



MED437
KING SAUD UNIVERSITY

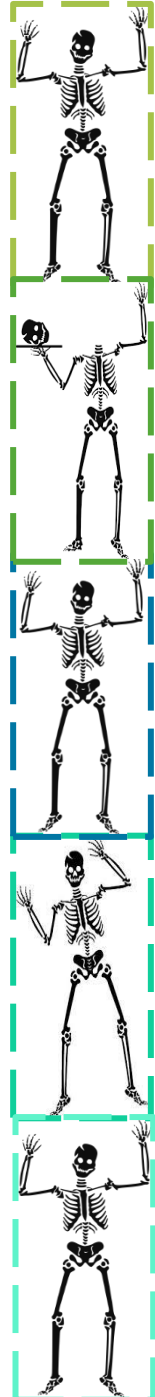
Team 437

Radiology

A complete revision for OSPE exam



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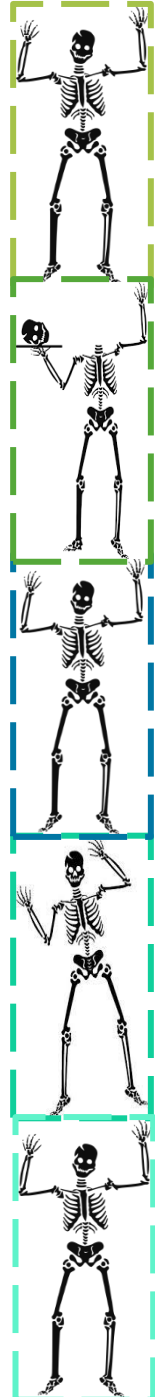


Introduction

You can go directly to the lectures, we added this just to help you better understand radiology.



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Introduction: diagnostic imaging tools

X-rays (Radiography)

- Radiography is the imaging of body structures, or parts of the body, using X-rays. X-rays are a form of radiation (X-radiation). X-radiation is special because it has a very high energy level that allows the X-ray beam to penetrate through the body and create an image or picture.
- Plain X-rays are the simplest medical images created through X-radiation. Any image created using an X-ray is **due to different X-radiation absorption by different structures or parts in the body.**
- A dense structure, such as bone, absorbs a high percentage of the X-ray beam (which appears light grey on the image), whereas low-density structures, such as soft tissues, absorb a small percentage (which appears dark grey on the image).



CT (Computed Tomography):

- computed tomography (CT) is a diagnostic imaging test used to create detailed images of internal organs, bones, soft tissue and blood vessels.
- The cross-sectional images generated during a CT scan can be reformatted in multiple planes, and can even generate three-dimensional images which can be viewed on a computer monitor, printed on film or transferred to electronic media.
- CT scanning is often **the best method for detecting many different cancers since the images allow doctors to confirm the presence of a tumor and determine its size and location. CT is fast, painless, noninvasive and accurate.** In emergency cases, it can reveal internal injuries and bleeding quickly enough to help save lives.

CT scan



Introduction: CTD

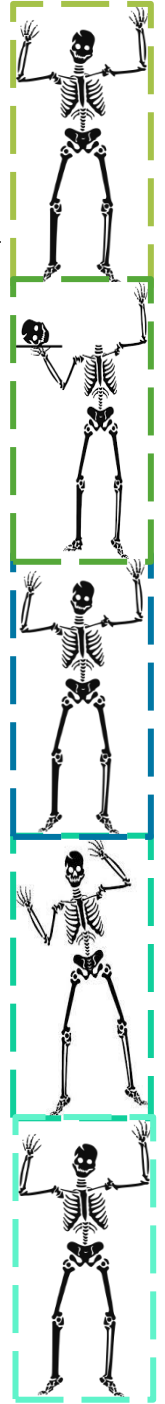
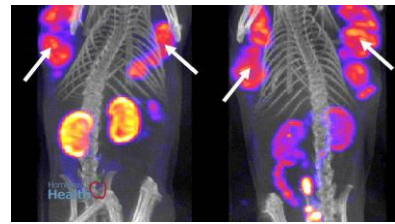
Ultrasound:

- Ultrasound imaging uses sound waves to produce pictures of the inside of the body.
- It is used to help diagnose the causes of pain, swelling and infection in the body's internal organs and to examine a baby in pregnant women and the brain and hips in infants.
- It's also used to help guide biopsies, diagnose heart conditions, and assess damage after a heart attack. **Ultrasound is safe, noninvasive, and does not use ionizing radiation.**



Nuclear medicine imaging:

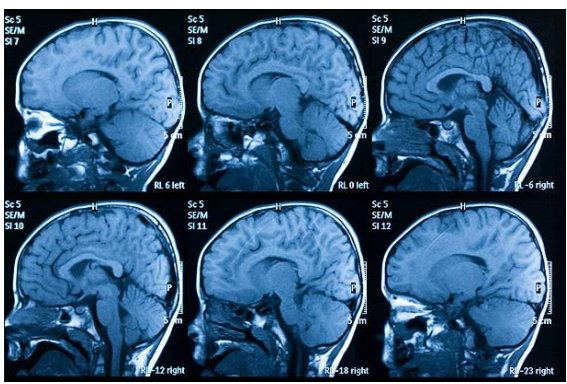
- Nuclear medicine imaging uses small amounts of radioactive materials called radiotracers that are typically injected into the bloodstream, inhaled or swallowed.
- The radiotracer travels through the area being examined and gives off energy in the form of gamma rays which are detected by a special camera and a computer to create images of the inside of the body.
- Nuclear medicine imaging provides unique information that often cannot be obtained using other imaging procedures and offers the **potential to identify disease in its earliest stages.**



Introduction: CTD

Magnetic Resonance Imaging:

- Magnetic resonance imaging (MRI) of the body uses a powerful magnetic field, radio waves and a computer to produce detailed pictures of the inside of your body.
- It may be used to help diagnose or monitor treatment for a variety of conditions within the chest, abdomen and pelvis. If the patient is pregnant, body MRI may be used to safely monitor their baby.

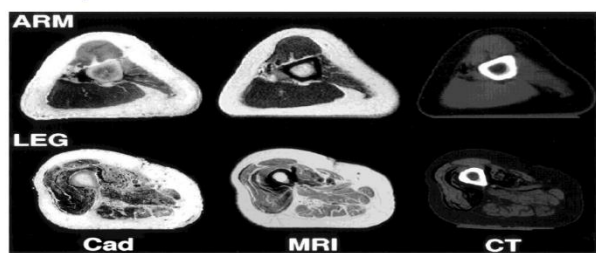
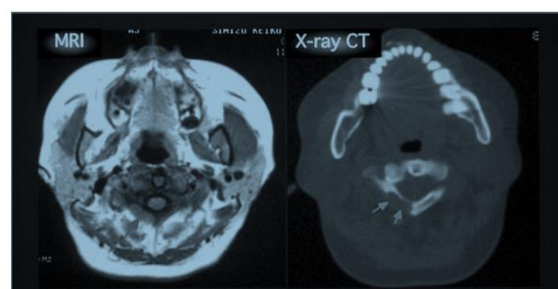


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Notes:

كثير نتلخبط بين صور ال MRI وال CT Scan وعشان نفرق:

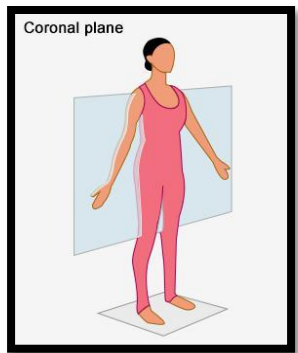
- صور ال MRI لل Soft tissue تكون واضحة جدا.
- بينما ال CT scan يوضح العظم فقط لانها فعليا عبارة عن X ray بس ياخذ صور من جميع الجهات، موب بس جهة واحدة



Introduction: Planes of the Body

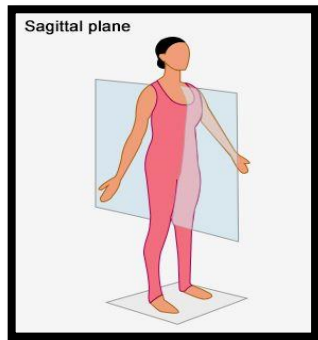
Coronal Plane (Frontal Plane):

A vertical plane running from side to side; divides the body or any of its parts into anterior and posterior portions.



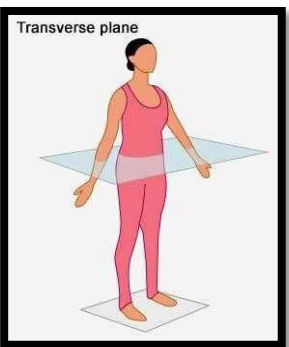
Sagittal Plane (Lateral Plane):

A vertical plane running from front to back; divides the body or any of its parts into right and left sides.



Axial Plane (Transverse Plane) :

A horizontal plane; divides the body or any of its parts into upper and lower parts.

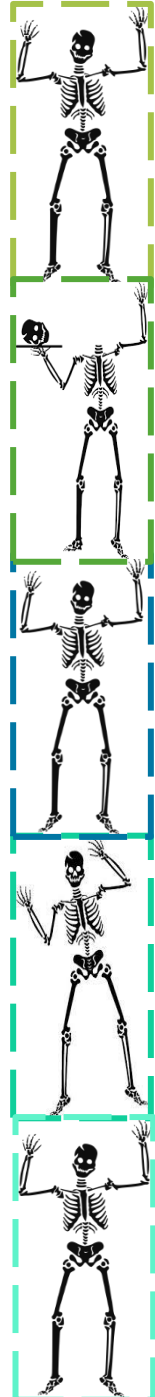


Practical (1)

A radiological anatomy of the vertebrae.



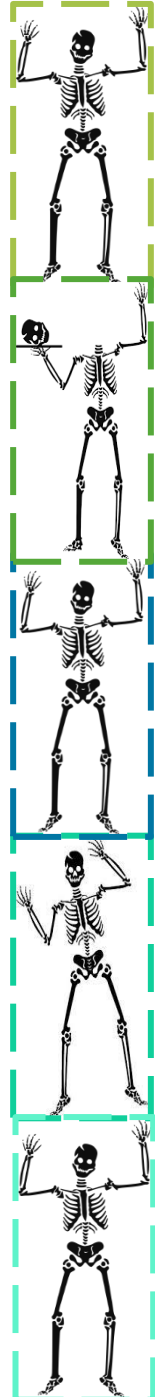
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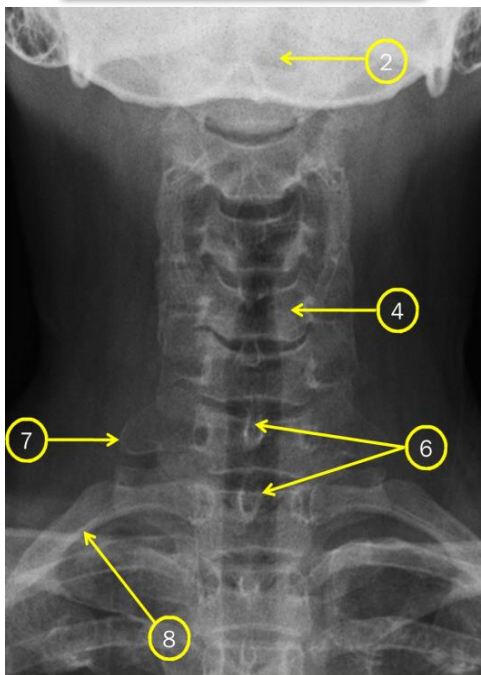
Cervical Spine



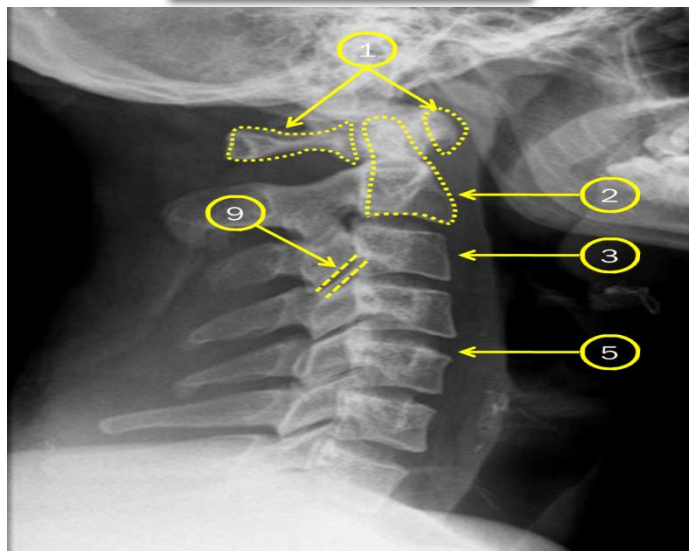
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Frontal View



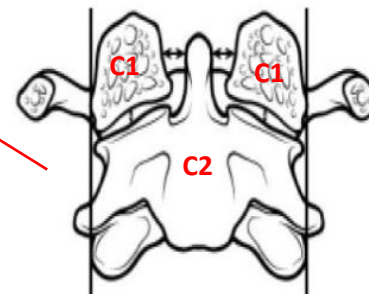
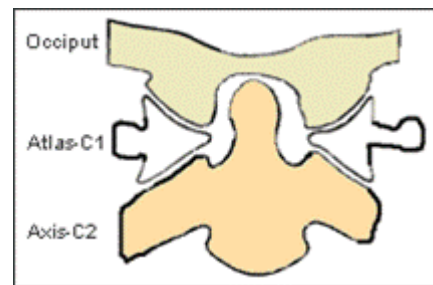
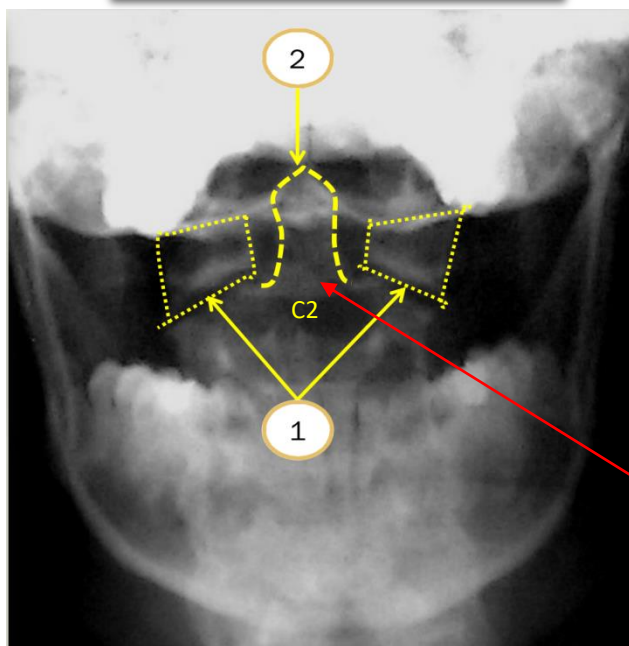
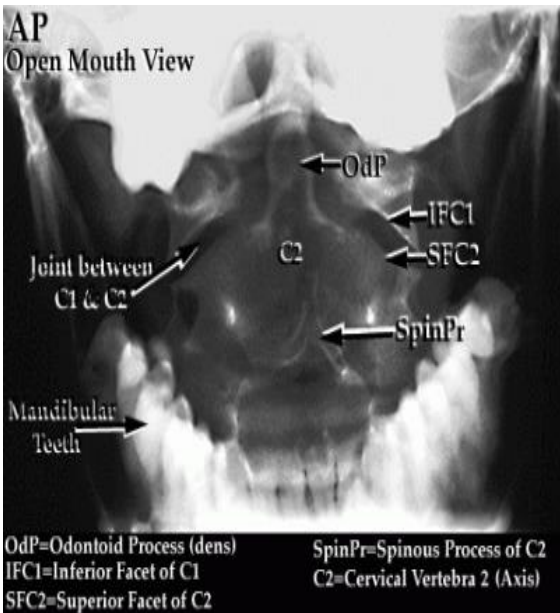
Sagittal View



