

# Level 6.2021

## Elbow Injuries

Anatomy, mechanism, diagnosis and  
treatment principles

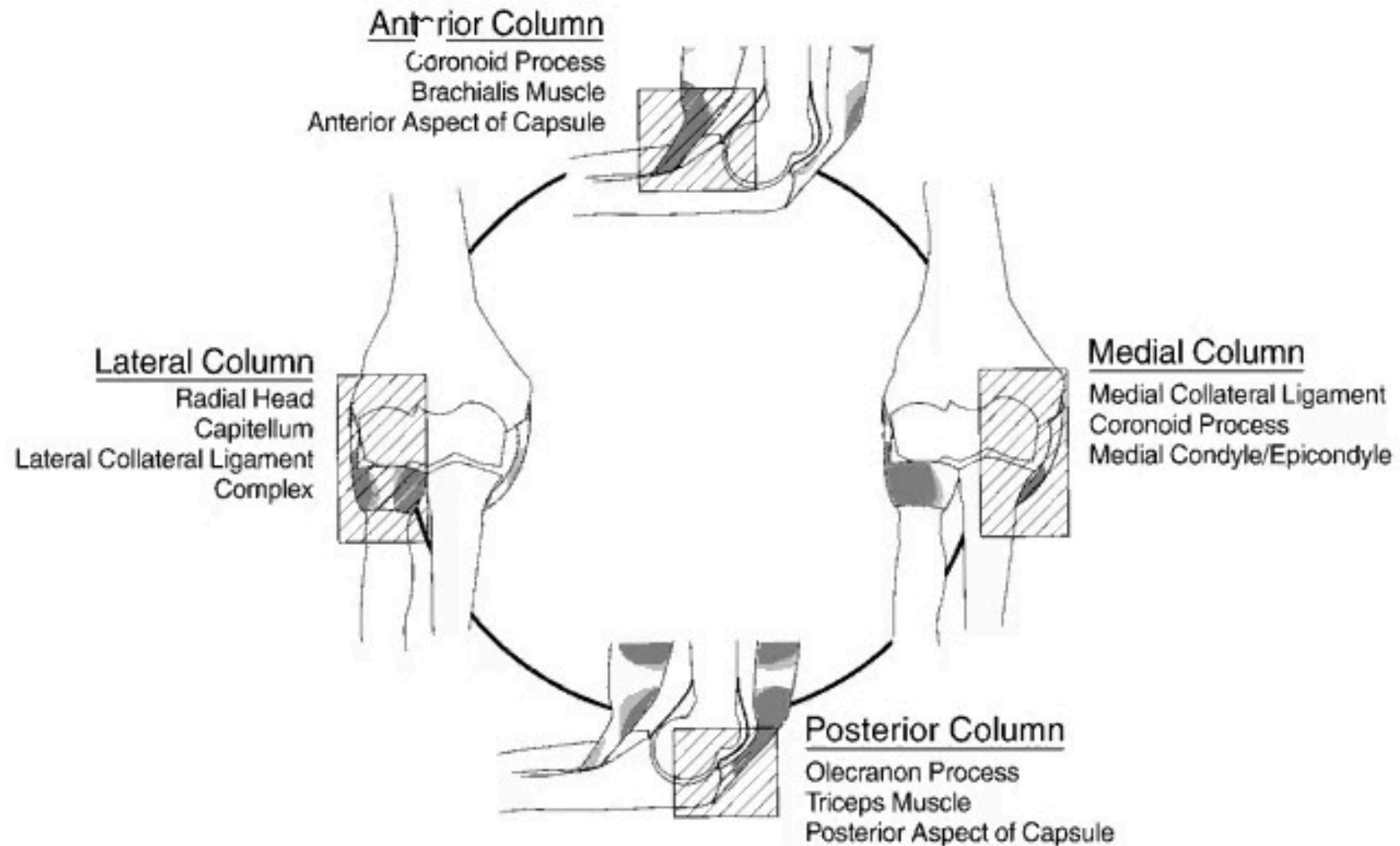
# Anatomy

- The Bones
- Humerus, Ulna and Radius
- Hinge Joint
- Stabilizing elements- articular surface configuration, capsulo –ligamentous, muscles.
- Important relations-brachial artery, ulna and radial nerve

# Three elbow joints



# Concept of stability



# Types of injury based on energy level

- Adult- high energy trauma
  - low energy( fragility)
- Paediatric – traumatic
  - child abuse
- Chronic - repetitive movement disorder

# Mechanism of Injury

- Sports- golf, tennis ball(little league elbow) wrestling
- Fall on out stretched arm or hand
- Varus stress – lateral condyle
- High energy trauma: MVA, MCA, gun shot
- Low energy trauma: Penetrating wounds
- Special mechanism-Nurse-maid elbow/abuse
- Obstetric trauma during delivery

# Soft tissue Spectrum of Injury

- Soft Tissue-Bruise, tendon ruptures eg. Triceps and biceps
- Capsulo-ligaments
- Over use- bursitis, tendinopathy
- Neurovascular injuries

# Bones range of injury in adults

- Dislocation-commonly posterior
- Simple dislocation- no associated fracture
- Complex dislocation- associated fracture
- olecranon, radial head, coronoid, supracondylar
- Monteggia
- Essex lopesiti



# Simple Dislocation

- Patho –anatomy- capsulo ligamentos tear
  - muscle contusion
  - joint instability
  - Osteo chordral lesions
- Various degrees of Nerve injury
- Vascular-thrombosis, rupture, laceration

# Fracture Dislocation



# Complicated Dislocation

- Associated with fractures
- Variable patterns- distal humeral (Partial/complete intra-articular fracture)
- Coronoid fractures

