

Management of severe open fracture of lower limbs with external fixation

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Objective

- Principles of open fractures management
- The different types of external fixator
- The different uses of external fixator
- Common problems of external fixation



Open fracture is a severe soft tissue injury

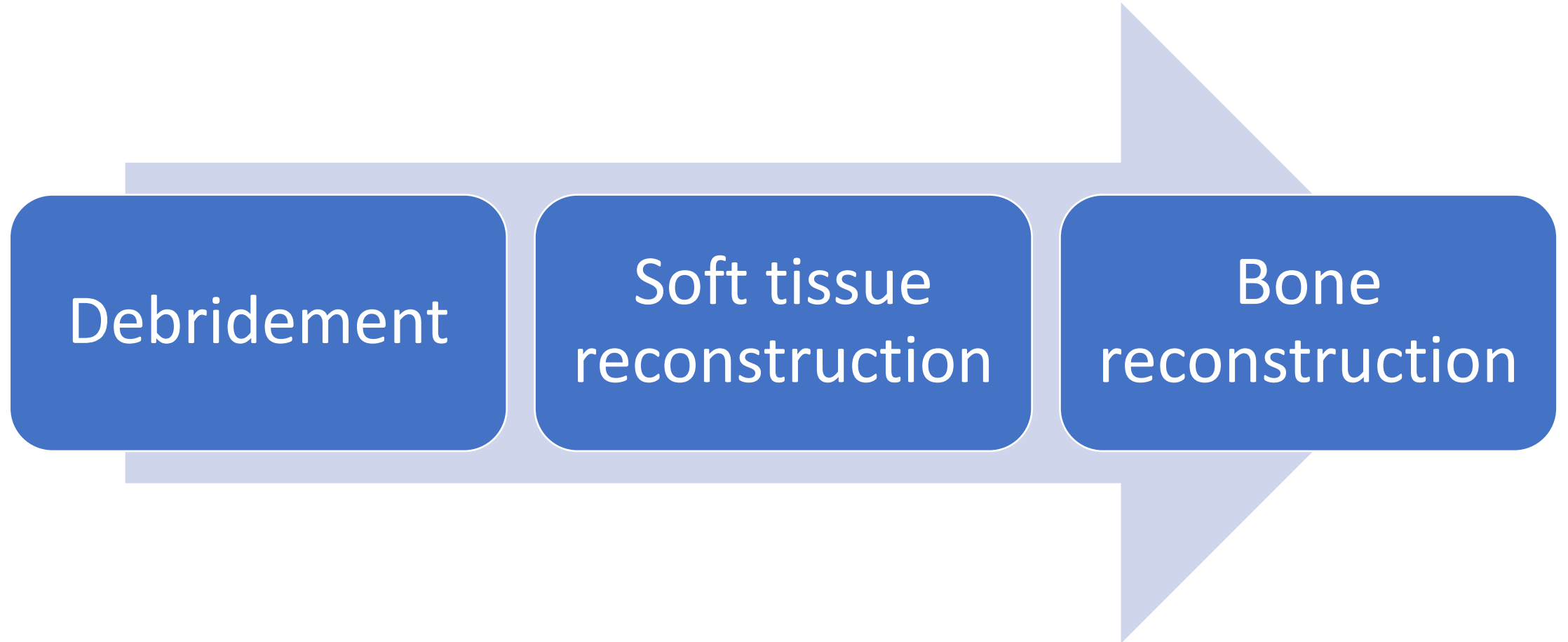


Aim

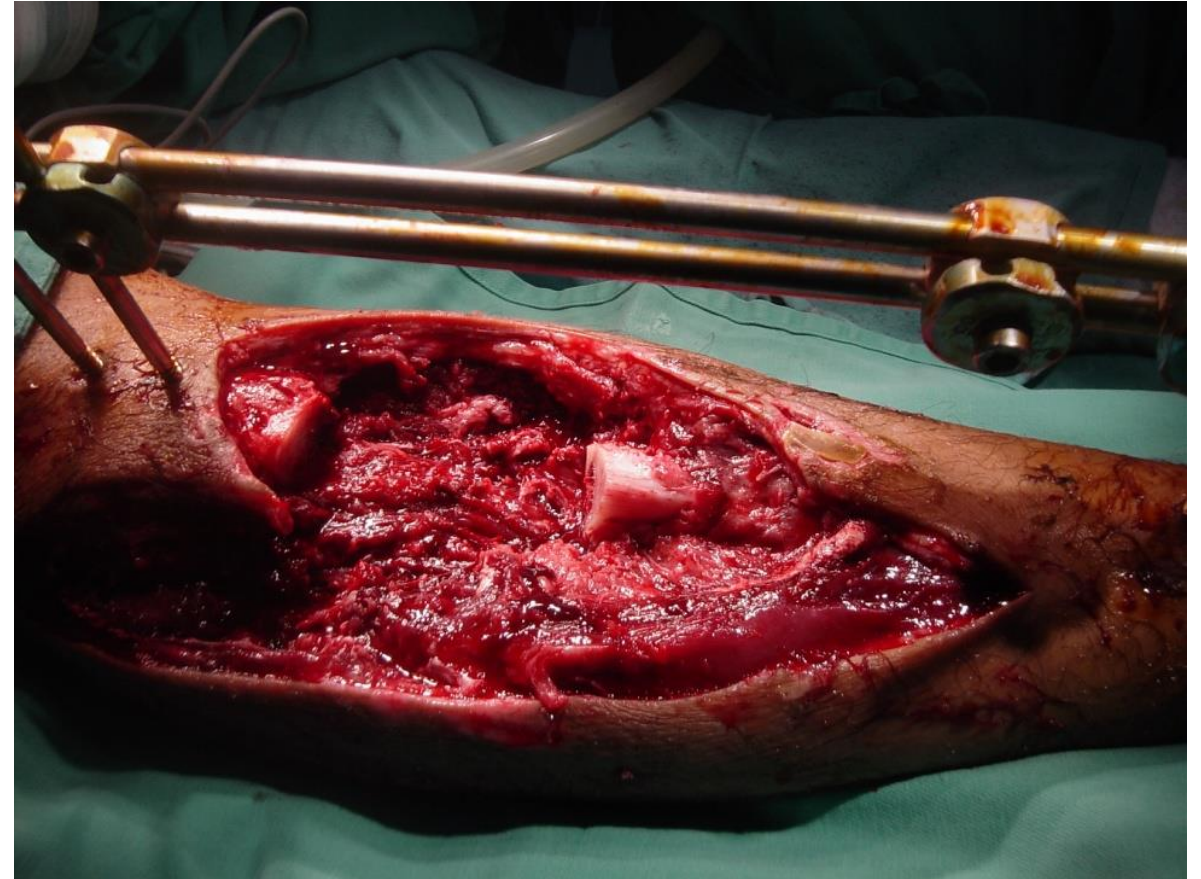
- **Save life**
 - Mangled extremity score
- **Prevent infection**
 - Antibiotics
 - Debridement
 - Early soft tissue coverage
 - Stable fixation
- **Promote fracture healing**
 - Bone graft / bone transport
 - Rehabilitation



