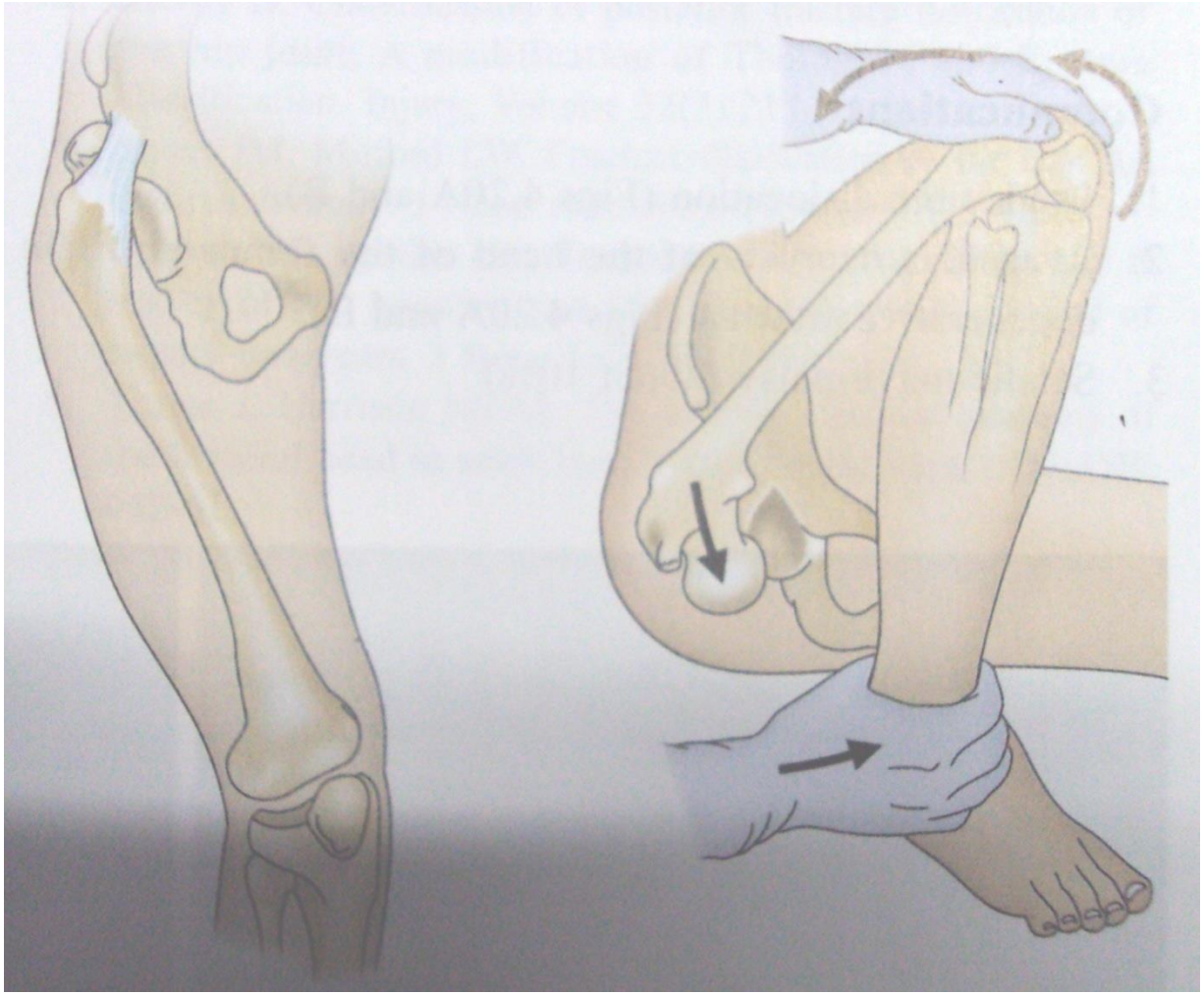
EAST BALTIMORE LIFT

- Modification of Allis method.
- Patient supine with HIP and Knee flexed 90^0 surgeon on the affected side of the limb.
- Keeping his one arm under the proximal calf.
- Another hand to grip the ankle of affected limb.

