Lower limbs trauma

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2020

Learning Objectives of lower limbs trauma lectures :

1/ to assess the clinical features , diagnosis and treatment of the following conditions :

A – **(Hip &femur):**Injuries of hip &femur , Dislocation of the hip, Fractures of the femoral neck, Intertrochanteric fractures, Proximal femoral fractures in children Femoral shaft fracture .

B- (**Knee**)Supracondylar & condylar fractures of the femur, Acute knee ligament injuries, Chronic ligamentous instability, Fractured tibial spine , Dislocation of the knee, Dislocation & Fractured patella .

C- **(leg):**Tibial plateau fractures , Fractures of proximal end of fibula, Fractures of tibia &fibula, Fracture of fibula alone,

Fracture of tibia alone .

D- **(ankle & foot):**Injuries of the ankle &foot , Malleolar fractures of the ankle , Pilon fractures (Tibial plafond #): , injuries of the talus , Fractures of the calcaneum , Mid-tarsal injuries, Tarso-metatarsal injuries and Metatarsal fractures .

2/ To know the principle of management of any case of lower limbs trauma .

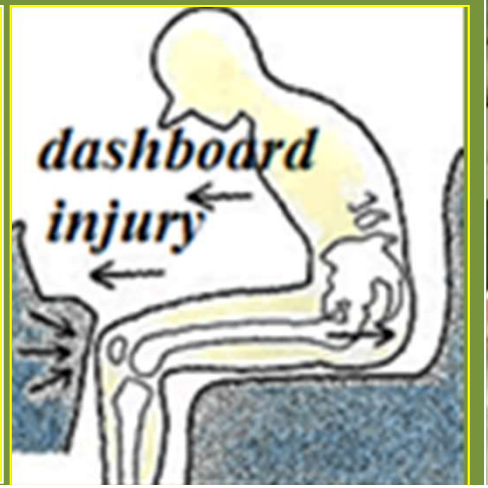
Injuries of hip & femur

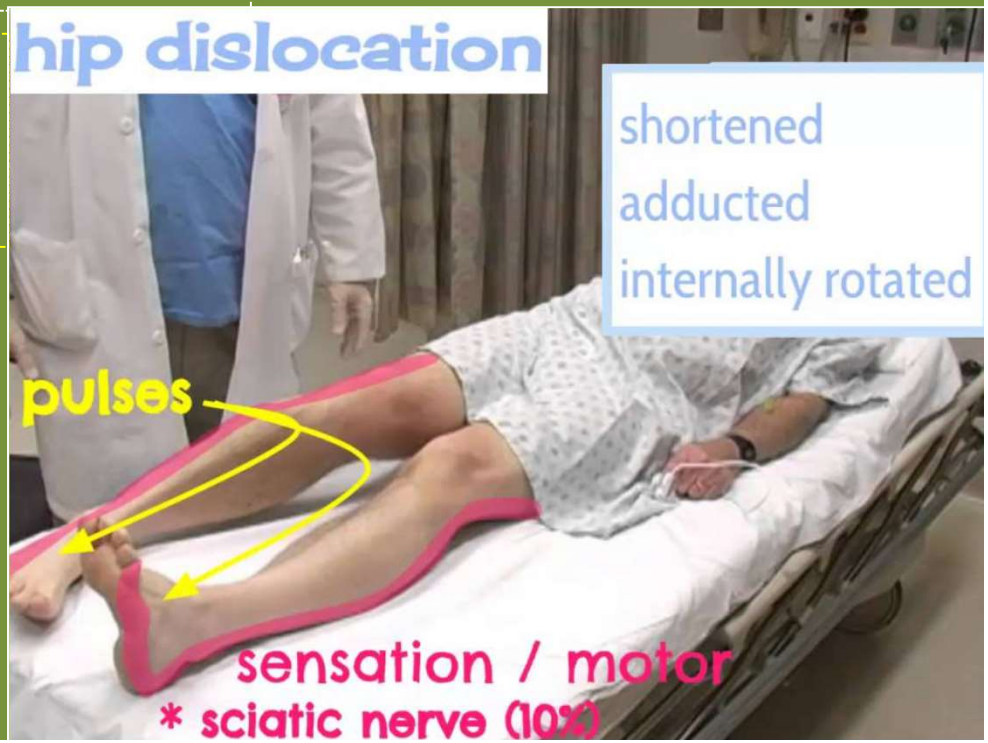
Dislocation of the hip

Posterior dislocation the commonest

MOI: usually dashboard injury to the knee with hip flexed &adducted ..
>> if abducted, there is in also a # of the posterior acet. wall (hip #- ≠)

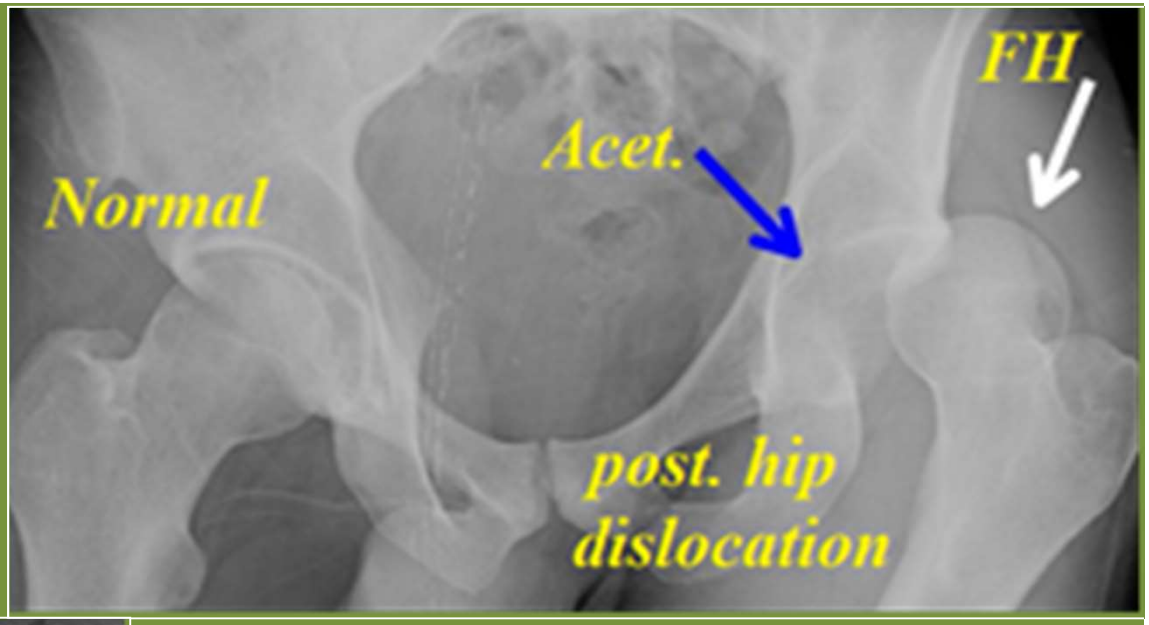
CF: the leg is short, adducted, internally rotated & flexed (unless the femur is #).
The sciatic nerve may be injured.





X-ray: AP view: the FH is out & above the acetablum .

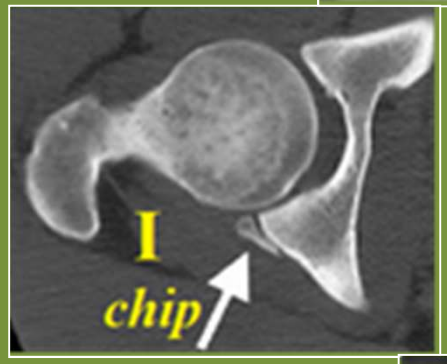
If suspect #, CT scan is needed.



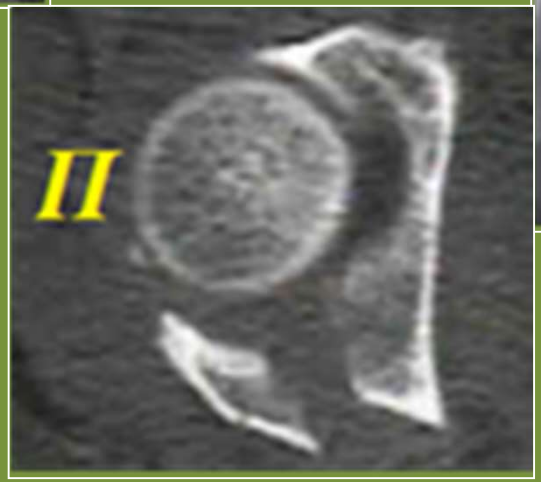
Classification:

type I:

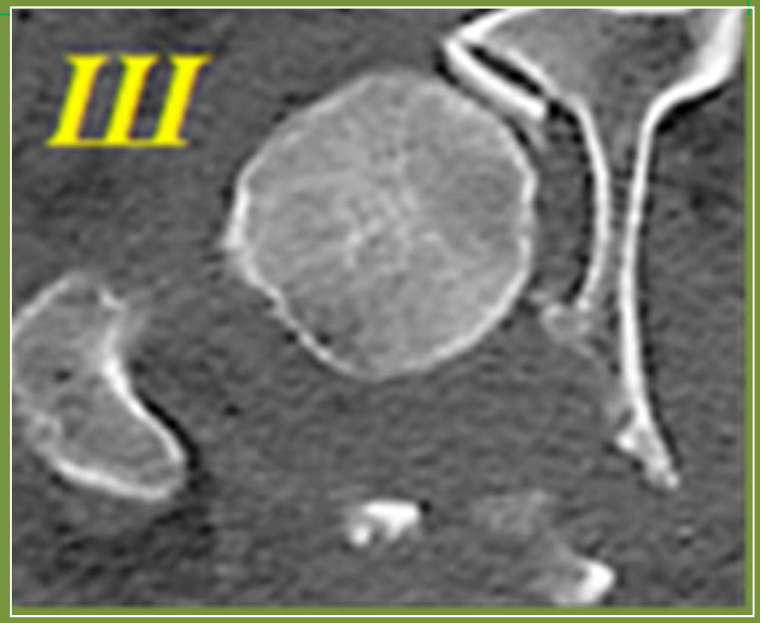
≠ without # or minor chip #.