STAGED SURGERY

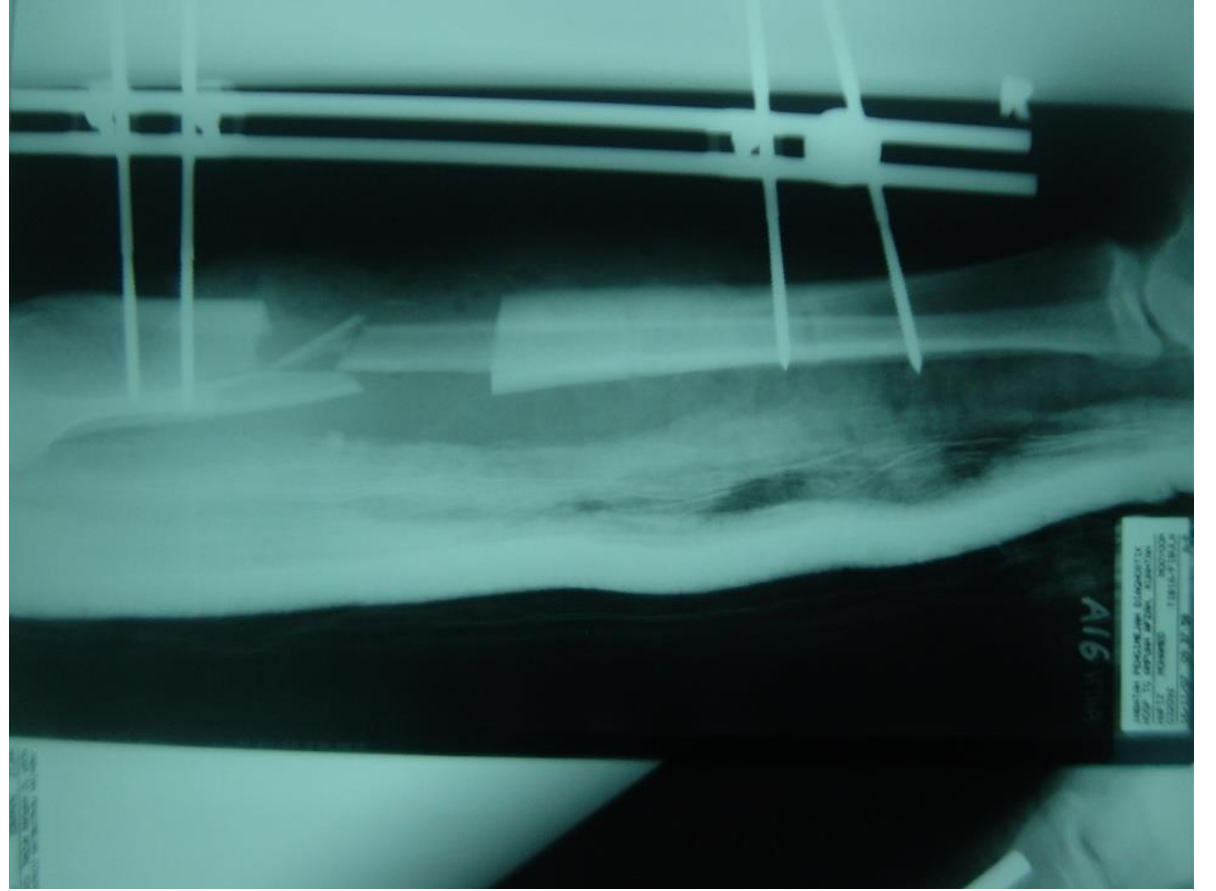
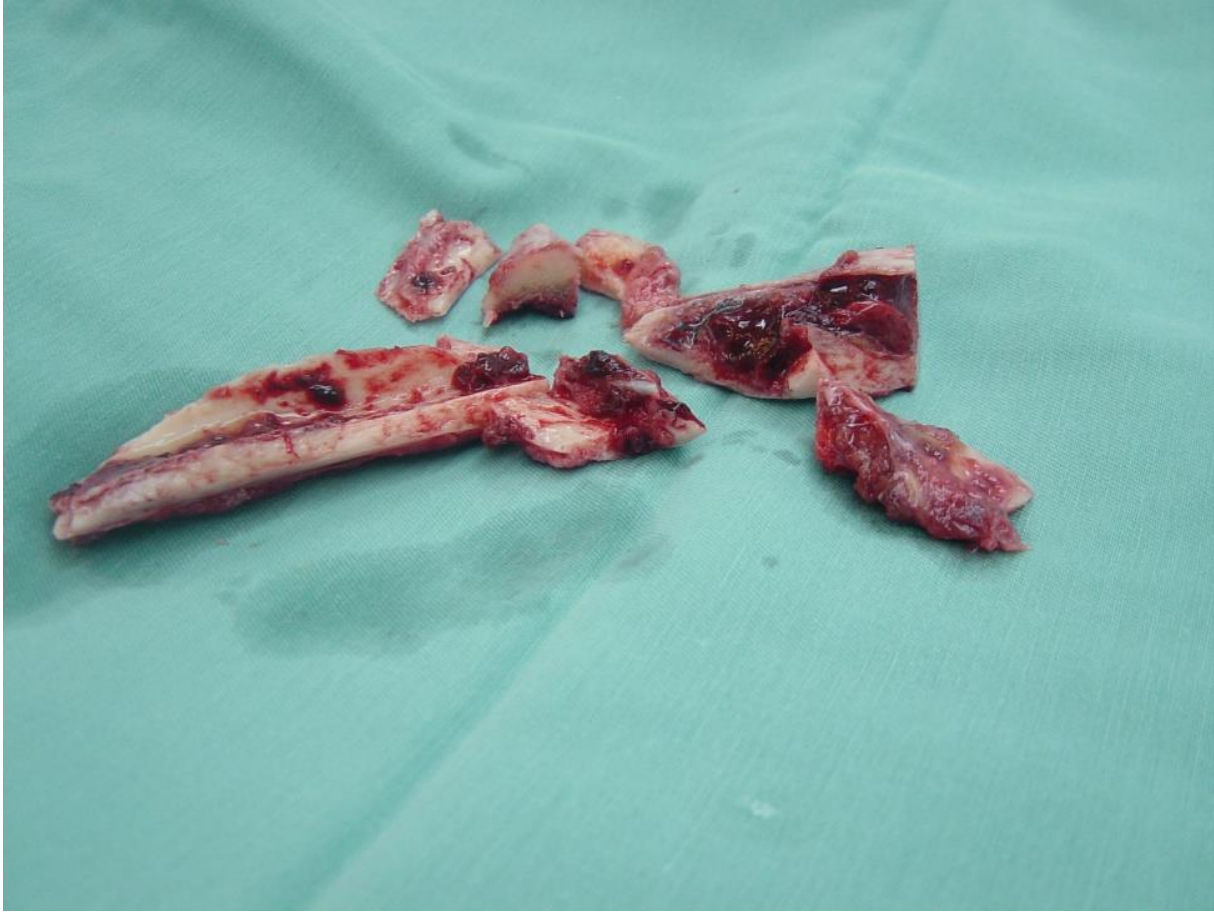


Debridement is the key

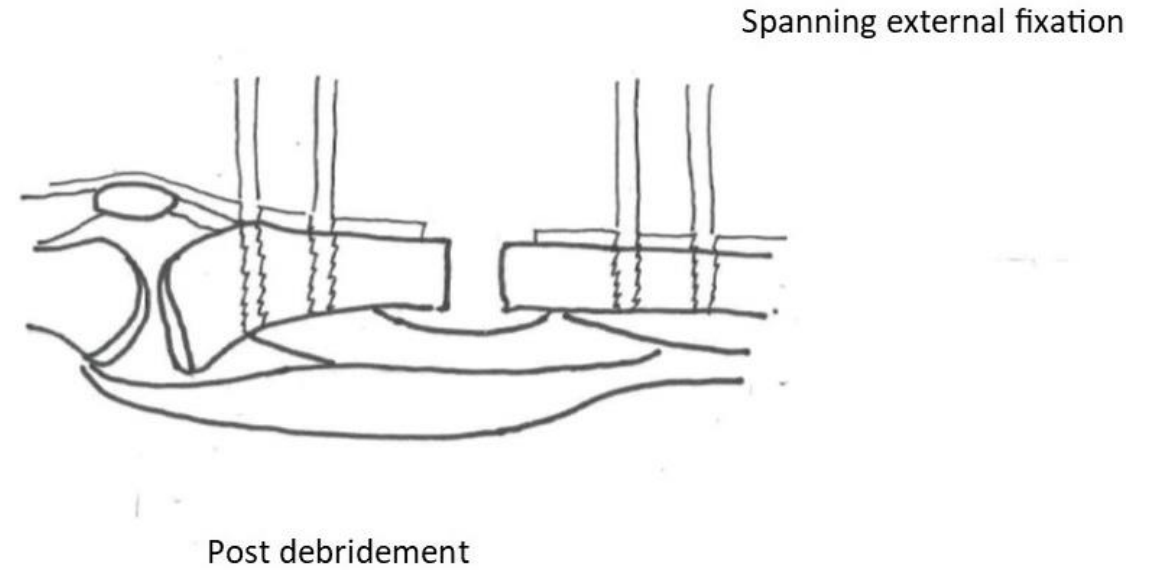
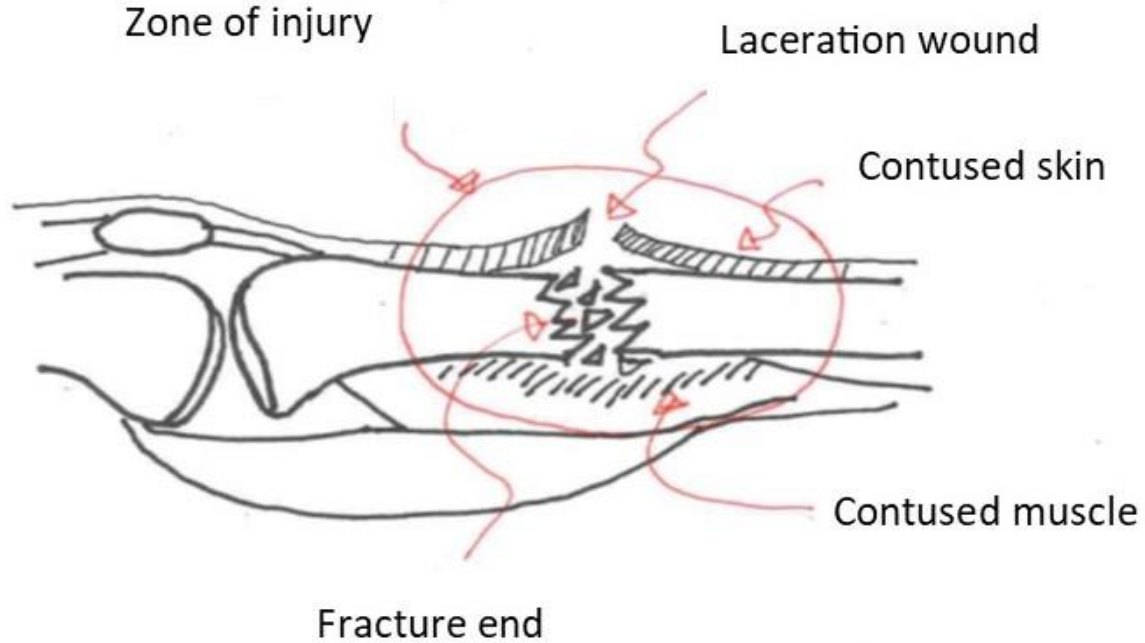


