



DİRSEK GÖRÜNTÜLEME

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BÜLENT ECEVİT ÜNİVERSİTESİ

ACİL TIP A.D.

- **Anatomi**
- **Normal grafiler**
- **AP ve Lateral grafide köşe taşları**
- **Lateral kondiler kırık**
- **Medial kondiler kırık**
- **Suprakondiler kırık**
- **Radius başı kırıkları**
- **Monteggia's kırıkları**
- **Galeazzi Kırığı**
- **Coronoid kırıkları**
- **Dirsek çıkığı**
- **Olekranon kırığı**

Dirsek Eklemi

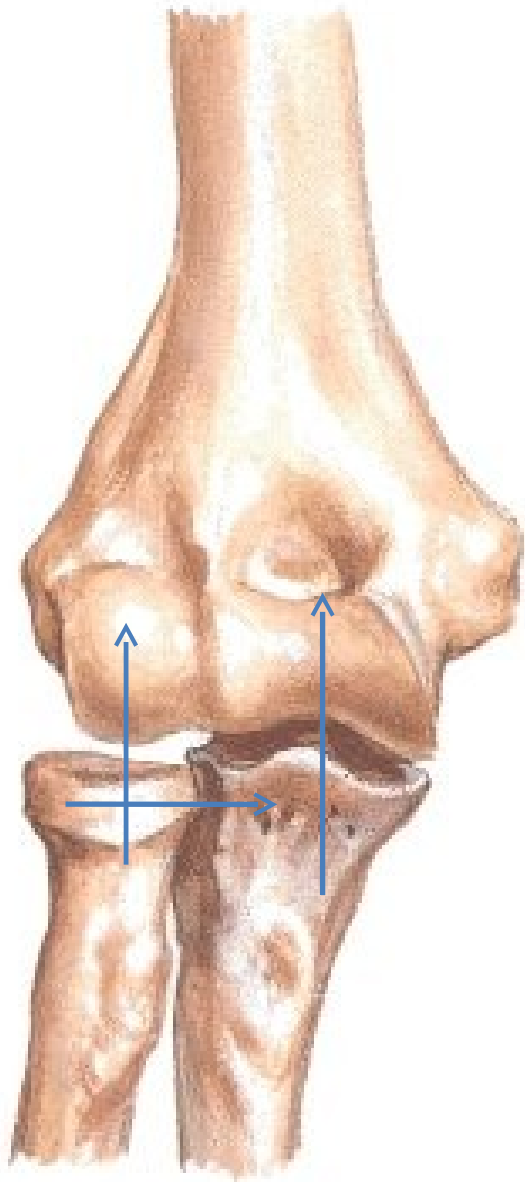
- 3 eklem yüzeyinden oluşur
- Trochoginglymoid tipte bir eklemdir.

Trochoid komponent;

- (1) radiohumeral and (2) proximal radioulnar eklem
- axial rotasyon

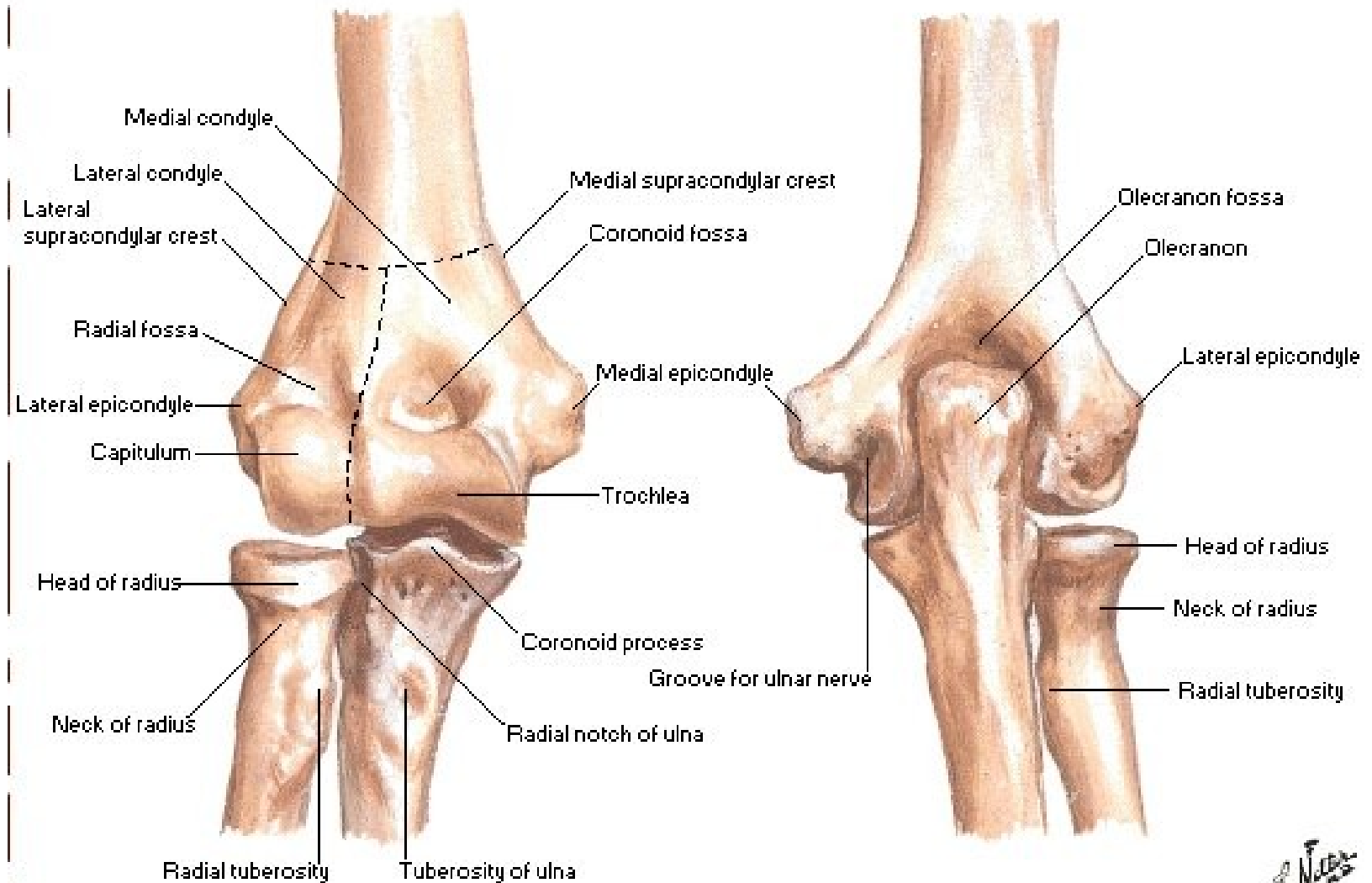
Ginglymus komponent

- (3) ulnohumeral eklem
- flexion and extension



Bones of Elbow in Extension

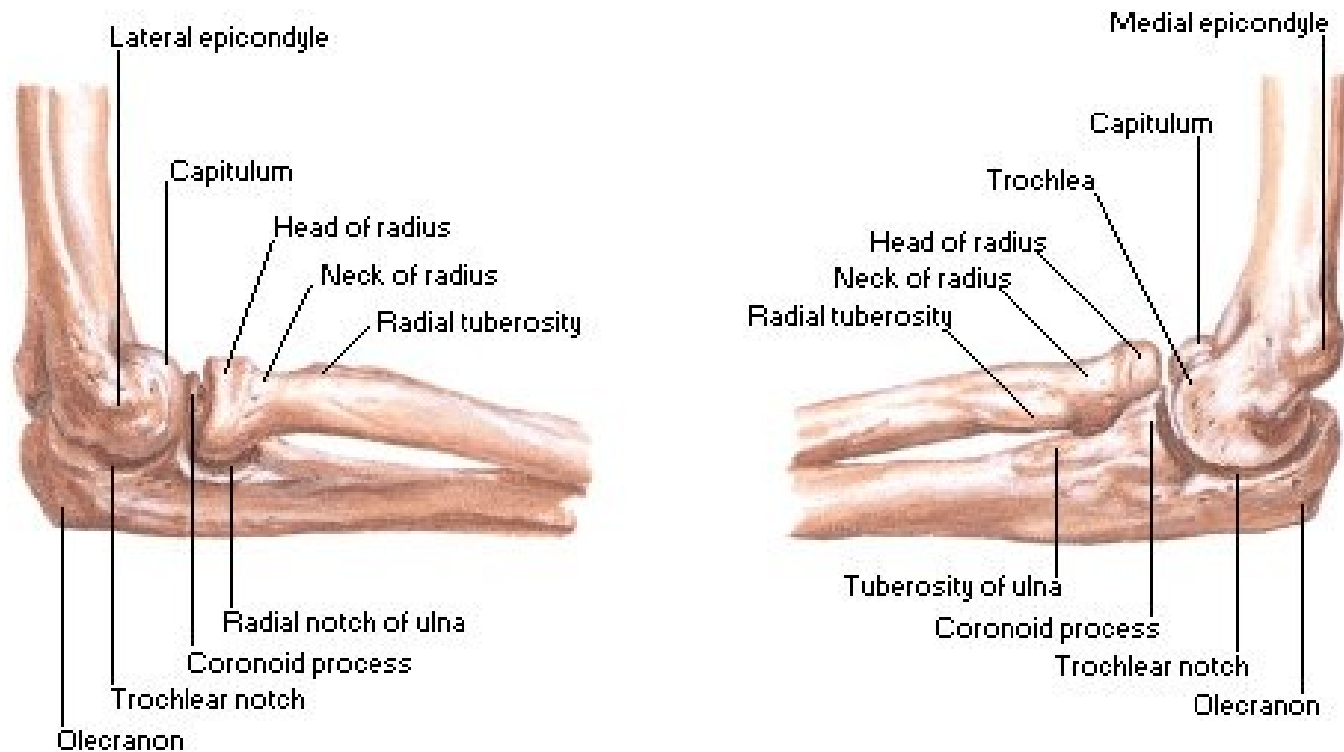
Anterior and Posterior Views





Bones of Elbow in 90° Flexion

Lateral and Medial Views



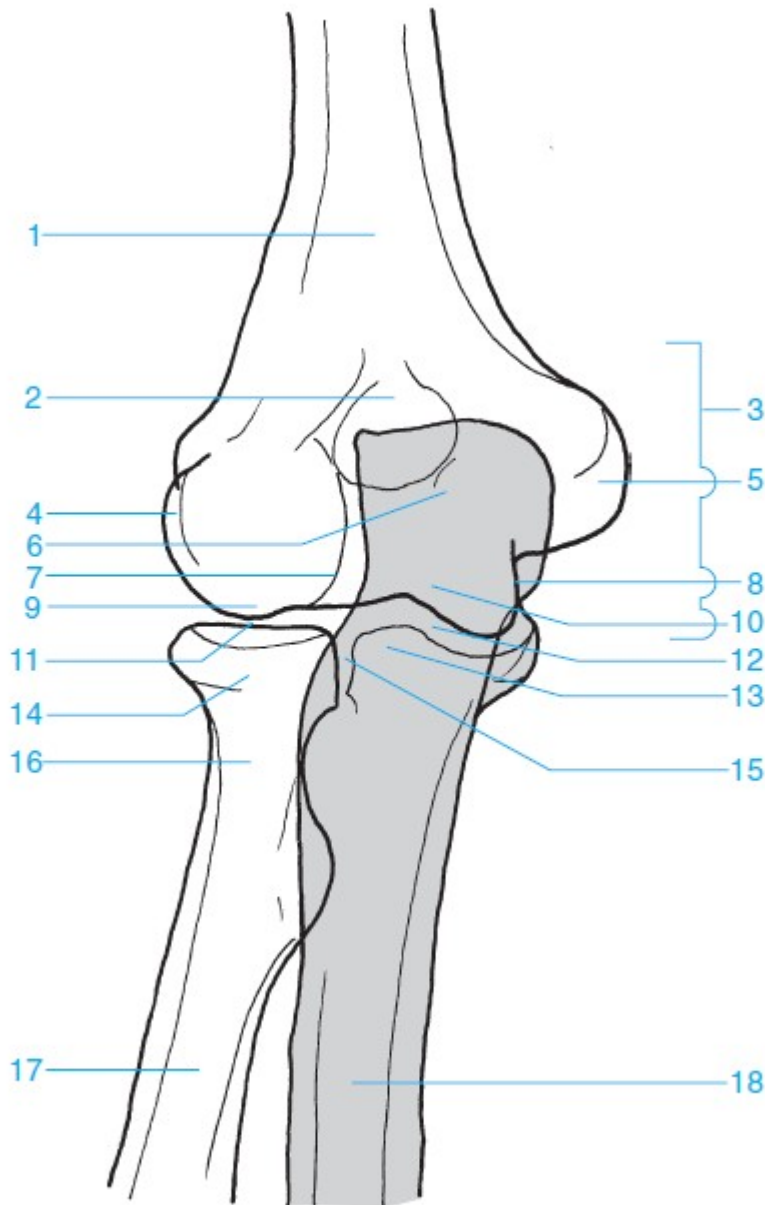
Radyolojik Değerlendirme

- Anteroposterior (AP)
- Tam lateral grafi
- BT
- MR
- USG

AP Grafi

- Dirsek tam ekstansiyonda
- Önkol supinasyonda

DİRSEK ANTEROPOSTERİOR GÖRÜNTÜSÜ

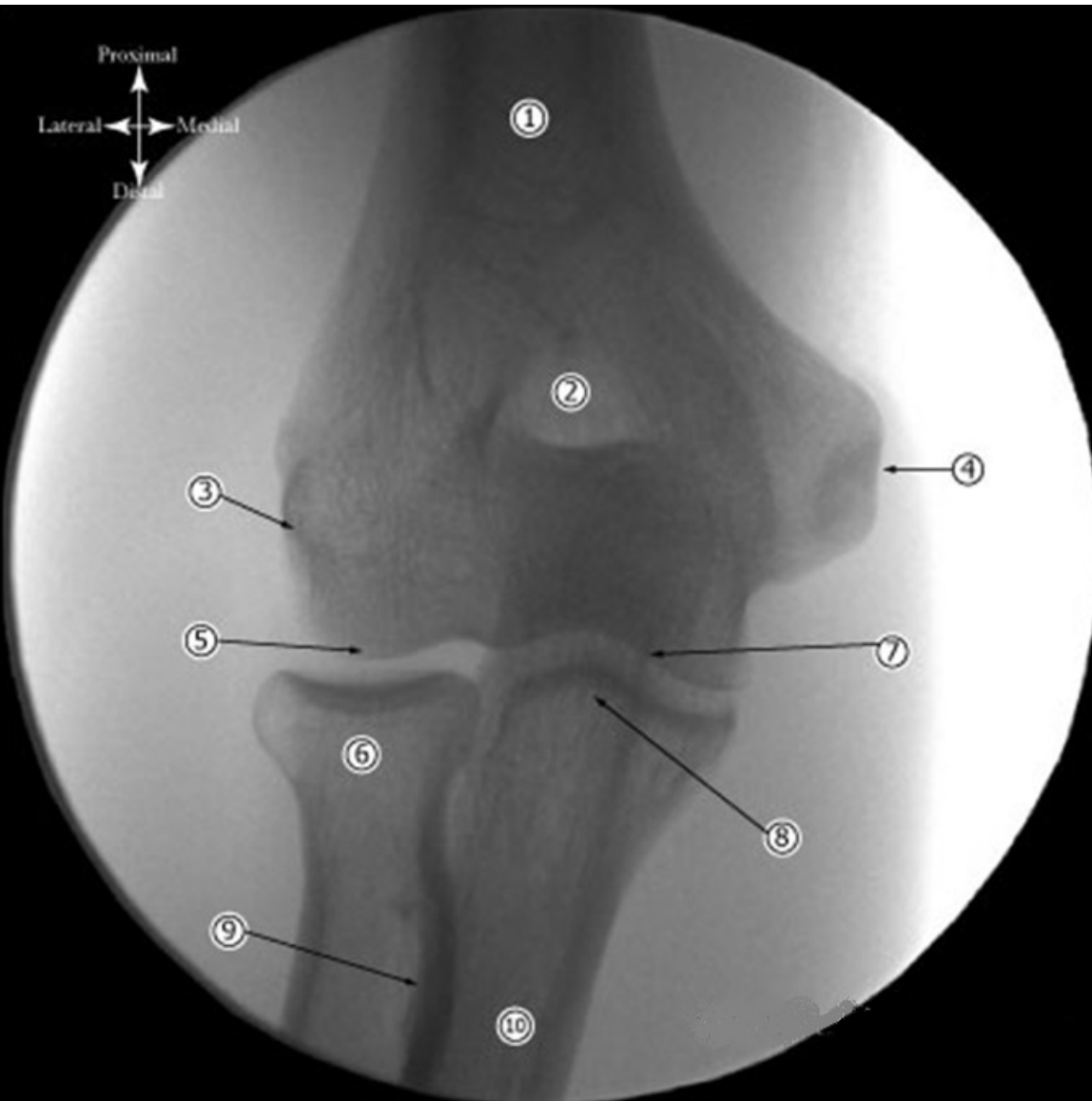


- 1 Humerus
- 2 Olecranon fossa
- 3 Medial epicondyle of the humerus
- 4 Lateral epicondyle of the humerus
- 5 Apex of the medial epicondyle of the humerus
- 6 Olecranon
- 7 Lateral margin of the trochlea
- 8 Medial margin of the trochlea
- 9 Capitellum
- 10 Trochlea
- 11 Humeroradial joint
- 12 Humeroulnar joint
- 13 Coronoid process
- 14 Radial head
- 15 Proximal radioulnar joint
- 16 Radial neck
- 17 Radius
- 18 Ulna