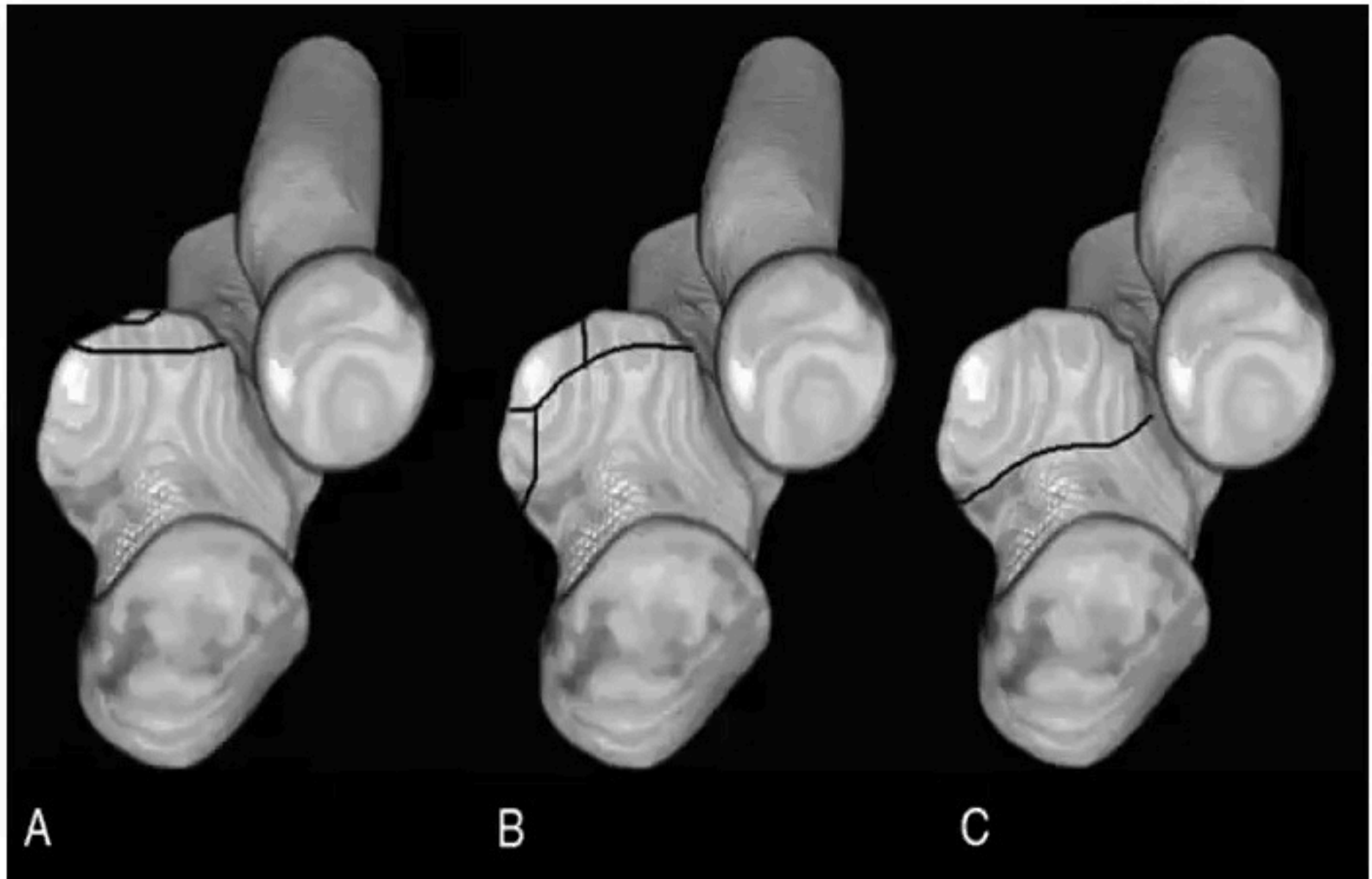
# Dislocation, radial and coronoid fracture (Terrible triad)