- The assistant on opposite side,doing the same
- Another assistant stablising the pelvis.
- Surgeon, assistant squat to some extent.
- Then straightening up to reduce the dislocaton

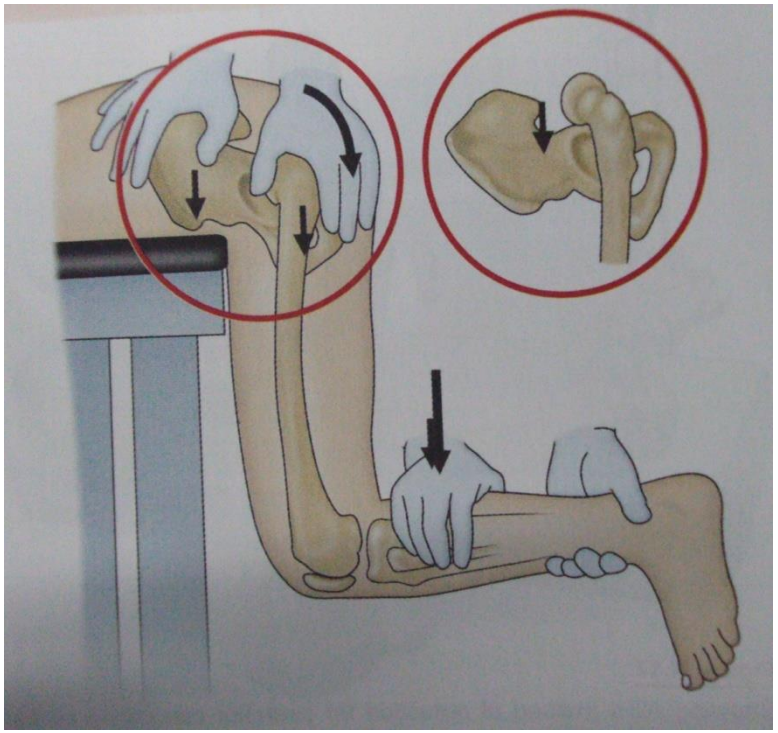
Bigelow method

- Same as Allis method.
- While maintaining the traction and counter traction limb is **rotated externally in a circumadductory manner**.
- Head levered back in to the acetabulam
- ***More prone for fracture NOF.***



STIMPSON GRAVITY METHOD

- Patient prone.
- Both lower limp hanging off the end of the table.
- Assistant stabilize the pelvis
- Knee in 90^0 flexion.
- Surgeon grasping the knee
- Longitudinal traction
- Internal & external rotation.

