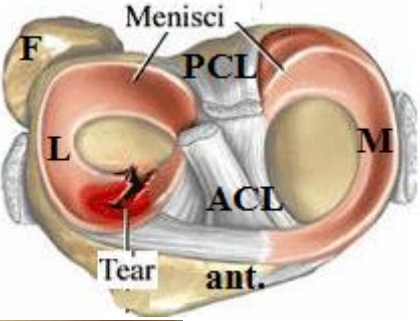
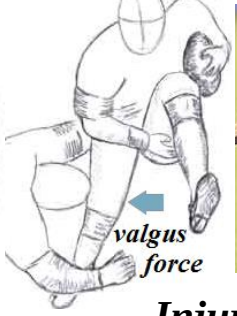
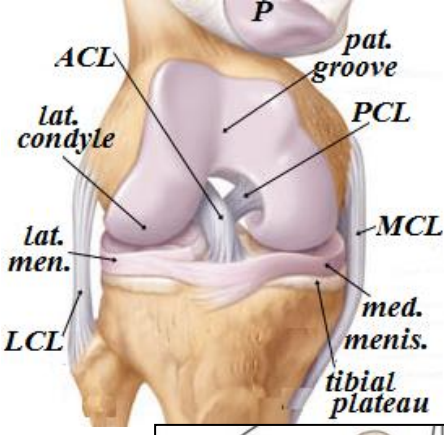
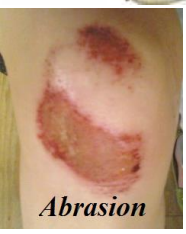






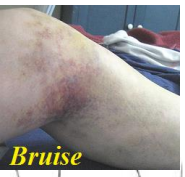
Injuries of the knee &leg



***Acute knee ligament injuries*: common in sports &RTA.**

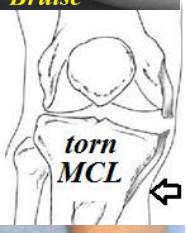
Knee stability depends on joint capsule, intra- & extra-articular lig. &controlling muscles rather than on bony structures.

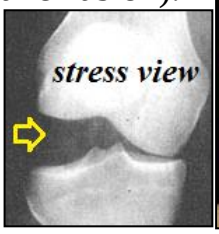
***MOI*: Valgus force→ MCL tear; Valgus +rotation→ MCL+ACL tear; Valgus +rotation +weight bearing→ MCL +ACL + med. meniscus tear; Varus force→ LCL tear; Varus + rotation→ LCL + ACL tear; Dashboard injury→ PCL tear.**

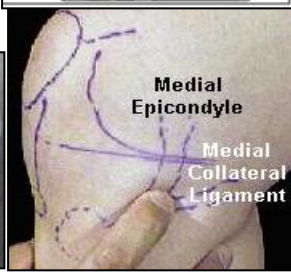


***CF*: twisting injury→ immediate painful doughy swelling(hemarthrosis) while in meniscus injury, swelling is *late* &fluctuant(synovial effusion).**

Look for site of maximum tenderness, bruises &abrasion.



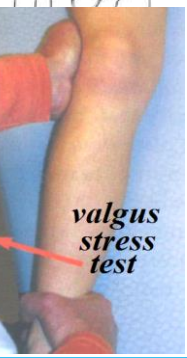




***Test for ligament tear*:**

Partial tear is painful with no abnormal movement, if in doubt→ stress view.

***Complete tear*: painless abnormal mvt→ If knee open with valgus or varus stress in 30°flexion→ only collateral tear; If open in extension→ capsule + collateral + cruciate tear; Anteroposterior stability: posterior sag→ PCL tear; anterior drawer test→ ACL; Lachman test→ ACL.**

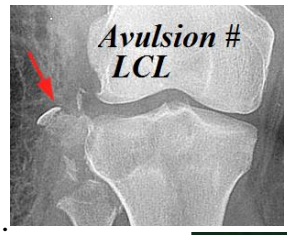


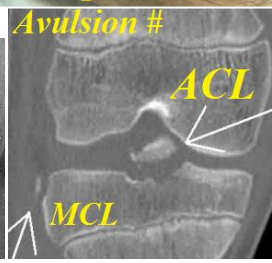
***Imaging*:**

***X-ray*: may show avulsion # e.g. ACL avulse tibial spine.**

***MRI*: to differentiate partial from complete tear.**

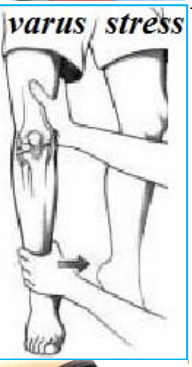
***Arthroscopy*: is contraindicated in acute complete tear.**





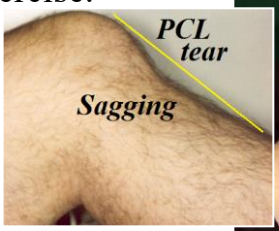
Treatment:

***Partial tear*: aspirate hemarthrosis→ 6wks brace or crepe bandage with early active exercise.**



***Complete tear*: MCL or LCL tear:** 6wks brace→ exercise.

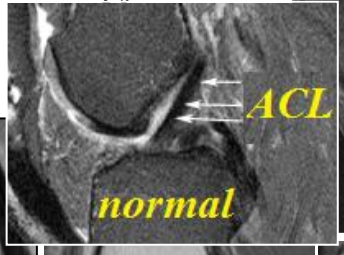
ACL or PCL tear: 6wks brace→ exercise; later if instability persists→ ligament reconstruction.

