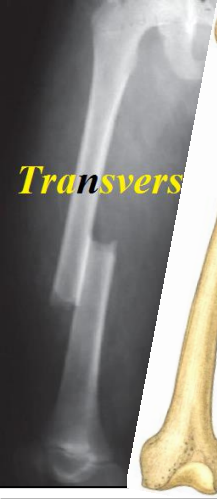
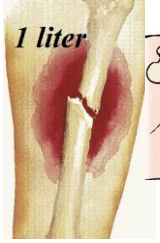
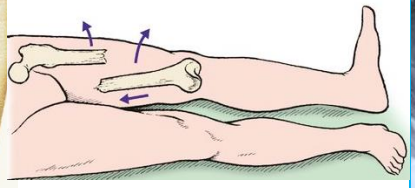




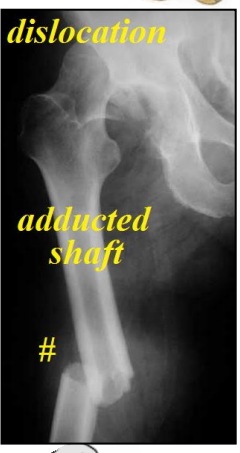


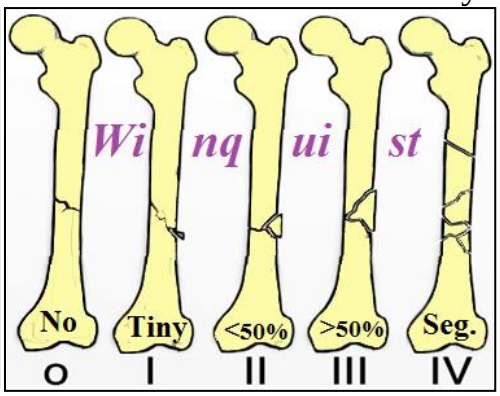
Femoral shaft fractures

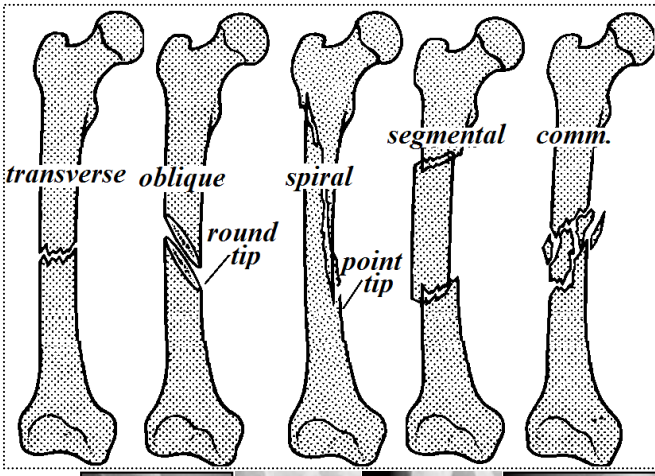
This is a fracture of young adults following high energy injury; in elderly, it is pathological until proved otherwise.

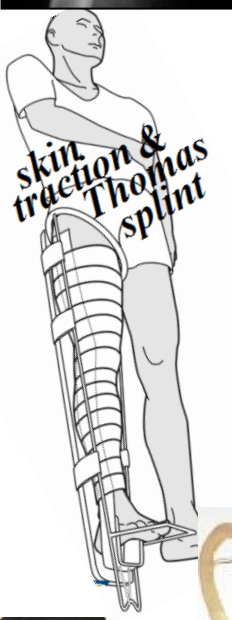
***MOI*:** Spiral # is caused by→ a twisting force;
Transverse &oblique #→ direct or angulation force;
Comminuted &Segmental #→ direct &indirect severe violence.

***Winquist's classification*:** depend on degree of # comminution which reflects # stability:



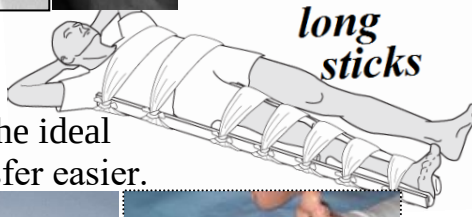






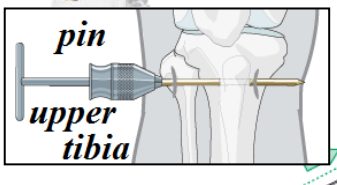
CF: short &externally rotated limb with deformed, bruised &swollen thigh due to soft tissue bleeding (**1**liter). ***Look for*** other limb or pelvic injury or associated life-threatening injury. Exclude neurovascular problem.