# Transoleclanon fracture dislocation



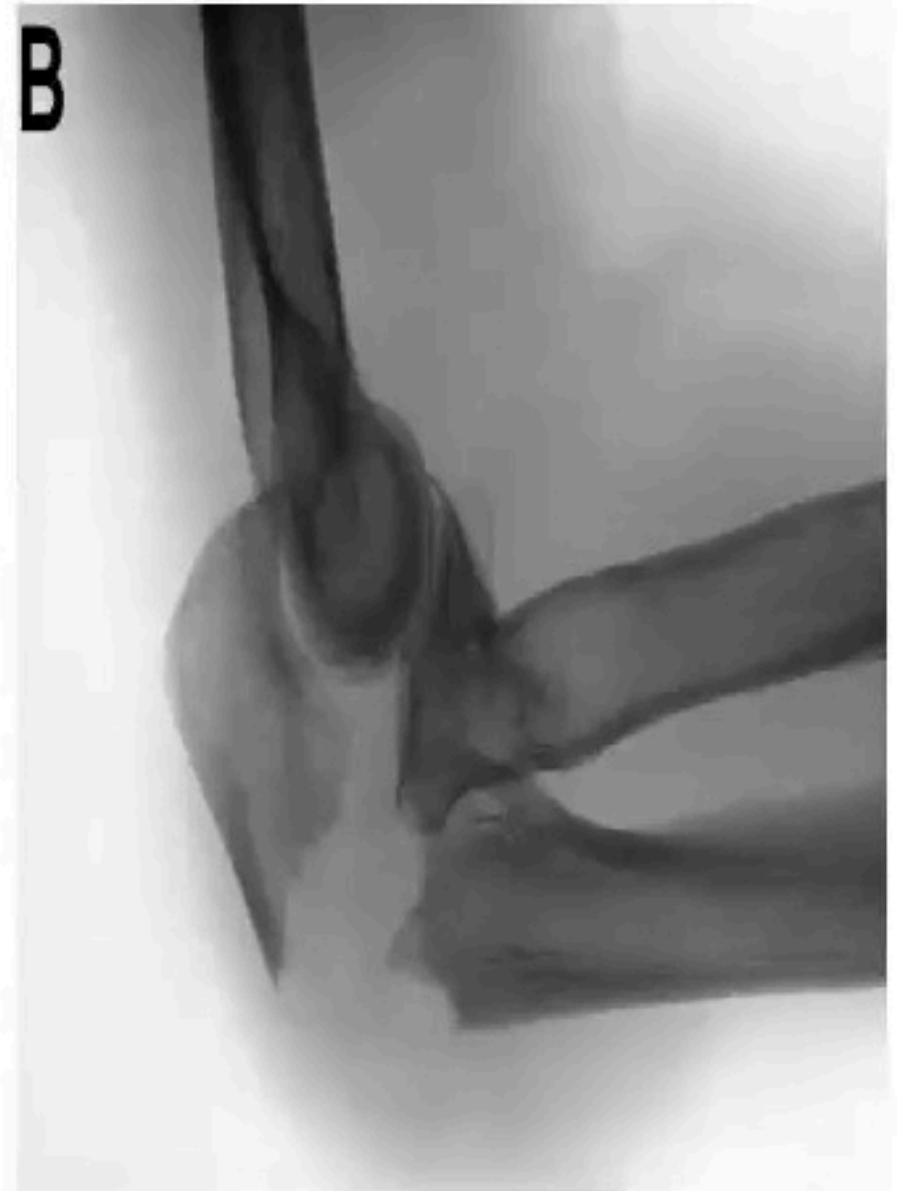
# Coronoid tomograms



# Complex fracture coronoid fracture intact

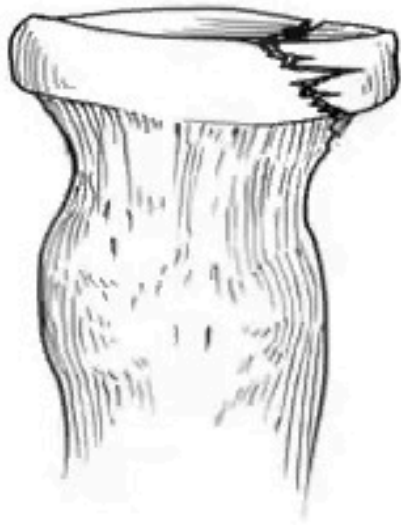


# Transolecranon fracture dislocation

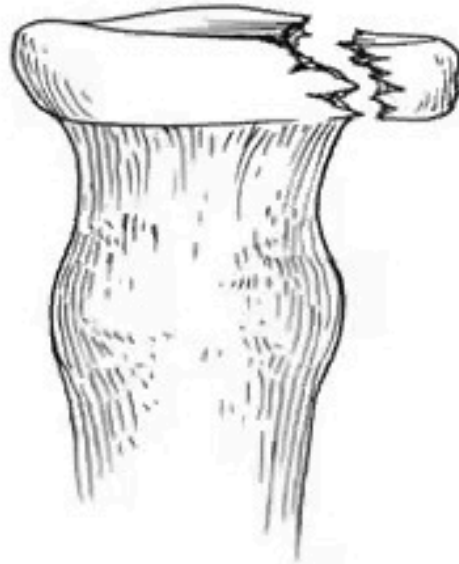




# Radial head



A



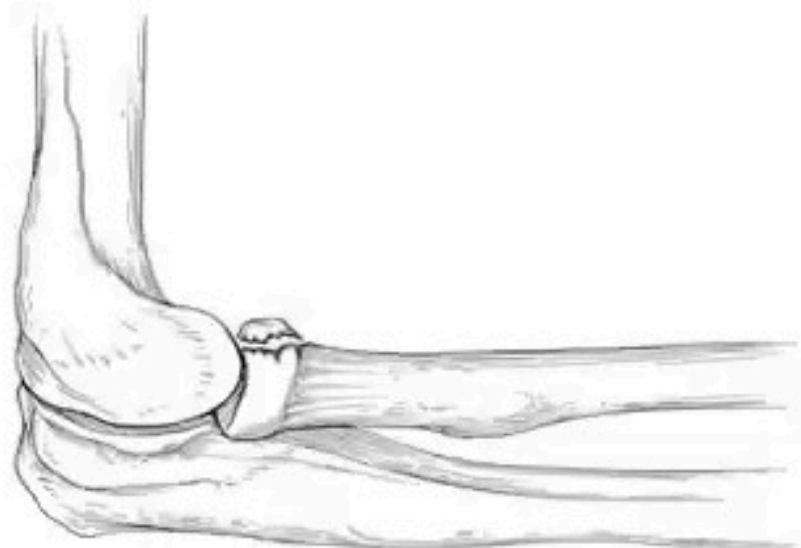
B



C



D



# X-ray Radial head fracture



# Variants of radial head fracture



# Essex lopresti injury association of radial fracture/ injury of inter-osseus membrane



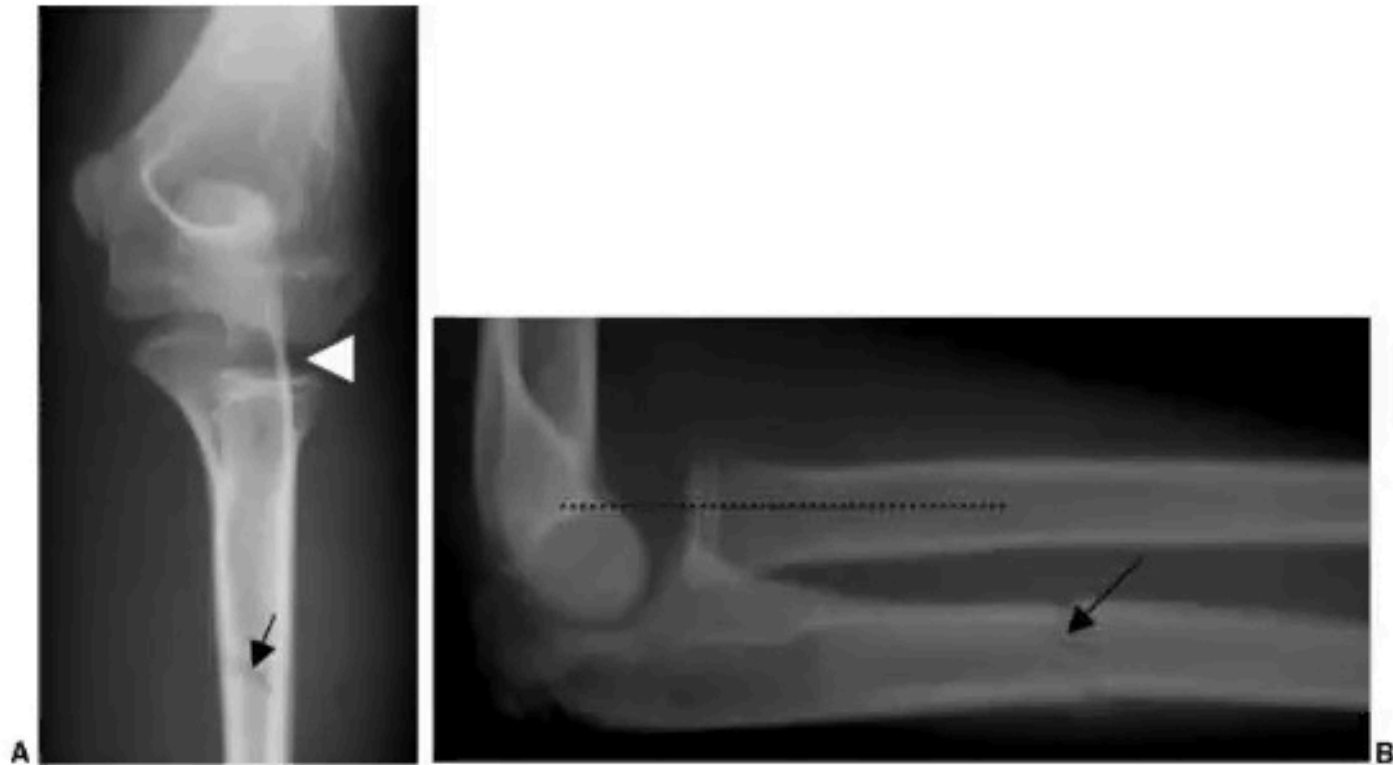
# Distal humerus injuries (jupiter & mehne classification)



# Proximal Radial Ulna Dislocation

- Anterior/posterior
- Diversion
- Medial lateral Trans –location
- Compromise supination/pronation
- Valgus instability
- Cam-effect of PRUJ fracture dislocation

# Monteggia fracture, radio- capitulum line above, diastasis of RC



# Evaluation

- History on mechanism of injury,
- circumstances of injury,
- sequel of injury
- co-morbidity
- Physical examination
- Imaging



# Physical Examination

- Deformity
- Bruise
- Swelling
- Shortening/Lengthening of fore arm
- Neuro-vascular integrity
- Any evidence of wound

# Imaging

- X-ray
- 1. Pre and post reduction
- 2. Reveals dislocation, fracture pattern, soft tissue oedema
- 3. Pit falls in complex injuries and Paediatric elbow injuries
- views: AP, LA, Radial view