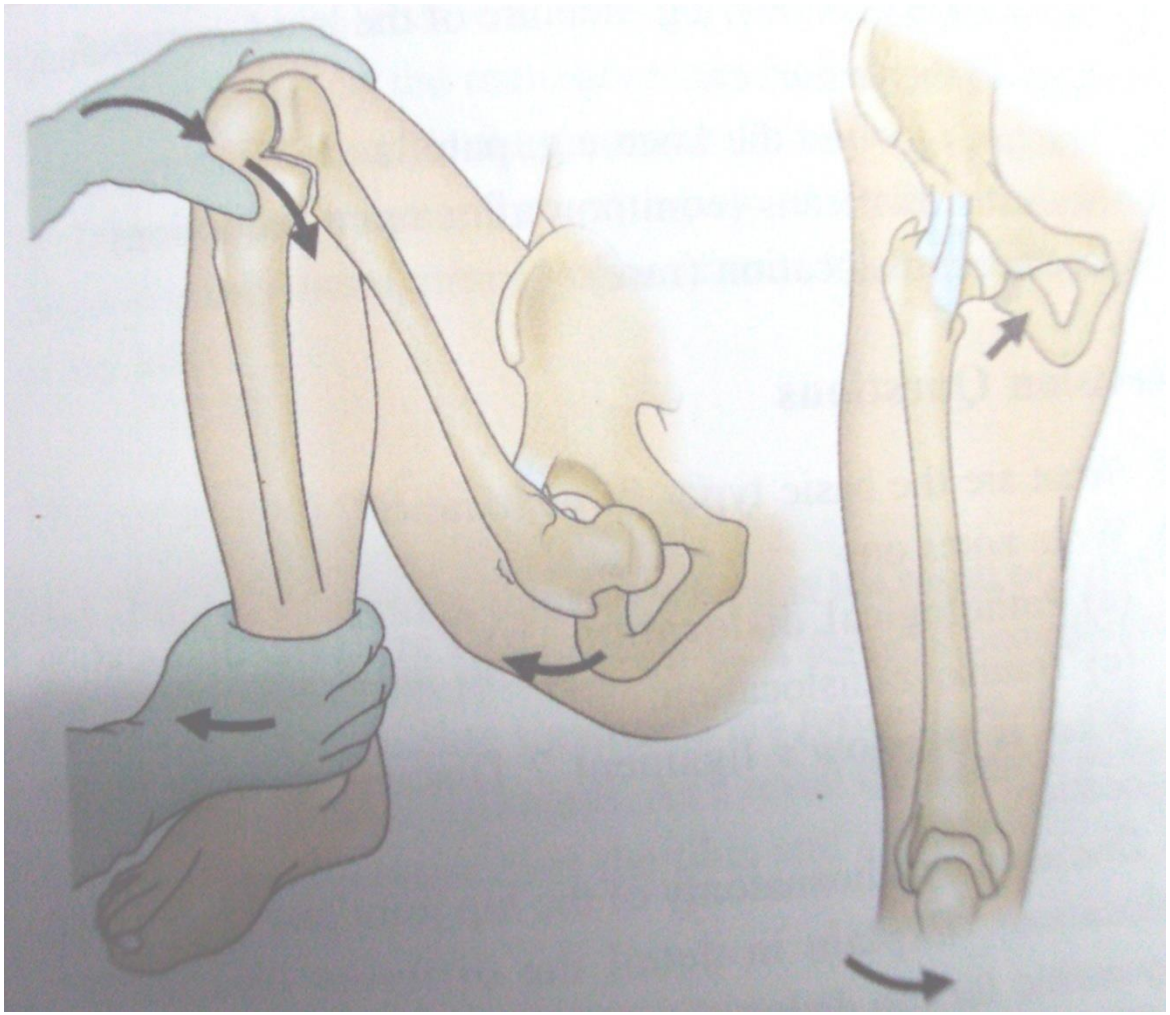


ANTERIOR DISLOCATION

- Allis method
- Second assistant giving lateral traction.
- Instead of external rotation, limp ***adducted & internally rotated.***
- Finally extension of the limb.

Reverse Bigelow's Method

- Exactly in opposite manner to that of posterior dislocation.
- Limb ***rotated internally*** in a circumadductory manner.



POST REDUCTION STABILITY TEST

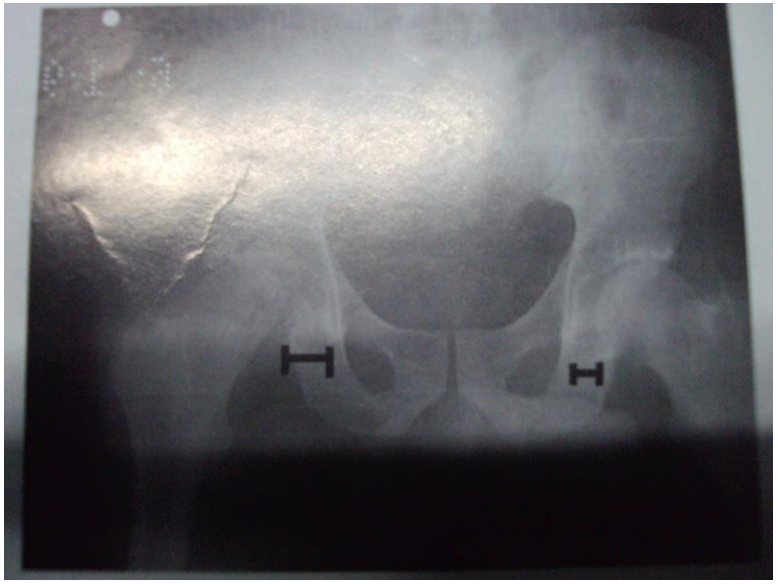
- Patient supine
- All ROM tested
- HIP flexed, internally rotated pressure given in axial long axis of the femur.
- Under C-Arm, any loss congruence between the head and roof of acetabulam -*unstable hip.*

POST REDUCTION ASSESSMENT

- X-ray – Five view to be taken
  - AP
  - 2 oblique views
  - Pelvic in let view
  - Pelvic outlet view

Contd….