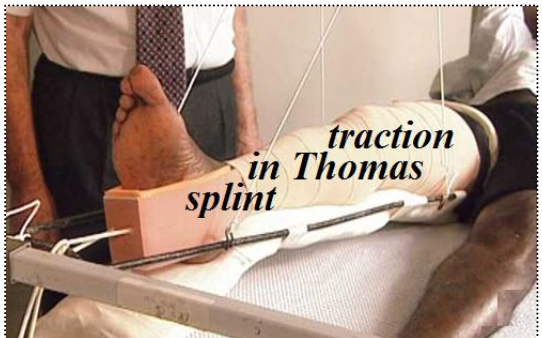
***X-ray*:** always x-ray the hip(to exclude another # or ≠) &the knee (floating knee). Those with multiple injury, also need pelvic &CXR.

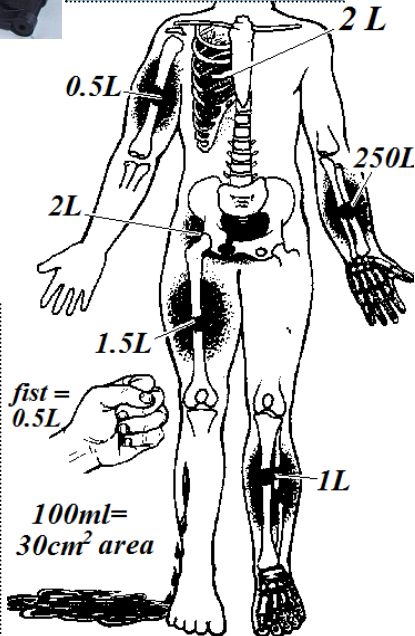


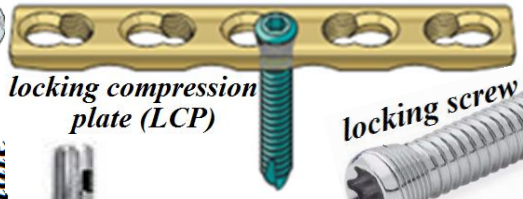
Emergency Ṛ*:** at the site of accident, the limb should be splinted by tying to other limb or any available splint but the ideal is ***Thomas' splint to: control pain, ↓ bleeding &make transfer easier.

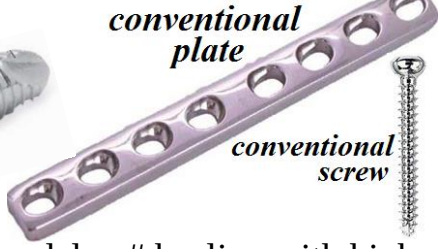
***Definitive Ṛ*:** (in the hospital):
Conservative Ṛ: (Traction &bracing): Indication:
1-children, 2-contraindication to anesthesia,3-lack of facility for internal fixation & 4-for lower 1/3 femur # than for proximal #.
***Method*:** skeletal traction through pin in upper tibia with hanged weight(10% of body weight) for 8 wks→ when # become sticky → use functional brace for total of 16-24wks.









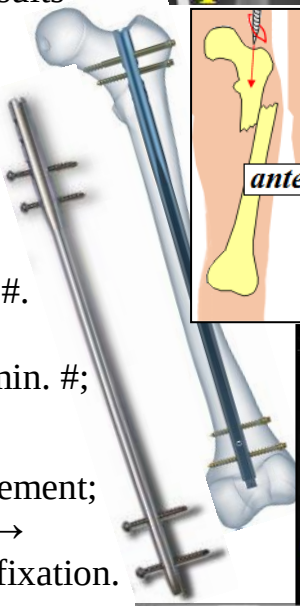


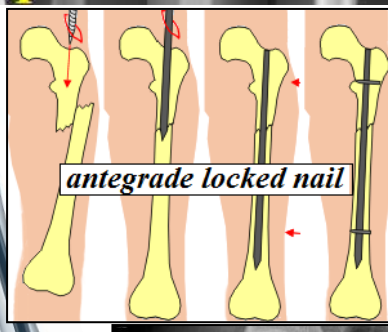
Operative Ṛ:

***Plating*:** conventional method may delay # healing with high rate of implant failure. Now a new technique of minimally invasive plate osteosynthesis (MIPO) have better results especially with # near upper or lower end of femur.