X-ray

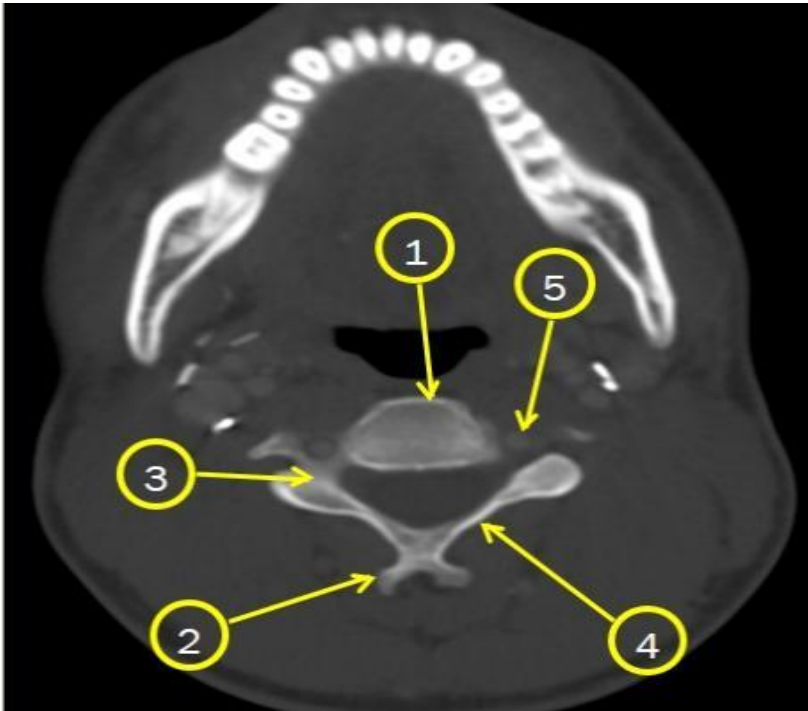
- 1- C1 (Atlas)
- 2- C2 (Axis)
- 3- C3
- 4- Vertebral Body of C5
- 5- Intervertebral disc
- 6- Spinous process
- 7- Transverse process
- 8- First rib
- 9- Facet Joint

Open mouth view



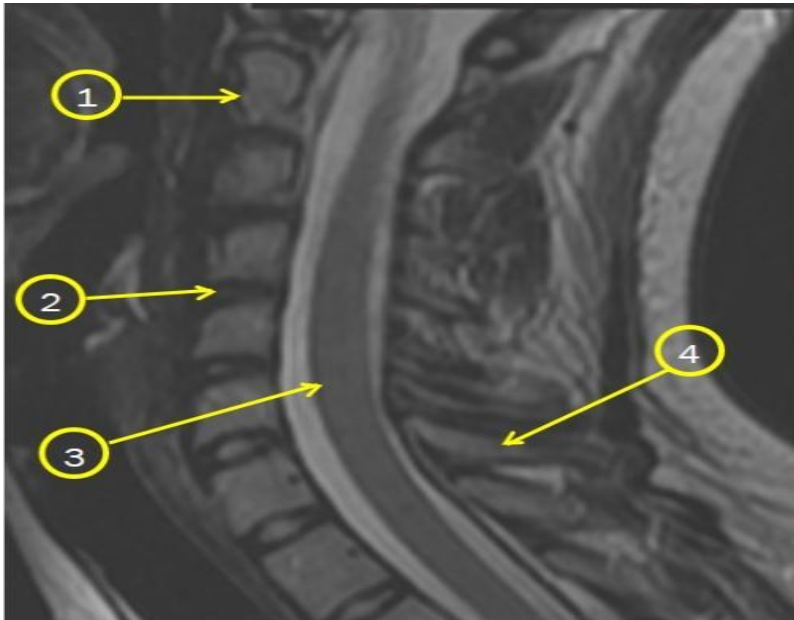
CT-SCAN

- 1- Vertebral body
- 2- Spinous process
- 3- Pedicle
- 4- Lamina
- 5- Transverse foramen



MRI

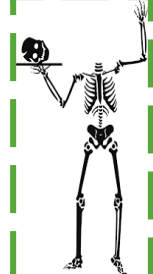
- 1- C2
- 2- Disc
- 3- Spinal cord
- 4- Spinous process

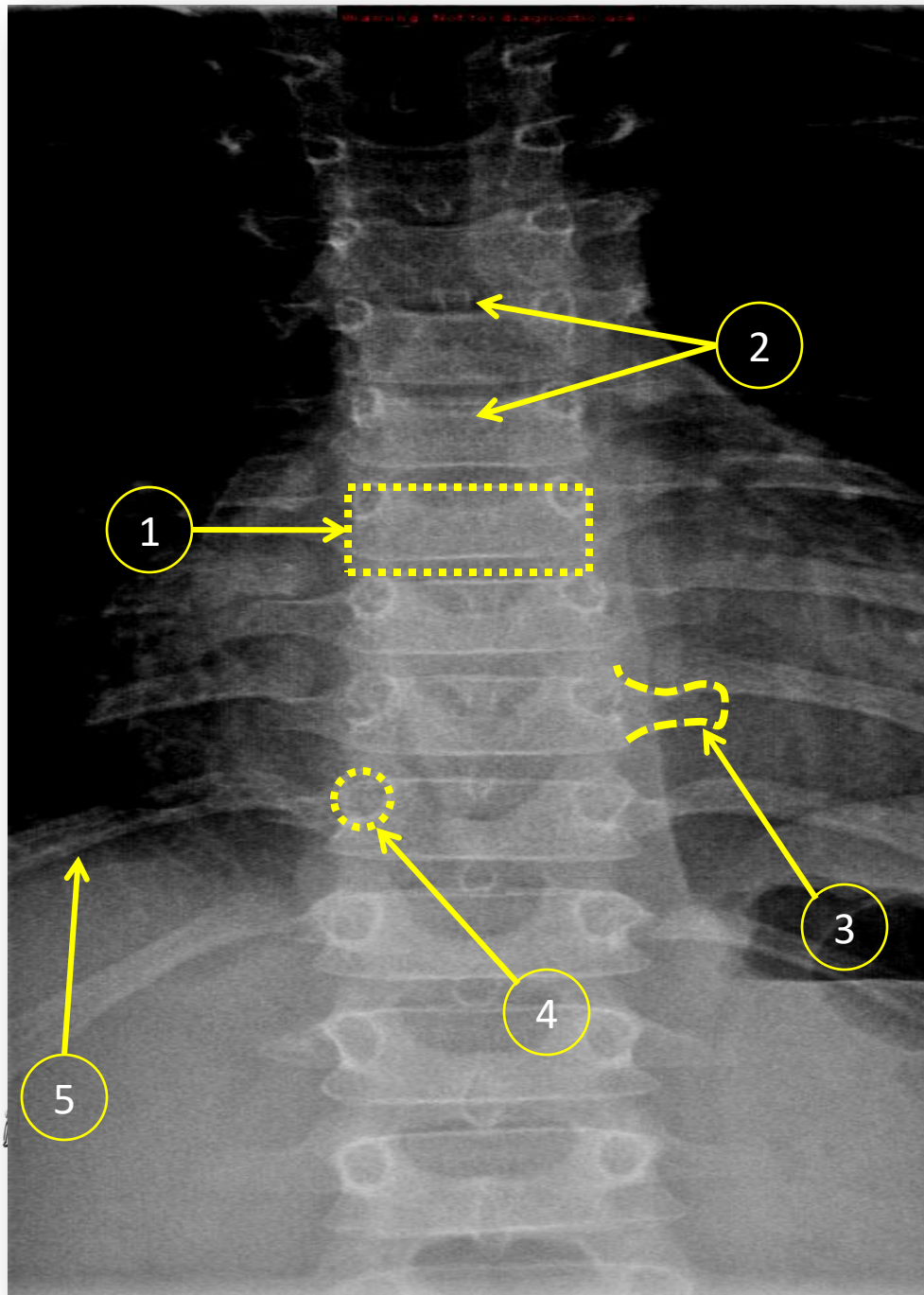


THORACIC SPINE



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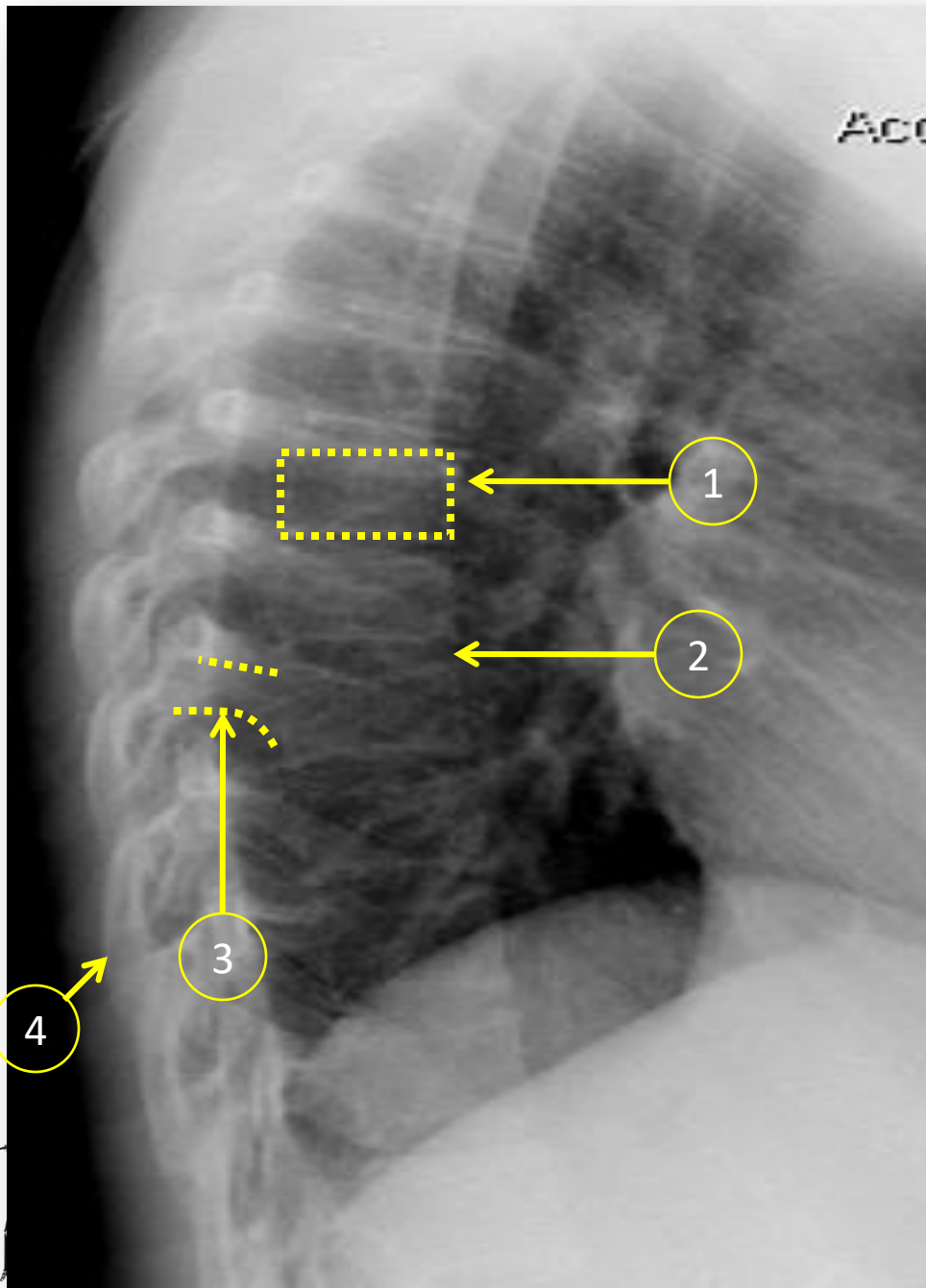




X-ray

- 1. Vertebral body
- 2. Spinous process
- 3. Transverse process
- 4. Pedicle
- 5. Rib





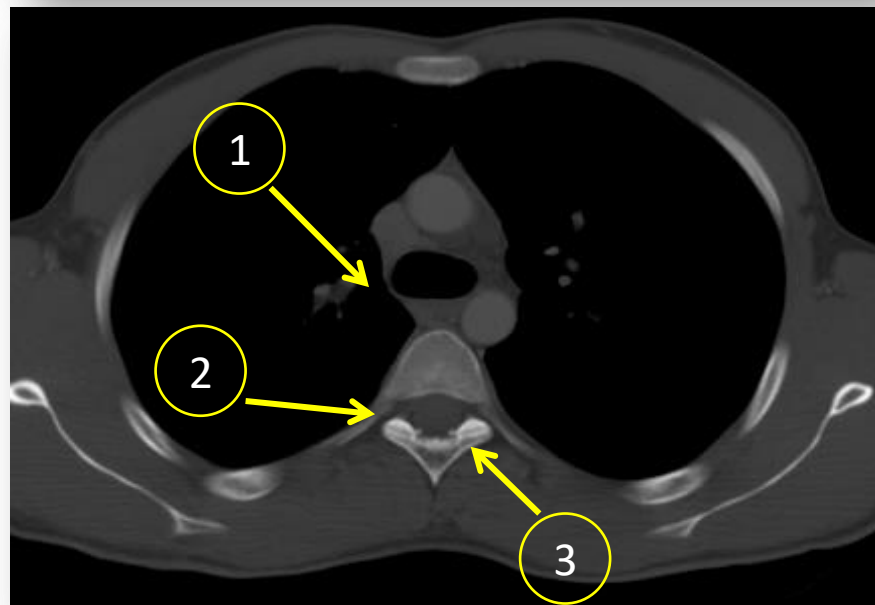
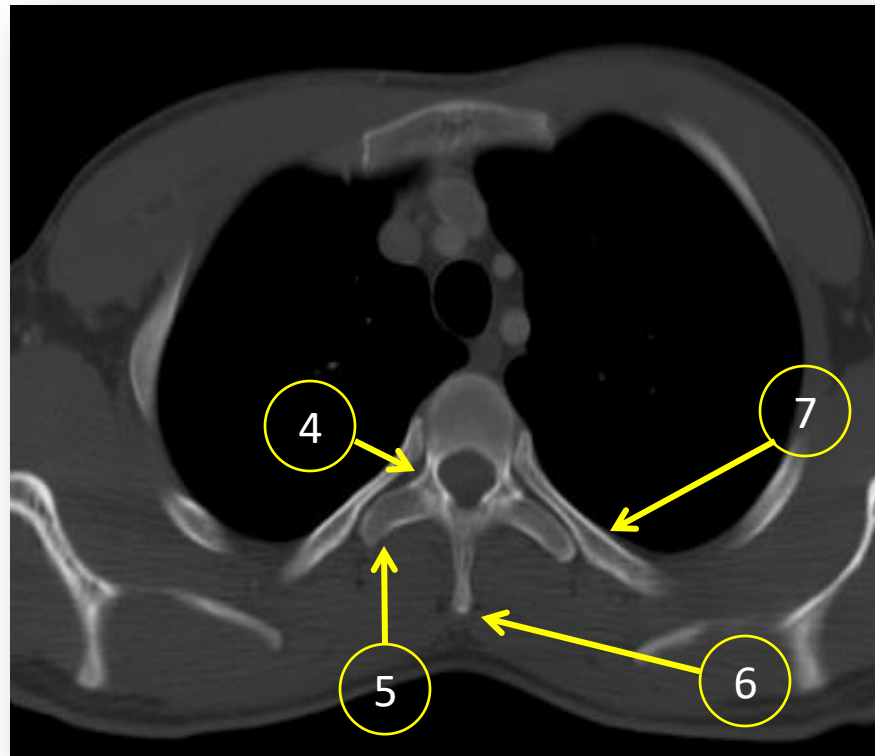
X-ray

- 1. Vertebral body
- 2. Intrvertebral disc
- 3. Pedicle
- 4. Rib



CT-SCAN

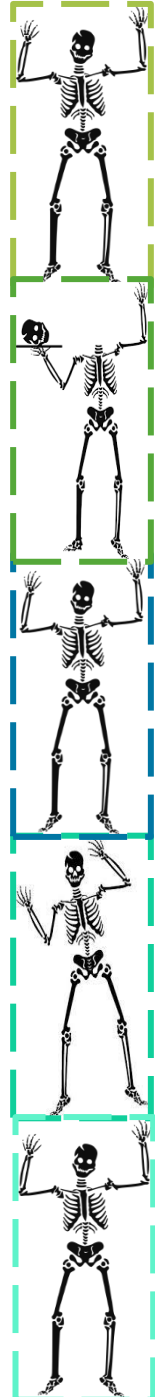
1. Vertebral body
2. Neural foramen
3. Lamina
4. Pedicle
5. Transverse process
6. Spinous process
7. Rib