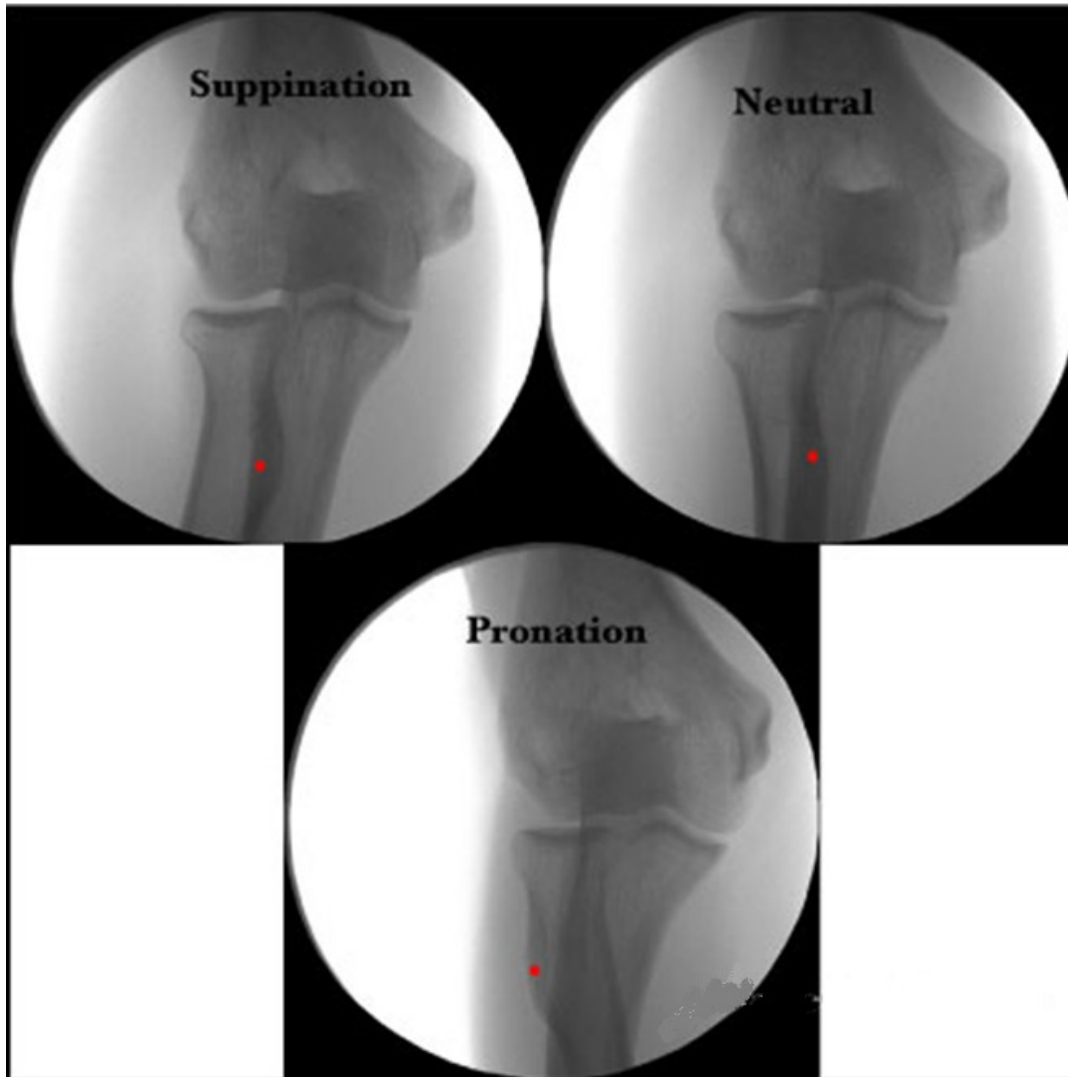
A



A/P Elbow Xray - Forearm in supination



1. Humeral Shaft
2. Olecranon fossa
3. Lateral epicondyle
4. Medial epicondyle
5. Capitellum
6. Radial head
7. Trochlea
8. Conoid tubercle
9. Radial tuberosity
10. Ulnar Shaft



A/P Elbow through a ROM from full supination to full pronation. Red dot indicates position of radial tuberosity which moves from:

- Anterior position in suppination
- Posteromedial in neutral rotation
- Lateral in pronation

DİRSEK LATERAL GÖRÜNTÜ



Lateral Grafi

- Dirsek 90⁰ fleksiyonda
- Önkol nötral pozisyonda

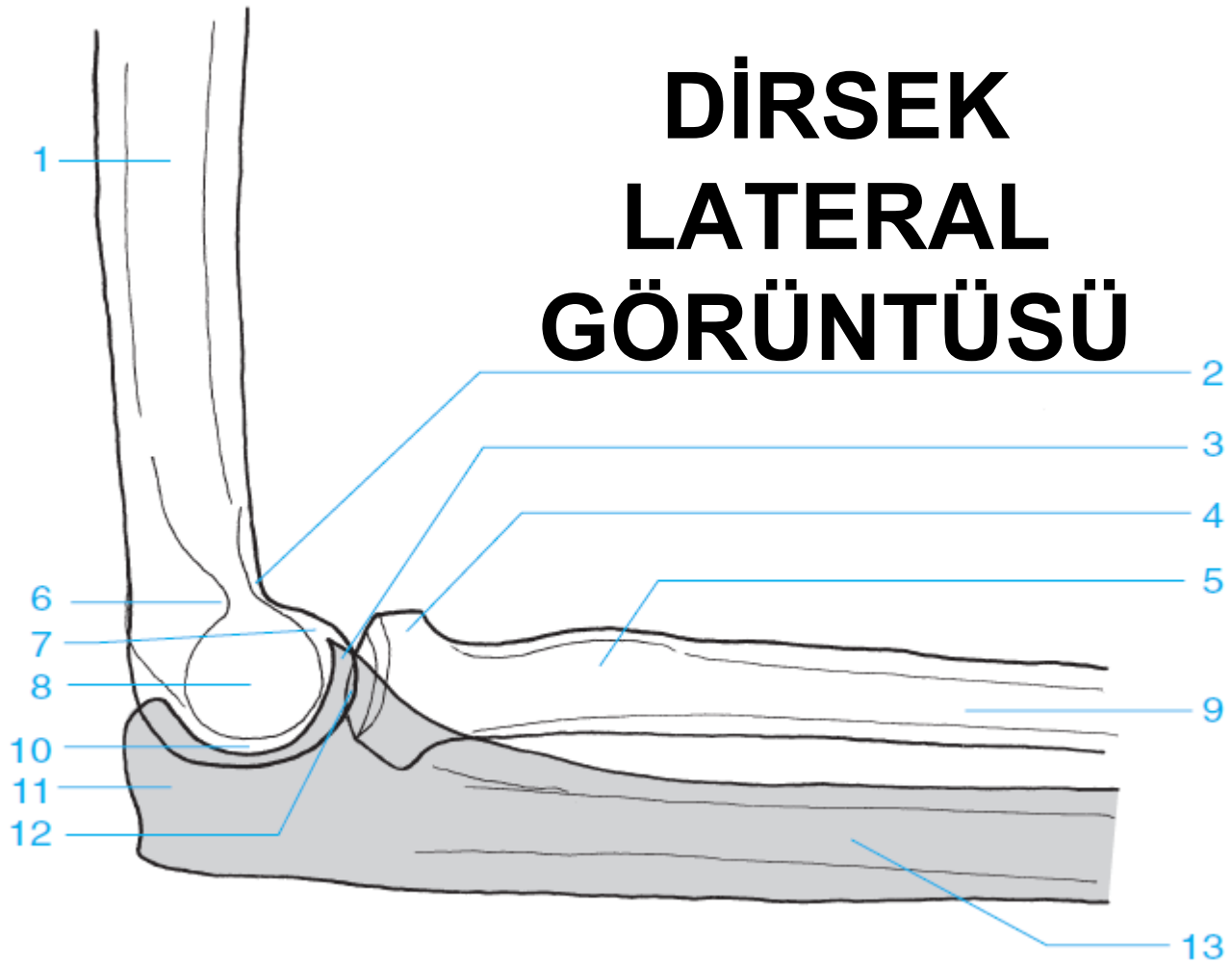
- coronoid and olecranon fossanın çakışması ile “teardrop” görüntüsü



Beyaz hat; coronoid in “teardrop” şekli

Siyah hat; olekranon fossa

DİRSEK LATERAL GÖRÜNTÜSÜ



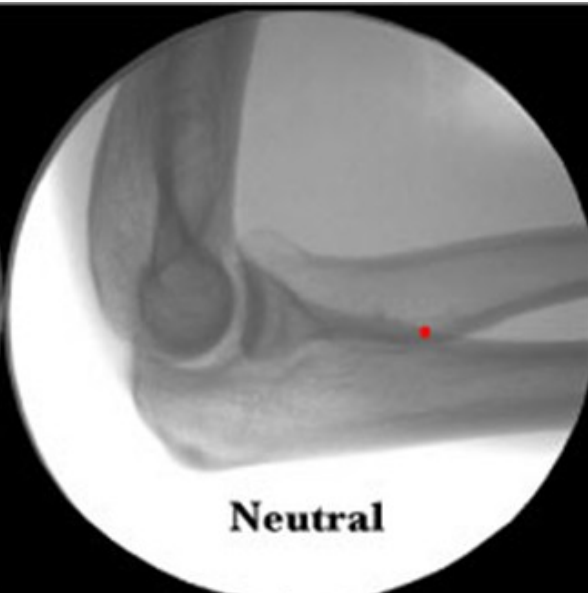
- 1 Humerus
- 2 Coronoid fossa
- 3 Coronoid process
- 4 Radial head
- 5 Radial tuberosity
- 6 Olecranon fossa
- 7 Medial epicondyle

- 8 Lateral epicondyle
- 9 Radius
- 10 Humeroulnar joint
- 11 Olecranon
- 12 Humeroradial joint
- 13 Ulna

Lateral Elbow Xray- Forearm in supination



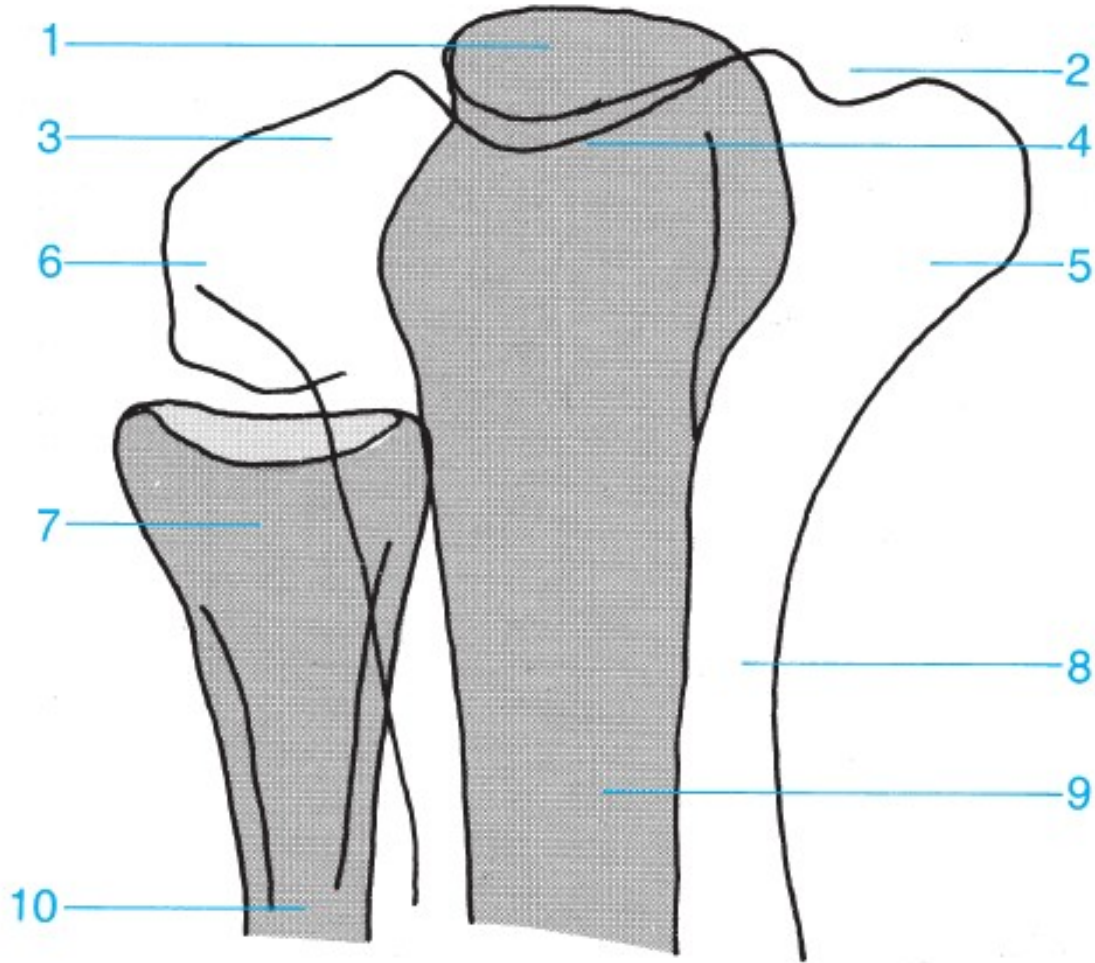
1. Humeral Shaft
2. Olecranon fossa
3. Olecranon
4. Lateral epicondyle
5. Conoid tubercle
6. Radial head
7. Radial tuberosity
8. Radius
9. Ulna
10. Medial epikondil



Lateral Elbow through a ROM
from full supination to full pronation. Red dot indicates position of radial tuberosity which moves from:

- Anterior position in suppination
- Posteromedial in neutral rotation
- Lateral in pronation

DİRSEK AKSİYAL GÖRÜNTÜ



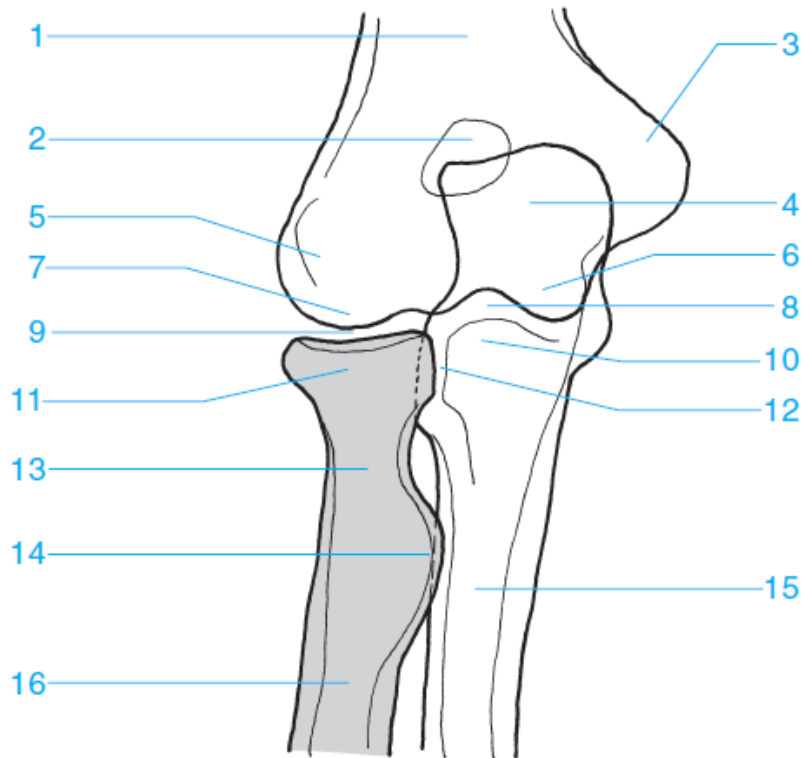
- 1 Olecranon
- 2 Cubital tunnel
- 3 Capitellum
- 4 Trochlea
- 5 Medial epicondyle

- 6 Lateral epicondyle
- 7 Radial head
- 8 Humerus
- 9 Ulna
- 10 Radius

DİRSEK AKSİAL GÖRÜNTÜ

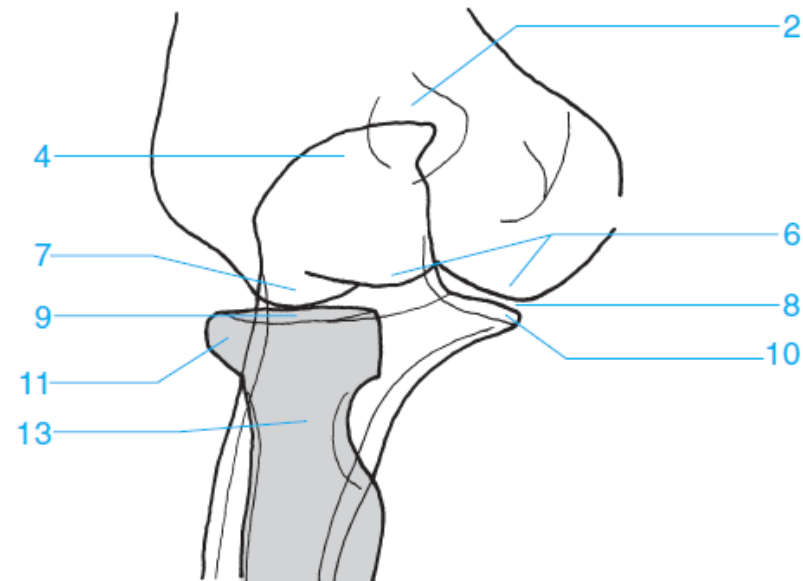


RADIUS OBLIQ GÖRÜNTÜSÜ



- 1 Humerus
- 2 Olecranon fossa
- 3 Medial epicondyle
- 4 Olecranon
- 5 Lateral epicondyle
- 6 Trochlea
- 7 Capitellum
- 8 Humeroulnar joint

- 9 Humeroradial joint
- 10 Coronoid process
- 11 Radial head
- 12 Proximal radioulnar joint
- 13 Radial neck
- 14 Radial tuberosity
- 15 Ulna
- 16 Radius



RADIUS OBLİQ GÖRÜNTÜSÜ



Travma

- Deplase olmayan ya da minimal deplase olan kırıklar görülemeyebilir.
- Kırık şüphesinin olması,
- ilgili radyolojik anatomi
- yaralanmanın sekonder bulguları yardımcı olacaktır.

