

# Radiology Anatomy of the Spine and Upper Extremity

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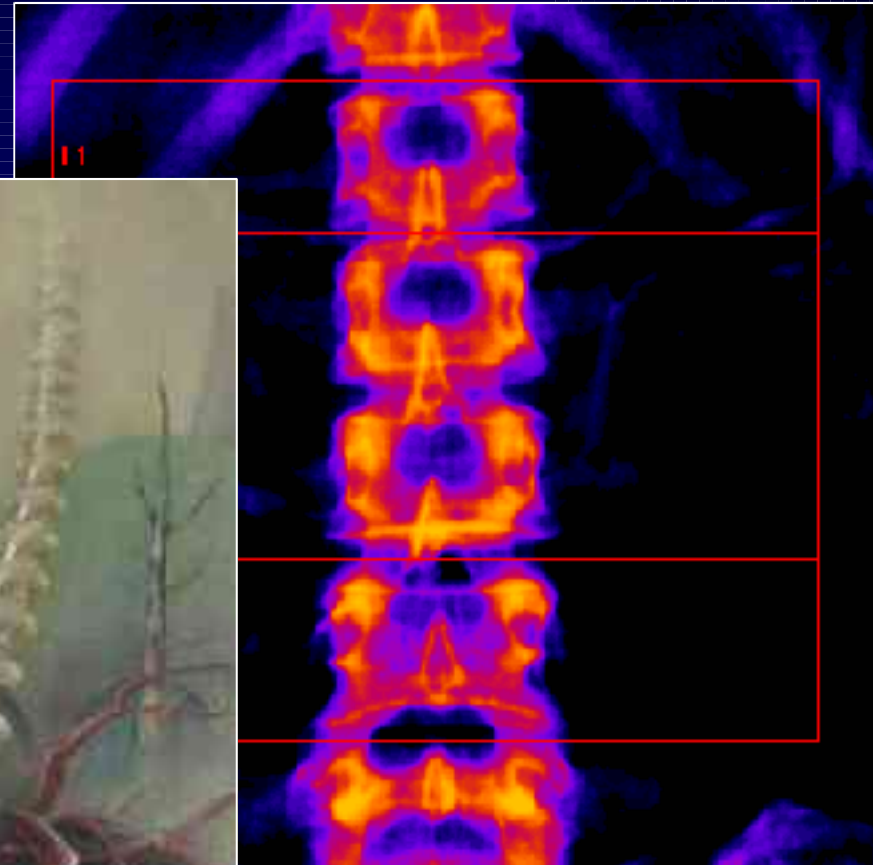
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# Learning Objective

- Identify anatomic structures of the spine and upper extremities on standard radiographic and cross-sectional images