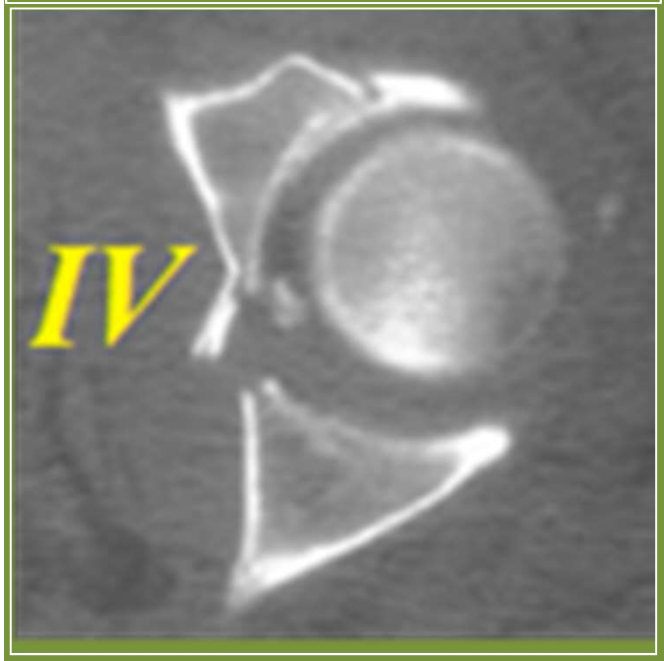
Type II : ≠ with single large frag. of post. acet. wall

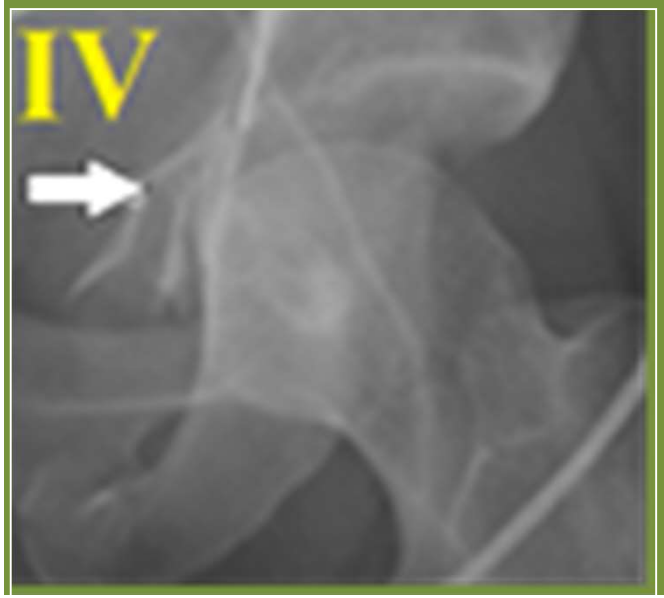


III: comminuted posterior wall

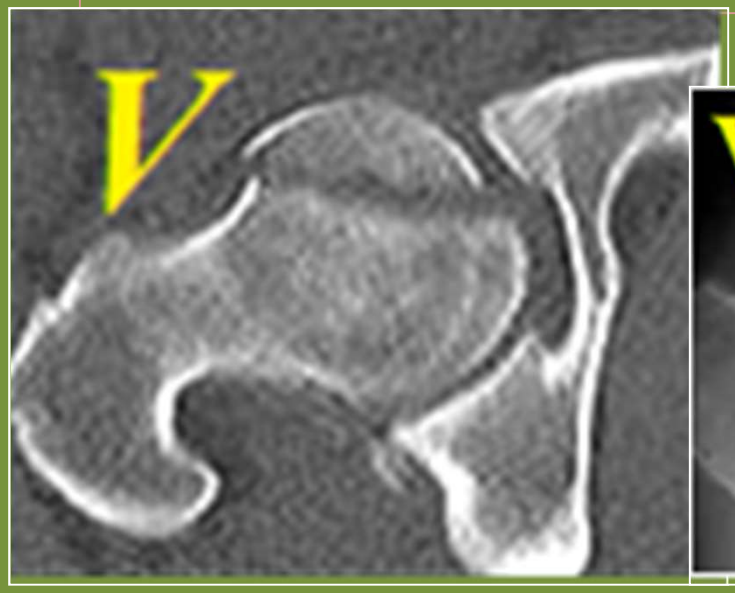


IV: ≠ with acet. floor #.

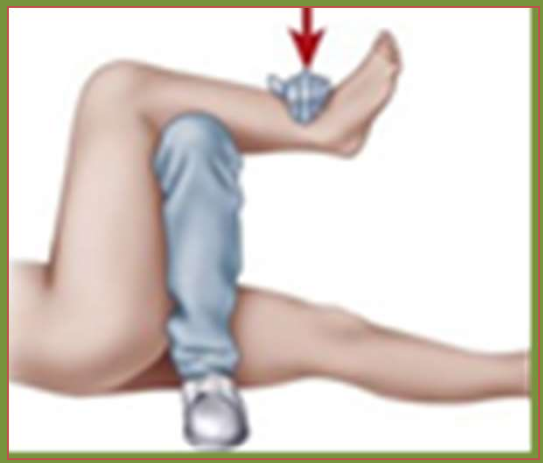




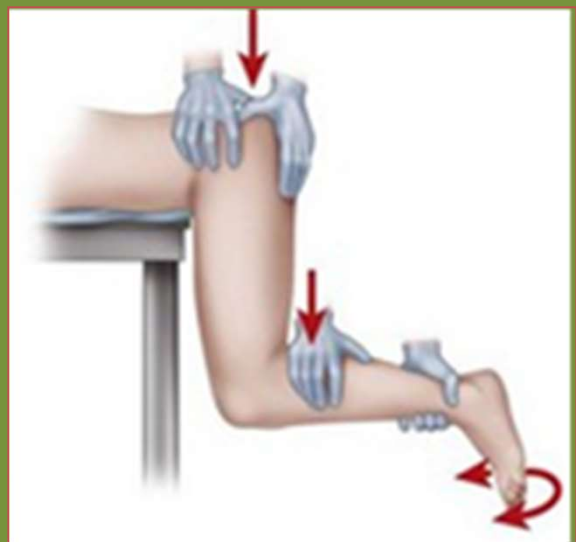
V: ≠ with femoral head #



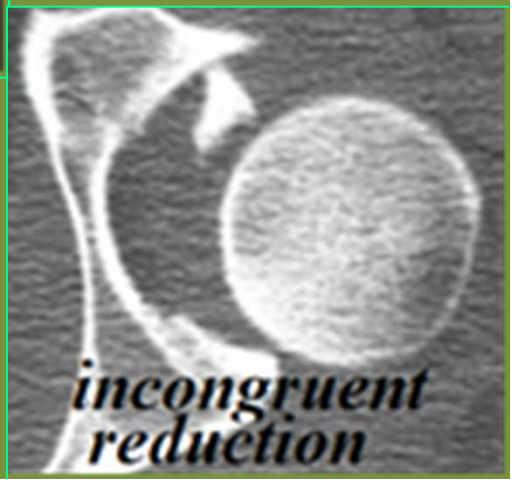
Ŗ: urgent closed reduction UGA: apply leg traction while flexing hip & knee 90° then ↑ upward traction with hip internal & external rotation; if reduction is successful, you will feel a 'clunk'. Checking x-ray to confirm reduction & CT to exclude a #



If type I (stable): 3wk traction → 3wk PWB



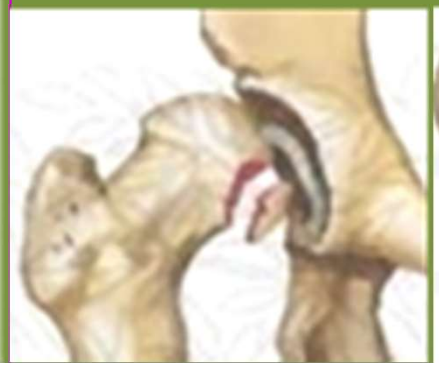
The other less stable types II, III , IV &V → 6 wk (skeletal) traction → 6 wk PWB



In any type, if post reduction CT shows a trapped bone fragment inside hip joint or a still displaced large bone segment (which may ↓ hip stability), then surgery is indicated: Remove or Fix

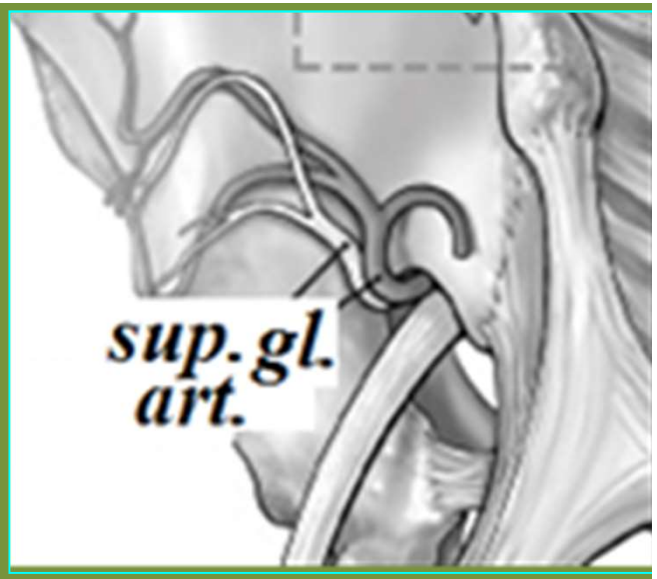

acet. post. wall
fixation using
Reconstruction
plate

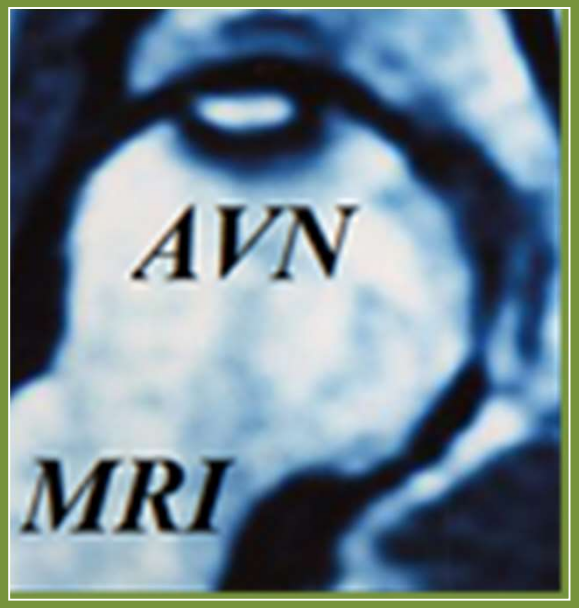

V

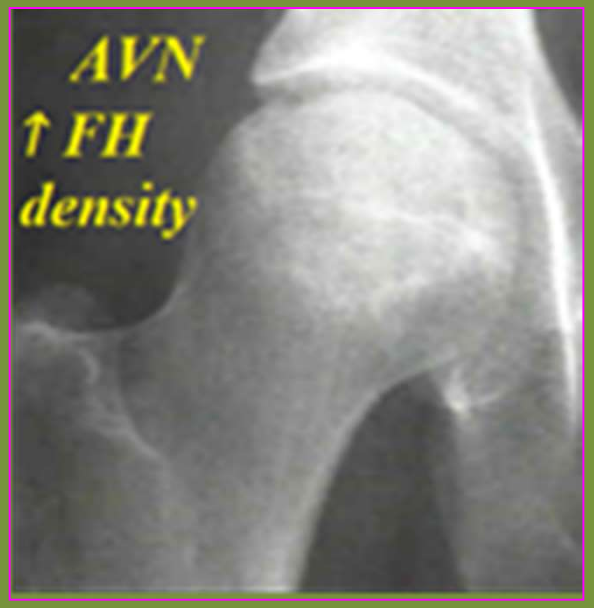


Complications .: Early:
1-Sciatic nerve injury (>10%);
2-Vascular injury(rare);
3-Associated femoral shaft #
(the ≠ may be missed).

Late: 1- AVN: incidence is 10%;
if reduction is delayed >12 hours, it ↑ to 40%. MRI will detect early changes while
x-ray changes (↑ FH density) need > 6 wk to be seen.







