

INJURIES AROUND ELBOW

DR ANURAG TIWARI

MBBS (MAMC), MS Ortho (MAMC), DNB, MNAMS

Fellow, Joint Replacement, University of Missouri, Columbia, USA

Orthopaedic Surgeon, Bhopal

- Isolated Fractures-

Radial Head #

Coronoid #

Olecranon #

- Elbow Dislocation-

Simple

Complex (# dislocation)

- Chronic Instability/ recurrent subluxation

Posterolateral Rotatory Instability (PLRI)

Posteromedial Rotatory Instability (PMRI)

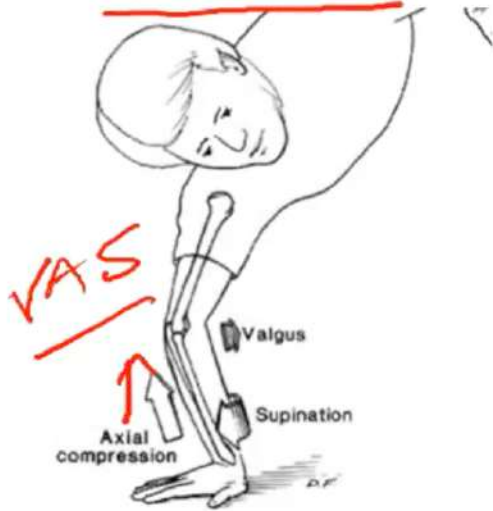


O'Driscoll- Morrey- Hotchkiss



Mechanism of injury

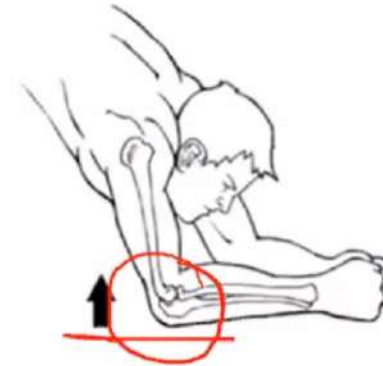
FOOSH



✓ Valgus Posterolateral Injury



✓ Varus Posteromedial Injury



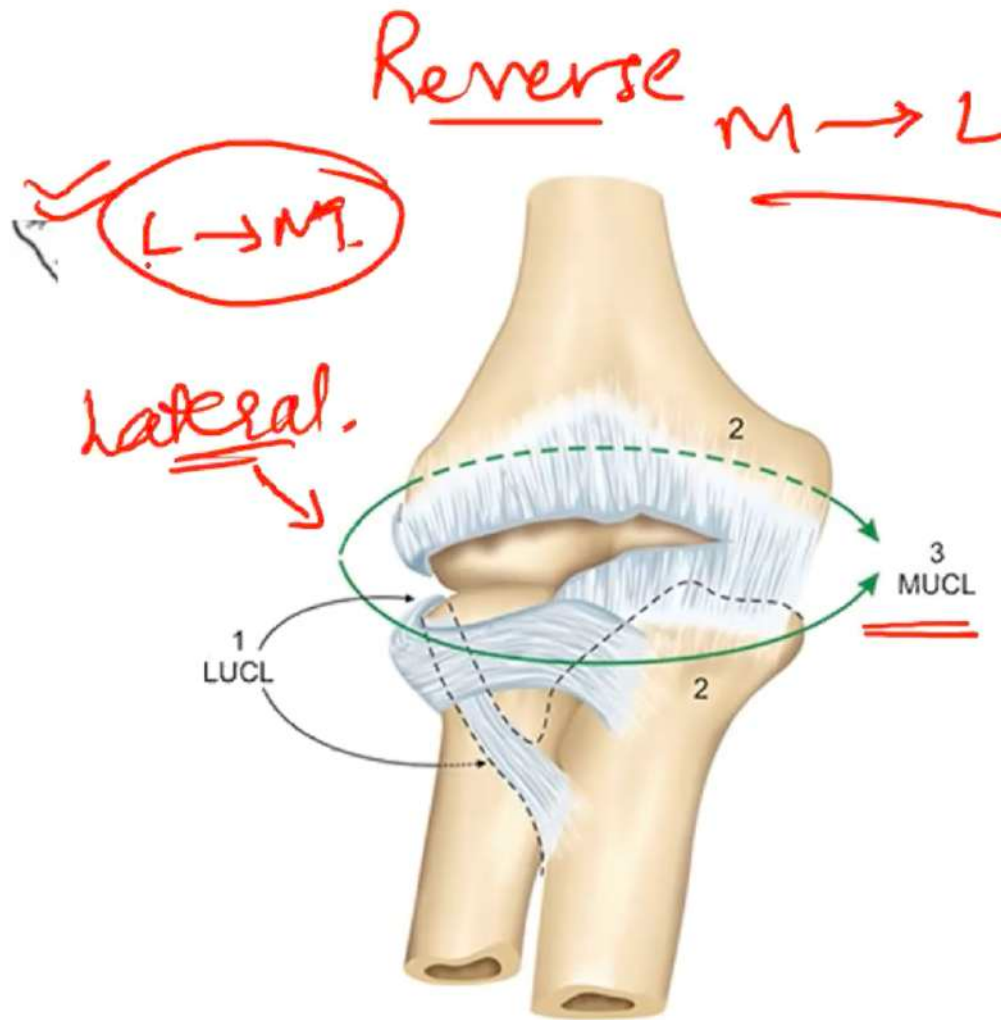
✓ Transolecranon # dislocation

INJURIES AROUND ELBOW: DR ANURAG TIWARI

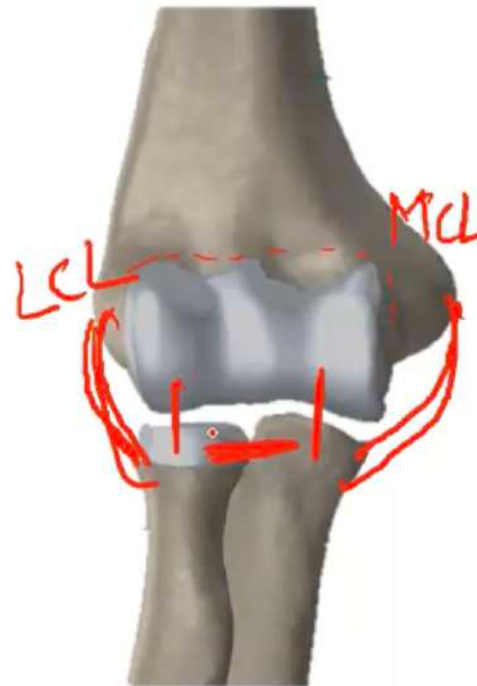
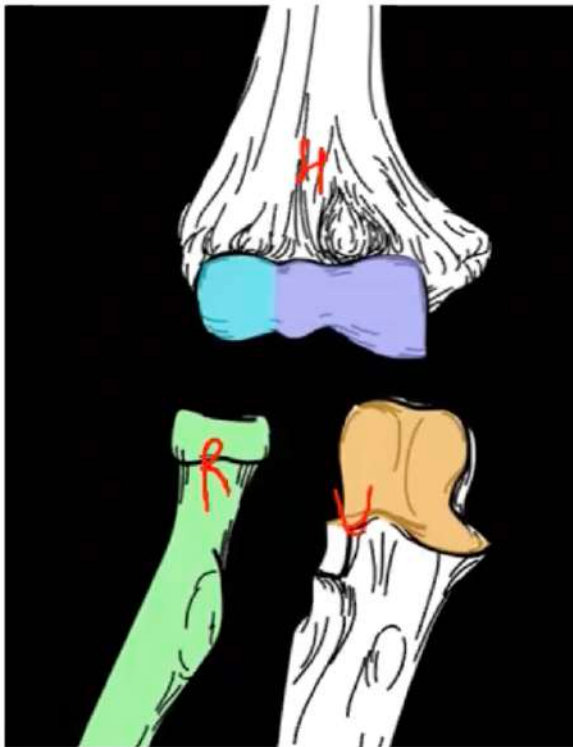
✓ Circle of Hori