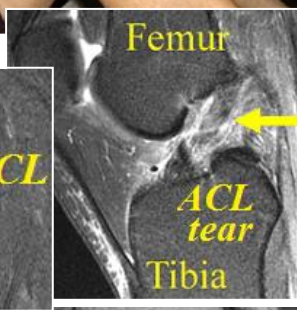


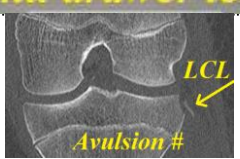
Combined collateral + ACL or PCL: 6wks brace→ exercise→ later reconstruction.

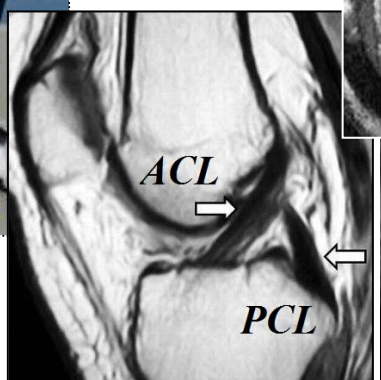
***Complications*: 1-*adhesion*:** occurs with partial tear bec. torn fibers stick to nearby tissues; ***CF*: attacks of pain &'giving way'; MRI differentiate it from meniscus tear; *Ṛ*: physiotherapy.**

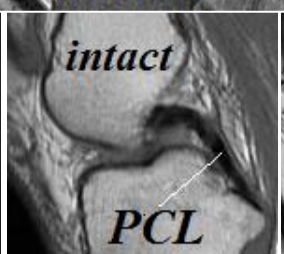
2-*instability*: the knee continue to give way→ OA.

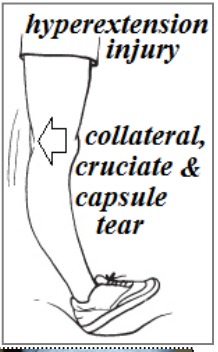


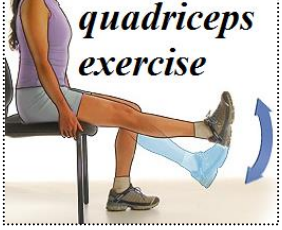


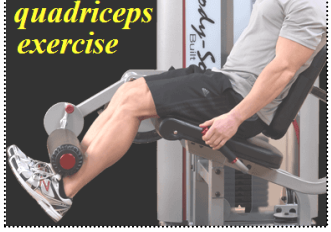












***Chronic ligamentous instability ('giving way')*:** either appear early after acute injury or progressively later. It is often tolerated in patient with usual activity rather than sport activity.

***CF*:** feeling of knee insecurity &giving way.

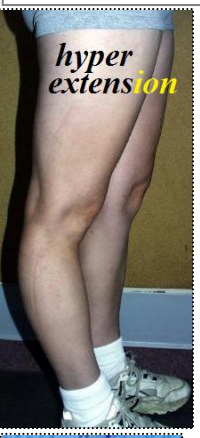
***O/E*:** quadriceps wasting; no tenderness; see the patient walking, standing on one leg, test the knee for hyperextension.

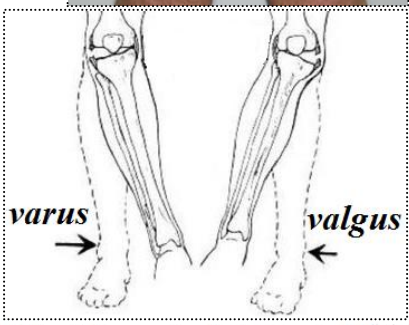
Tests for ***abnormal*** movement:

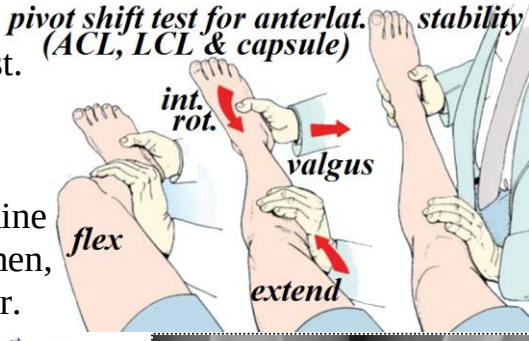
For ***Side-to-side*** stability→ varus/ valgus stress tests.

For ***Anteroposterior*** stability→ anterior &posterior drawer & Lachman test .