# SPINE



# Visual Human Sagittal View



7 Cervical Vertebra

12 Thoracic Vertebra

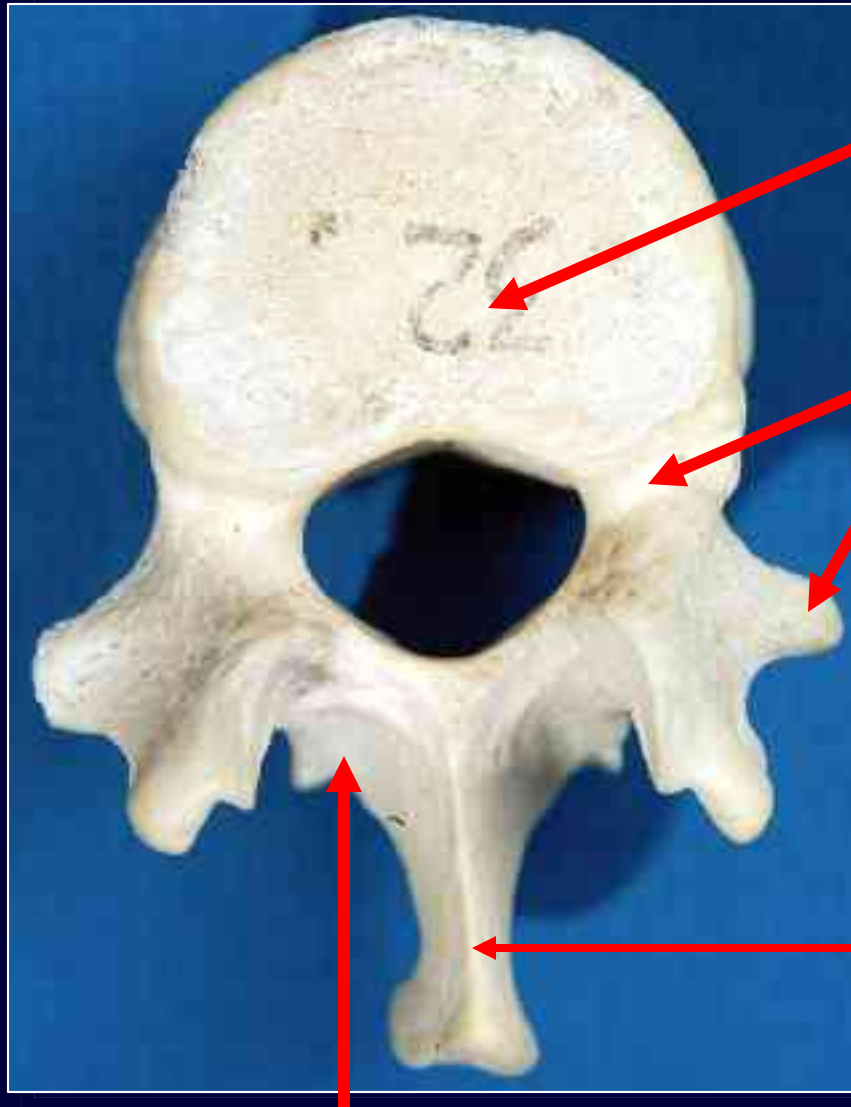
5 Lumbar Vertebra

5 Sacral Vertebra (fused)

3 Coccygeal Vertebra (fused)



# Lumbar Vertebral Body



**BODY**

**PEDICLE**

**TRANSVERSE  
PROCESS**

**SPINOUS PROCESS**

**LAMINA**

# Lumbar Vertebral Body



**BODY**

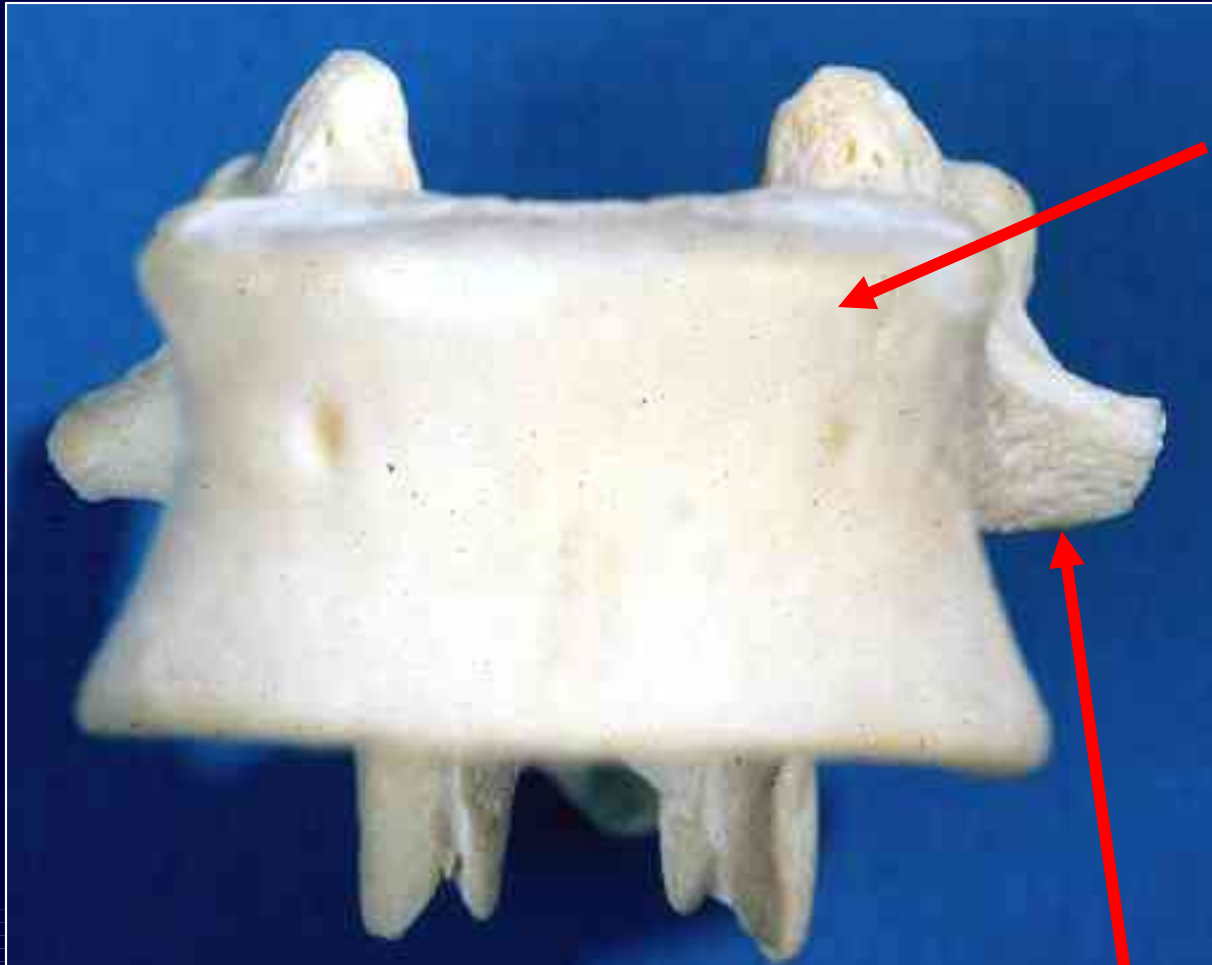
**PEDICLE**

**TRANSVERSE  
PROCESS (*fractured*)**

**SPINOUS PROCESS**

**LAMINA**

# SPINE FROM THE FRONT

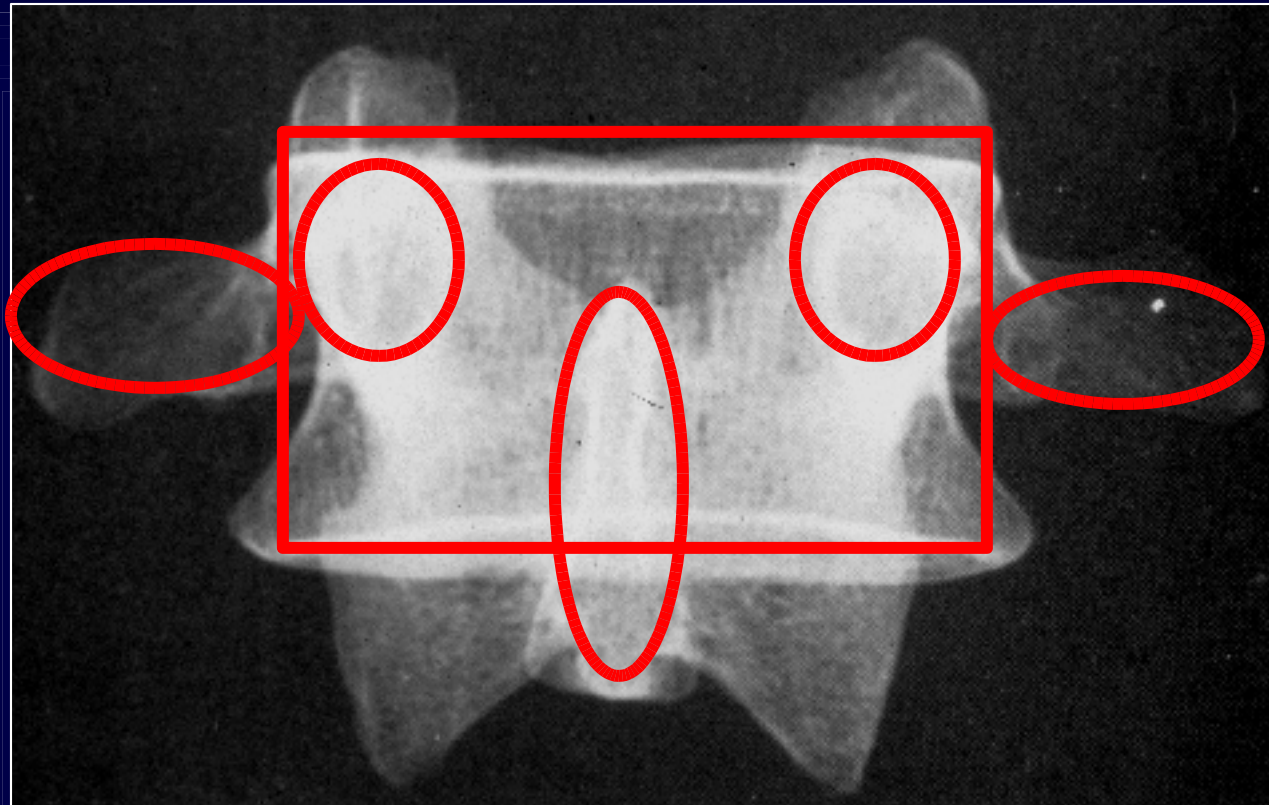


**BODY**

**TRANSVERSE  
PROCESS**

# SPECIMEN RADIOGRAPH L4

**BODY**



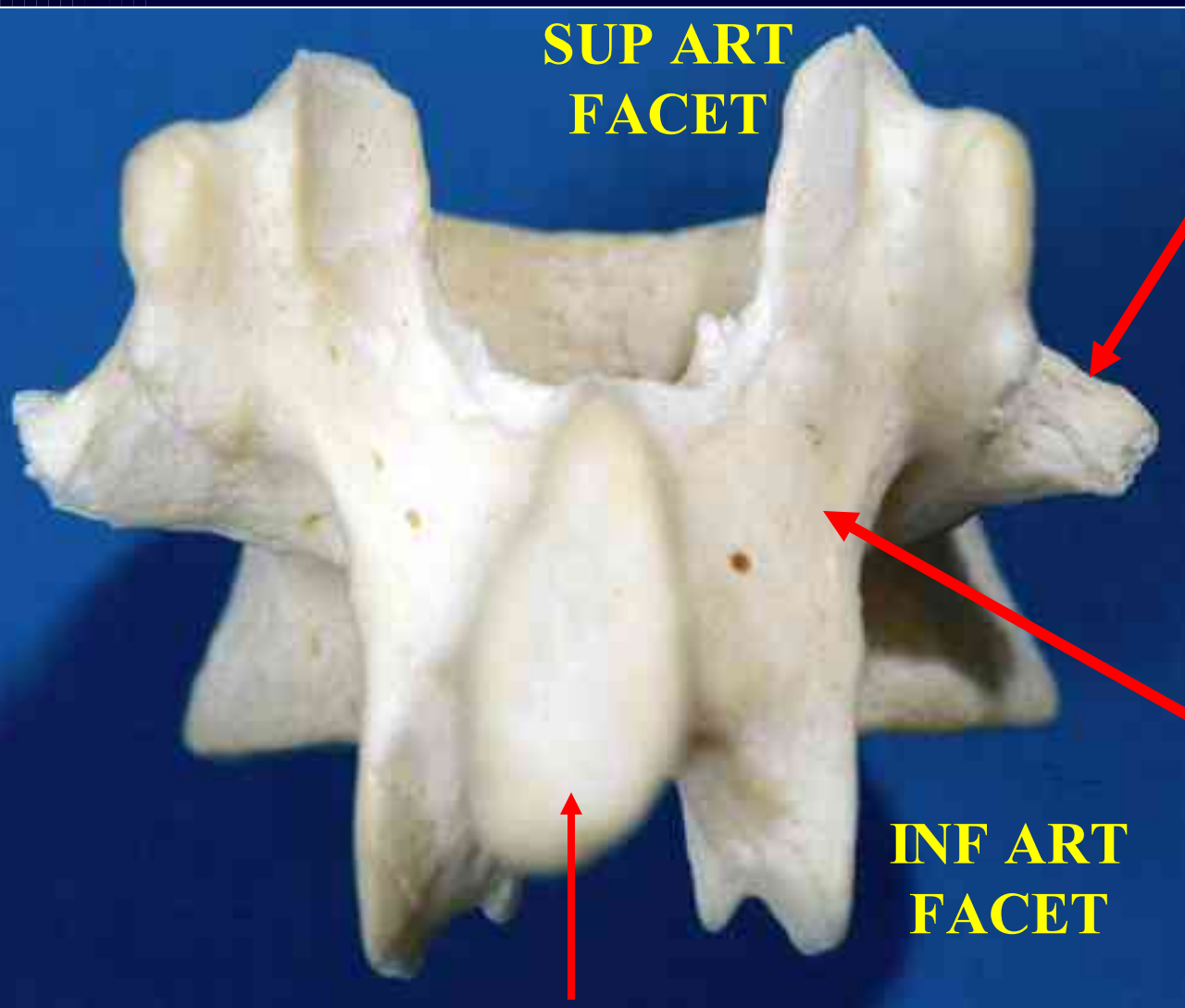
**PEDICLES**

**SPINOUS PROCESS**

**TRANSVERSE PROCESSES**



# SPINE FROM THE BACK



**SUP ART  
FACET**

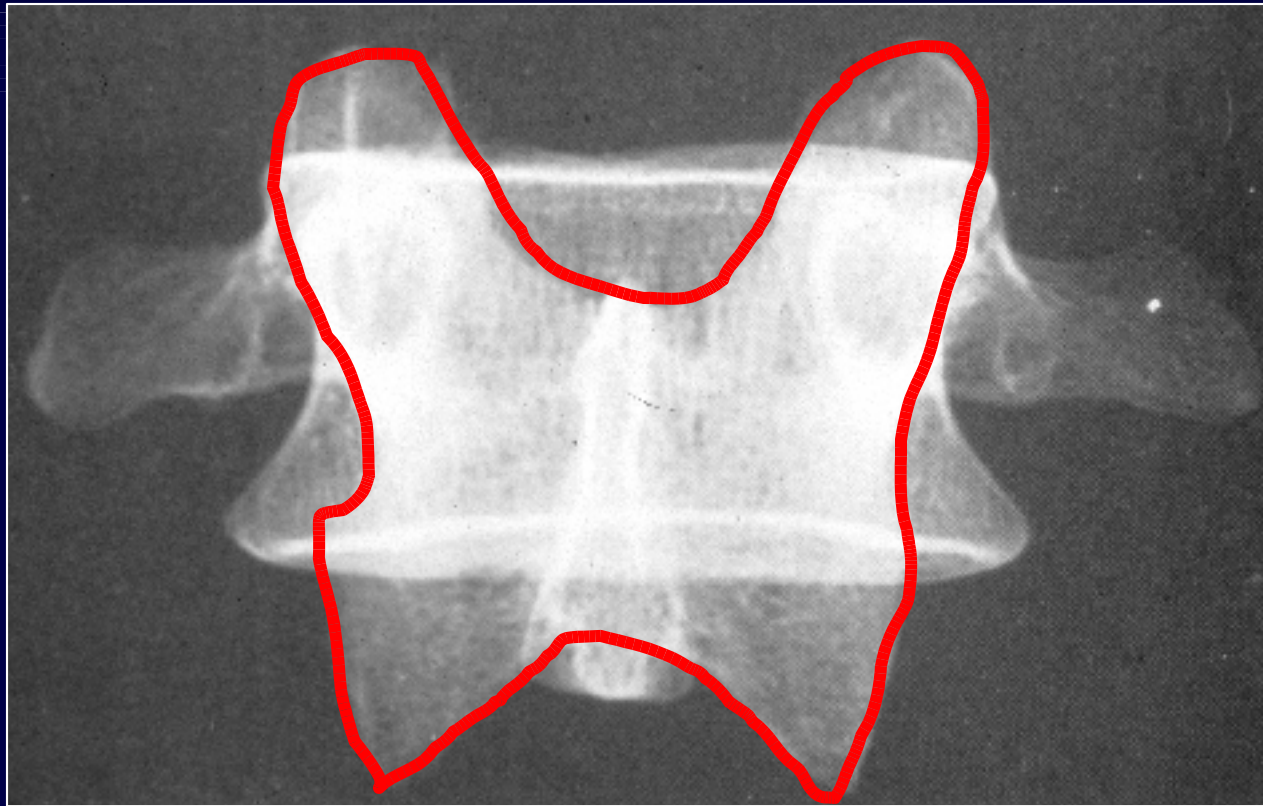
**TRANSVERSE  
PROCESS**

**LAMINA**

**INF ART  
FACET**

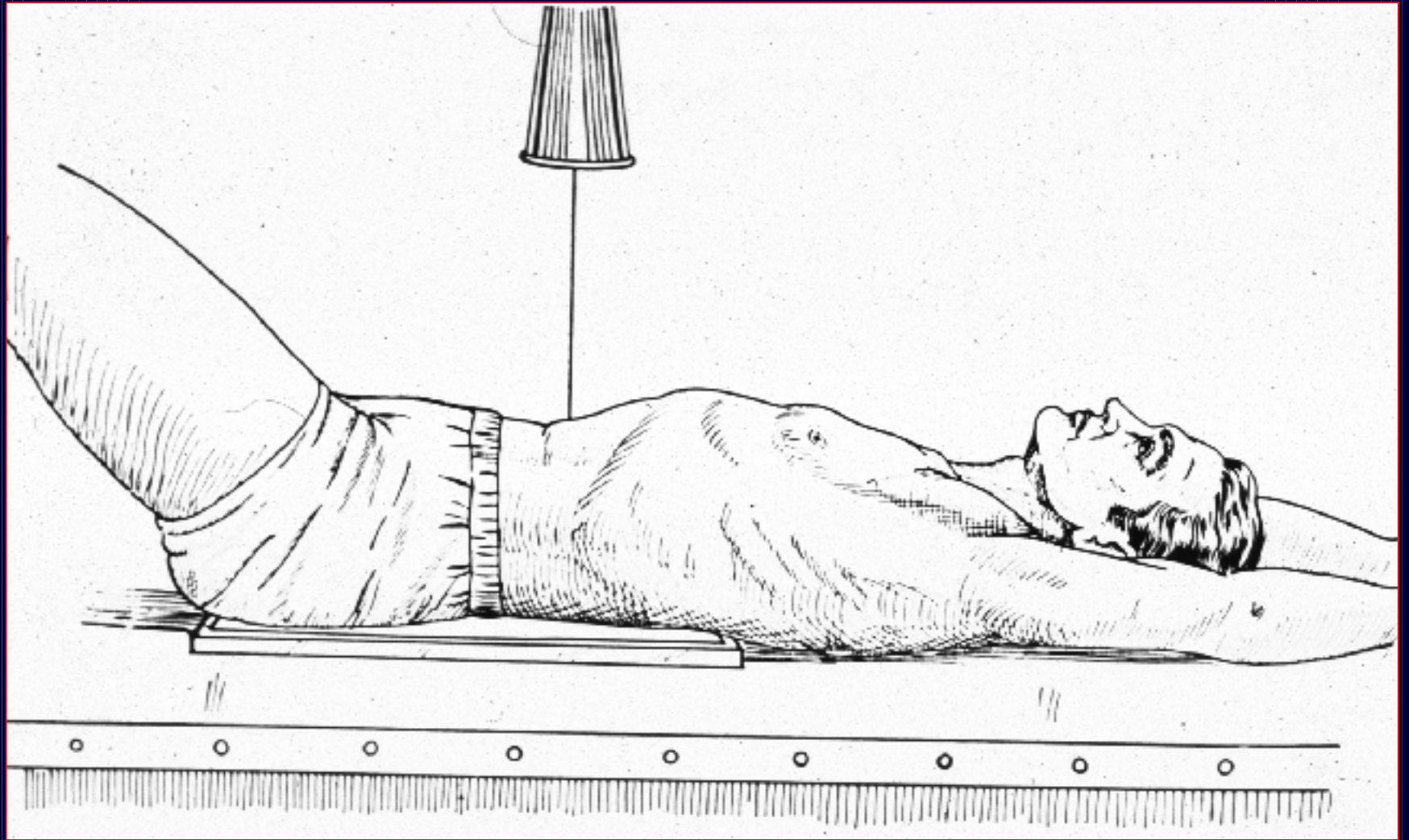
**SPINOUS PROCESS**

# SPECIMEN RADIOGRAPH L4



**Lamina and Facets**

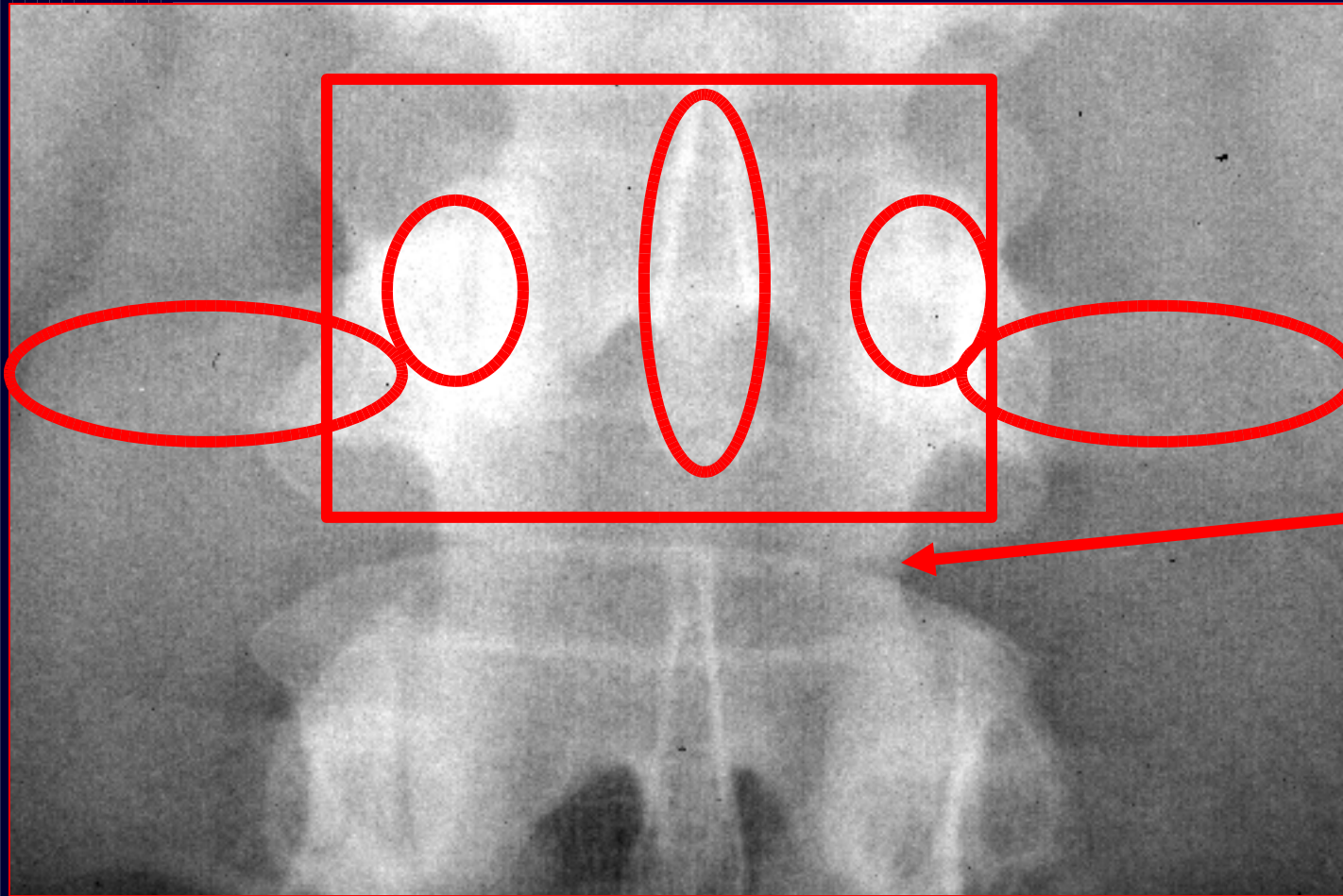
# AP Lumbar Spine



# AP Lumbar Spine



# AP Lumbar Spine



**BODY  
PEDICLE**

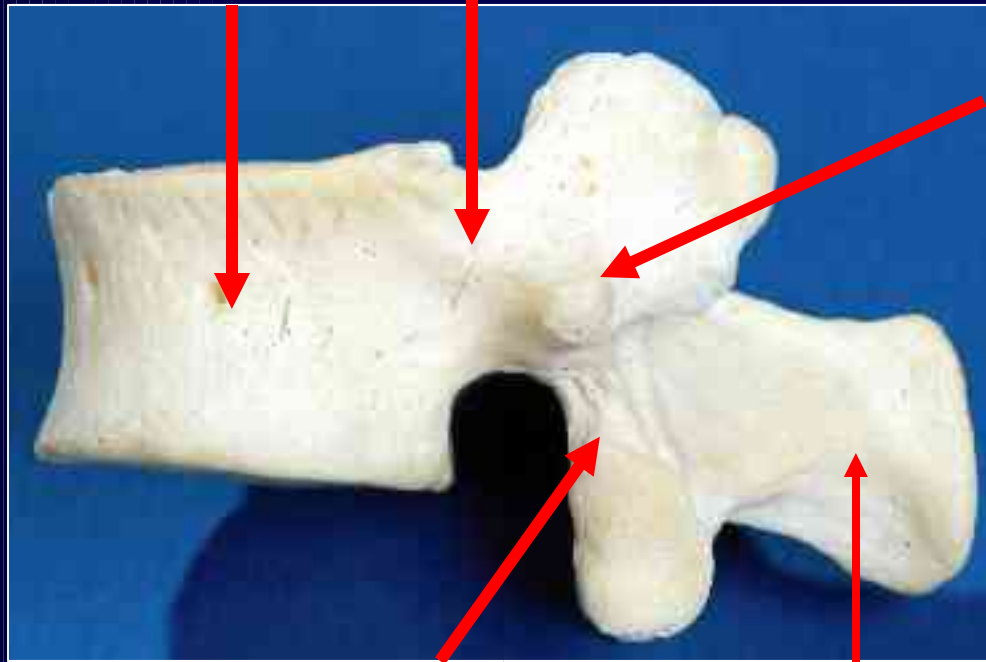
**LAMINA**

**TRANSVERSE  
PROCESS**

**SPINOUS  
PROCESS**

# Spine Viewed from Side

**BODY PEDICLE**



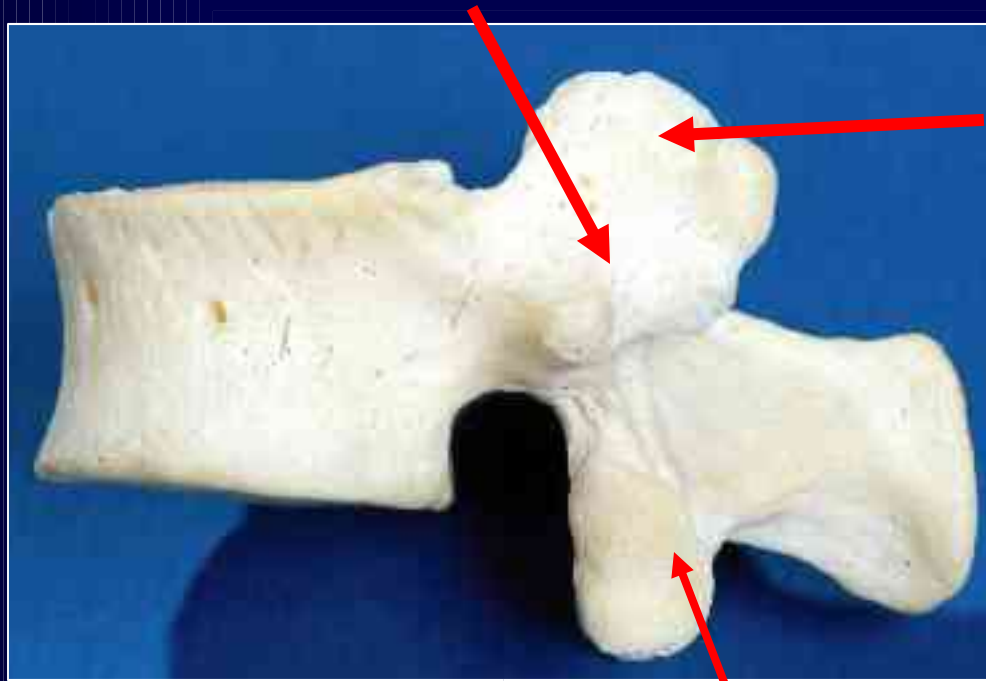