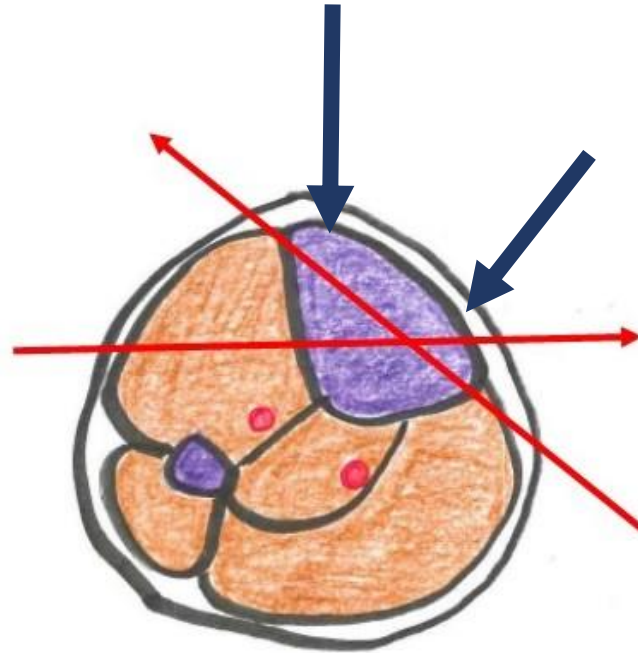
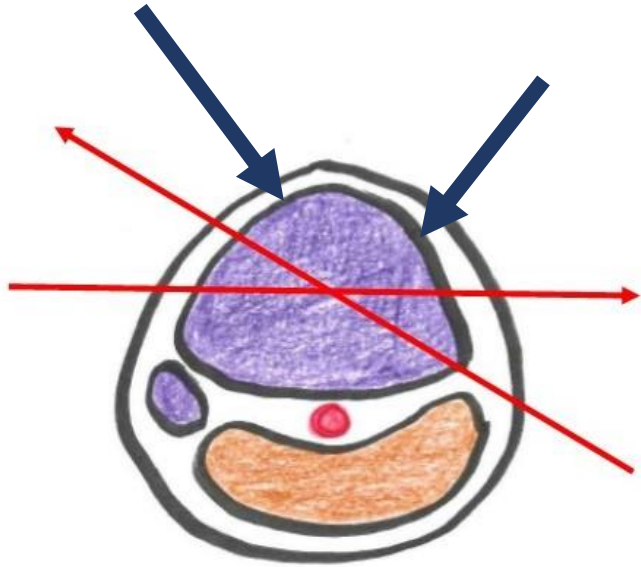
BONE DEBRIDEMENT