For ***Rotatory*** stability→ modified drawer &pivot shift test.







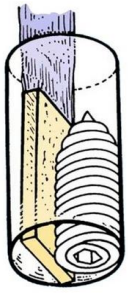
Imaging: MRI is reliable for cruciate &meniscus injury.

***Arthroscopy*:** is both for diagnosis &surgical Ṛ.

Ṛ: 6 mths of quadriceps &hamstring exercise→ re- examine → most of patients will not need operation except sportsmen, intolerable giving way &recurrent locking of meniscal tear.

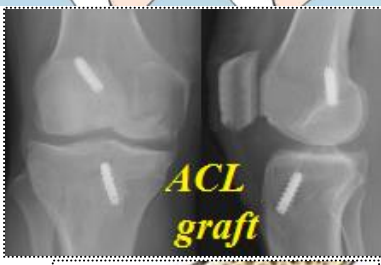
Operative Ṛ*: *Arthroscopic reconstruction

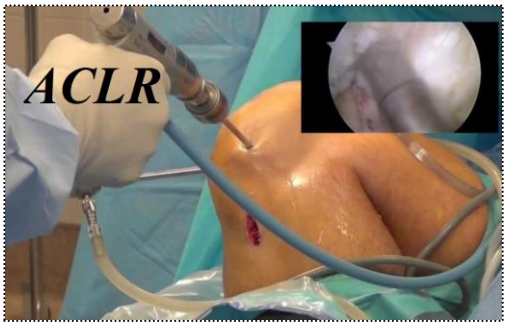
***Isolated ACL tear*→** replacement with strip of patellar tendon graft with bone at either end.

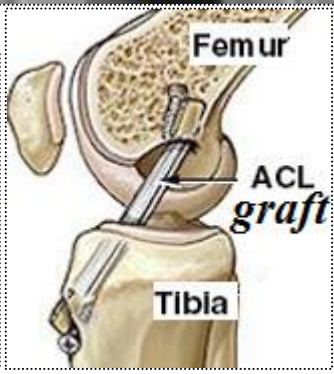


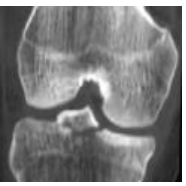
***Anteromedial &anterolateral rotatory instability*:** ACL+MCL or LCL→ ACL reconstruction is enough.

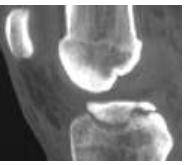
***Posteromedial &posterolateral rotatory instability*:** PCL+MCL or LCL→ repair of all damaged structures.









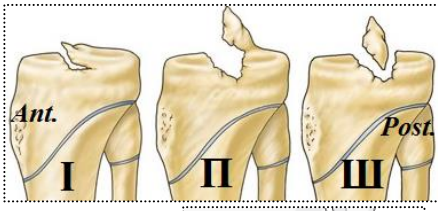


***Fractured tibial spine*:** is the adolescent variant of ACL tear.

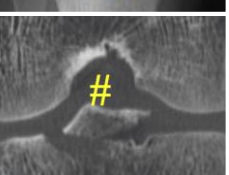
***MOI*:** ACL traction by severe twisting or varus/valgus force.

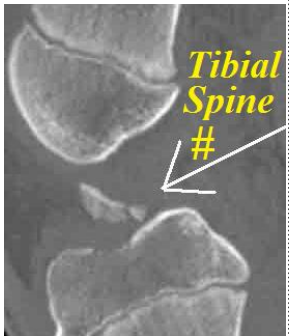
***CF*:** swollen tender knee with doughy feel.

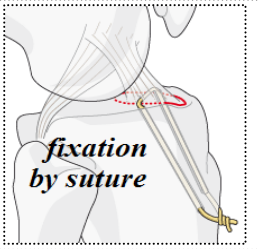
***X-ray*:** the # may be missed; the spine(intercondylar eminence) may be: **I**-undisplaced; **II**-hinged; **III**-completely displaced.

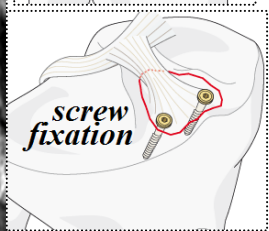


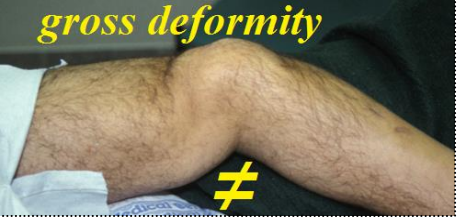
***Ṛ*:** UGA the joint is aspirated &manipulated to full extension→ 6wks plaster cylinder. If there is block to full extension or the fragment is significantly displaced→ ORIF.