Lumber Spine

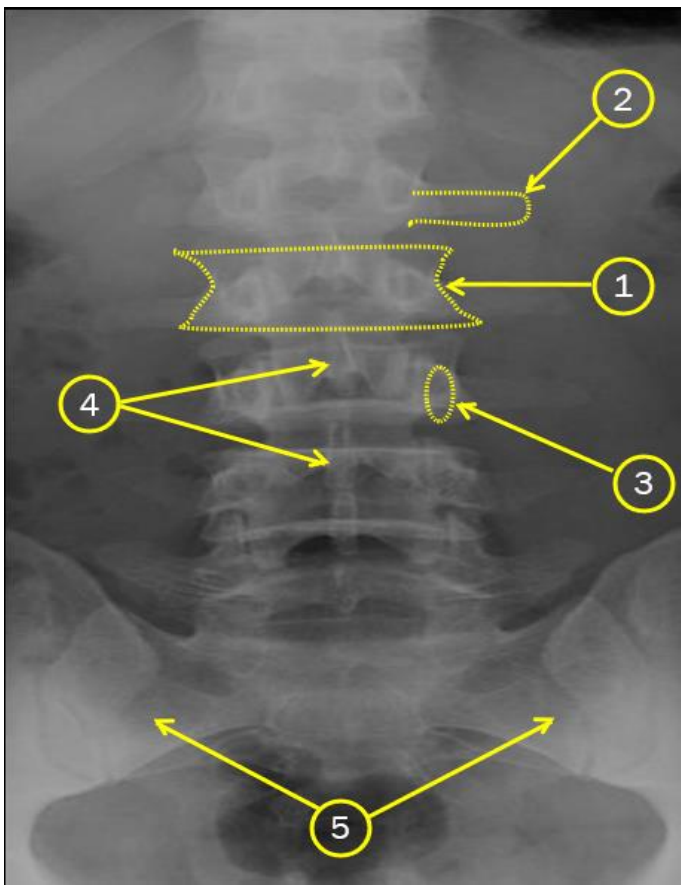


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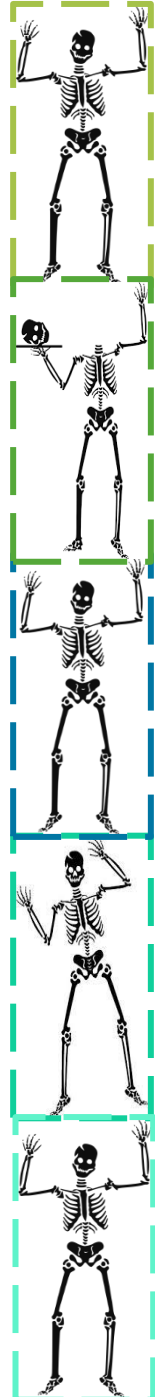
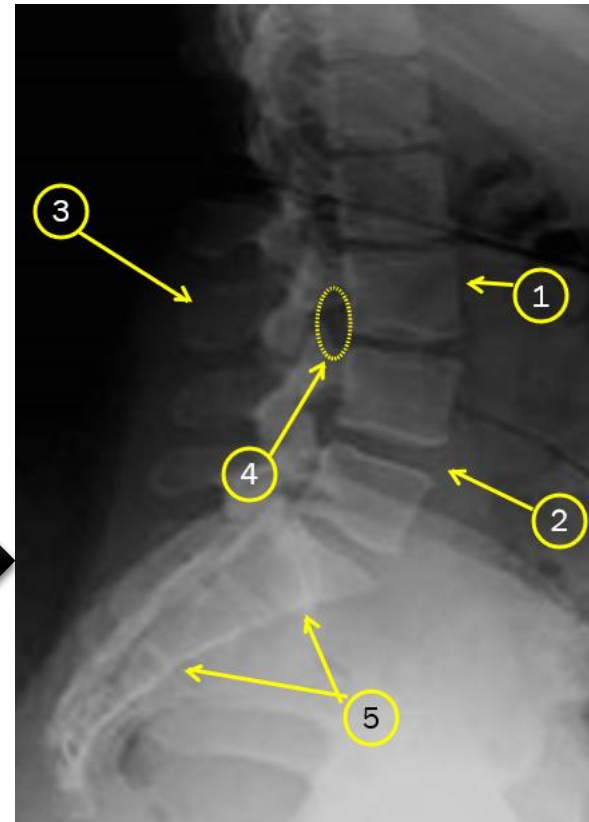


X-ray

1. Vertebral body
2. Transverse process
3. Pedicle
4. Spinous process
5. Sacrum



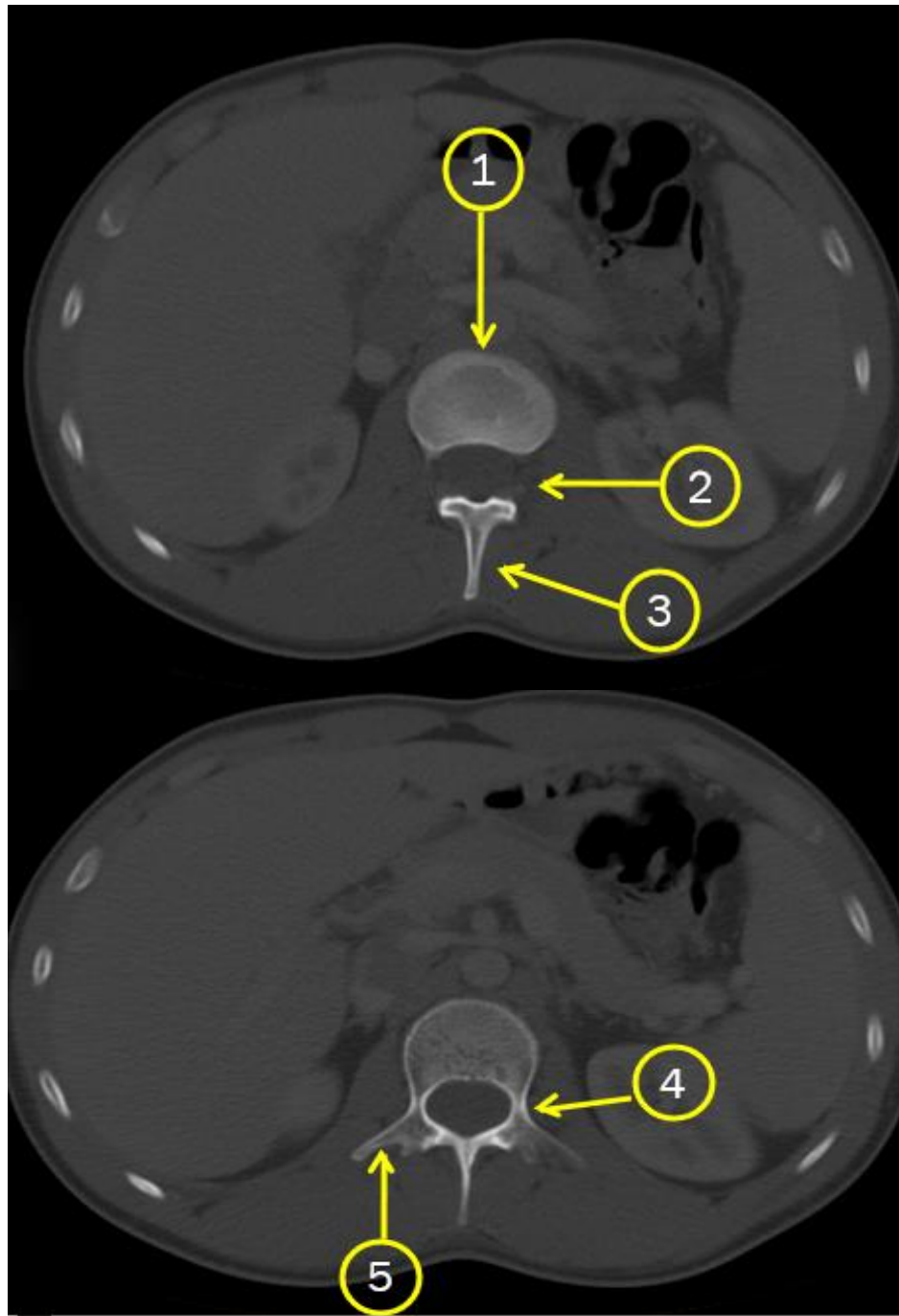
1. Vertebral body L3
2. Intervertebral disc
3. Spinous process
4. Neural foramen
5. Sacrum



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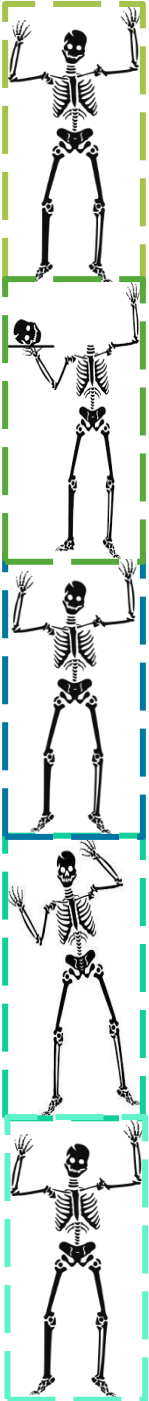
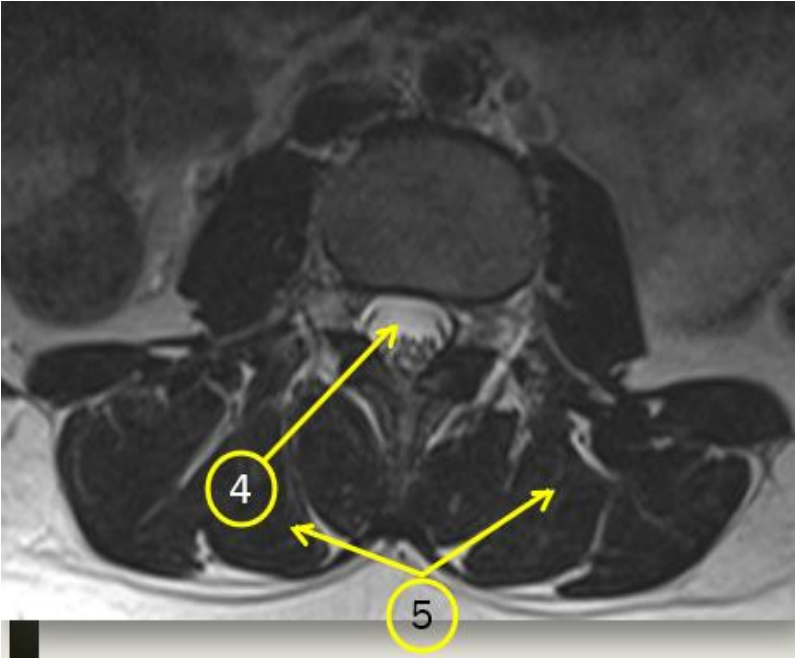
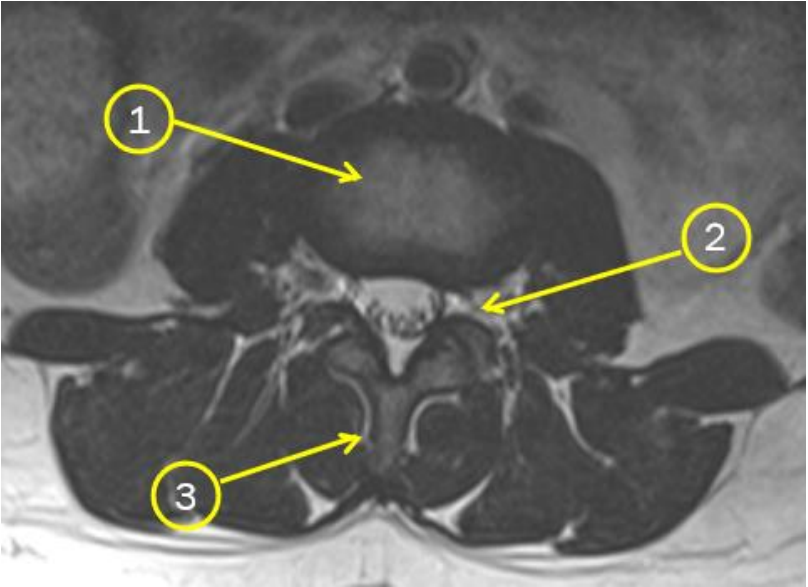
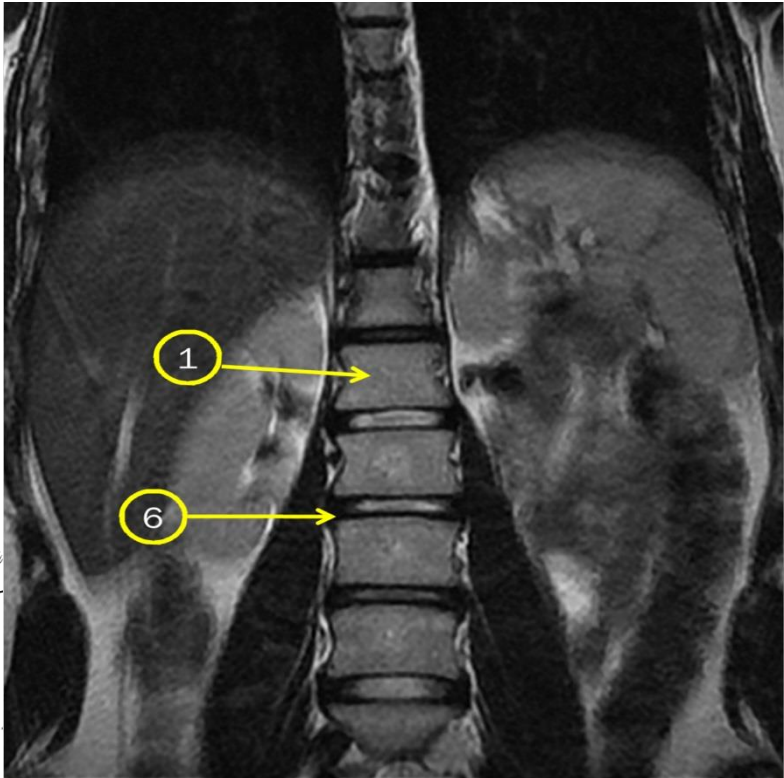
CT-SCAN

1. Vertebral body
2. Neural foramen
3. Spinous process
4. Pedicle
5. Transverse process



MRI

- 1. Vertebral body
- 2. Neural foramen
- 3. Spinous process
- 4. Thecal sac
- 5. Para-spinal muscles
- 6. Intervertebral disc