FOOSH

VAS

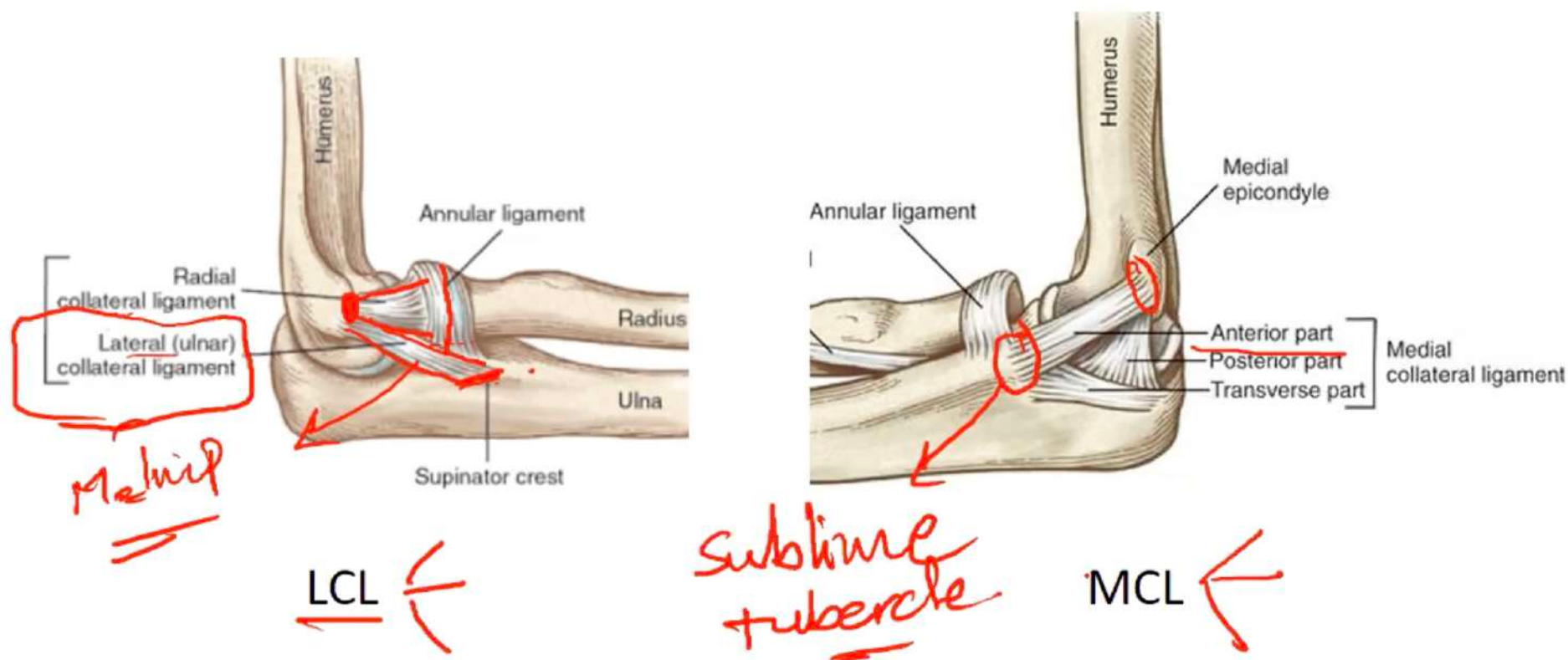


Anatomy of elbow

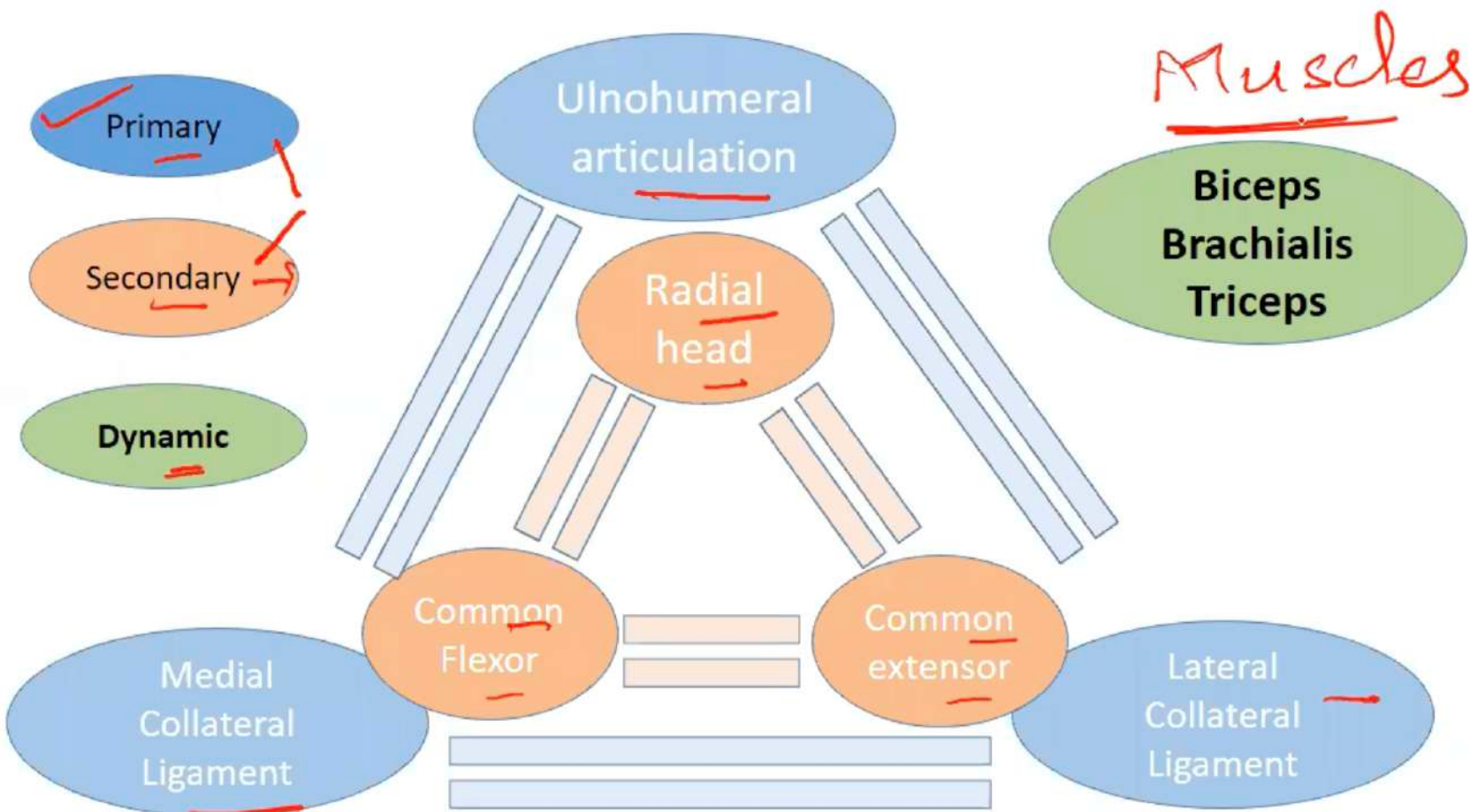


- 3 bones
- 3 joints
- 2 ligaments
- Capsule
- Rotatory hinge type of joint

Ligamentous anatomy



Stabilizers of elbow joint



FNB - 2015/16

• Most important structure contributing maximum to Varus stability?

• A. Radial head

• B. LUCL ligament → 86%.

• C. MCL ligament → 14%.

• D. Coronoid

↓ 70-80%

• Most important structure contributing valgus stability?

A. Coronoid

B. LUCL

C. Radial head

✓ D. MCL

- Varus stability - Coronoid >> LUCL
- Valgus stability – MCL ant band >> Radial head
- PLR stability- LUCL >> Radial head
- PMR stability - Ant MCL

Radial Head/ Neck

- ✓ Most common elbow # in adult
 - Young age 20-50 years
 - Females > Males
- Isolated #
- Component of Terrible triad

Mechanism of injury

- 3 mechanisms-

Valgus with MCL tear

PLRI with LCL tear

Axial impaction with DRUJ injury

✓
" Essex-Lopresti"
VAS



Clinical presentation

- Pain, swelling, echhymosis, tenderness etc
- Range of motion –

Restricted rotation (block)

Crepitus on rotation

Indications

Xray

- ✓ AP and Lateral views



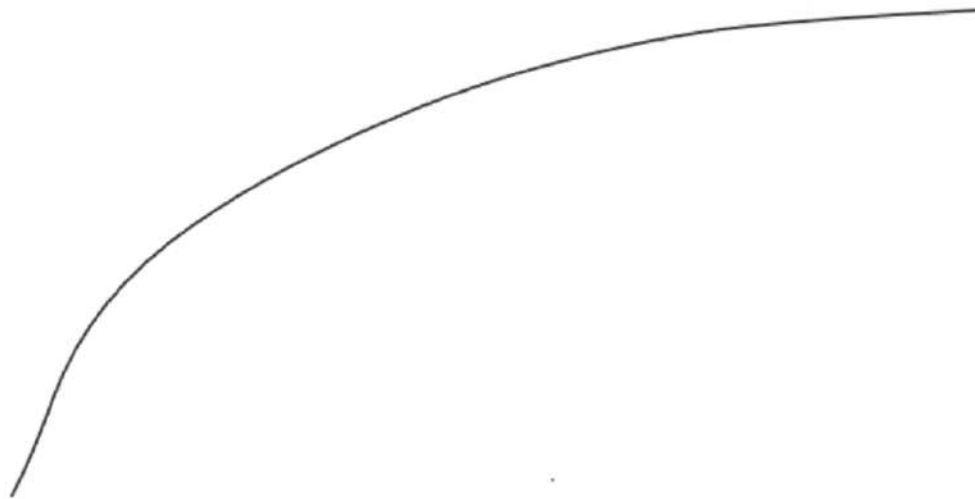
fat pad sign → Undisplaced #

Children
#s / humerus

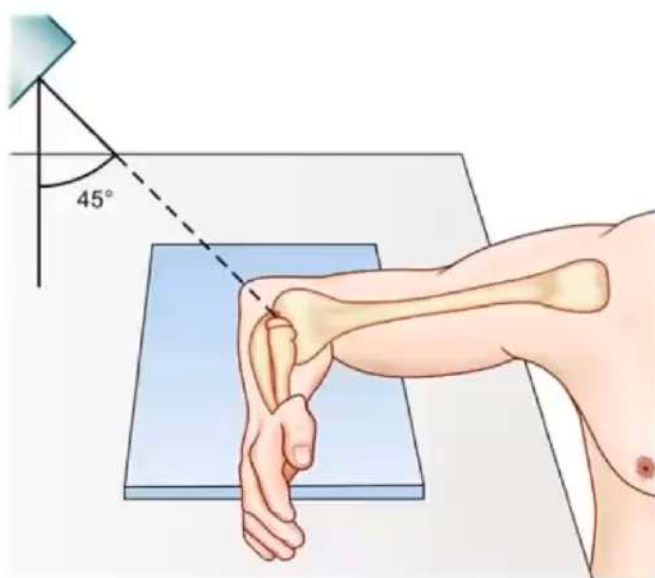
Adult
Radial Head #

Specific view for radial head/ Radiocapitellar jt

- A. 45° Caudad lateral view
- B. 45° Cephalad lateral view
- C. 45° cephalad AP view
- D. 45° caudad AP view



Greenspan view



CT



Classification-

• Mason

• Modified Mason



V → $< 2mm$
 $< 30\%$ art surf.