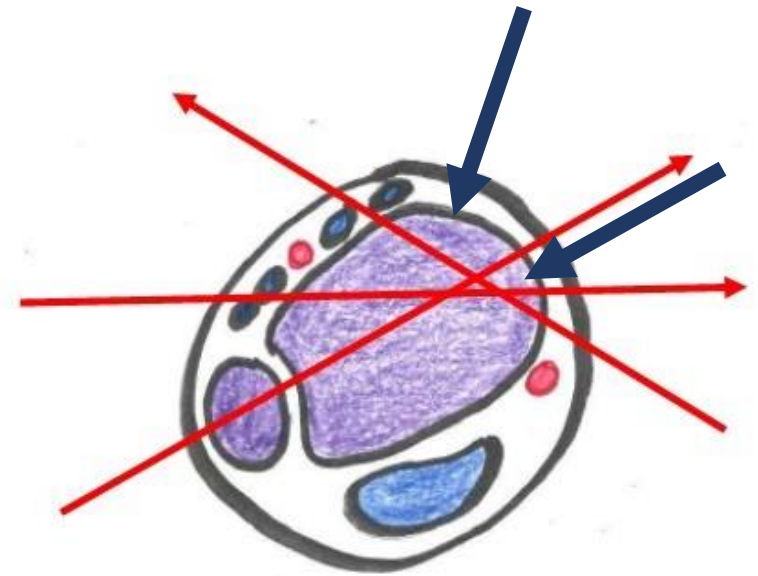


Stability with spanning external fixator



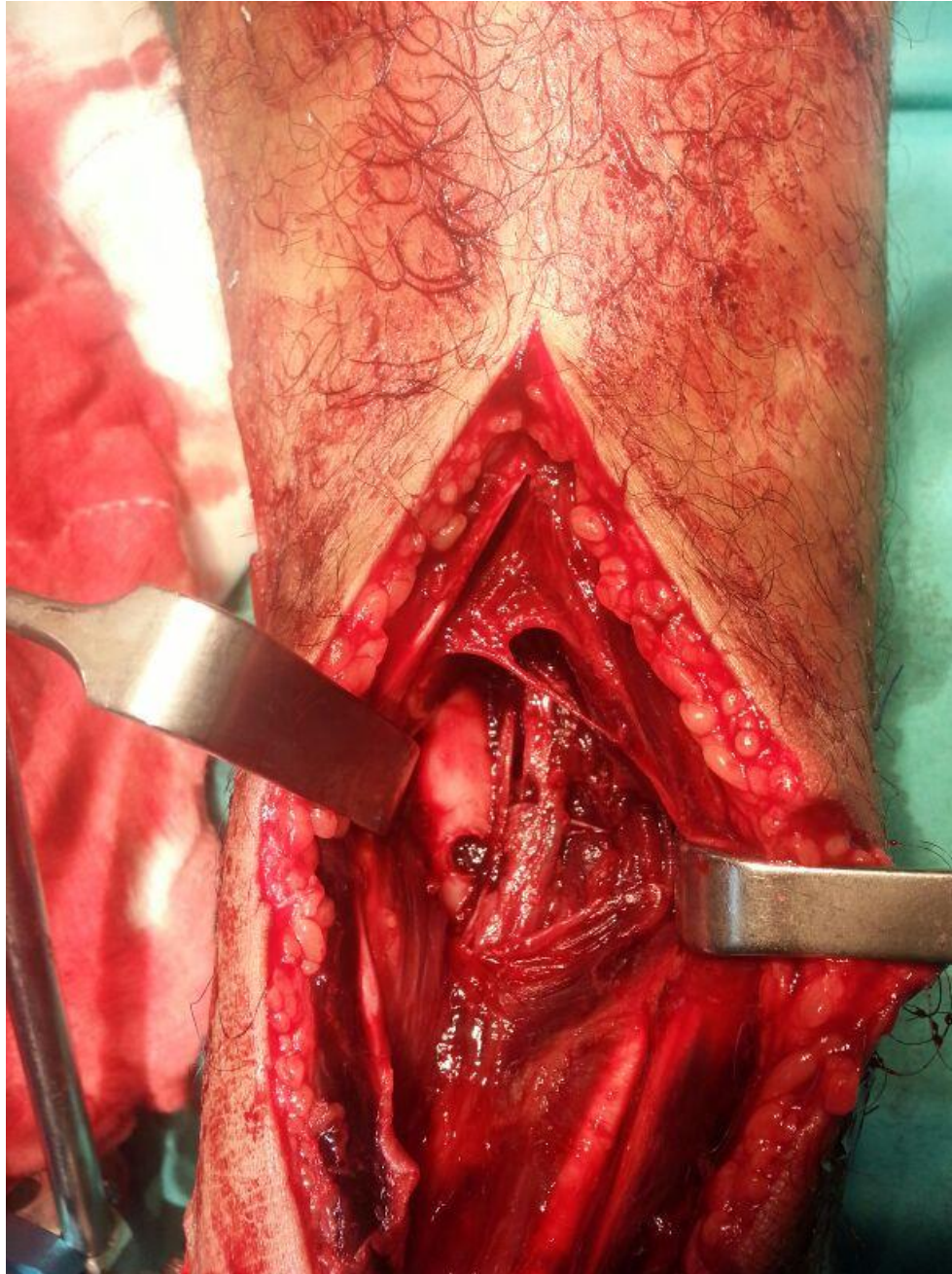


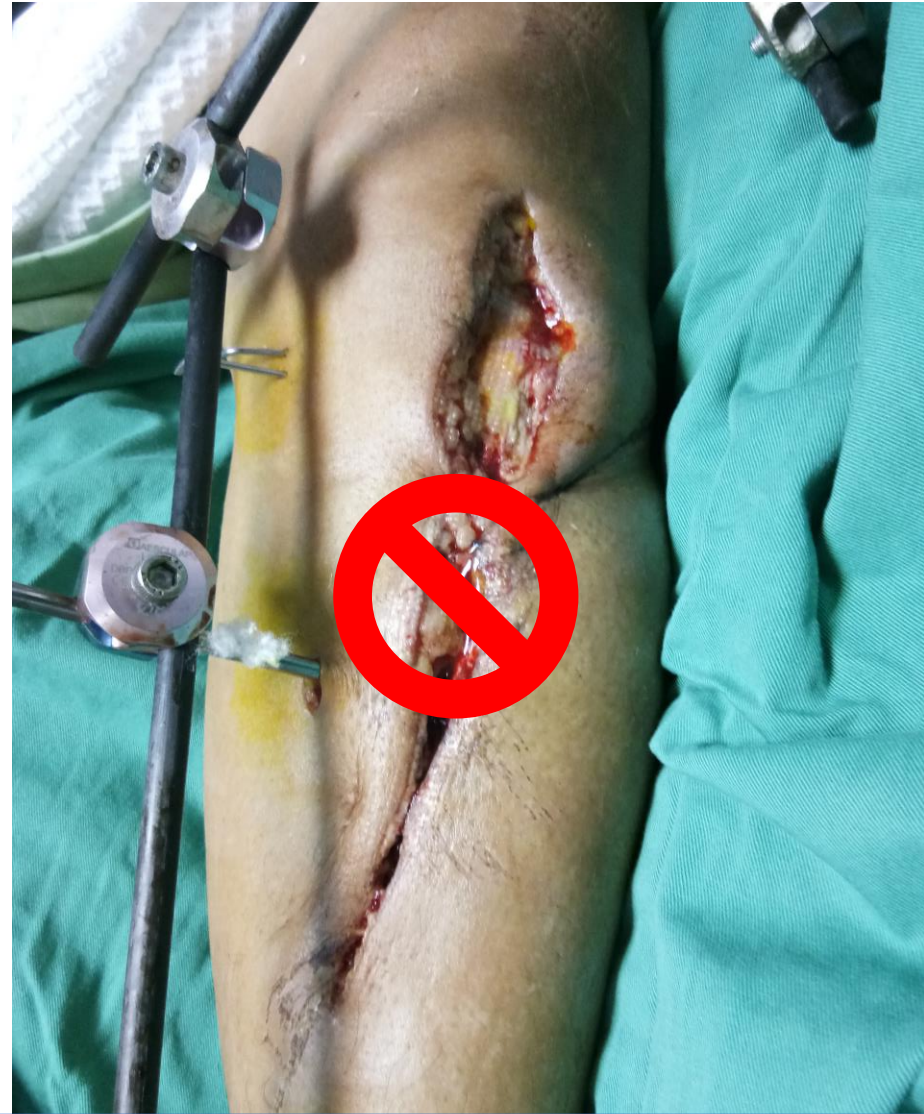
Safe corridor





SAFETY





Avoid screws in the zone of injury

Cross ankle



Cross knee

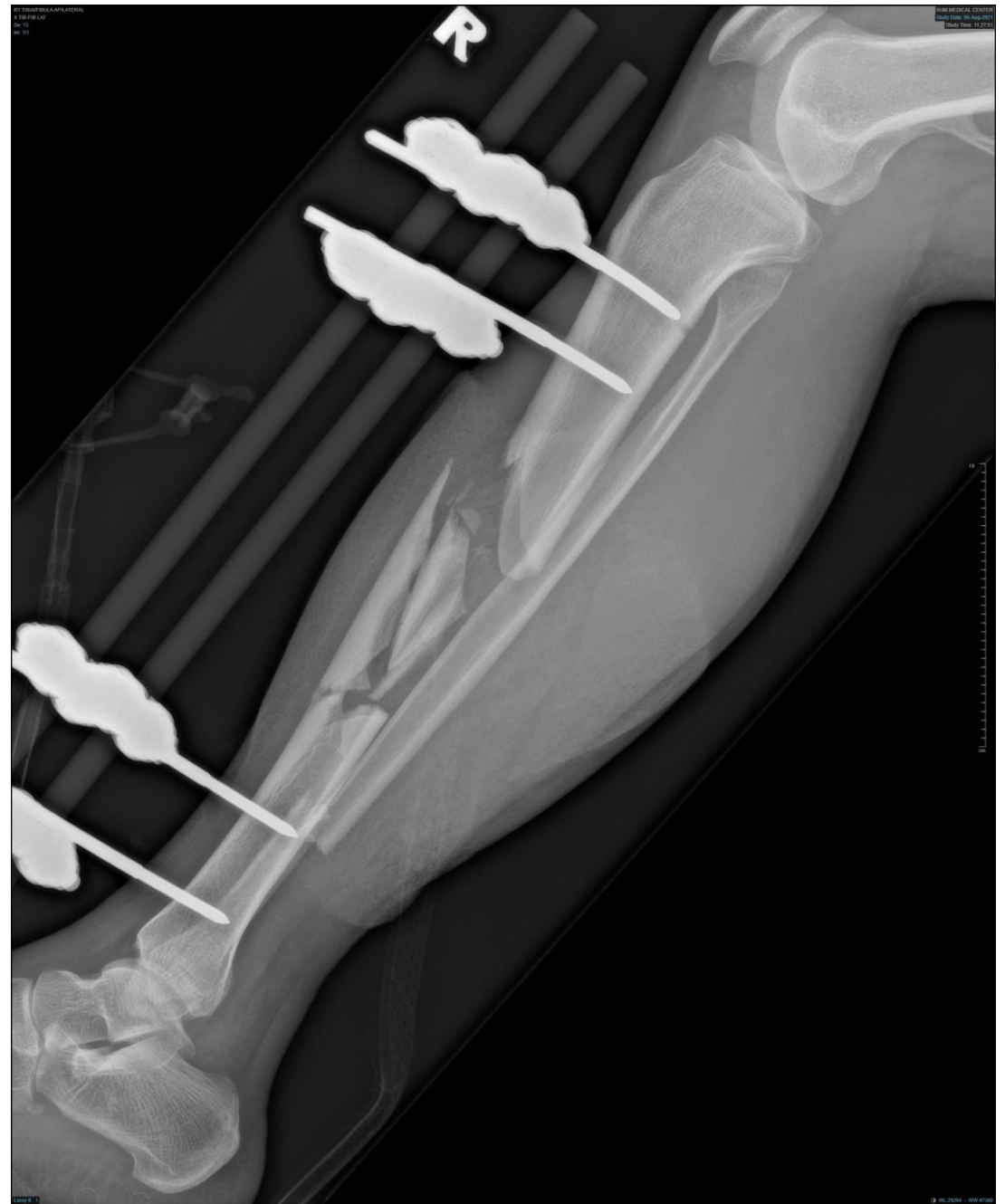


Staged protocol









Timing





Delayed case



Perforators flap and screw placement



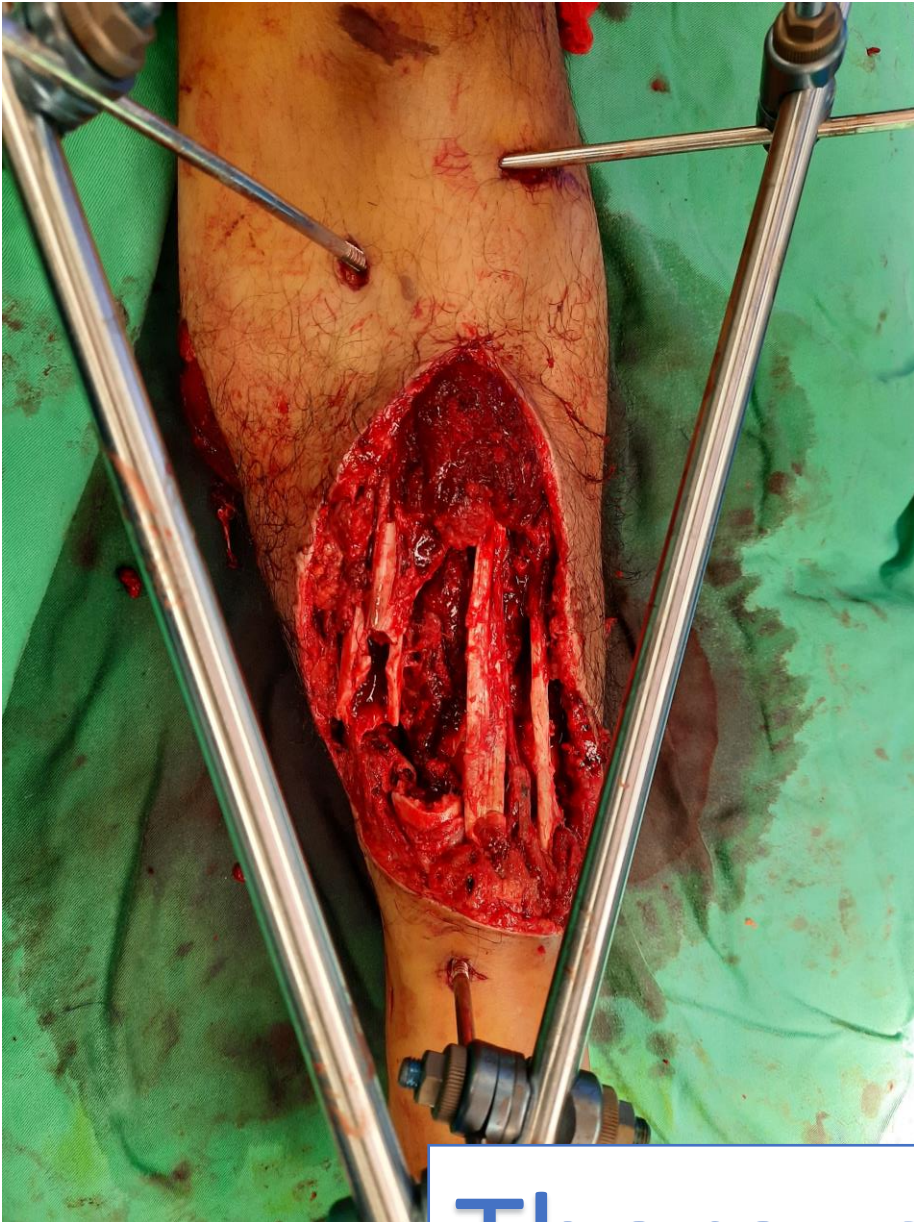
Lateral plate and remove external fixator