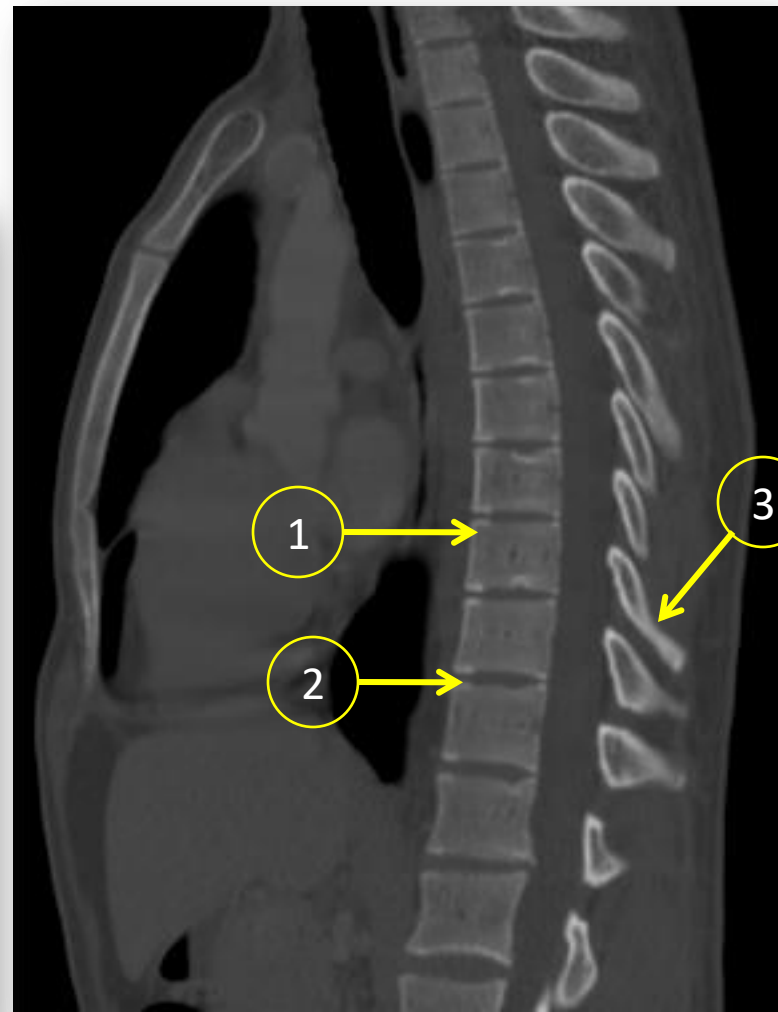
Dorsal and Lumbosacral spine



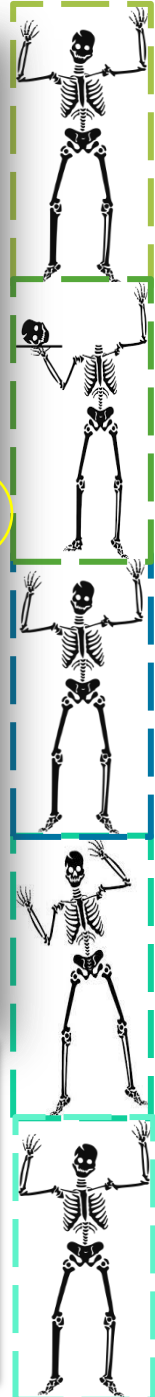
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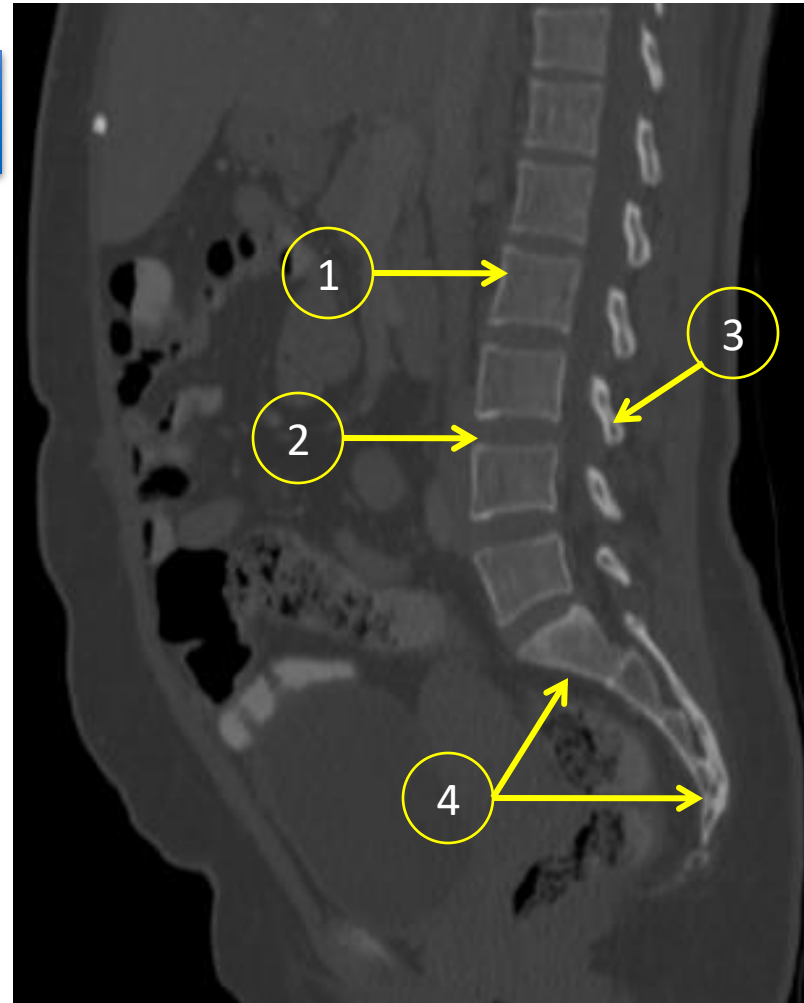
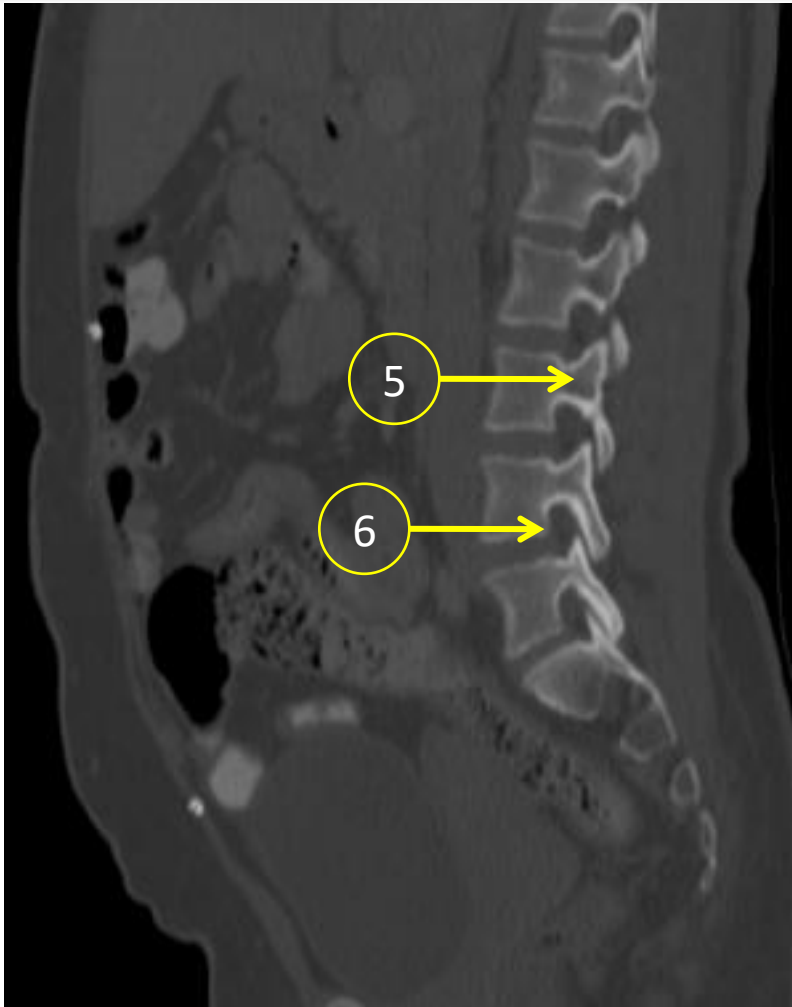
Dorsal spine



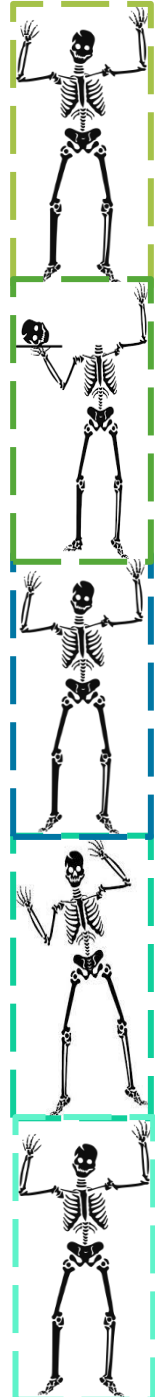
1. Vertebral body
2. Intervertebral disc
3. Spinous process
4. Pedicle
5. Neural foramen



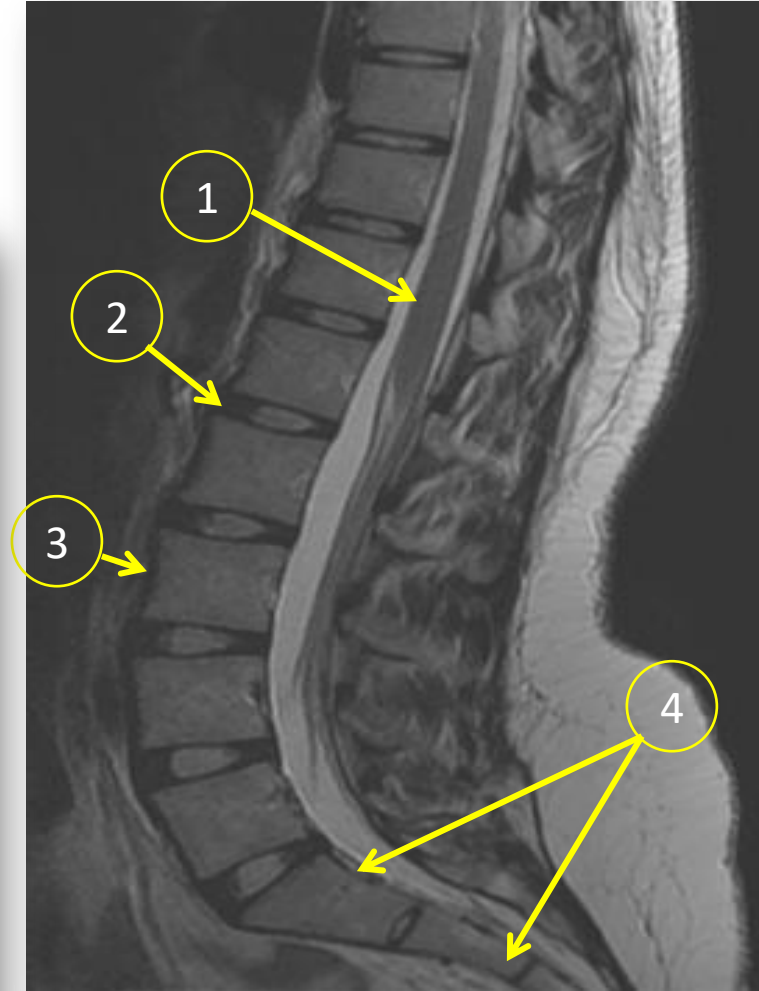
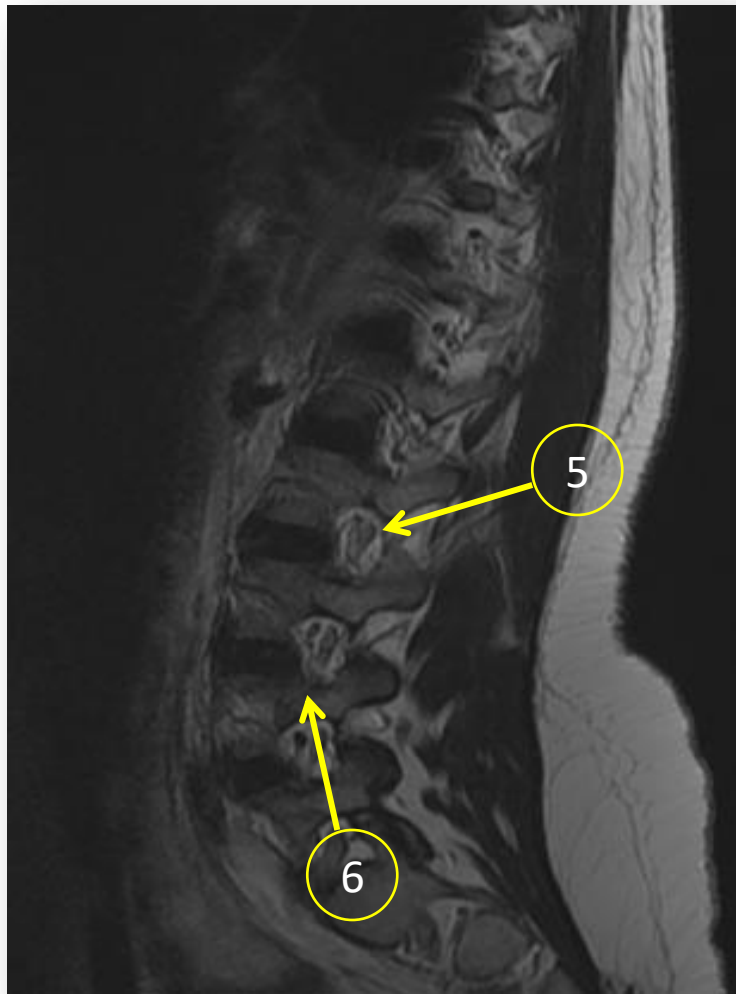
Lumbosacral spine



1. Vertebral body
2. Intrvertebral disc
3. Spinous process
4. Sacrum
5. Pedicle
6. Neural foramen



Lumbosacral spine



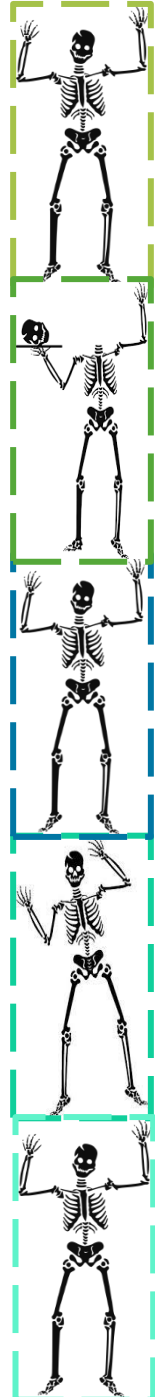
1. Spinal cord
2. Disc
3. Vertebral body
4. Sacrum
5. Neural foramen
6. Pedicle