Radyolojik deęerlendirmede önemli köşe taşları-1

- Anterior humeral hat
- Radiocapitellar hat
- Coronoid hattın yumuşak ve konkav olması
- Anormal fat-pad belirtisi
 - Yükselmiş anterior fat-pad yada sail işareti
 - Posterior fat-pad
- Yeri deęişmiş supinator yağ düzlemi
- Olecranon bursa

Radyolojik değerlendirilmede önemli köşe taşları-2

- Ossifikasyon merkezleri “**CRITOE**”
- **C**apitellum
- **R**adius başı
- **I**nternal or medial epicondyle
- **T**rochlea
- **O**lecranon
- **E**xternal or lateral epicondyle

Ossifikasyon merkezleri

CRITOE

- **C** = CAPITELLUM
- **R** = RADIAL HEAD
- **I** = INTERNAL EPICONDYLE (MEDIAL)
- **T** = TROCHLEA
- **O** = OLECRANON
- **E** = LATERAL EPICONDYLE

**3. Medial
Epicondyle**

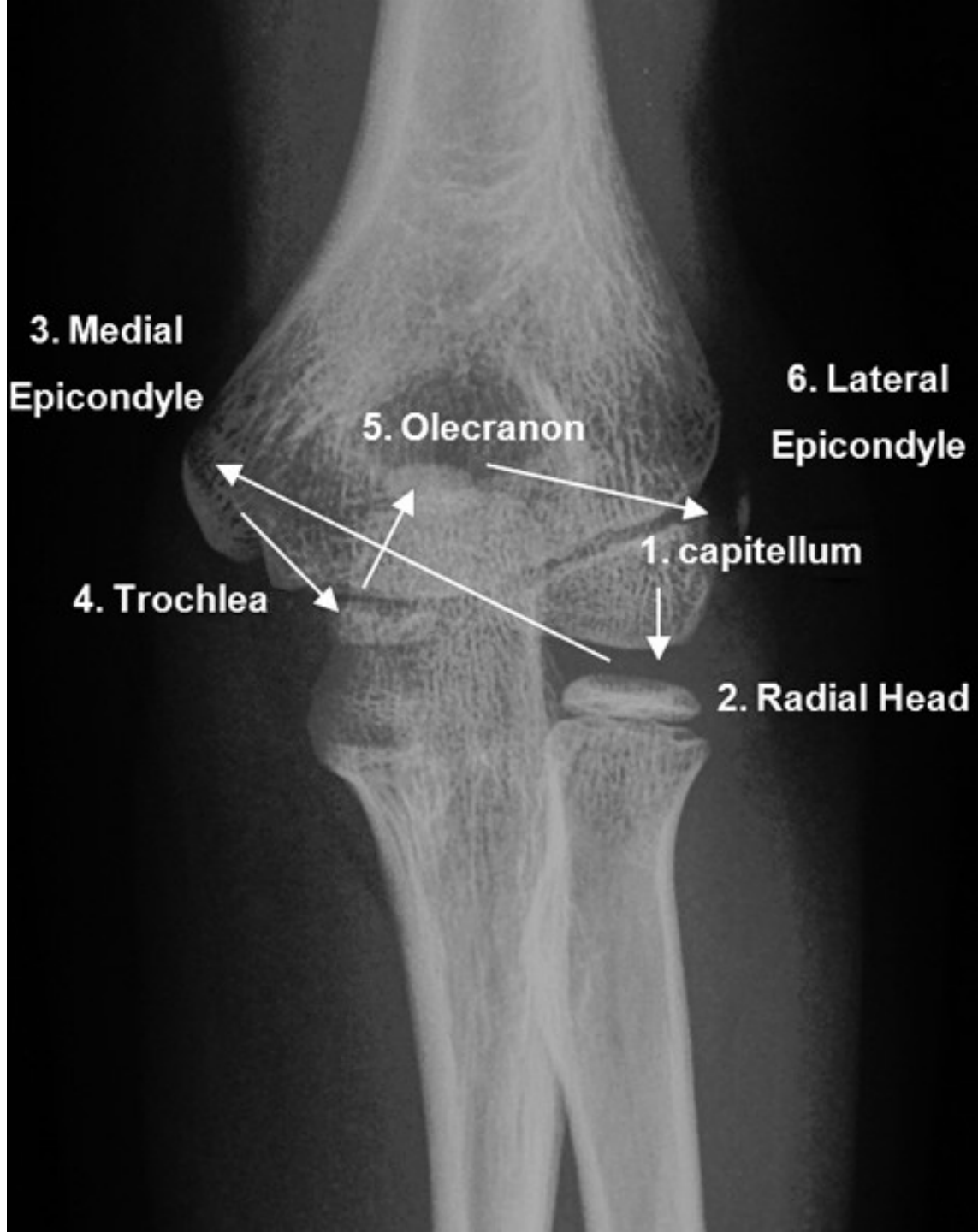
**6. Lateral
Epicondyle**

5. Olecranon

4. Trochlea

1. capitellum

2. Radial Head



Ossifikasyon merkezleri



Epifizal Füzyon

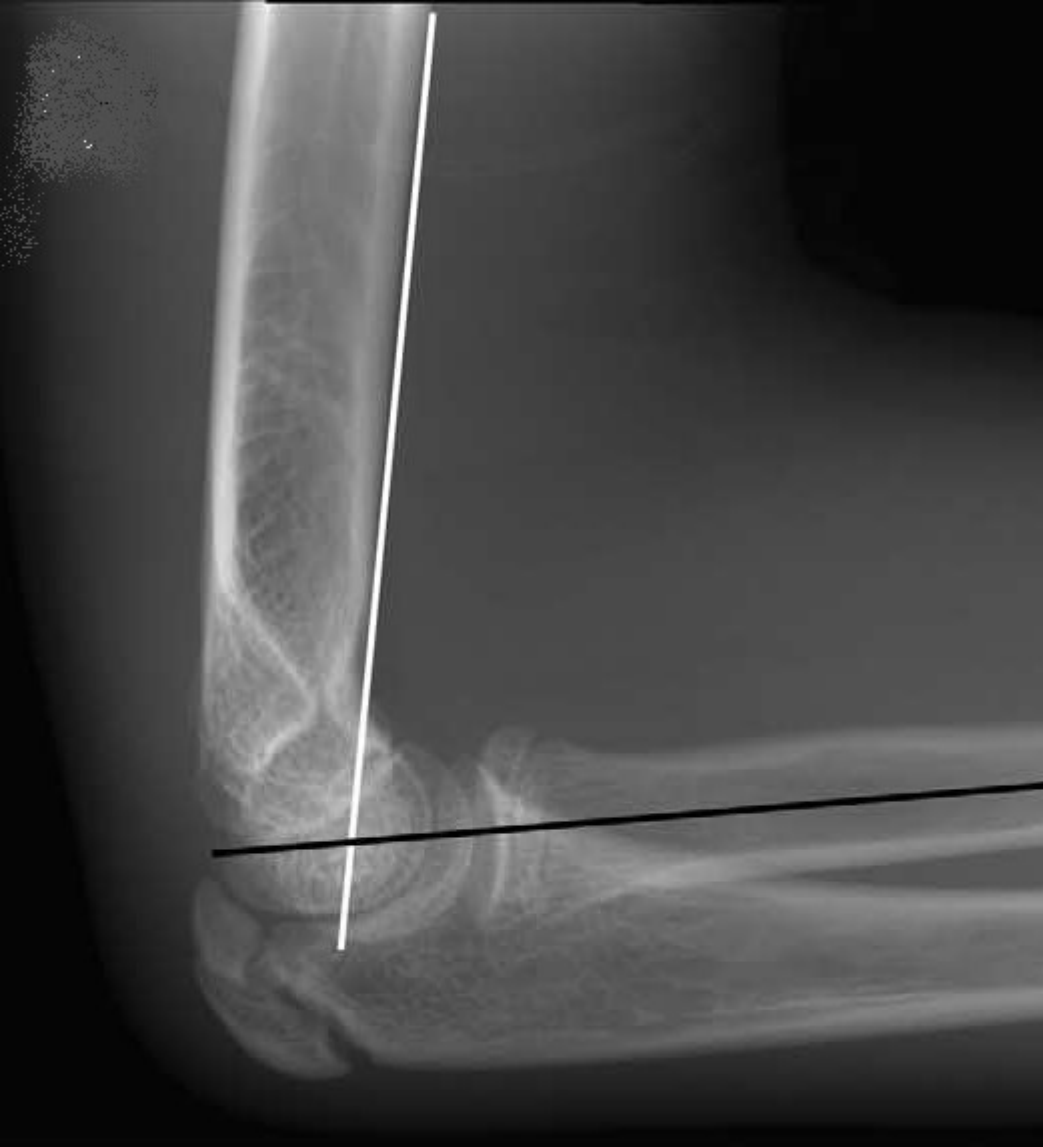
- lateral epicondyle,trochlea --13 yaş
- medial epicondyl---geç ergenlik
- capitellum ossification-- 6ay-2yaş

Anterior Humeral Line

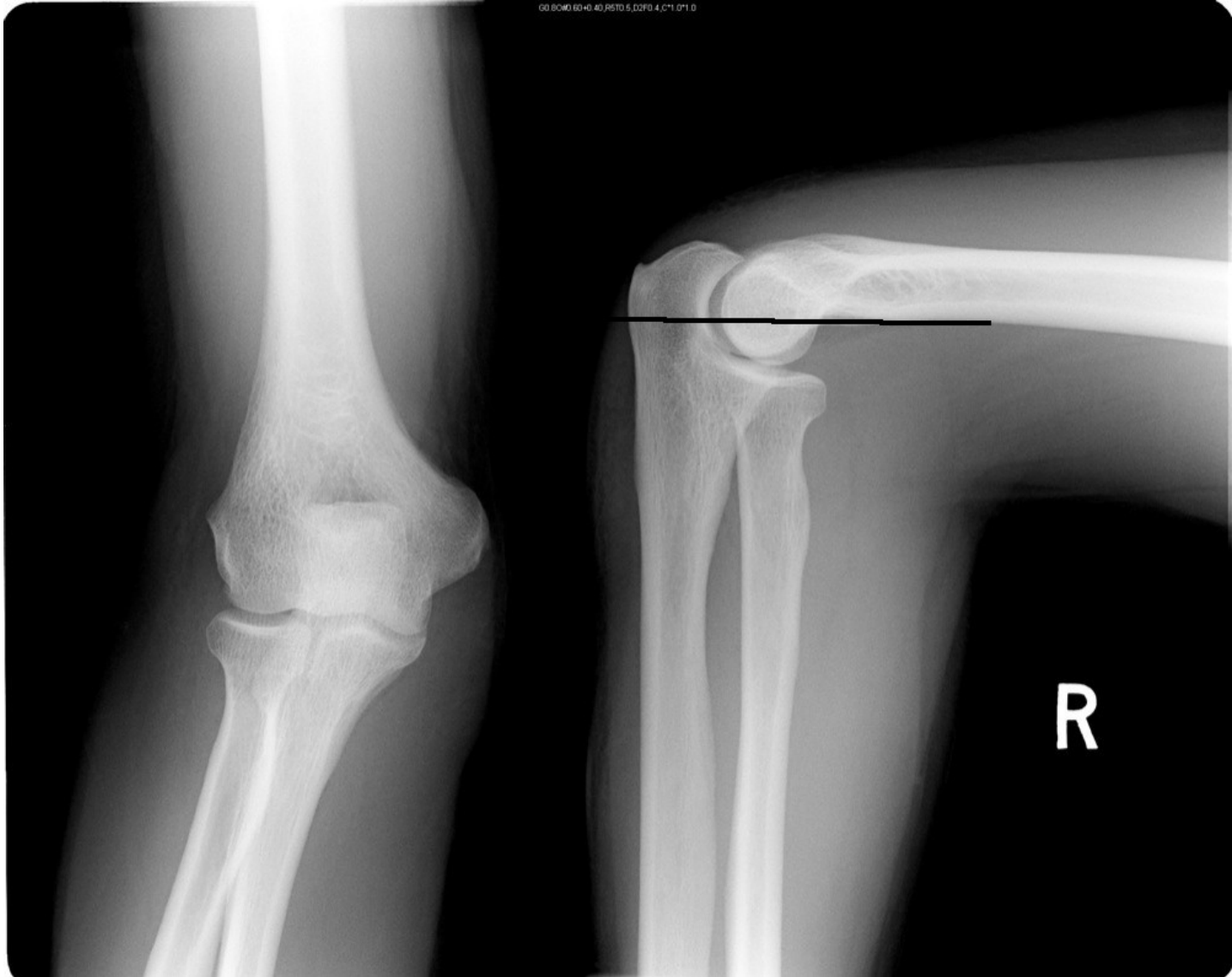
Lateral grafide anterior humeral kortexten çizilen hat capitellumun $1/3$ ünün ortasından geçmeli.

Hattın anterior ya da posteriora yer değiştirmesi;

- Epifiz yaralanması
- Distal humerusta suprakondiler kırığı gösterir.



Anterior humeral line

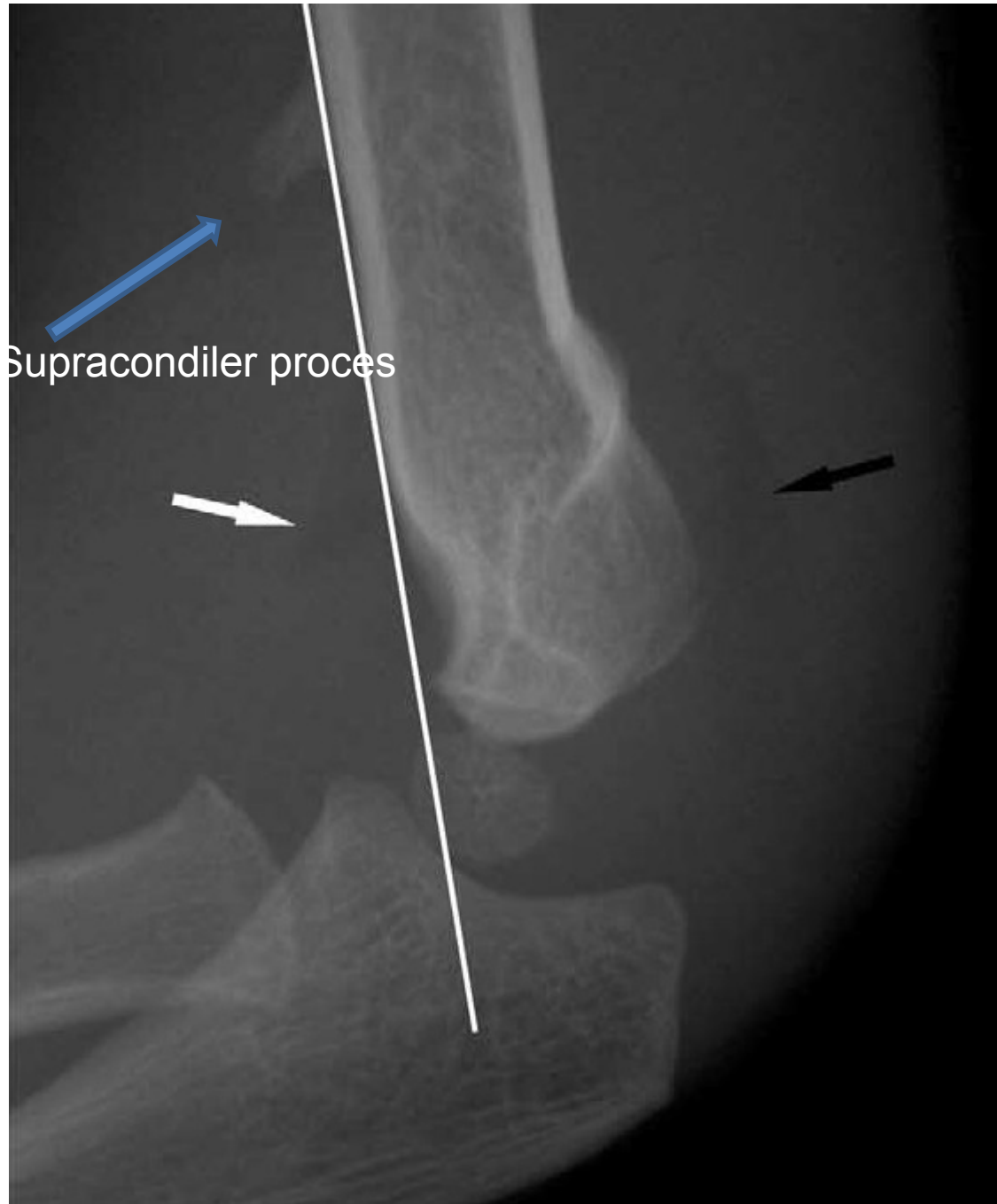


Anterior humeral line





Lateral grafide;
Suprakondiler kırık durumunda
capitellum ossifikasyon merkezi
anterior humeral hattın posteriorunda
gör÷lmekte.