D → $> 2mm$
 $> 30\%$



C - Comminution

4



Treatment

- Non operative

Indications

Undisplaced #

No block to forearm rotation

No crepitus in forearm rotation

- Operative-

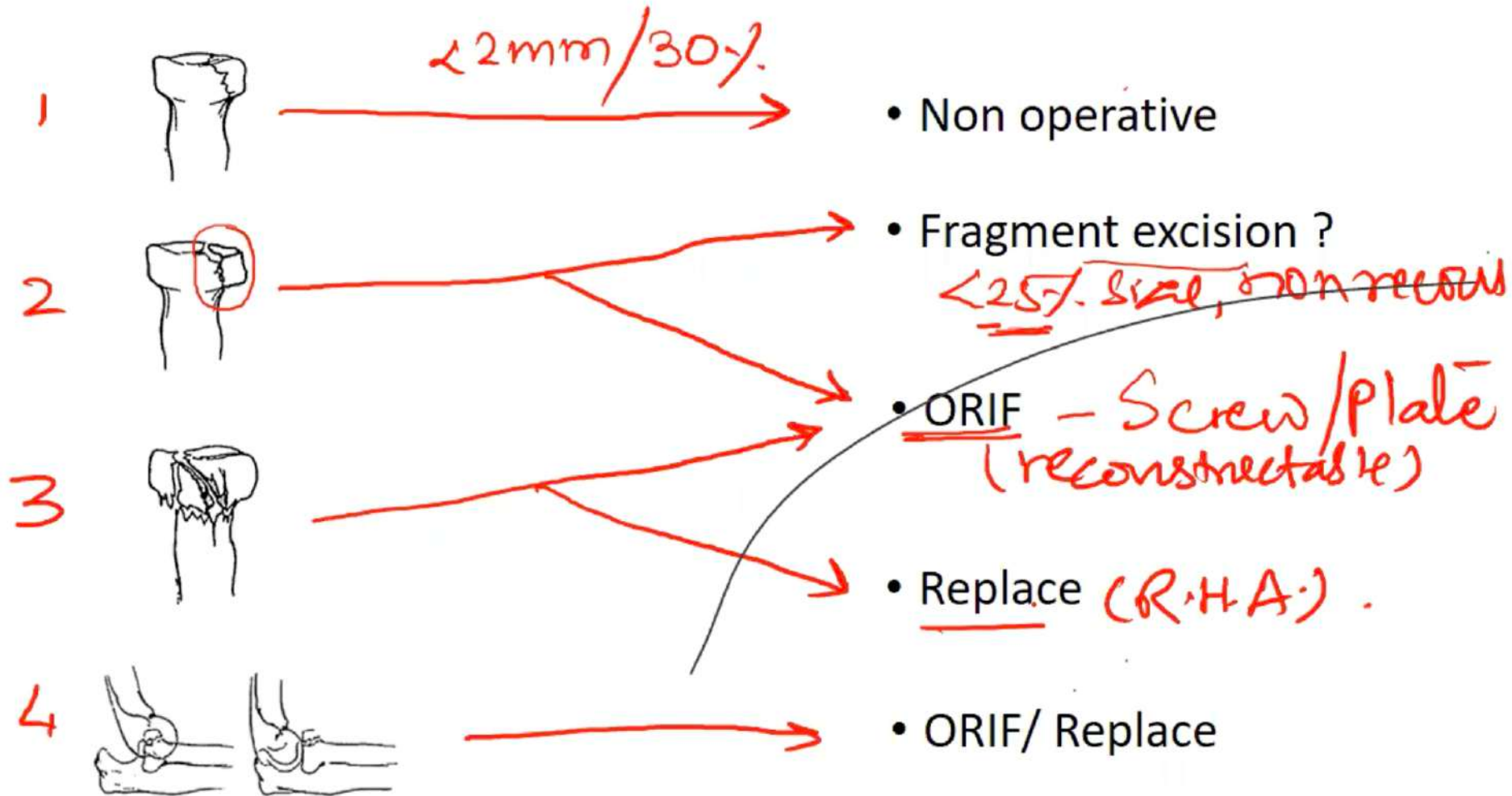
Non operative



- Simple sling for 3 days
- After 3 days → Start active motion

↓
Passive X-

Operative-

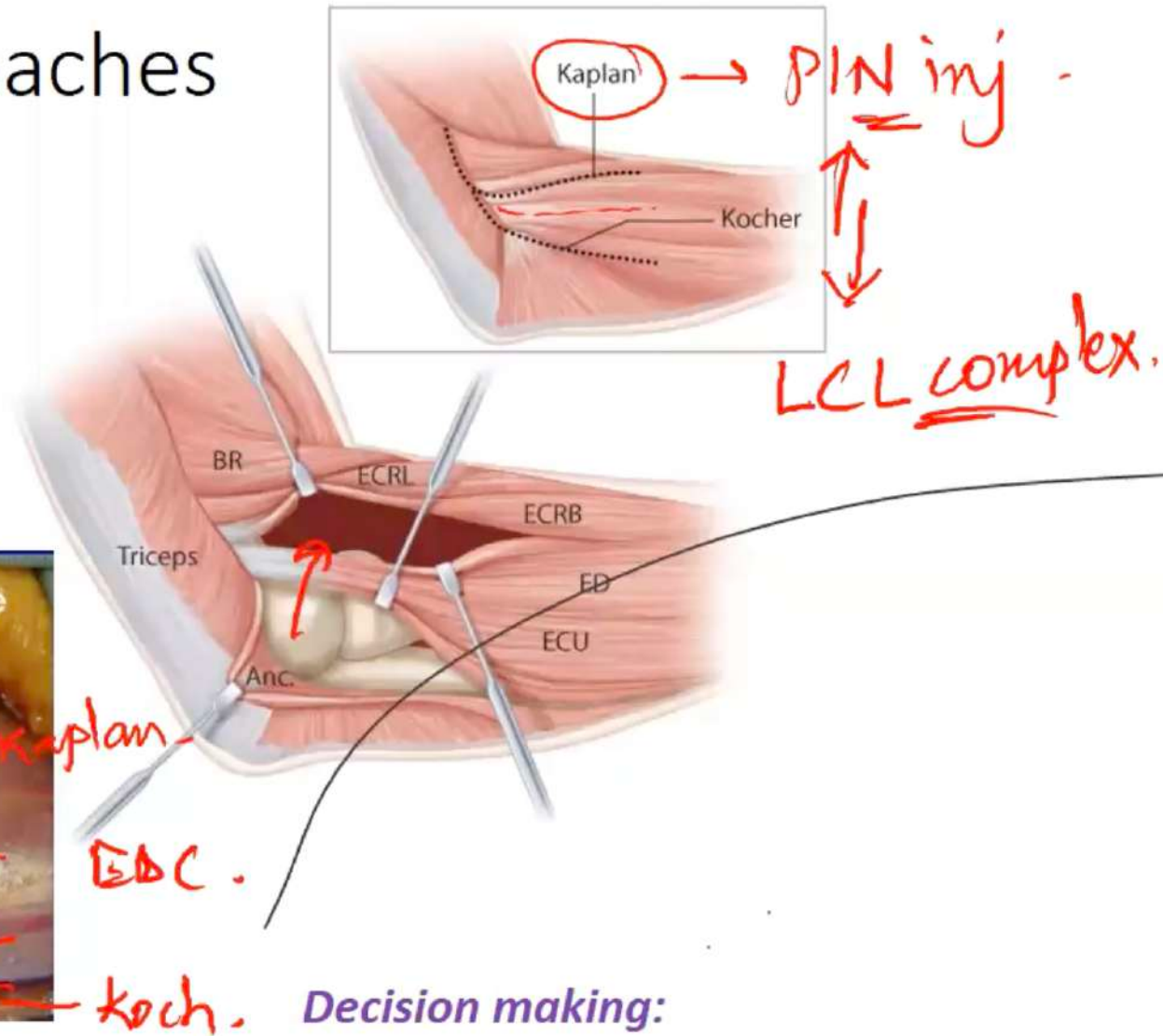
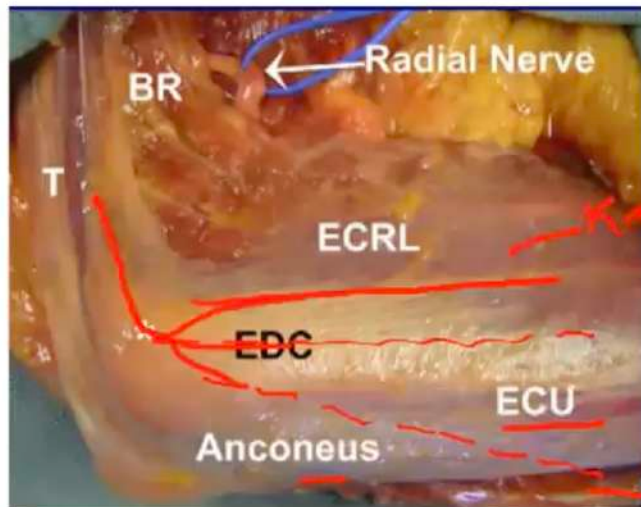


ORIF

- Approach ?
- Implant choice ?
- Position of plate ?
- How to avoid PIN injury ?
- Use of Indomethacin and /or radiation ?

