Radiology Anatomy of the Spine and Upper Extremity

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Learning Objective

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

PEDICILE

TRANSVERSE PROCESS (fractured)

SPINOUS PROCESS

LAMINA
SPINE FROM THE FRONT

BODY

TRANSVERSE PROCESS
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
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

Cervical

Thoracic

Lumbar

Superior Facets
Facet Joints Sagittal Reconstructions

Cervical

Thoracic

Lumbar
Intervertebral Disc Space

NEURAL FORAMEN

INTERVERTEBRAL DISC
Nerve Roots

- BODY
- DISC
- PEDICLE
- SPINOUS PROCESS
- NERVE ROOT
- INF FACET
- SUP FACET
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

- Ligamentum Flavum
- Intertransverse Ligament
- Posterior Longitudinal Ligament
- Facet Capsular Ligament
- Interspinous Ligament
- Supraspinous Ligament
- Anterior Longitudinal Ligament
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 other structures are likely to be 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
SHOULDER (BACK)

CLAVICLE
ACROMION
SPINE
GLENOID
HUMERUS
SCAPULA
AP Shoulder

- Clavicle
- Acromion
- Coracoid
- Greater Tuberosity
- Glenoid
- Humerus
LEFT SHOULDER AXILLARY VIEW

X-RAY TUBE

FILM
RIGHT SCAPULA FROM BELOW

CORACOID  GLENOID

ACROMION
LEFT SHOULDER (AXILLARY)

Anterior

Lesser Tuberosity

Coracoid

Clavicle

Glenoid

Acromion

Humerus
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**
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 injected into glenohumeral joint

Contrast leaking into subacromial bursa through tear in supraspinatus
The Elbow
LEFT ELBOW FROM FRONT

- Humerus
- Medial Epicondyle
- Lateral Epicondyle
- Trochlea
- Ulna
- Capitulum
- Radial Head

Medial Lateral
Medial View of Elbow

- Humerus
- Ulna
- Olecranon
- Medial Epicondyle
- Radial Head
- Coronoid
The Wrist Palmar View
Carpal Bones (*Proximal Row*)

- Scaphoid
- Lunate
- Triquetrum
- Pisiform
- Radius
- Ulna
The Wrist Palmar View
Carpal Bones (Proximal Row)

Scaphoid
Lunate
Triquetrum
Pisiform
Radius
Ulna
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

Coronal Wrist

- Radius
- Lunate
- Capitate