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# *Comminutive patellar fracture*



## MECHANISM

### Direct trauma, anterior aspect ++++

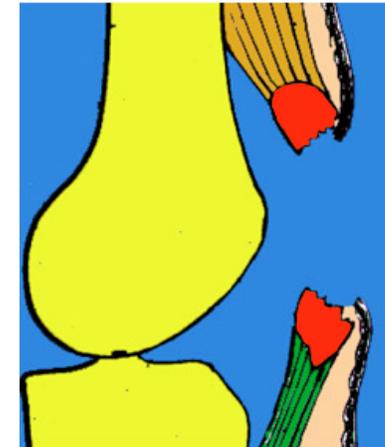
- Knee flexed, quadriceps contracted: displaced fracture
- **Compression against condyles/trochlea: comminuted fracture**
- Knee in extension: non-displaced fracture



### Indirect trauma

(violent contraction of the quadriceps)

- Avulsion of the quadriceps
- Horizontal fatigue fracture (athlete)
- Sleeve fracture (child)



## Clinical examination:

- Large knee
- Functional impotence
- May be partial
- Front pain
- Associated lesions ++



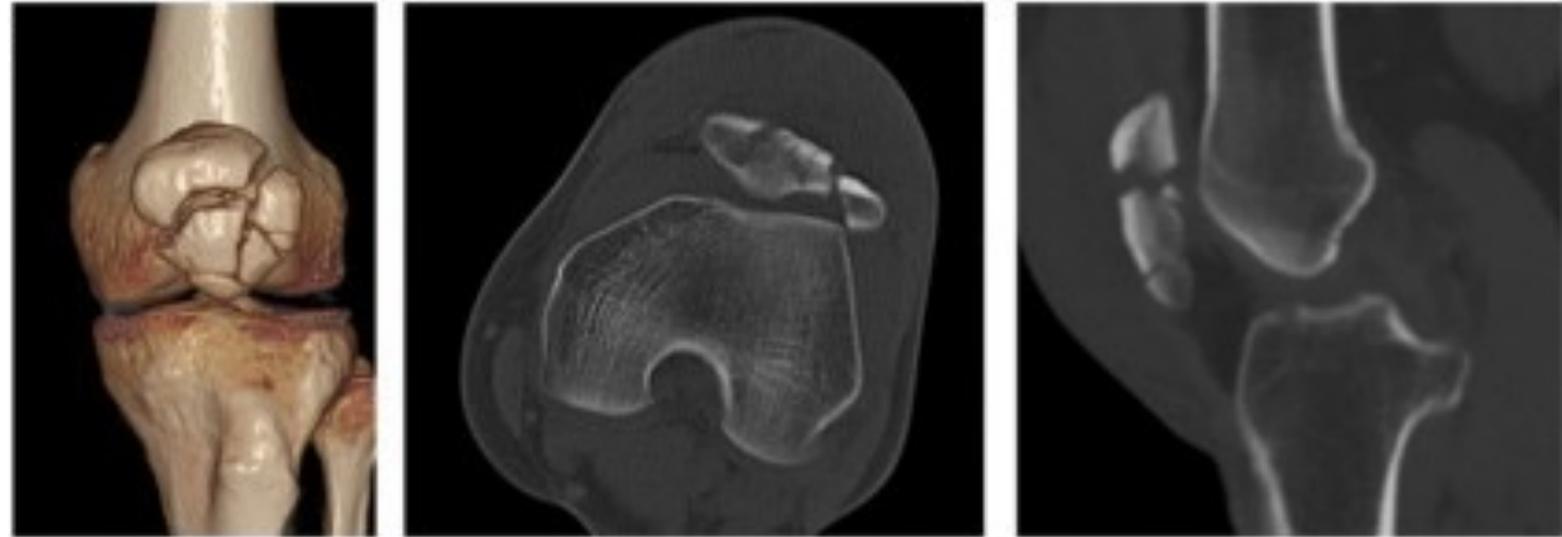
## X-rays

- Face + Profil
- confirm diagnosis



## CT scan

- pre op vizualisation, 3D+++



## Associated lesions

25% skin lesions

6% open fracture

5% ligament injury (3% PCL)

12% associated limb fracture





Non operative treatment

Surgical treatment

Treatment of complications

## Non operative treatment

debatable

### INDICATIONS:

- No discontinuity of extensor mechanism
- + Stable fracture (Rx profile at 60° flexion)
- + Joint step  $\leq 1\text{mm}$
- + Interfragmentary diastasis  $\leq 1\text{mm}$