2- Myositis ossificans

3- OA: due to:
a- cartilage damage;
b- retained bone frag. in the joint;
c- AVN

Anterior dislocation

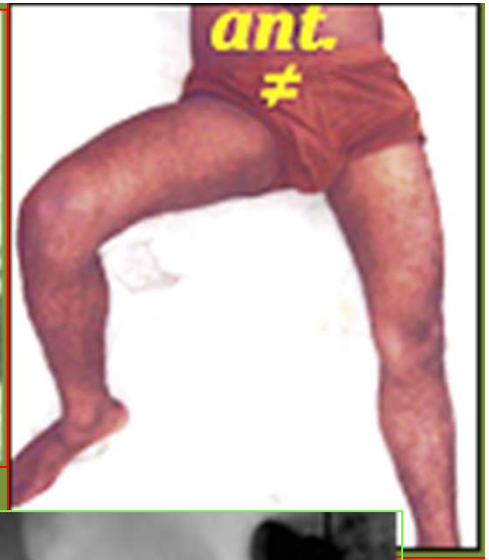
rare

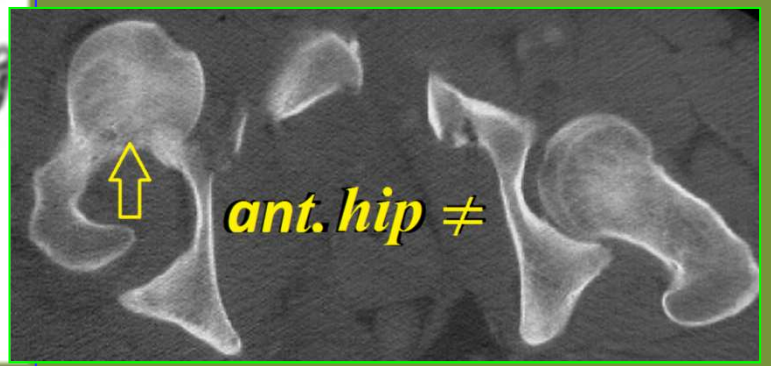
MOI: RTA or FFH

CF: leg abducted, externally rotated &flexed

X-ray: F.Head lies in front of acet. &
either superior (over pubis or ilium)
inferior (over obturator foramen)

R : same as posterior ≠



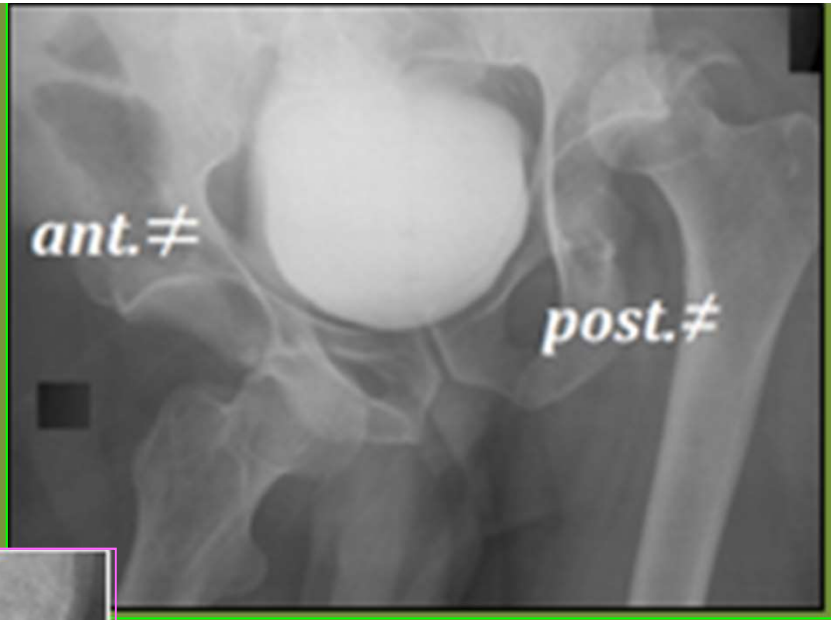


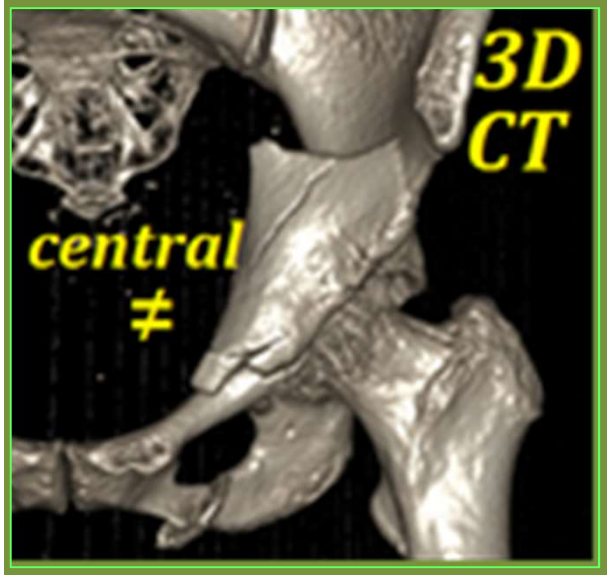
Central dislocation (Acetabular floor fracture)

MOI: fall on the side or blow on grtr. trochanter

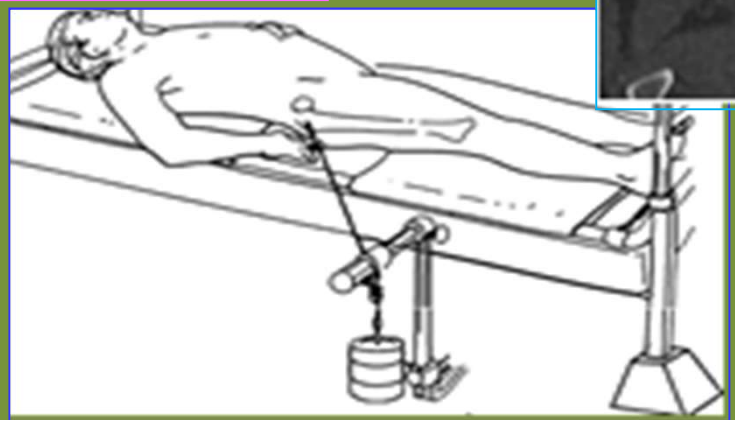
CF: the leg is in normal position

X-ray: FH is pushed medially with acet. floor #





Ṛ: 12 wks skeletal traction ±
lateral traction in the gr. trochanter



Complications : OA

Fractures of the femoral neck

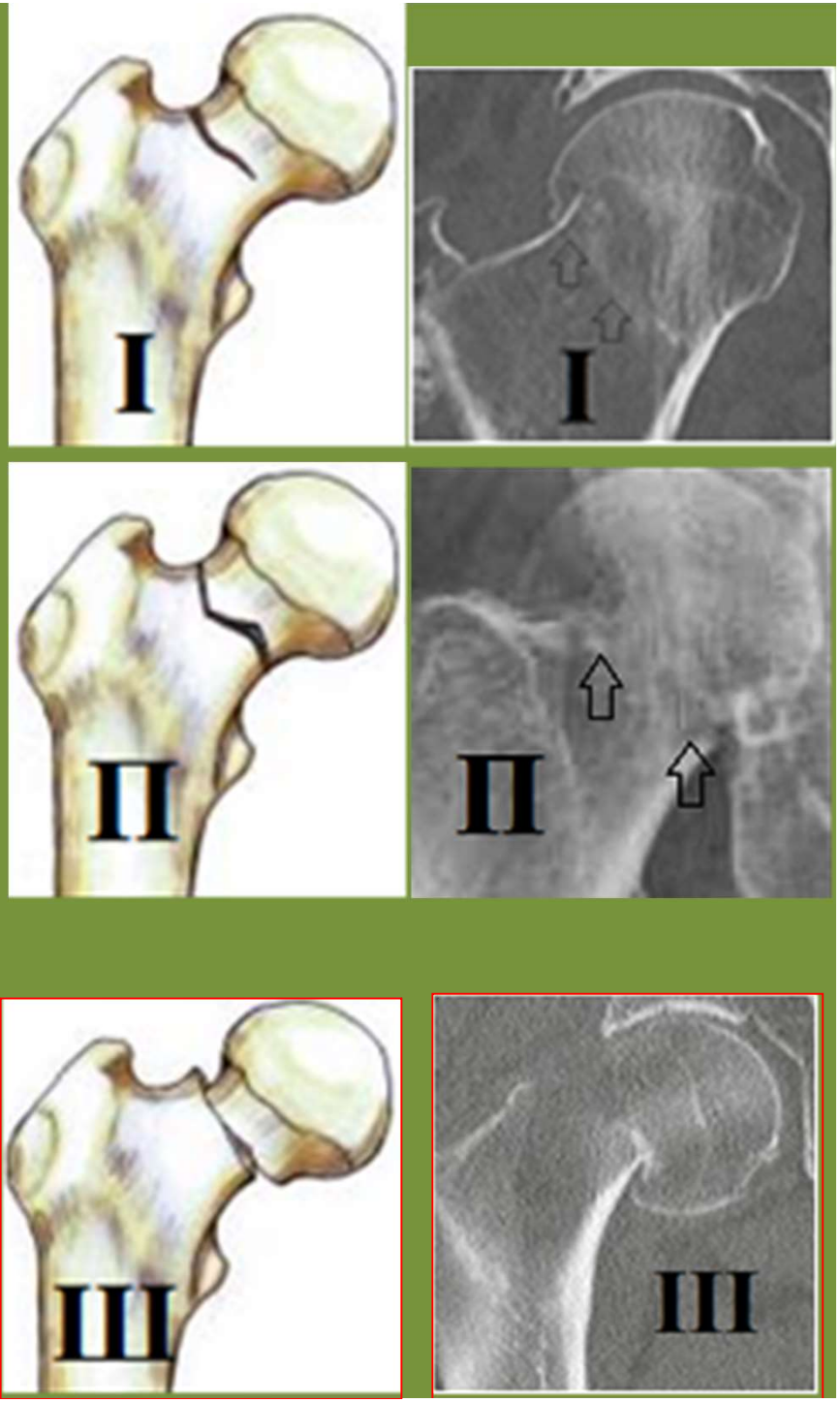
common in old osteoporotic

Risk factors: 1-Weak bone like osteoporosis, osteomalacia, DM, stroke (disuse), alcoholism & chronic diseases; 2- Old people have weak muscles &poor balance with ↑ tendency to fall

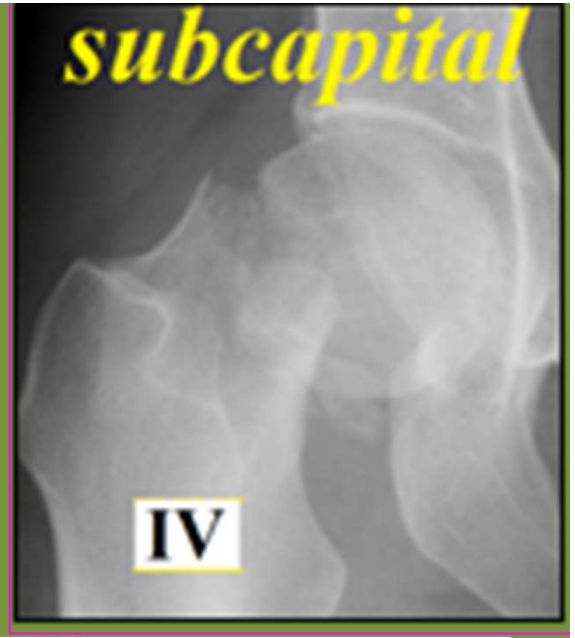
MOI: In elderly: simple fall or even catching toe in a carpet.
In young: RTA or FFH

Garden's classification: 4 stages of progressive displacements

Stage I: incomplete impacted #.
Stage II: complete undisplaced #.
Stage III: moderately displaced #.