**TRANSVERSE  
PROCESS**

**LAMINA**

**SPINOUS PROCESS**

# Spine Viewed from Side

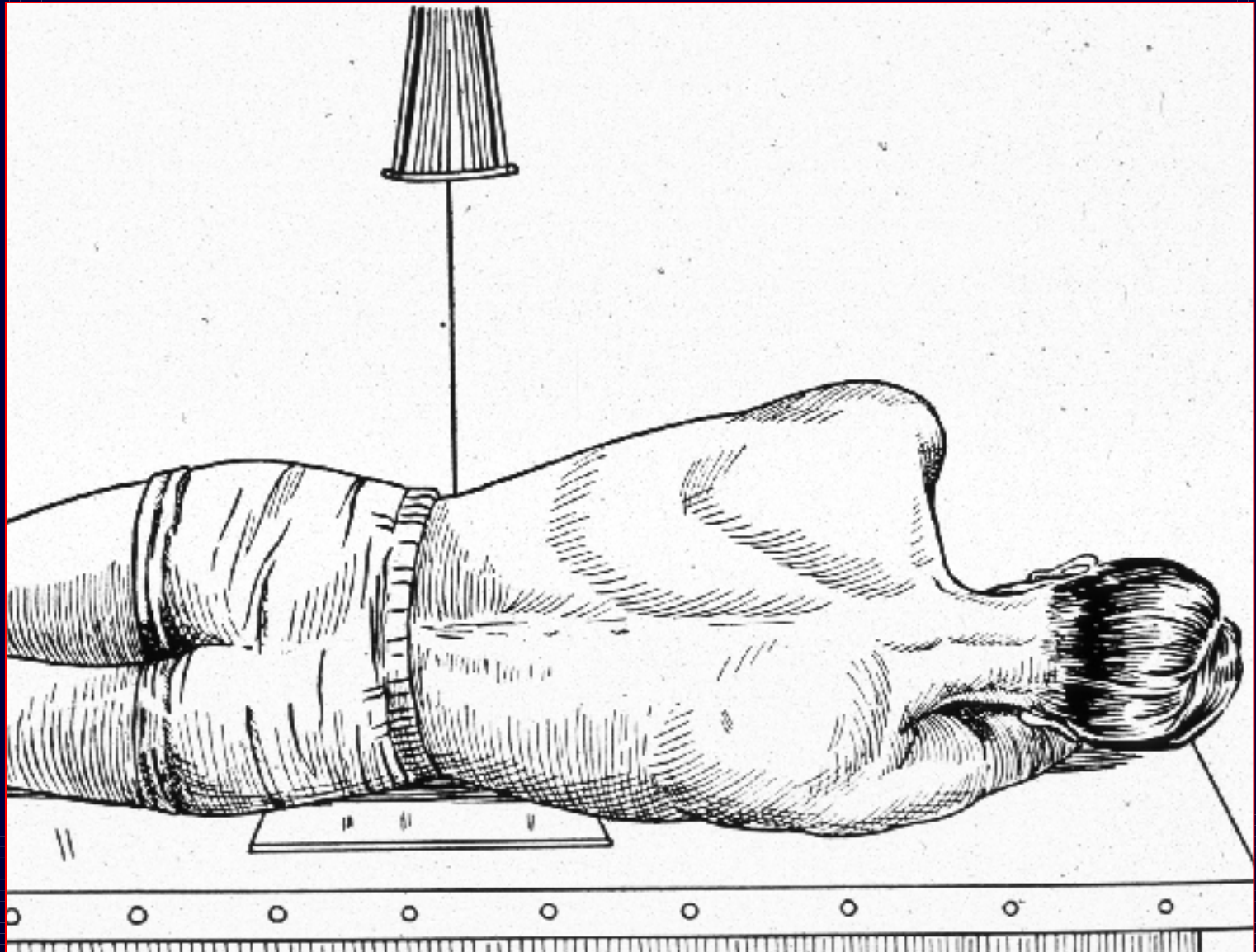
## PARS INTRAARTICULARIS



**SUPERIOR  
FACET**

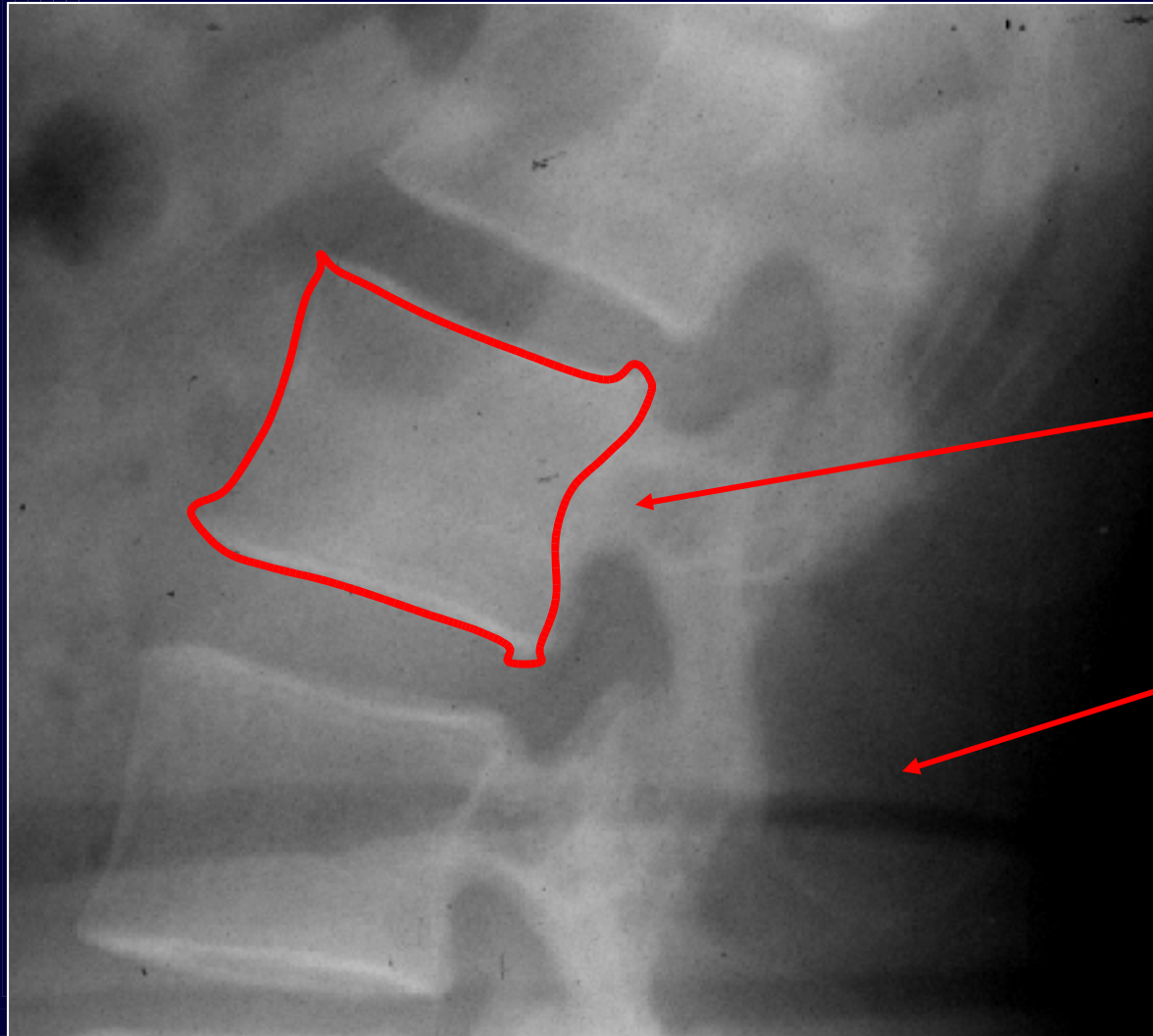
**INFERIOR FACET**

# Lateral Lumbar Spine





# Lateral Lumbar Spine

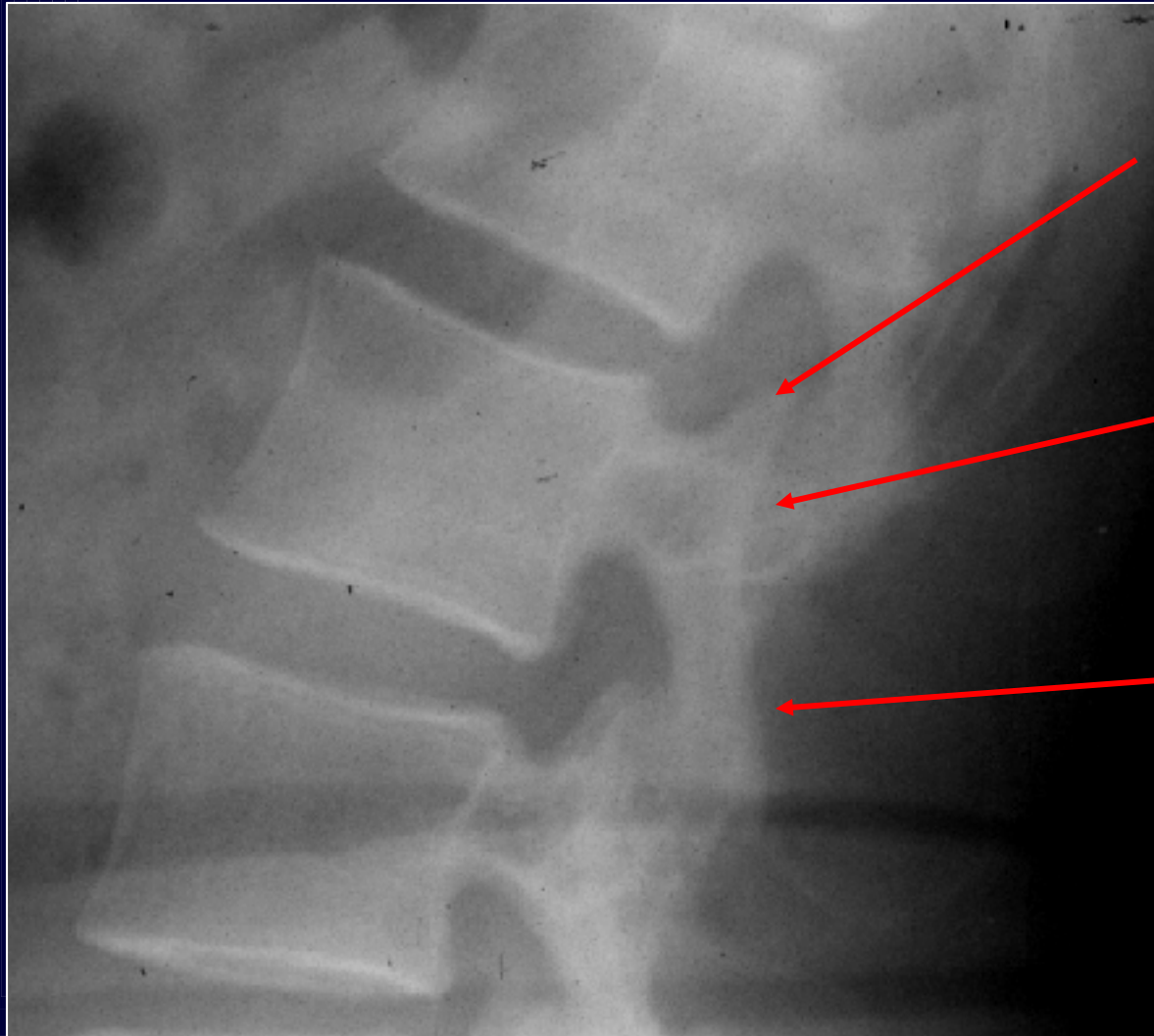


**BODY**

**PEDICLE**

**SPINOUS  
PROCESS**

# Lateral Lumbar Spine

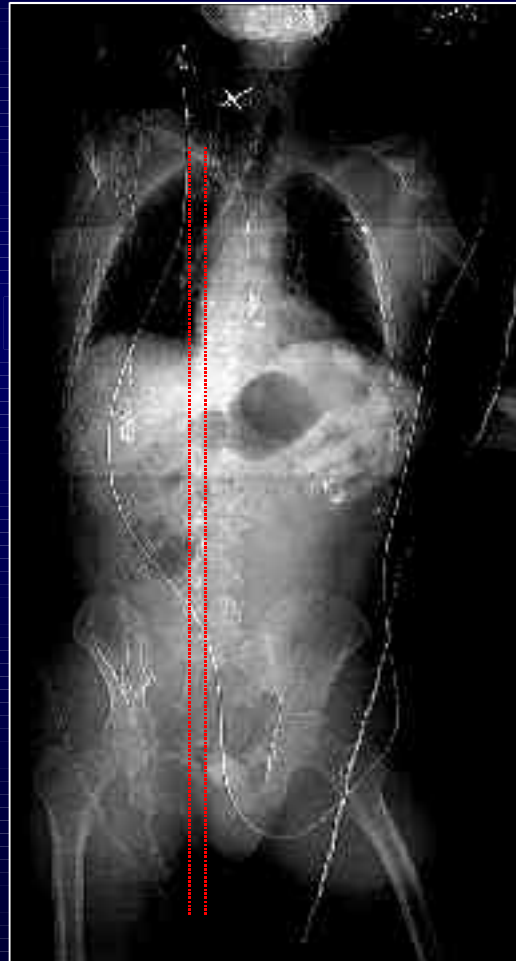


**SUPERIOR  
FACET**

**PARS**

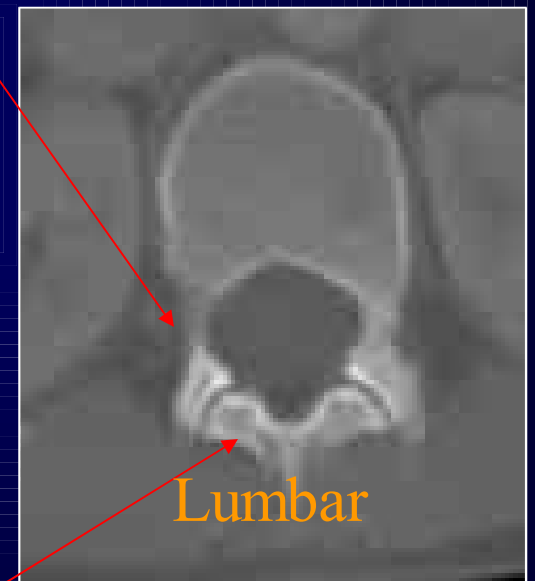
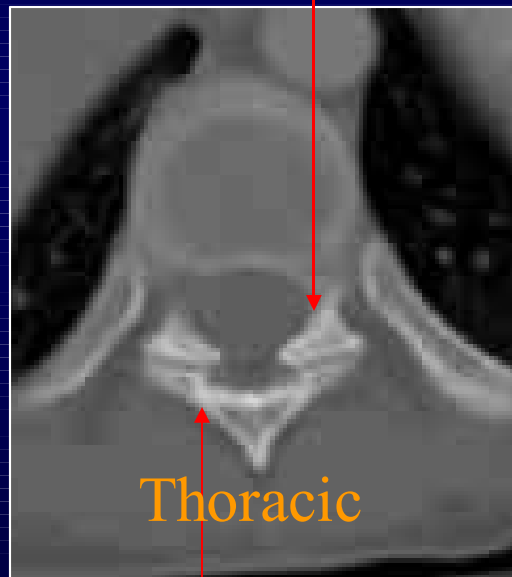
**INFERIOR  
FACET**

# CT Lumbar Spine Sagittal Reconstructions



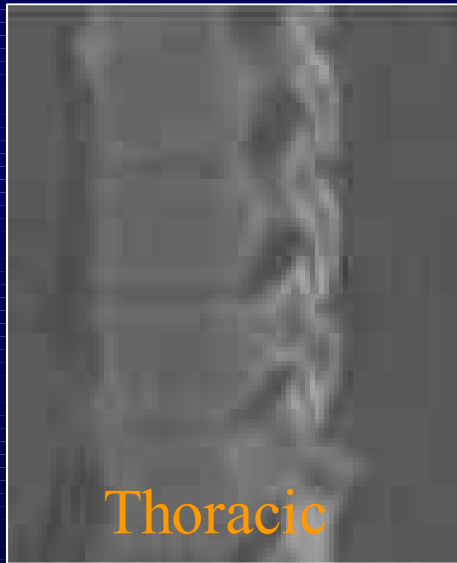
# Facet Joints Axial View

Inferior Facets

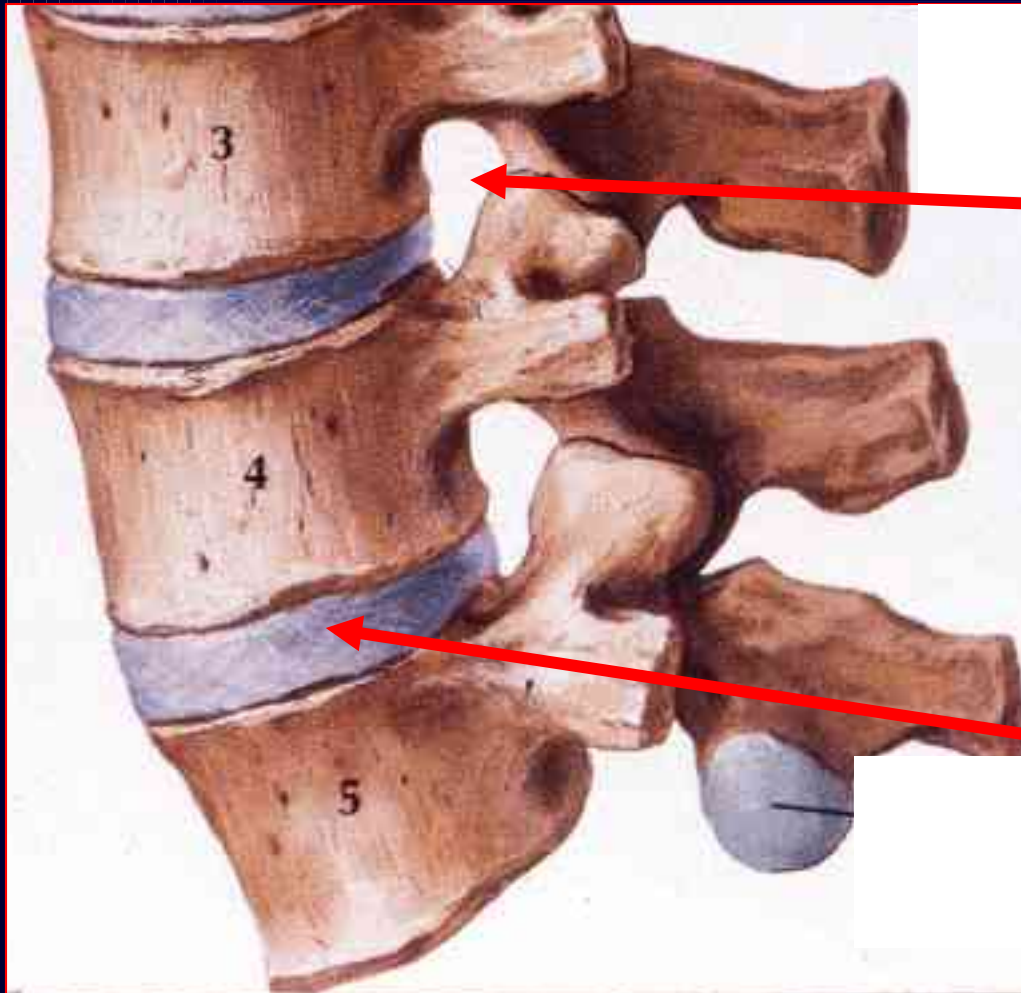


Superior Facets

# Facet Joints Sagittal Reconstructions



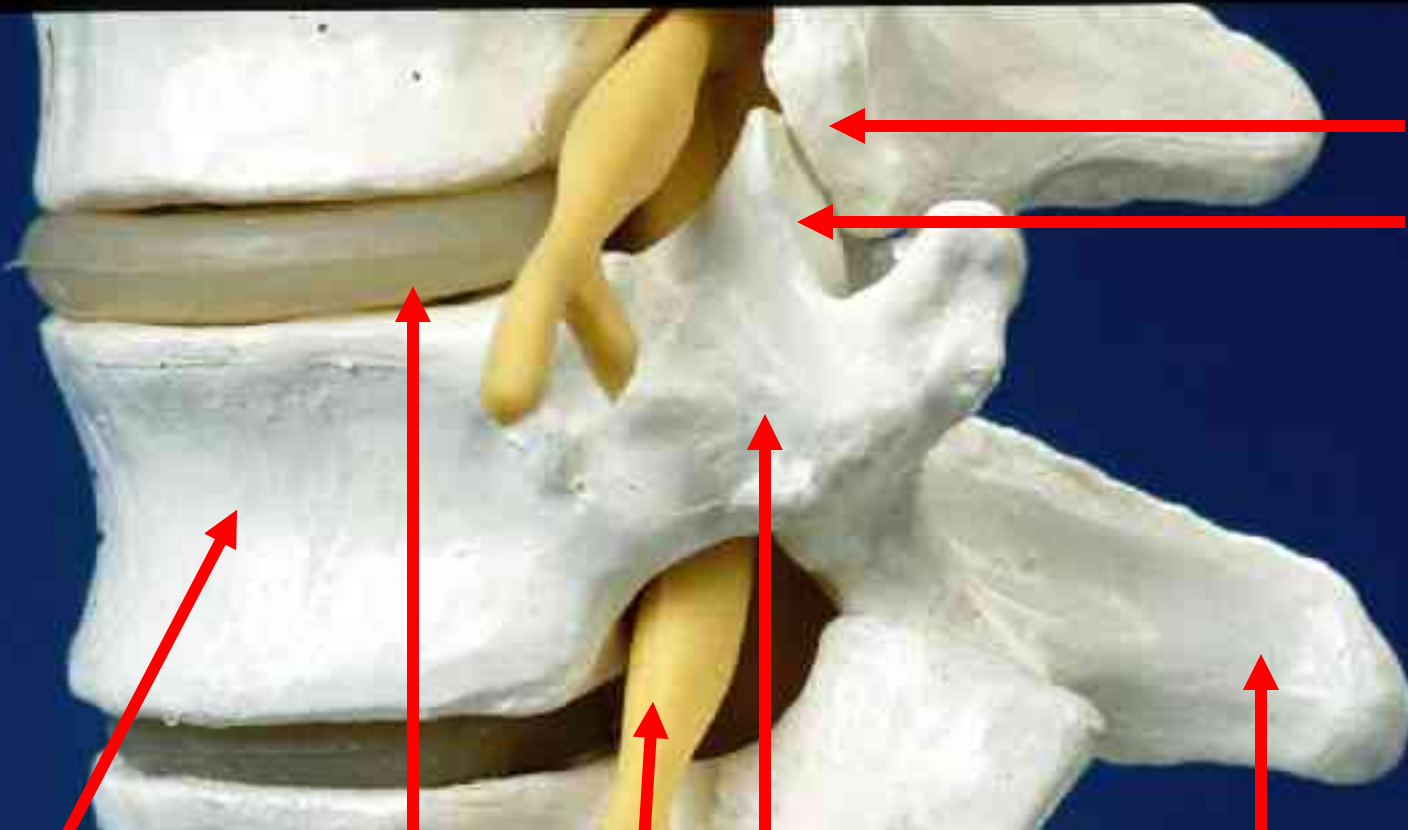
# Intervertebral Disc Space



**NEURAL  
FORAMEN**

**INTERVERTEBRAL  
DISC**

# Nerve Roots



**INF FACET**  
**SUP FACET**

**BODY**

**DISC**

**PEDICLE**

**SPINOUS**

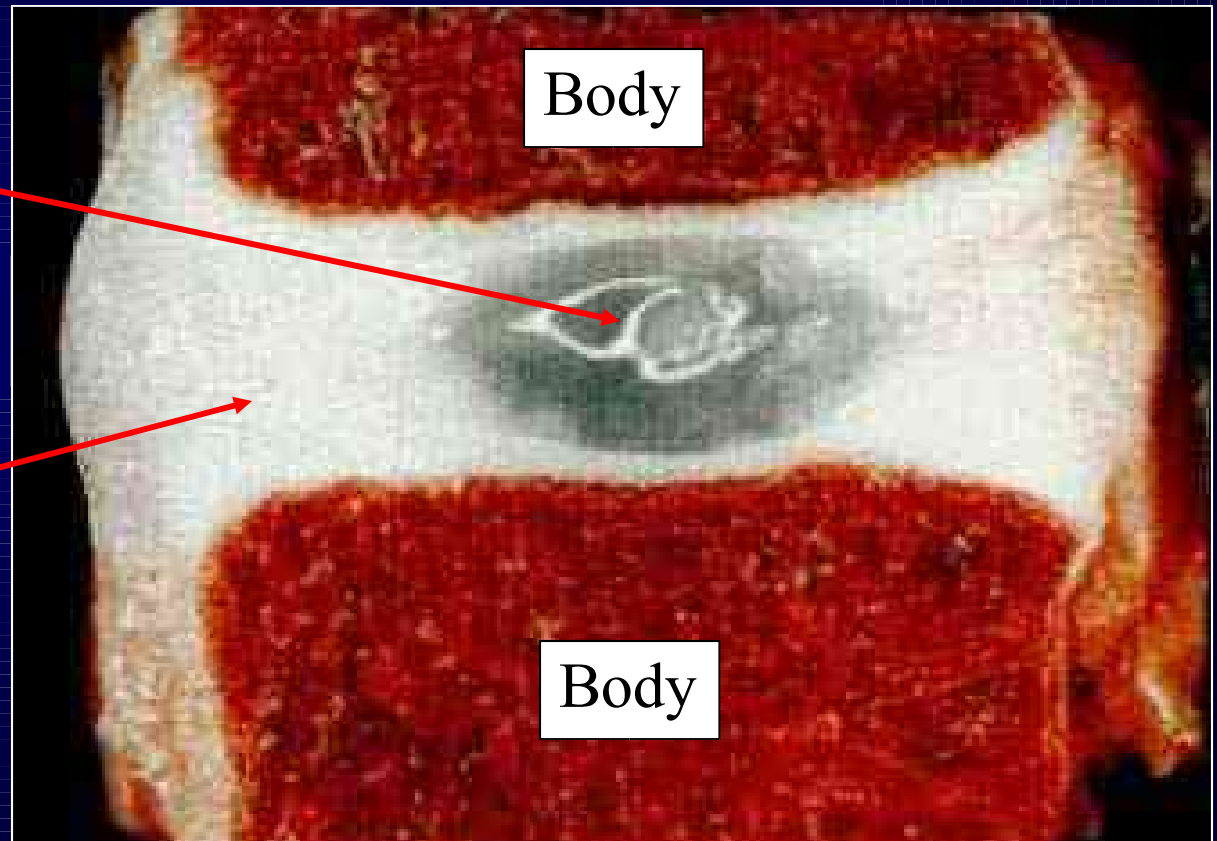
**NERVE ROOT**

**PROCESS**

# Intervertebral Disc

Nucleus Pulposus

Annulus Fibrosa



Sagittal Section Lumbar Spine



# MRI: Intervertebral Disc

**Spinal Cord**

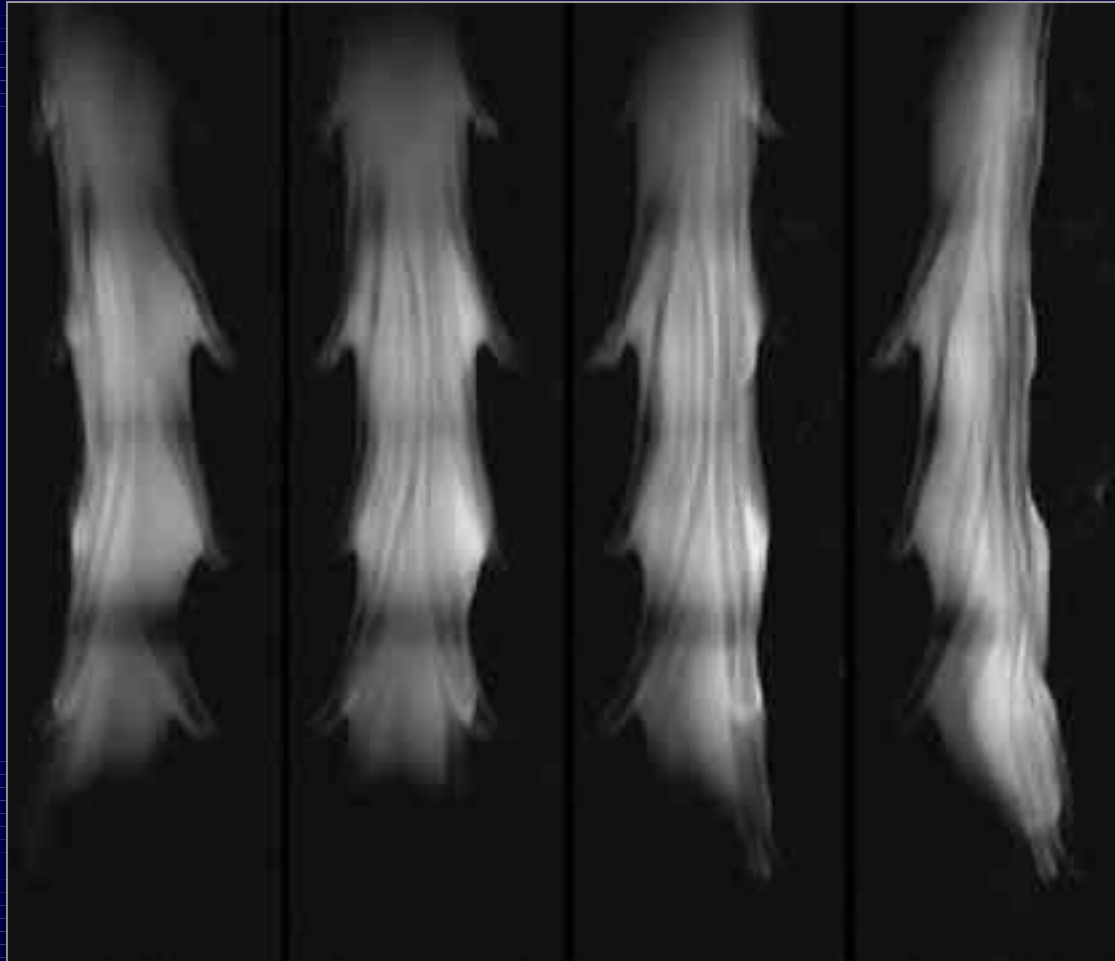
(Cauda Equina)