# MRI

## Subtle injuries, fat pads



A

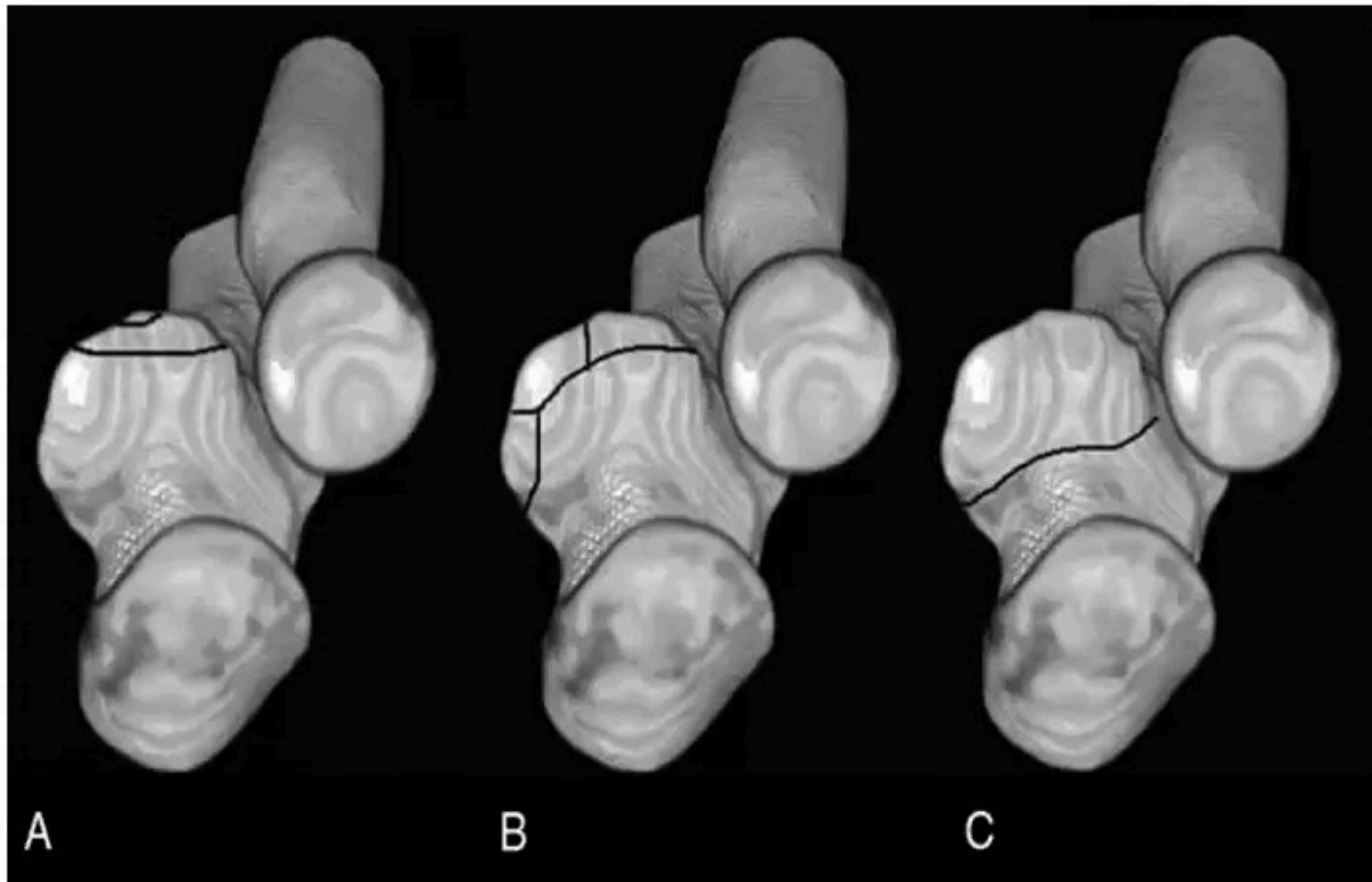


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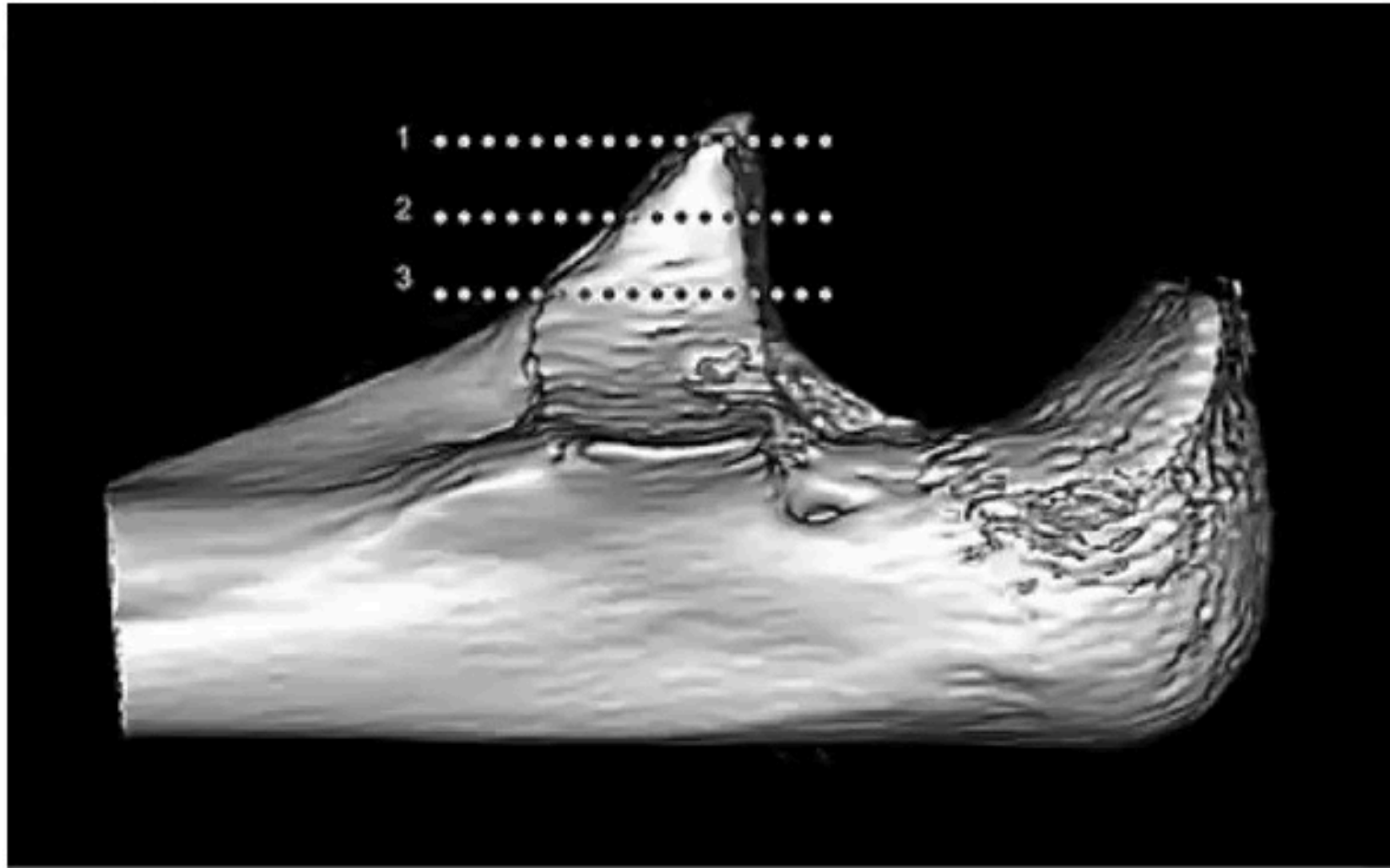