## Non operative treatment

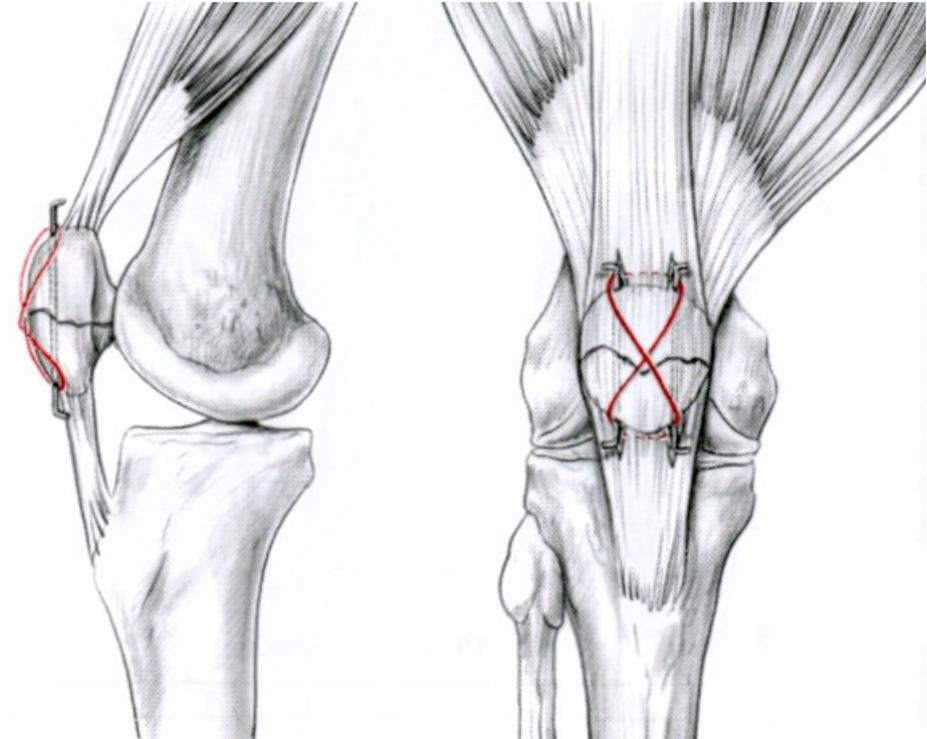
- Bracing 6 weeks
- Full weight bearing with brace
- Rehabilitation: passive
  - 0-30° 15J
  - 0-60° 15J
  - 0-90° 15J
- Regular follow-up: D7, D45...



## Surgical treatment

### INDICATIONS:

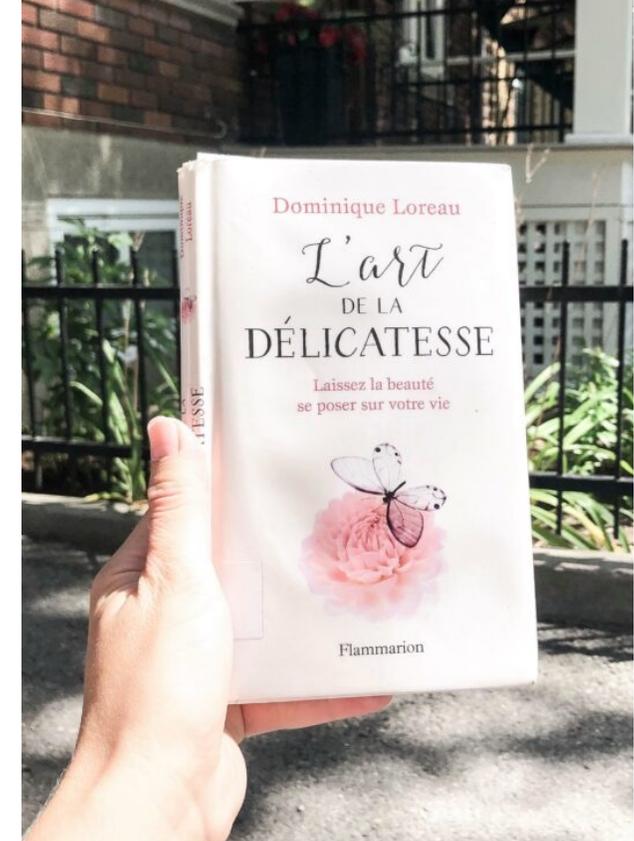
- discontinuity of extensor mechanism
- Unstable fracture
- Joint step  $\geq 1\text{m}$
- Interfragmentary diastasis  $\geq 1\text{mm}$



## Surgical treatment

RULES: be delicate and cautious+++

- Skin is your friend: don't be aggressive
- Control the cartilage reduction
  - Small medial arthrotomy + digital palpation
    - « *a little finger is better than big promises* »
  - intraoperative fluoroscopy
- Always control the quad and patellar tendons