Supracondiler proces

Capitellum anterior humeral linenin posteriorunda

Anterior ve posterior fat pad sign

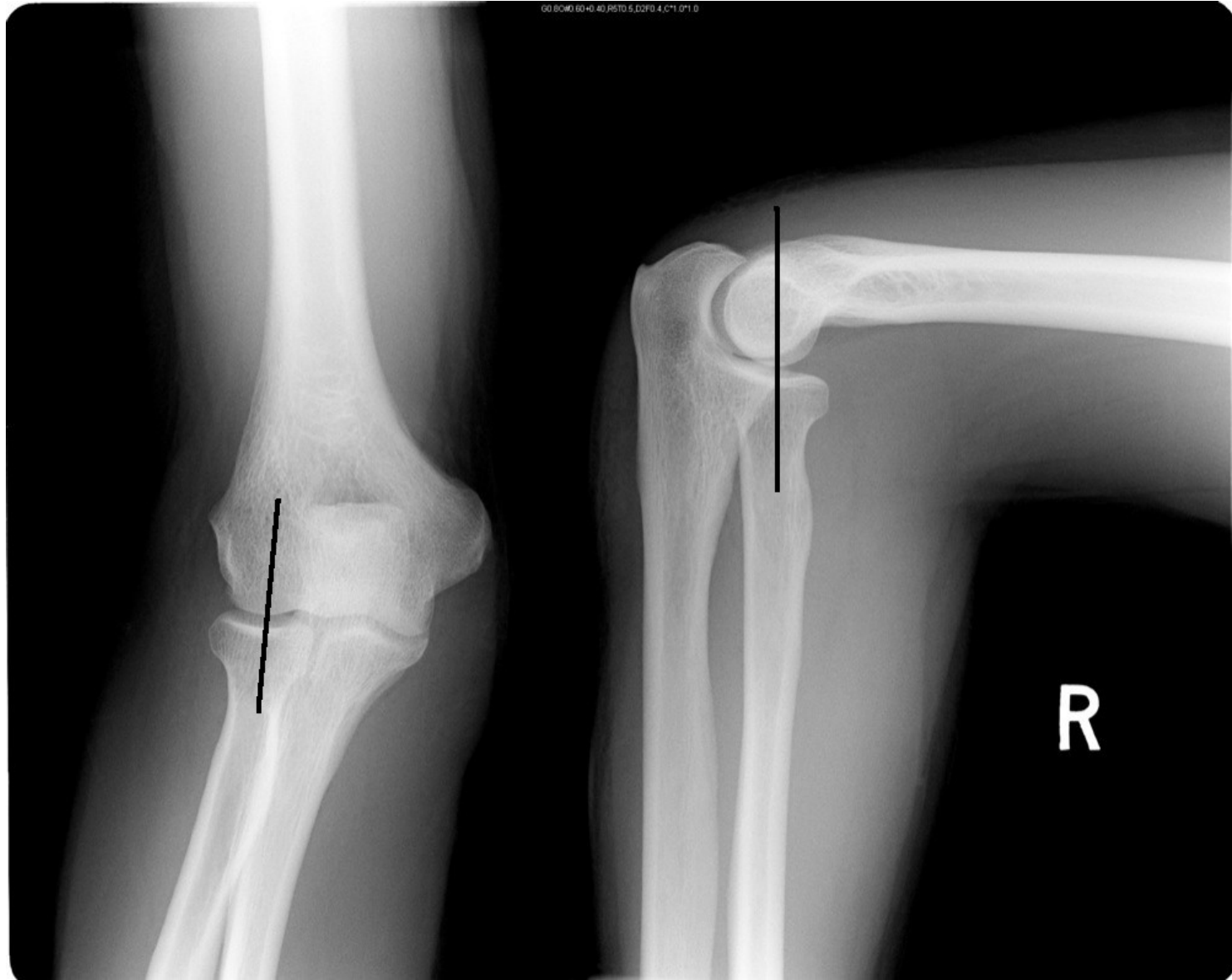
Radio-Capitellar Line

- Radiusun uzun aksı-capitellum
- Herhangi bir sapma radius başı çıkığı
- 4 yaş altı çocuklarda humerusun en zayıf komponenti distal humeral epifizal büyüme plağıdır.
- 4-10 yaş arasında dirsek kırıklarınının %60 ı suprakondiler
- Daha sonra medial ve lateral epikondil kırıkları

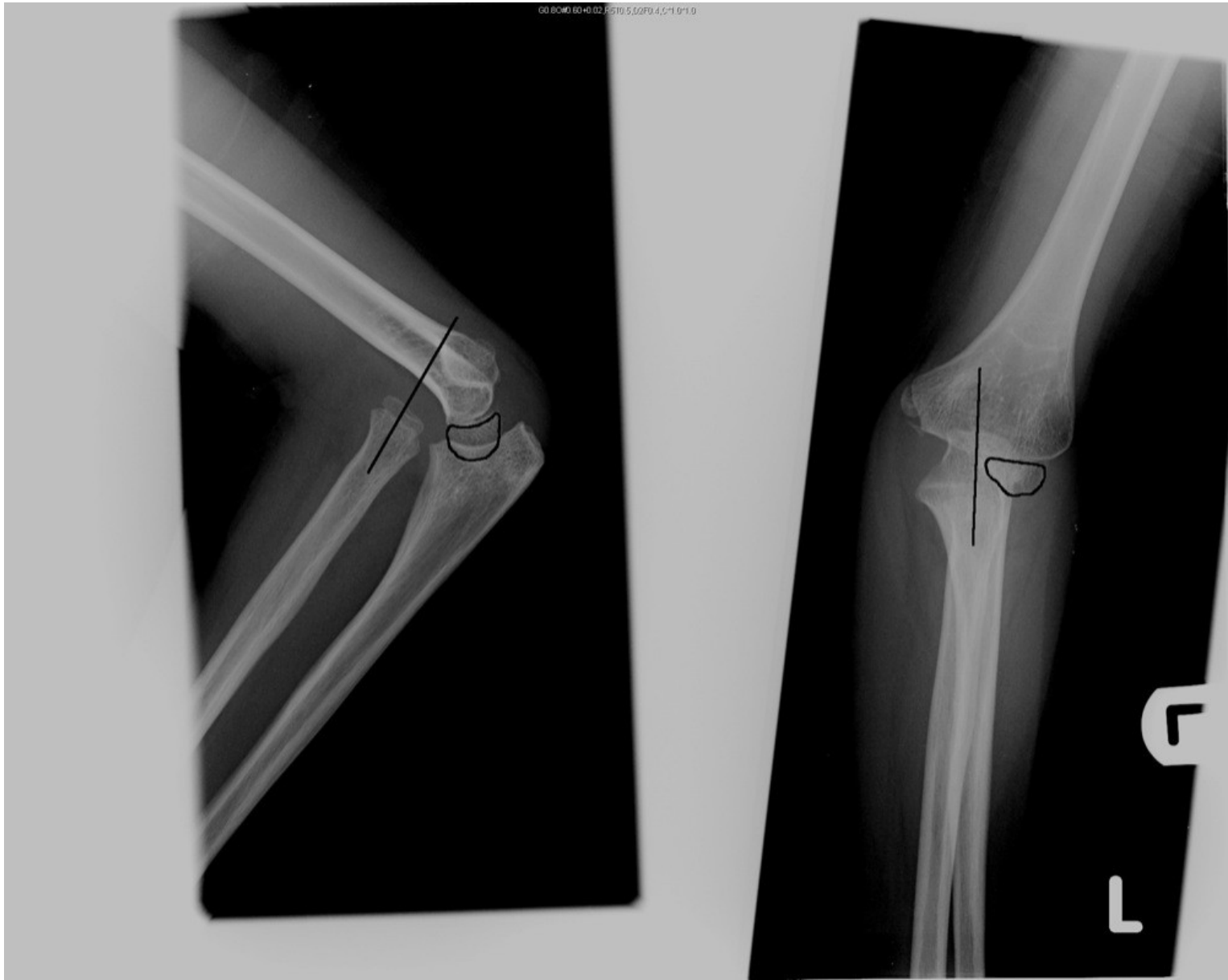


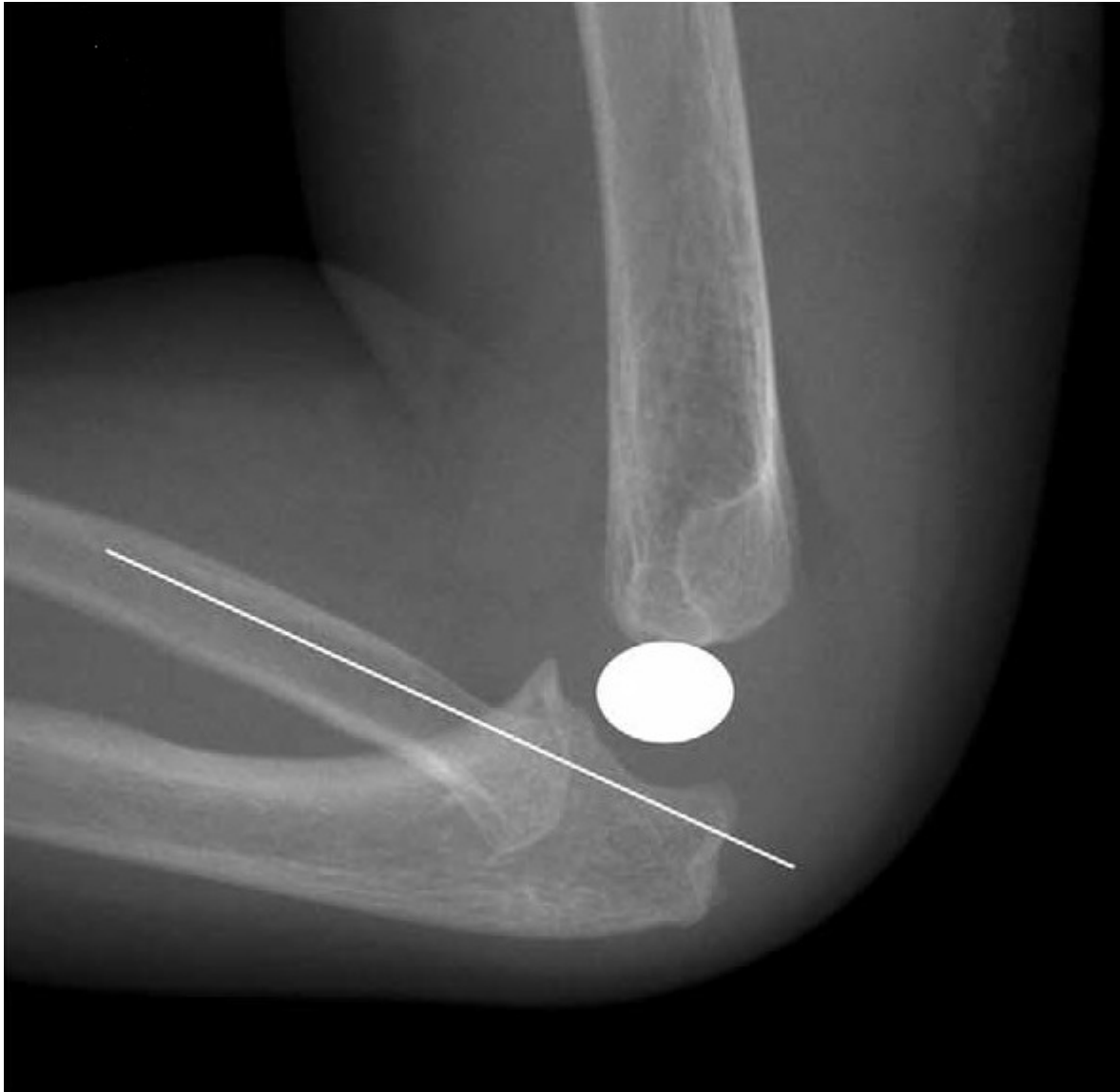
Beyaz hat;Anterior humeral line
Siyah hat;Radiocapitellar line

Radiocapitellar Line



Radiocapitellar Line







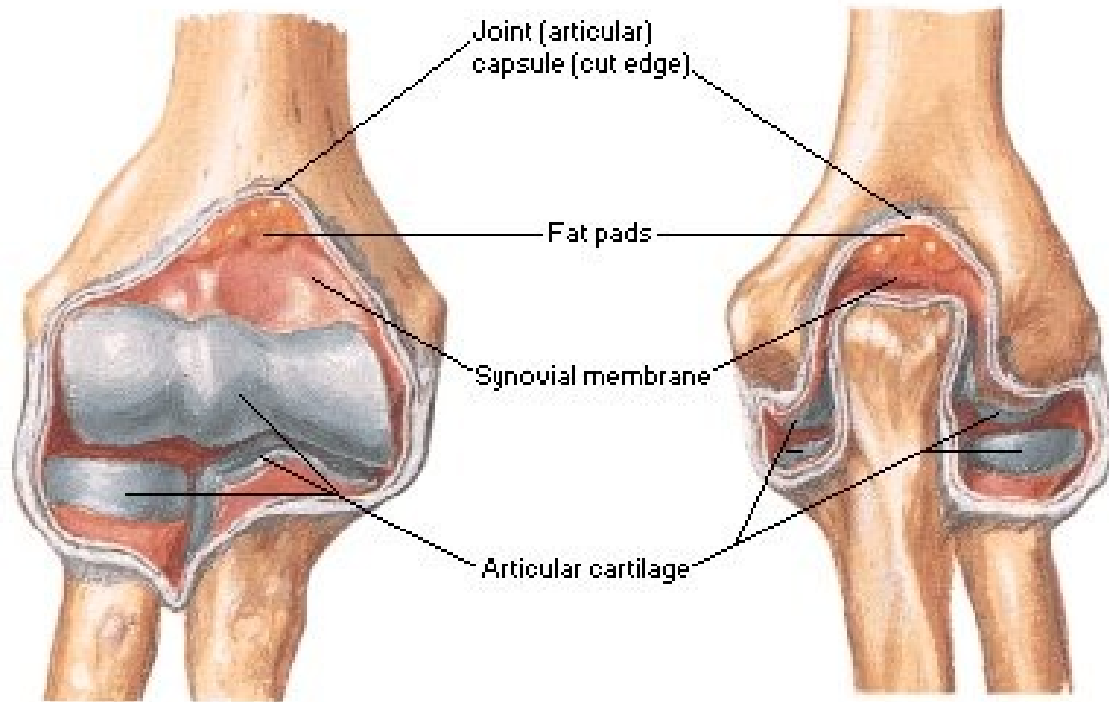
Lateral obliq grafide radius başının anteromedial çıkığı. Radiocapitellar line capitellum ossifikasyon merkezinin medialinde kalmış.

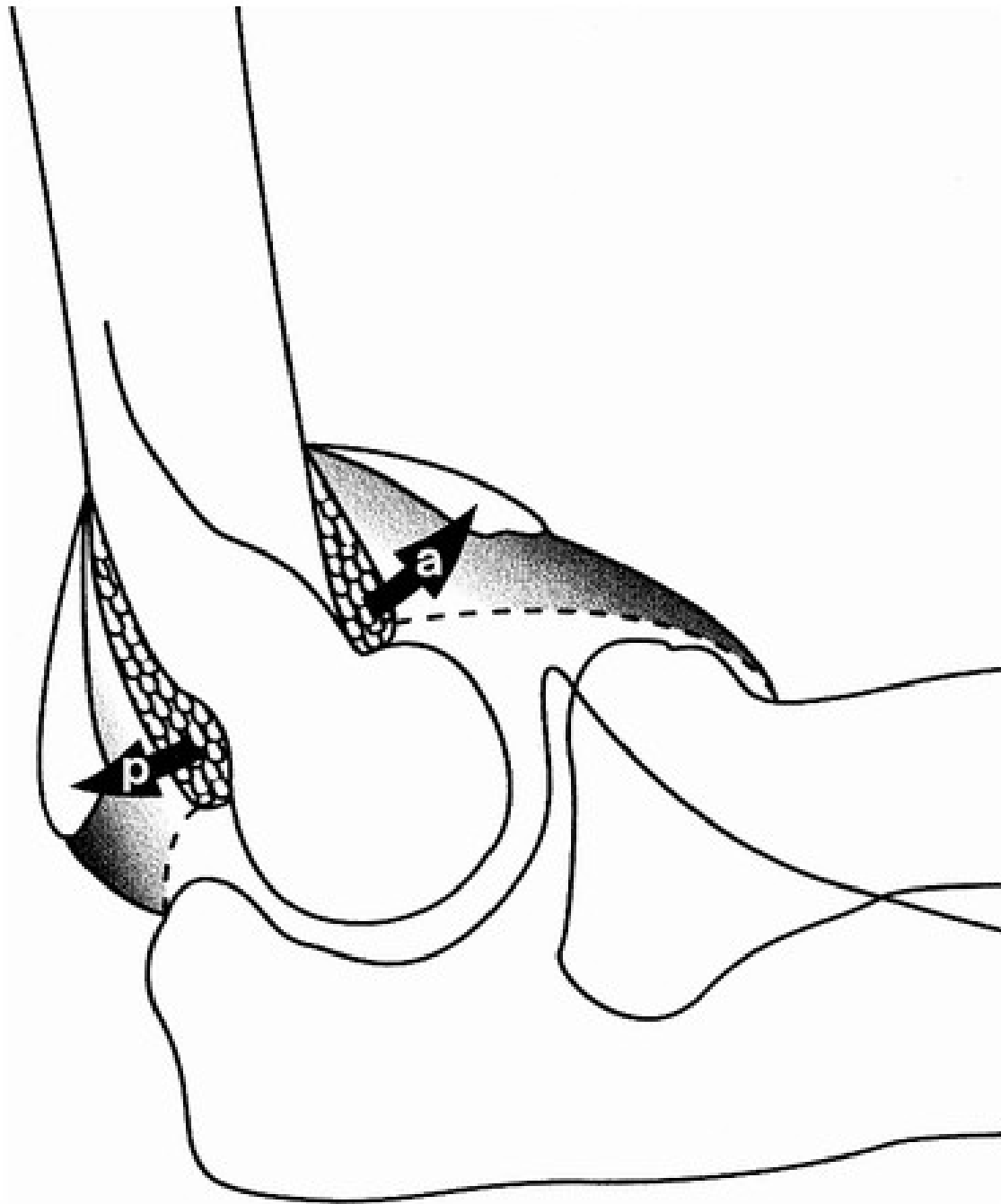
Fat Pad Sign

- Ekstrasinovial yağ dokuları kapsüler sınır içinde bulunur.
- Posterior yağ dokusu olekranon fossa içine doğru uzanır.
- Ekleme uzanan herhangi bir fazlalık posterior radiolucent yağ dokusunu posterior humeral kortexe doğru iter.
- Anterior yağ dokusu normalde ince bir hat olarak görünür. Problem durumunda anteriorsuperiora doğru çıkar ve “sail sign” ortaya çıkar.