C

# Coronoid tomograms



# Corronoid fracturs



# Principles of treatment

Diagnose and treat life & limb threatening injury

Make a definite diagnosis and severity

Decide on operative or non-operative/& timing

Consider skills, knowledge and theatre resources

Evaluate and monitor treatment

Rehabilitation

Follow up for complications

# Treatment

- Simple dislocation- Pain killers
  - Closed Reduction
  - Splint for 2-3 weeks
  - Passive range of movement up to 3 months
  - Active range of movement for up to 8 weeks

# Indications of surgery

- Instability
- Failed reduction
- Intra-articular extension of fracture/ fragment
- Constant pull by muscles( olecranon, lcondyle/ epicondyles
- Compound injuries, / associated neurovascular



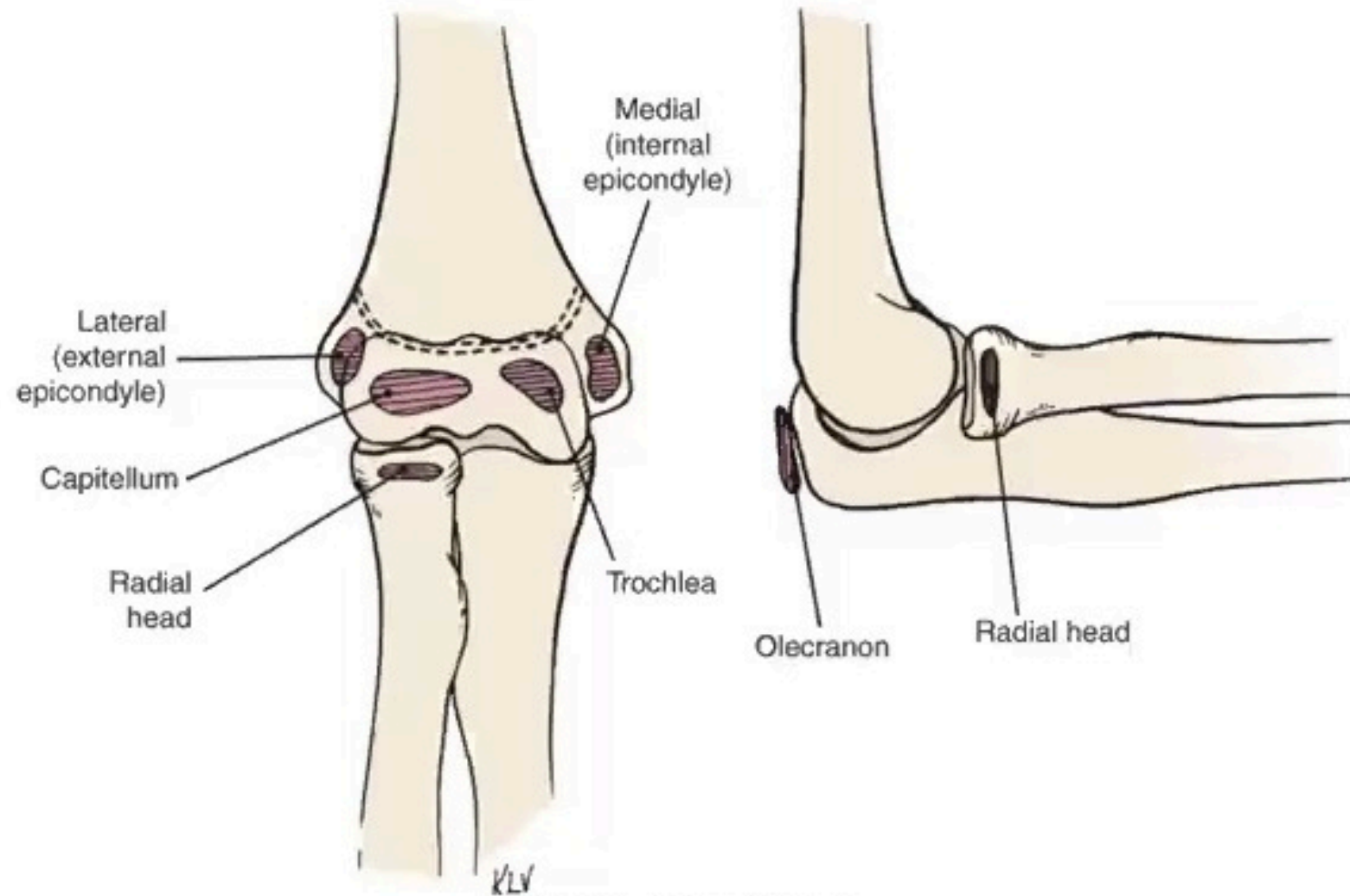
# Complications in Adult Elbow

- Stiffness
- Instability
- Compartment Syndrome
- Ectopic/Heterotopic calcification of the ligament
- Myositis ossificans
- Neurovascular injuries

# Paediatric Elbow

- Ossification centres( CRITOE)
- Growth Plates
- Capsulo-ligamentos structures are stronger than the growth plates
- Periostium is thick
- Pain around elbow
- Dislocation rare
- Fractures missed cause of ossification
- Compare both sides
- Figure of 8, well take x-ray at distal end of humerus