Inadequate

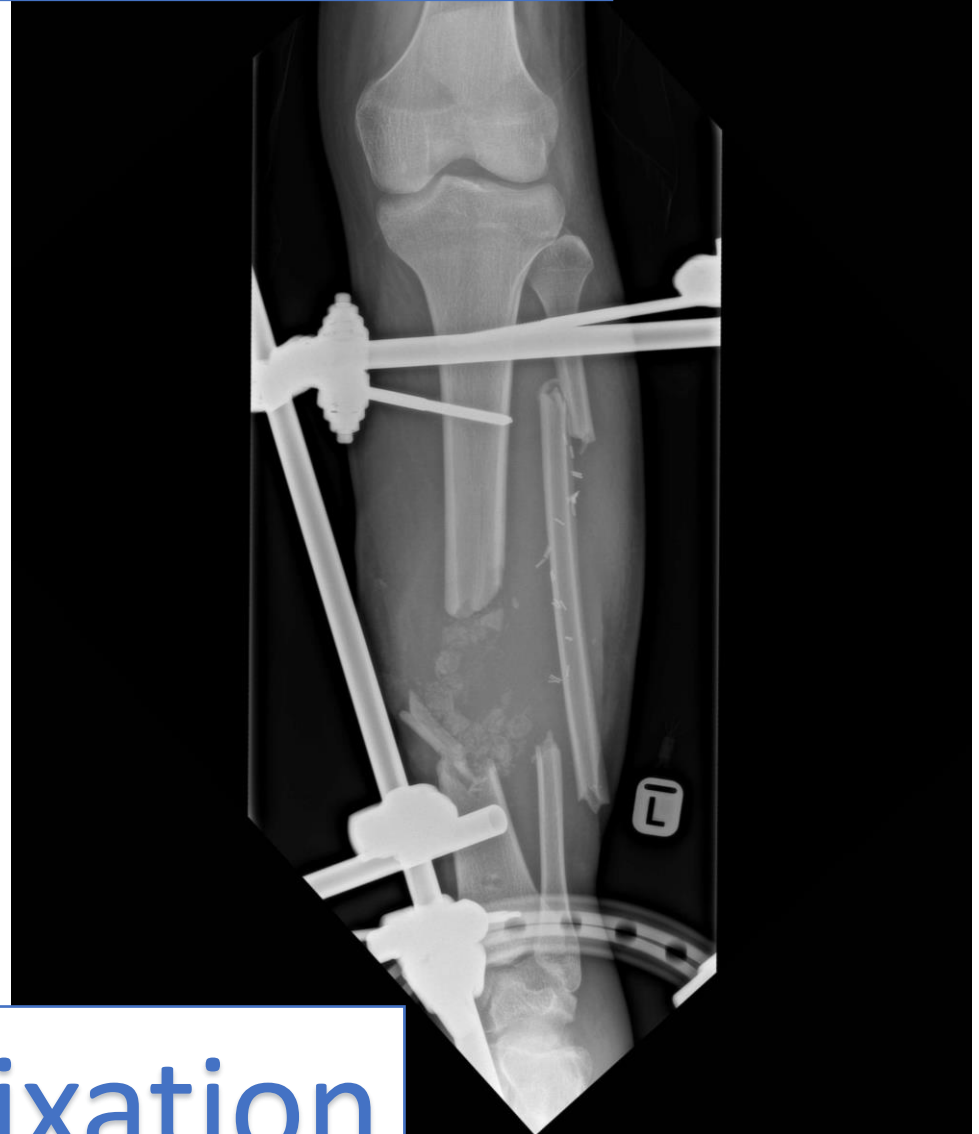






Thorough debridement

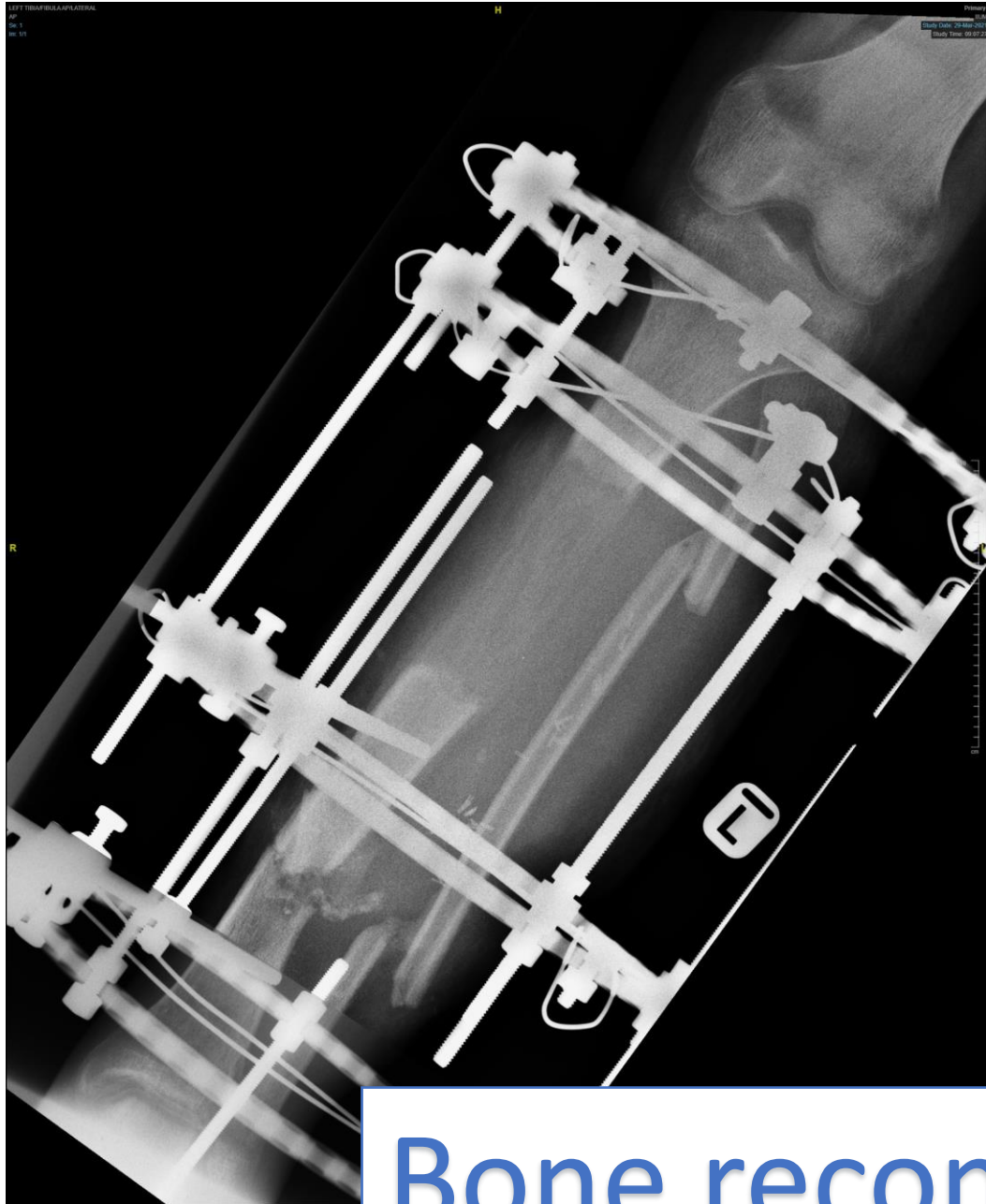
Facilitate wound care



Stable fixation



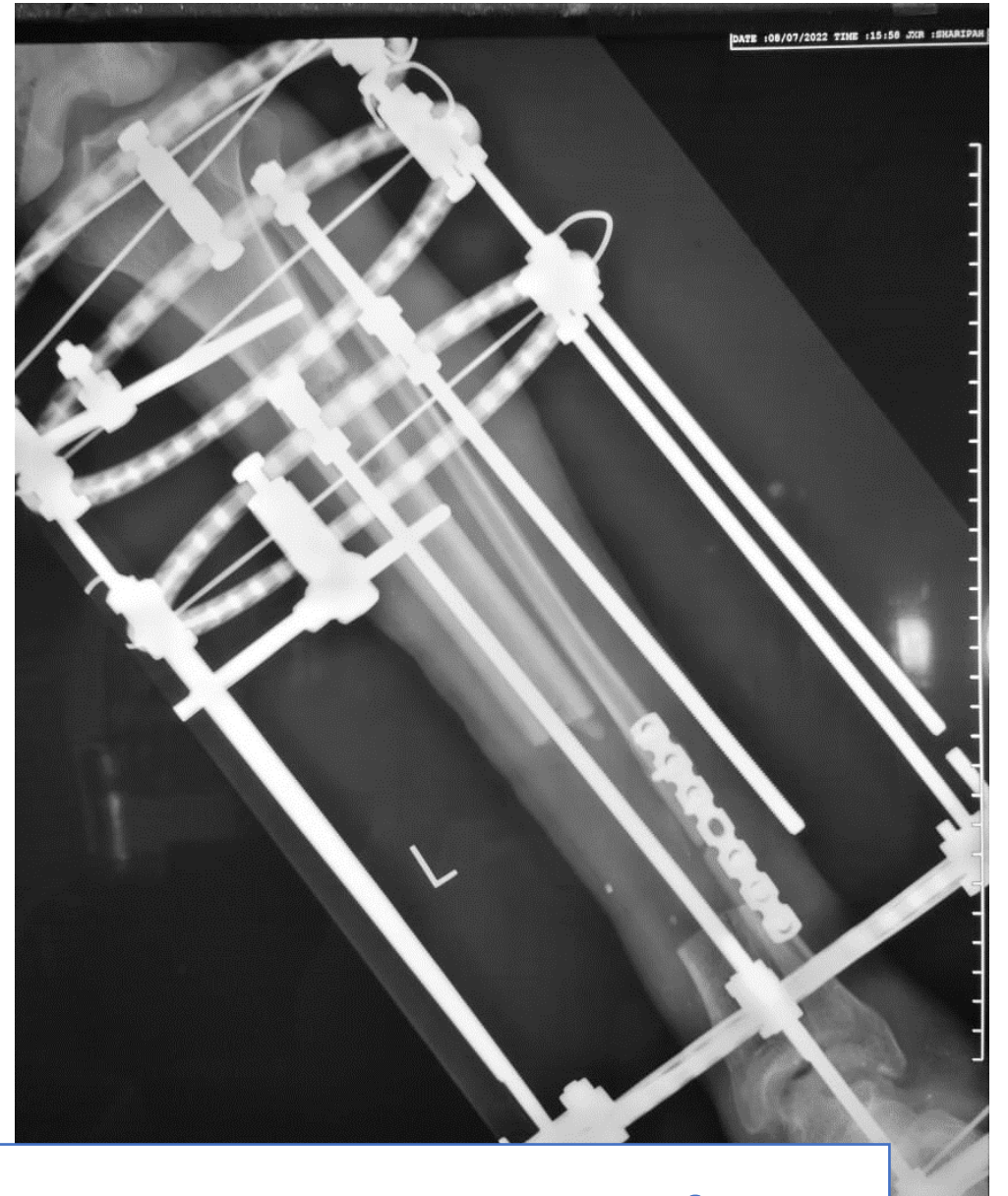
Soft tissue first



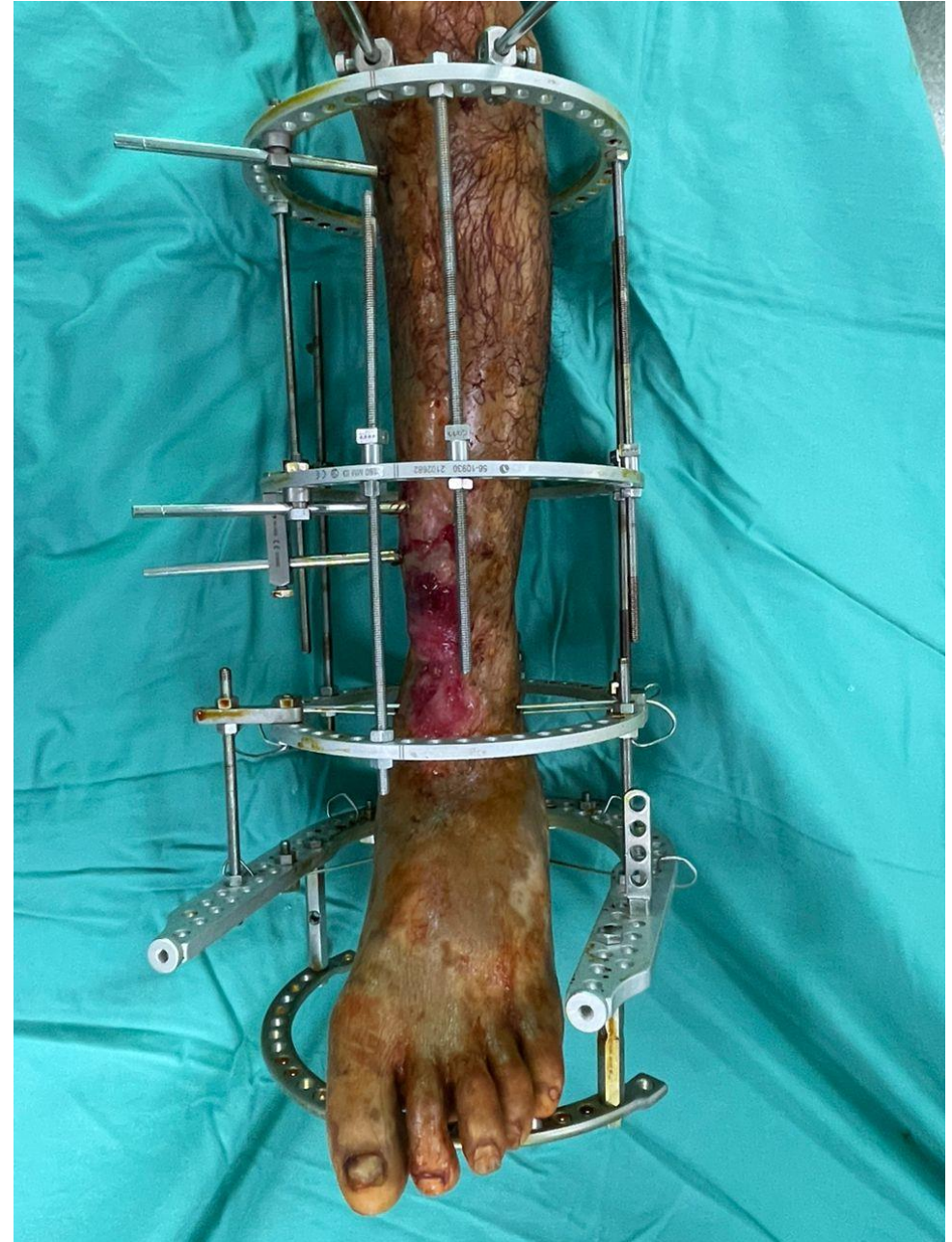
Bone reconstruction last

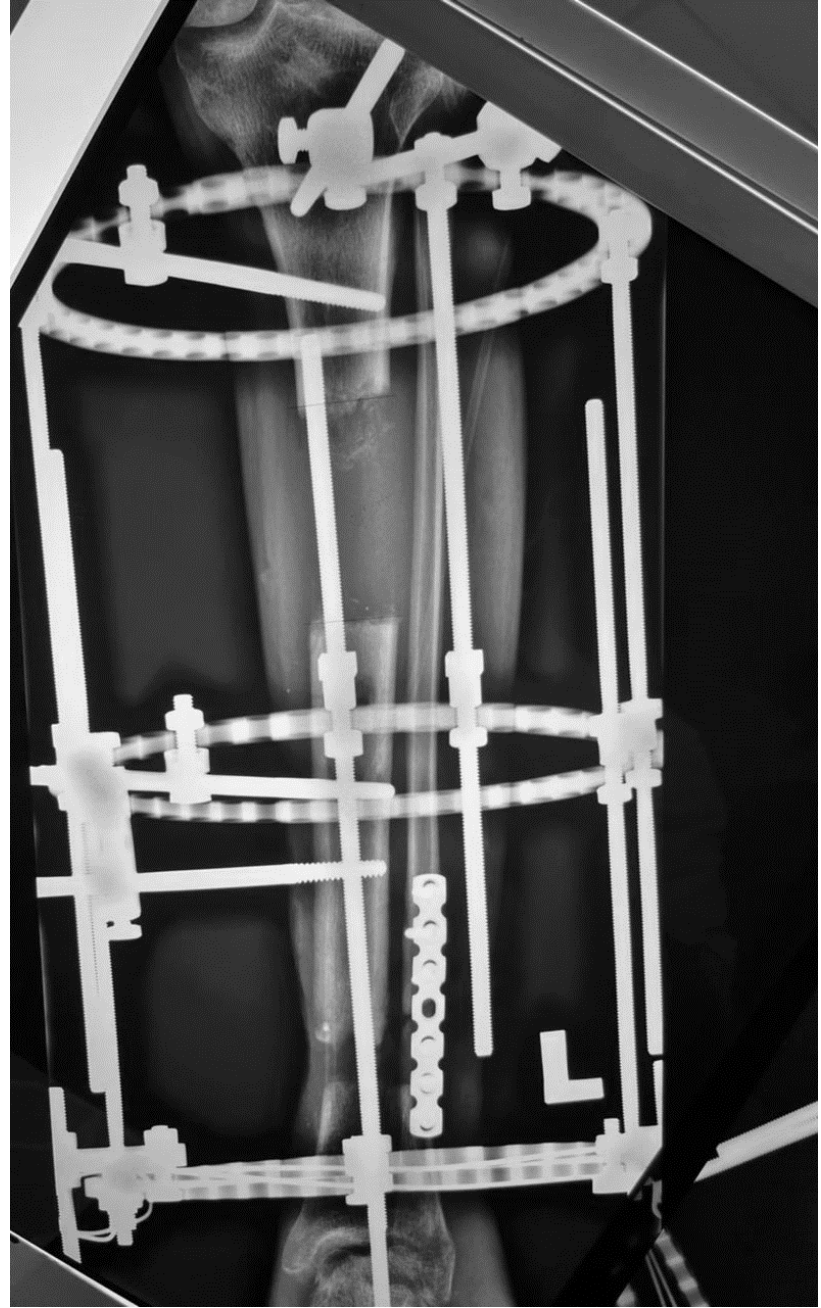