**Intervertebral Disc**

- Nucleus Pulposa
- Annulus Fibrosa

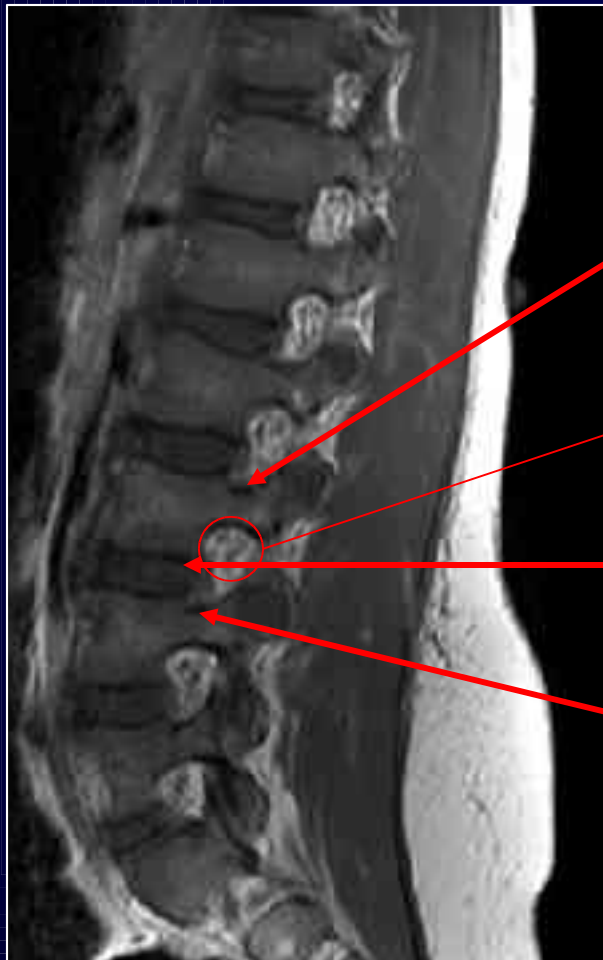


# Cauda Equina



MRI Myelogram

# Neural Foramen



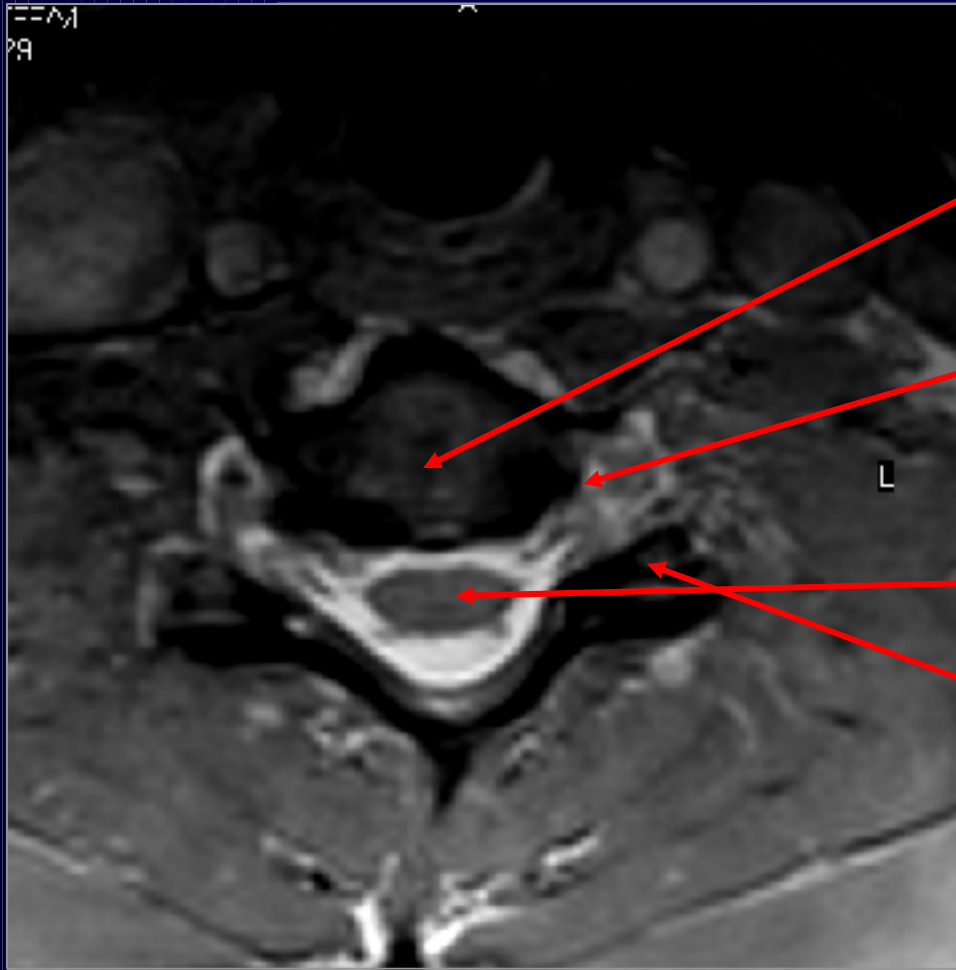
**Pedicle (L3)**

**L3 Nerve Root**

**L3/L4 Intervertebral Disc**

**Pedicle (L4)**

# Neural Foramina Cervical Spine



Vertebral Body

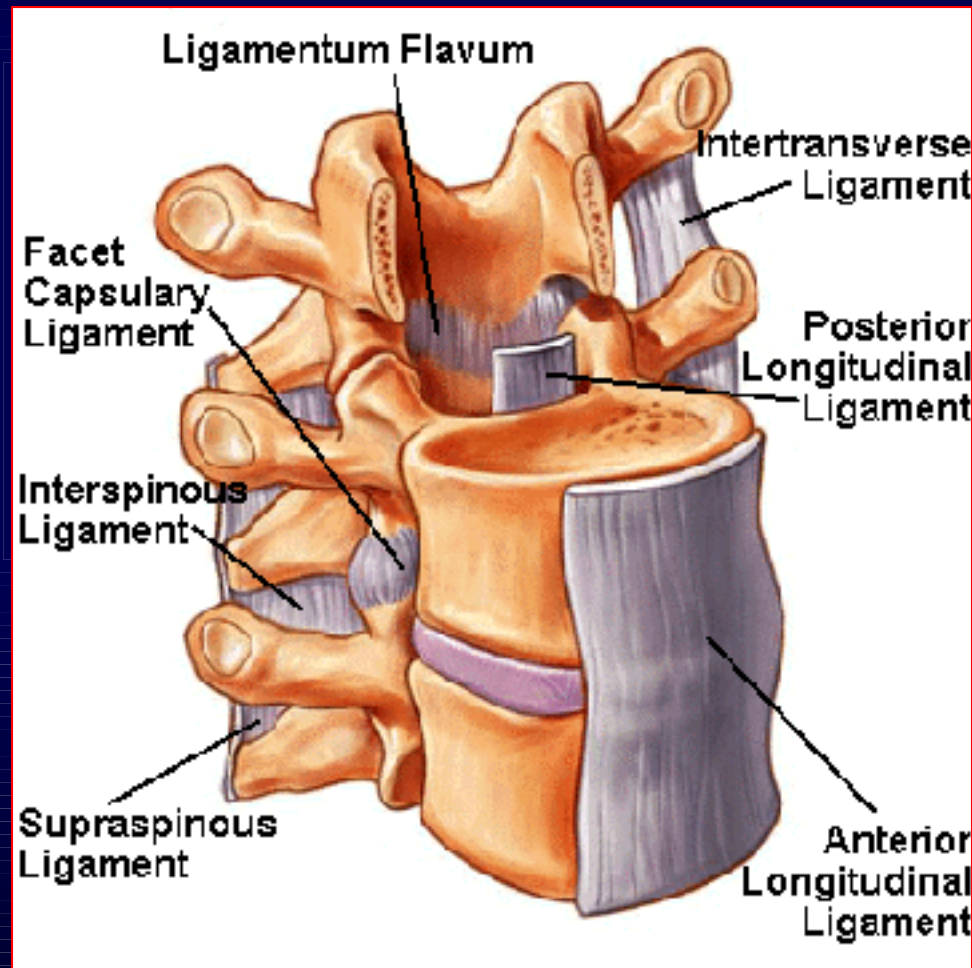
Nerve Roots

Cervical Spinal Cord

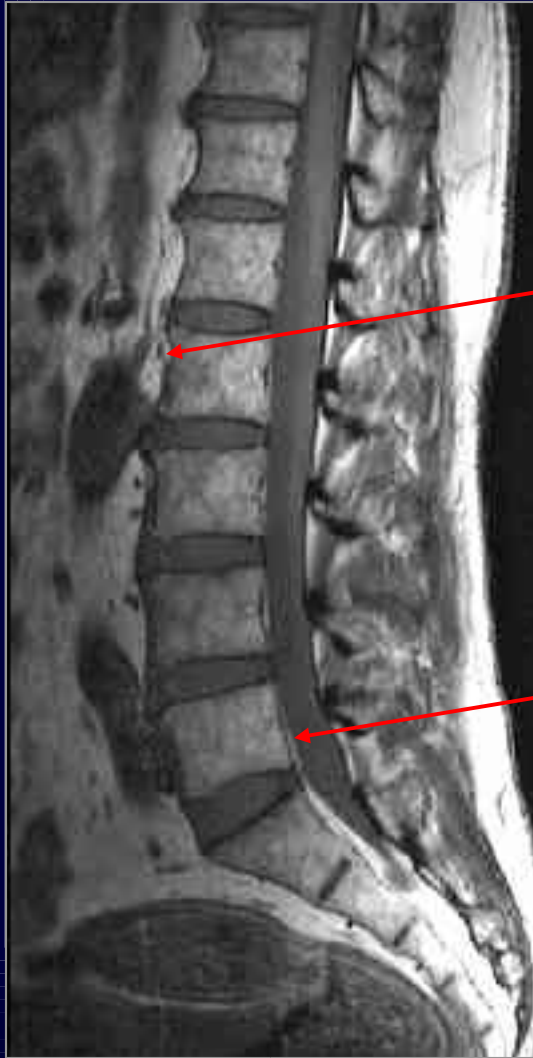
Facet Joint

Viewed from bottom

# Spinal Ligaments



# Spinal Ligament



Anterior Longitudinal  
Spinal Ligament

Posterior Longitudinal  
Spinal Ligament

# Case Study: 17 year-old Male involved in a MVA



*Do you see a fracture?*

Fracture of C7 vertebral body

# Case Study: 17 year-old Male involved in a MVA



*What Bilateral Facets Dislocation at C6/7 injured?*



# Case Study: 17 year-old Male involved in a MVA



*Spinal Cord Injury*

*Anterior Longitudinal  
Spinal Ligament*

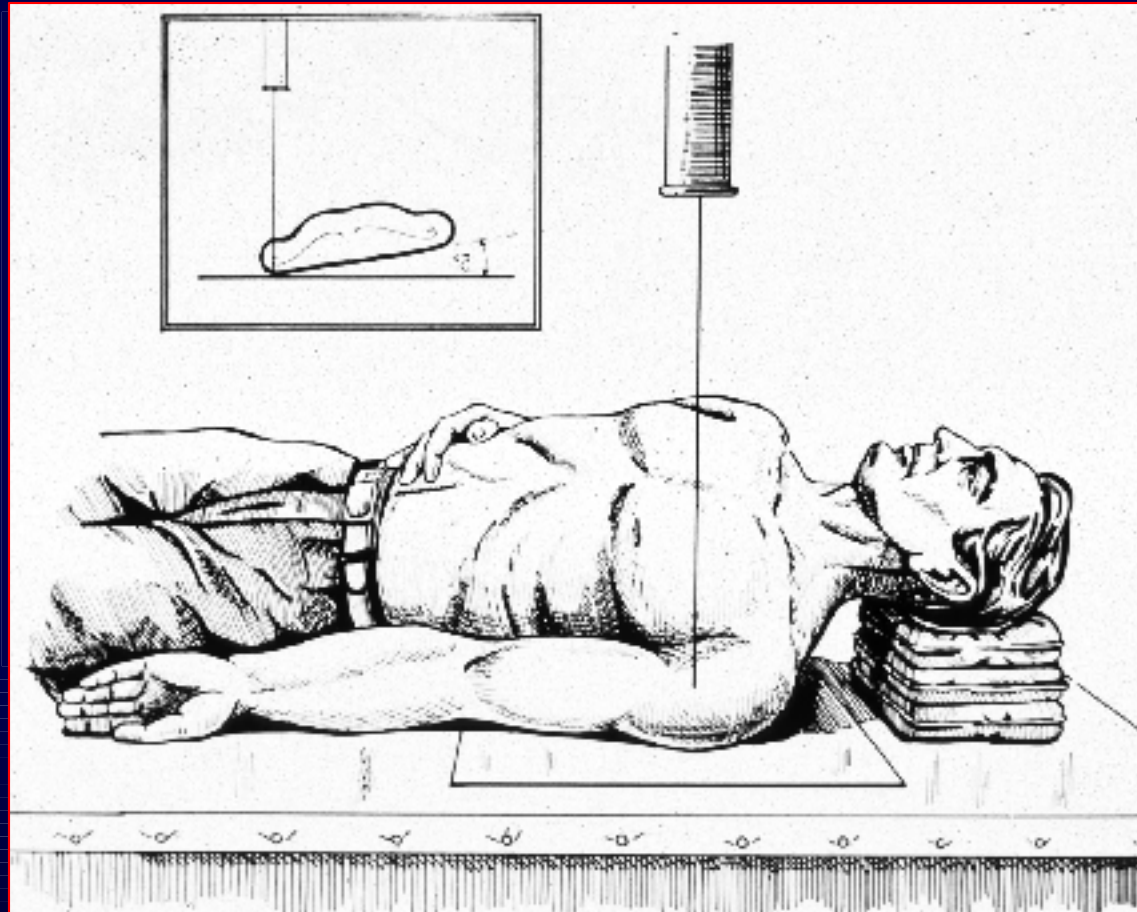
*Posterior Longitudinal  
Spinal Ligament*