Elbow Joint [Opened]

Anterior and Posterior Views







Anterior ve posterior yağ dokusu

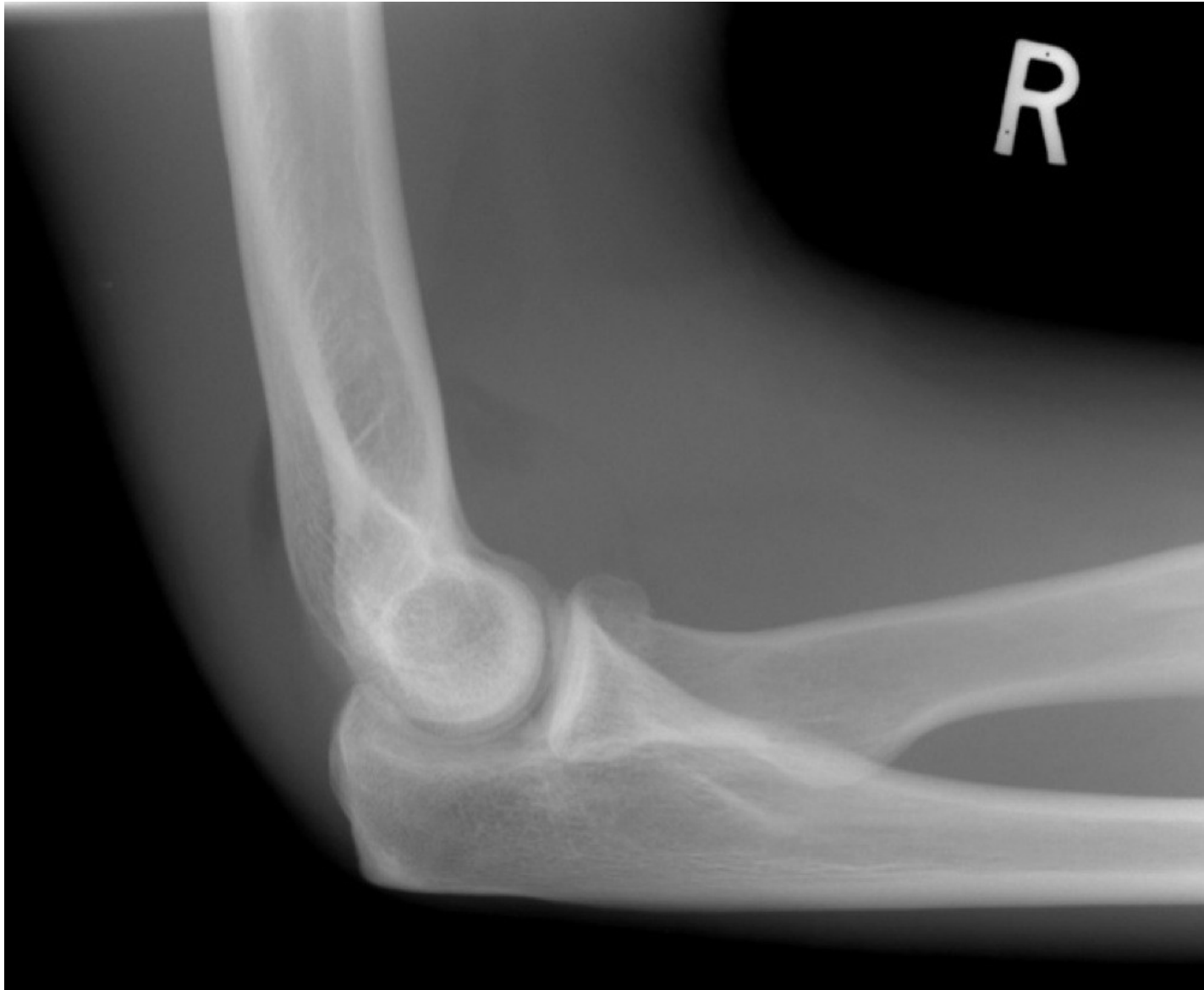
abnormal anterior fatpad →



Fat pad Sign



Fat pad sign

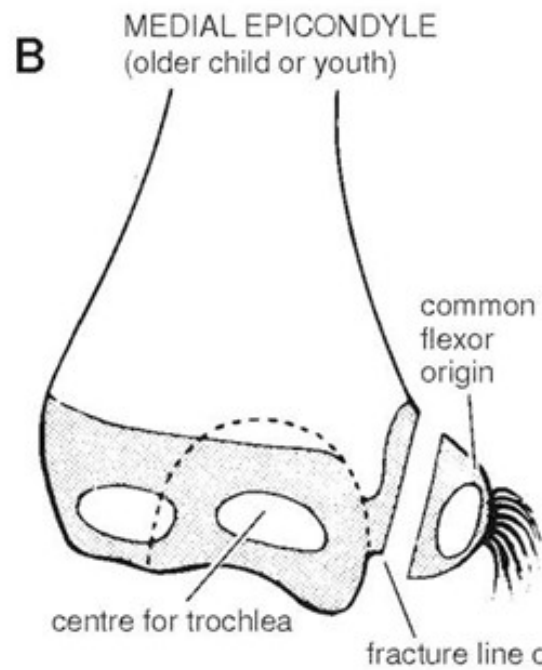
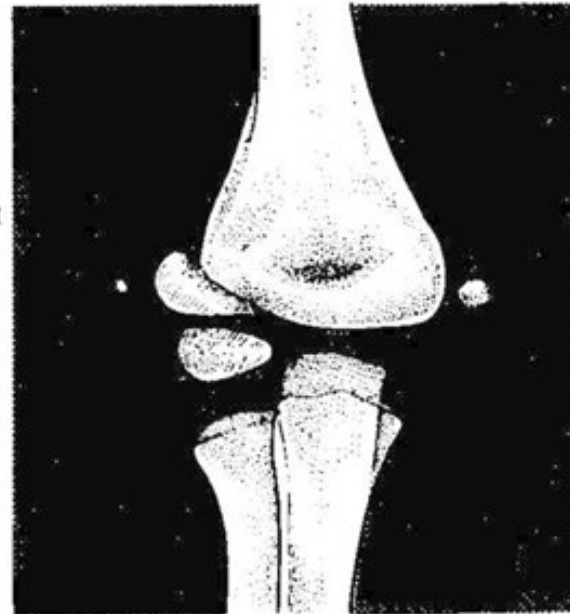
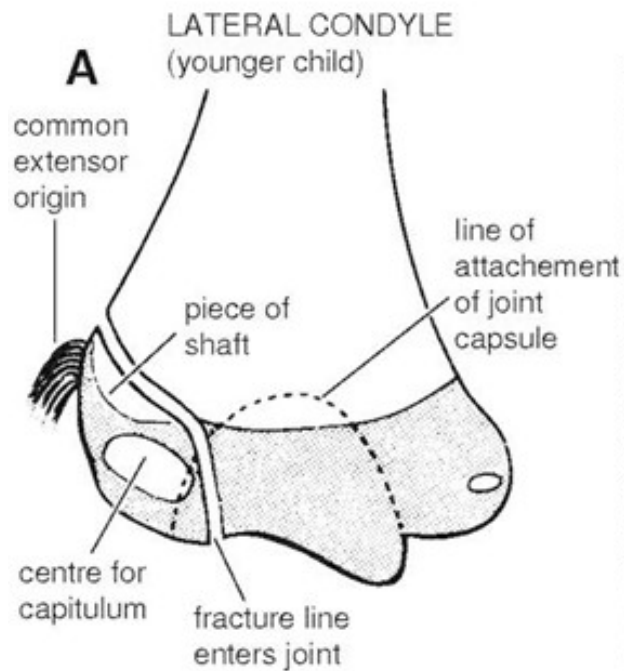


- İmmatür kırıldak komponentte olan kırıklar nedeniyle “fat pad sign” özellikle pediatrik popülasyonda önemlidir.
- MR bu vakalarda yardımcı olacaktır.



T1 ağırlıklı MR görüntüsünde
obliq suprakondiler kırık

Kondil Kırıkları



Lateral Kondiler Kırık

- Genellikle küçük çocuklarda sık

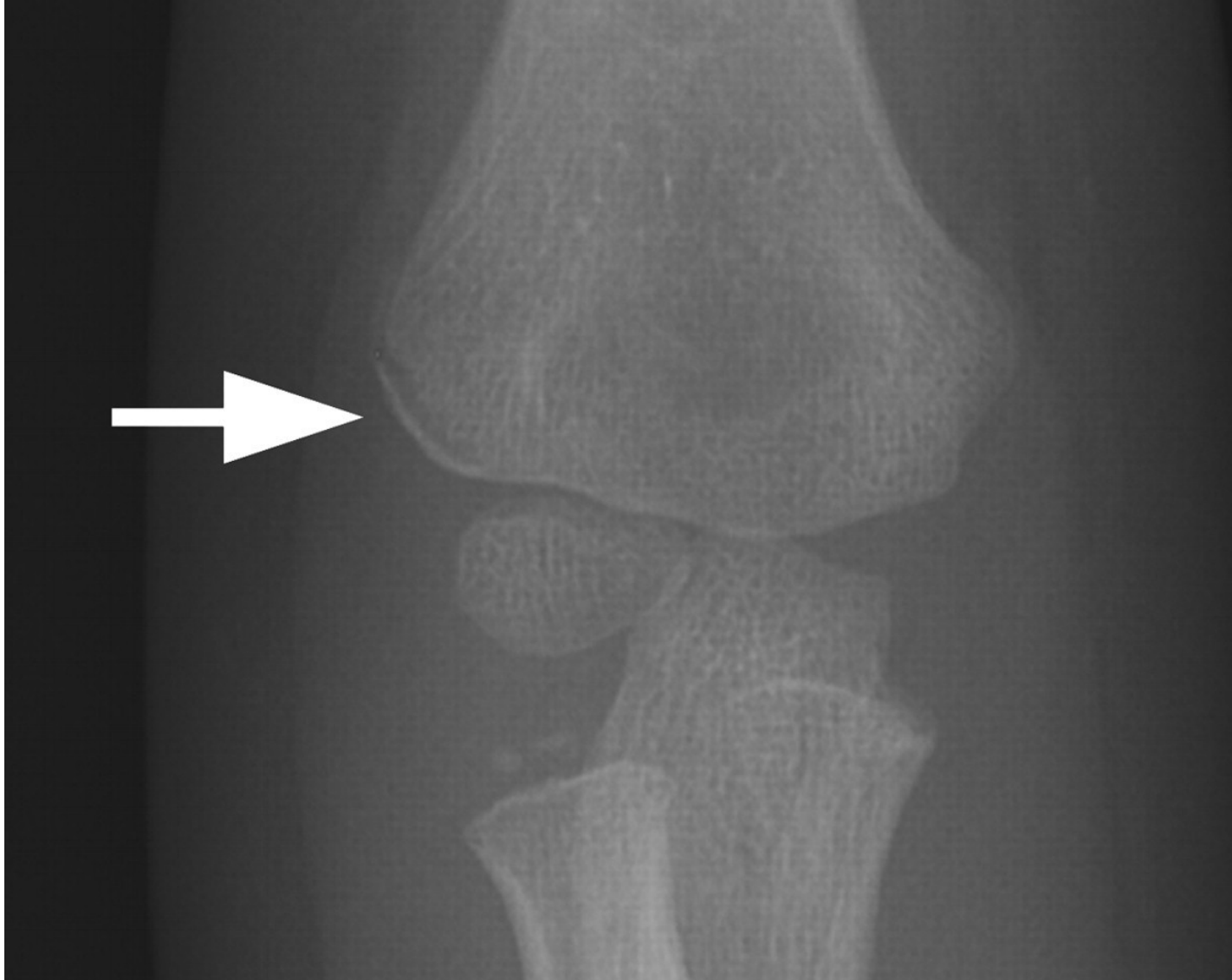
Lateral condyle fracture



Lateral kondil Kırığı



Lateral kondiler kırık



Lateral kondiler kırık



Lateral kondiler kırık



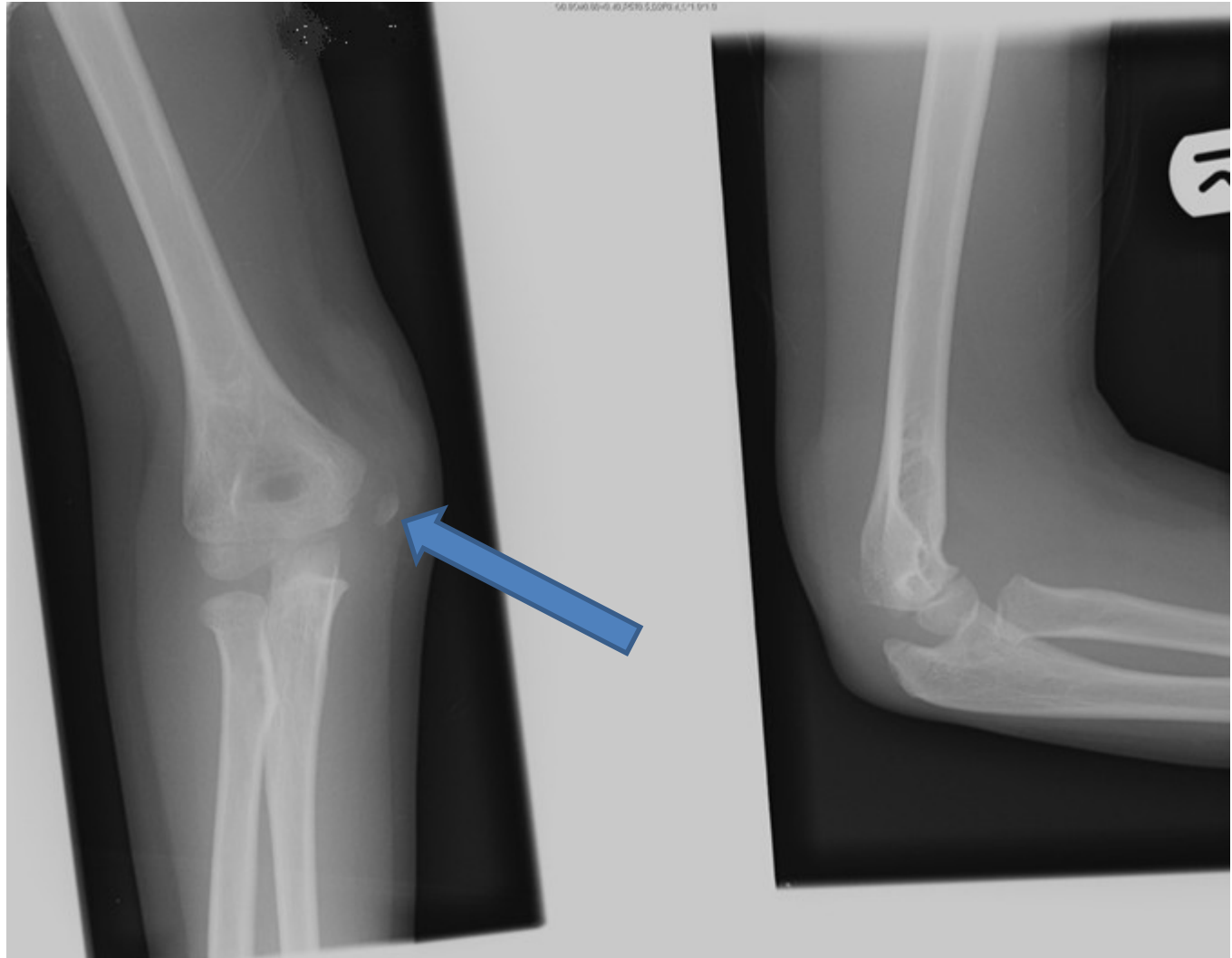


Minimal deplase
Lateral kondil kırığı.
Genellikle küçük
çocuklarda görülür.

Medial Kondiler Kırık

- Sıklıkla 9-15 yaş arasında

Avulsion of the ossification centre for the internal (medial) epicondyle





Suprakondiler Kırık

Suprakondiler Humerus Kırığı

- Çocuklarda distal humerus kırıkları sık
- yetişkinlerin %50 sinde radius başı kırıkları

Suprakondiler Humerus Kırığı



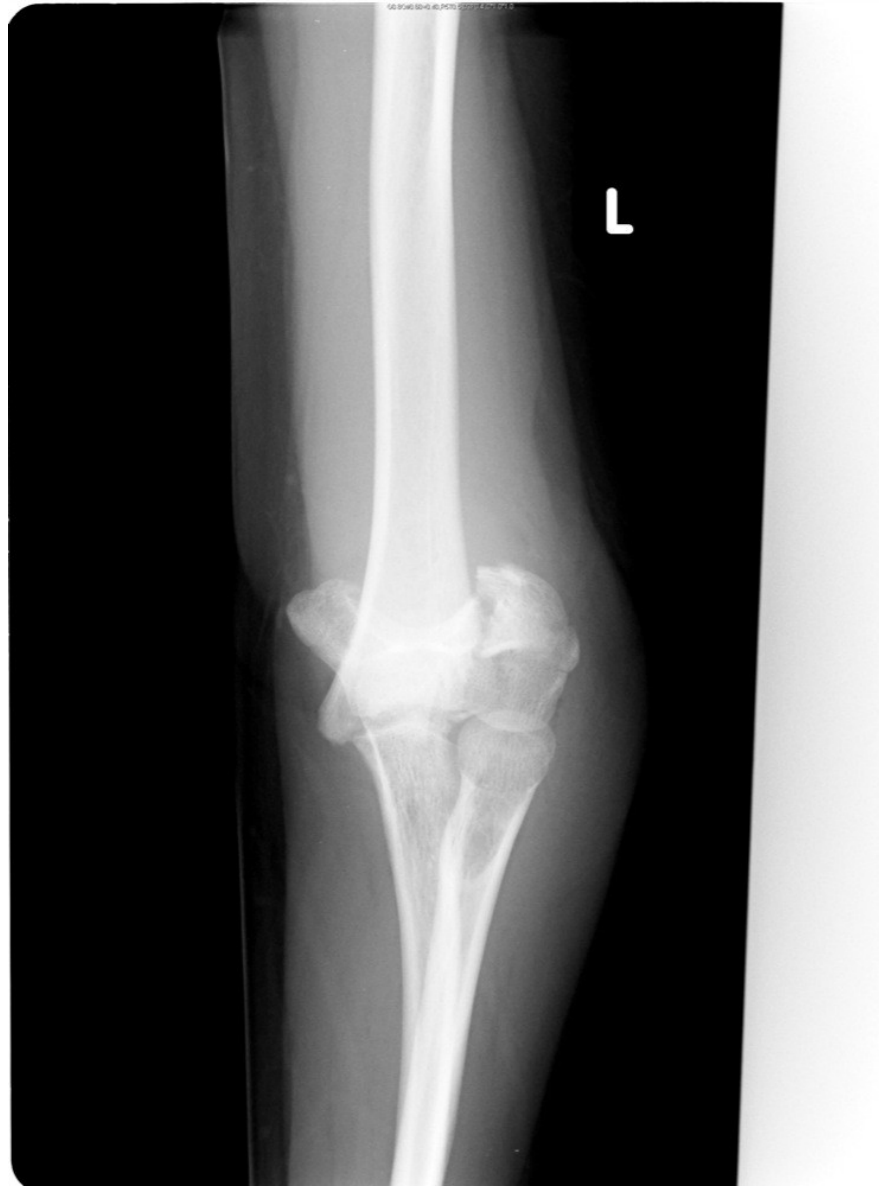
Supracondylar fracture



Supracondylar fracture



Supracondylar fracture



Radius Başı Kırıkları



Radius başında anterolateral kortikal sınırda fokal dađınıklık.