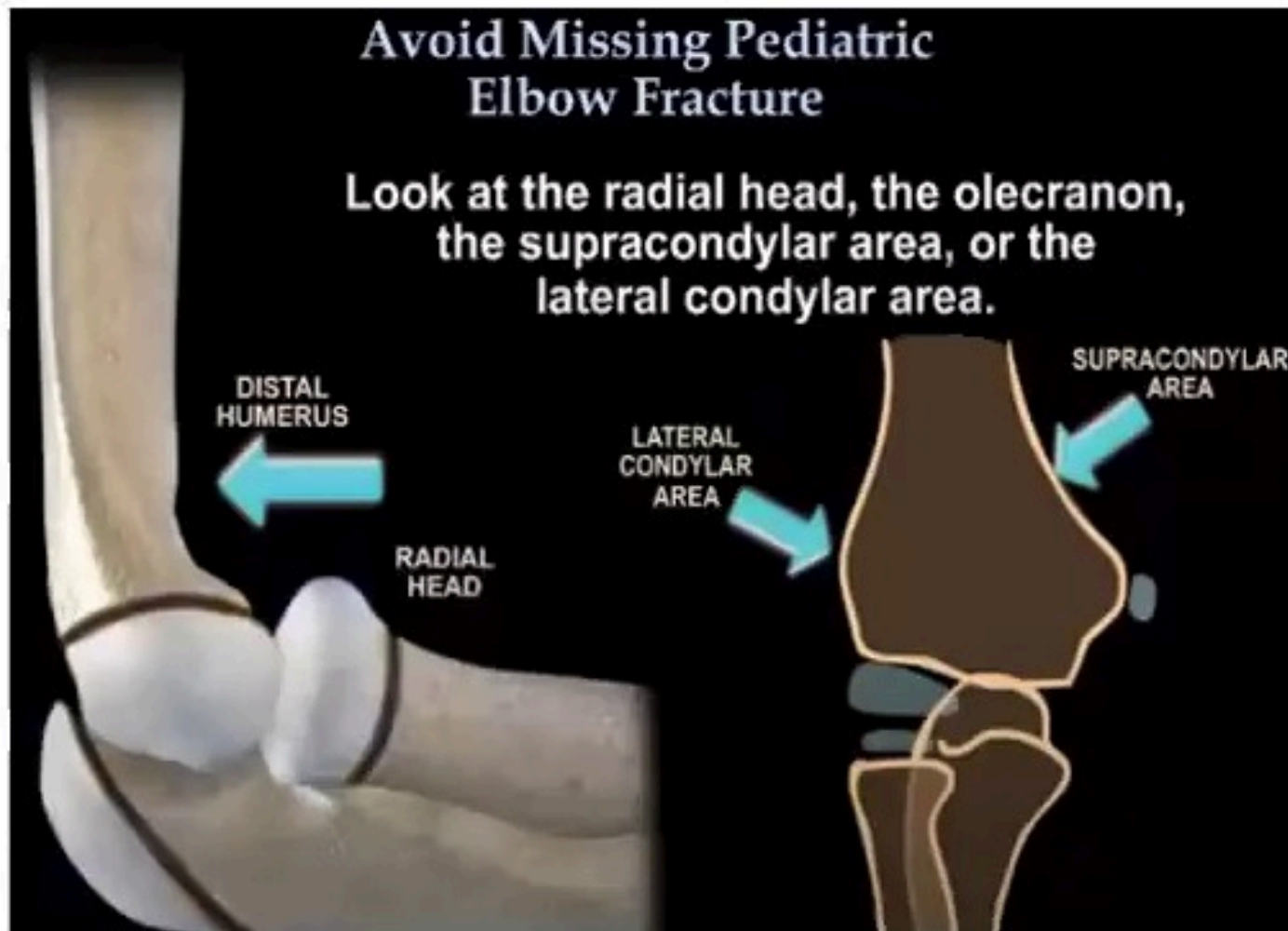
# Paed elbow anatomy



# Paediatric Elbow injuries

- Injuries include-
  - apophysitis
  - Supra condylar fracture
  - Medial and Lateral condyles
  - Radial head fracture
  - PURJ Dislocation
  - Aversion injuries

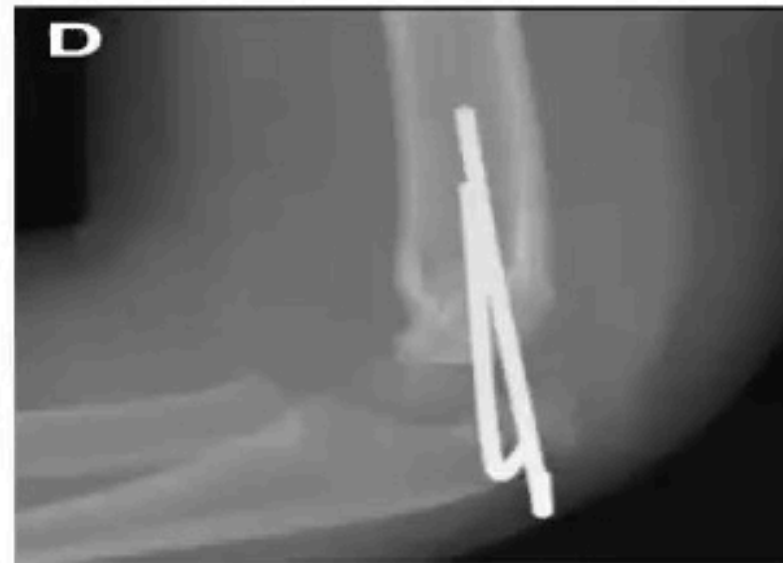
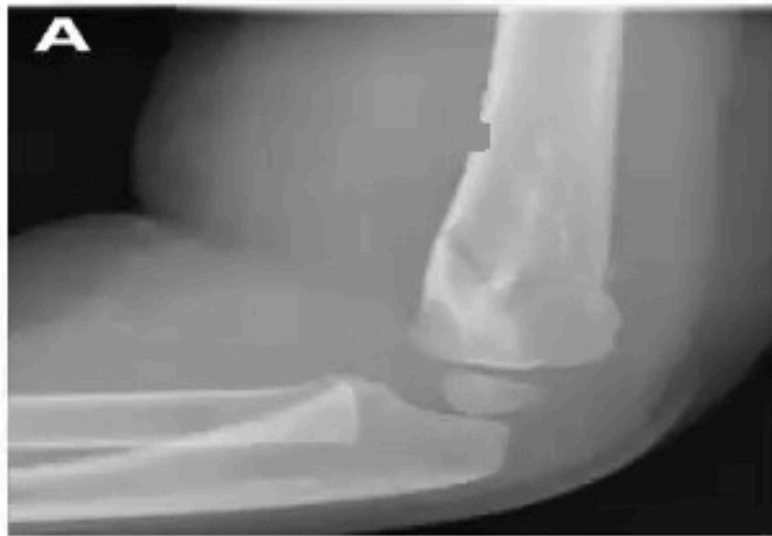
# Don't miss a fracture at child elbow