Stage IV : severely displaced #



Healing problems:

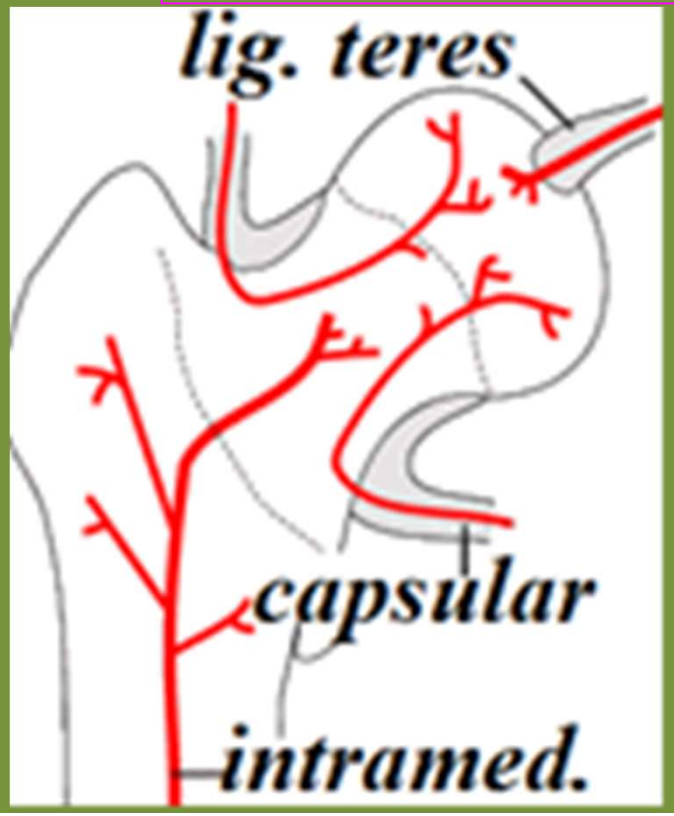
1- Bone ischemia: FH gets it's bl. from:

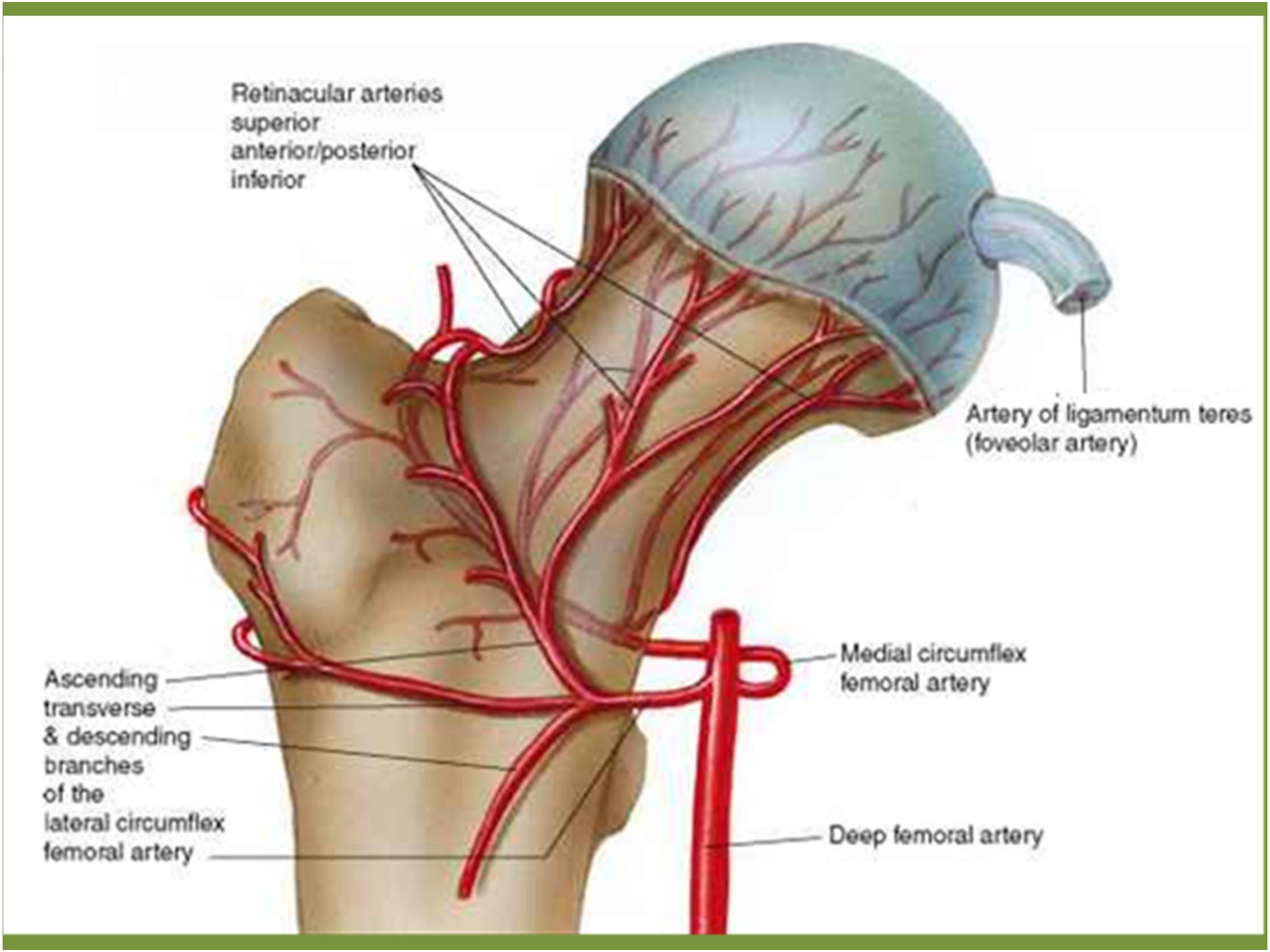
a- lig. teres vessels (poor in elderly & in 20% not present);

b- intramedullary vessels (always interrupted by the #);

c- capsular vessels (usually kinked or torn in displaced #).

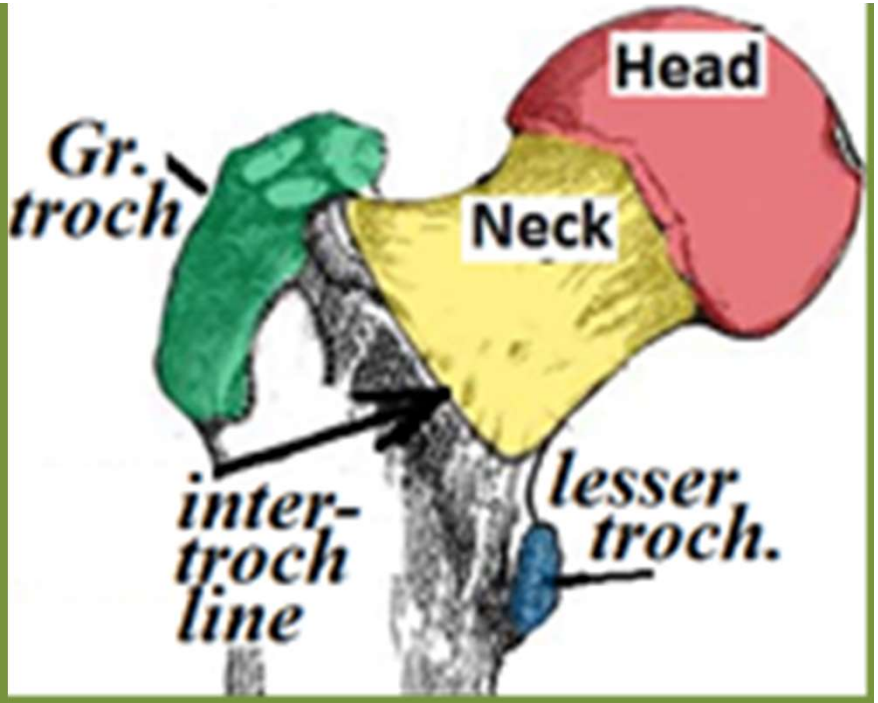
Hence the high incidence of AVN in displaced #

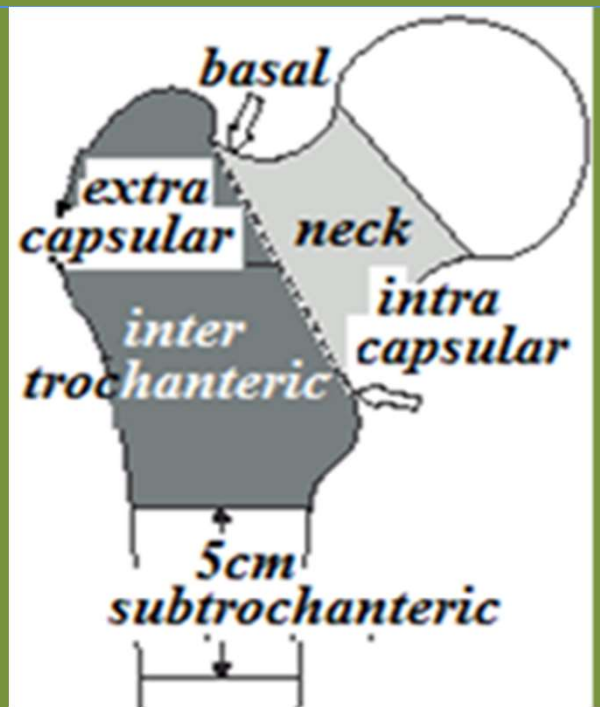


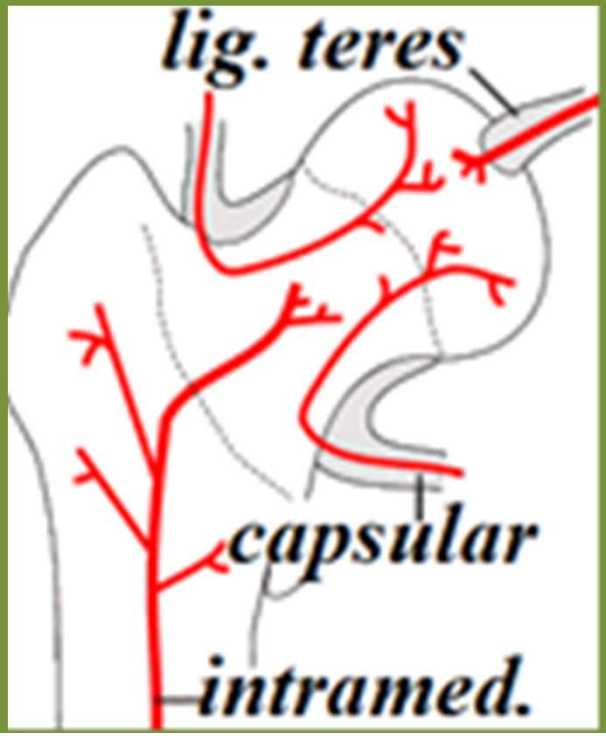

Retinacular arteries
superior
anterior/posterior
inferior
Artery of ligamentum teres
(foveolar artery)
Medial circumflex
femoral artery
Ascending
transverse
& descending
branches
of the
lateral circumflex
femoral artery
Deep femoral artery

2- Poor healing: due to

a- FH has poor bl. supply;
b- F.Neck has no S.tissue attachment which could promote callus formation.
c- FNeck # is intra-capsular # & the synovial fluid prevents clotting of # hematoma; Hence the high incidence of nonunion







CF: short & externally rotated leg

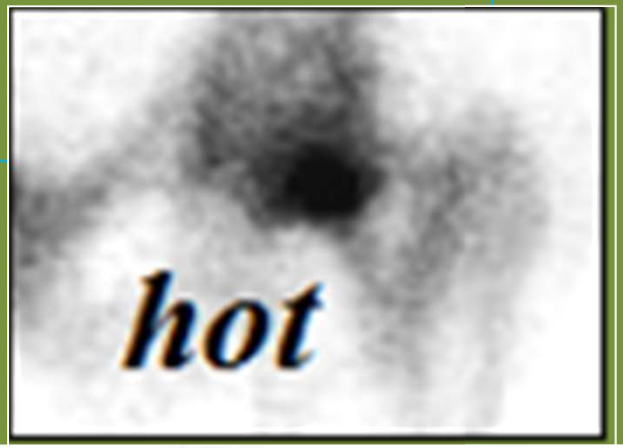
Don't miss:

1-impacted #: can walk with 'normal' x-ray;

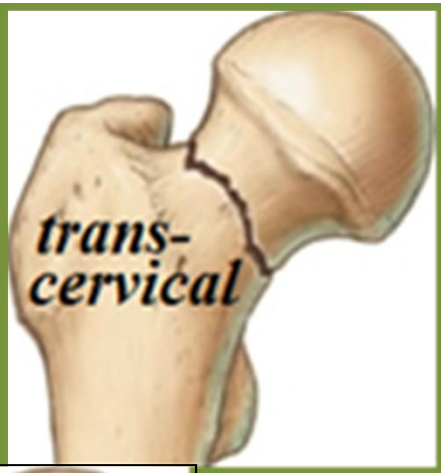
2- stress #: hip pain, no trauma, normal x-ray but MRI or bone scan: 'hot' lesion.