Intramedullary nailing*:** the classical unlocked ***Kuntscher nail require OR and retrograde insertion. It is useful for mid &upper 1/3 stable #.

***Locked IM nailing*:** CR with antegrade IM nailing locked by interlocking proximal &distal screws for unstable comminuted # & for subtroch. &lower 1/3 #.

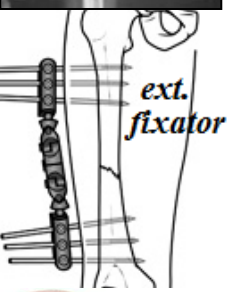




***External fixation*:** CR &percutaneous fixation for: 1-severe open #; 2-multiple injury; 3-severely commin. #; 4- # with bone loss; and 5- # with vascular injury.

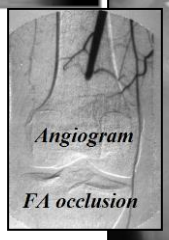
***Open femoral fractures*:** 1-IV AB; 2-wound debridement; 3-fixation: no obvious contamination, Gustilo I&Π→ same Ṛ as closed #. Gustilo IIIA, B &C→ external fixation.

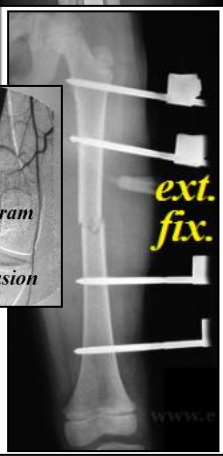
***Fracture with vascular injury*:** warning signs: 1-severe bleeding or expanding hematoma; and 2-distal ischemia. Investig.:1-doppler & CT angiography. Ṛ→ quick external fixation & arterial repair or bypass(no >6hrs delay).



***Comp.*: *Early*: 1-*Shock*:** 1-2liters lost, Ṛ→ transfusion.

2-*Fat embolism &ARDS*: risk factors are multiple injury, chest injury & shock. CF: ↑pulse rate, ↑temp, dyspnea, restless & petechial hemorrhage. Investigation: blood gases. Ṛ→ supportive.





3-*Thromboembolism*; *4-Infection*: occur in open # &in closed # Ṛ by IF; Ṛ→ AB, debridement, external fixation.

***Late: 1-Delayed union &nonunion*:** Ṛ→ rigid fixation &bone graft.

2-*Malunion*: angulation(<15°is accepted), shortening &malrotation.

3-*Knee stiffness*: due to soft tissue adhesion, Ṛ→ early physiotherapy.

4-*Implant failure*: due to early weight bearing before # healing.

Femoral shaft fracture in children*:** common; ***MOI: FFH or RTA.

Conservative Ṛ (traction→ spica cast or immediate spica cast) is > successful for younger than older children:

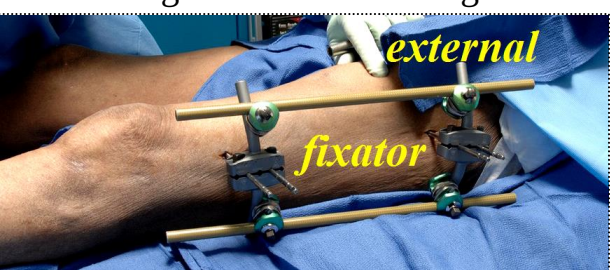
***Infants*(<2yr):** 1-2wks traction→ 4wks spica cast(30°angulation is accepted).

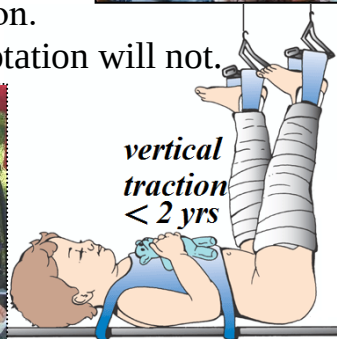
***Children*(2-10yr):** 2-3wks traction→ 4wks spica cast(20° angulation&2cm shortening are accepted).