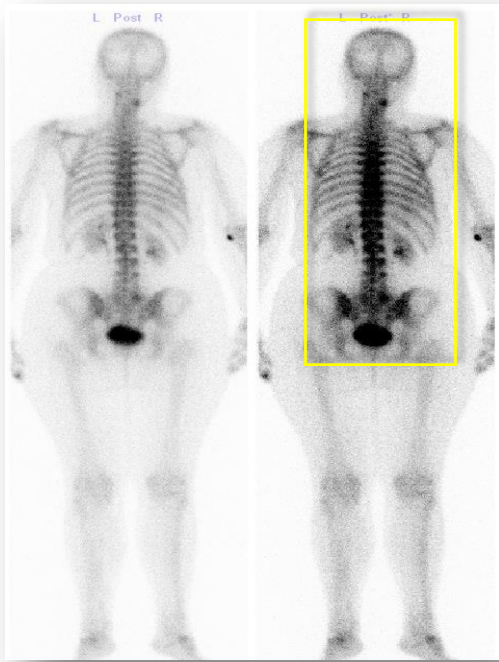


Ultrasound and Nuclear scan



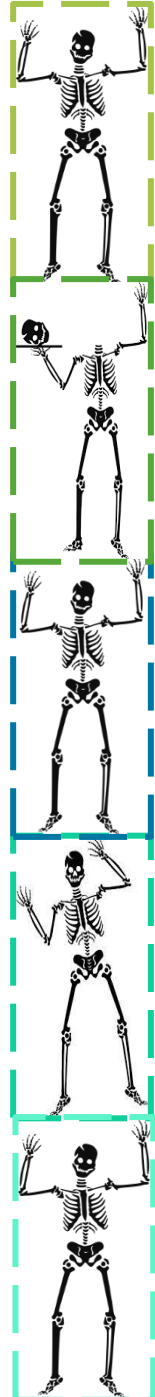
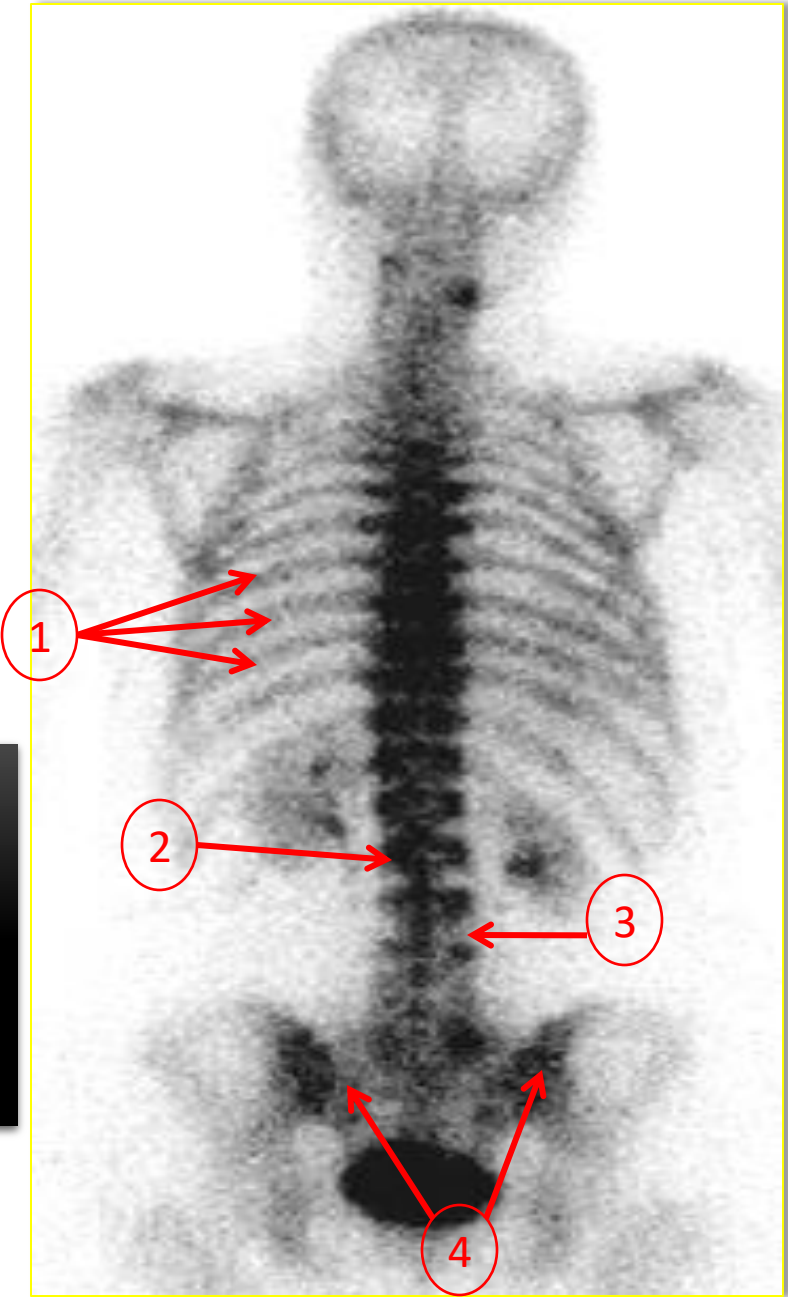
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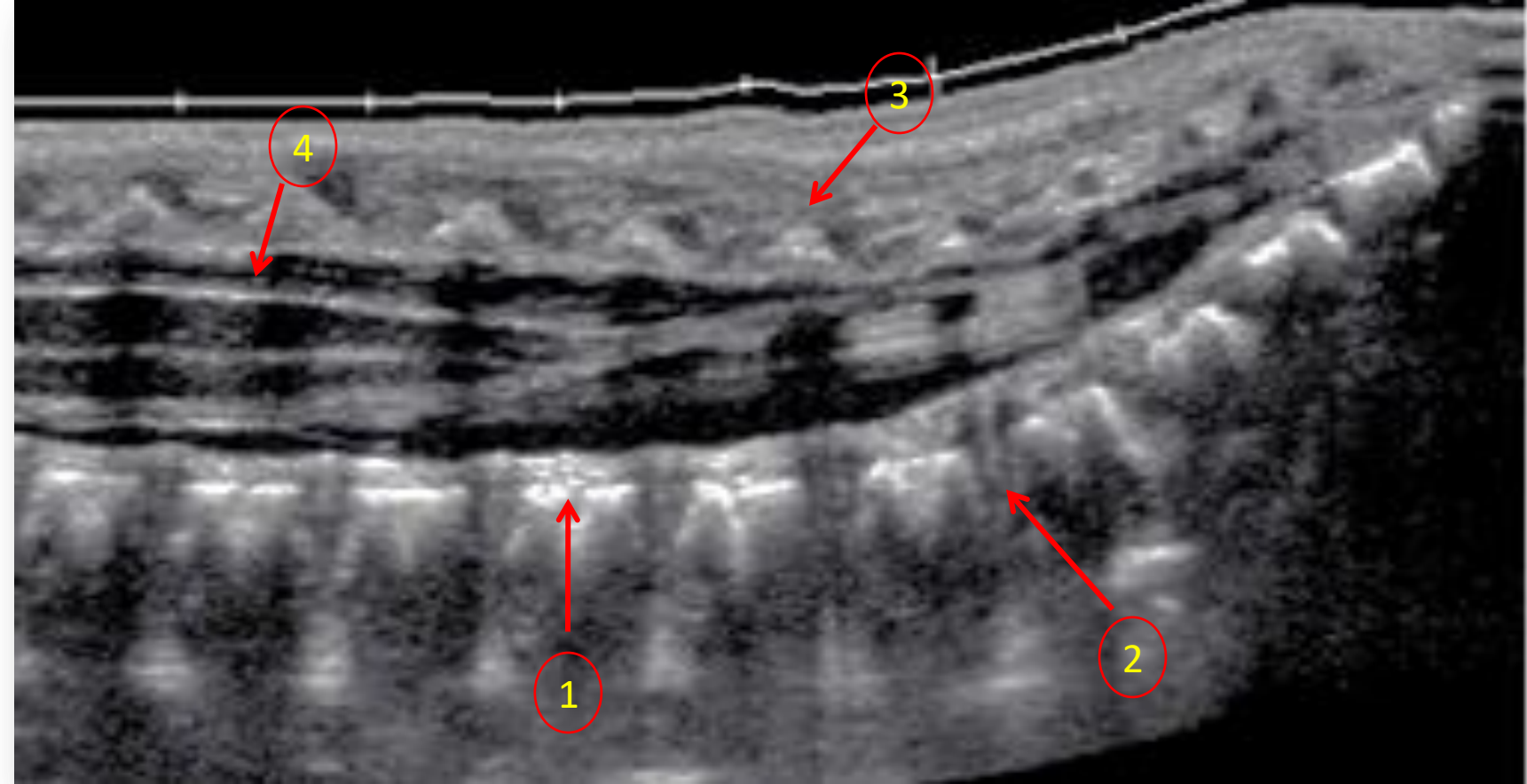




Nuclear scan

- 1. Ribs
- 2. Vertebral body
- 3. Disc
- 4. sacrum





Ultrasound

1. Vertebral body
2. Intervertebral disc
3. Spinous process
4. Spinal cord



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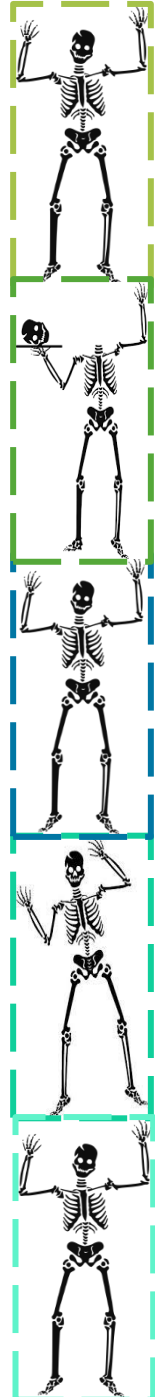


Practical (2)

UPPER LIMB



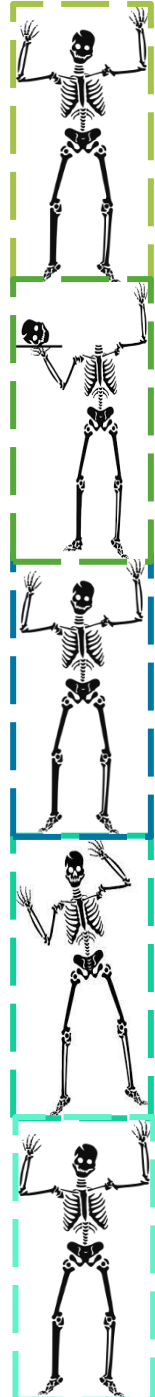
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Shoulder region

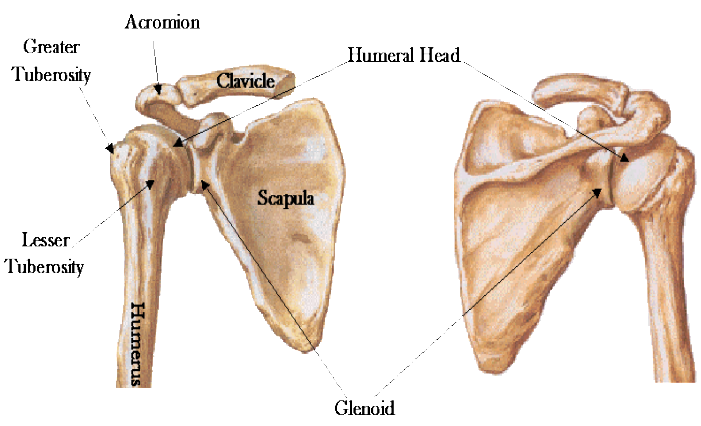
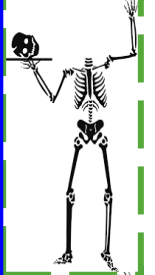
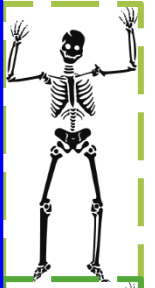
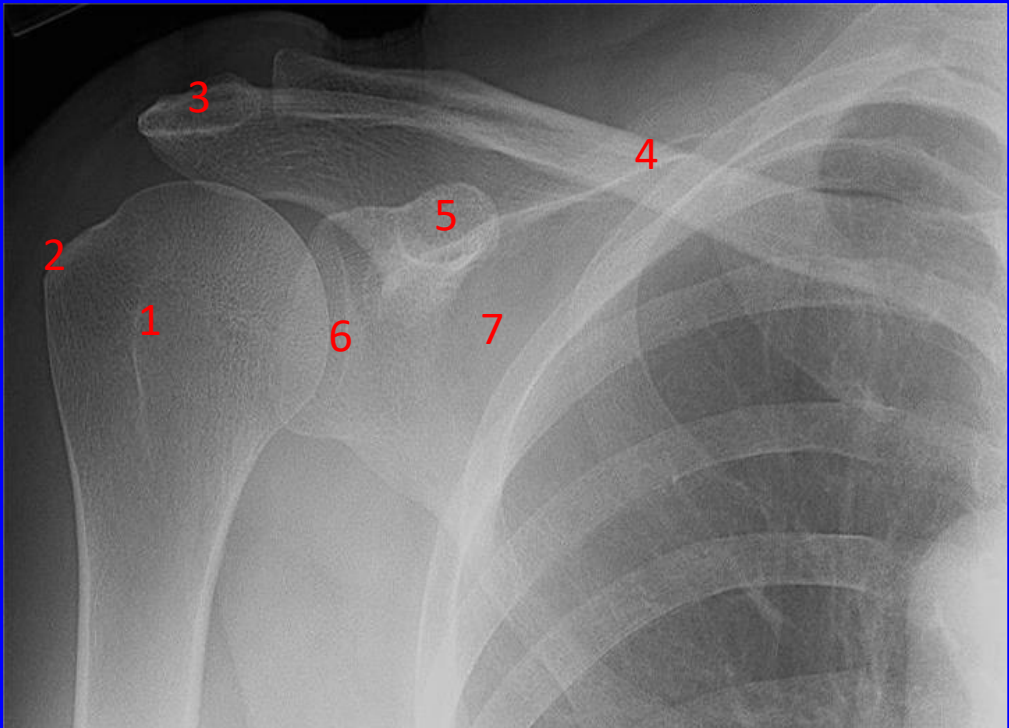


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X-ray

- 1. lesser tuberosity
- 2. greater tuberosity
- 3. acromion
- 4. clavicle
- 5. coracoid
- 6. glenoid
- 7. scapula

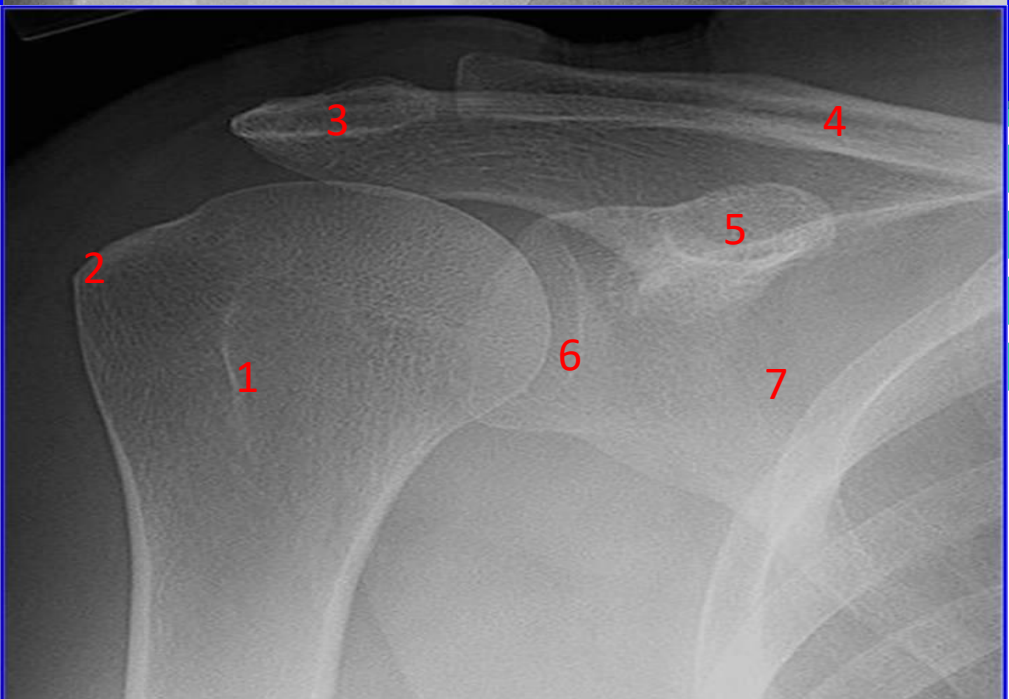


FRONT VIEW

BACK VIEW



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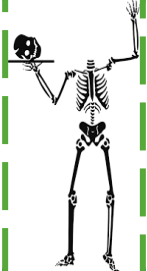
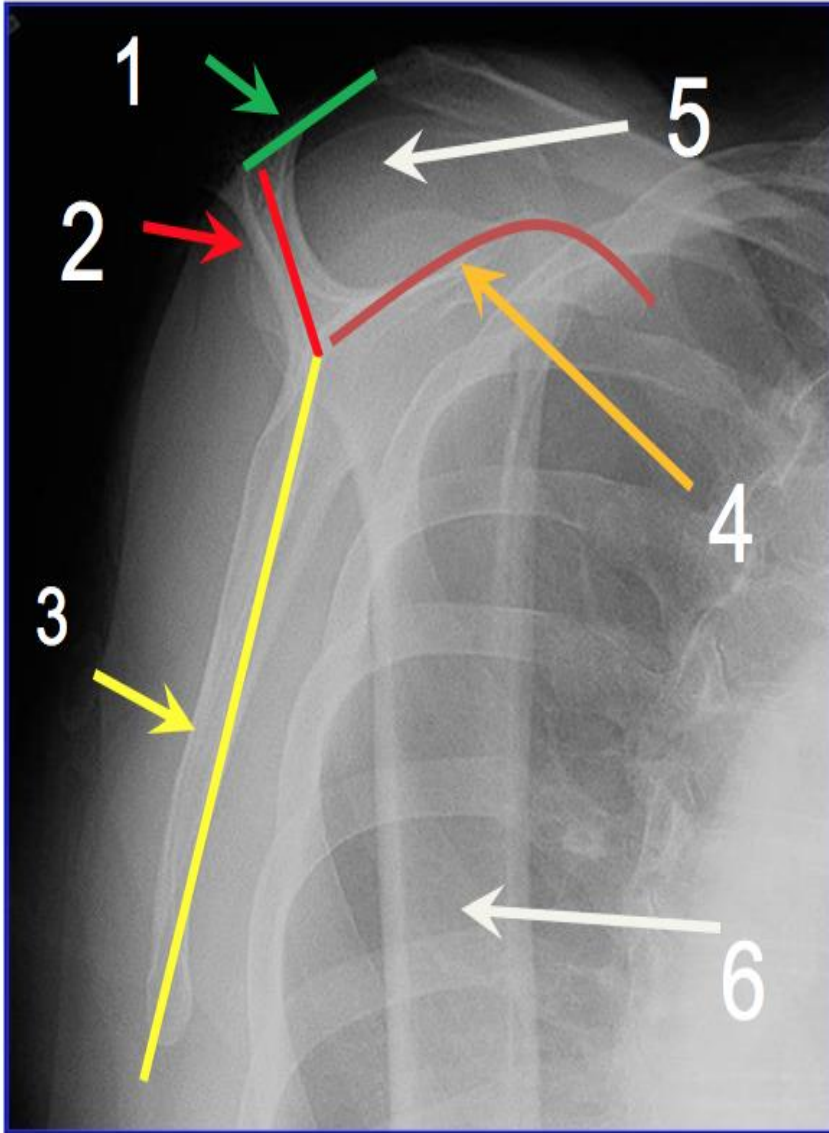