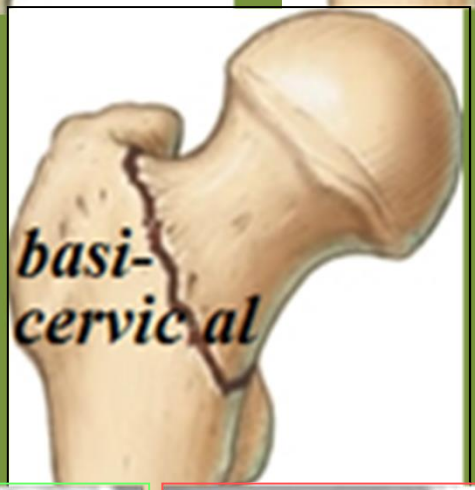
3- painless # in bed-ridden patients.

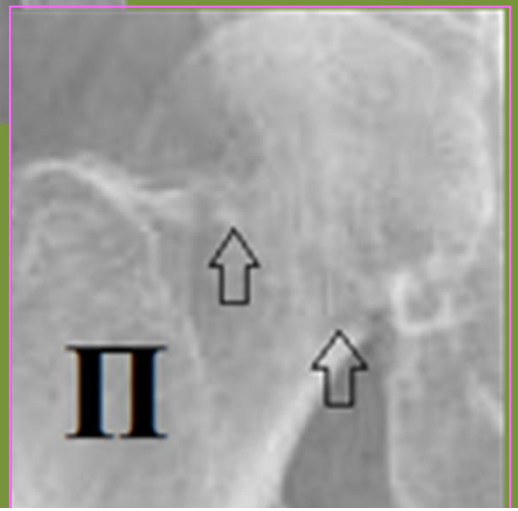
4- multiple #: every patient with femoral shaft # should x-ray his pelvis to exclude hip #.

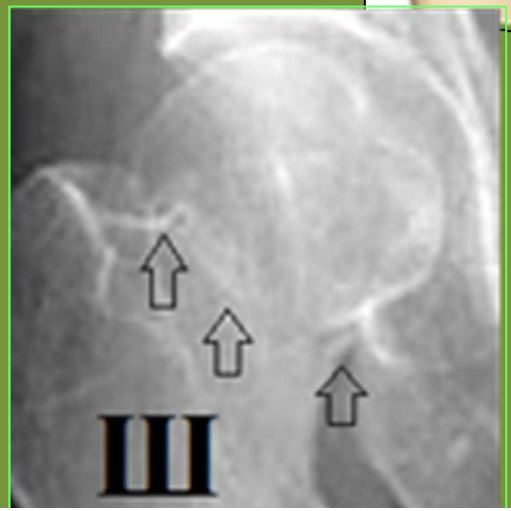


X-ray: according to site of # (**anatomical classification**): subcapital, mid-cervical or basal. Assess the degree of # displacement by matching of bone trabeculae- Garden's stages.









Ṛ: is operative. The aim is:
1- keep patient active to prevent comp. of recumbency.
2- 'ensure' # union by perfect reduction & secure fixation.
If the patient is left without operation:
1- stage I & II→ III & IV.
2- displaced # never unite without fixation.
3- lying in bed→ DVT, PE, pneumonia & bed sore.
4- too painful.

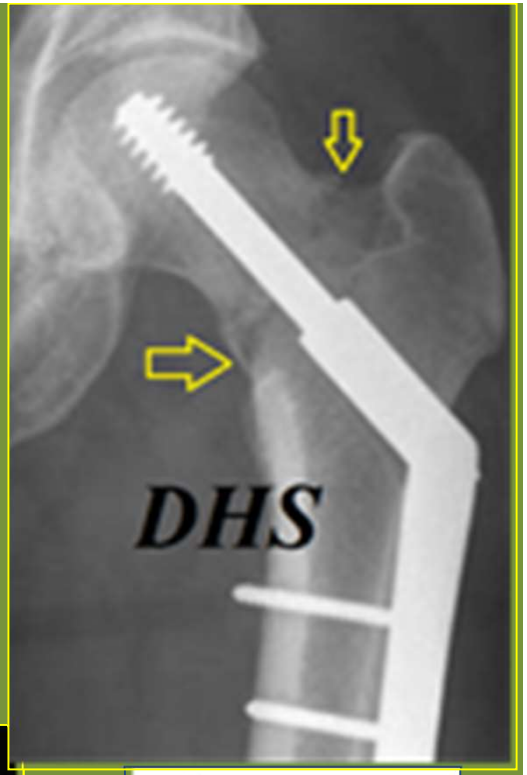
Initial Ṛ: skin traction to relief pain; preop. preparation.

Surgery: depends on patient age & activity & on # site & stage

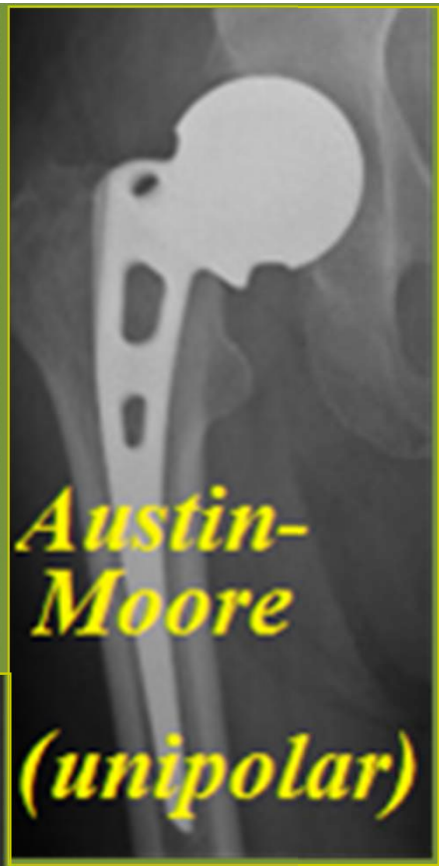
1- Int.fixation (cannulated screws or DHS):

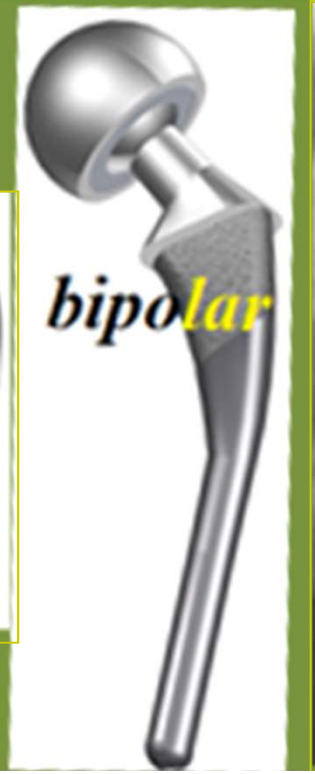
Stage I&Π (all ages)→ Cl.Red+ IF;

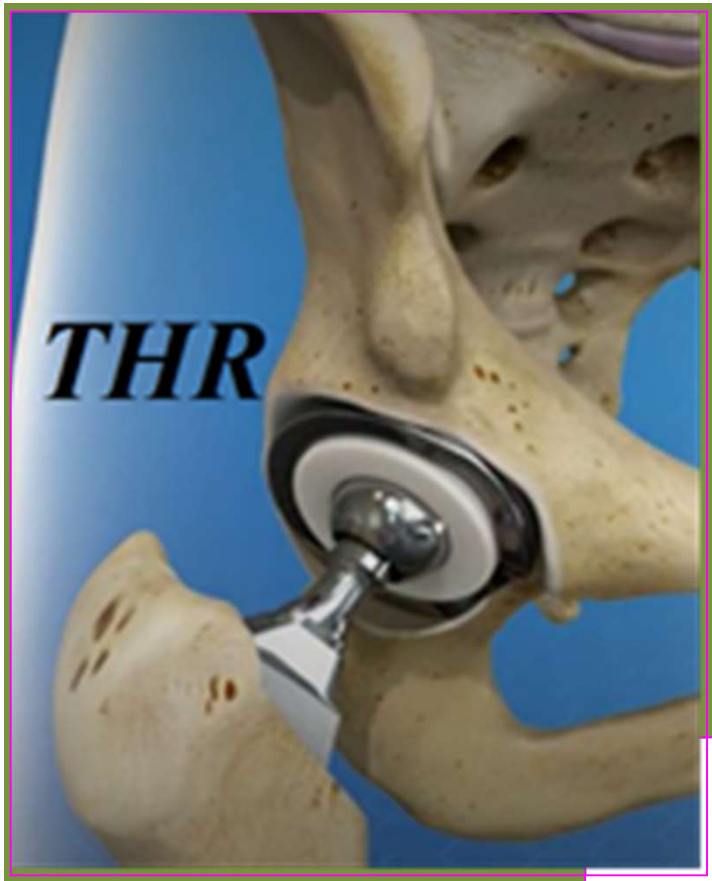
Stage Ш&IV(<65)→ Cl.Red + IF & if C.R. fails→ O.R. + I.F. only when healing is predictable in younger age; if healing is unlikely as in old age, then should go to hip replacement →