- **Congruence assessed by relationship between the head and roof of acetabulam.**
- **There should be equal parallelism.**
- **Intact Shenton's line.**
- ***Distance between the Radio graphic tear drop and femoral head – compared with normal hip.***



POST REDUCTION CT

- 2mm cuts
- Intraarticular fragments better visualized.

POST REDUCTION MANAGEMENT

Current protocal (CAMPBELL)

- Mobilisation after they able to do straight leg rise.
- With hip precautions followed for 6 weeks
- Initial mobilisation with crutches in toe touch weight bearing

OPEN REDUCTION

- **Indications:-**
  - Irreducible dislocation.
  - Neglected dislocation.
  - Dislocation with fracture head of femur.
  - Dislocation particularly involving the weight bearing part of neck of femur.
  - Dislocation with fracture shaft of femur.
  - *When >30^0 of posterior wall involved in fracture dislocation.*
  - Iatrogenic sciatic nerve palsy.

OPEN REDUCTION - APPROCHES

- ***Anterior approach – (smith peterson)***
  - Anterior dislocation.
  - Dislocation with fracture head.
- ***Posterior approach –(Kocher – Longenbeck's)***
  - Post. dislocation.
  - Dislocation with fracture posterior wall.
  - Dislocation with soft tissue inter position.

OPEN REDUCTION - APPROCHES

- ***Lateral Approach – Watson Jone's***
  - Irreducible dislocation.
  - Neck of femur.
- ***Advantages:-***
  - Complete exposure of neck and acetabulam.
  - Vascular structures not disturbed.

Trans trochantric approach (or) surgical dislocation approach

- For Dislocation with femoral fead fracture , acetabular fracture
- Full view of acetabulor cavity, head of femur.

Posterior Approach	Anterior Approach
Convenient	Technically difficult
Most difficult to visualise the antero medially oriented fragment,with out disturbing the ligamentum teres (further damaging the blood supply to fragment)	**Easy to reduce the antero medially oriented fragment.**
More chance for AVN	*Less change for AVN*

DISLOCATION WITH FRACTURE HEAD-Principles

- If congruent reduction – conservative
- If non congruent with unstable hip.
  - Open reduction, then

    If Small fragment,

    Excision of fragment

    If larger fragment, fixation with
    - **Herbert screws**
    - **Acutrax screws.**
    - **Counter sinking screws with head.**
    - **Resorbable pins**

- **Type 1** –CR –concentric-conservative

  If not – OR- fixation or resection of the fragment.
- **Type 2** CR-Concentric-Conservative

  If not - OR - fixation

- **Type 3 – Controversial.**

  In young pt- OR ,Osteosynthesis of # neck of femur with vascularised pedicle graft.
- **In older age**, Hemiarthroplasty
- Type 4 : Depending upon the type of acetabular #

DISLOCATION WITH FRACTURE NECK OF FEMUR

- Open reduction of hip dislocation
  - Osteosynthesis of fracture NOF
  - With vascularised quadratus femoris graft.

DISLOCATION WITH FRACTURE SHAFT OF FEMUR

- Hip dislocation
  - CR. With stimpson gravity method.
  - Greater trochantric manipulation with stein men pin insertion.
  - ***ORIF of fracture SOF.***

DISLOCATION WITH FRACTURE POSTERIOR WALL OF ACETABULAM

- Congruent / stable reduction conservative.
- *ORIF – when > 30% involved*
- Through Kocher – Longen back approach
- >60 years – Replacement surgery

CENTRAL FRACTURE DISLOCATION

- Transverse acetabular fracture with dislocation.
- **Two groups**
  - *1.Intact weight bearing surface*
  - *2.Acetabulam made into bag of bones*

Management

- **Group I -** Anatomic Reduction
  Internal Fixation.
- **Group II -** **Conservative**
  Early mobilisation
- Always depending upon
  superior acetabular dome.
  congruence between dome and head.