## Surgical treatment

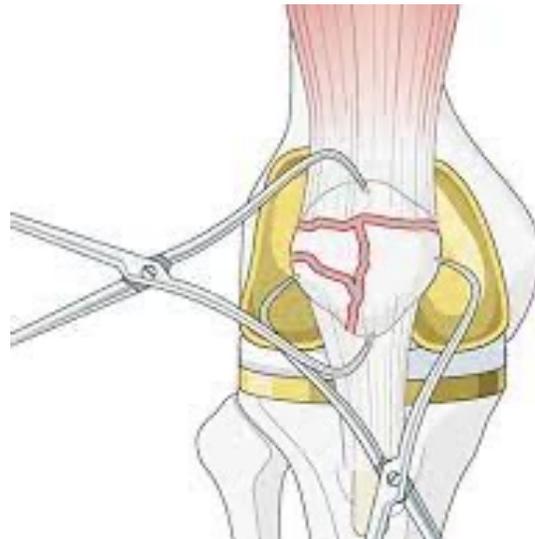
### REDUCTION

- use the periosteum
- pulled and sutured
- close the package



## Surgical treatment

- if periosteum is damaged:  
clamps  
+ temporary K wire :1mm to 1.5mm

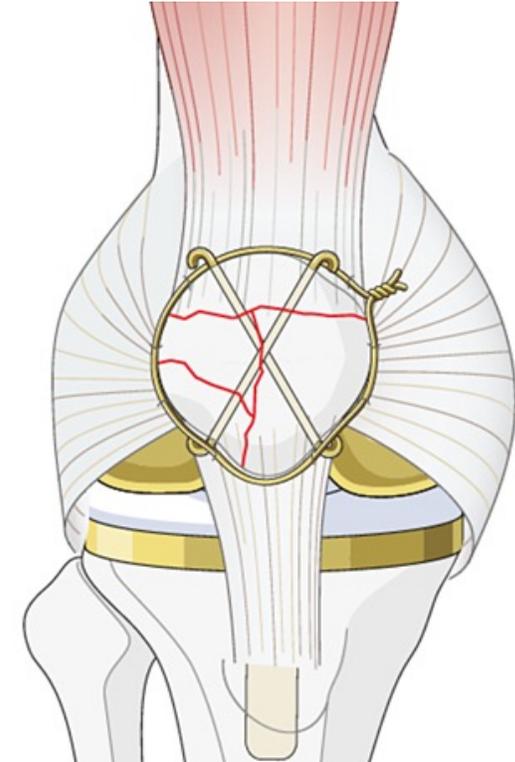


## Surgical treatment

### OPTIONS for FIXATION:

- **K-wire + cerclage**
- Titanium cerclage
- Lag screws + cerclage
- Cannulated Screw + tension bands
- Plate
- Patellectomy: partial, total

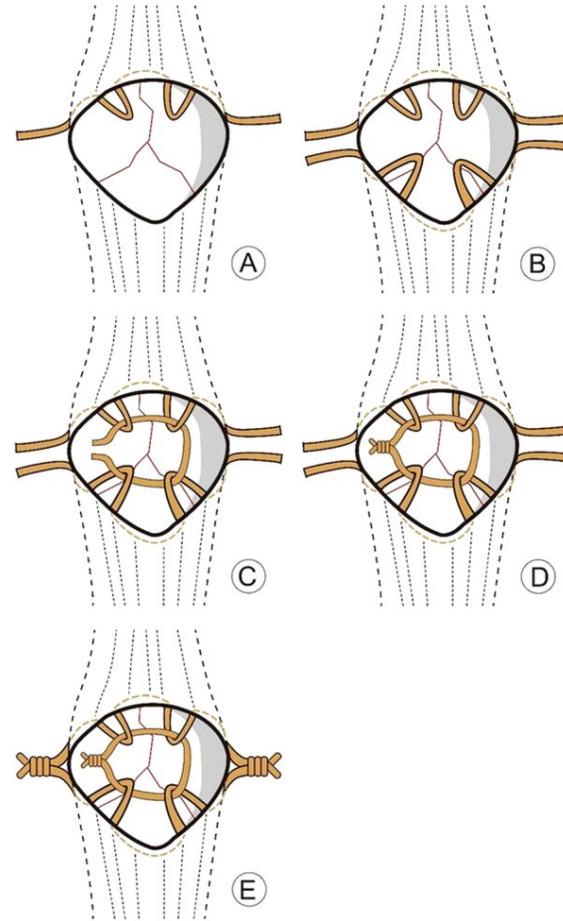
Equatorial cerclage  
> figure 8



## Surgical treatment

### OPTIONS:

- K-wire + cerclage
- **Titanium cerclage**
- Lag screws + cerclage
- Cannulated Screw + tension bands
- Plate
- Patellectomy: partial, total