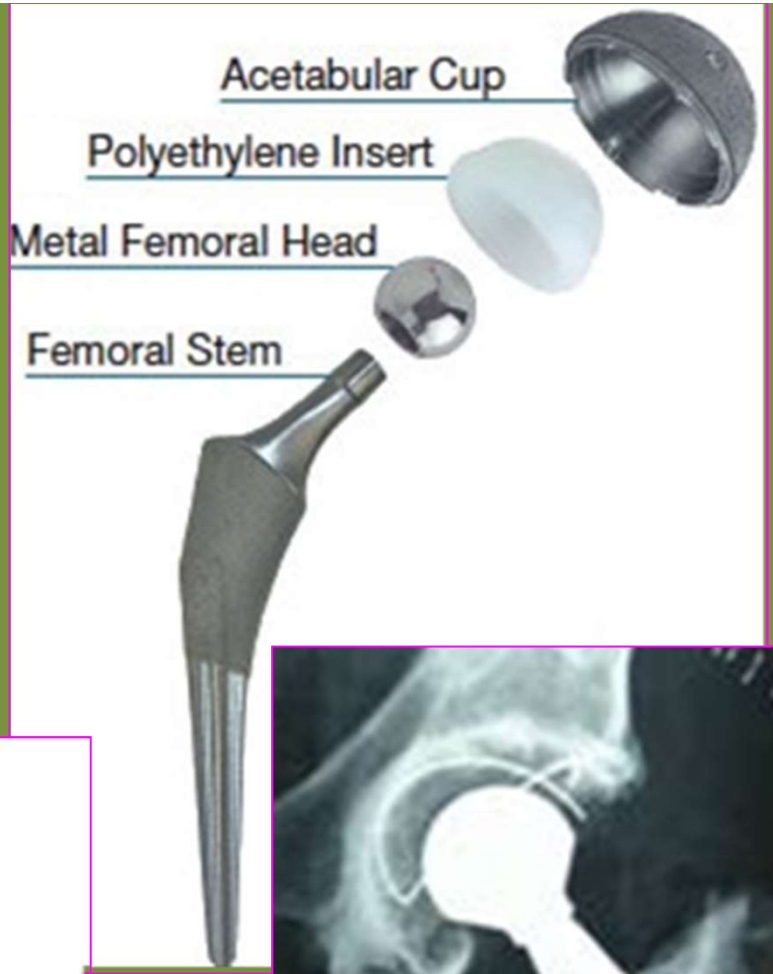
2- Prosthetic replacement: For older less active, use:
Partial hip replacement (PHR): replacing FH only using unipolar or bipolar prosthesis ± cement.
Total hip replacement (THR): for more active pt. or those with acet. damage as in old # or metastasis







Total hip replacement



Post-op.: sit up in bed or chair & start activity from the 1st day.

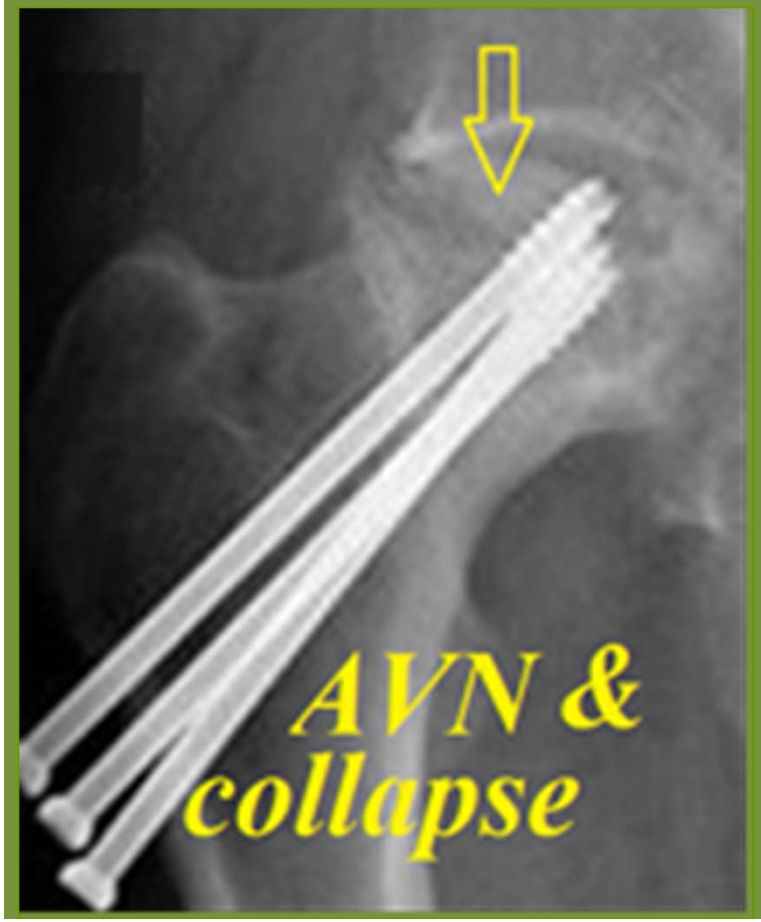
Complications .:

1- General: DVT, PE, & bed sore.

2- AVN: 30% of displaced &10% of undisplaced #.

3- Non-union: 30% of displaced #.

4- OA: due to AVN & FH collapse.



Intertrochanteric fractures: common in elderly but are extra capsular, so unite quickly without AVN.

MOI: direct fall on GT. or indirect twist.
CF: tender swelling &bruise of upper thigh with short &externally rotated leg

X-ray: # line pass from lesser to G.T.
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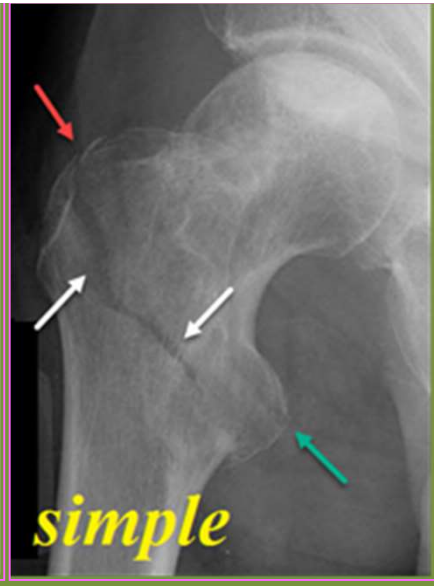
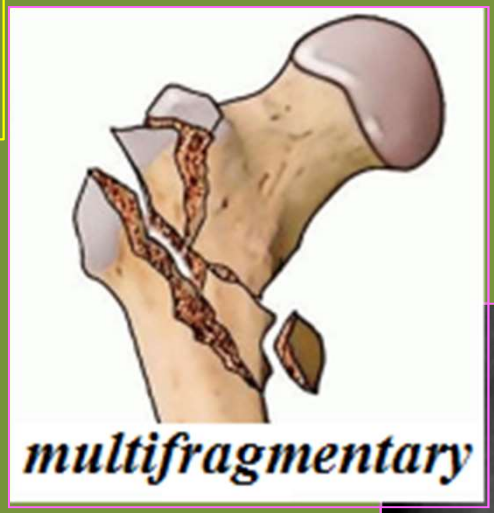
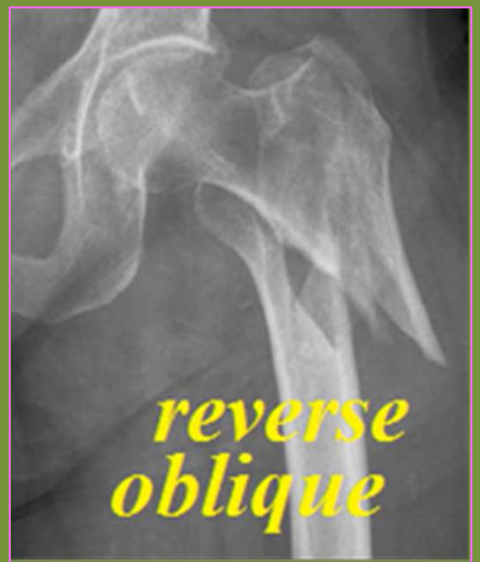
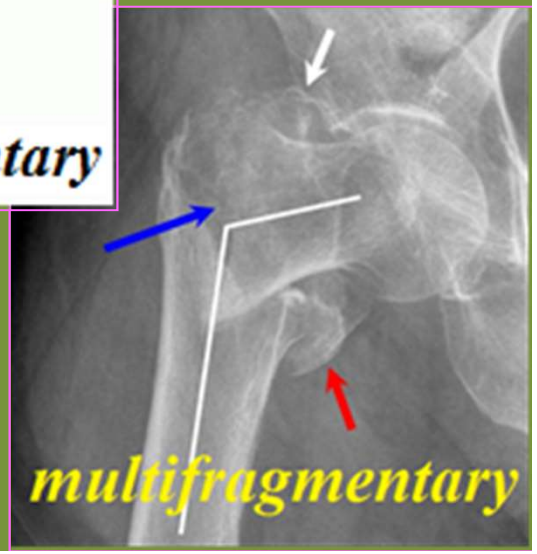






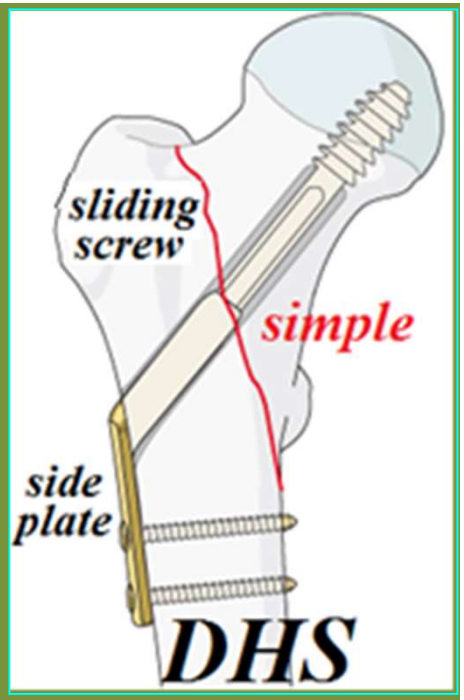


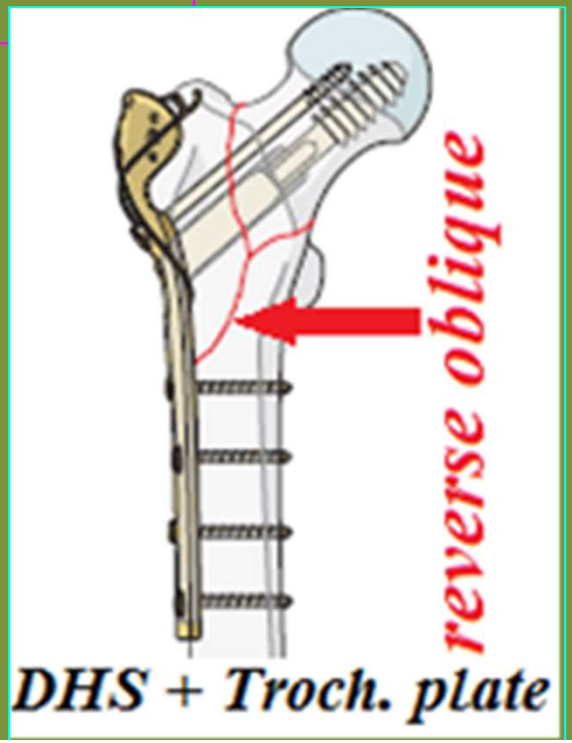
A fracture is considered unstable if:
1- widely separated 4 parts # or comminuted posteromedial cortex;
2- reverse oblique or subtrochanteric extension; 3- severe osteoporosis

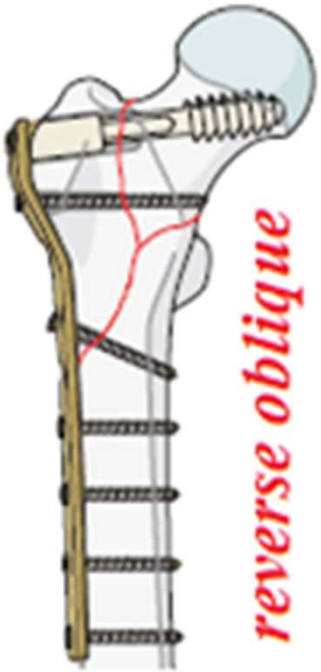
R: is almost always by IF in order to:

1- obtain the best possible reduction & 2- mobilize patient early

Types of IF: CR or OR & fixation by a device that can maintain neck / shaft angle. According to the degree of # stability, use one of these

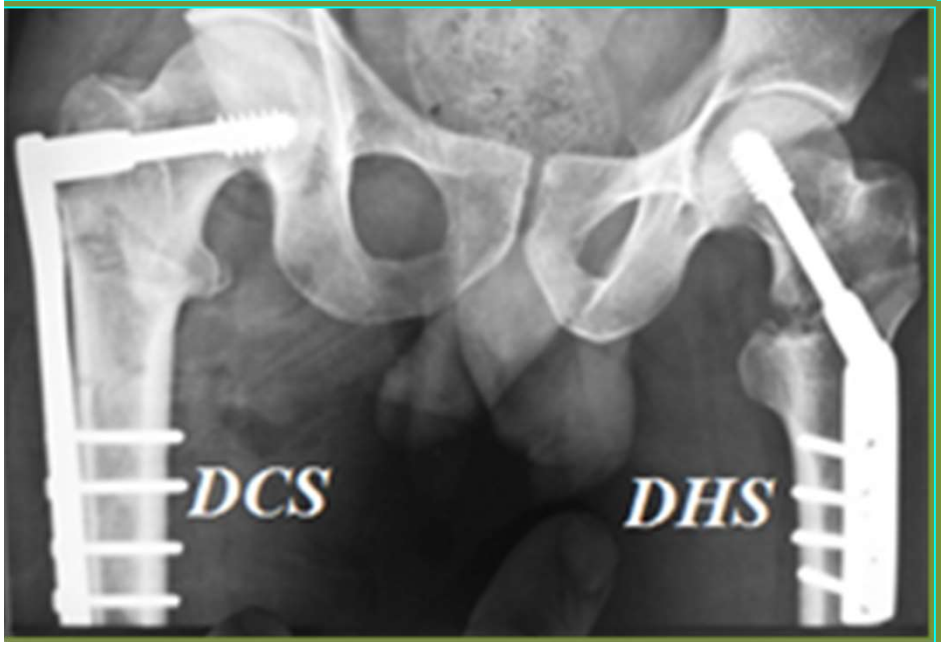


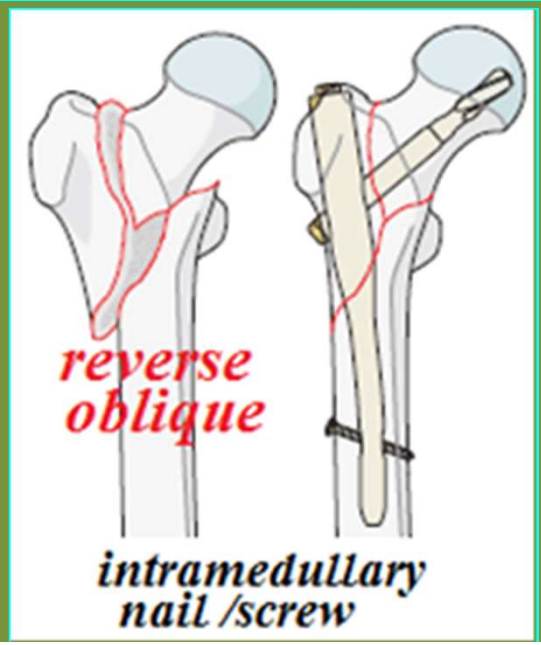




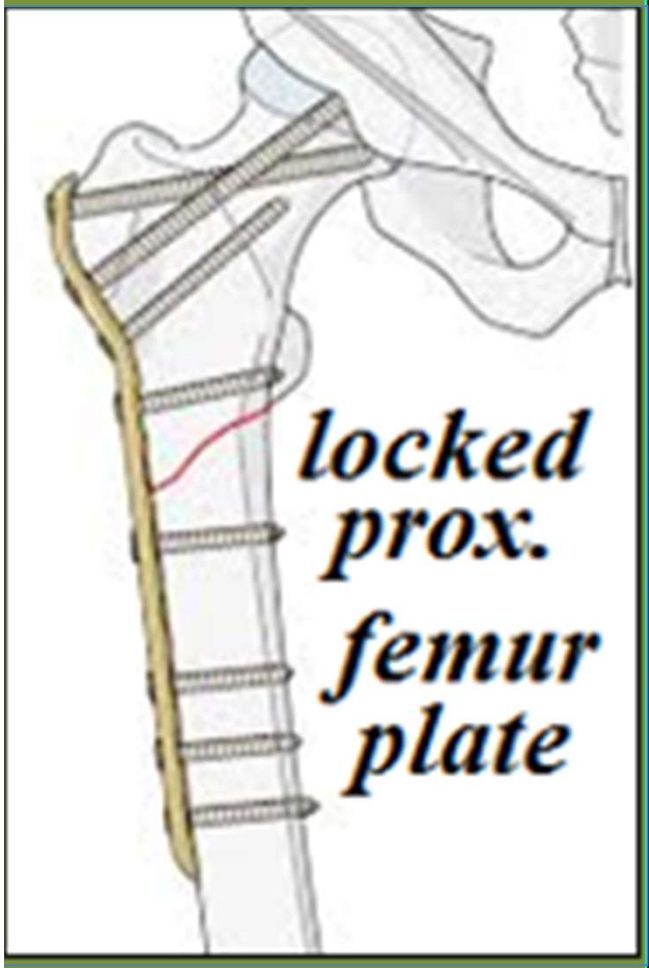
Dynamic condylar screw

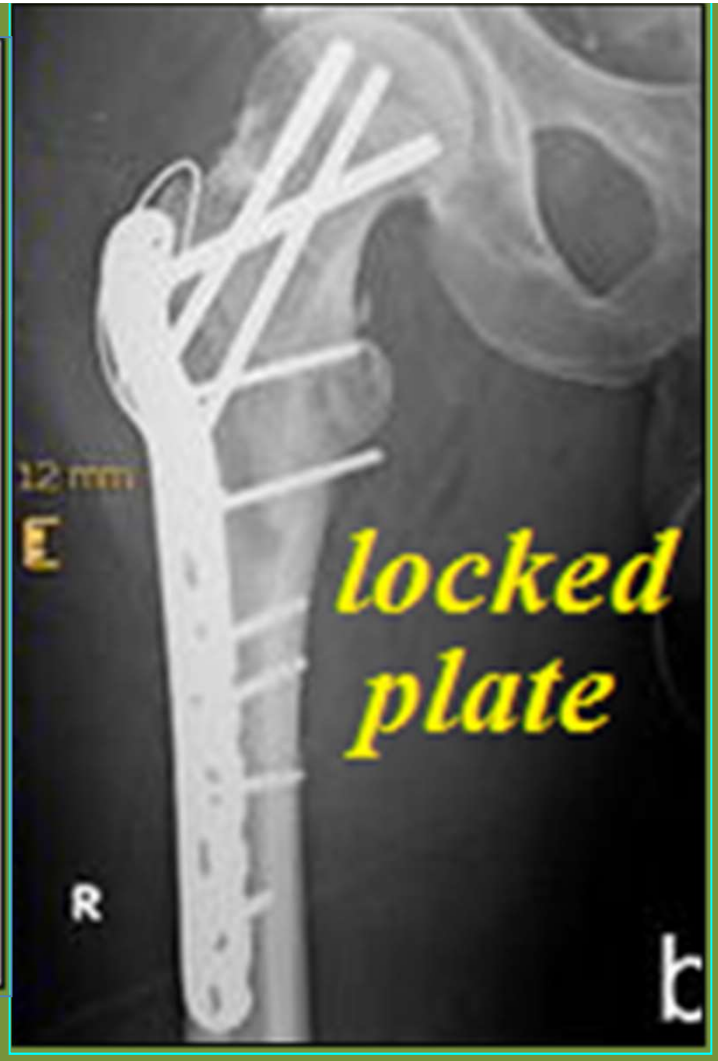
condylar blade plate

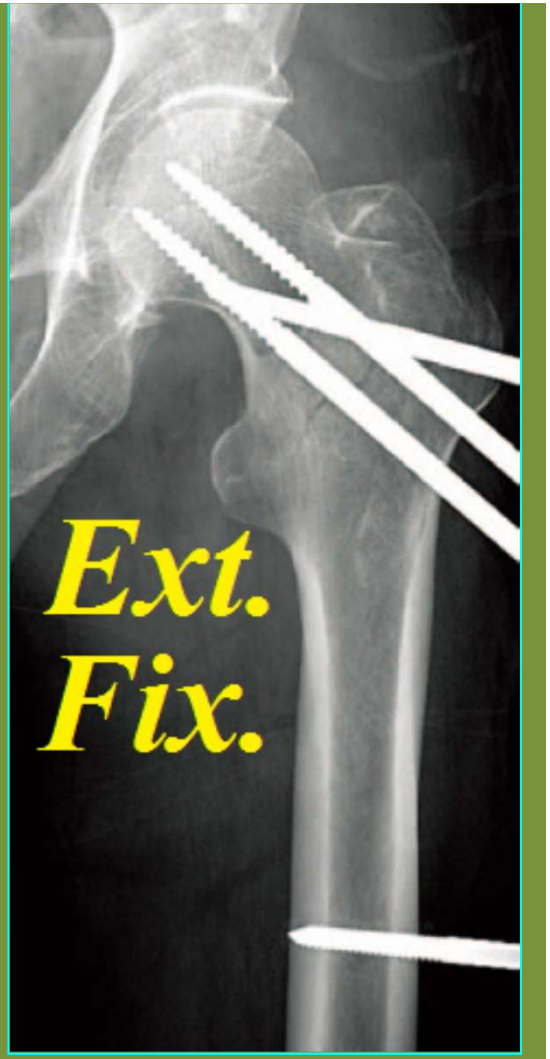




intramedullary nail /screw

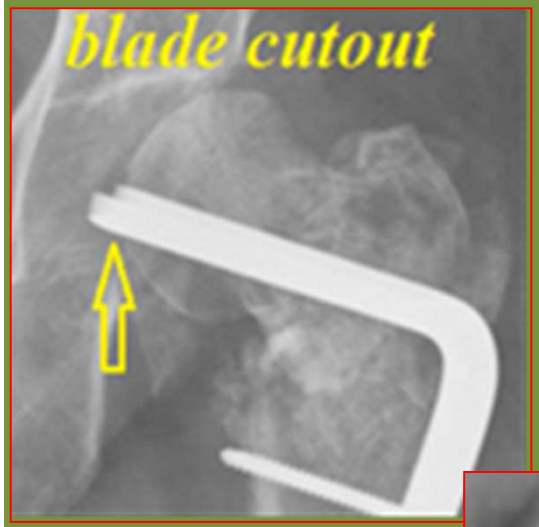


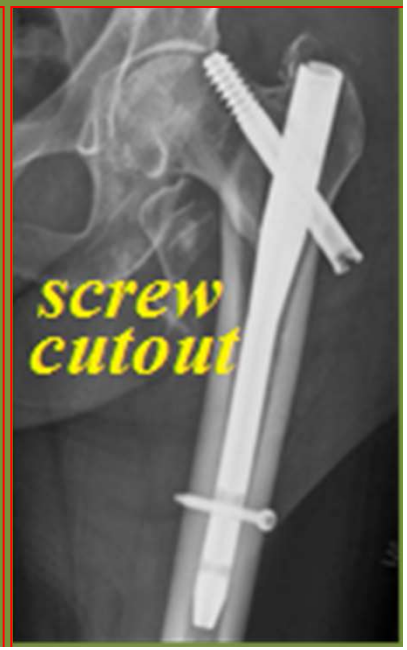




Conservative R by traction is an alternative to ORIF if have no facility or unfit patient

Comp.: Early: DVT, PE.
Late: 1- failed fixation;
2- malunion.
3- nonunion(rare).