# *Upper Extremity*



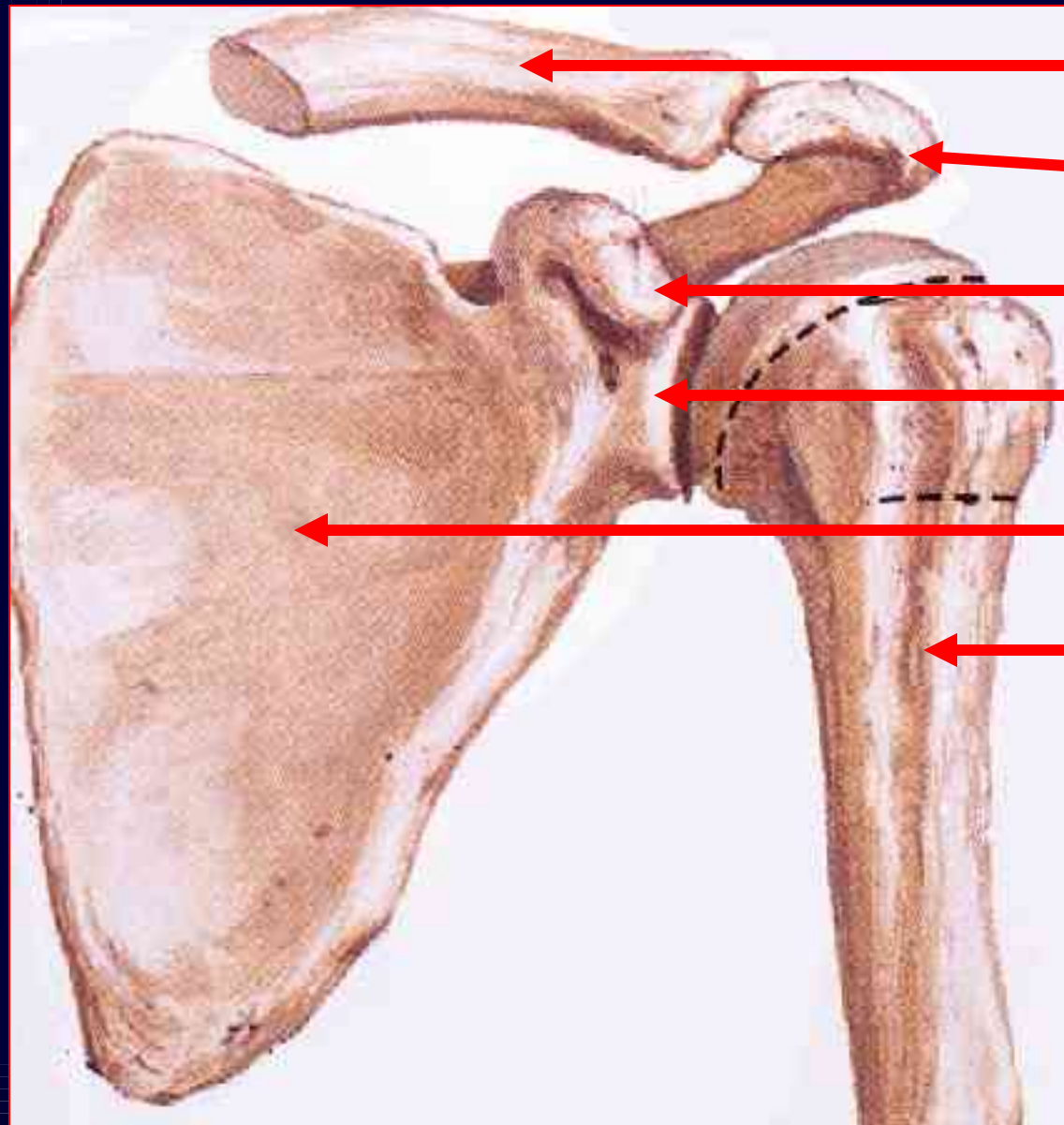
# Radiographic Anatomy

X-RAY BEAM



FILM

# LEFT SHOULDER (FRONT)



**CLAVICLE**

**ACROMION**

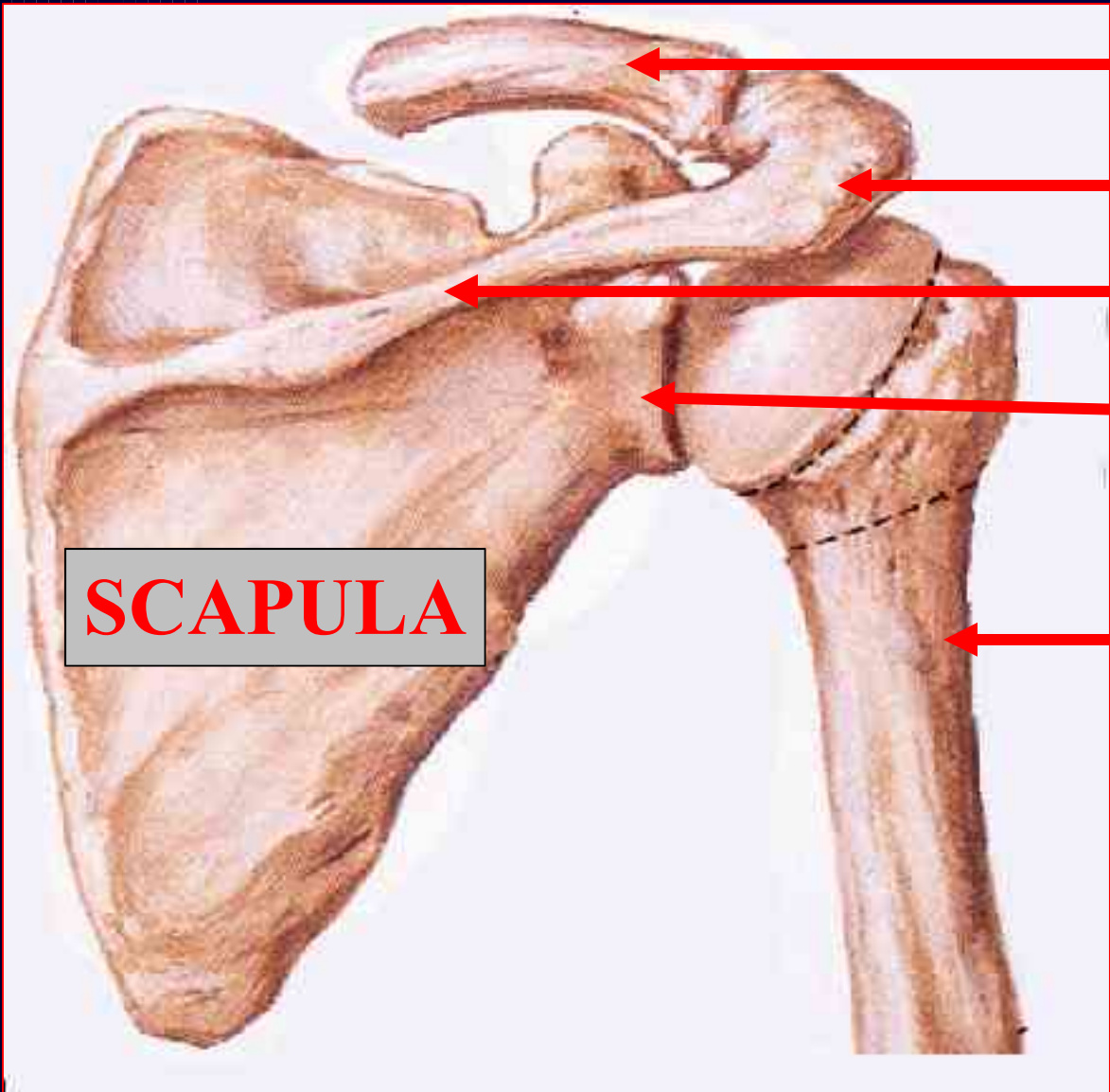
**CORACOID**

**GLENOID**

**SCAPULA**

**HUMERUS**

# SHOULDER (BACK)



**CLAVICLE**

**ACROMION**

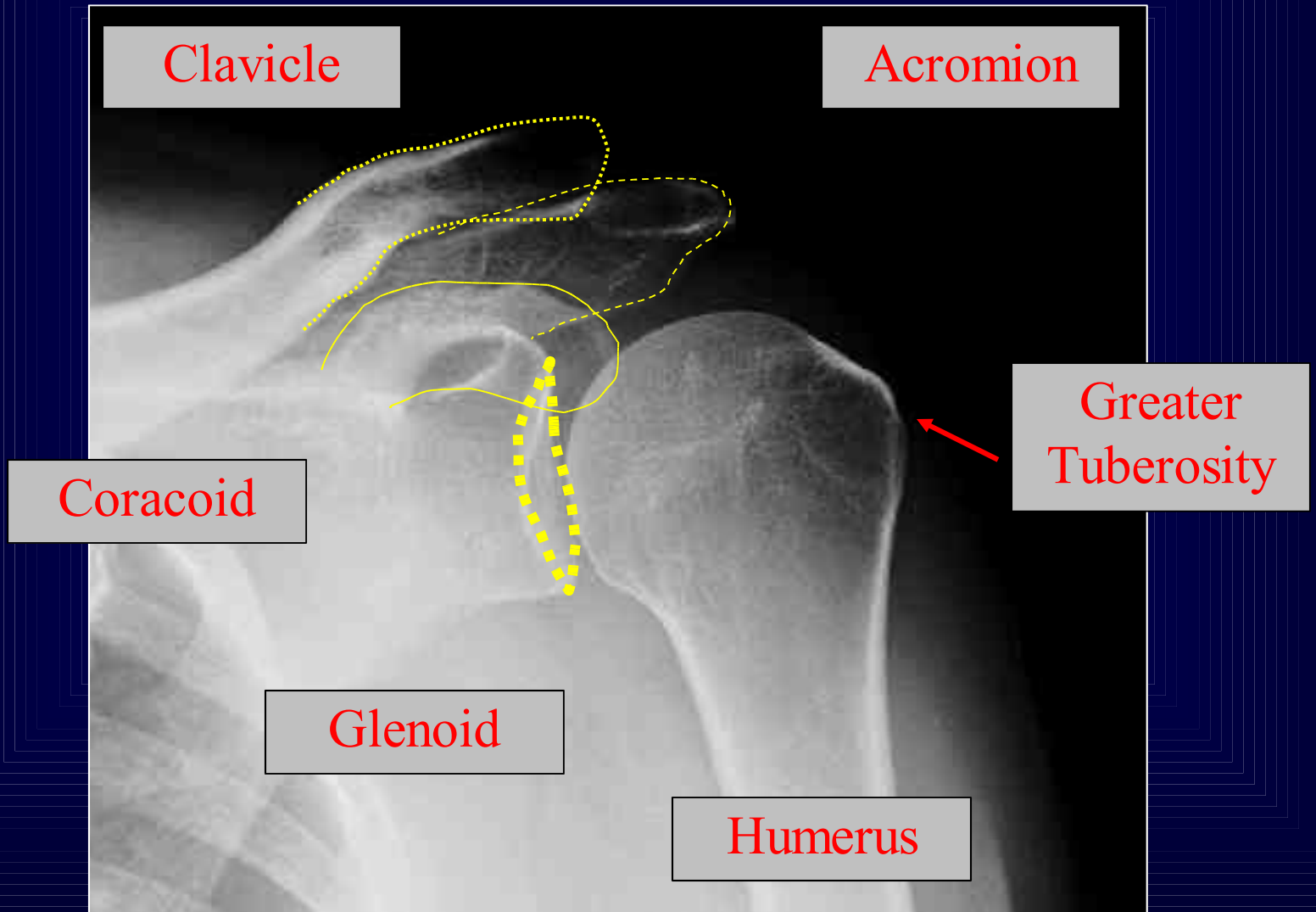
**SPINE**

**GLENOID**

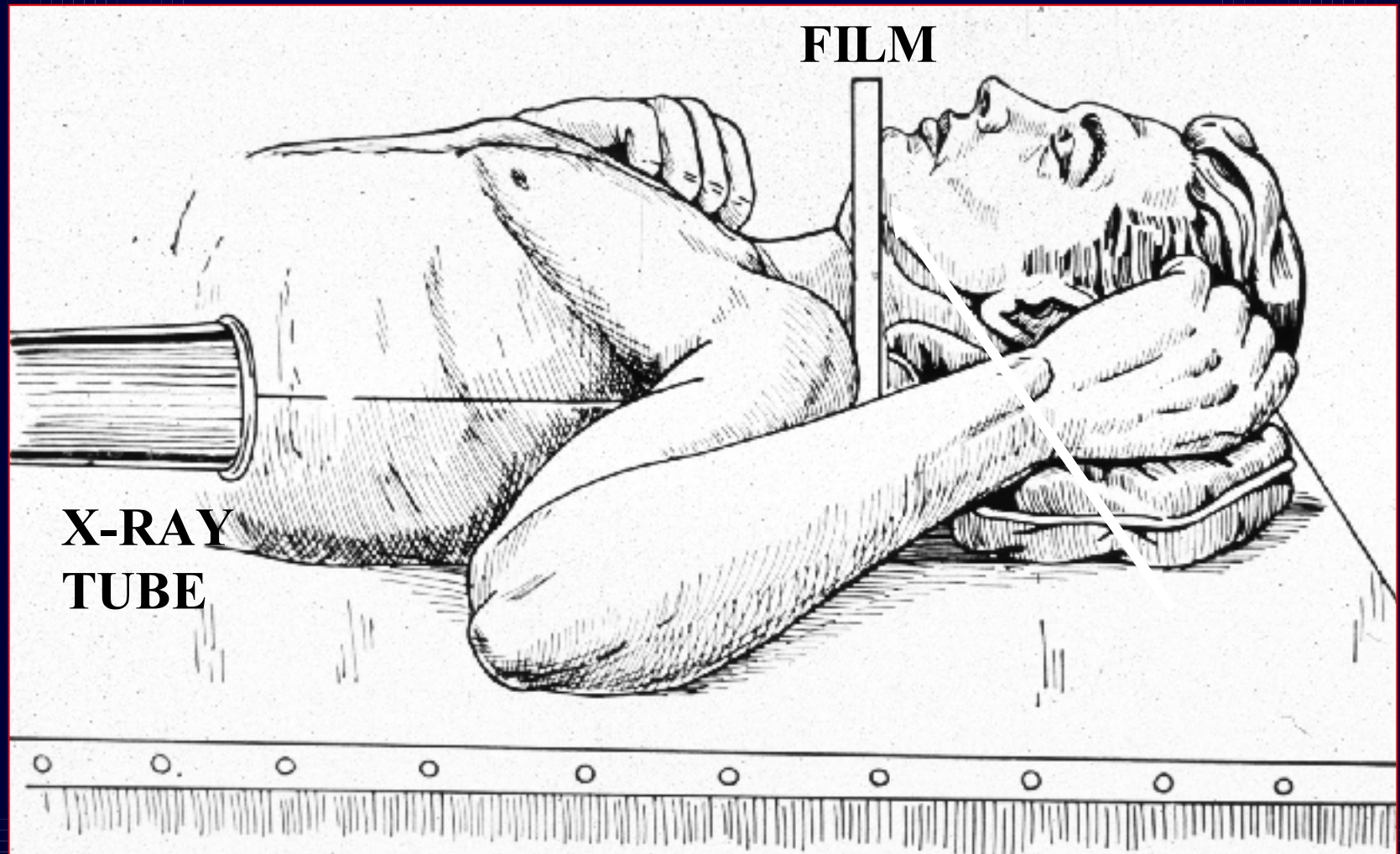
**HUMERUS**

**SCAPULA**

# AP Shoulder



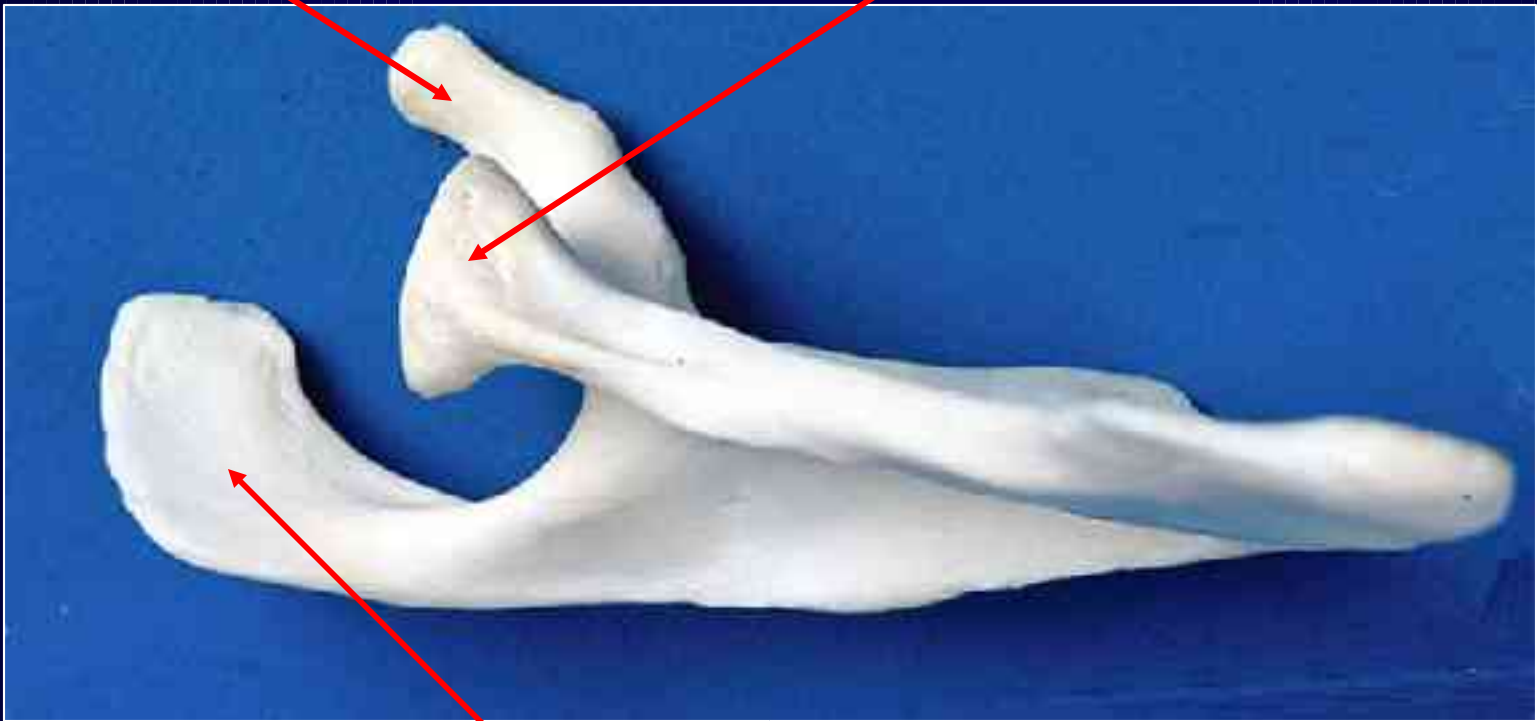
# LEFT SHOULDER AXILLARY VIEW



# RIGHT SCAPULA FROM BELOW

**CORACOID**

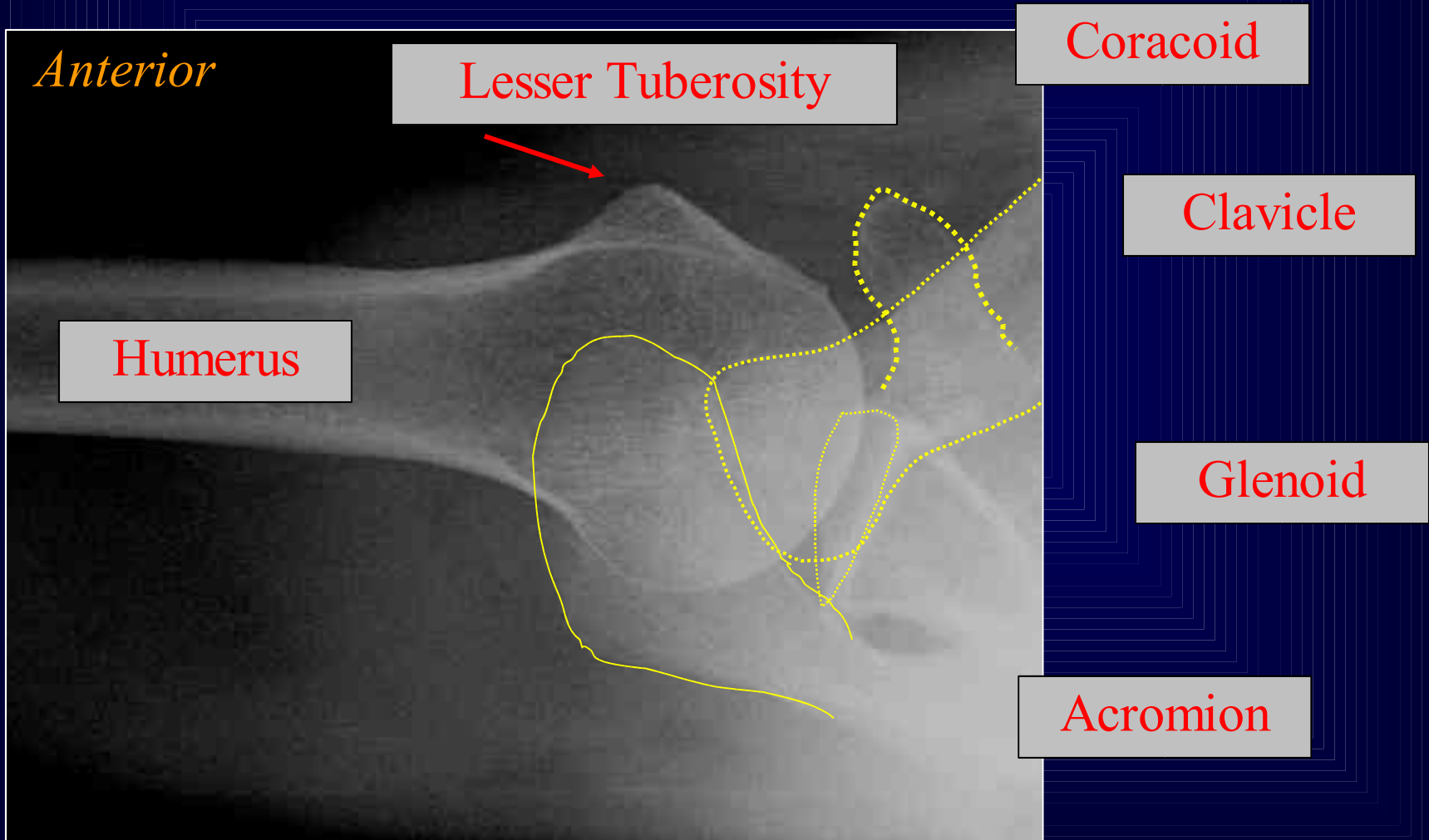
**GLENOID**



**ACROMION**



# LEFT SHOULDER (AXILLARY)

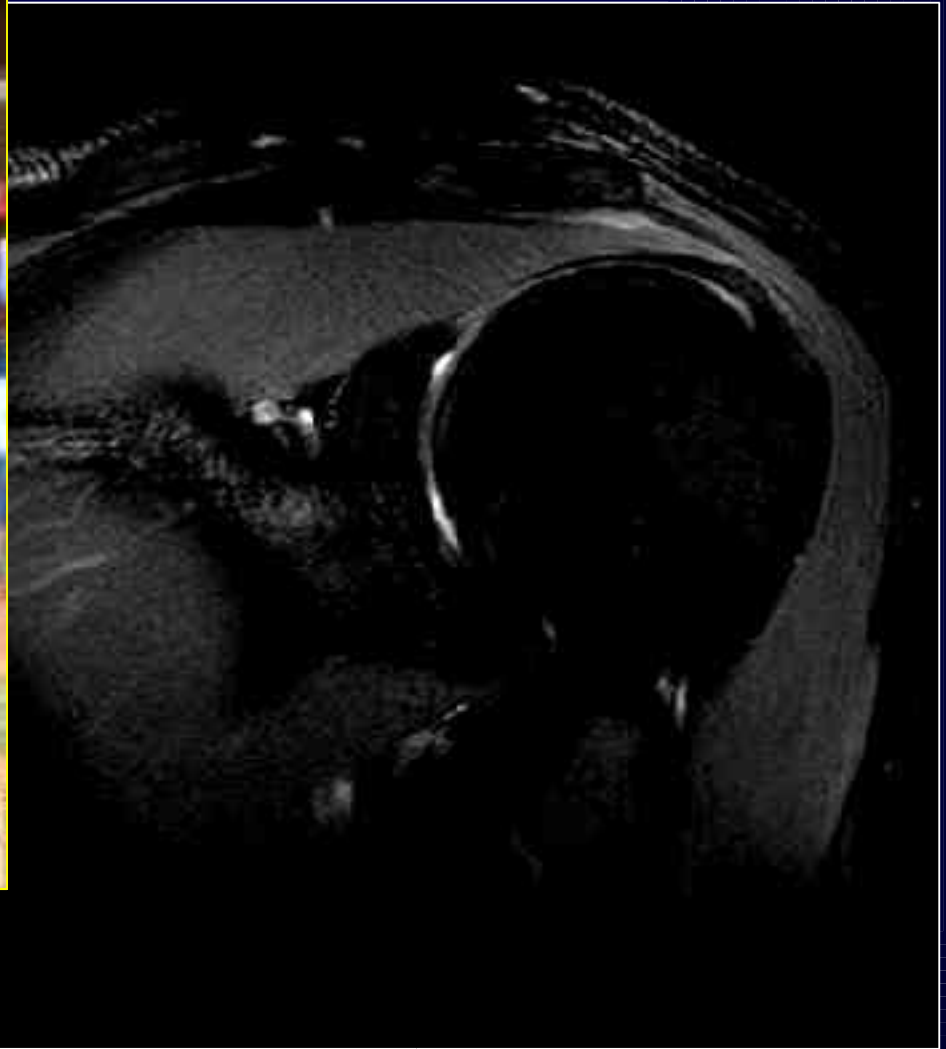


# Case Study: *52 year old male with shoulder pain*



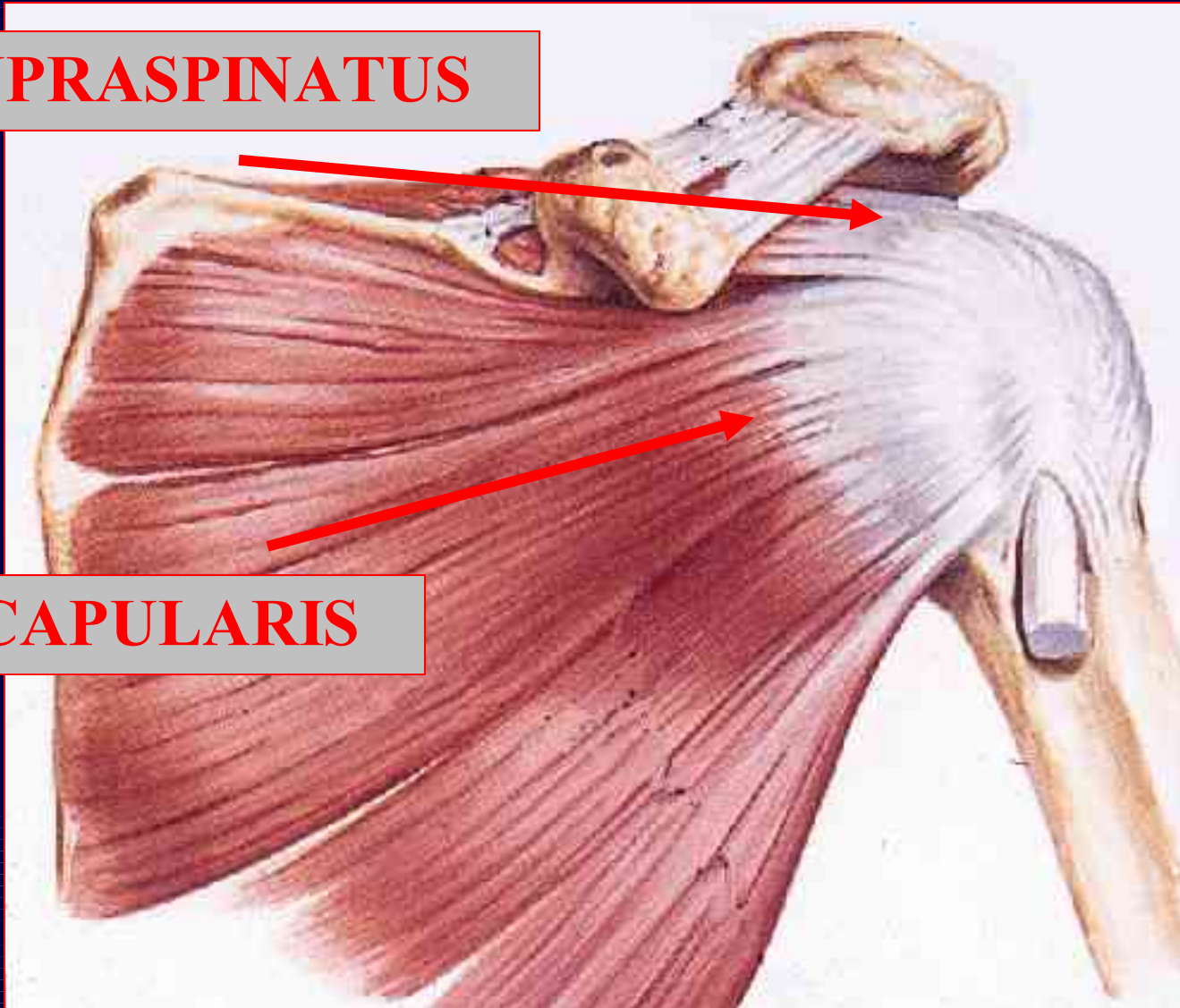
Do you identify the cause of the shoulder pain?