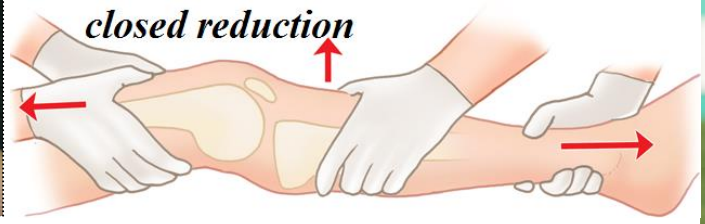










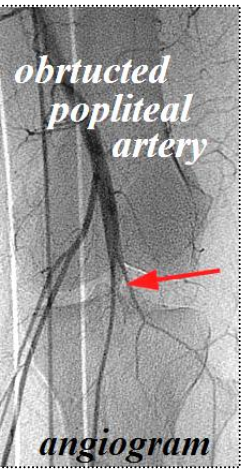


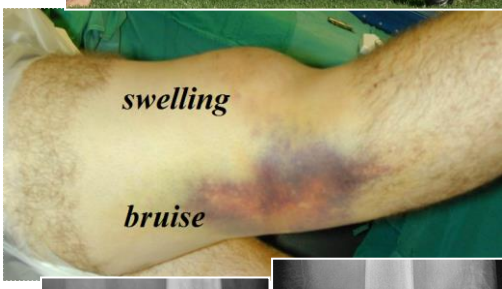
Dislocation of the knee:

***MOI*:** a force tearing capsule, cruciate &coll. lig.→ knee ≠.

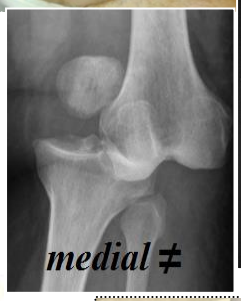
***CF*:** severe swelling, bruising + gross deformity. 20% will have popliteal art. &/ or peroneal n. injury.
35% of ≠ reduce spontaneously after injury(occult ≠).

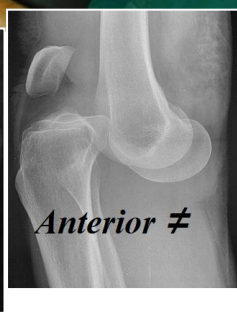
***X-ray*:** ≠ can be in any direction(ant., post., lat., med.); any lig. can avulse a piece of its bony attachment.

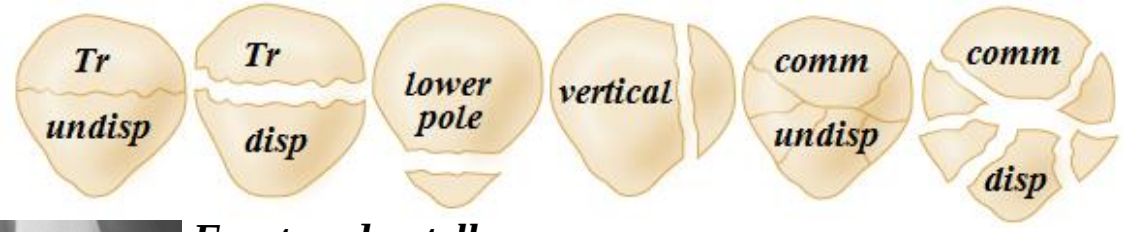




***Ṛ*:** Urgent CR UGA→ back-splint with frequent check of the circulation in the 1st week, later → hinged brace.
If CR fails, vascular injury or open ≠ → ***open reduction*** + lig. repair. ***Complication*:** knee instability or stiffness.

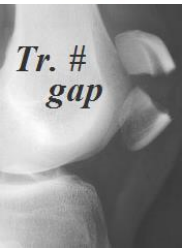


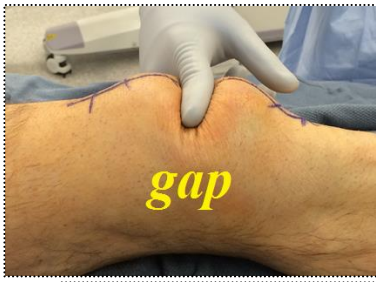


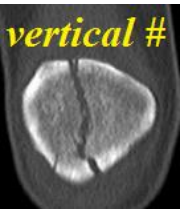


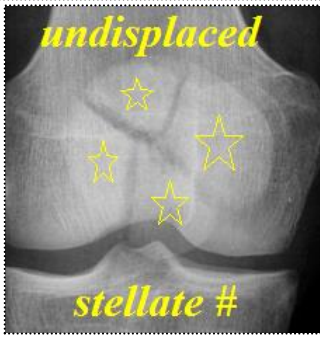
Fractured patella:

***Anatomy*:** the patella is a sesamoid bone in the quadriceps tendon; vastus medialis &lateralis also inserted into medial &lateral sides of the patella; the medial &lateral extensor retinacula are expansion of quadriceps bypassing the patella & inserting into the upper tibia. The main function of the patella is to ↑ the efficiency of the quadriceps.