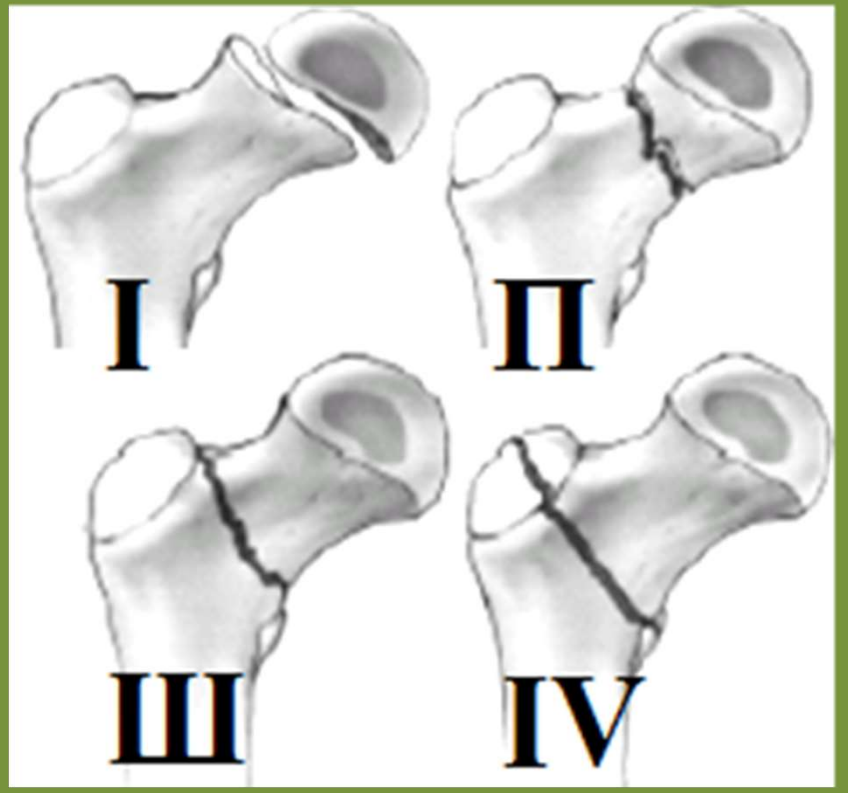


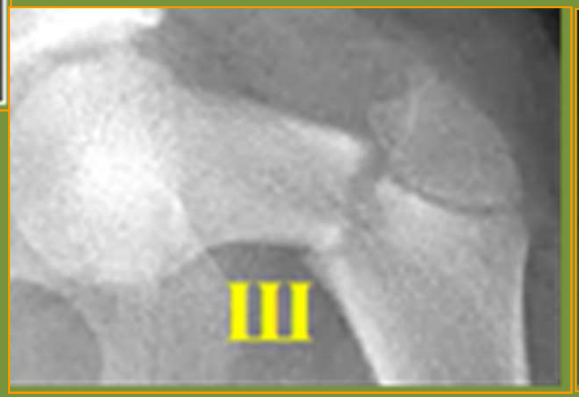


Proximal femoral fractures in children: uncommon

MOI: severe trauma like RTA or FFH

Delbet classification:
I: transepiphyseal,
II : transcervical,
III : cervicotrochanteric,
IV: intertrochanteric.





Ṛ: undisplaced #⟶ 6-8 wks hip spica.
Displaced #⟶ CRPP or ORIF.

Comp.:

1- AVN (40% in displaced type I&Π).

2- Coxa vara

3- shortening.

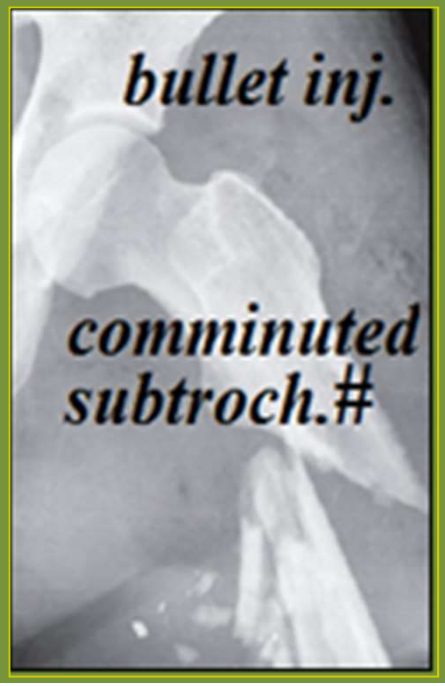
Subtrochanteric fractures

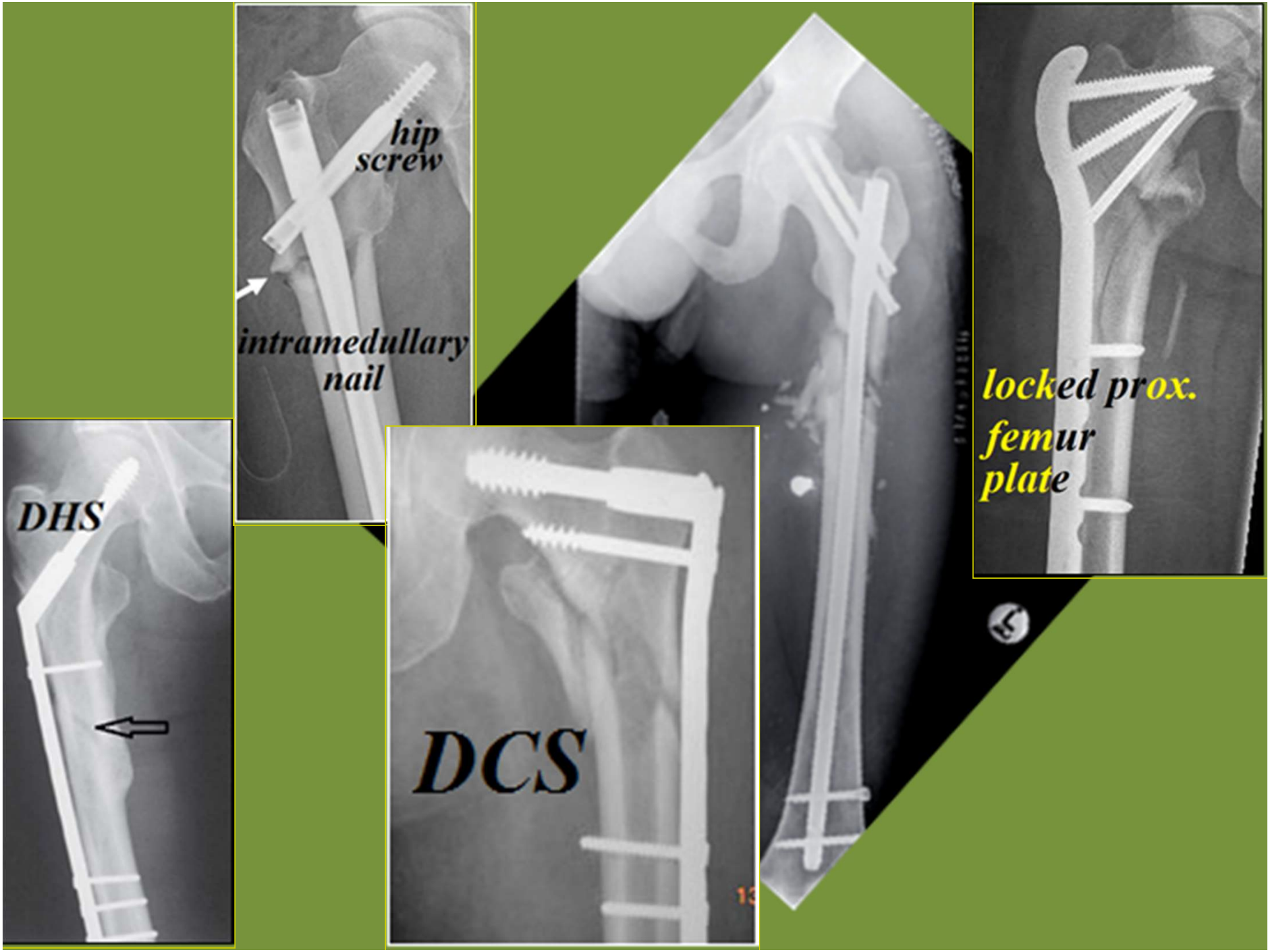
occur at any age following severe trauma.

CF: swollen tender thigh with short &externally rotated leg

X-ray: # line is through or below lesser troch.(transverse, oblique or spiral)

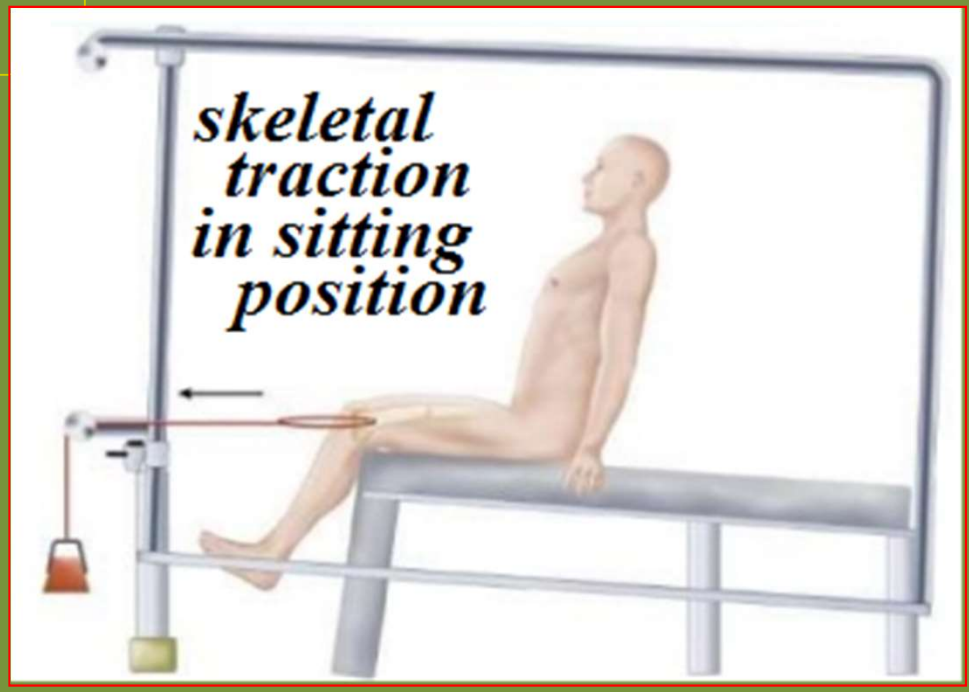
Ŗ: ORIF: DHS, DCS, locked plate, blade plate, IM nail with locking screw




hip
screw
intramedullary
nail
DHS
DCS
locked prox.
femur
plate

Conservative Ṛ by traction is possible but difficult: 3 mths skeletal traction in the sitting position.

The upper fragment is flexed & abducted while the distal is pulled up & adducted.



Comp.:
1- malunion;
2- nonunion.

Next is 2