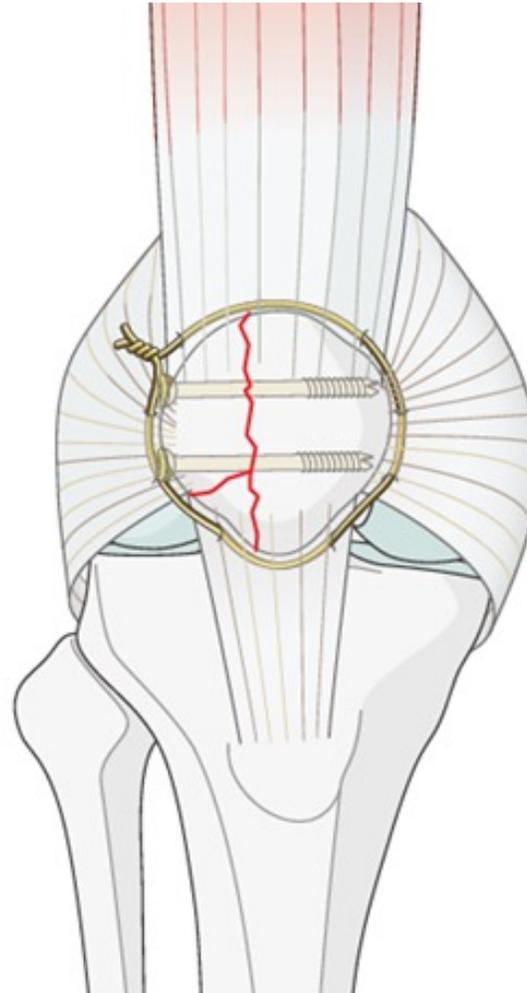


## Surgical treatment

### OPTIONS:

- K-wire + cerclage
- Titanium cerclage
- **Lag screws + cerclage**
- Cannulated Screw + tension bands
- Plate
- Patellectomy: partial, total

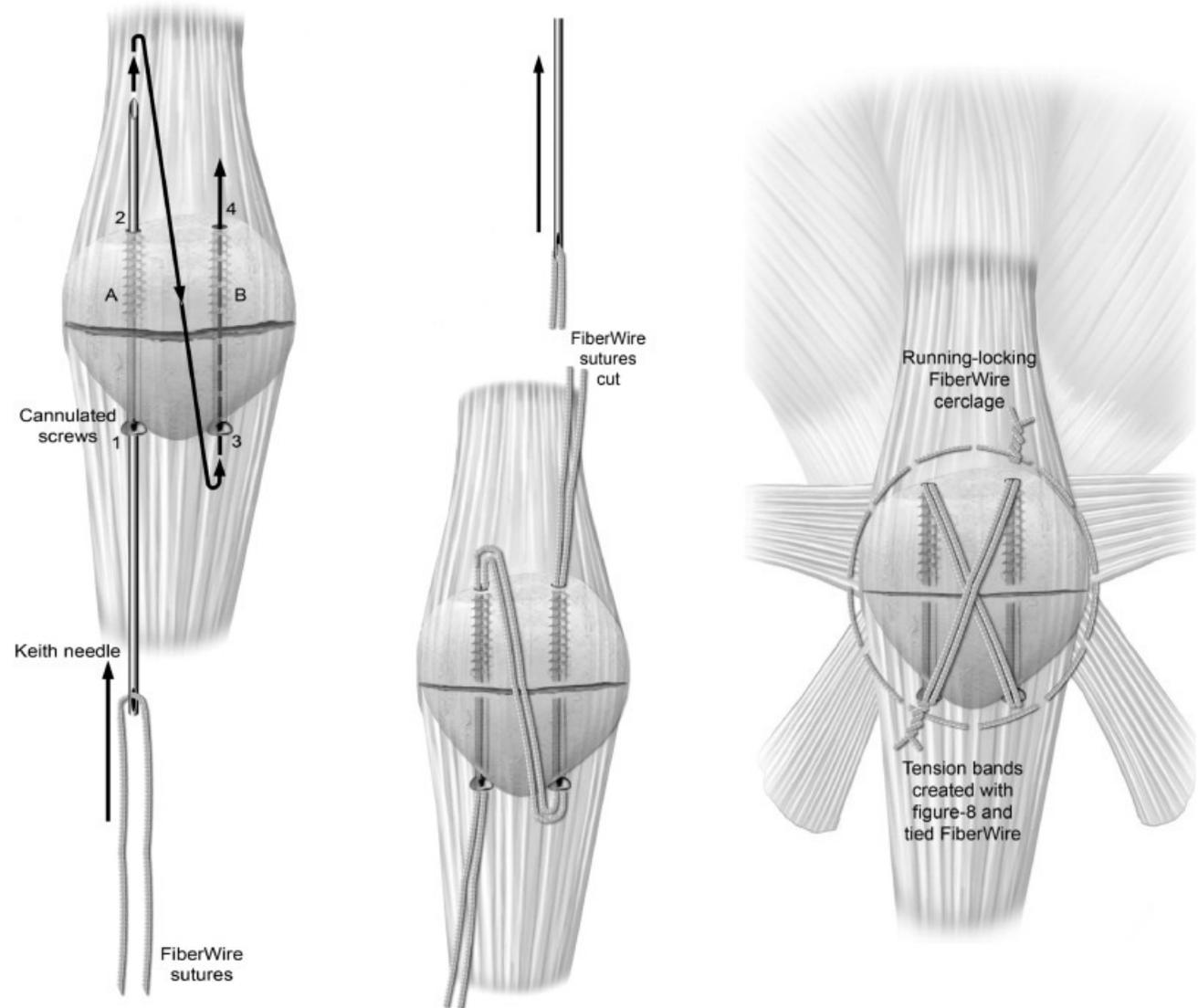
**Compression screws  
(foot & ankle)  
rarely isolated in comminutive fracture  
+/- Equatorial cerclage  
+/- K wire**