Lateral obliq grafide intraartiküler uzanan kırık hattı.



Normali konkav olan Radius baş ve boyun bileşkesinin fokal bozulması.
Anterior fat pad belirtisinin ortaya çıkması.



Radius boynu lateral sınırında kortekste bozukluk.

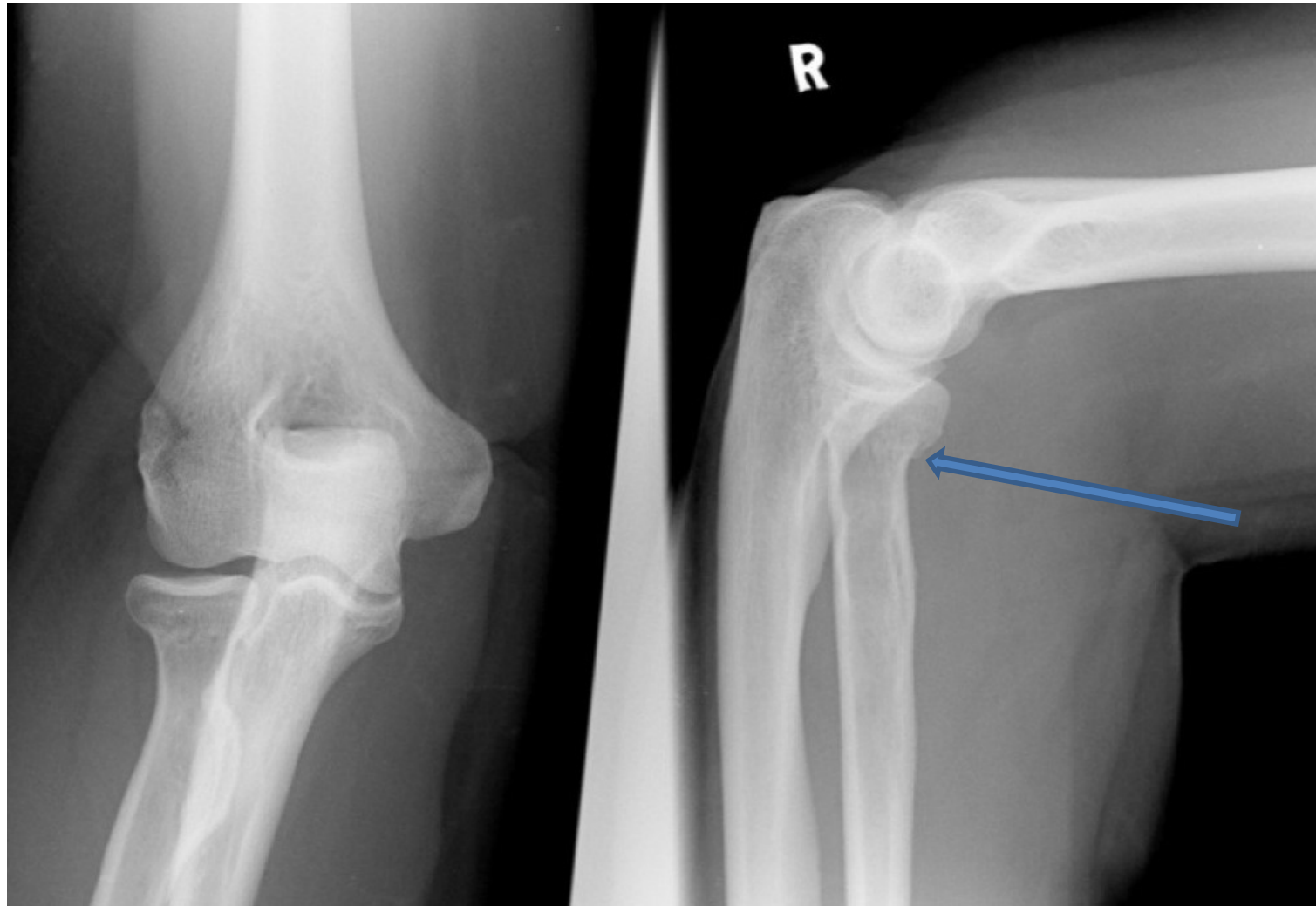
Radial head fracture

linear lucency extending into the joint



Radial head fracture

cortical break at the neck



- 2 mm den fazla yada radius başı yüzeyinin 1/3 ünden fazla intraartiküler deplesyon açık redüksiyon ve internal fiksasyon için güçlü bir göstergedir.



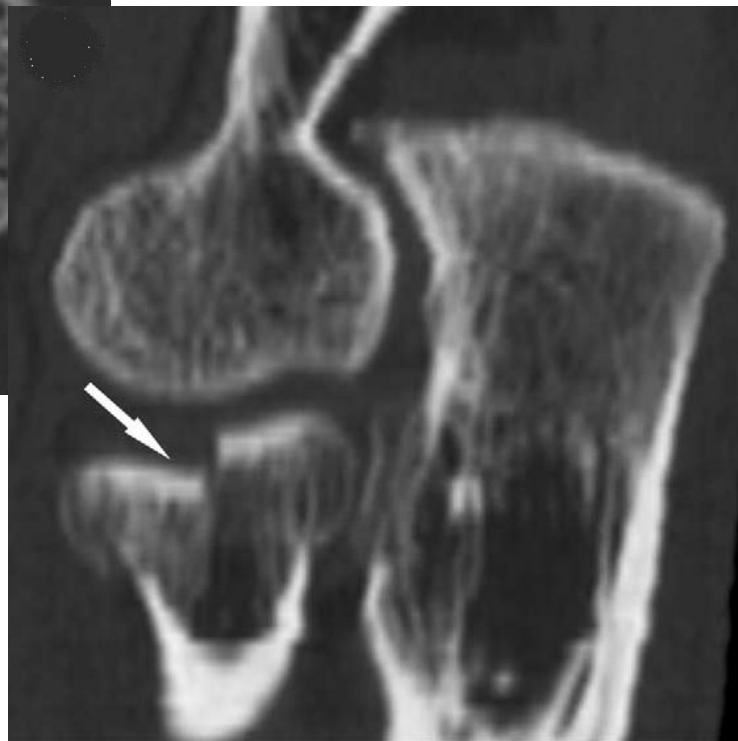
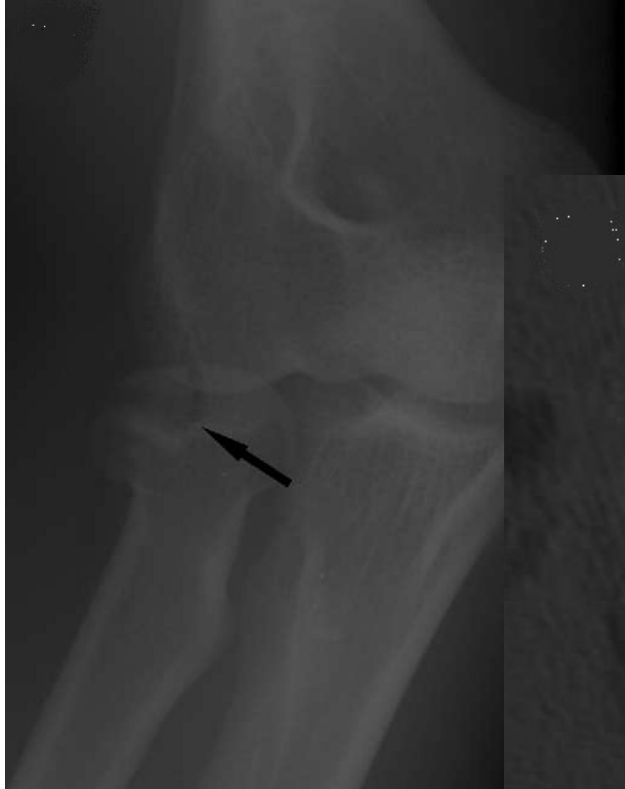
Eklem içine uzanan radius başı kırığı.
Anterior komponent deprese.



BT görüntüsü

BT görüntüsü





Dirsek

- Pelvise benzer şekilde halka yapısında
- Ön kol kemiklerinden birinin kırılması diğerinin çıkmasıyla ilişkilidir.

Monteggia's Fracture

- **Type I (or extension type) - 60% of cases**
- **Type II (flexion type) - 15%**
- **Type III - 20%**
- **Type IV (5%)**

Monteggia's Fracture

- Ulnar shaftta kırık
- Radiokapitellar eklemdede çıkık (sıklıkla anterior)

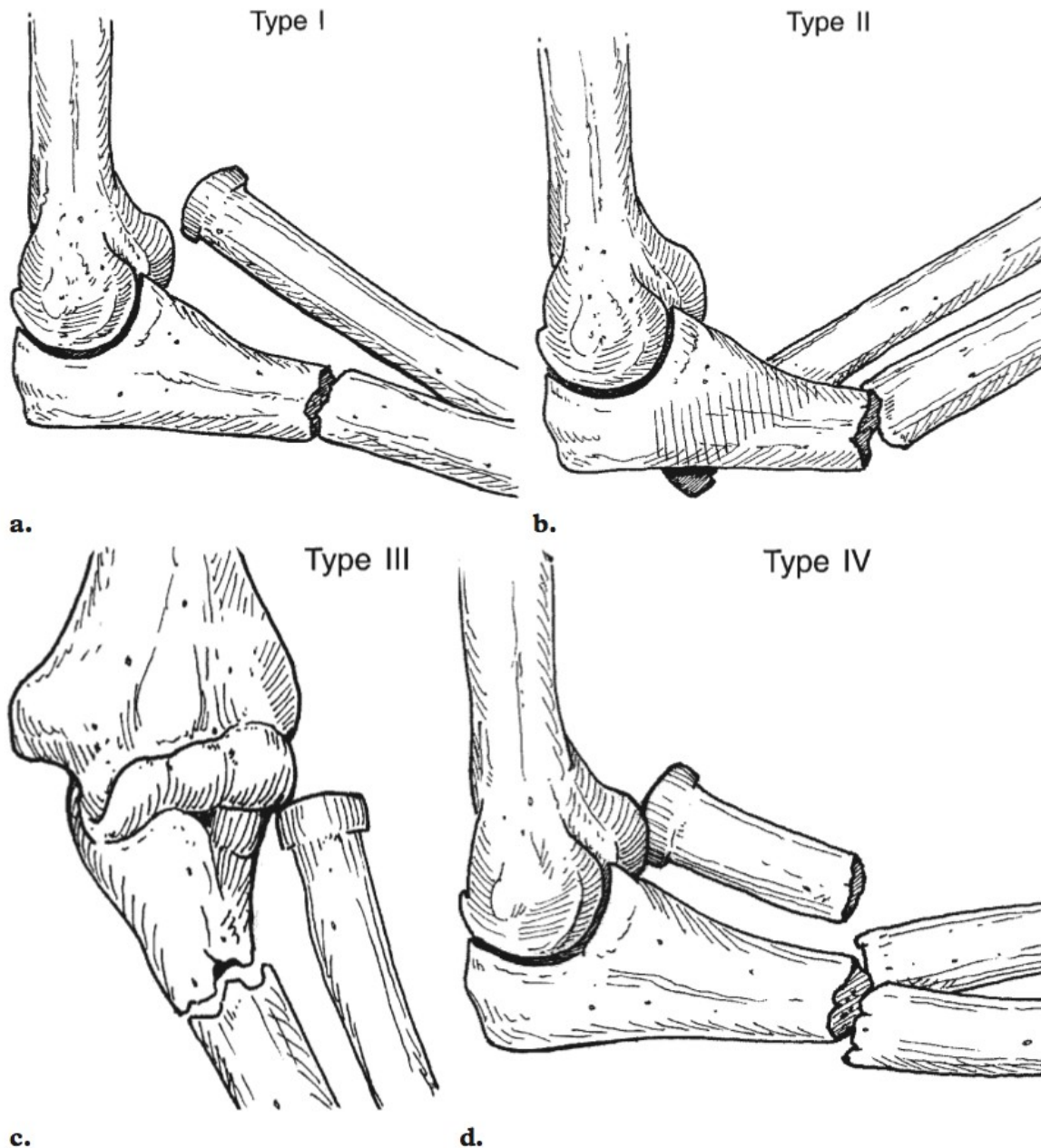


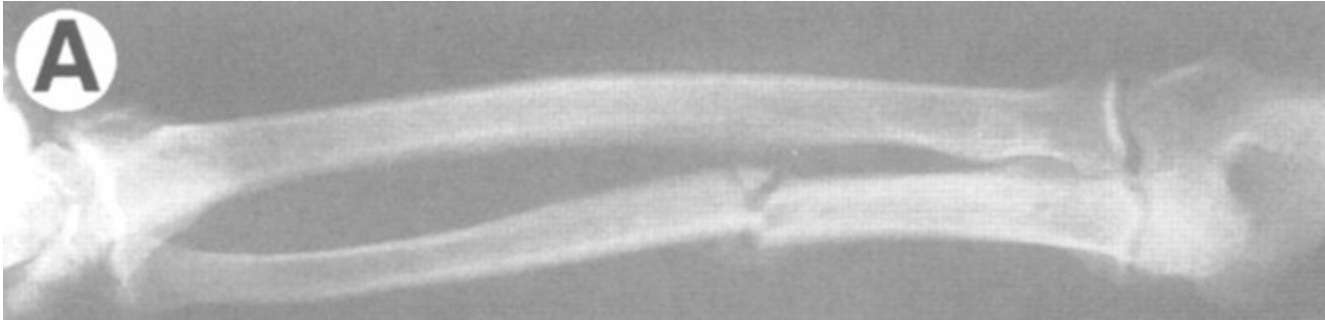
Figure 2. Drawings illustrate Bado's classification of Monteggia fractures: type I (a), type II (b), type III (c), and type IV (d). A type I Bado fracture represents the fracture-dislocation originally described by Monteggia, a fracture of the proximal one-third of the ulna with anterior dislocation of the radial head.