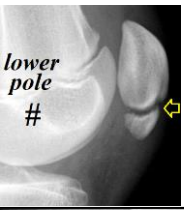


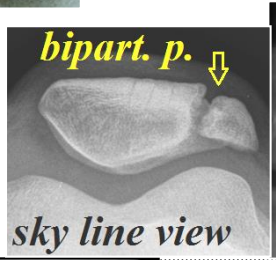
***MOI*:** either
Direct injury like dashboard blow or fall onto the knee→ undisplaced crack or comminuted(stellate) # with no tear of the extensor expansion.
Indirect injury by traction of quadriceps contraction against resistance → transverse # with gap bec. of extensor expansion tear.

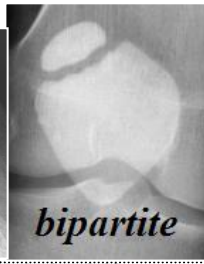
***CF*:** swollen bruised knee; if direct injury the patient can lift his leg &no gap can be felt in contrast to indirect injury. Aspiration→ blood + fat droplets.

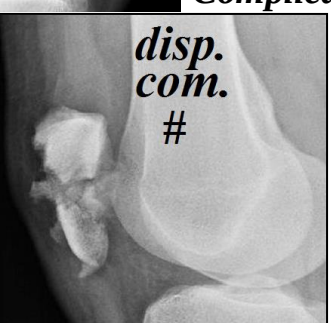
***X-ray*:** bi- or tri-partite patella(with smooth rounded edge) should not be mistaken for #.

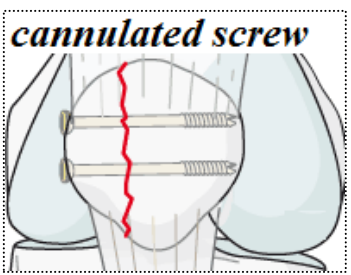
***Ṛ*:**
***Undisplaced #*:** aspirate hemarthrosis→ 4wks cast + exercise.
***Comminuted #*:** if undisplaced → the same Ṛ. If displaced → immediate patellectomy(to avoid later patellofemoral OA).
***Transverse # with gap*:** ORIF +repair of extensor expansion. 2K-wires + tension band, screw, cerclage wire &patella plate.
***Complication*:** patellofemoral OA.

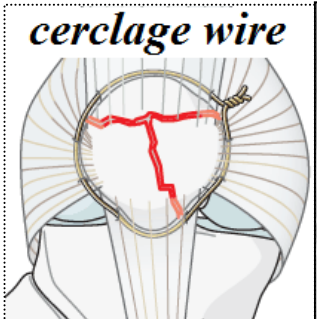


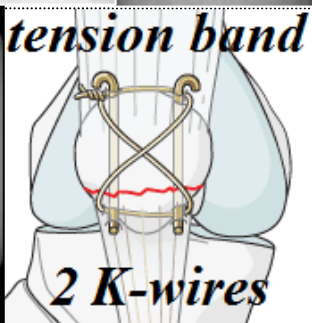


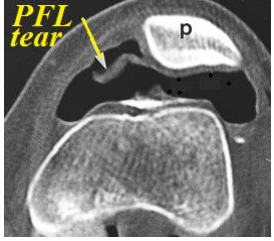


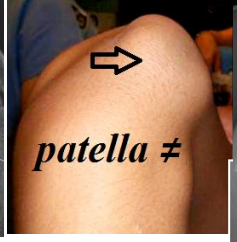


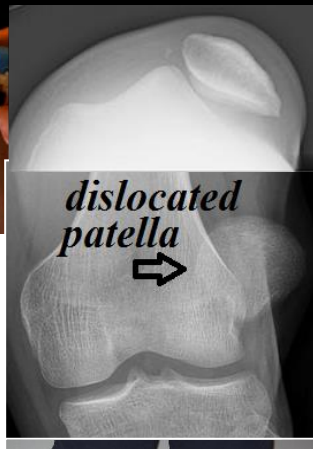










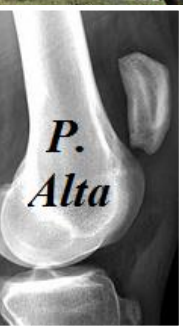


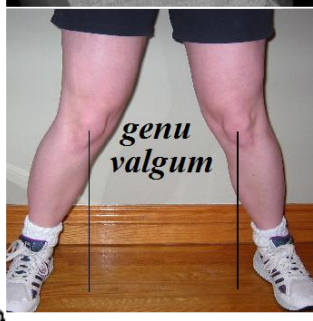
***Dislocation of patella*:** is almost always lateral with tear of med. patellofemoral lig. &med. retinaculum.

***MOI*:** direct force is rare; often indirect twisting injury→ quadriceps contraction while the knee in valgus &external rotation.

***Risk factors*:** genu valgum, tibial torsion, patella alta, shallow intercondylar groove, lig. laxity &weak vastus medialis obliqus(VMO).

***CF*:** the patient fall to the ground; the patella is felt on lateral side of the knee; knee movement is impossible. Often it reduces spontaneously leaving tenderness &bruises on medial side.