## Surgical treatment

### OPTIONS:

- K-wire + cerclage
- Titanium cerclage
- Lag screws + cerclage
- **Cannulated Screw  
+ tension bands**
- Plate
- Patellectomy: partial, total

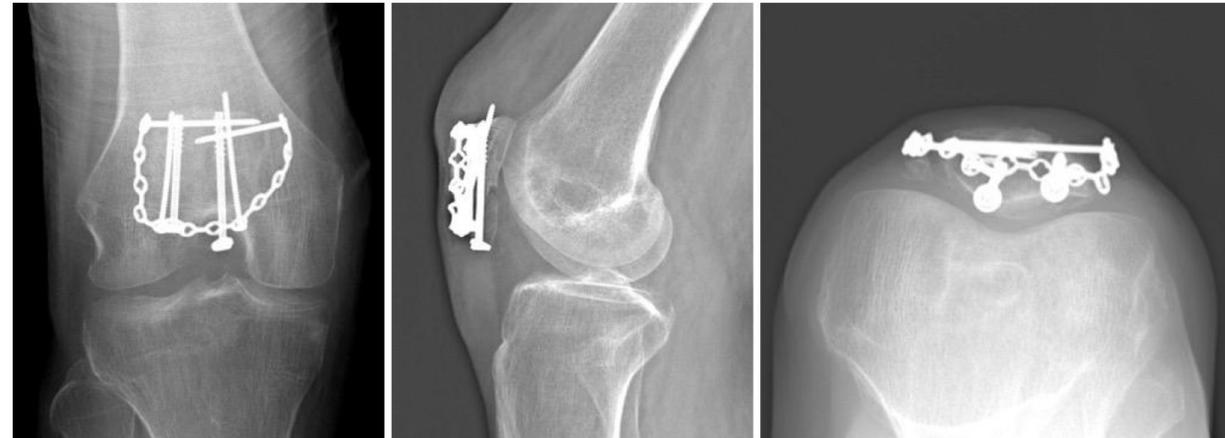


## Surgical treatment

Be careful of the skin

### OPTIONS:

- K-wire + cerclage
- Titanium cerclage
- Lag screws +/- cerclage
- Cannulated Screw +/- tension bands
- **Plate**
- Patellectomy: partial, total



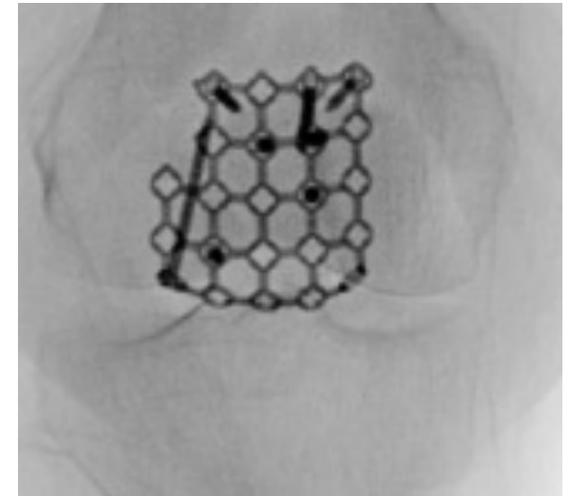
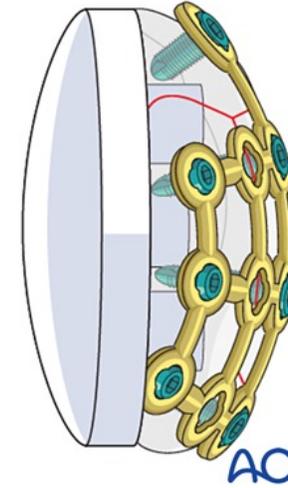
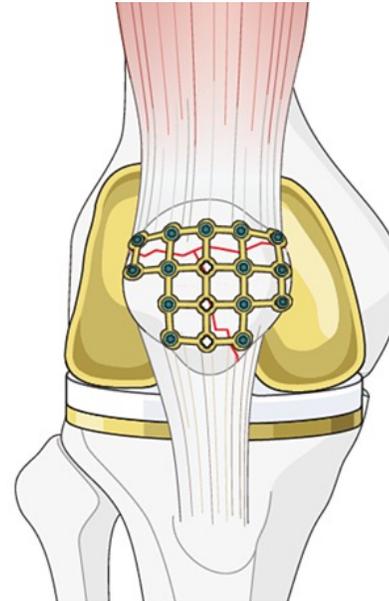
patella rim plate