# MRI Anatomy of the Shoulder



# MUSCLES FROM THE FRONT

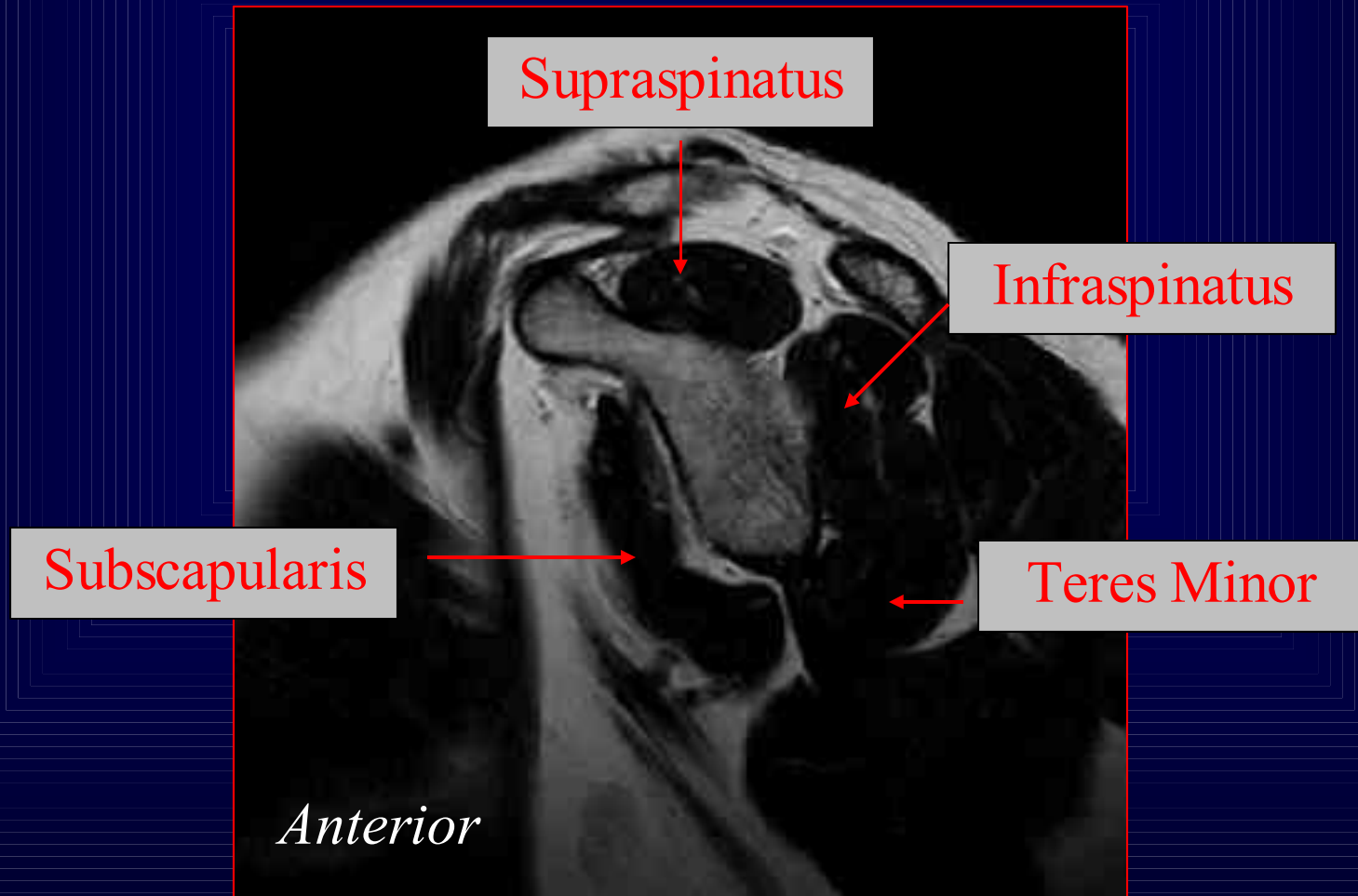
**SUPRASPINATUS**



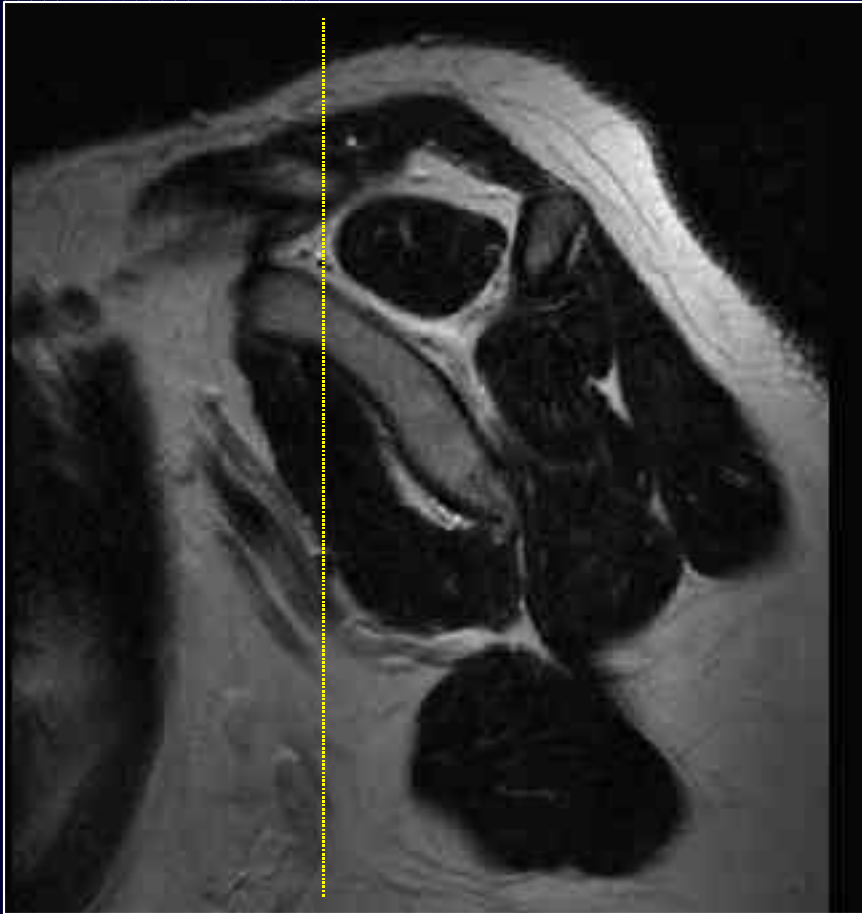
**SUBSCAPULARIS**

# Rotator Cuff Muscles

## *Sagittal View*



# Rotator Cuff: *Subscapularis*

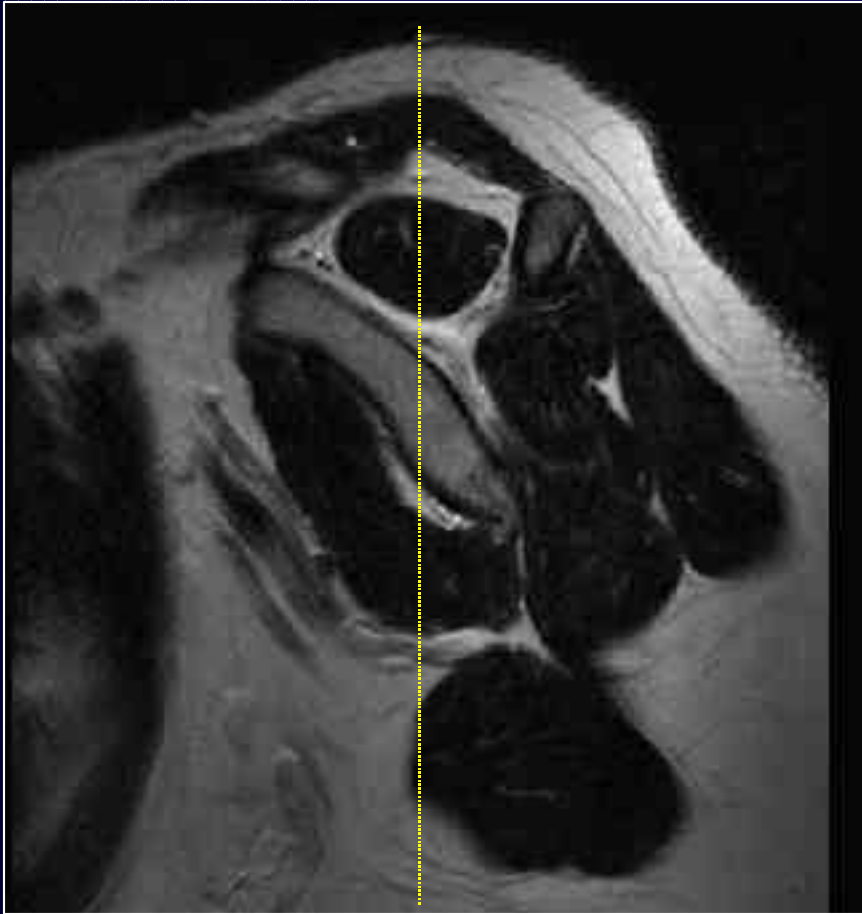


Sagittal View



Coronal View

# Rotator Cuff: *Supraspinatus*



Sagittal View



Coronal View

# MUSCLES FROM THE BACK

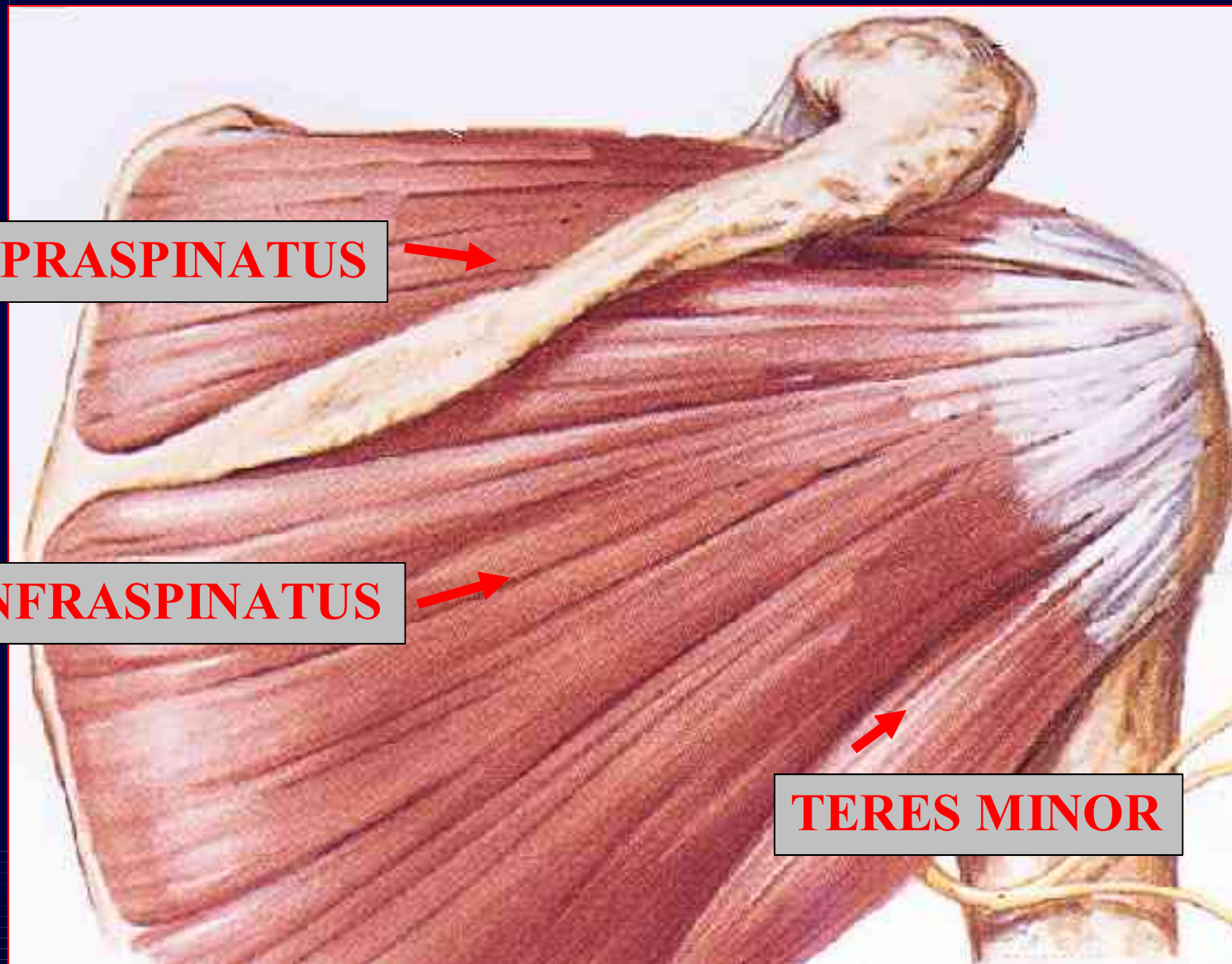
**SUPRASPINATUS**



**INFRASPINATUS**

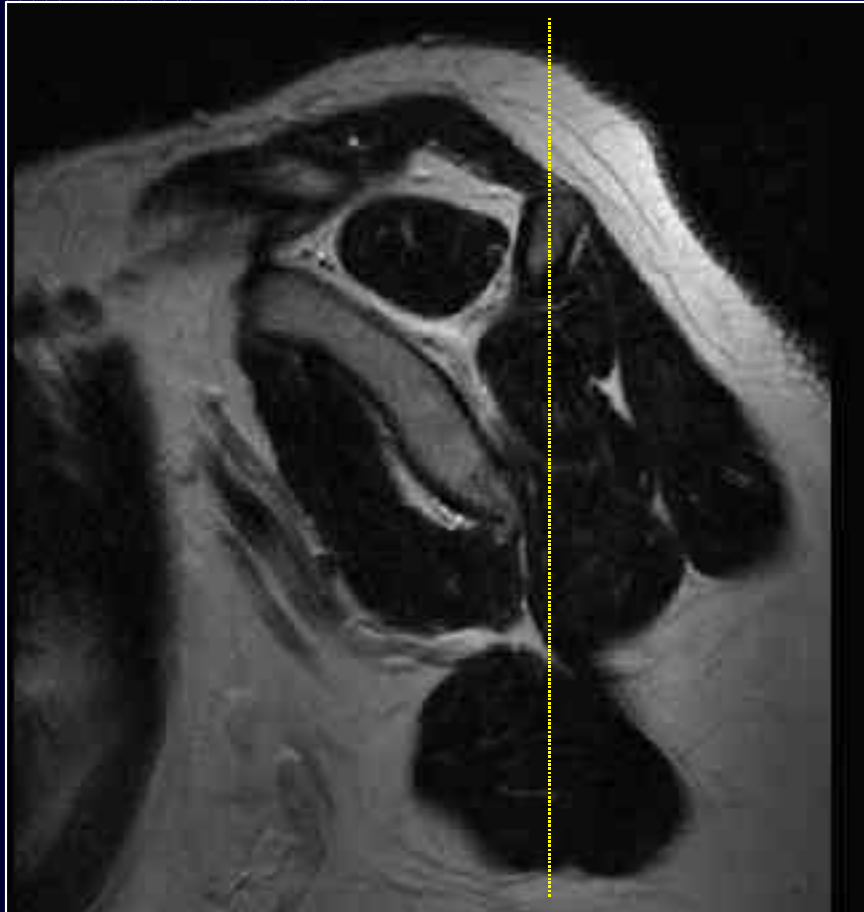


**TERES MINOR**

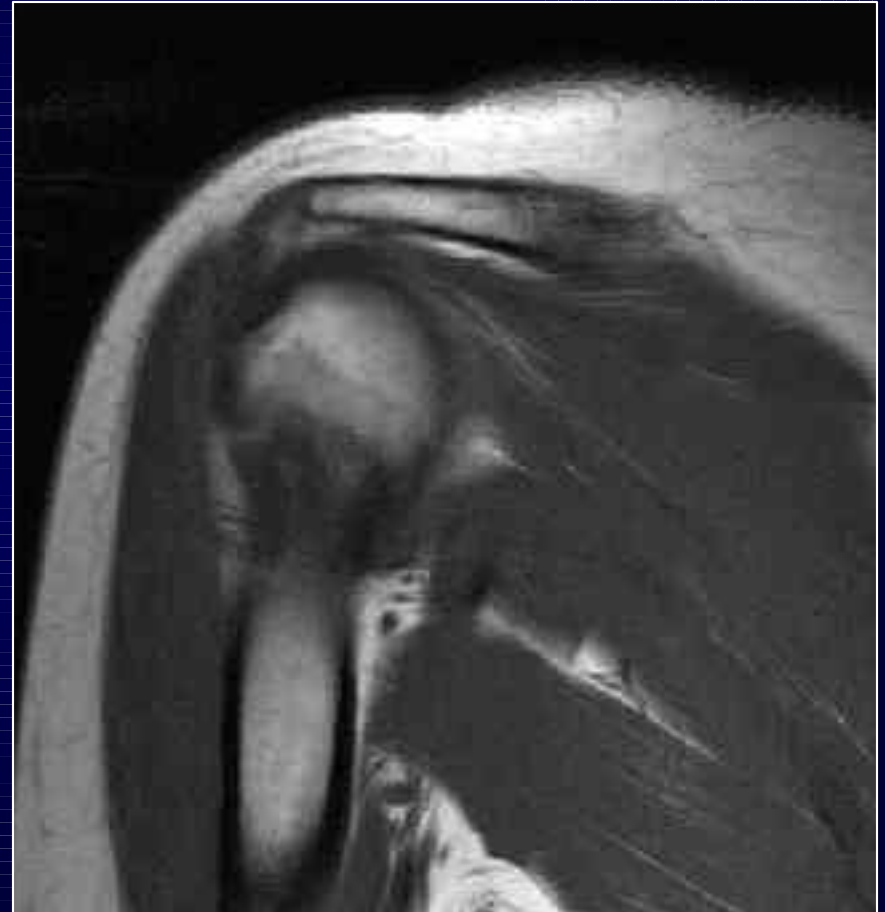




# Rotator Cuff: *Infraspinatus*

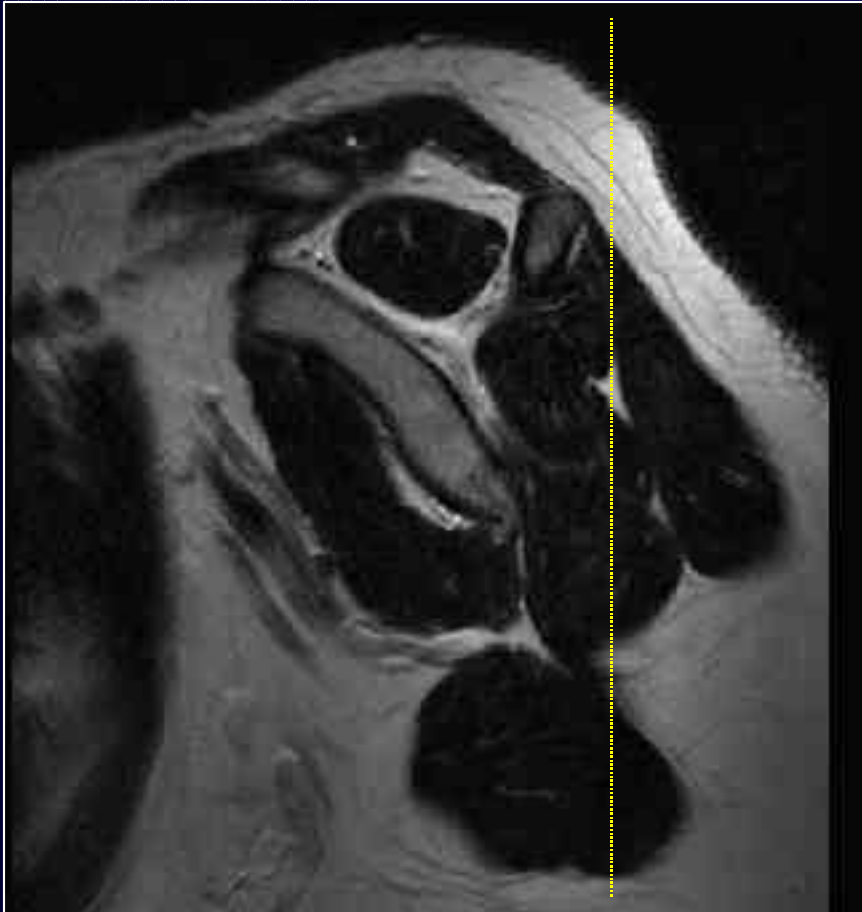


Sagittal View

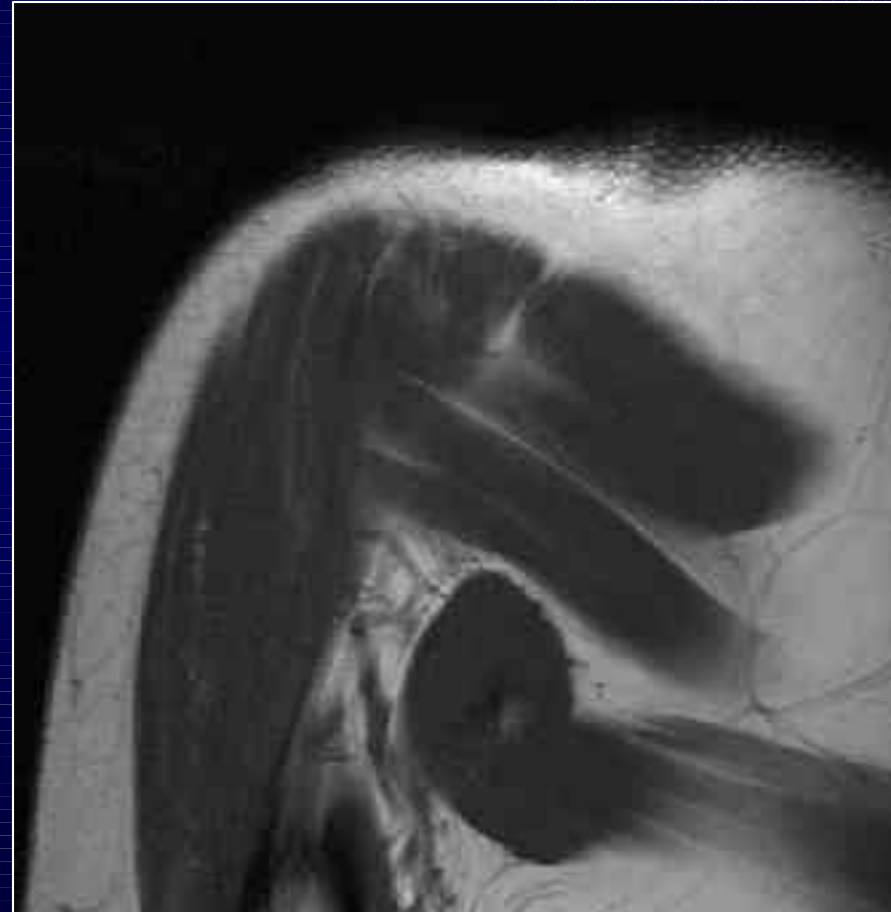


Coronal View

# Rotator Cuff: *Teres Minor*



Sagittal View



Coronal View

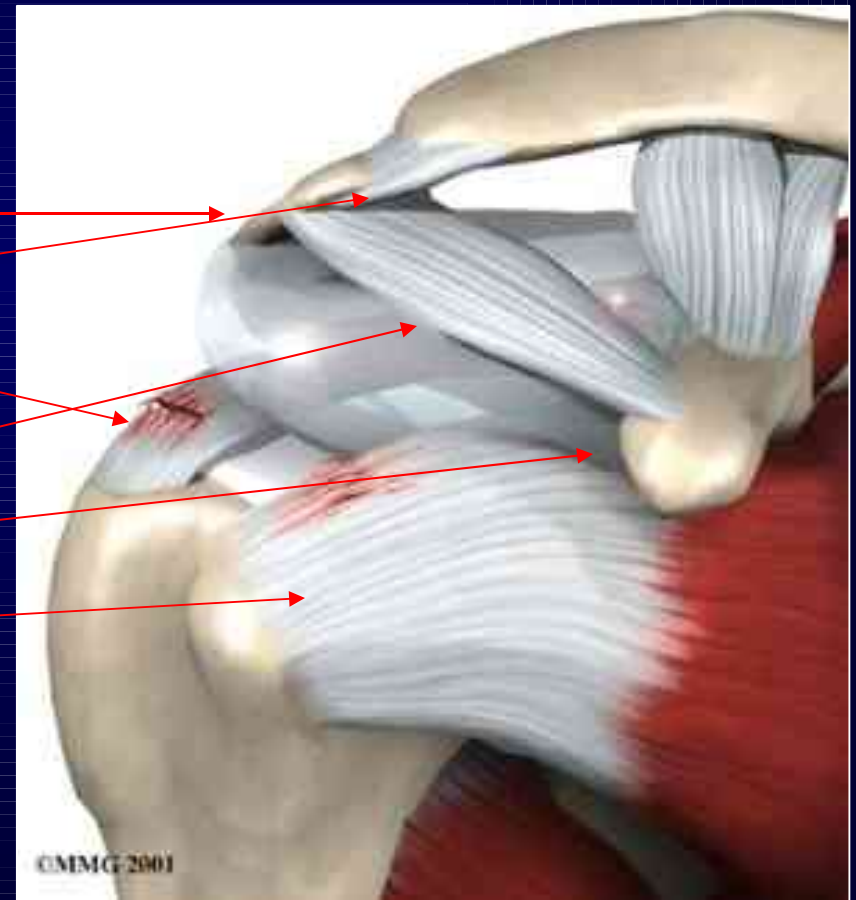
# Anatomy Considerations in Rotator Cuff Tears