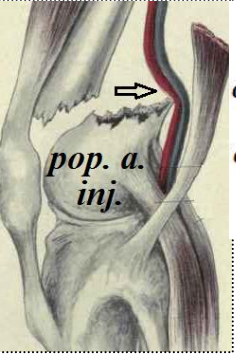
***Teenager*:** 4-6wks traction→ 6wks spica cast or better operative Ṛ like adults.

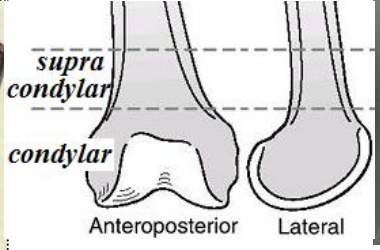
***Operative Ṛ*:** if traction cannot reduce the #→ internal or external fixation.

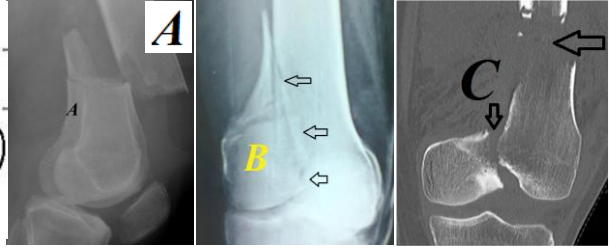
*Angulation &shortening will be corrected to some extent with growth but rotation will not.

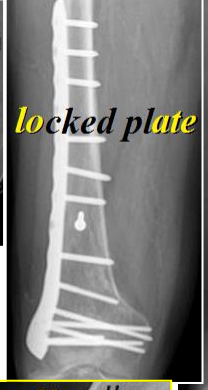




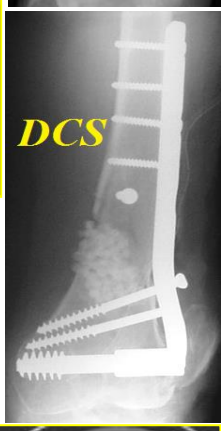




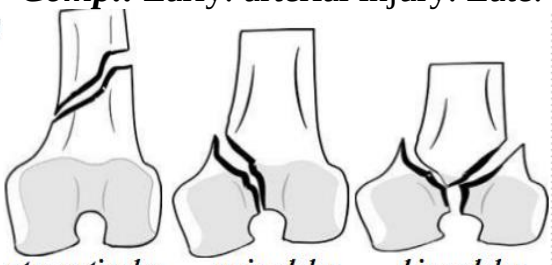


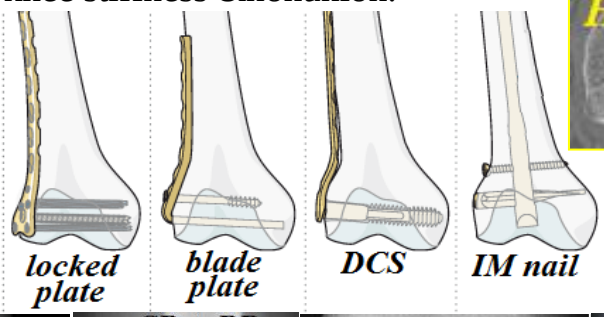


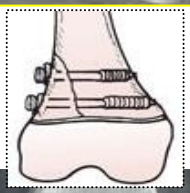
***Supracondylar fractures of the femur*:** seen in young following high energy injury or in old osteoporotic patients.
***MOI*:** direct force; distal frag. may be flexed by gastrocnemius pressing on popliteal art.
***CF*:** deformed swollen knee (haemarthrosis); always palpate the distal pulse.
X-ray*:** AO classification: ***A: extra articular; ***B: unicondylar; C: bicondylar***.