Post op Management

- In case of fracture dislocation.
  - No active hip movement till 6 weeks
  - But CPM to be started once the pain decreased.
  - The toe touch weight bearing – After pain subsides till 10 – 12 weeks.

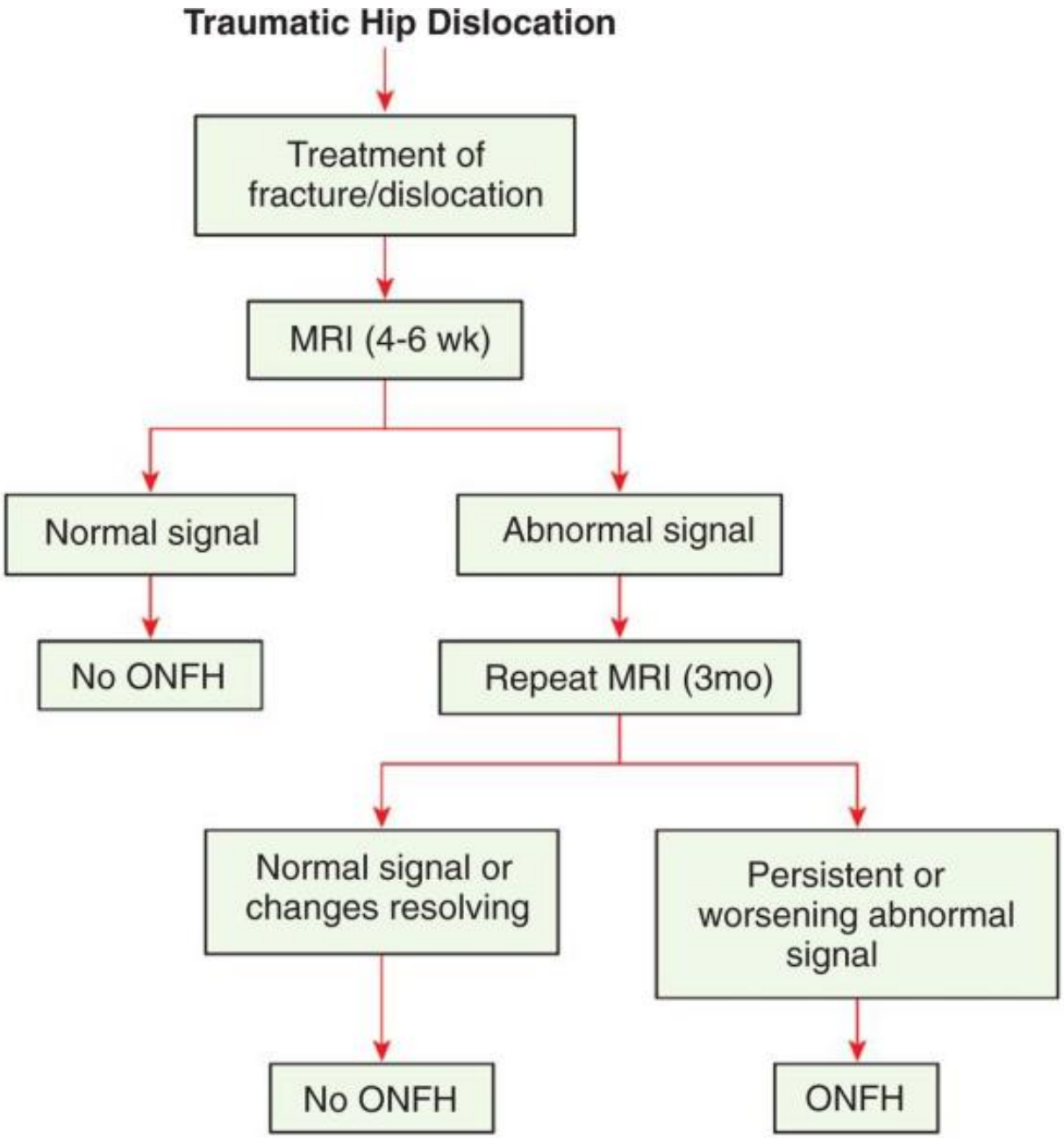
COMPLICATIONS - EARLY

- ***Sciatic nerve injury:***
  - 10-12% cases
  - Stretching
  - Peroneal part.
  - Usually recovers
  - If nerve injury after reduction