Type I (or extension type)

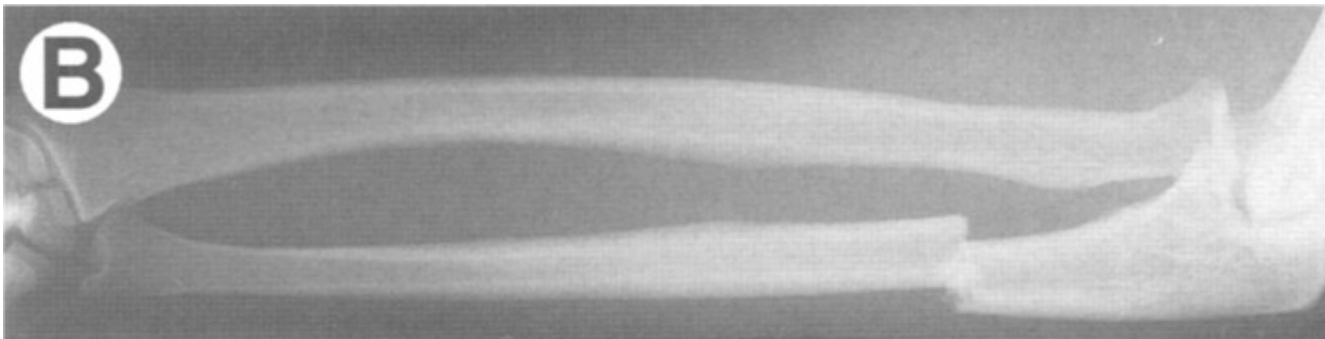
- anterior dislocation of radial head (or frx) and fracture of ulnar diaphysis at any level w/ anterior angulation (usually proximal third);



PA Grafi



Lateral Grafi



Type II (flexion type)

- **posterior** or posterolateral dislocation of **radial head (or frx)**;
- frx of proximal ulnar diaphysis with posterior angulation;



Type III

- lateral or anterolateral dislocation of the radial head;
- fracture of ulnar metaphysis;
- frx of ulna just distal to coronoid process w/ lateral dislocation of radial head;



Type IV (Bado-type)

- anterior dislocation of the radial head;
- frx of proximal 1/3 of radius & frx of ulna at the same level;

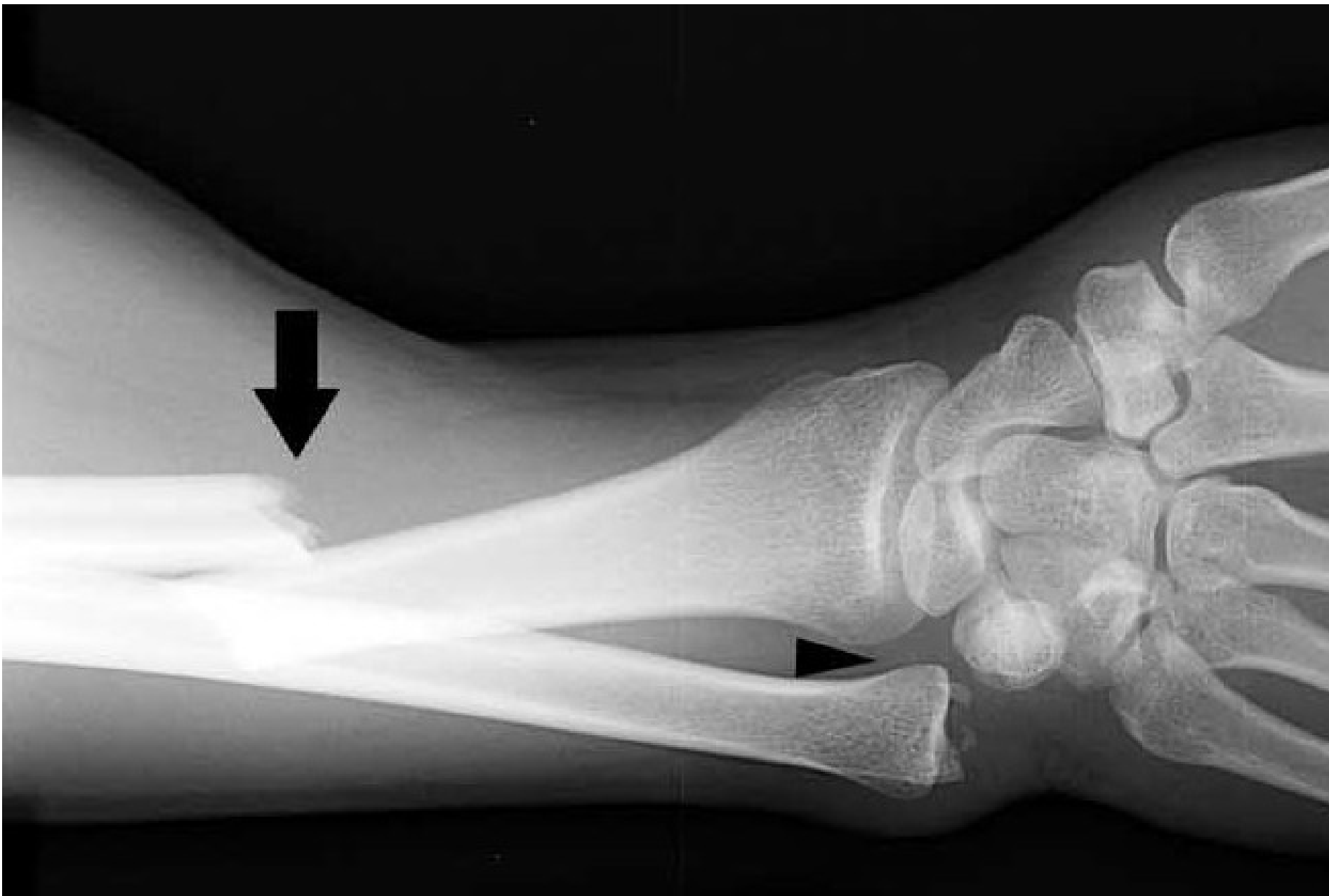


Floating Elbow



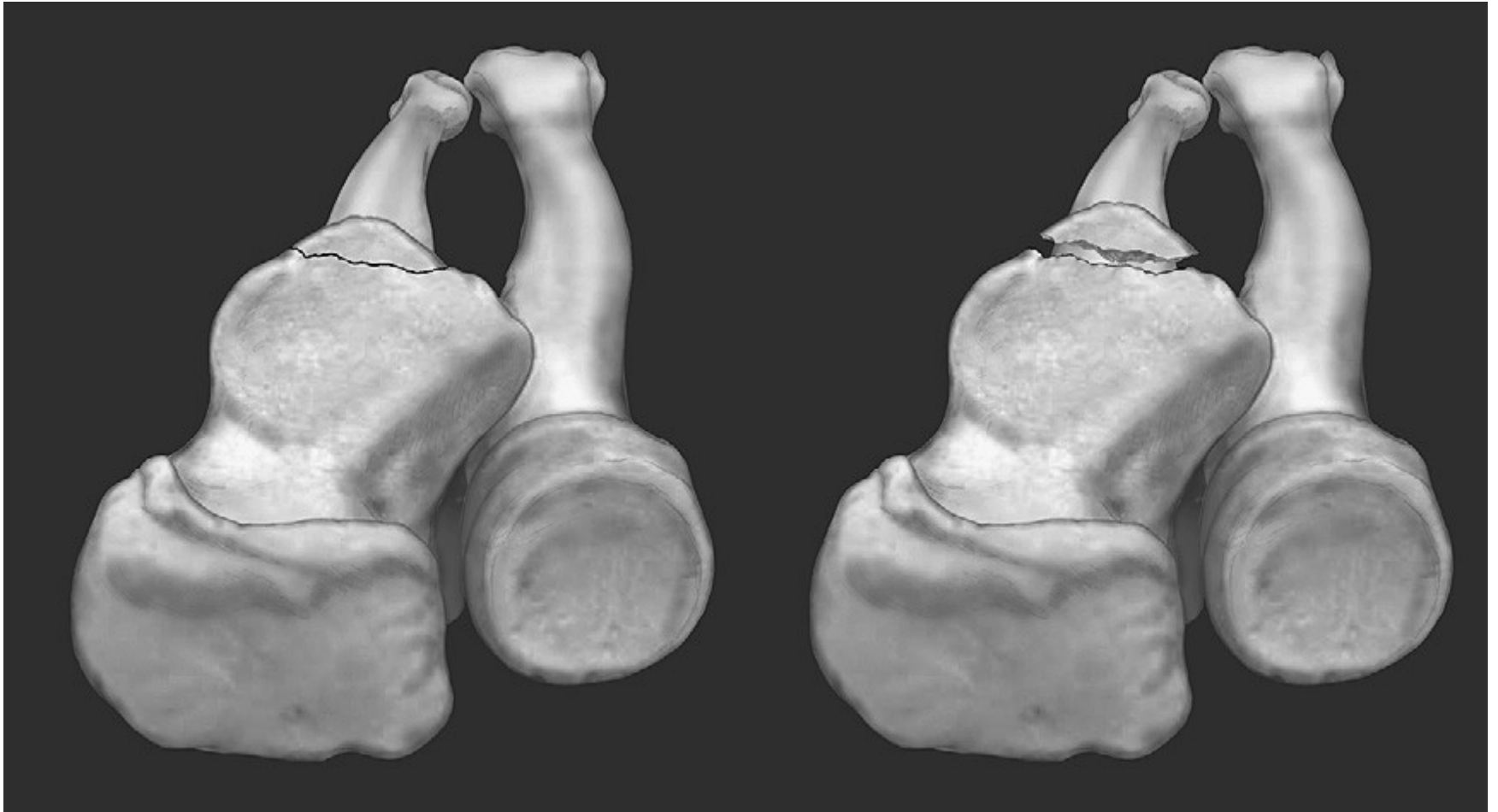
Galeazzi Kırığı

- Radial şaftta kırık
- Distal radioulnar eklemdede çıkık



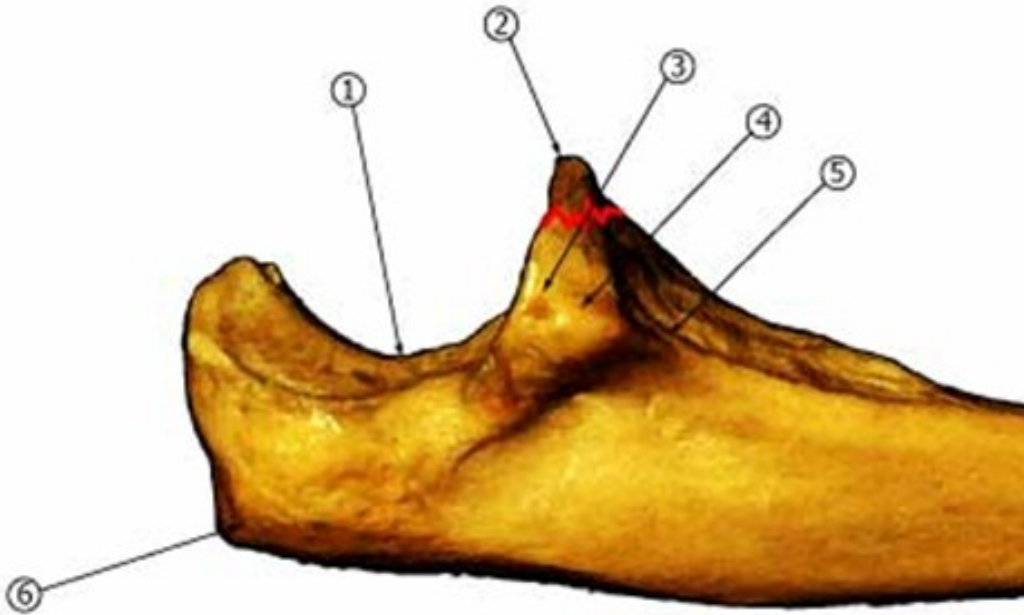
Coronoid Kırığı

Type 1 “tip” coronoid fracture

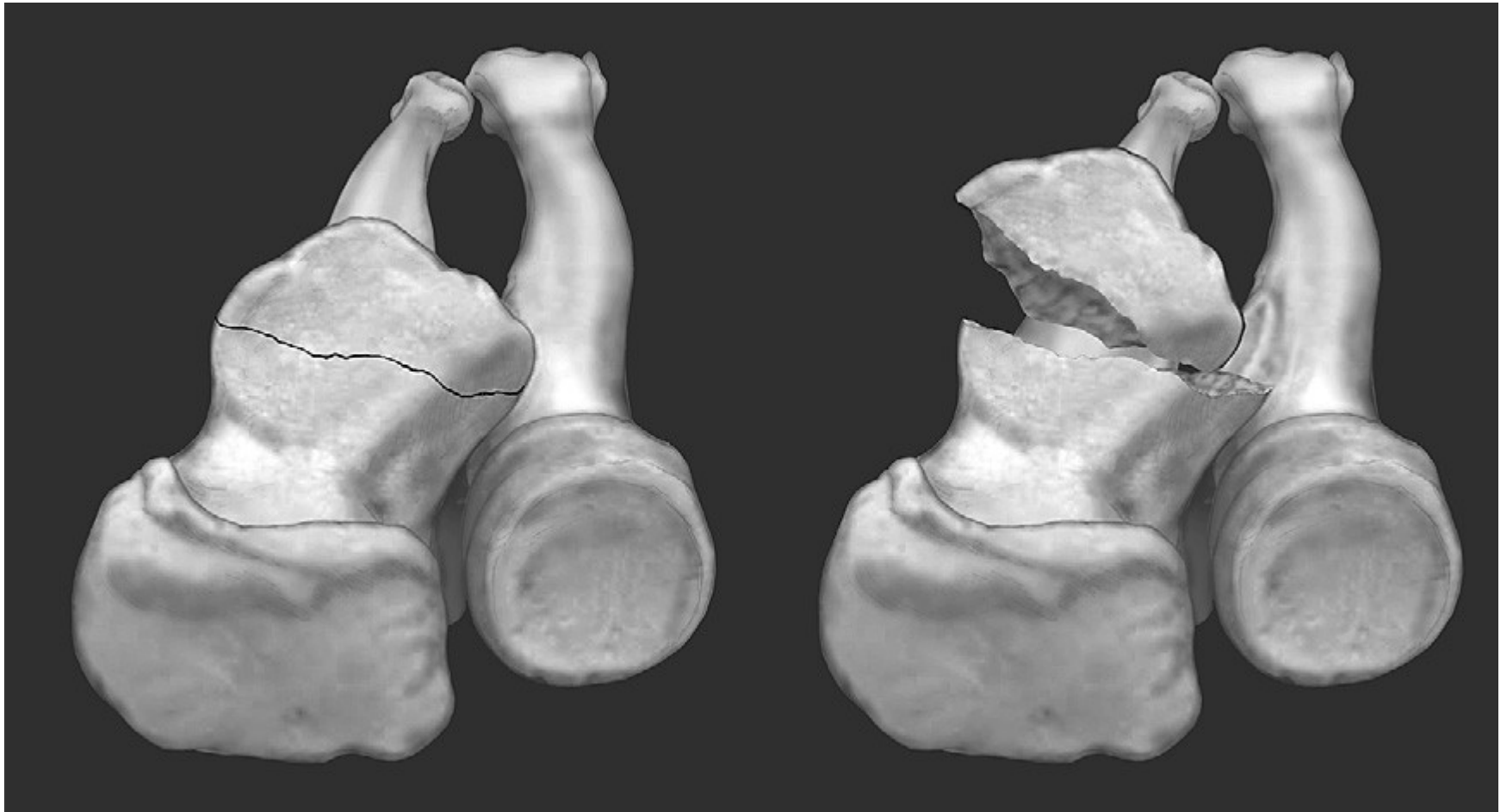


Coronoid Fracture

Type 1

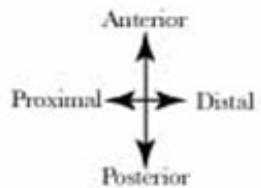
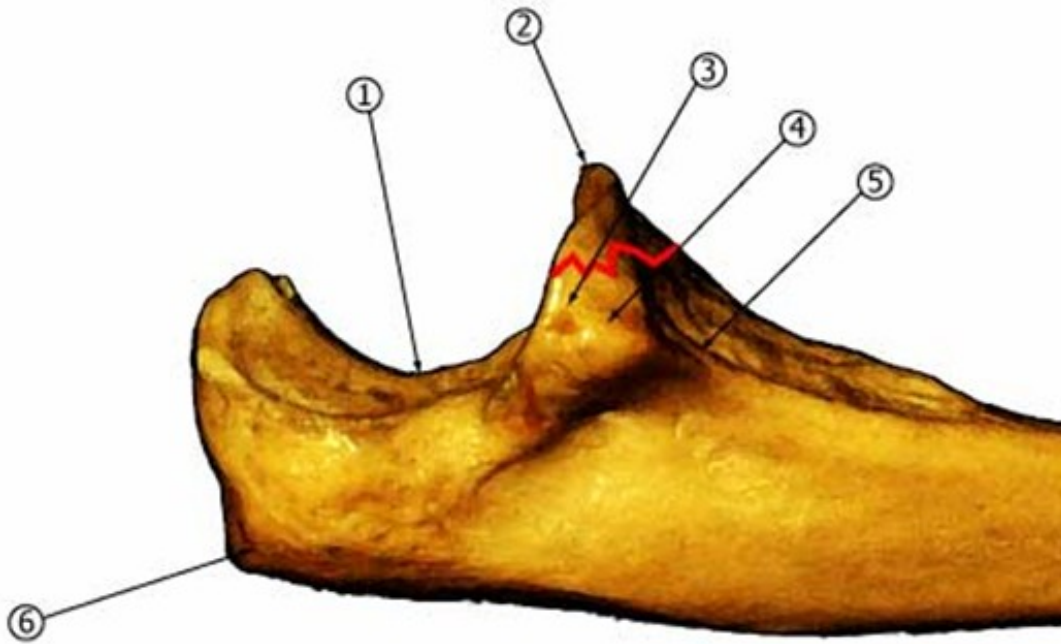