## Surgical treatment

### OPTIONS:

- K-wire + cerclage
- Titanium cerclage
- Lag screws +/- cerclage
- Cannulated Screw +/- tension bands
- **Plate**
- Patellectomy: partial, total

**locking plating**

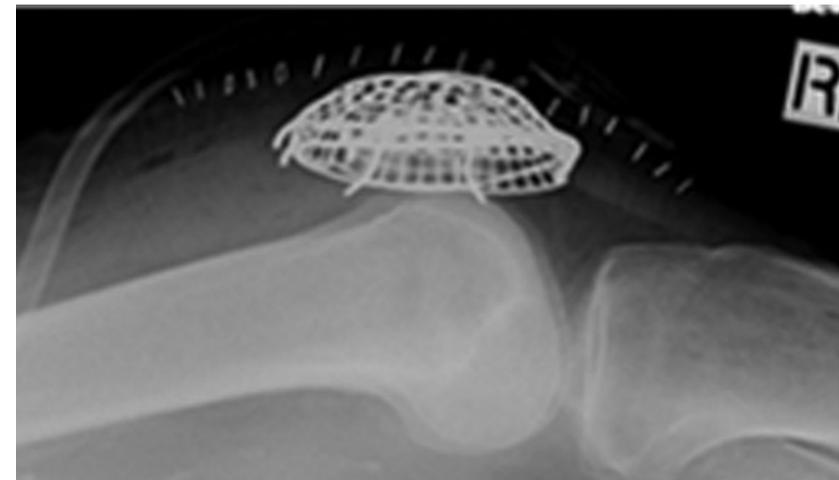
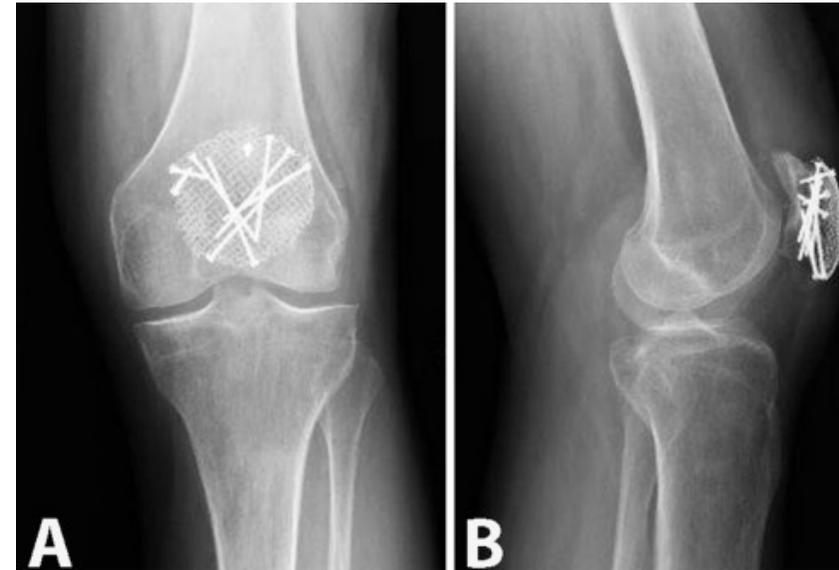


## Surgical treatment

### OPTIONS:

- K-wire + cerclage
- Titanium cerclage
- Lag screws +/- cerclage
- Cannulated Screw +/- tension bands
- **Plate**
- Patellectomy: partial, total