# Impingement of the Rotator Cuff

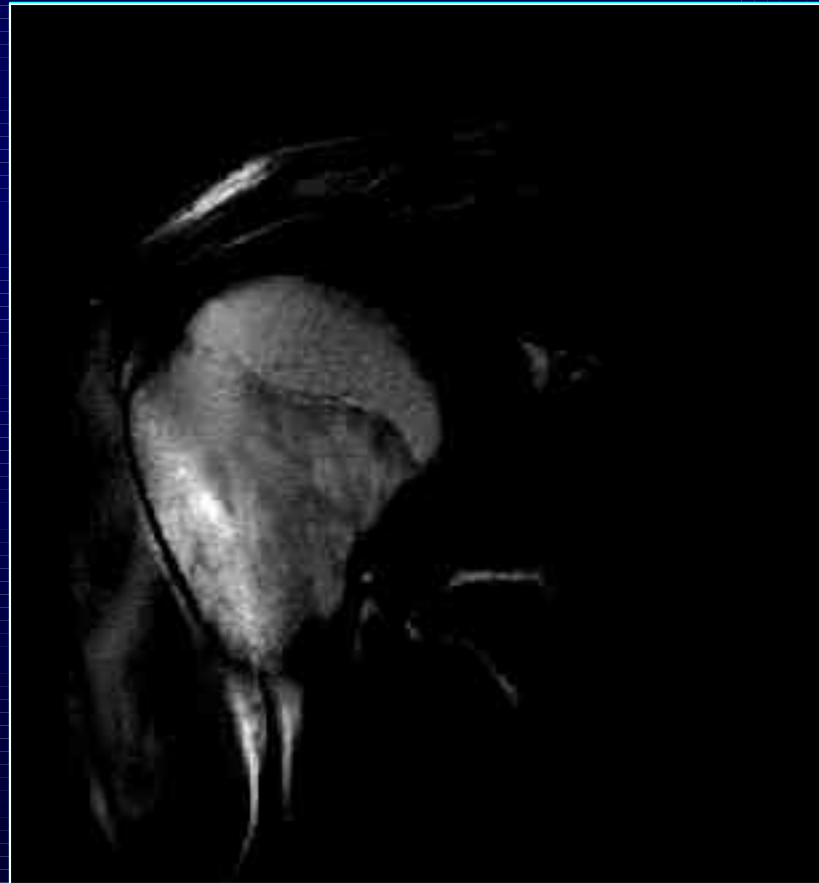
## Coracoacromial Arch

- Acromion
- AC Joint
- Supraspinatus
- Coracoacromial ligament
- Coracoid Process
- Subscapularis