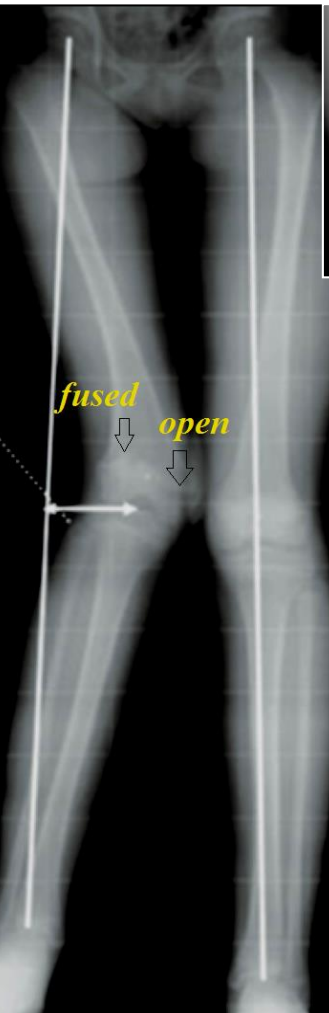


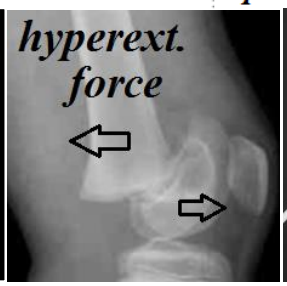
***Conservative Ṛ*:** Undisplaced #→ hinged knee brace &NWB for 6wks. Displaced #(if facility for ORIF is absent)→ skeletal traction through upper tibia with knee in flexion for 6wks→ brace &PWB.
Operative Ṛ is the Ṛ of choice→ ORIF using traditional 95° blade plate, dynamic condylar screw(DCS), locked distal IM nail or better locked plate. The advantages of ORIF: easy nursing for elderly &knee movements can be started early.
***Comp.*:** Early: arterial injury. Late: knee stiffness &nonunion.