    Immediate exploration
- ***Vascular injury.***
  - Superior gluteal artery injury.
- ***Fracture of shaft of femur***

LATE COMPLICATIONS

- **Avascular necrosis**
  - M.C. after posterior dislocation.
  - It reduced within 6 hrs, 0 -10% only.
  - M.C. cause – spasm of vessles not due to turned vessles.
  - **Early sign** : ***cystic irregularity at junction of superior articular surface of femoral head with neck.s***


Traumatic Hip Dislocation
Treatment of fracture/dislocation
MRI (4-6 wk)
Normal signal
Abnormal signal
No ONFH
Repeat MRI (3mo)
Normal signal or changes resolving
Persistent or worsening abnormal signal
No ONFH
ONFH

SECONDARY OSTEOARTHRITIS

- M.C. in posterior dislocation.
- **Delay in reduction leads to chondrocyte a*poptosis***
- Leads to Osteoarthritis.

Old Unreduced dislocation

- Anterior
- Intertrochanteric Osteotomy (Gibson's approach)
- Dividing the femur along the intertrochanteric line
- Adduction Internal rotation Extension of the limb

Post reduction

- Skin traction 6 weeks
- Crutch walking after 6 weeks
- Full weight bearing after 3-4 months

Nagi Modified Girdlestone arthroplasty – for >6 months old

- Anterior smith peterson approach
- Subcapital osteotomy
- Cut femoral neck is displaced upward into the acetabuum
- Post op skeletal traction for 6 weeks
- Non weightbearing/ Crutch walking aftr 6 weeks
- Gradual weightbearing after 3 months

posterior

- Type I –

  Closed reduction

  Gupta's traction abduction technique

  Open reduction

- Type 2 and 3

  Open reduction internal fixation with post op skeletal traction

Gupta's traction abduction technique

- Utpt with 18 kgs
- Under sedation and muscle relaxation
- Alternate day x-ray , on 5th day head will be at or below level of acetabulum
- Now, gradually abduct the limb and reduce the traction with 3.6 kgs every 4th day
- Once head reduced, traction with 7 kgs for 2 wks.
- After 2 wks, non weightbearing exercises for 4 weeks.
- Full weightbearing after 3 months.

- Type 4 and 5
  - Total Hip arthroplasty (>3 month old)
  - Arthrodesis (young patients)
  - Subtrochanteric osteotomy

Heterotopic classification

- Implies the significane of trauma.
- M.C. in posterior dislocation, In anterior dislocation, in case head of femur fracture.
- Indomethacin – to prevent it
- Rediation therapy – in older age.

Myositis ossificans

- Due to repeated manipulition.
- Associate with head injury.

Irreducible Dislocation

- **In posterior type,**
  - Button holing through the capsule
  - Long bony fragment interposition
  - Soft tissue Interposition of
    - Pyriformis
    - Gluteus maximus
    - Ligamentus teres
    - Acetabular Labrum
    - Iliofemoral ligament

In Anterior Dislocation

- Button holing through the capsule.
- Bony fragments interposition.
- Soft tissue interposition.
  - Rectus femoris
  - Illiopsoas.
  - Anterior Hip capsule.
  - Acetabuar Labrum.

Treament for irreducible dislocation.

- Open reduction
- Arthrodesis
- Total Hip replacement.
- Giridle stone excision arthroplasty.

Poor function at 6 months – Poor progrosis.

Good function at 1 year – Good progrosis.

Future?

- Arthroscopic removal of small fragments.
- **>2cm^2 surface** area in impaction injury on the Head will lead to – contact force disturbance.

  - Secondary osteo arthritis.
- So this area must be elevated and to be packed with ***subchondral grafts.***

Take home message…

- **High voilence injury, polytraumatic.**
- **Reduction as early as possible.**
- **Proper post reduction assesment.**
- **OR, if CR failed.**
- **Early immobilisation**
- **Close follow up,in delayed reduction cases**


Thank You!