Y view

- 1. acromion
- 2. spine
- 3. scapula
- 4. Coracoid
- 5. Humerus head
- 6. Humeral shaft



X-ray

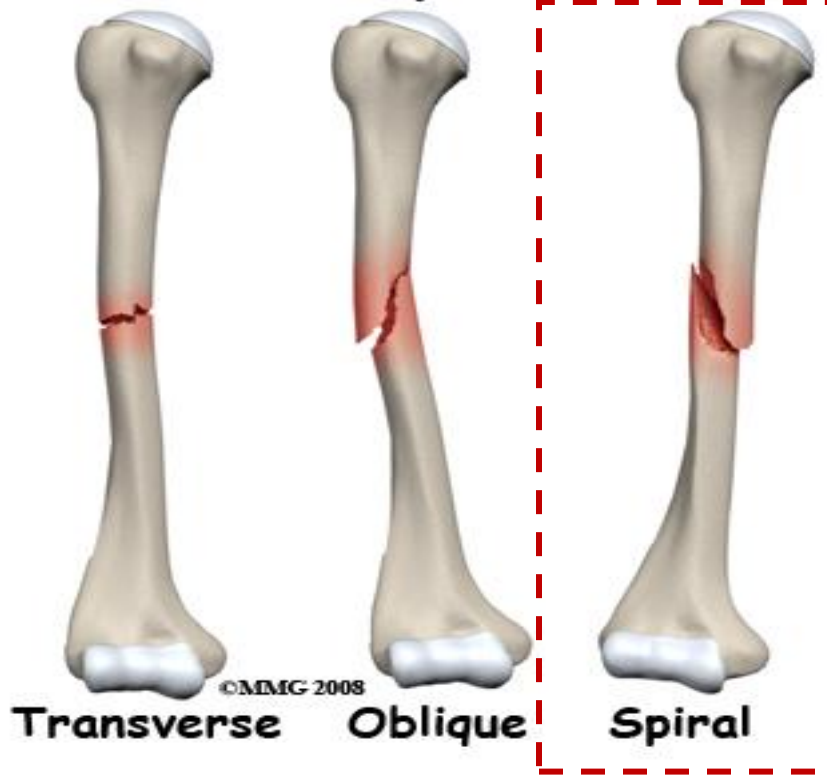


X-ray

Humerus fracture



Fracture patterns



extra explanation:

Spiral Humeral fractures:

generally result from an indirect force, such as a fall on an elbow or outstretched arm.

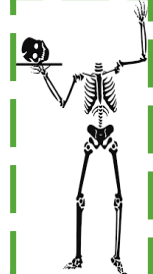
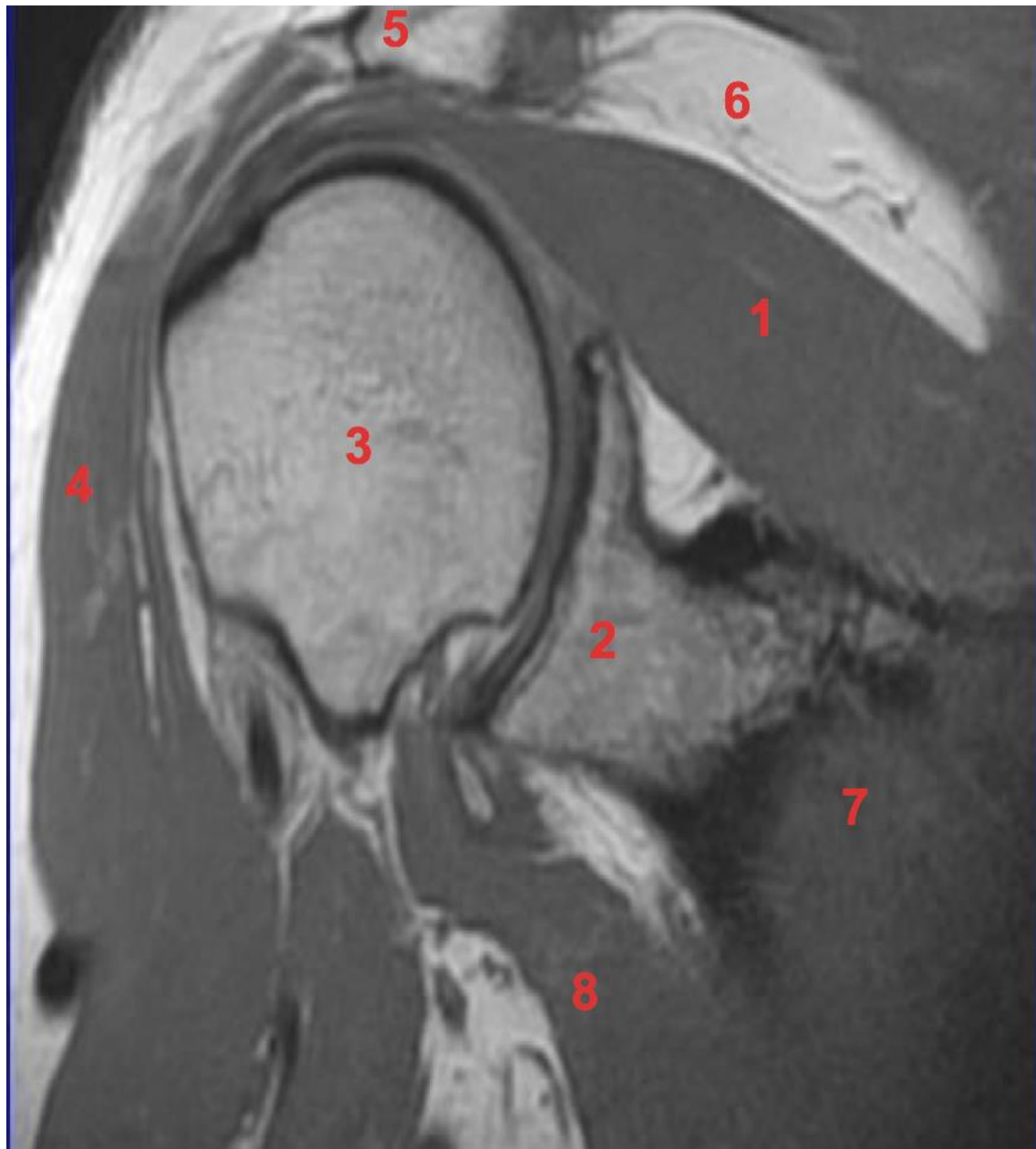


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MRI

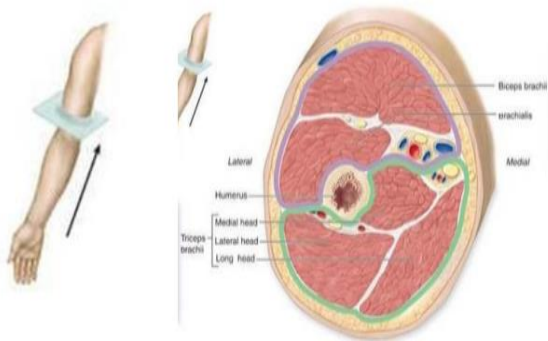
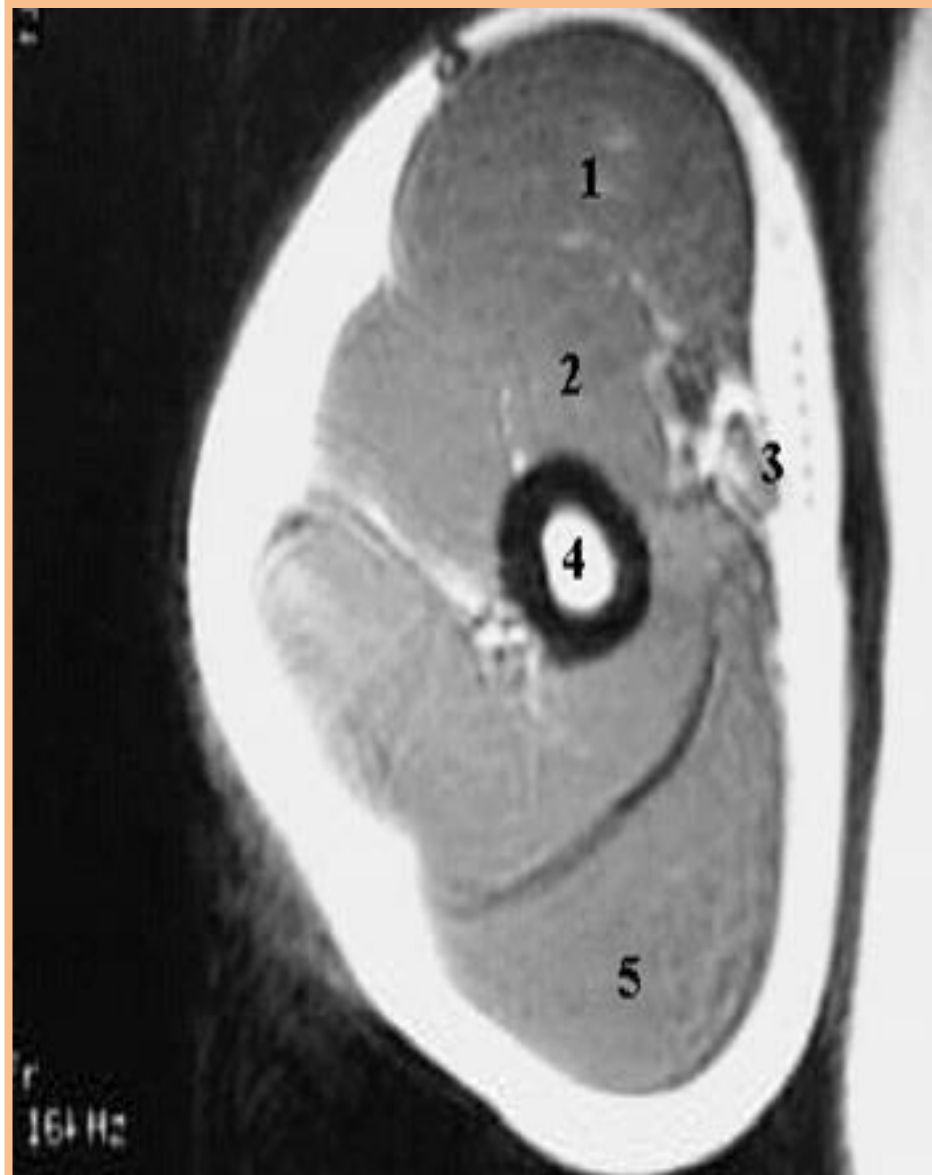
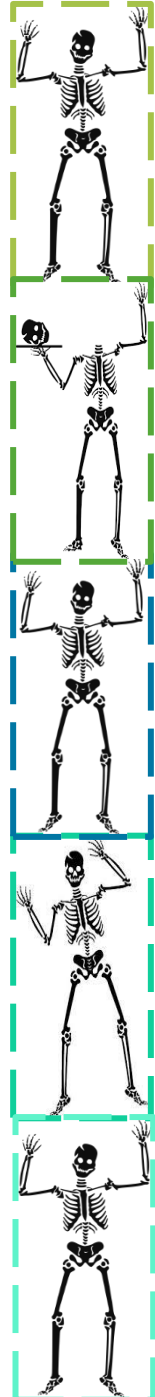
- 1- supraspinatus muscle
- 2- glenoid cavity
- 3- humeral head
- 4- deltoid muscle
- 5- acromion
- 6- clavicle
- 7- subscapularis muscle
- 8- teres minor



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MRI

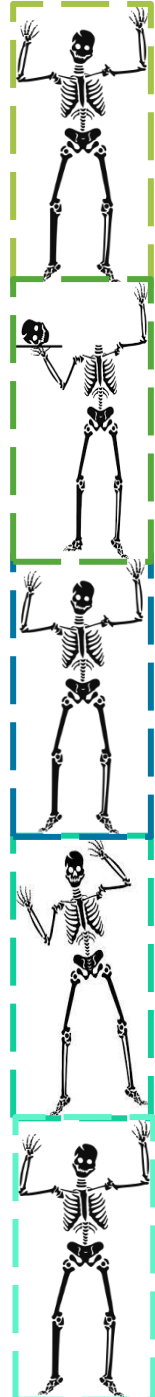
- 1- Biceps brachii muscle
- 2- Brachialis muscle
- 3- Brachial artery
- 4- Humerus
- 5- Triceps muscle



ELBOW JOINT

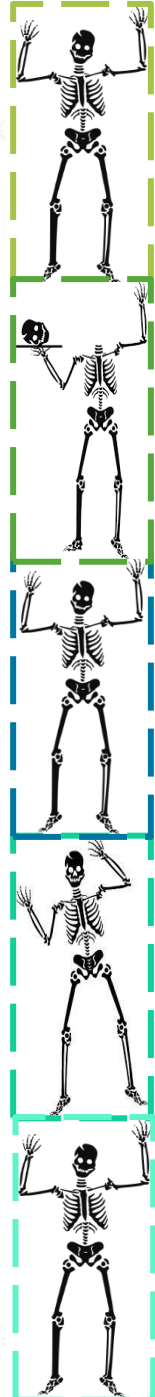
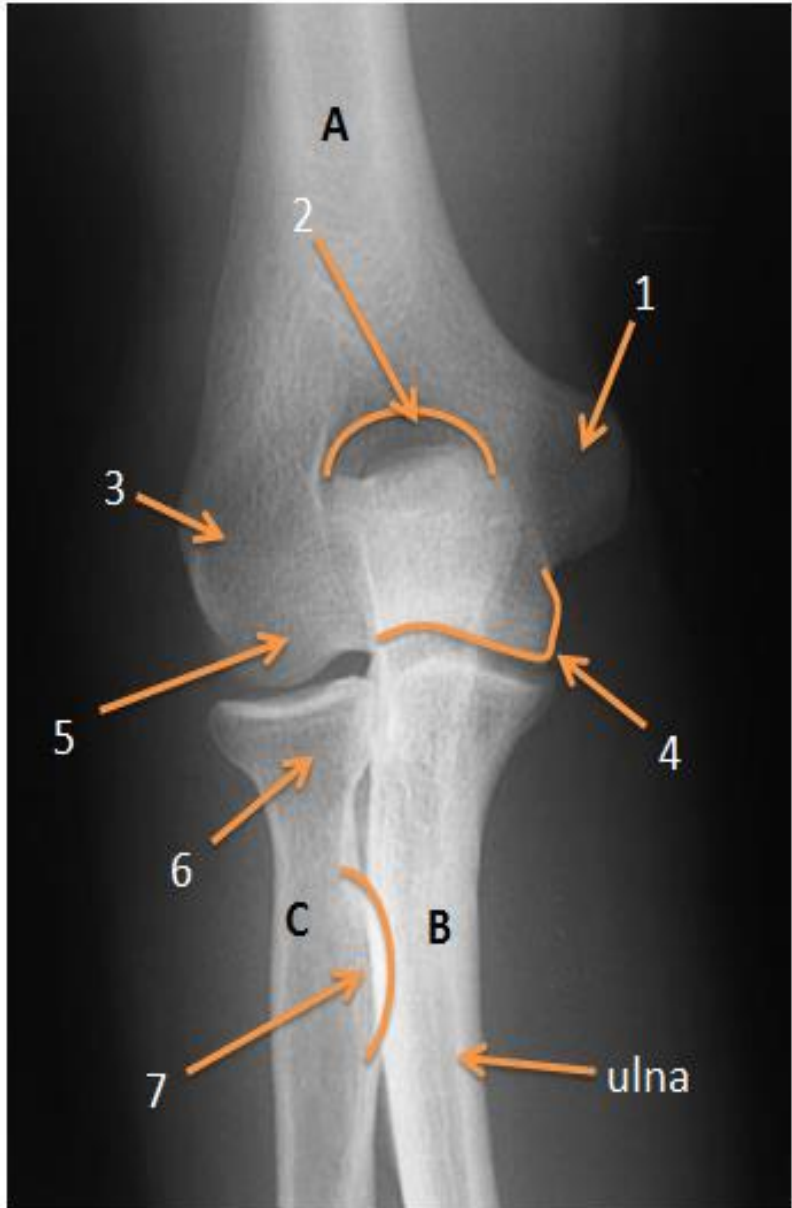