**mesh plating**



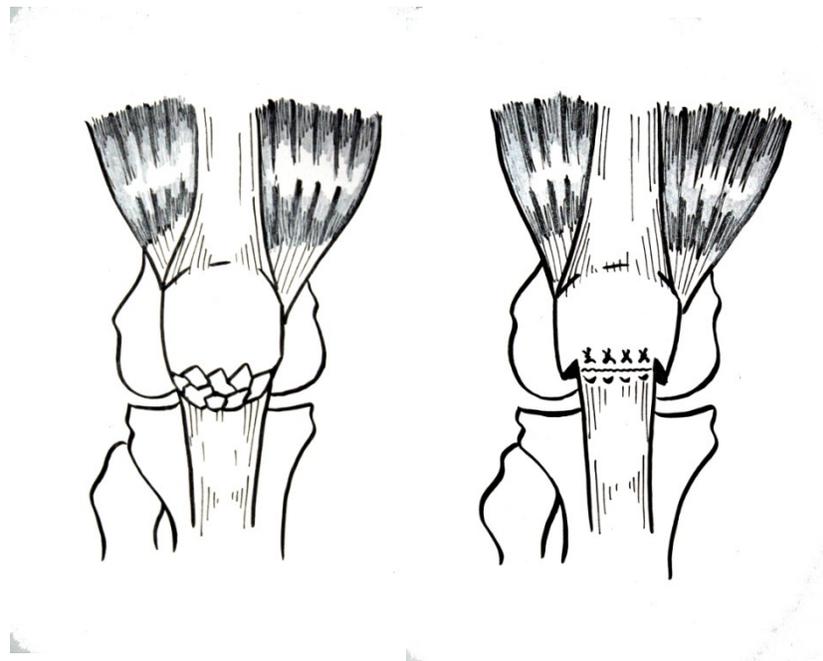
## Surgical treatment

### OPTIONS:

- K-wire + cerclage
- Titanium cerclage
- Lag screws +/- cerclage
- Cannulated Screw +/- tension bands
- Plate
- **Patellectomy: partial**

If highly comminutive fracture of Proximal or distal

Then: reinsertion of the QT or PT



## Surgical treatment

### OPTIONS:

- K-wire + cerclage
- Titanium cerclage
- Lag screws +/- cerclage
- Cannulated Screw +/- tension bands
- Plate
- **Patellectomy: total**



To avoid+++  
Last solution

## Skin issues

- PREVENTION+++
- Be careful
- from incision to closure
- plate





## Stiffness in flexion

- Mobilisation under anesthesia < 3 months
  - Arthrolysis / arthroscopy > 3 months
- + equipment removal (after 6 months)

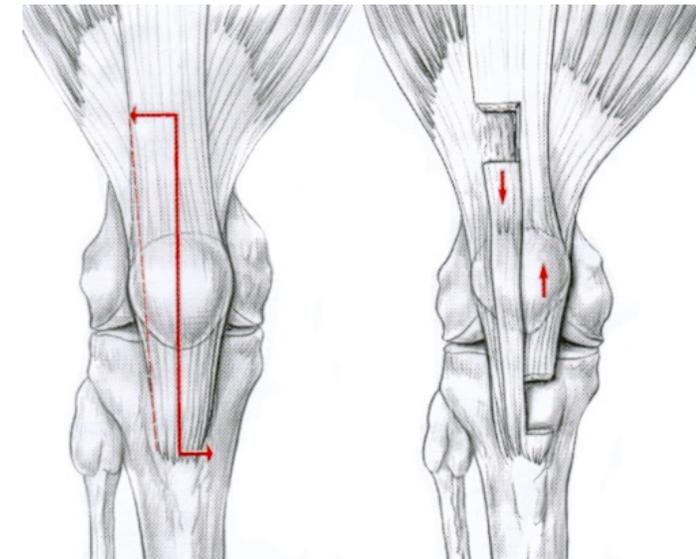
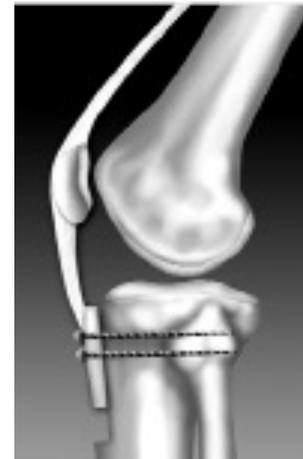
## Patella Baja