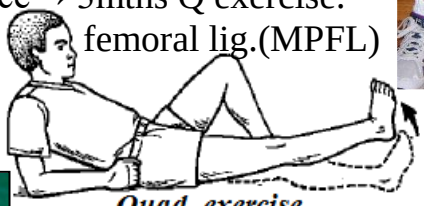


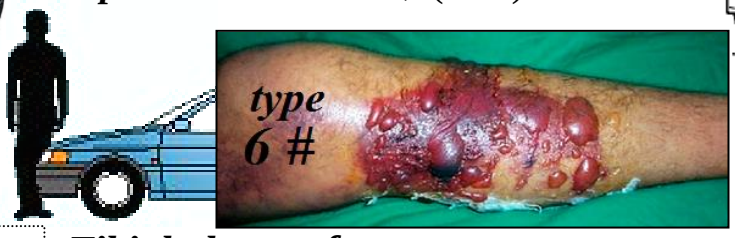


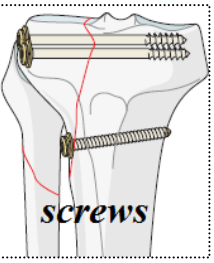
***X-ray*:** the patella is displaced laterally &there may be osteochondral #.

***Ṛ*:** push patella back into its place→ 3wks brace→ 3mths Q exercise. Some prefer operative repair of medial patello femoral lig.(MPFL) to prevent recurrent ≠ in severe injury.

***Complication*:** recurrent ≠ (20%).





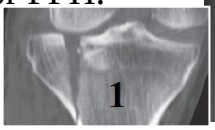


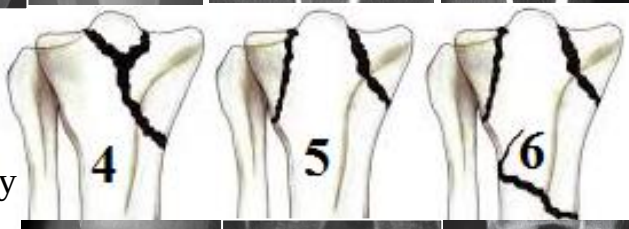
***Tibial plateau fractures*:** adults(50-60).

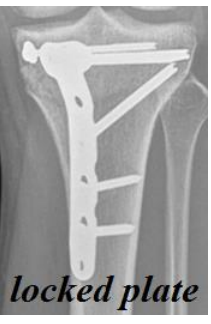
***MOI*:** varus or valgus force + axial loading like car striking a pedestrian (bumper #) or FFH.

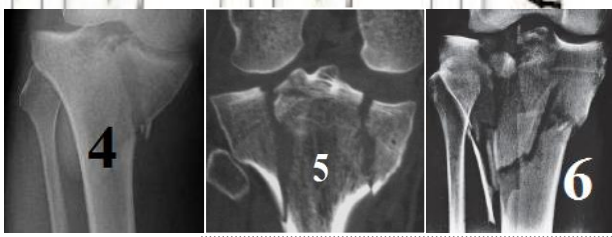
***Schatzker's classification*:**

Type 1 - lateral condyle split #.
2 - lateral condyle split-depressed #.
3 - lateral condyle depressed #.
4 - medial condyle split or depression #.
5 – bicondylar #.
6 – uni or bicondylar + subcondylar #.





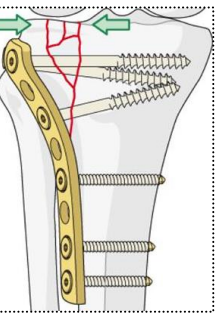




***CF*:** swollen, deformed &bruised knee with doughy feel; look for vascular injury, compartment syndrome, ligament tear &nerve injury.

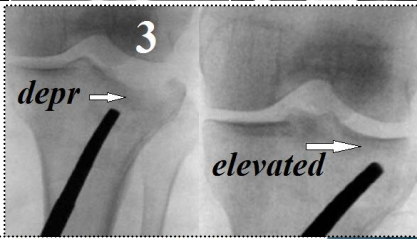
***X-ray*:** AP& lateral views; CT & MRI.

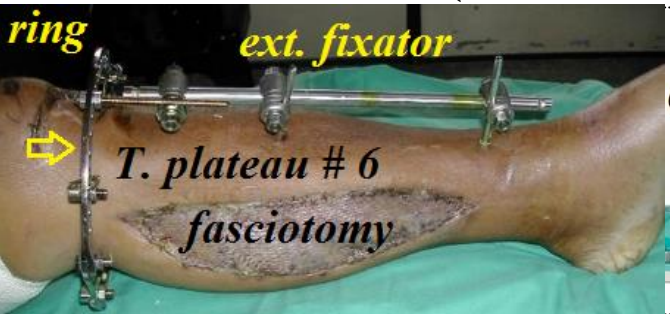
***Ṛ*:**

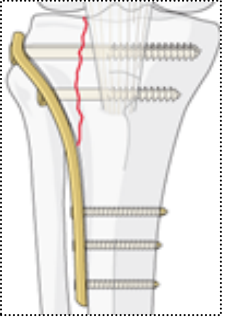


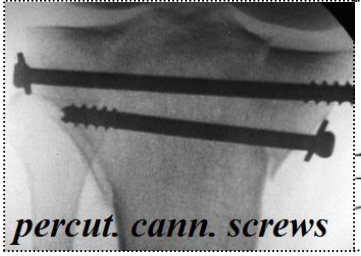
***Conservative*:** aspirate the hemarthrosis & apply crepe bandage→ 2wks continuous passive motion (CPM) machine→ 6wks hinged brace NWB→ 6wks PWB.