Lateral Approaches

- Kocher
- EDC split
- Kaplan



Implant choice

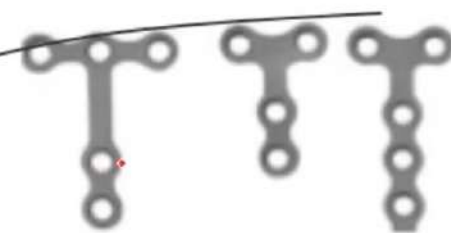
Head# Neck# -



1.5 or 2mm screws

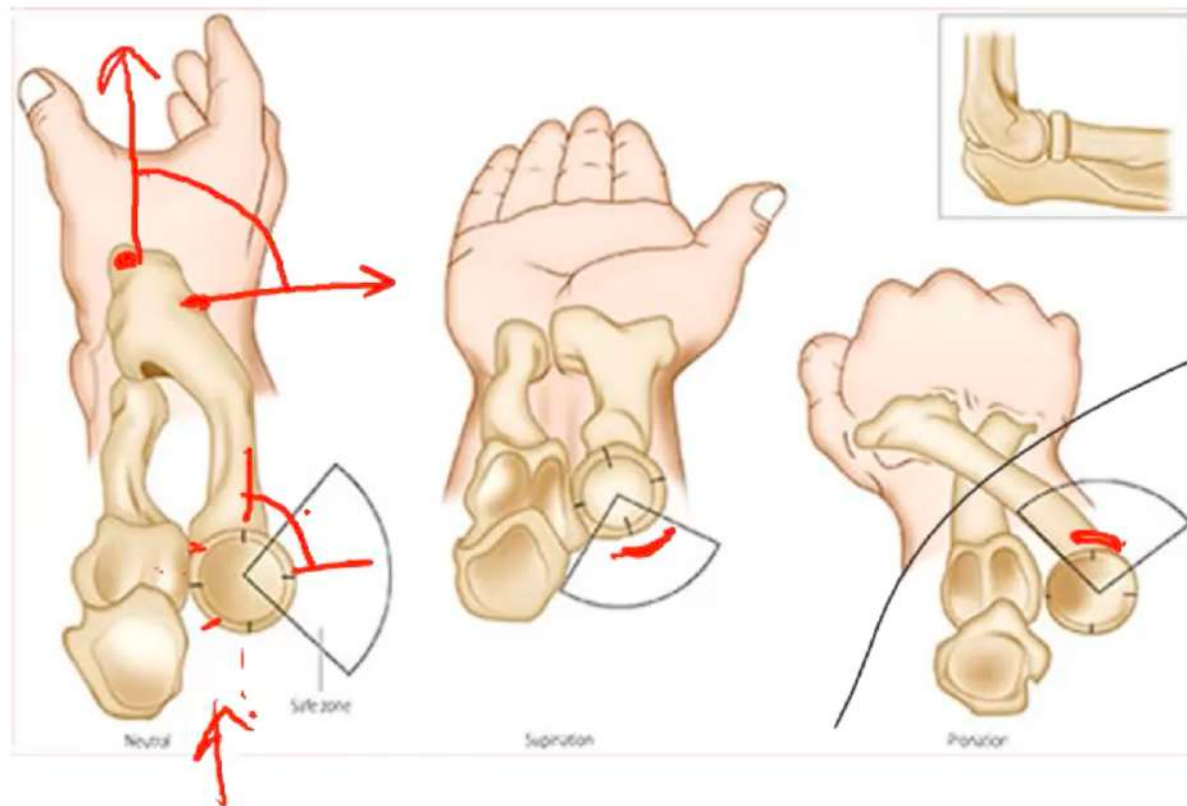


Radial head and neck plate



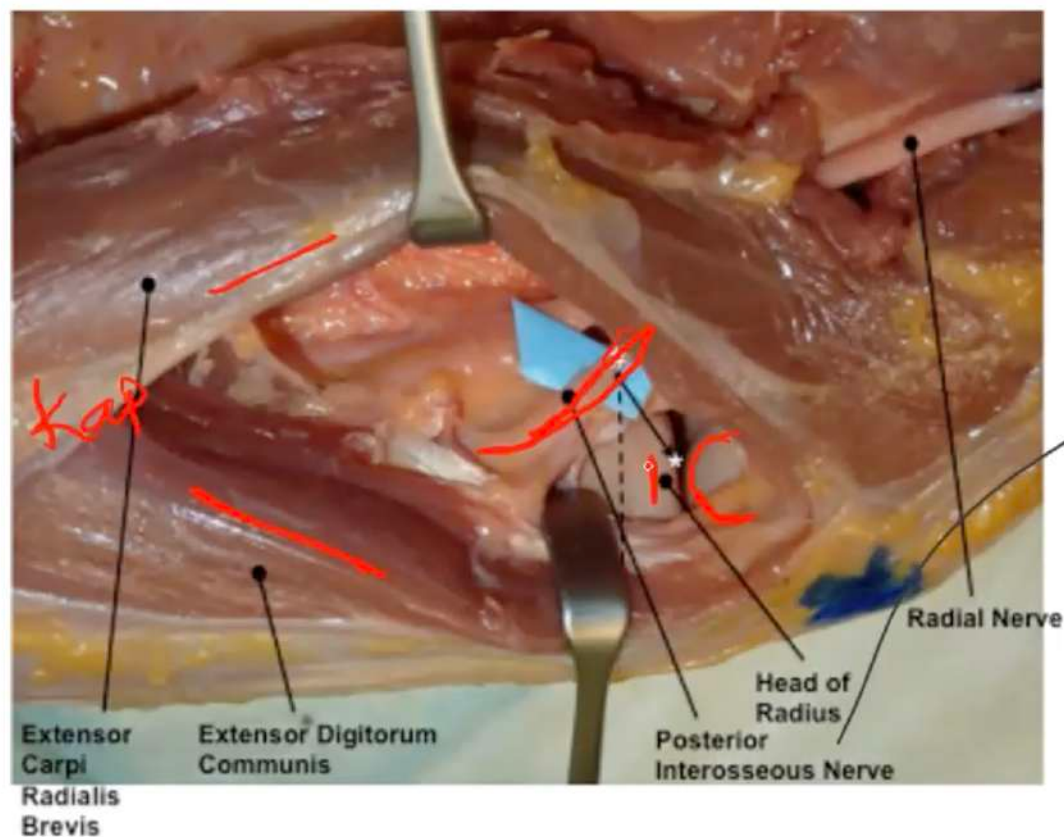
Mini T plate

Position of plate – Safe zone



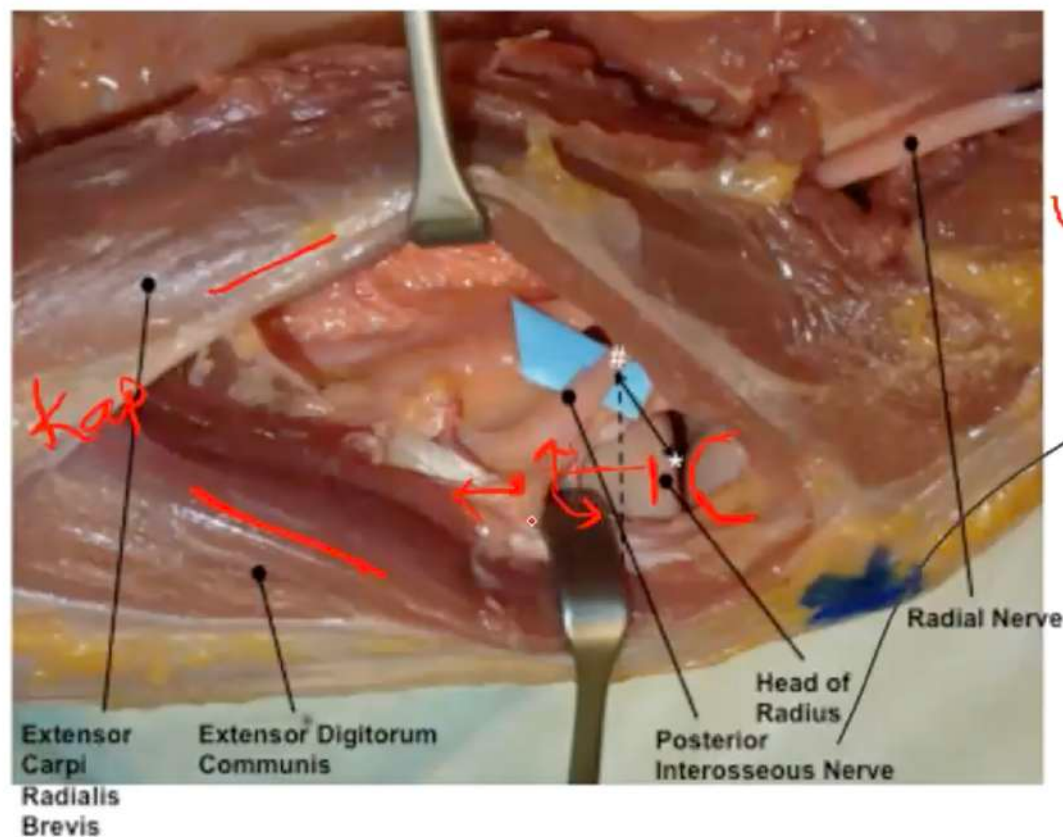
- ✓ Smith and Hotchkiss
- ✓ Caputo

PIN protection



- 3 tips-

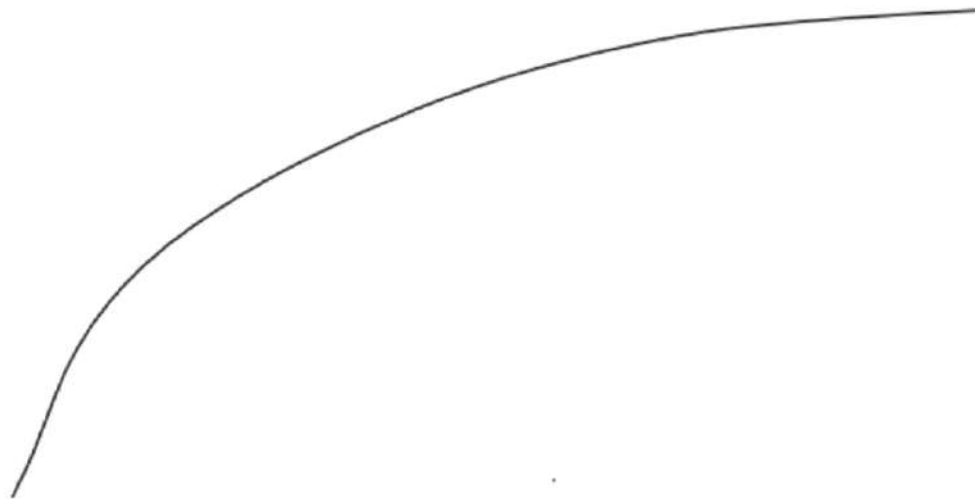
PIN protection



- 3 tips-
 - ✓ 1. Pronation
 2. No retractor on anterior side
 3. Don't dissect blindly especially distal to biceps insertion

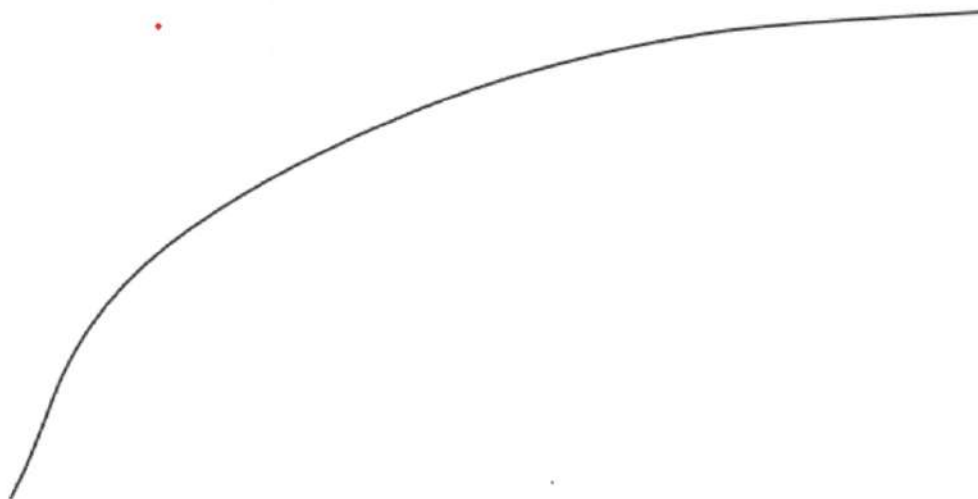
Radial head excision

- Primary excision without replacement is contraindicated



Radial Head arthroplasty

- Indications ?
- Size of prosthesis ?



DR IF →

- Indications-

- Comminuted # (3 or more fragments)
- Poor bone quality- Internal fixation is not good

Size selection/ measurement



dra-

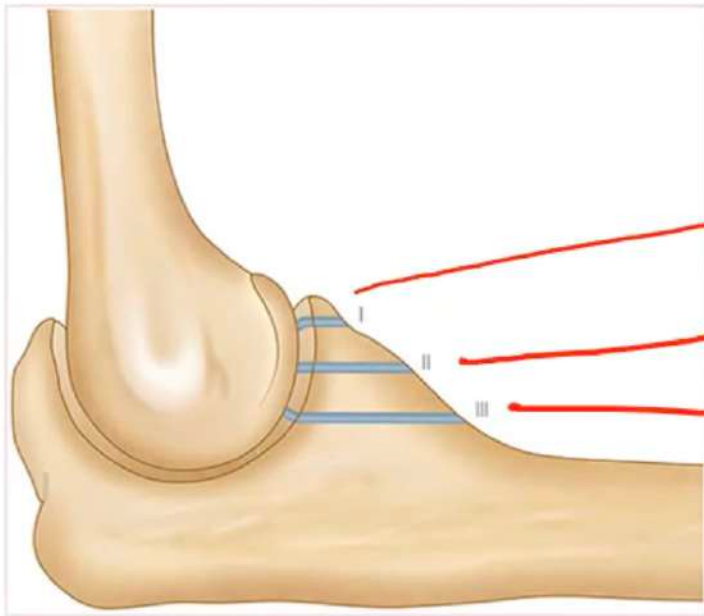
thickness

- ✓ If large size-
- If small-
- If in doubt -

- ✓ Overstuffing of joint → Capitellar surface erosion
- Valgus instability
- prefer smaller size

Classification

Regan and Morrey

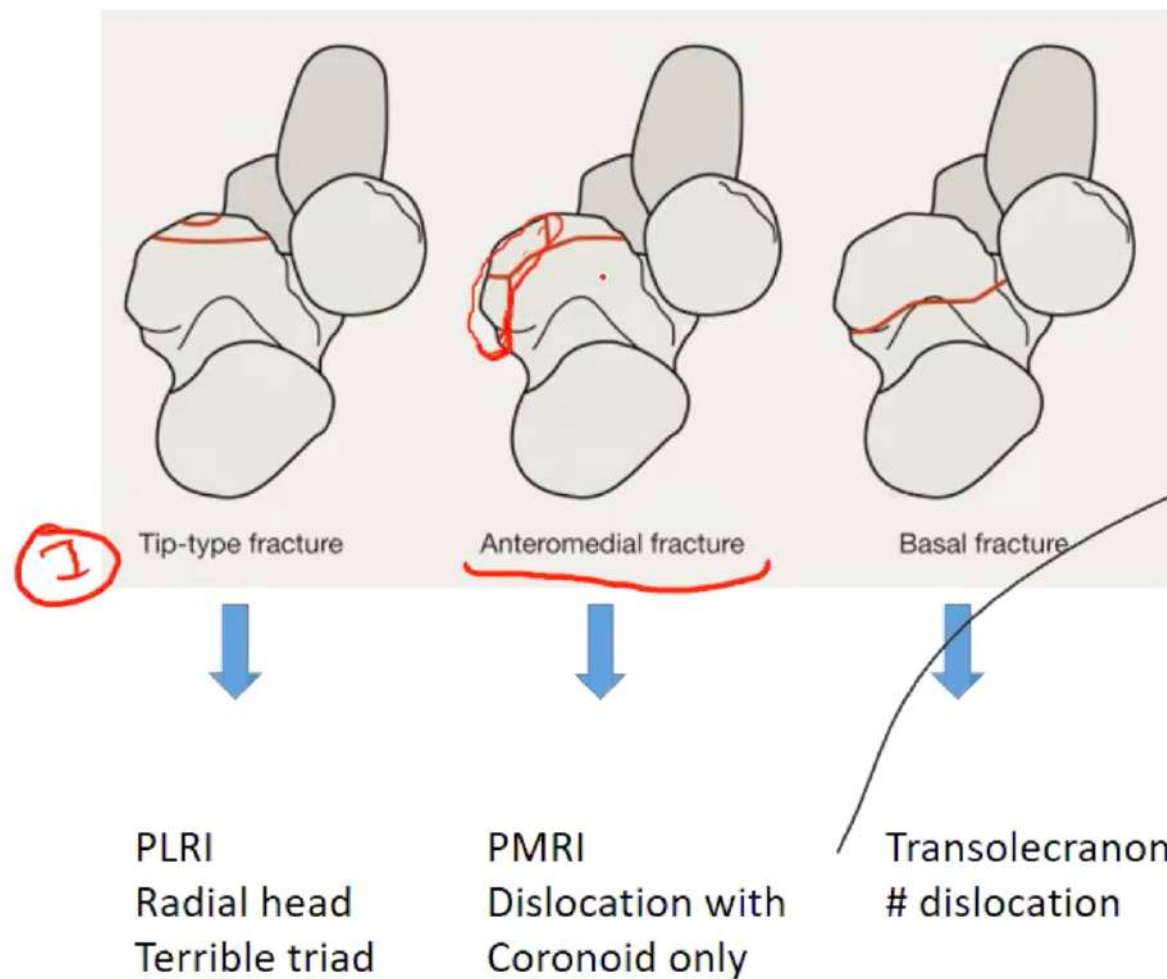


tip (I)