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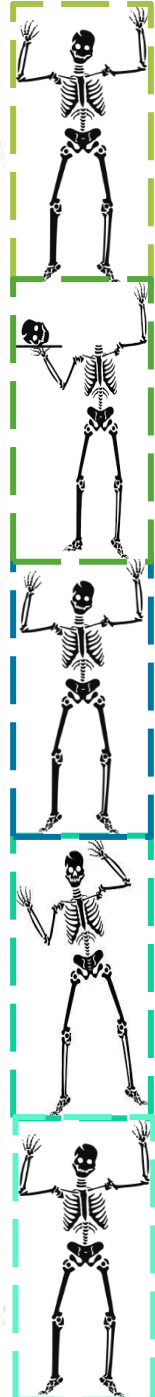
X-ray

<p>A-Humerus</p>	<p>1-Medial epicondyle 2-Olecranon fossa 3-Lateral epicondyle 4-Trochlea 5-Capitulum</p>
<p>B-Ulna</p>	
<p>C-Radius</p>	<p>6-Radial Head 7-Radial tuberosity</p>



X-ray

- 1- Humerus
- 2- Coronoid Process
- 3- Radial Head
- 4- Radial Tuberosity
- 5- Olecranon process
- 6- Olecranon Fossa
- 7- Ulna

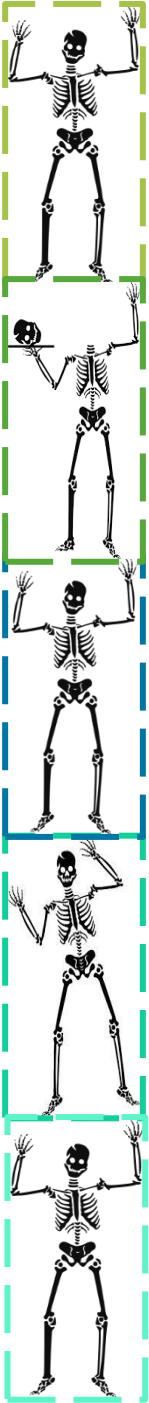


X-ray

CHILD

ADULT

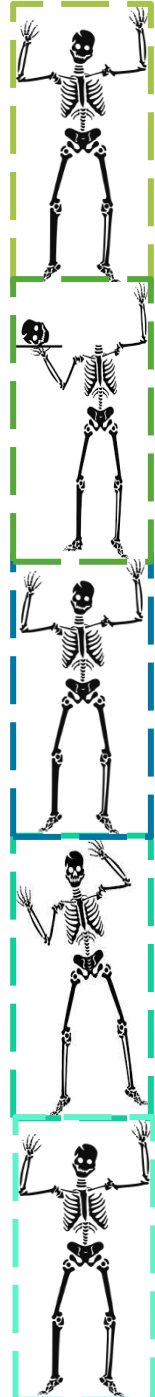
In a child scan you can find more cartilage than in adults.



HAND

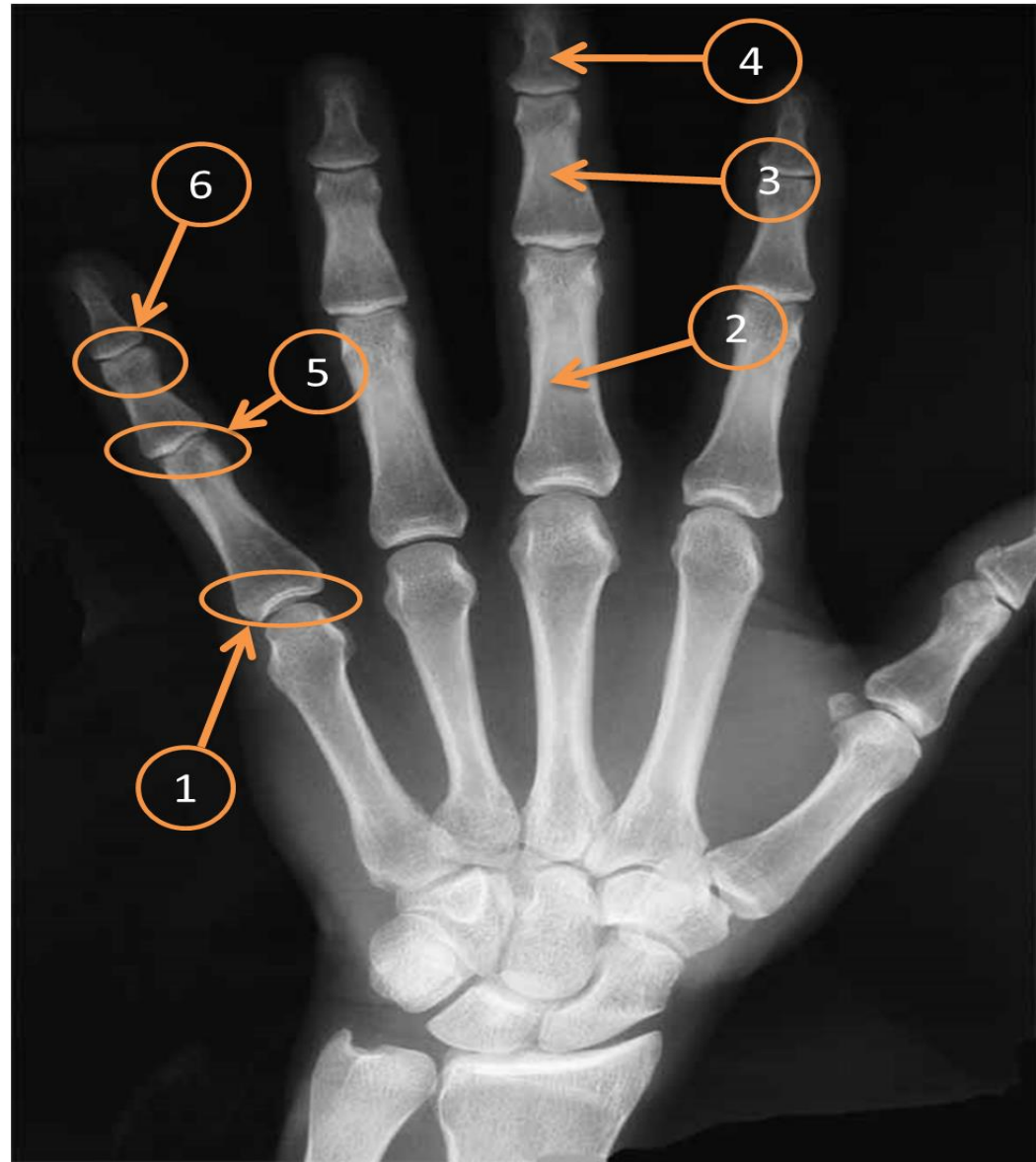


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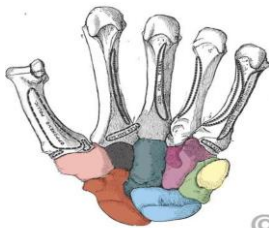
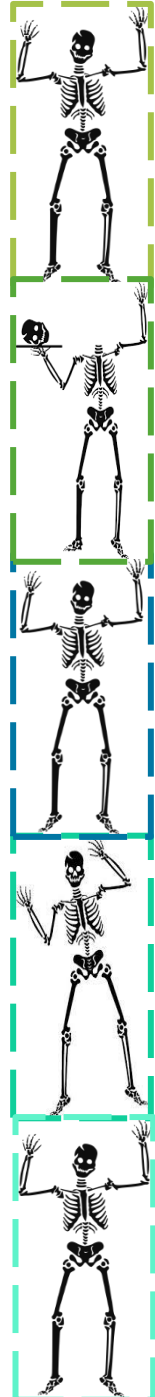


X-ray

- 1- Metacarpophalangeal joint
- 2- Proximal phalanx
- 3- Middle phalanx
- 4- Distal phalanx
- 5- Proximal interphalanx joint
- 6- Distal interphalanx joint



X-ray



- Scaphoid
- Lunate
- Triquetrum
- Pisiform
- Trapezium
- Trapezoid
- Capitate
- Hamate

© teachmeanatomy

To help you memorize:

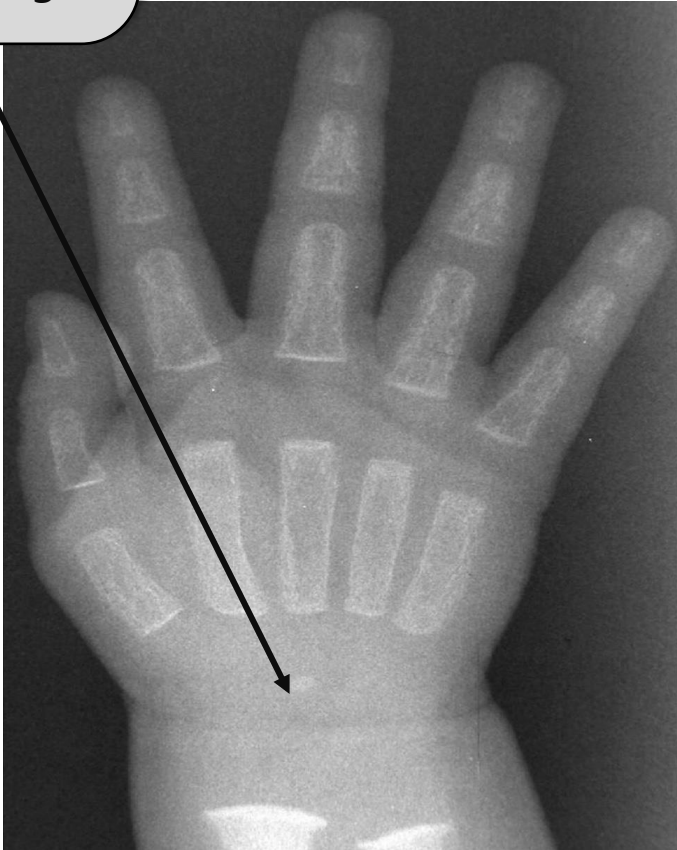
Sam Likes To Push The Toy Car Hard
She Looks Too Pretty Try To Catch Her
Sally Left The Party To Take Cathy Home



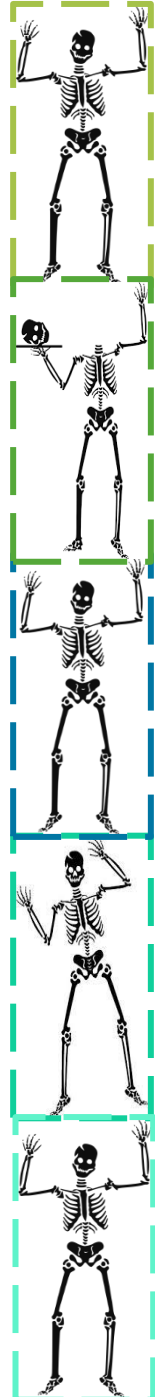
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As you can see there is no carpal bones they're still cartilage.

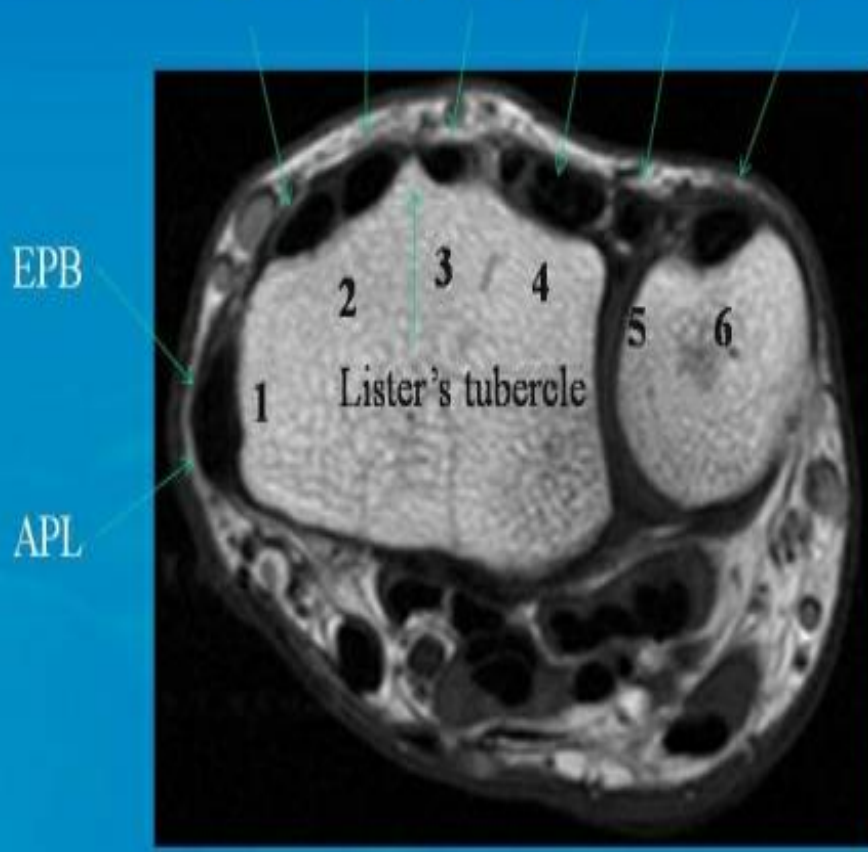
Child



Adult



ECRL ECRB EPL ED EDM EU



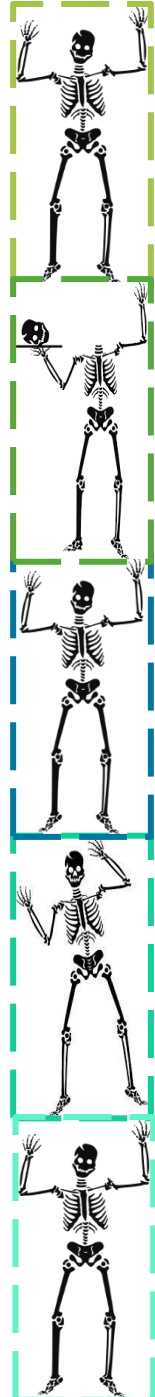
MRI

Shortcuts:

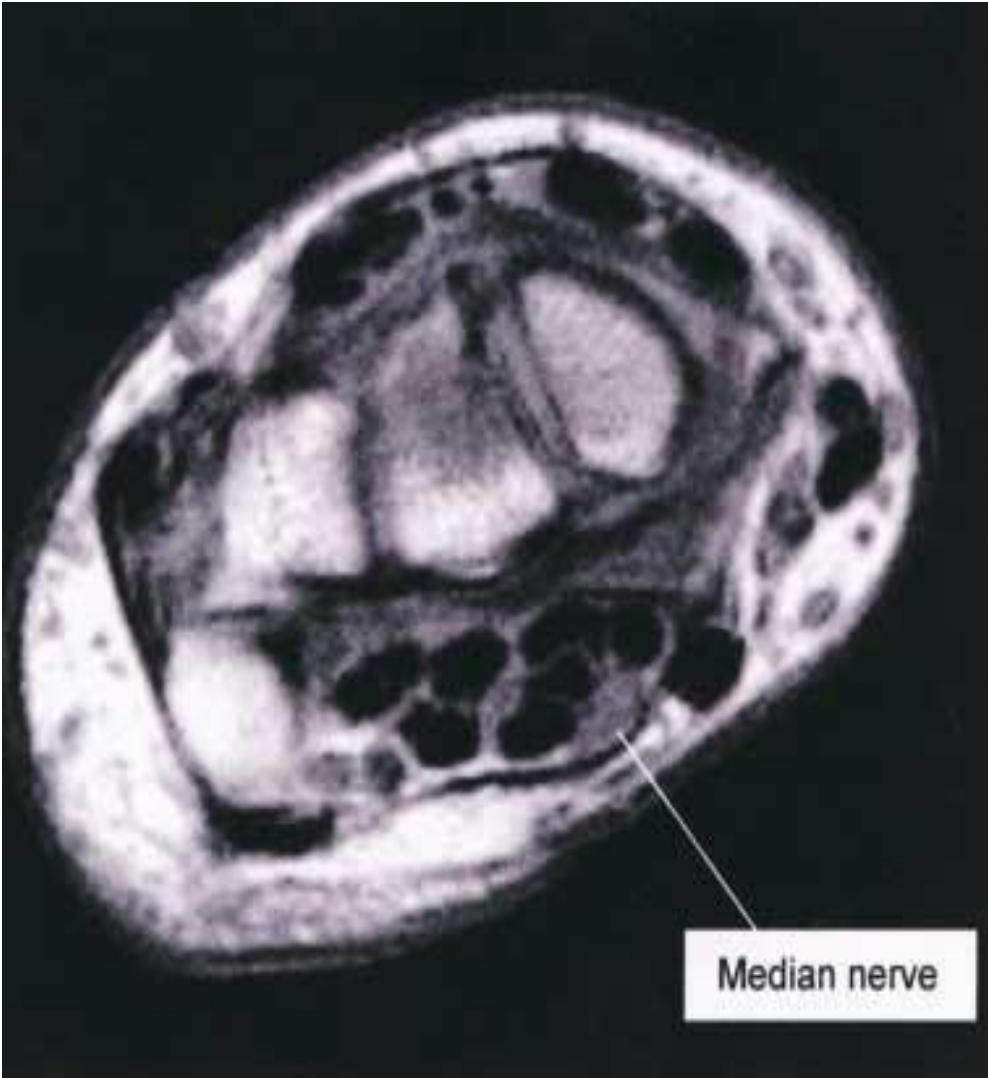
- Extensor Carpi radialis longus (ECRL).
- Extensor Carpi radialis brevis (ECRB).
- Extensor Digitorum (ED).
- Extensor Digiti minimi (EDM).
- Extensor Carpi ulnaris (EU).
- Extensor pollicis longus, (EPL).
- Abductor pollicis longus, (APL).
- Extensor pollicis brevis, (EPB).