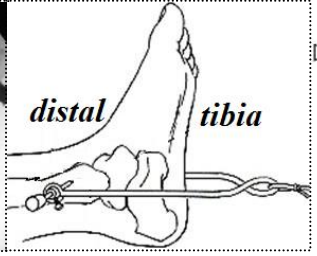
***Operative*:** ORIF→ screws alone or plate (locked or buttress) + elevation of any articular depression &support with bone graft. In severe soft tissue injury, open # or severe # comminution, external fixator(± minimal internal fixation) gives better result.

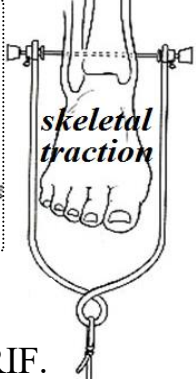


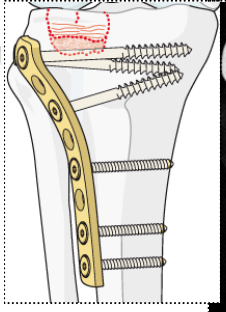


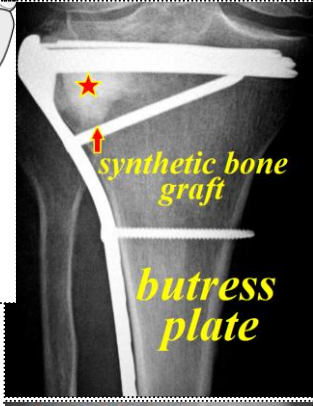




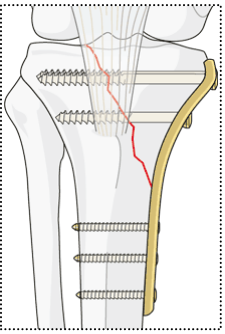








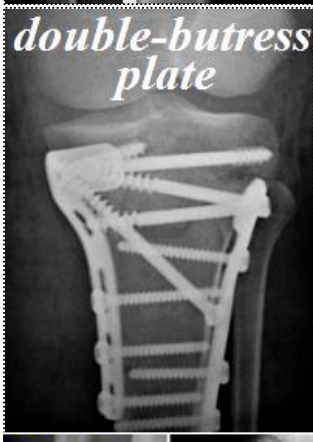
I&IV: If undisplaced→ conservative
If displaced→ ORIF.



II&III: If depression >5mm &young→ ORIF.
If <5mm or elderly→ conservative.

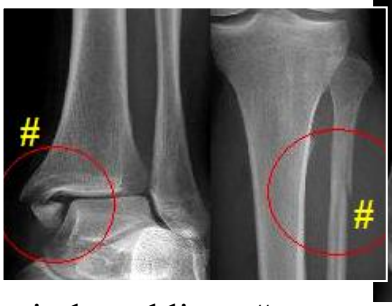
V &VI: if severely displaced, there is a risk of comp. syndrome.
If undisplaced or slightly displaced in elderly→ conservative.
If displaced→ ORIF or circular-frame external fixation or 6wks skeletal traction→ 6wks brace.

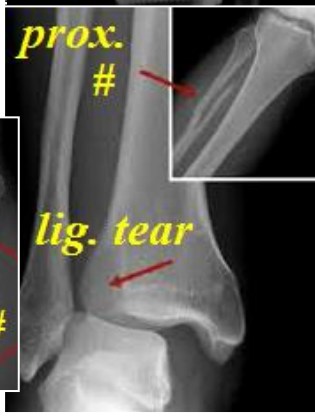
Complications: ***Early*: compartment syndrome:** may be seen in closed type 5&6 due to excessive bleeding.
***Late*: knee stiffness, varus or valgus deformity &OA(**after 5-10yrs**).**



Fractures of proximal end of fibula:

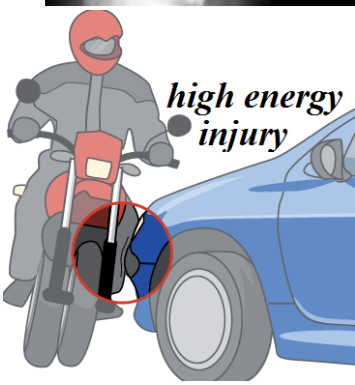
***MOI*:** either direct blow or indirect twisting injury.
The isolated # is rare &needs no Ṛ but **look for** associated injuries:
1-ankle # or ligament tear(Maisonneuve #); always x-ray the ***ankle***.
2-knee lig. injury; always check ***knee*** stability.
3-peroneal nerve injury.
late complication: peroneal nerve entrapment.