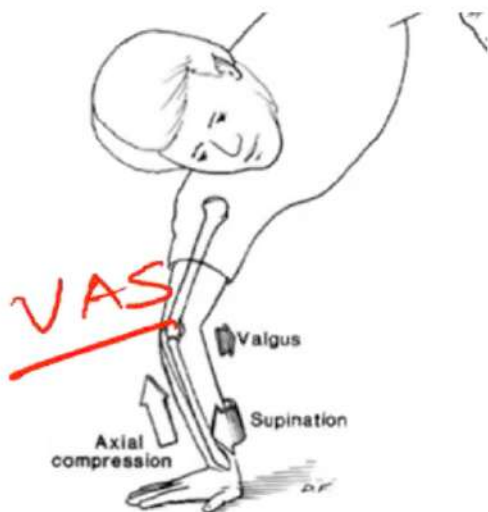
< 50% HT (2)

> 50% HT (3)

O'Driscoll



FOOSH



Valgus Posterolateral Injury

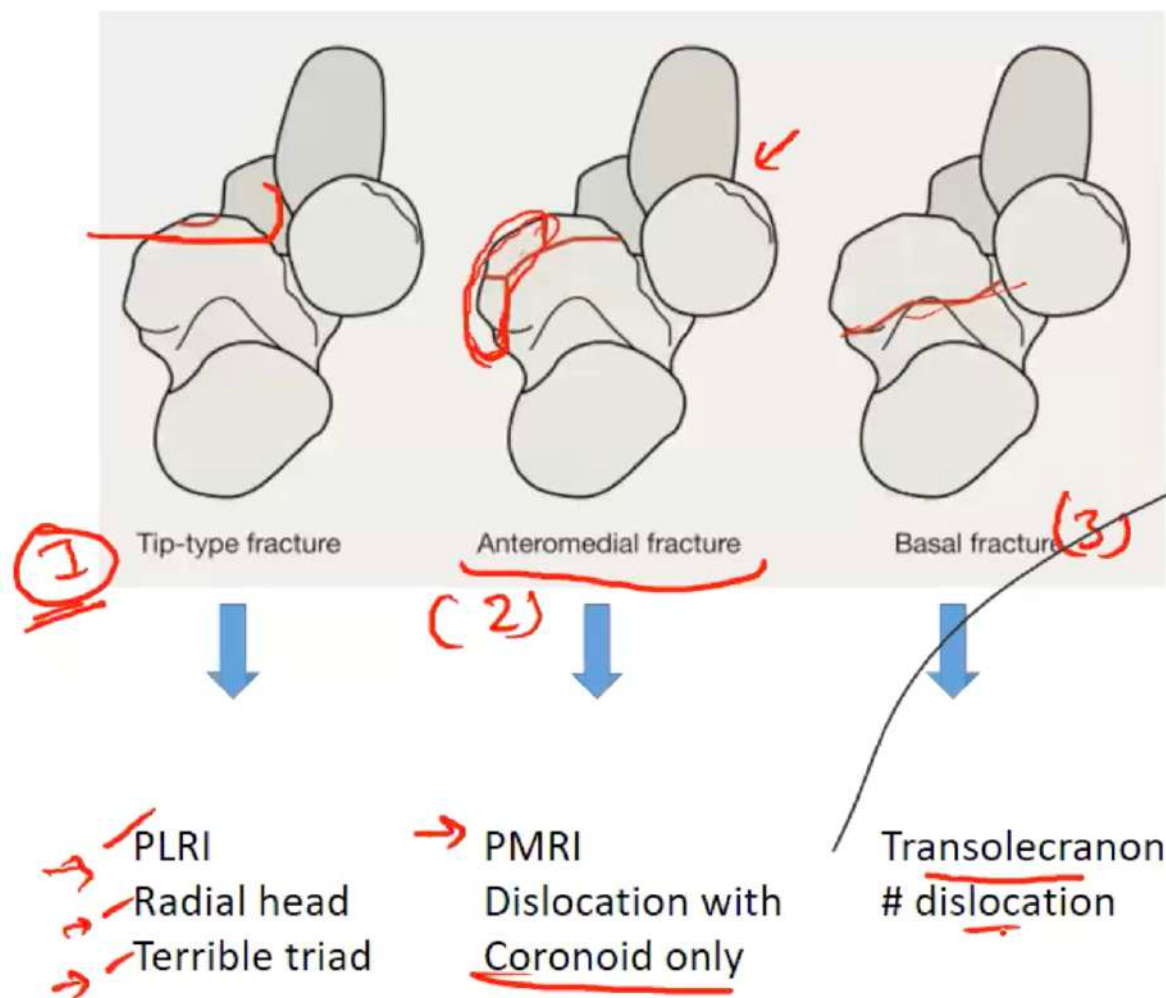


Varus Posteromedial Injury

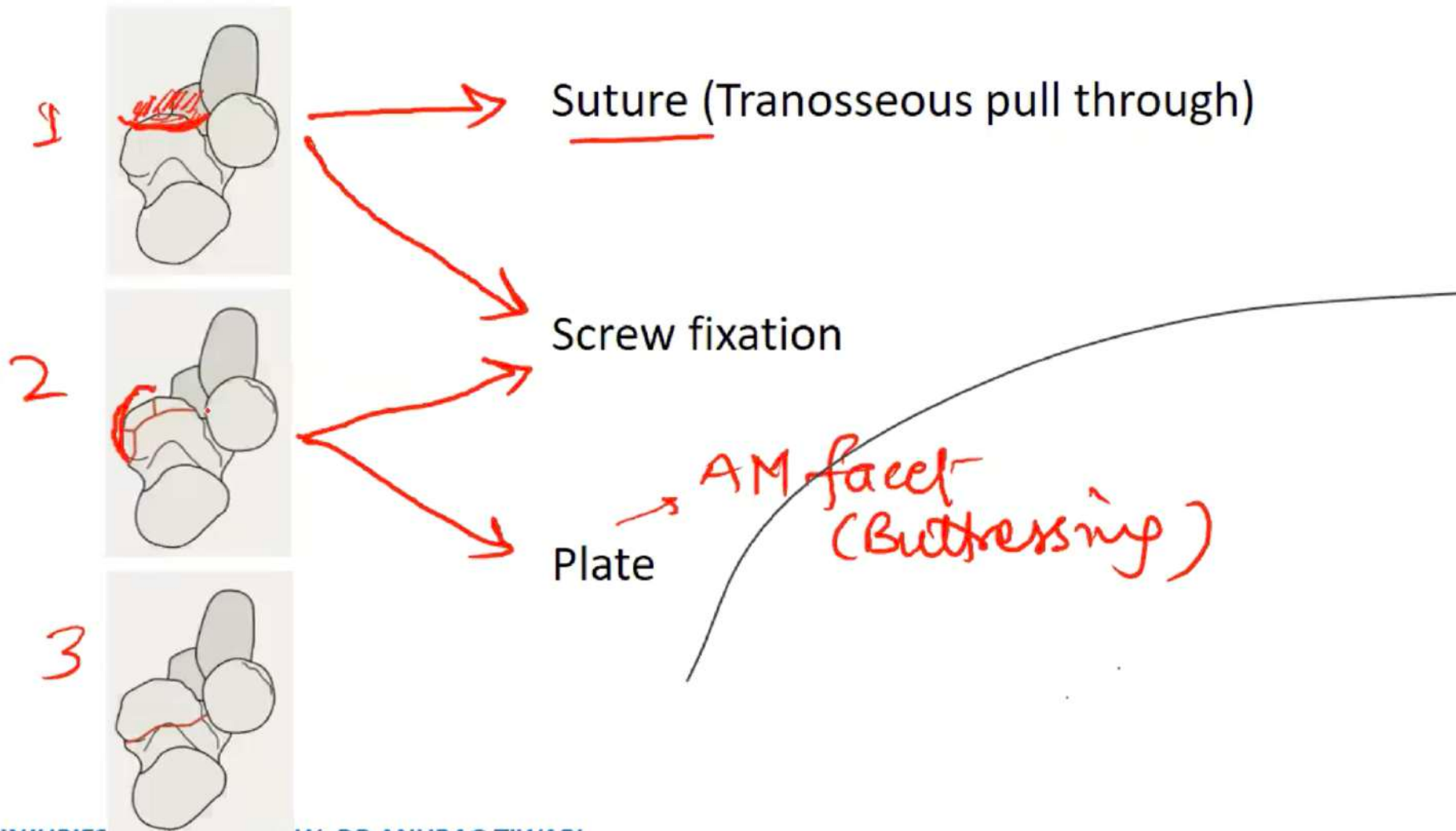


Transolecranon # dislocation

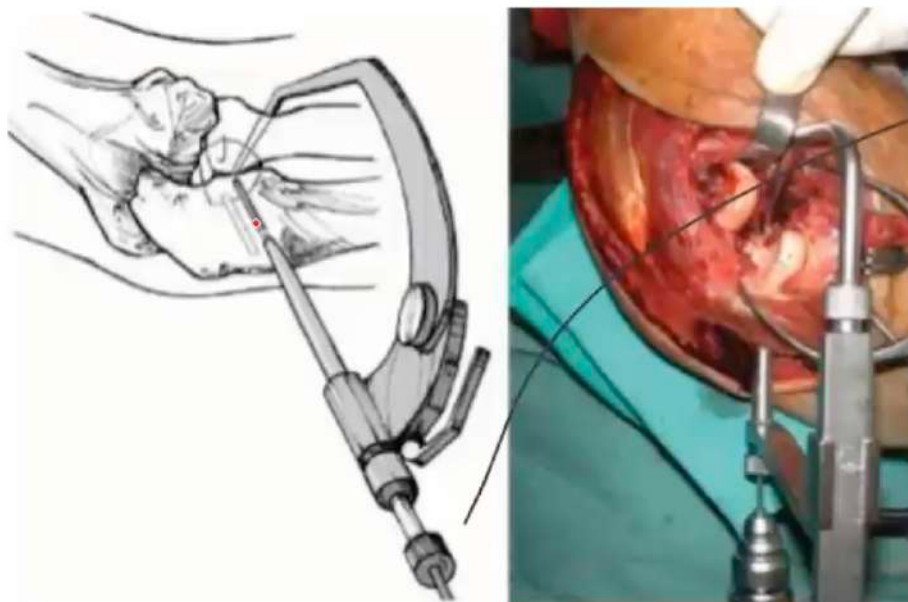
O'Driscoll



Treatment



Use of ACL targeting device

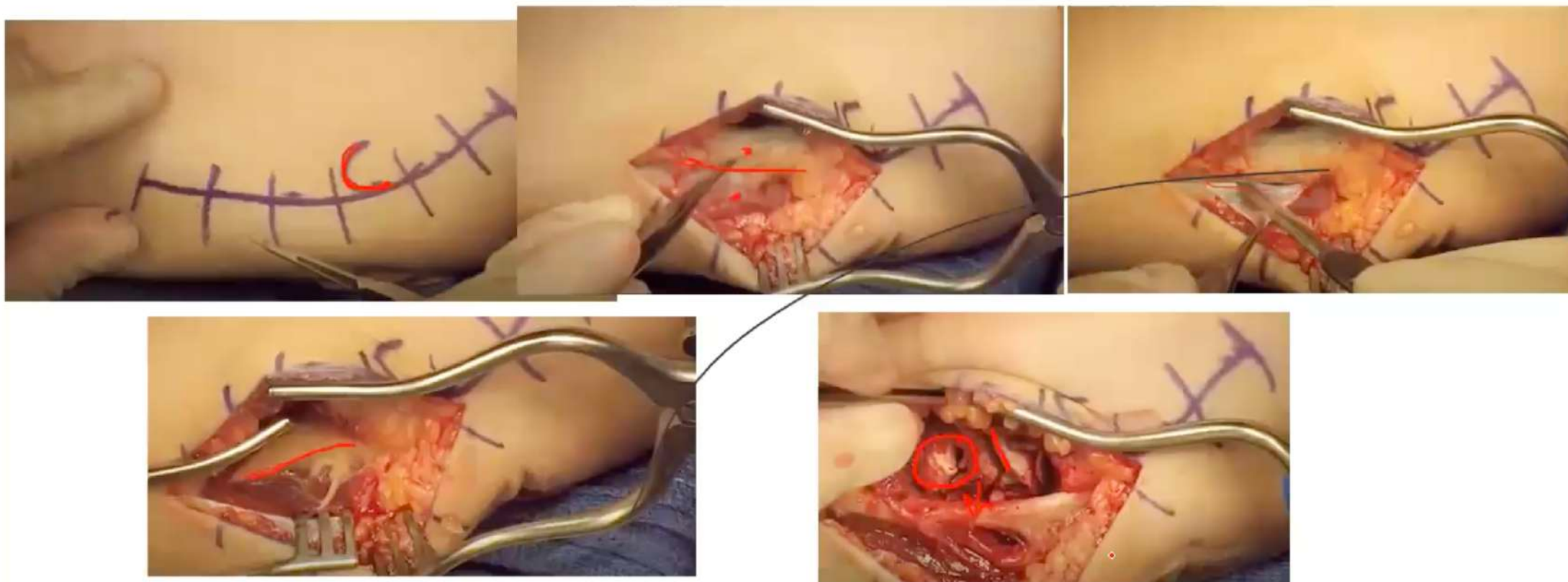




> 1cm

No 2 Non absorbable suture is preferred

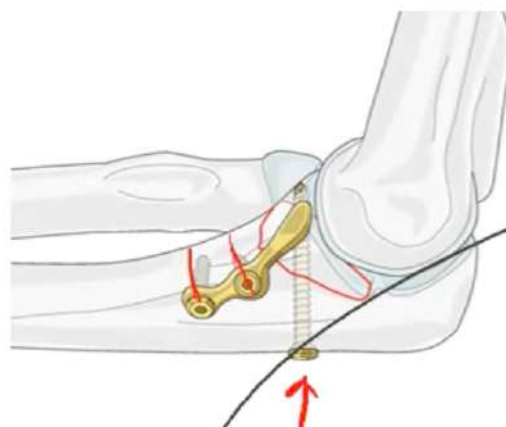
Medial approach for plate



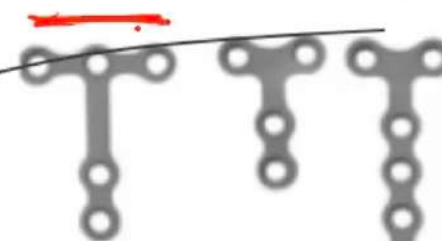
Implant choice



Screws



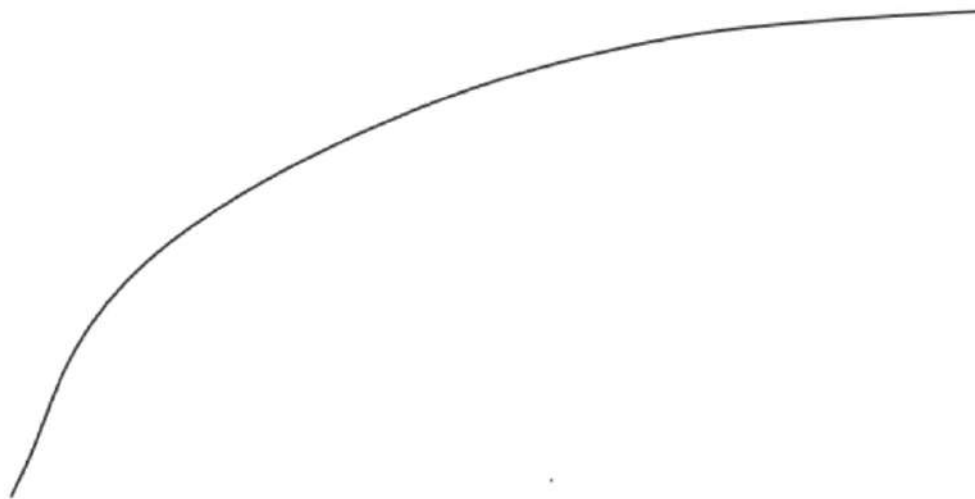
Coronoid buttress plate



Mini T plate

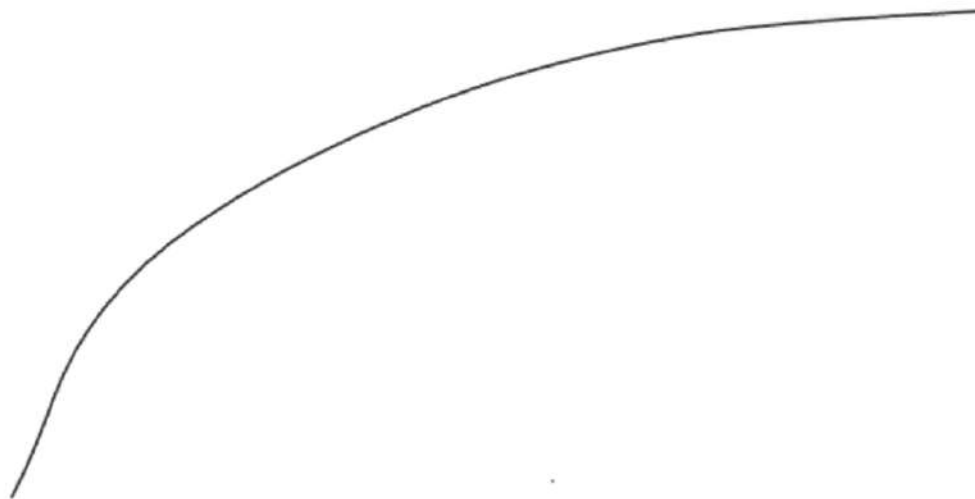
Elbow dislocation

- Most common joint dislocation ??
- Elbow
 - Hip
 - Shoulder
 - Patella



- Most common joint dislocation in child ??