Anterior knee pain

Caton-Deschamps index  $< 0.6$

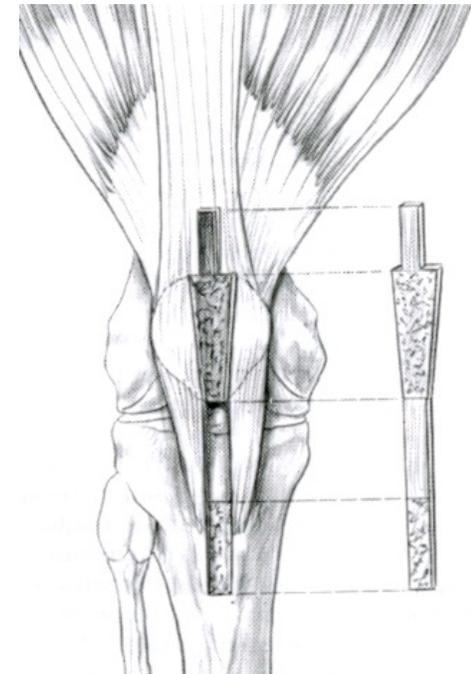
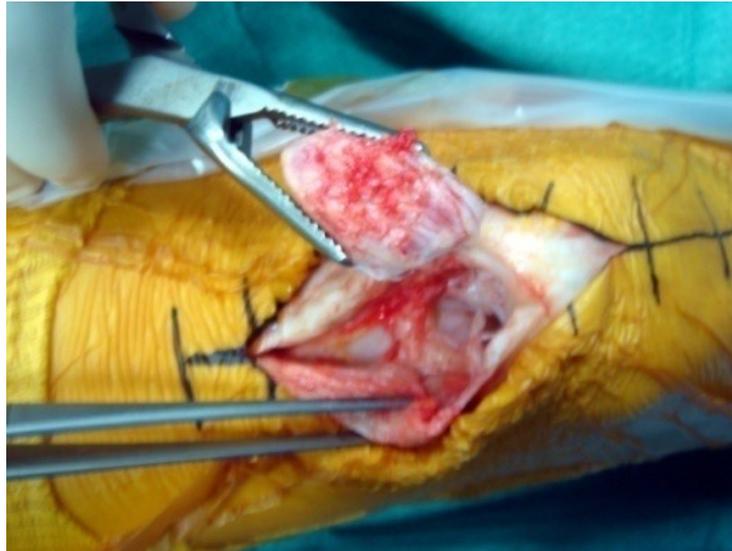


- TT transfer
- Patellar tendon lengthening

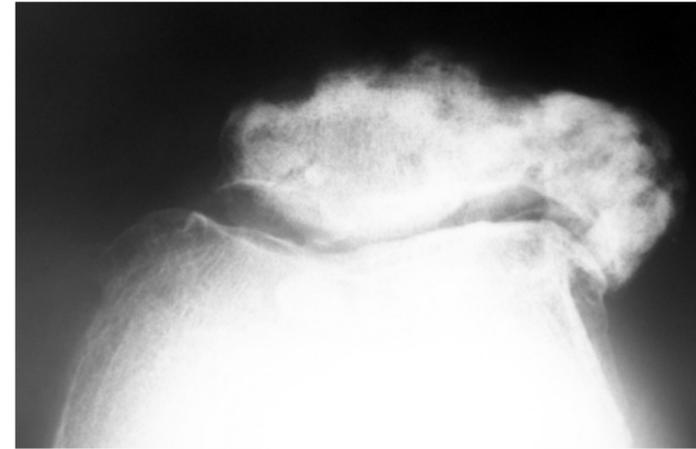
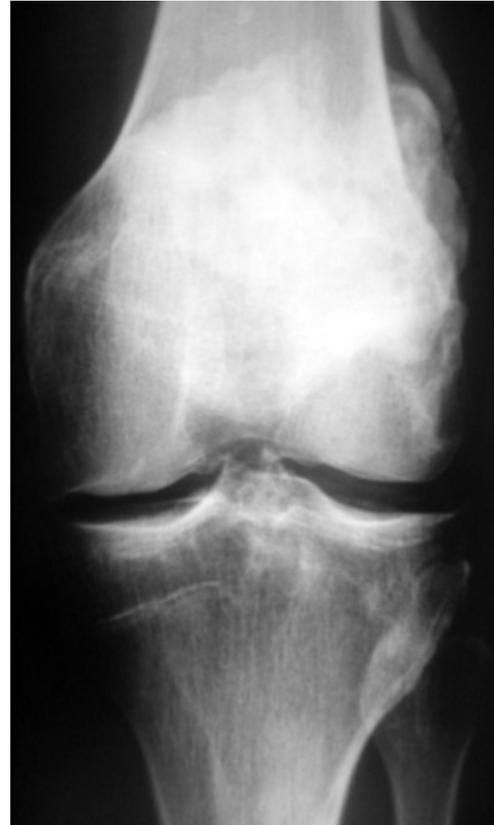


## non-union

Non union treatment + graft



mal-union



Bone removal

## CONCLUSION – TAKE HOME MESSAGE



- **Direct** high energy trauma
- Diagnostic: Ask **CT-scan**
- Treatment is difficult
  - No winner
  - know **all the options** to choose the most adapted
  - respect rules : be careful of **skin**, small **arthrotomy** to check the cartilage reduction



*Thank you for your attention*