Type 2 “mid-transverse” coronoid fracture

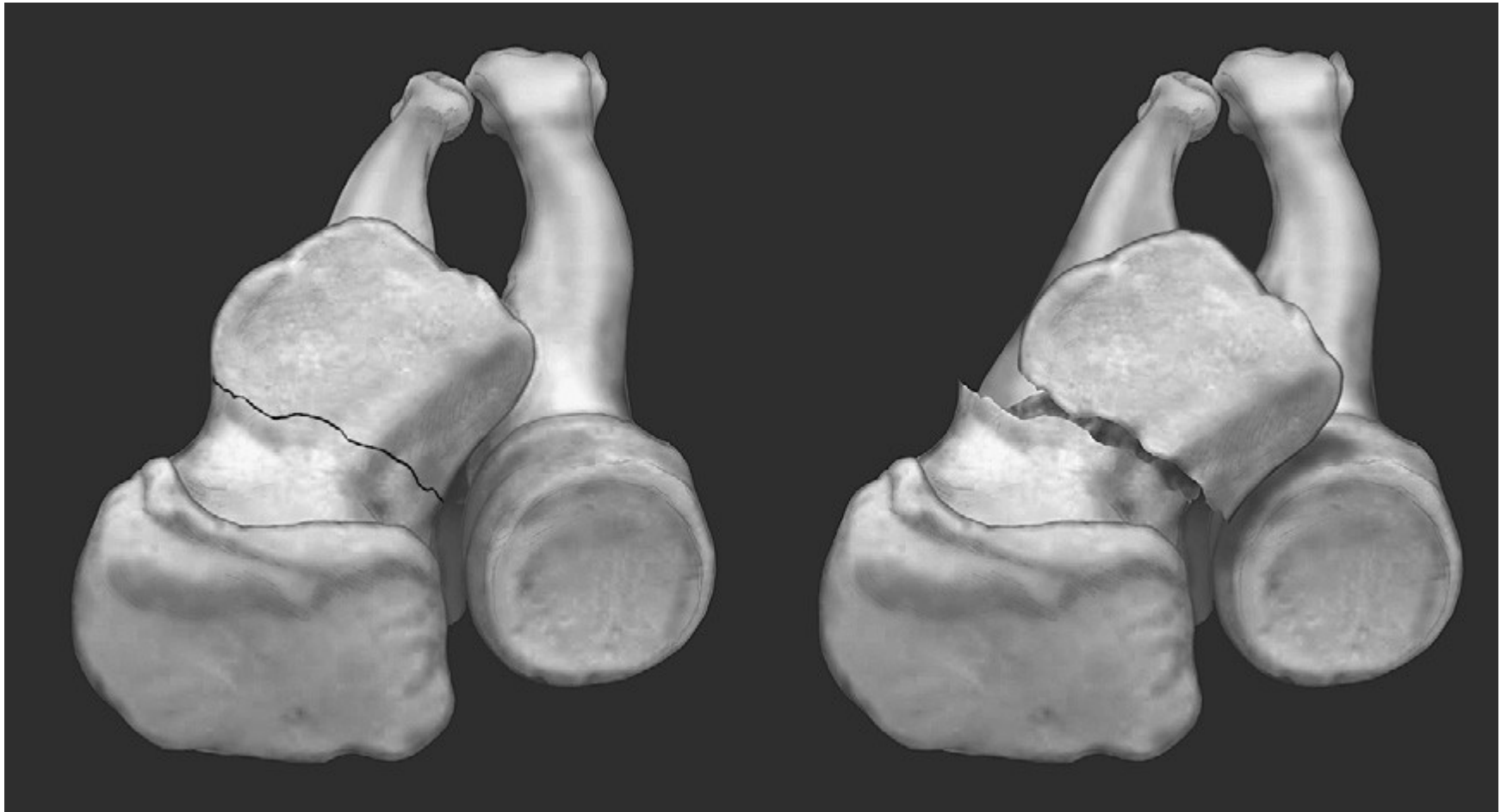


Coronoid Fracture

Type 2

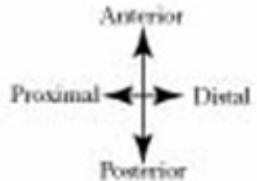
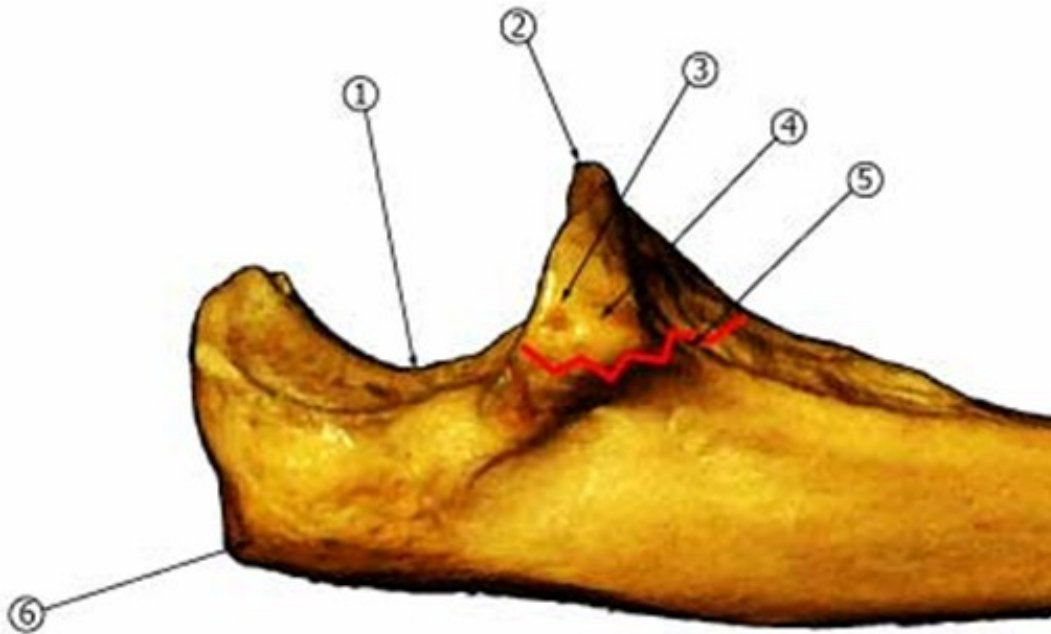


Type 3 “basal” coronoid fracture

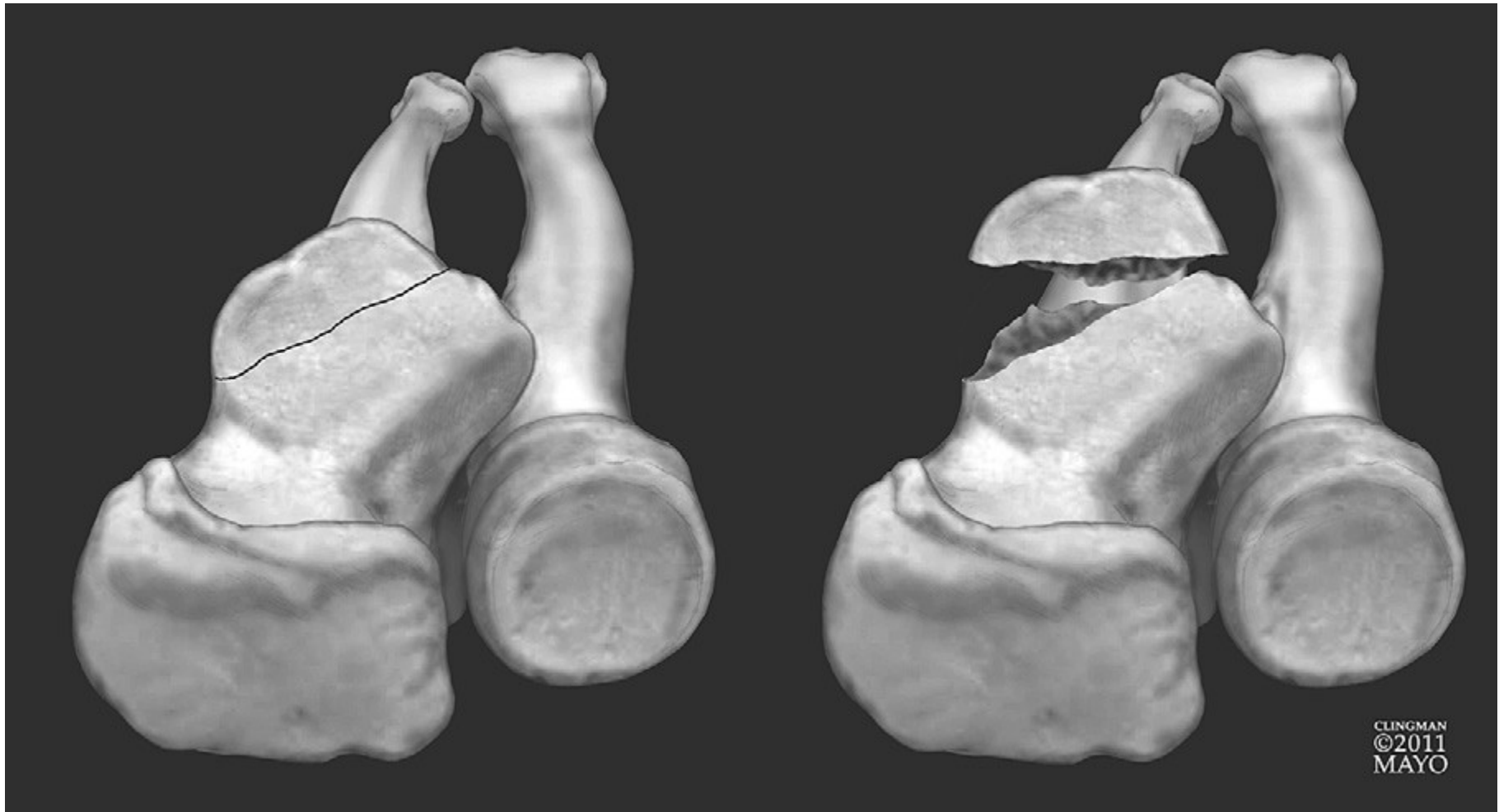


Coronoid Fracture

Type 3

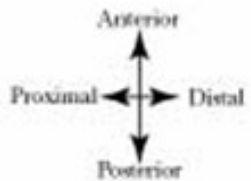
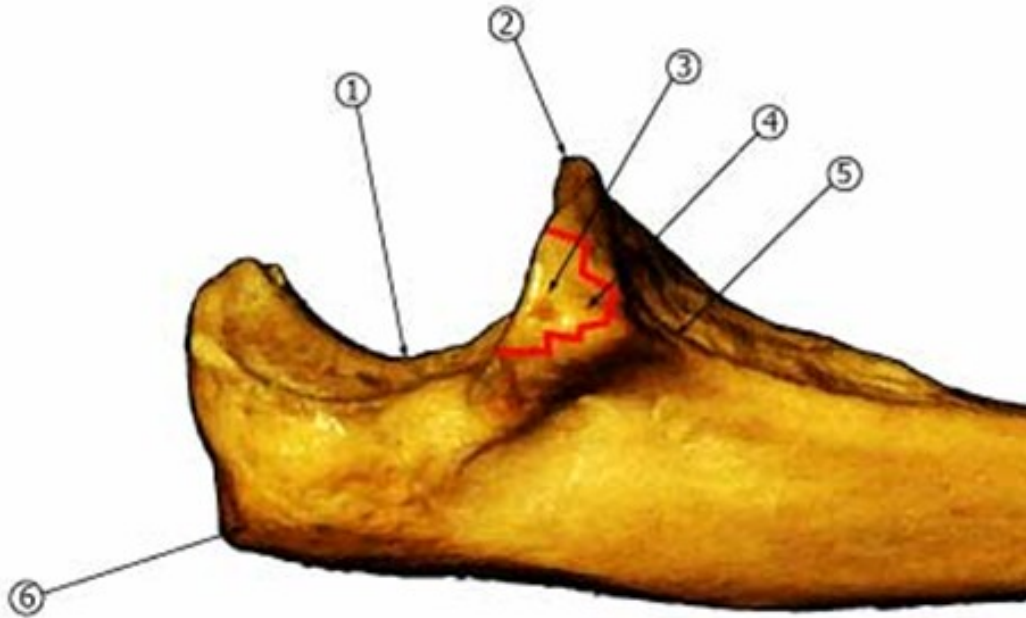


Type 4 AM “oblique” anteromedial coronoid fracture

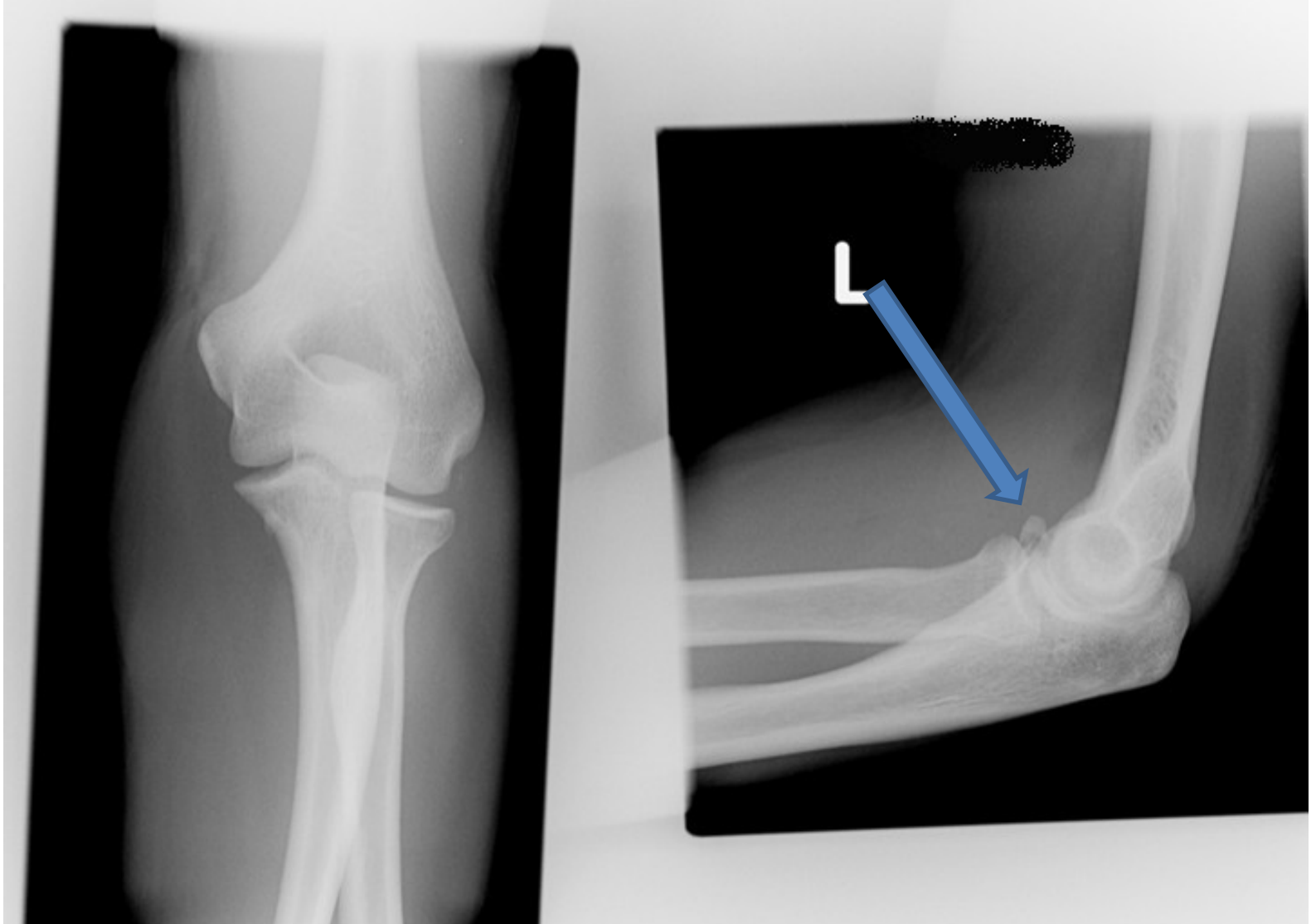


Coronoid Fracture

Anteromedial Facet



Coronoid process kırığı



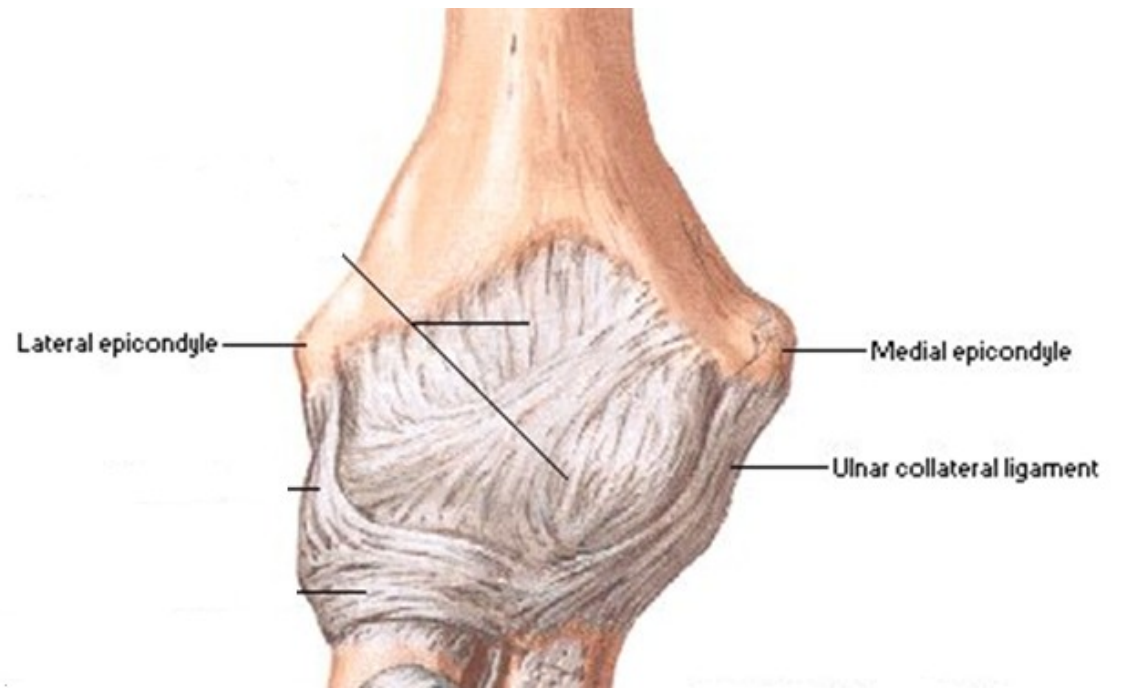
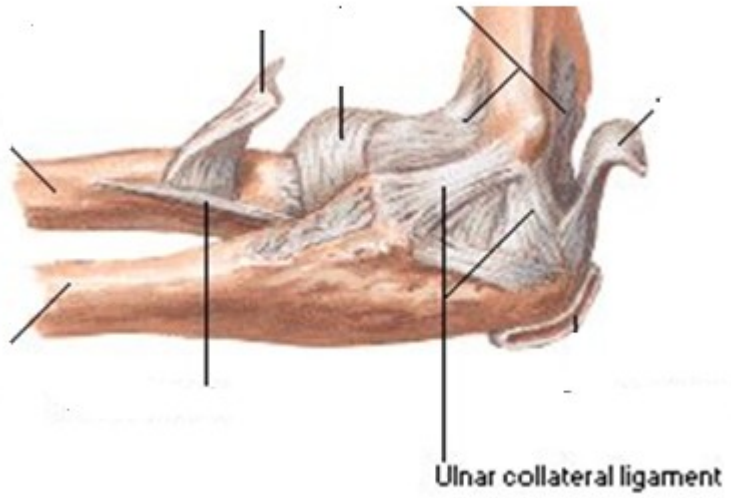


Coronoid kırıkları



Rekürren dirsek çıkığı

Dirsek Çıkığı





Dirseğin tam posterior çıkığı



AP and lateral views of posterior elbow dislocation.

Elbow Dislocation



Elbow Dislocation



Elbow Dislocation



Elbow Dislocation



Olekranon Kırığı

Olekranon Kırığı



Olekranon Kırığı



Olekranon Kırığı



Olekranon Kırığı



Olekranon Kırığı