- A. Shoulder
- B. Elbow
- C. Hip
- D. PIP joint



Classification

- On the basis of Direction

✓ Posterior Lateral
ME.
FOOSH.
VAS

- On basis of #

- Simple- No associated #
- Complex- # dislocation

Clinical presentation

- Pain, Swelling, ecchymosis, tenderness
- Posterior dislocation is most common
- Bowstringing of triceps muscle
- Three bony point relationship – disturbed
(Reversal of triangle) (▲ instead of ▼)
- ✓ Neurovascular examination is must



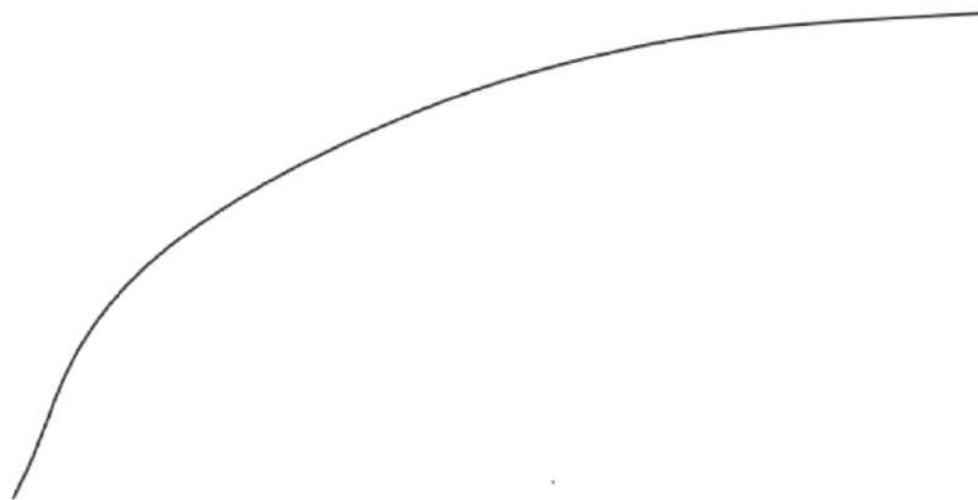
• Most common nerve injury in elbow dislocation ??

• A. Median nerve

• B. Radial nerve

✓ C. Ulnar nerve

• D. PIN



Xrays



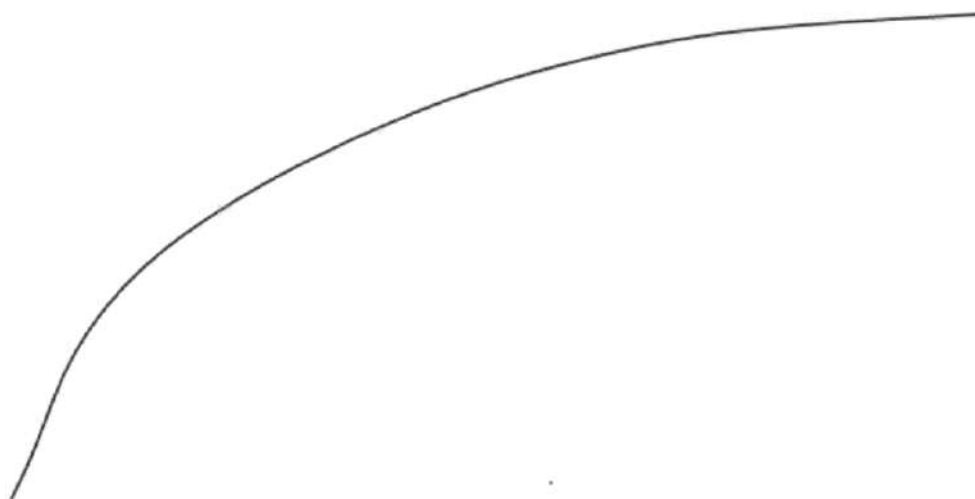
AP

FOOSH → VAS → PLRI



Imaging

- In elbow dislocations, after Xray what should be the next investigation
- A. CT
- B. MRI
- C. CEMRI
- D. USG