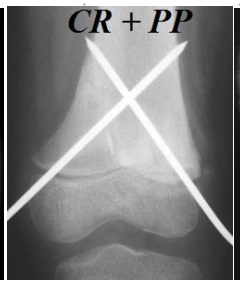


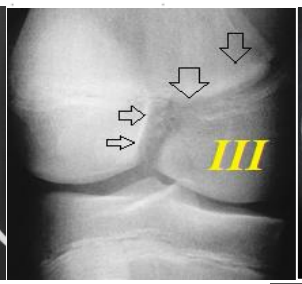


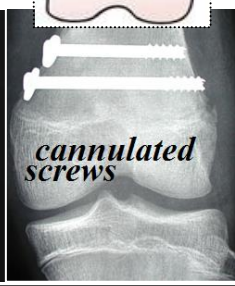




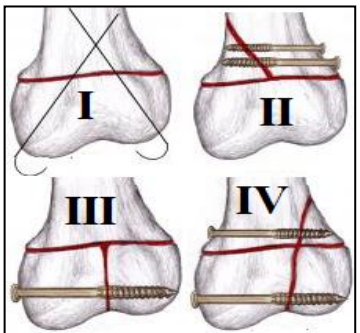


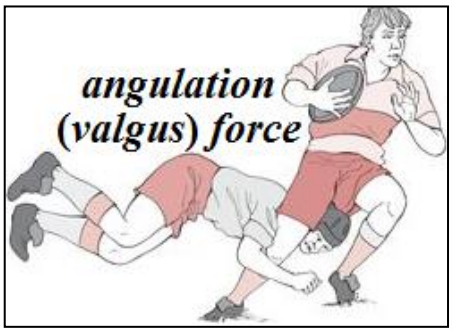


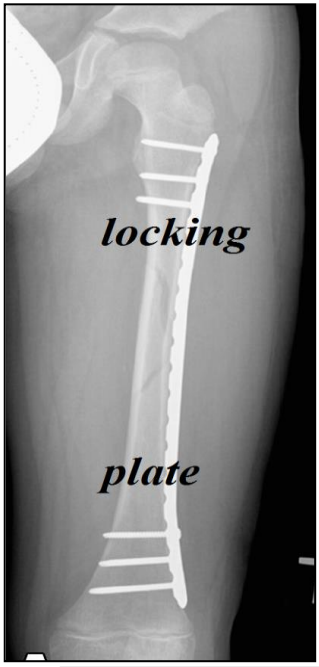


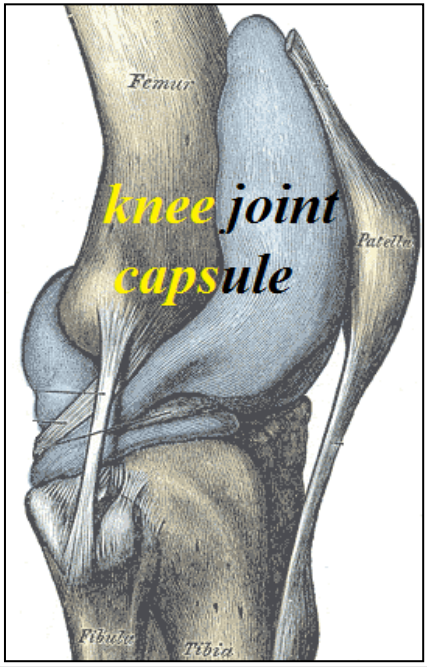


***Fracture-separation of the distal femoral epiphysis*:**
is the adolescent equivalent of supracondylar #.
***MOI*:** hyperextension force→ forward shift of epiphysis.
or angulation force→ lateral shift of epiphysis.
***CF*:** swollen deformed knee; the popliteal artery may be obstructed by lower femur. ***X-ray*:** usually Salter-Harris ***type* II**.
***Ṛ*:** CR &cast or CR or OR + PP or screw fixation.
***Comp.*:** 1-Vascular injury in hyperextension deformity.
2-Physeal arrest → varus or valgus deformity or shortening.

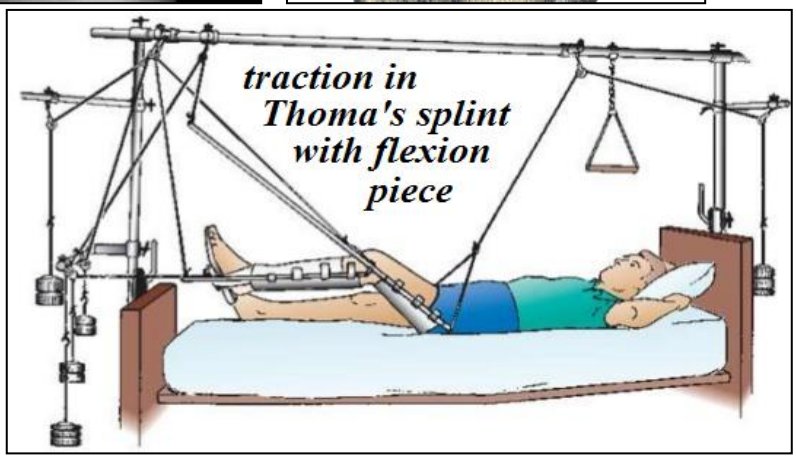




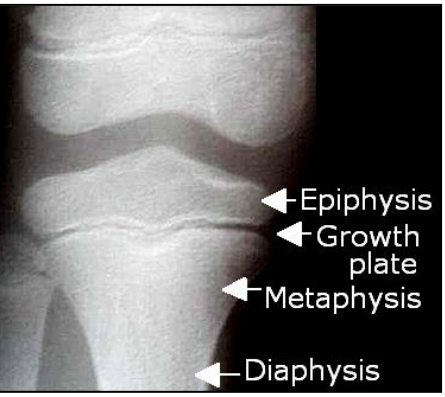

locking
plate


Femur
knee joint
capsule
Patella
Fibula
Tibia


spica cast

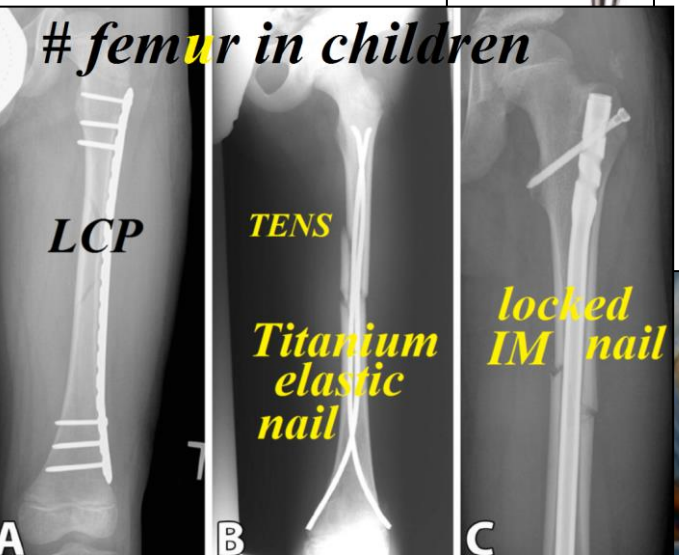

traction in
Thoma's splint
with flexion
piece


skeletal traction


Epiphysis
Growth plate
Metaphysis
Diaphysis


open #


prehospital traction splint


femur in children
LCP
TENS
Titanium elastic nail
locked IM nail
A
B
C


closed IM nailing