**Anterior View**

# MRI Anatomy of the Rotator Cuff



# MRI Anatomy of the Rotator Cuff



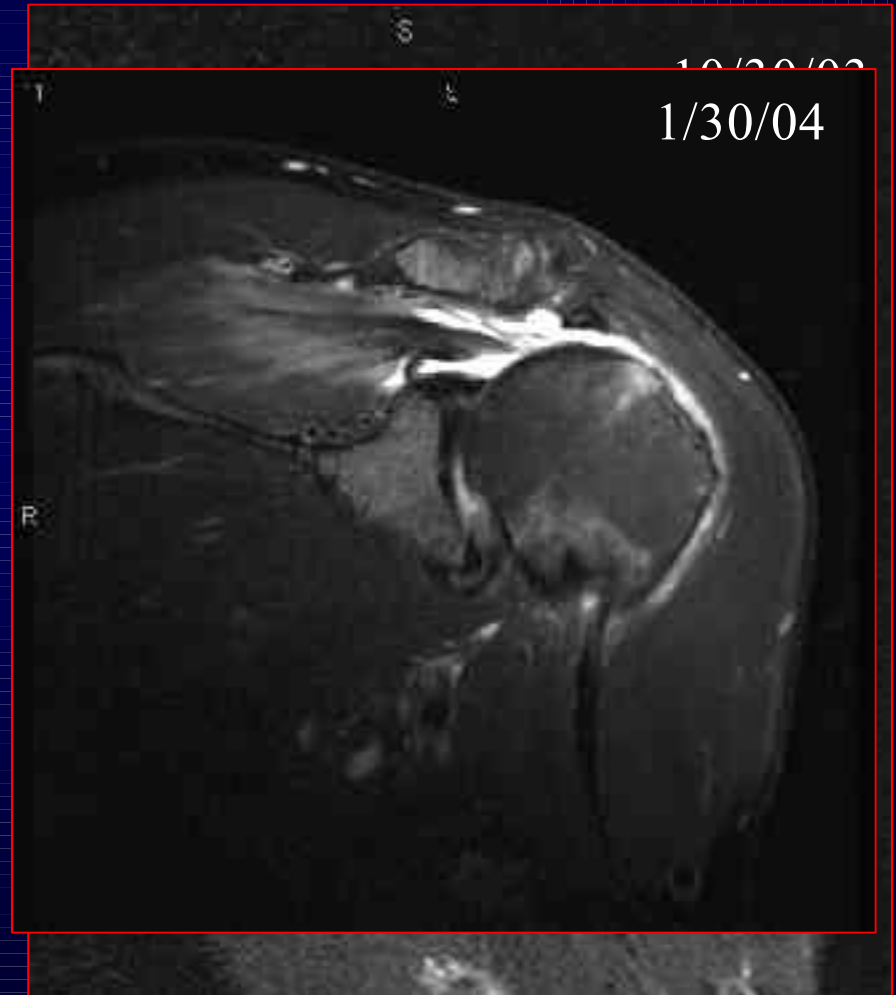
# Rotator Cuff Tear



Contrast leaking into subacromial bursa through tear in supraspinatus

Contrast injected into glenohumeral joint

# ROTATOR CUFF TEAR

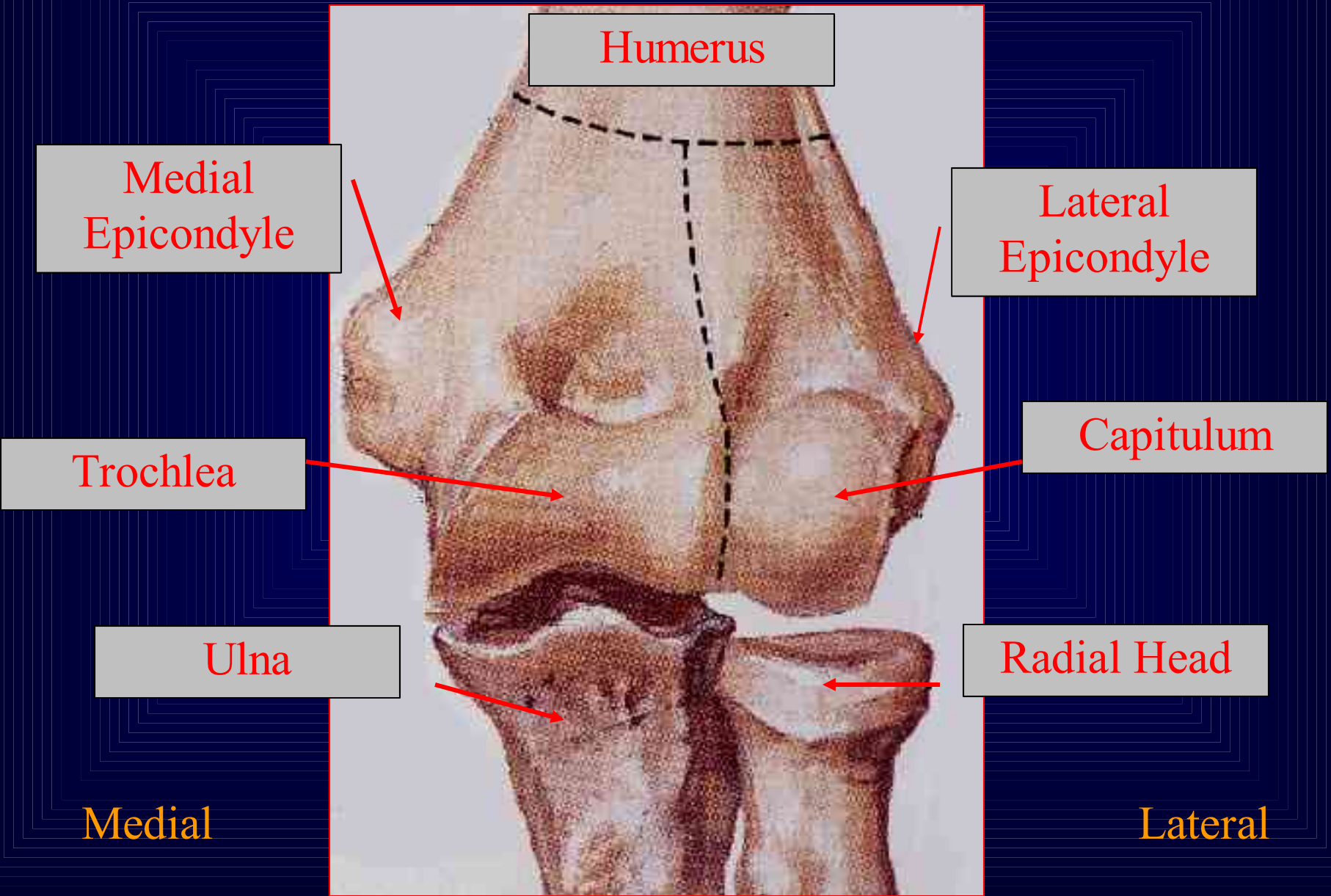




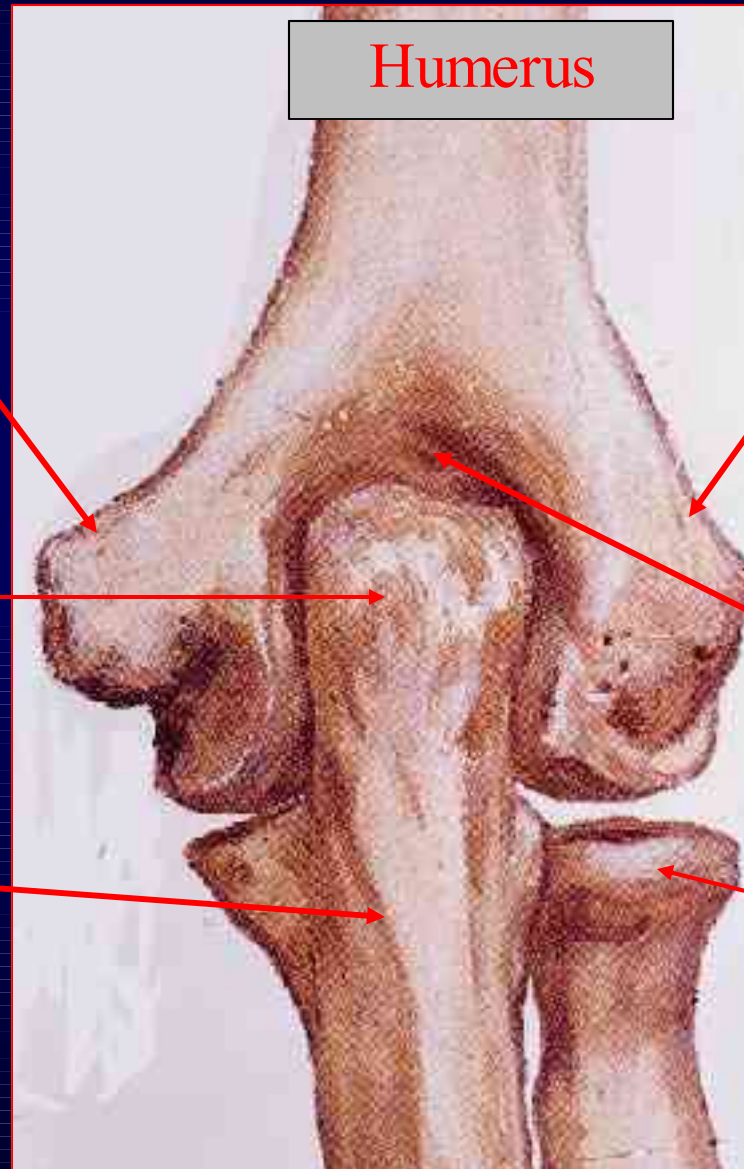
# The Elbow



# LEFT ELBOW FROM FRONT



# Elbow from the Back



Humerus

Medial  
Epicondyle

Lateral  
Epicondyle

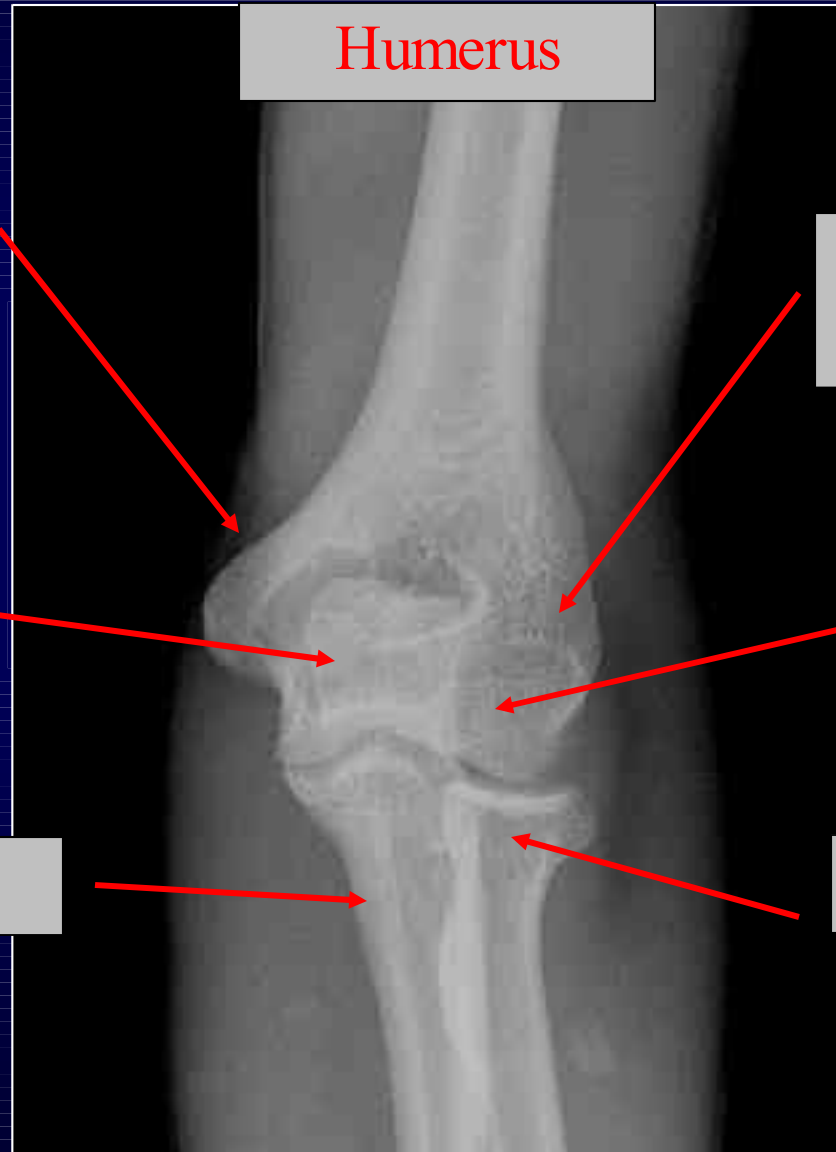
Olecranon

Olecranon  
fossa

Ulna

Radial Head

# AP ELBOW



Humerus

Medial  
Epicondyle

Lateral  
Epicondyle

Trochlea

Capitulum

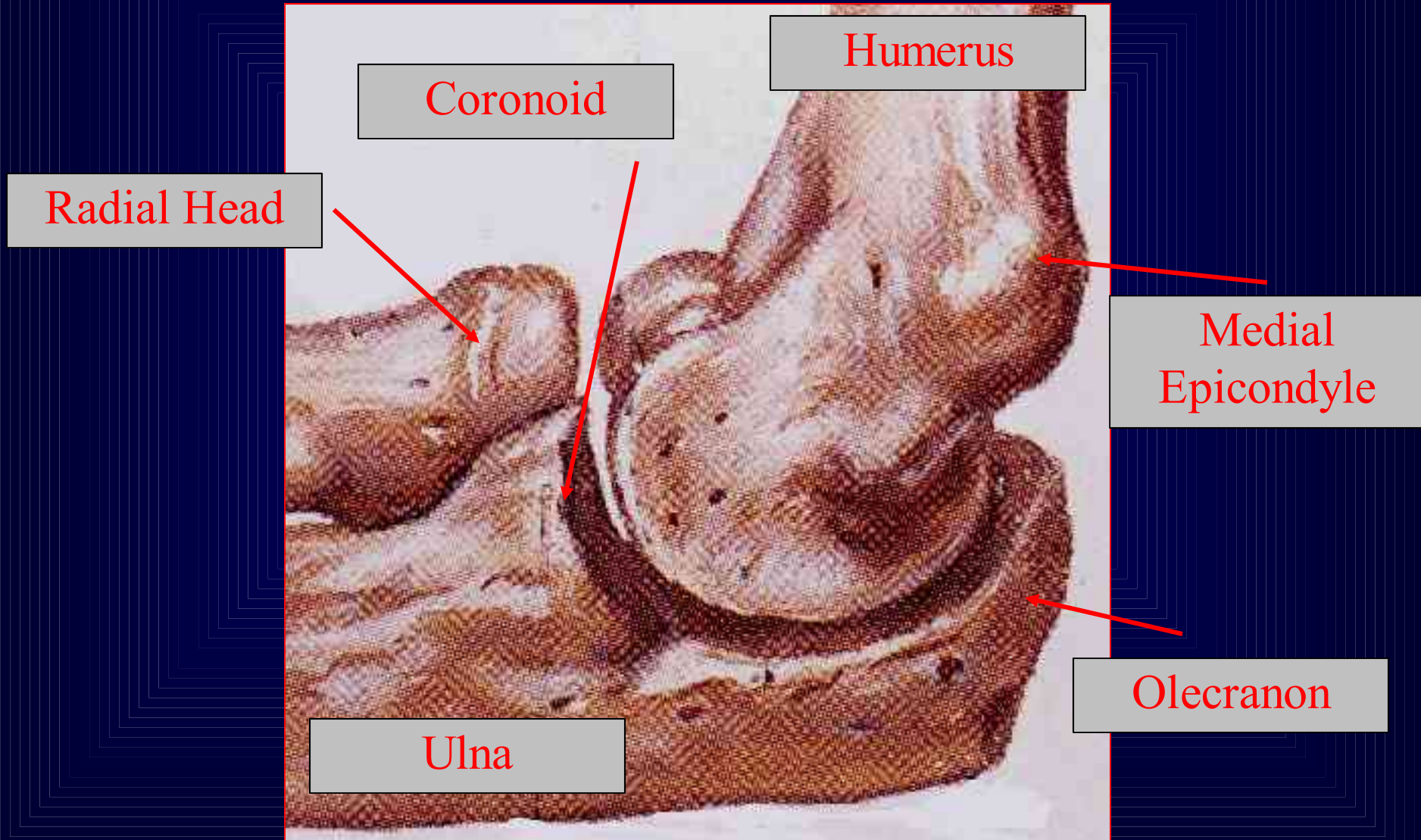
Ulna

Radial Head

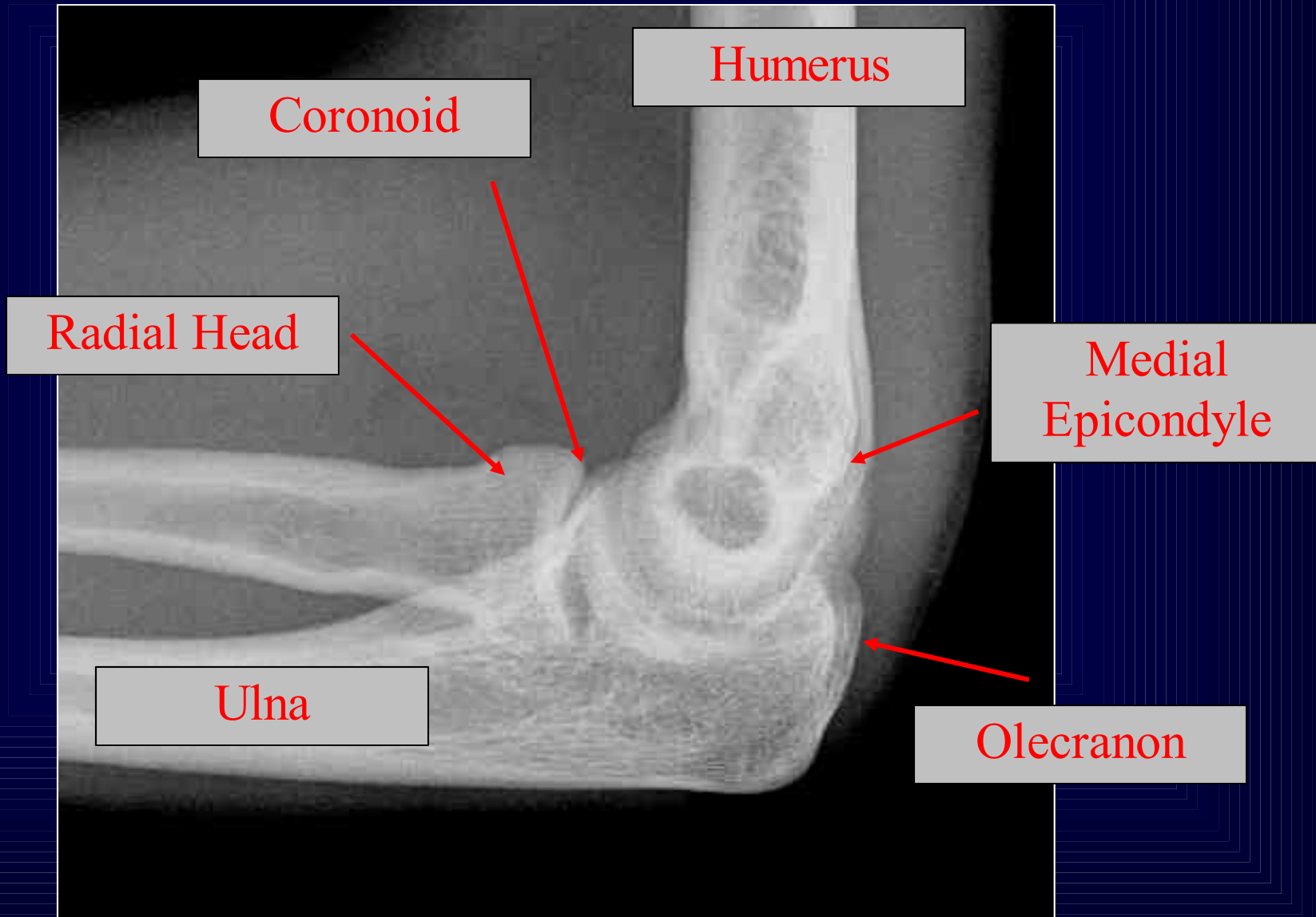
Medial

Lateral

# Medial View of Elbow



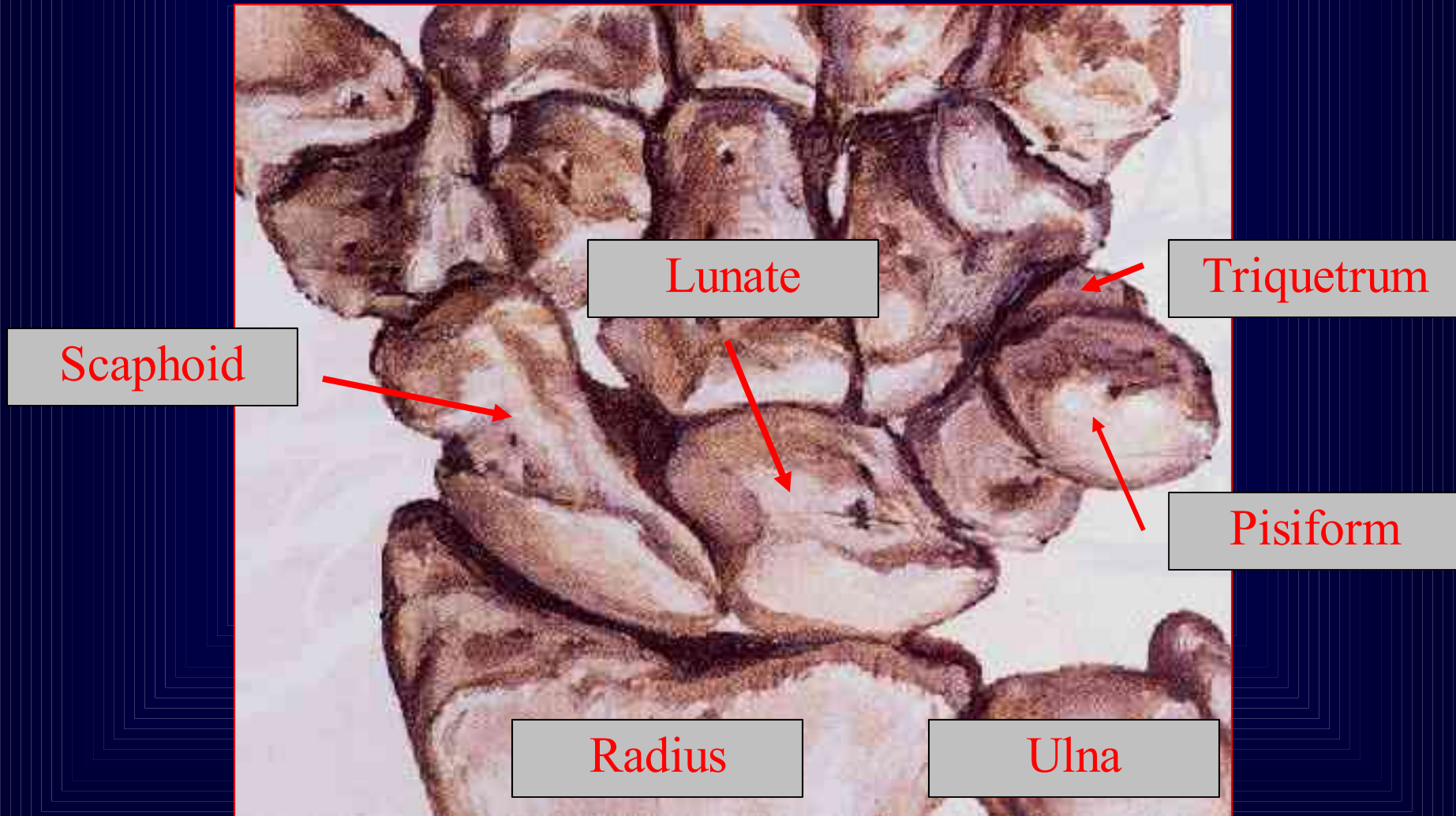
# Medial View of Elbow



# The Wrist



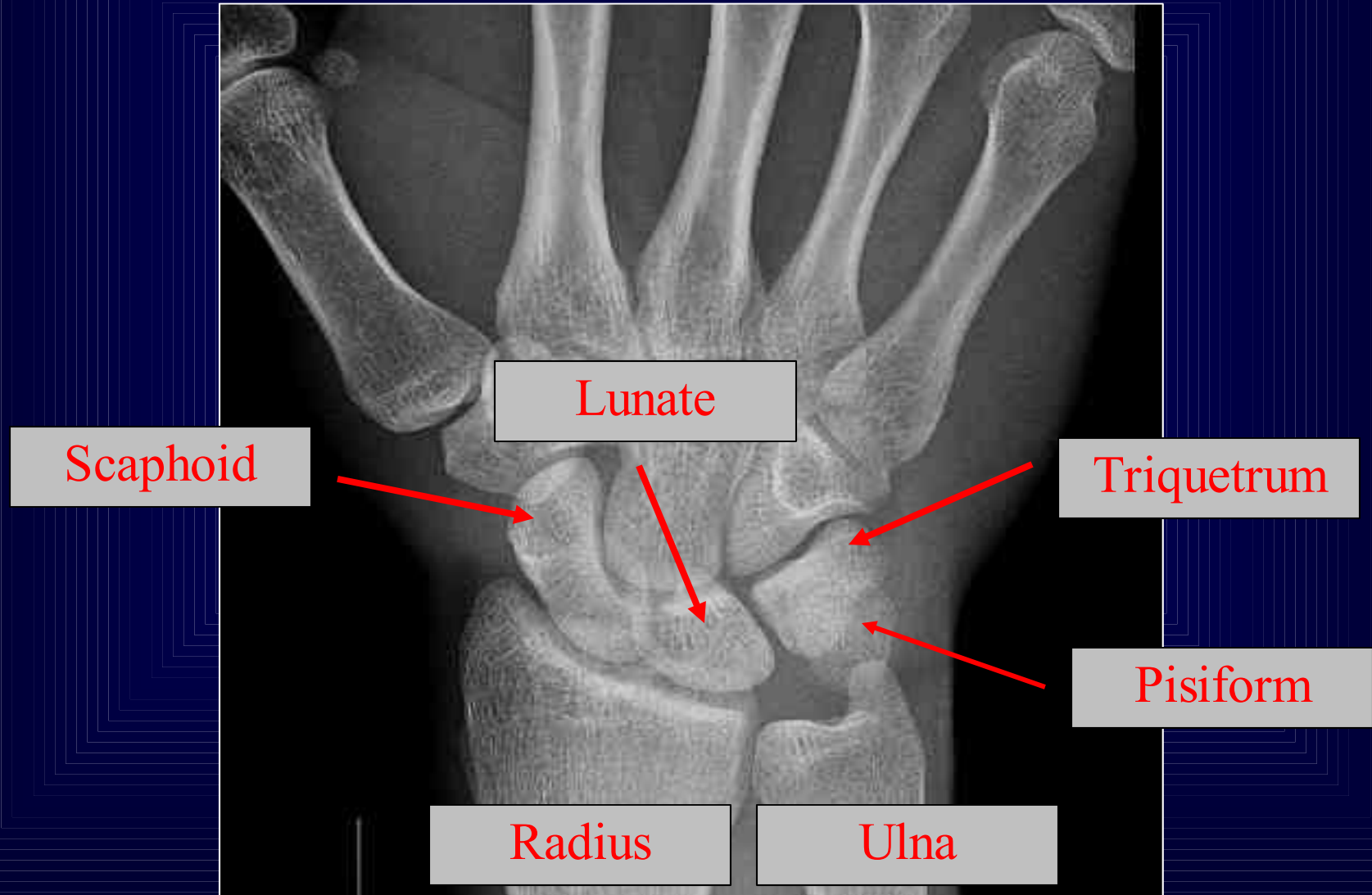
# The Wrist Palmar View Carpal Bones (*Proximal Row*)



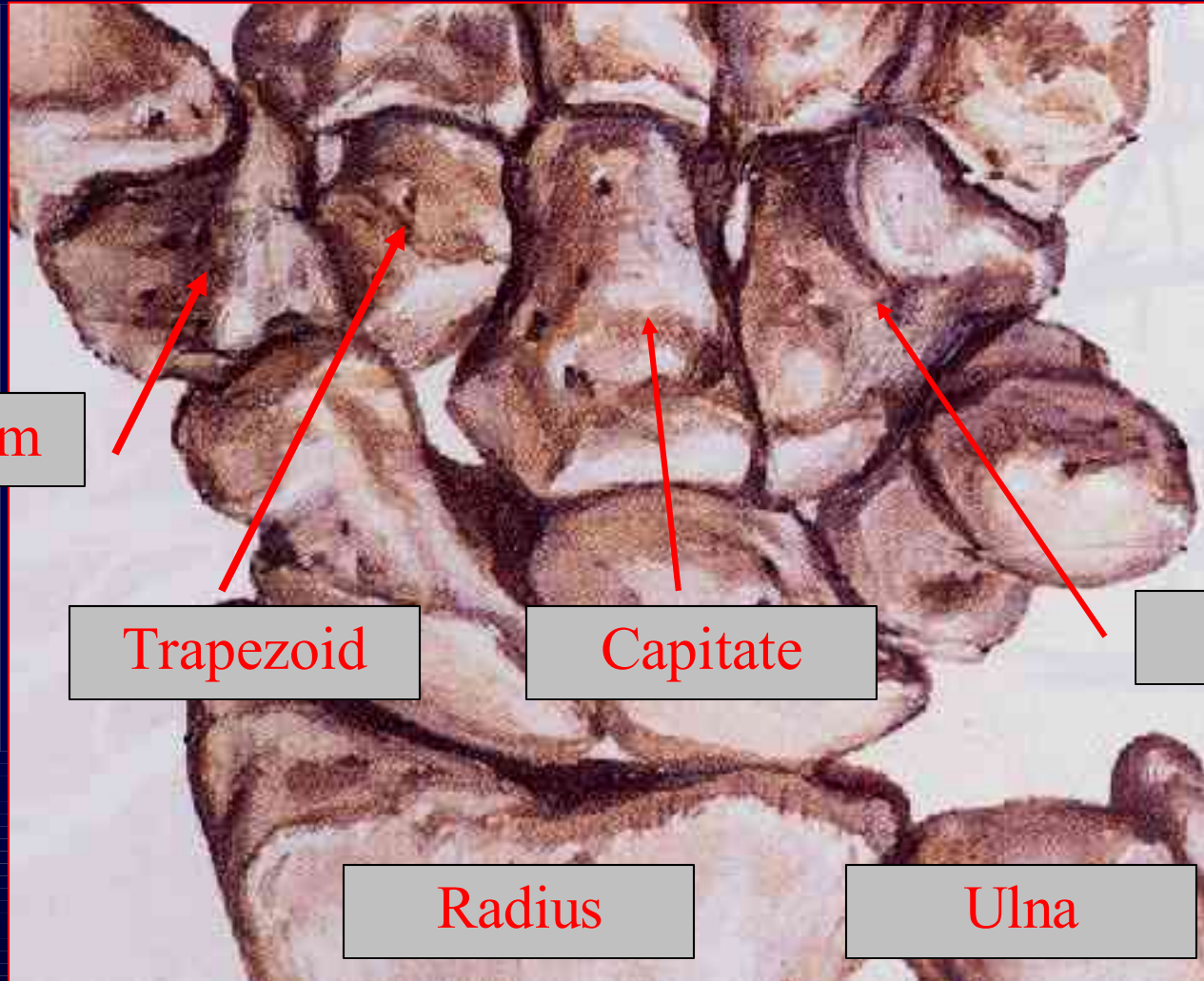


# The Wrist Palmar View

## Carpal Bones (*Proximal Row*)



# The Wrist Palmar View Carpal Bones (*Distal Row*)



Trapezium

Trapezoid

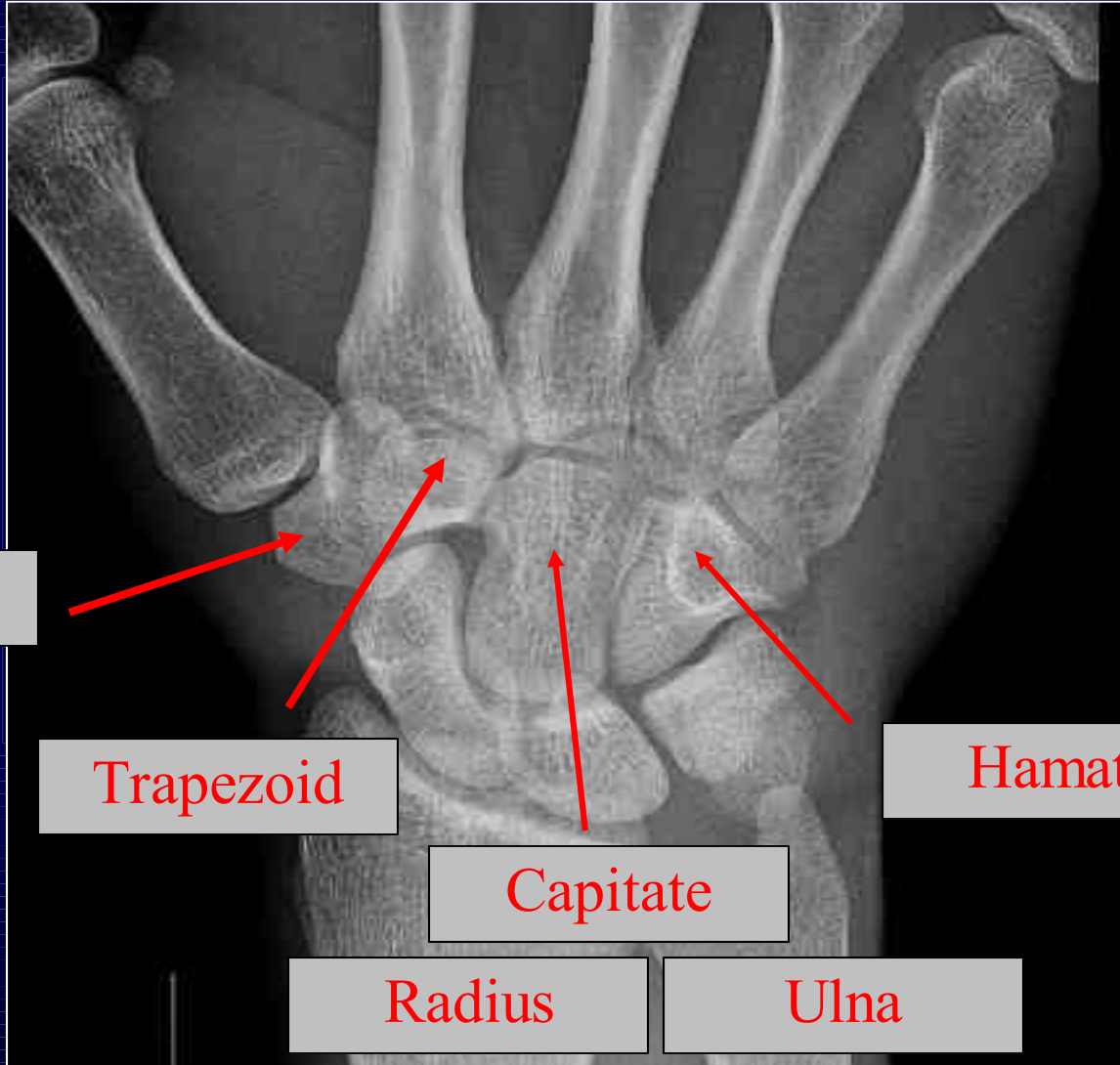
Capitate

Hamate

Radius

Ulna

# The Wrist Palmar View Carpal Bones (*Distal Row*)



Trapezium

Trapezoid

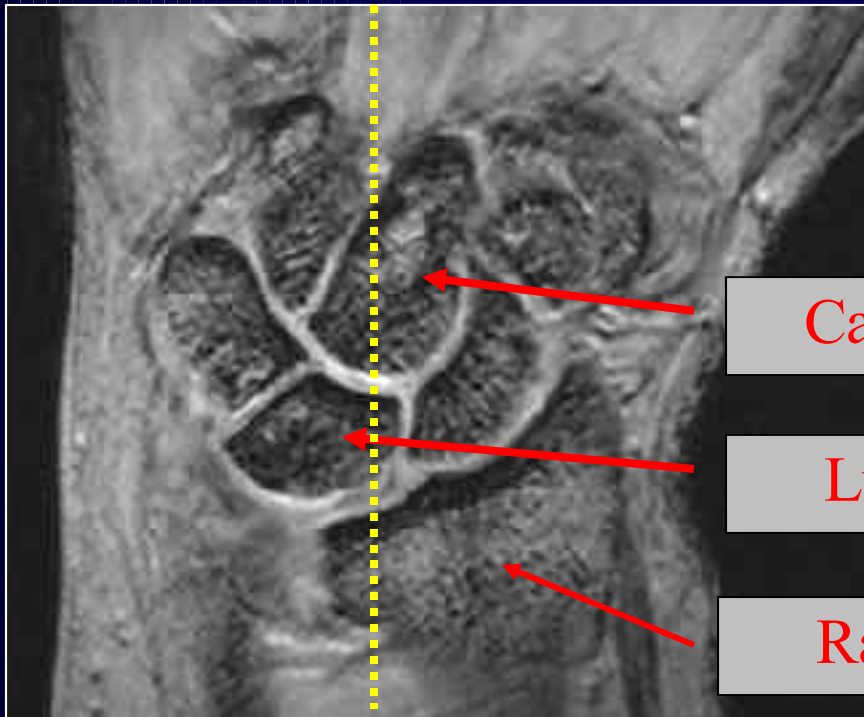
Capitate

Hamate

Radius

Ulna

# MR Anatomy of the Wrist



Capitate

Lunate

Radius

Coronal Wrist