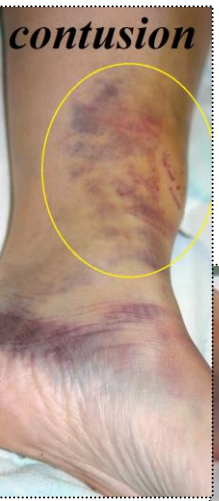


Fractures of tibia &fibula: fracture tibia is common &often it is open because of its subcutaneous position.

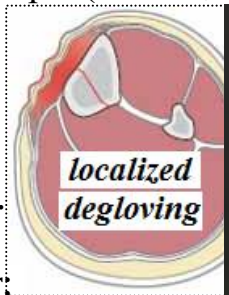
MOI: Indirect injury(***low energy*** e.g. sport)→ spiral or oblique #; bone fragment may pierce the covering skin from within.
Direct injury(***high energy*** e.g. RTA)→ comminuted # + overlying skin crush or split.

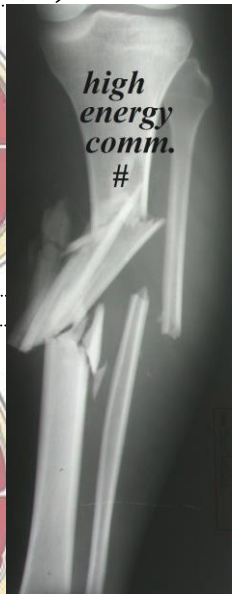


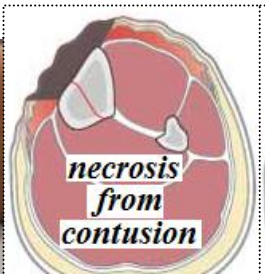
Pathological anatomy: # healing depends on:
1- Severity of soft tissue injury: **Tscherne's** classification of skin lesion in ***closed*** #:***1***-no lesion; ***2***-contusion; ***3***-localized degloving; ***4***-extensive degloving; ***5***-necrosis from contusion.
For ***open*** # → **Gustilo's** classification.
2- Severity of bone injury: high energy injury→ comminuted &open(G III A,B,C).
Low energy injury→ spiral &closed or open(GI or II).
3- Stability of the #. **4-** Degree of contamination.

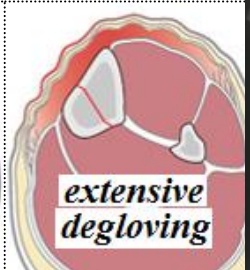


CF: swollen deformed leg &externally rotated foot.
Look for: open wound; skin bruising, crushing & tenting; weak or absent pulse, compartment syndrome & nerve injury.
X-ray: the entire leg with knee &ankle should be seen.
***Management*: *Aim*:** 1-limit ST damage &preserve skin cover; 2-prevent compartment syndrome;



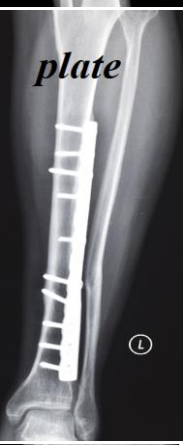




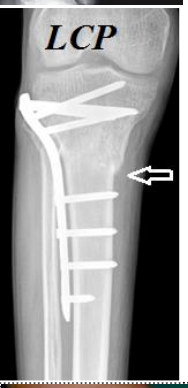


3-reduce &hold the #;
4-start early weight bearing;
5-early joint movement.

Conservative Ṛ: for ***stable*** low energy # if undisplaced or slightly displaced with little soft tissue damage→ full length cast(from mid thigh to metatarsal necks) &elevation for 2wks→ checking x-ray & cast renewed if become loose→ 16wks PWB. If skin viability is doubtful→ 2wks observation in back slab &elevation→ casting.



Operative Ṛ: for displaced high energy ***unstable*** # with more ST damage:
Closed intramedullary nailing(for closed shaft # &open G I, II, &IIIA)**;**
Plate fixation**(**open plating for metaphyseal # or MIPO for shaft &metaphyseal #)
&
External fixation for open # G IIIB&C &closed # with severe comminution &/or severe ST damage.



Complications**:** ***Early*****:**
1-vas. injury: prox. 1/3 # may injure pop. art.→ repair.
2-comp. syndrome(prox. #): fasciotomy→ ext. fixation.
3-infection: 1% for G I &30% for G IIIC.
Late**:** 1-malunion: 1.5cm shortening &7˚angulation are acceptable, if more or mal-rotation→ tibial osteotomy.
2-delayed union &nonunion: especially in high energy #, infection or bone loss→ stable fixation &bone graft.
3-joint stiffness: of ankle may lasts 12months.