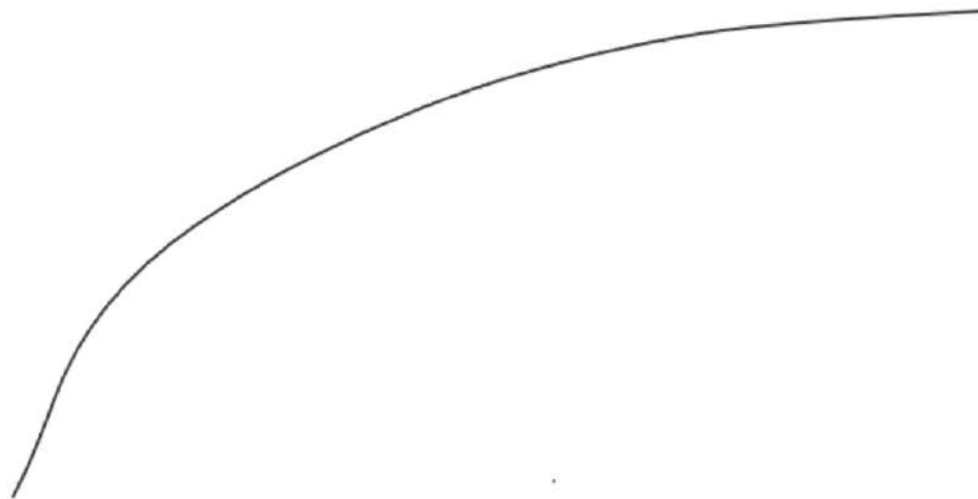
FoOSH → VAS → PLRI



Imaging

• In elbow dislocations, after Xray what should be the next investigation

- ✓ • A. CT
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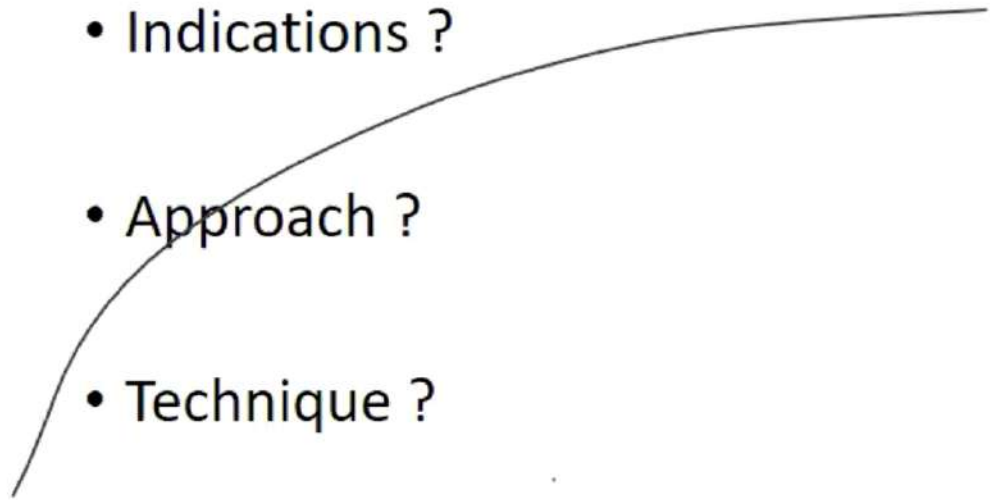
Treatment

- Close reduction-

- Technique?
- How to check for instability ?
- Period of Immobilization ?

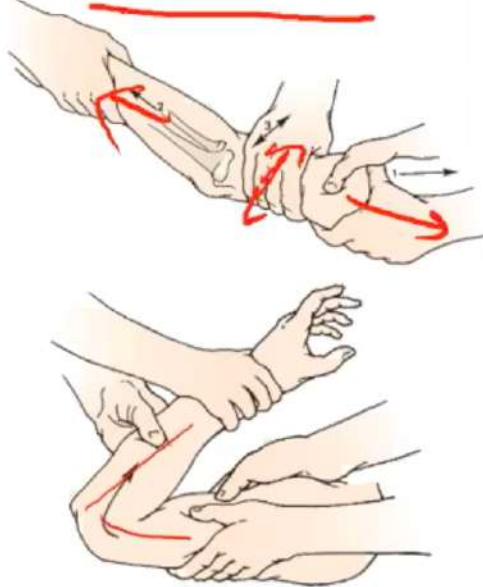
- Open reduction-

- Indications ?
- Approach ?
- Technique ?

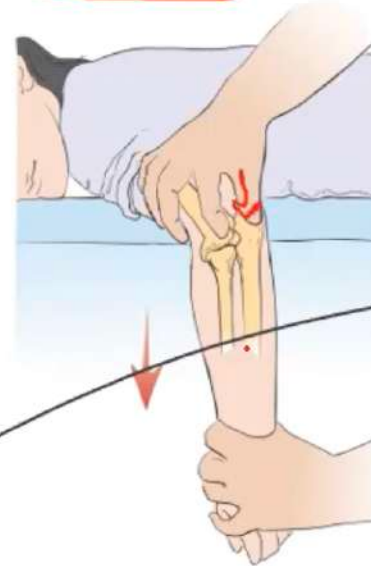


Technique of CR

• Parvins method



• Prone method



- Flexion of 30 degree
- 1, 2- Traction – Countertraction
- 3- Medial – lateral alignment corrected, forearm supinated
- Slight anterior force to olecranon

Close reduction- Instability check



1. Look for asymmetry in joint space
2. Feel for crepitus
3. Move for checking ROM
(Flex- Extension in supination, pronation and neutral position)

Immobilization

- POP slab in 90 degree of flexion
- Pronation or supination ? – which has maximum stability
- Duration-
< 3 weeks
- Physiotherapy- Active only (Passive is contraindicated)

Treatment

• Close reduction-

- Technique?
- How to check for instability ?
- Period of Immobilization ?

• Open reduction-

- Indications ?
- Approach ?
- Technique ?

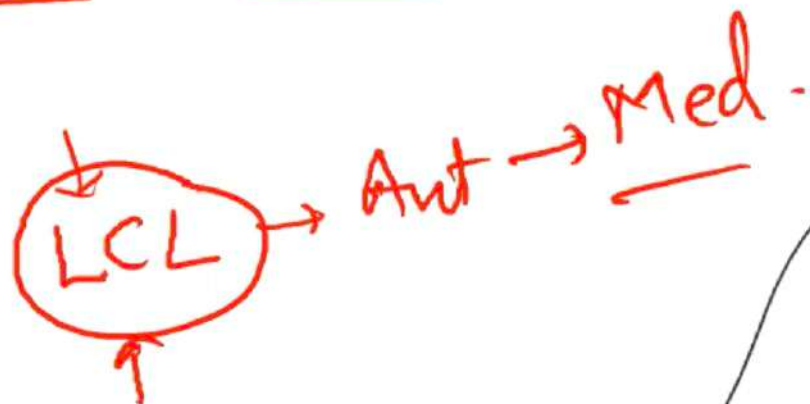
Indications for Open reduction

- Open dislocation
- Vascular injury
- If elbow is irreducible
- After CR, If elbow dislocates in < 30 degree flexion
- Joint space is not congruous
- Associated # in post reduction xray



Approach

- Single Posterior approach
- Lateral + Medial approach



Technique

- LCL repair
- If unstable
- MCL repair
- If unstable
- External fixator

Immobilization after ligament repair

LCL is repaired, MCL intact →

MCL is repaired, LCL intact →

Both are repaired →

90 flexion +

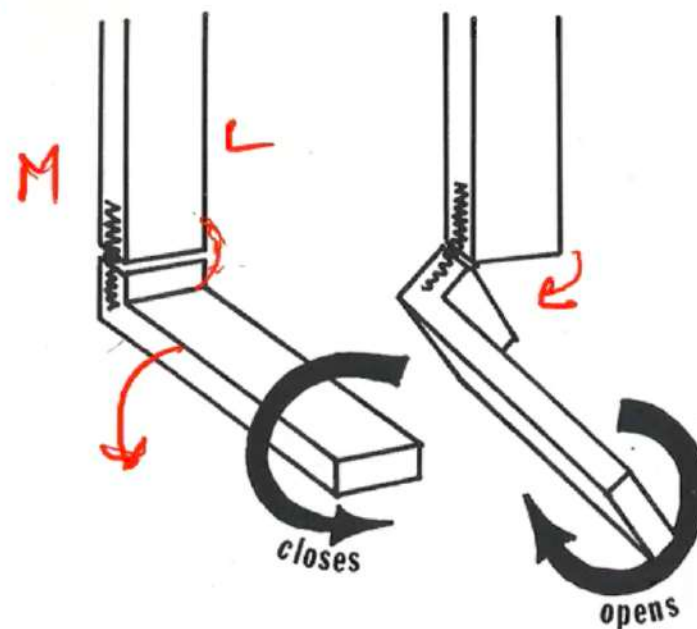
Pronation

Supination

Neutral

more strong side

Rule of Thumb



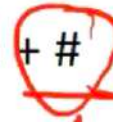
Elbow # dislocation



Complex.



elbow dislocation + #



+ Radial head #

+ Coronoid #

+ Radial head # + Coronoid #



Terrible triad.

Xray



↑
VPMRI.

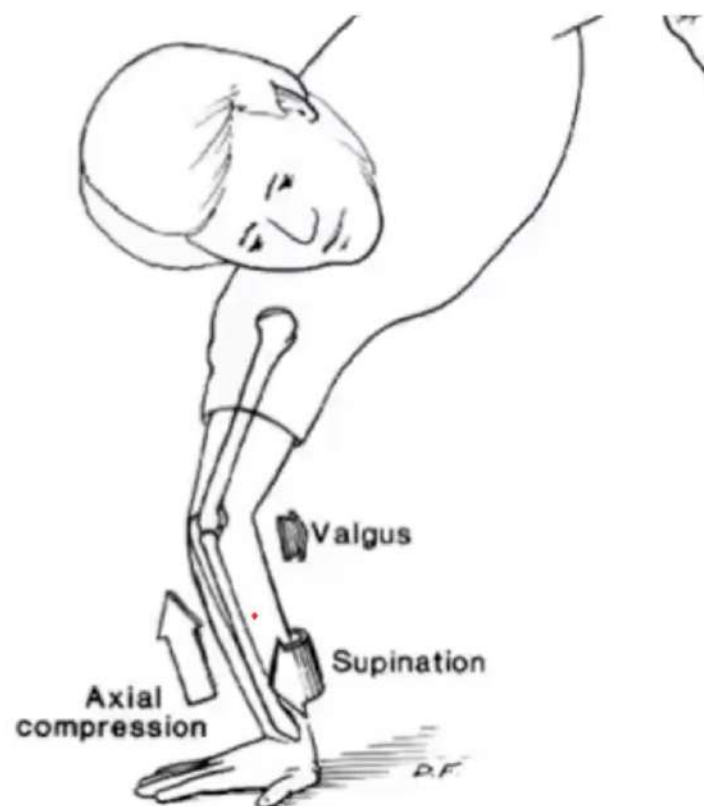


Terrible Triad Elbow

- Dislocation + Radial Head + Coronoid
- Why terrible-
 - Recurrent/ persistent instability
 - Chronic instability
 - Arthritis
 - Poor outcome
 - Difficult to repair