Bone and soft tissue together





Bone and soft tissue regeneration





Bone and soft tissue transplant





External fixator protect the graft and prevent equinus

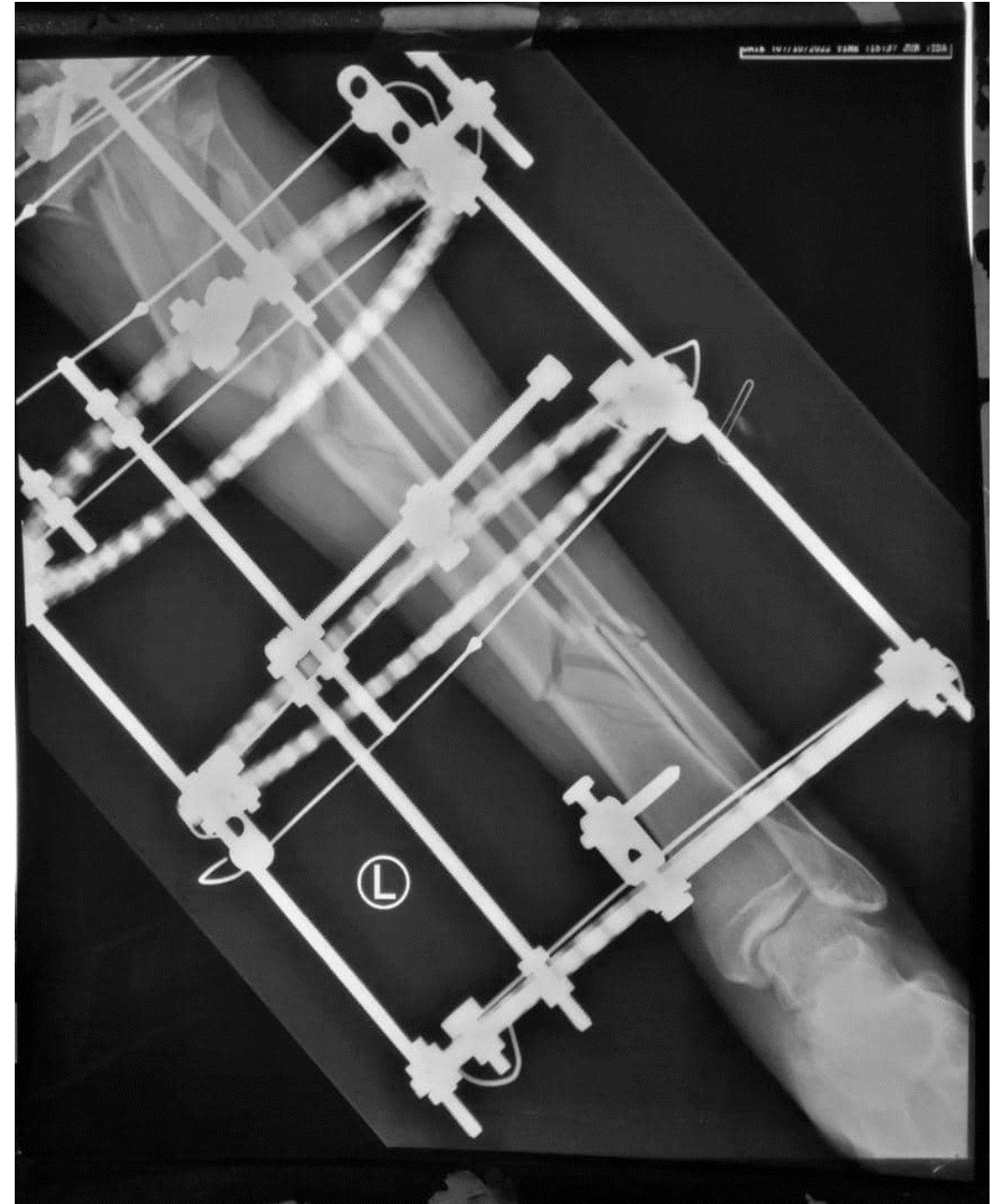


Walk with orthosis



Intra articular and shaft open fracture

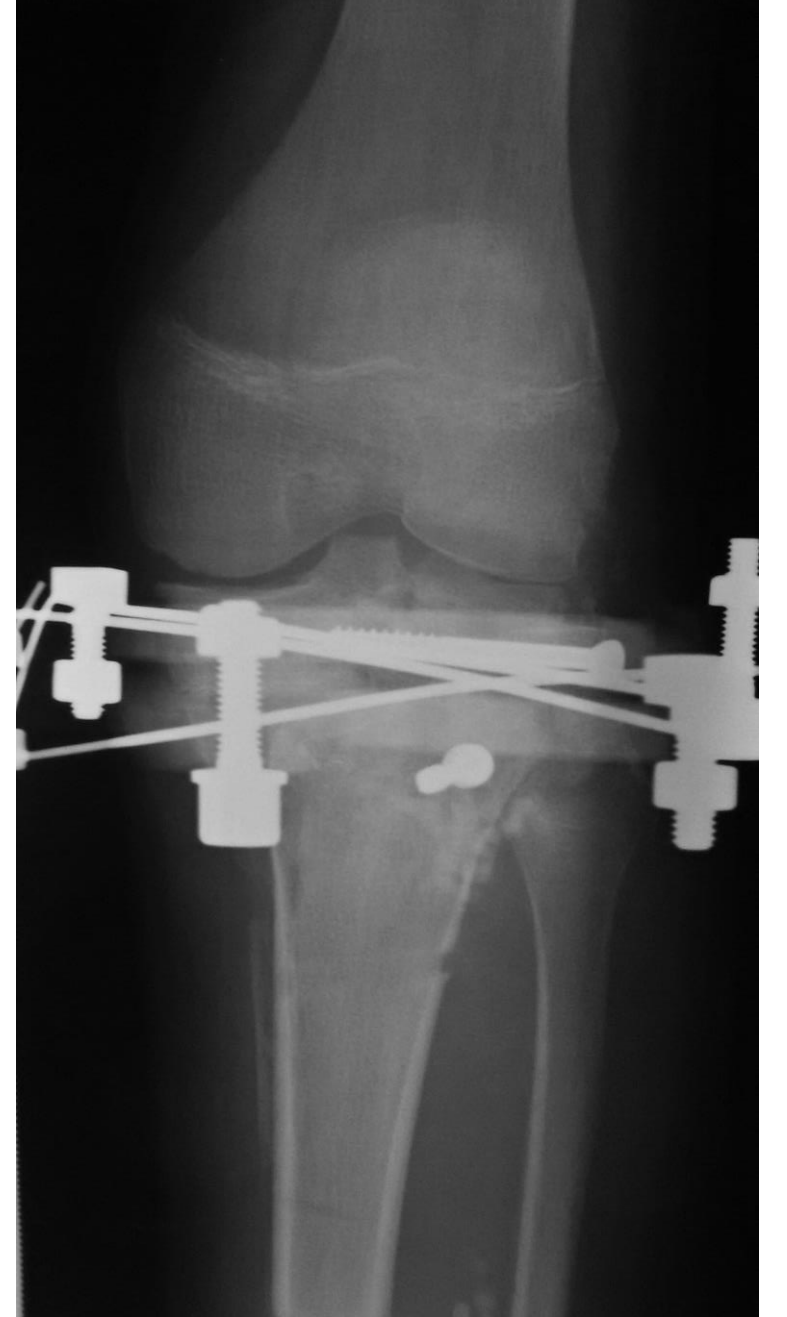