# Supracondylar fracture



# Treatment of Supracondylar

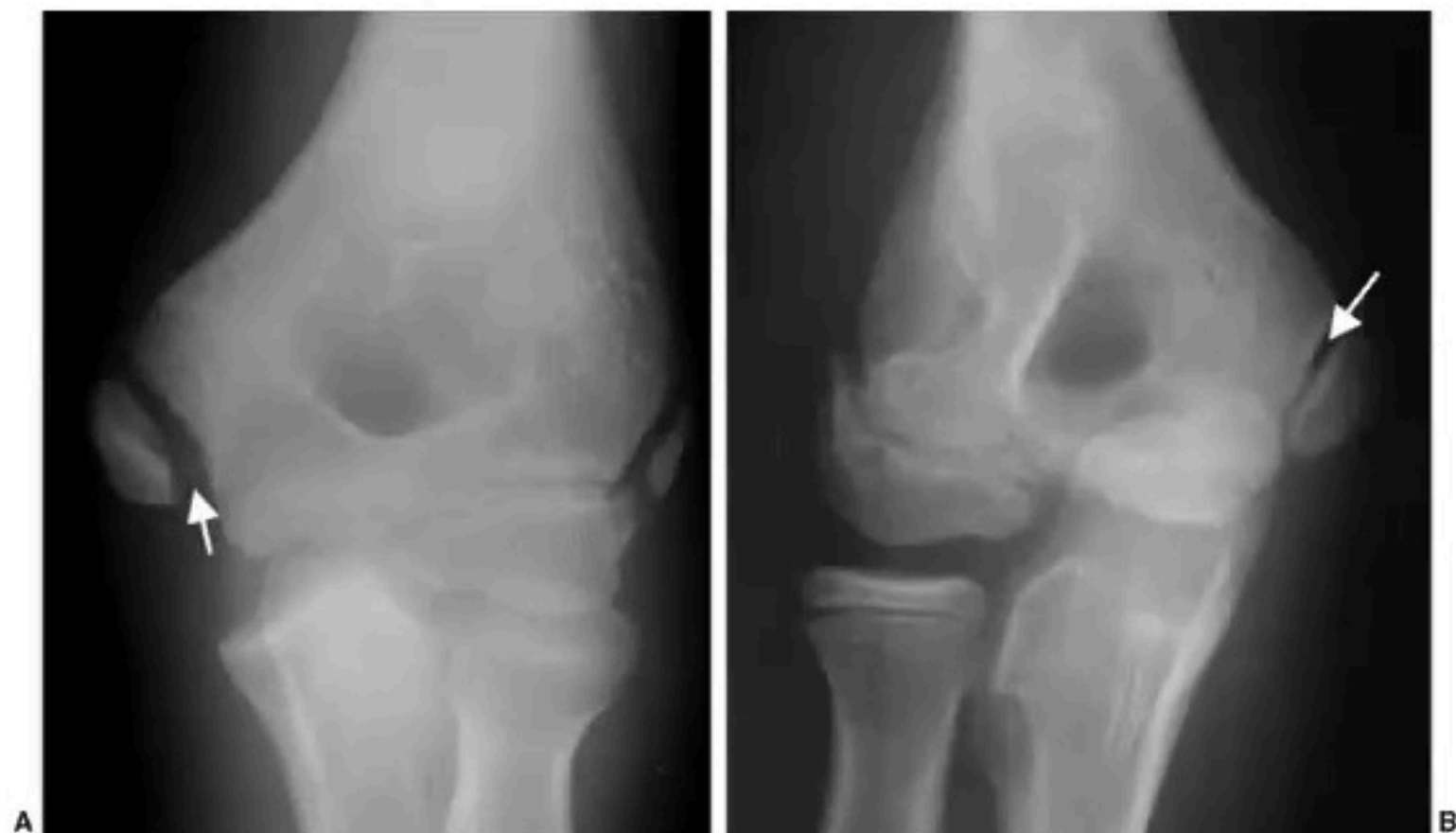


# Medial epicodyle fracture intraarticular





# Minimally displaced epicondyle # nb: A-injured B -uninjured



# Lateral condyle fracture compare injured /uninjured



# Complication of Paediatric elbow fractures

- Avascular necrosis of the trochlear
- Osteo chondritis dessican
- CAM effect or PRUJ
- Valgus/ varus deformity
- Growth disturbances
- Compartment syndrome
- Neurovascular injury

# summary

- Injury- subtle to complex
- Appropriate diagnosis based on Hx, PE, Images
- Treatment –simple splint age to complex reconstruction
- Acutely limb loss is possible
- Chronic Complications varied and debilitating

## Questions

- Which is the first ossification center at elbow?
- What deformity decreases the carrying angle?
- Microcirculation blockade is a feature of?
- Tardy ulna nerve palsy is seen in which elbow fracture?
- The earliest reliable sign of compartment syndrome is?
- Most common site of myositis ossifican is?