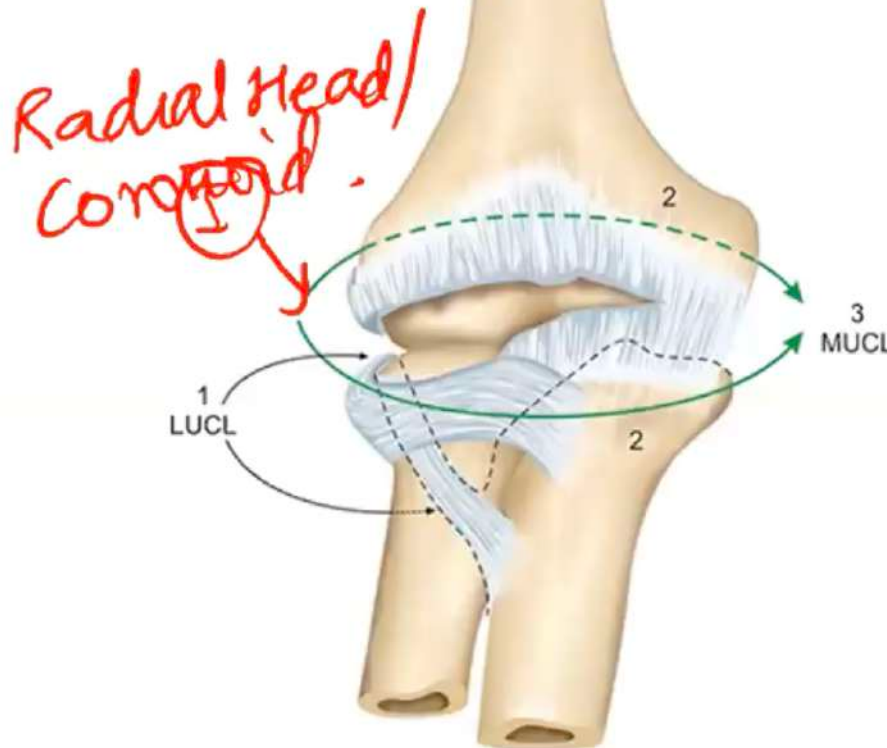
Mech of injury

- FOOSH → Valgus, axial, supination



Stages

- 1- LUCL injury
- 2- Ant and post capsule
- 3A- sprain of MCL
- 3B – Rupture MCL
- 3C- all soft tissues gone



Imaging

- Xray- Pre and post reduction xray
- Radial head- McLaughline line
- Coronoid – lateral view
- CT with 3D



Treatment of # dislocation

Close reduction



- Concentric reduction achieved
- No instability while checking ROM
- Small # Radial head with no block to rotation
- Small coronoid # (< 10 % size)

Rare



✓ Non operative

Operative

Operative

- Sequence ?
- Approach ?

Sequence of Repair

- 1 • Coronoid fixation
- 2 • Radial head ORIF/ Replace
- 3 • LCL repair
 - MCL repair, If ~~required~~

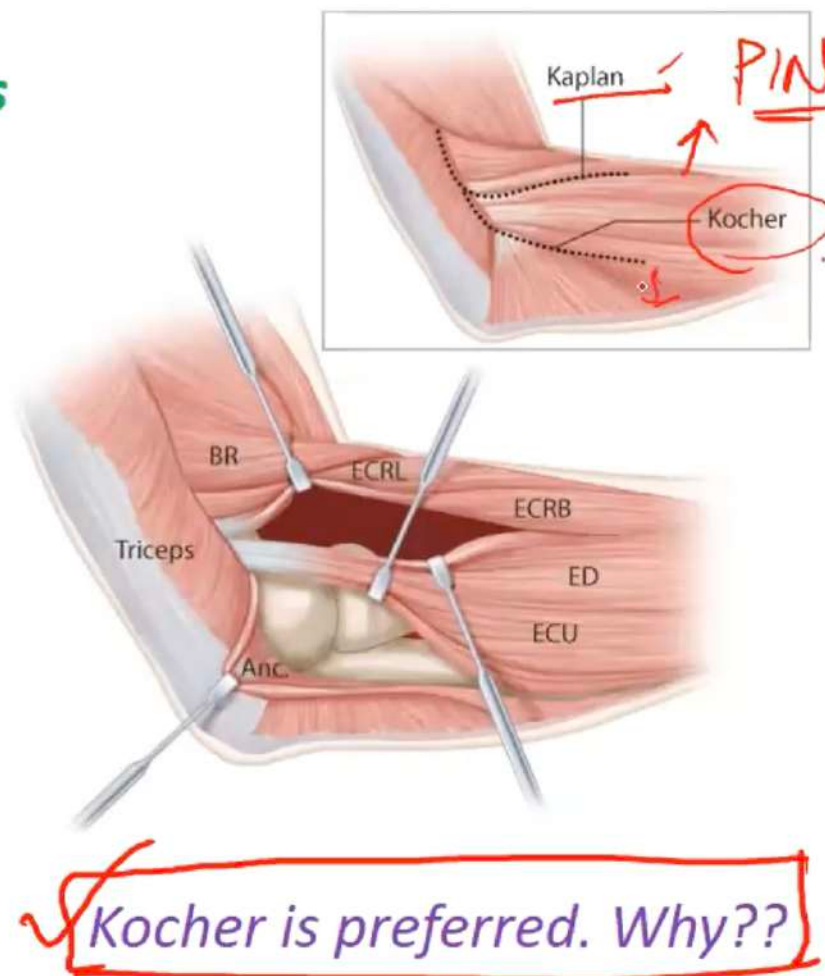
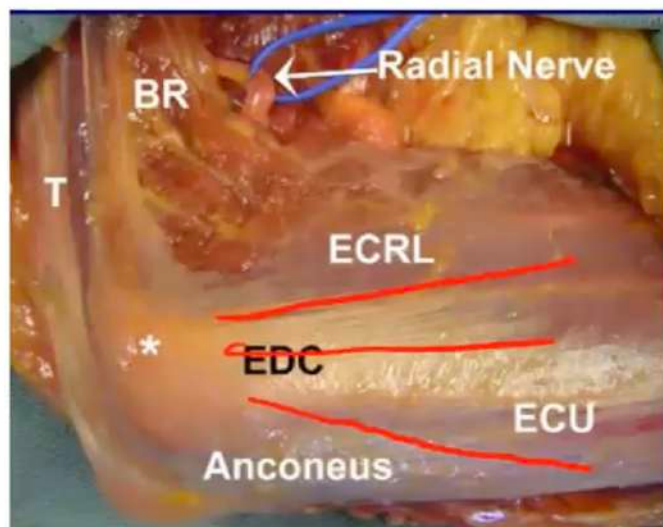
Deep to Superficial

Approach

- ✓ Single Posterior approach
- Lateral + Medial approach

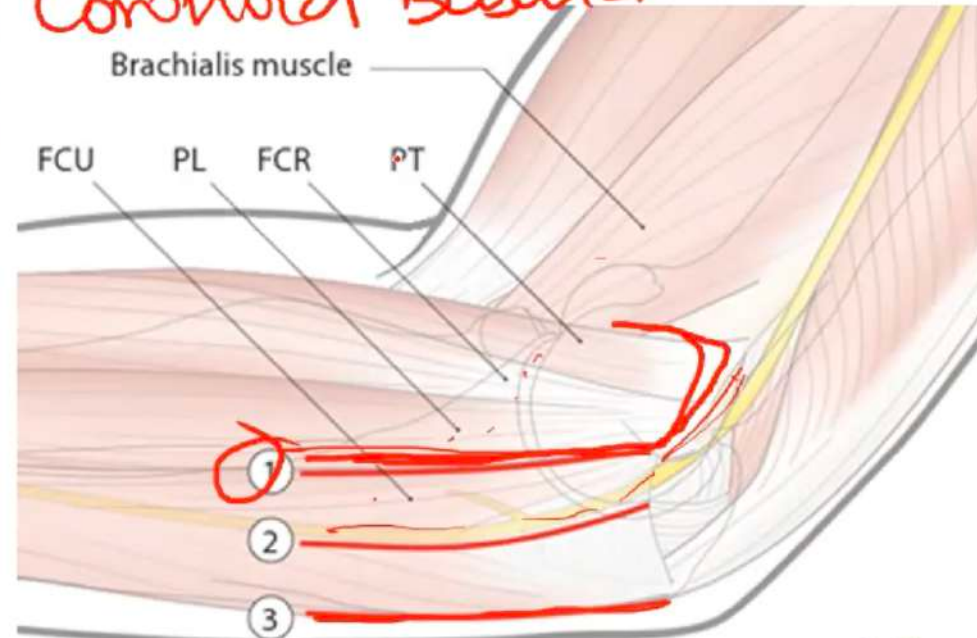
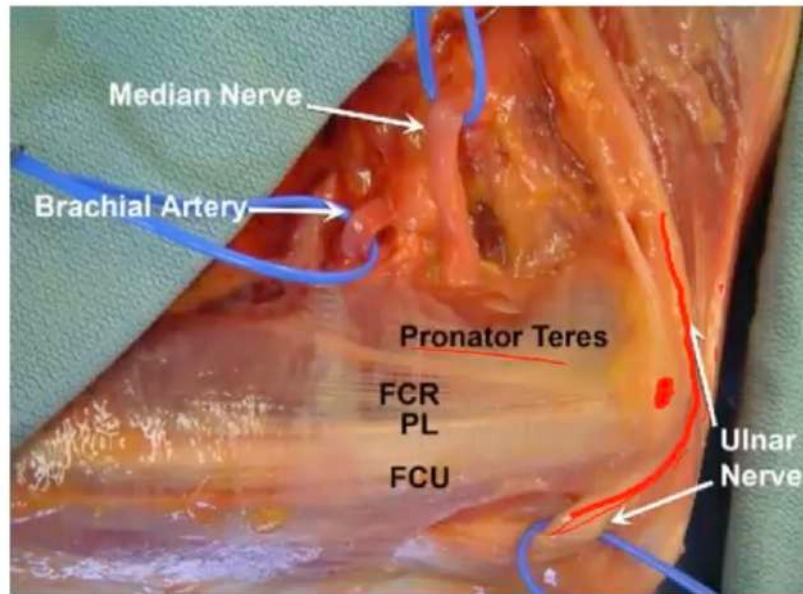
Lateral approach

- **Kocher- ECU and Anconeus**
- Kaplan- ECRB and EDC
- EDC split-between EDC fibres



Medial approach

1. Over the top Hotchkiss approach
2. Between two heads of FCU (Floor of ulnar nerve approach)
3. Elevation of entire flexor mass → *Coronoid Basal*



- Indications of medial approach-
- Coronoid # fixation - If radial head is not #
- Plating of coronoid AM facet
- MCL repair
- Ulnar nerve symptoms- Transposition

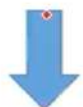
- Coronoid ORIF
- Radial head ORIF/ Replace
- LCL repair



- If unstable



- MCL repair



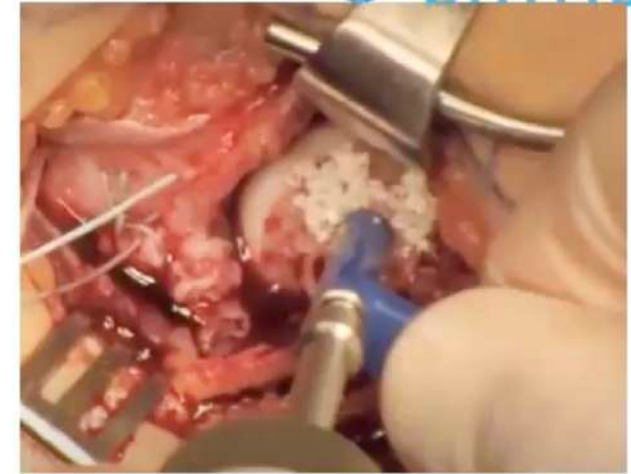
- If unstable



- External fixator

LCL repair

- Isometric point
- Technique?
- Position of elbow while fixing?



LCL repair avulsion

- Isometric point ant/distal to centre
- Technique? Suture to tunnel
- Position of elbow while fixing?



Pronation Thumb - MCL

External fixator

- Static

Easy, < 3wks

- Hinged

ROM,

*↓
difficult.*