Intra articular open fracture



Gastrocnemius flap after Ilizarov frame





Problem with bone transport



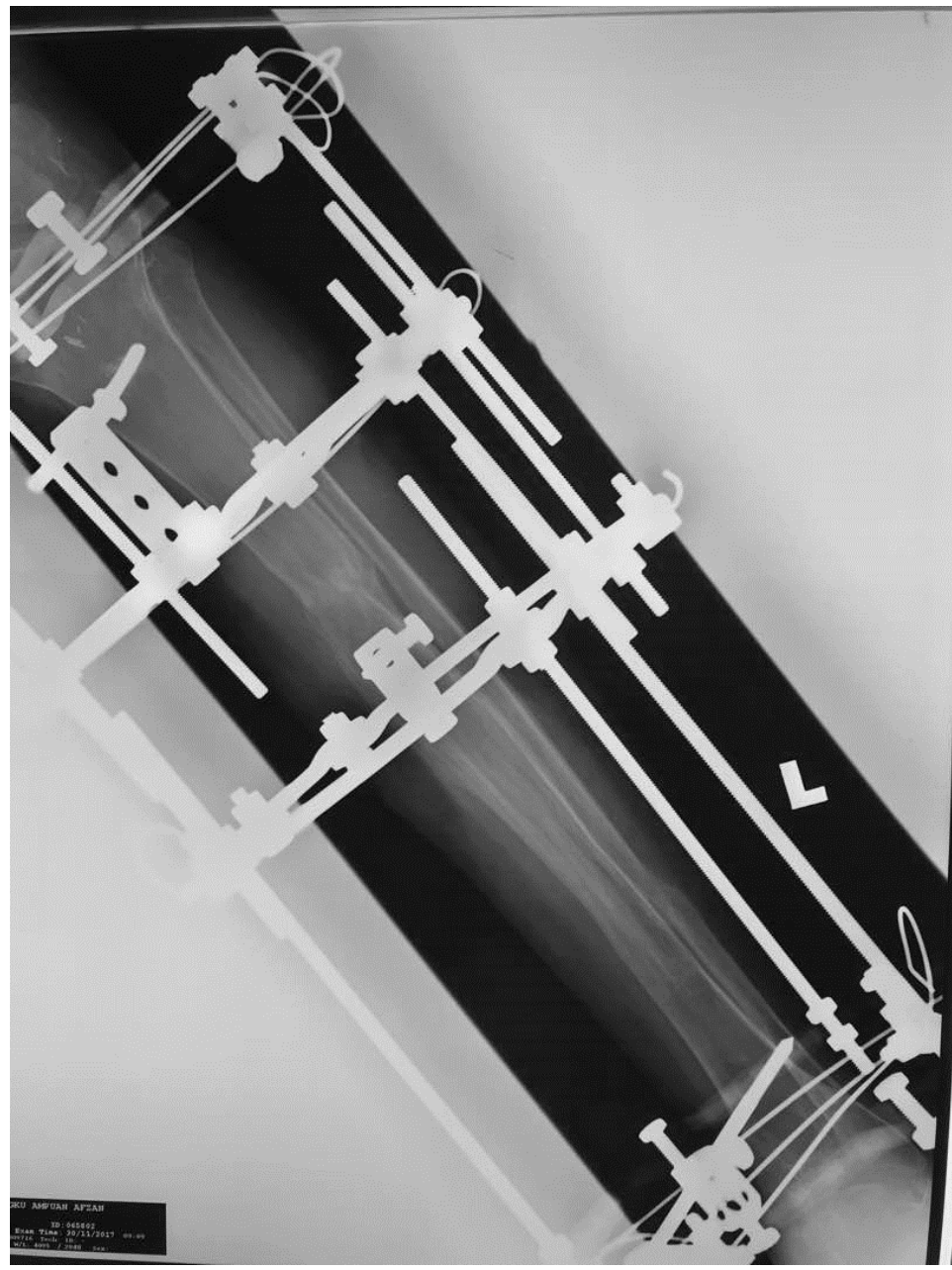
Retrograde bone transport



Footplate to prevent equinus



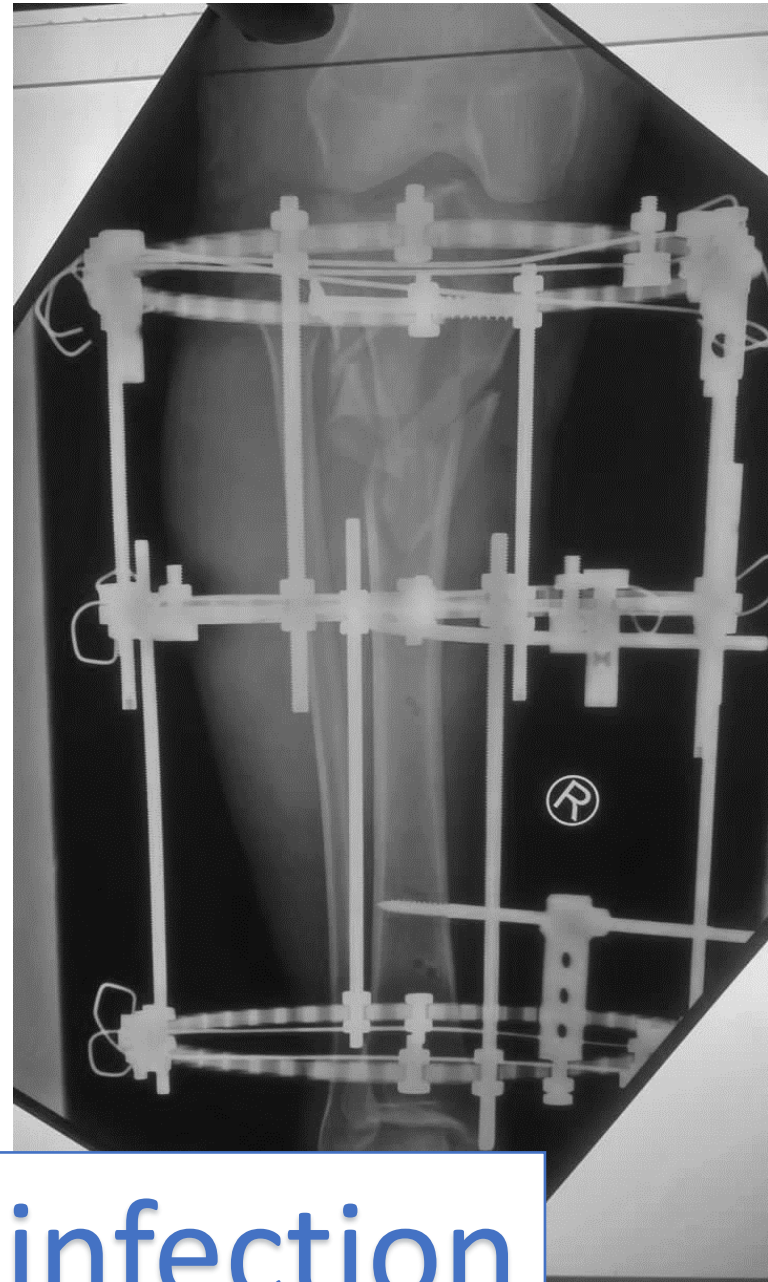
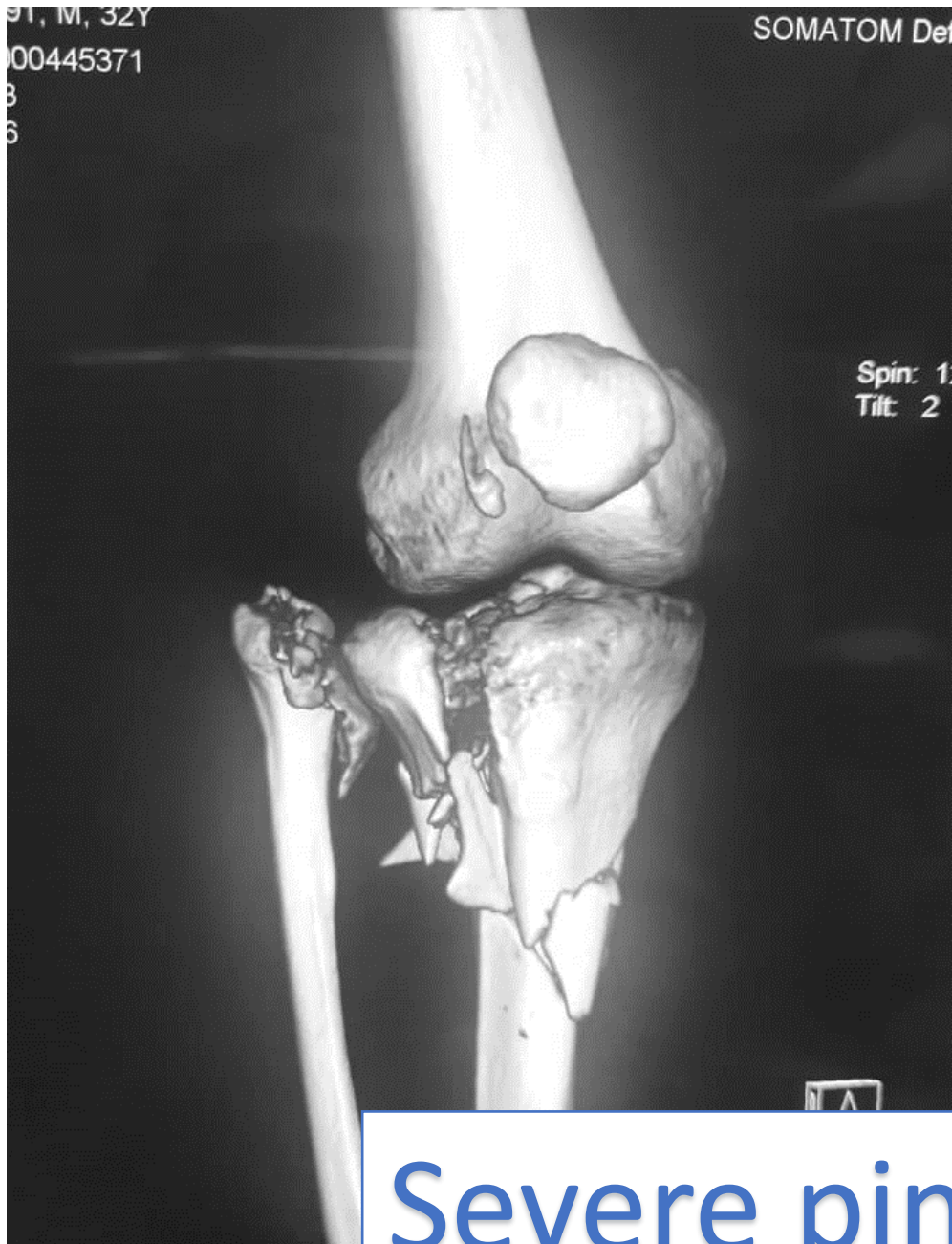
TA Lengthening and bone graft at docking



Ankle equinus







Severe pin site infection



Hybrid fixator for easy access to flap surgery



Patient-centered care







Take home message

- External fixator
 - Temporary stabilization
 - Timing
 - Pin placement
 - **Protect the joint**
 - Definitive fixation
 - Severe comminution
 - Bone transport
 - Wound reconstruction