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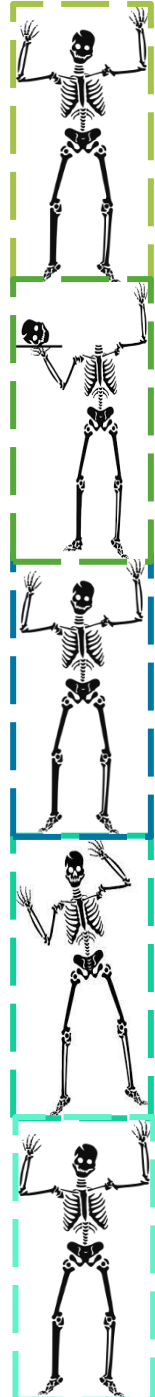
MRI



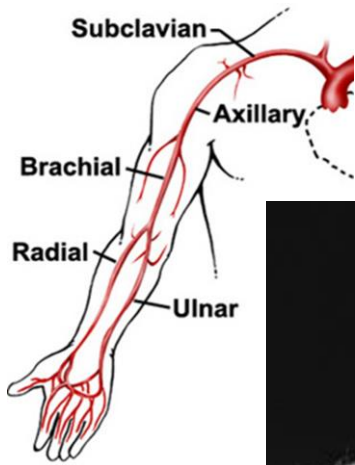
Upper limb vessels



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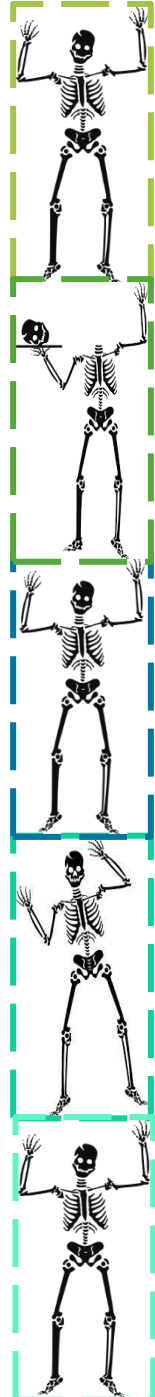
UPPER LIMB VESSELS



- 1- Radial Artery
- 2- Ulnar Artery
- 3- Deep Palmar Arch
- 4- Common Palmar Digital Artery
- 5- Proper Palmar Digital Artery

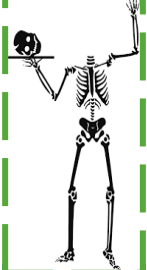


- 1- Vertebral Artery
- 2- Axillary Artery
- 3- Internal Thoracic Artery
- 4- Posterior Humeral Circumflex Artery
- 5- Circumflex Scapular Artery
- 6- Subscapular Artery
- 7- Brachial Artery



RT. UPPER EXTREMITY ANGIOGRAM

extra explanation:
Extremity angiography:
is a test used to see the arteries in the hands, arms, feet, or legs. Use X-rays and a special dye to see inside the arteries.

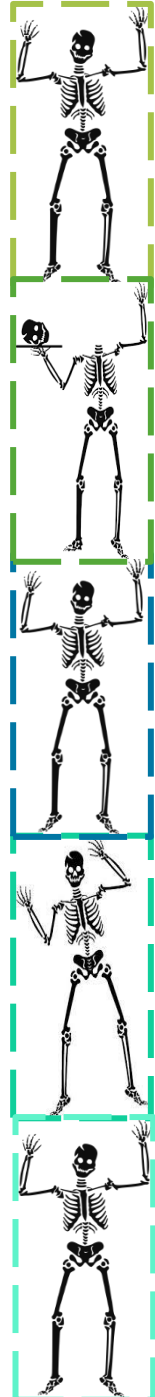


Practical (3)

LOWER LIMB.



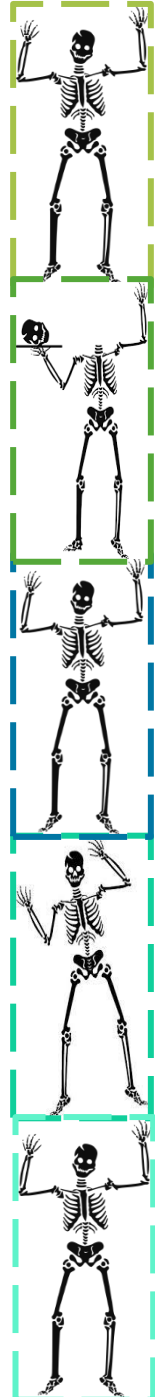
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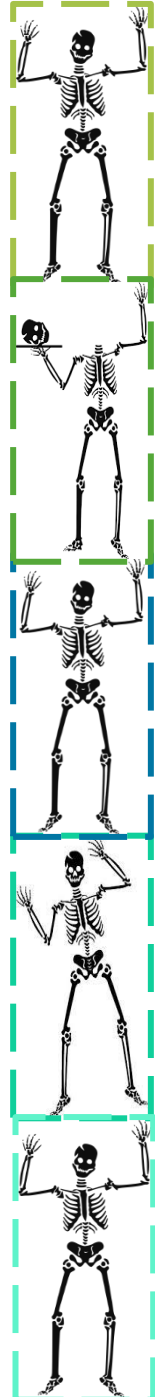
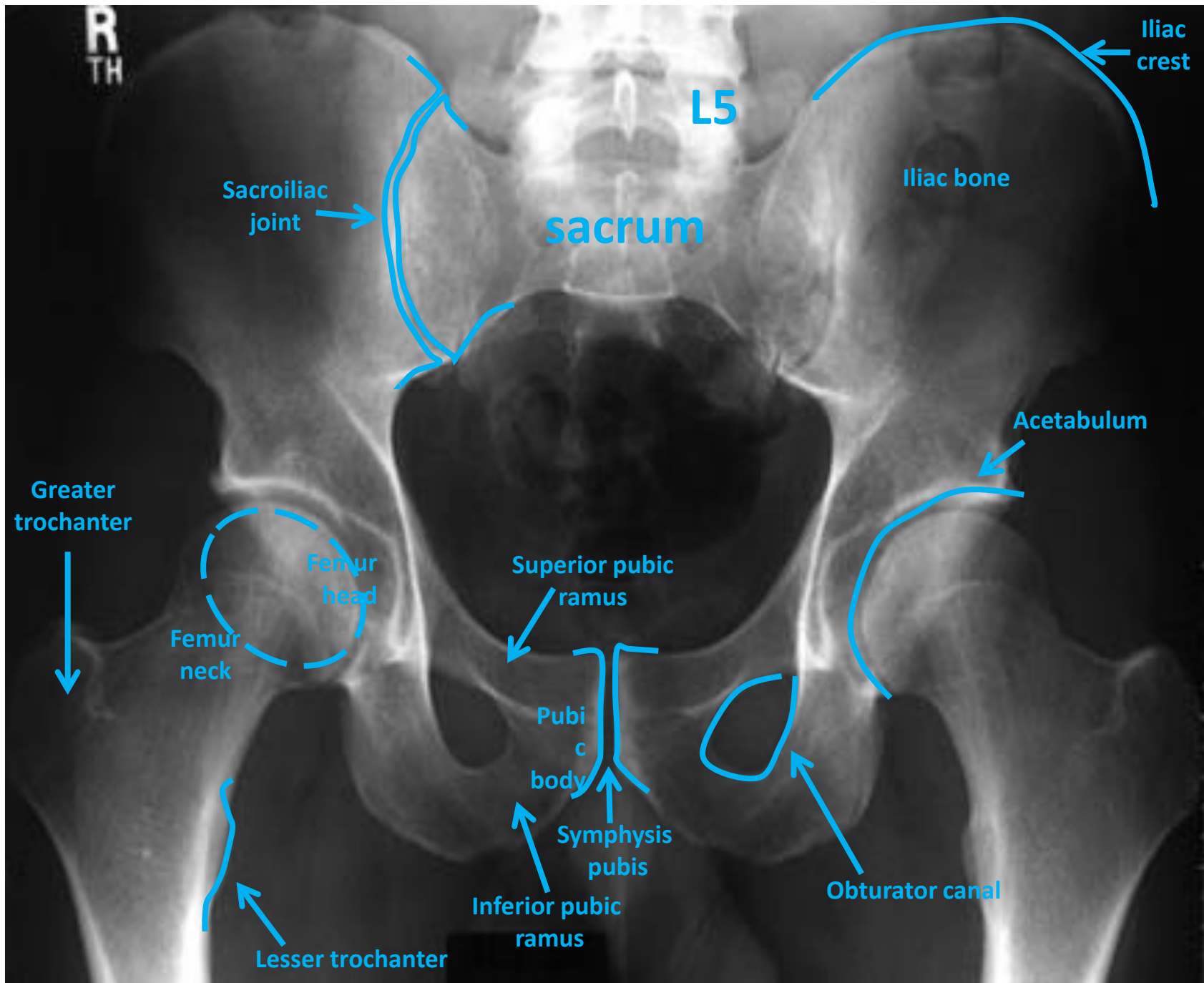


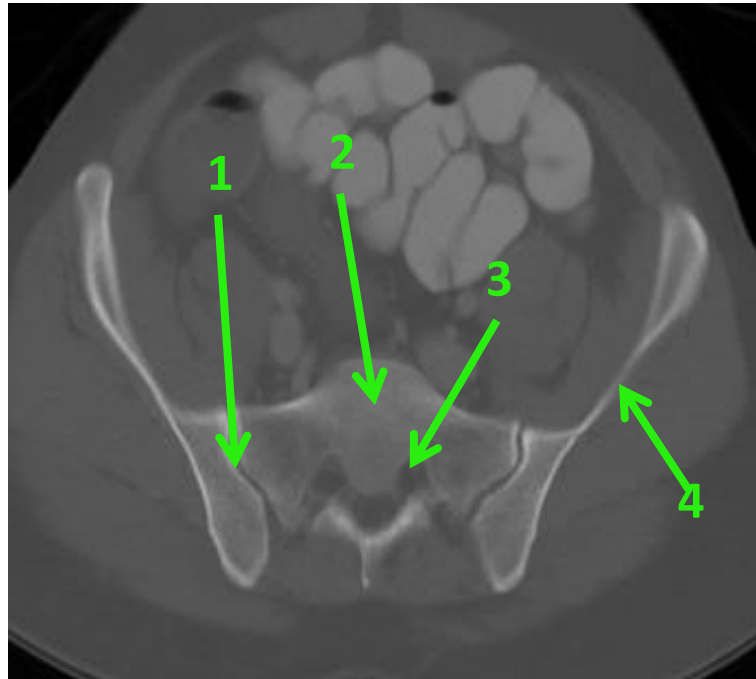
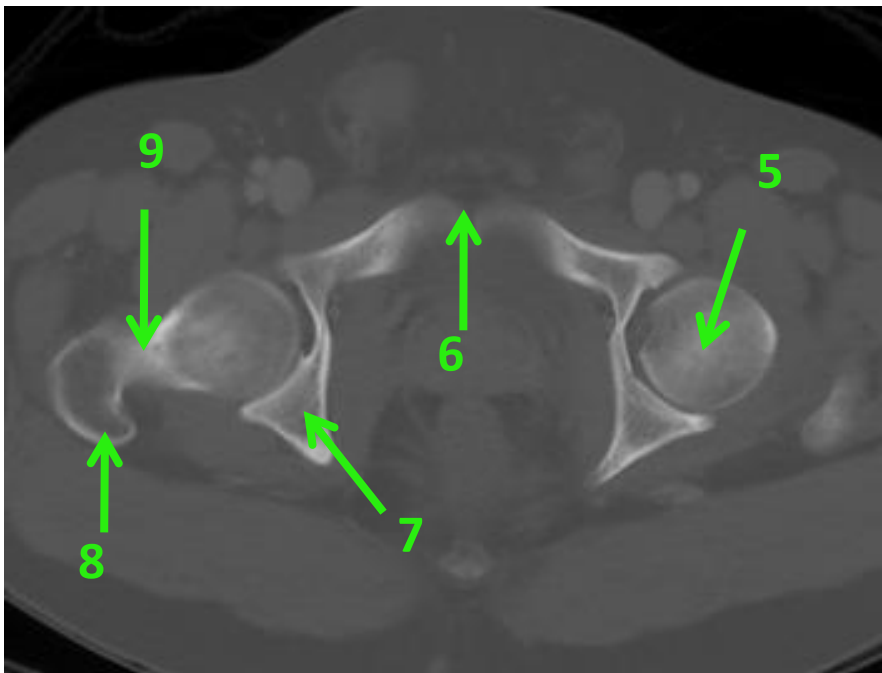
Pelvic



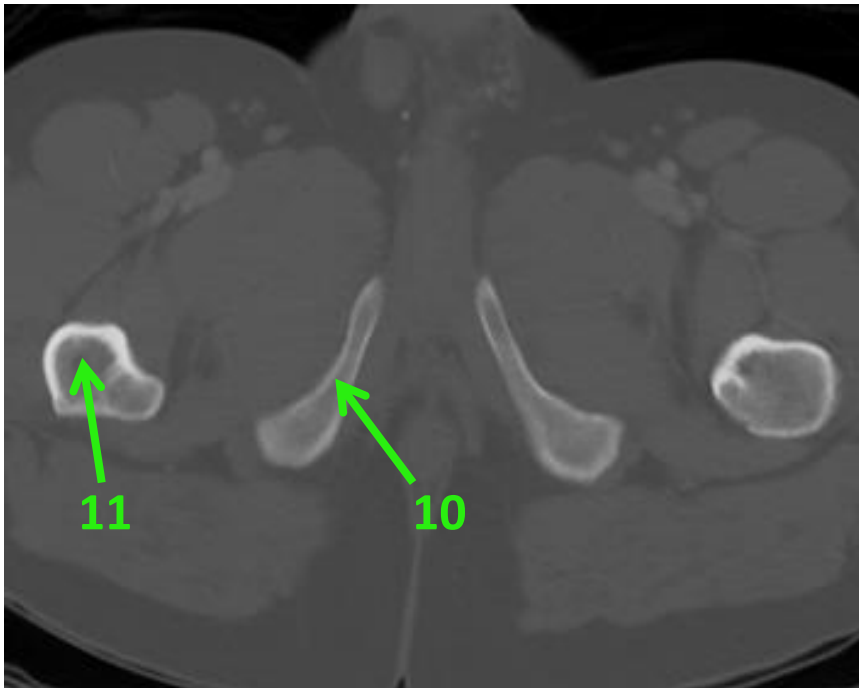
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CT-SCAN

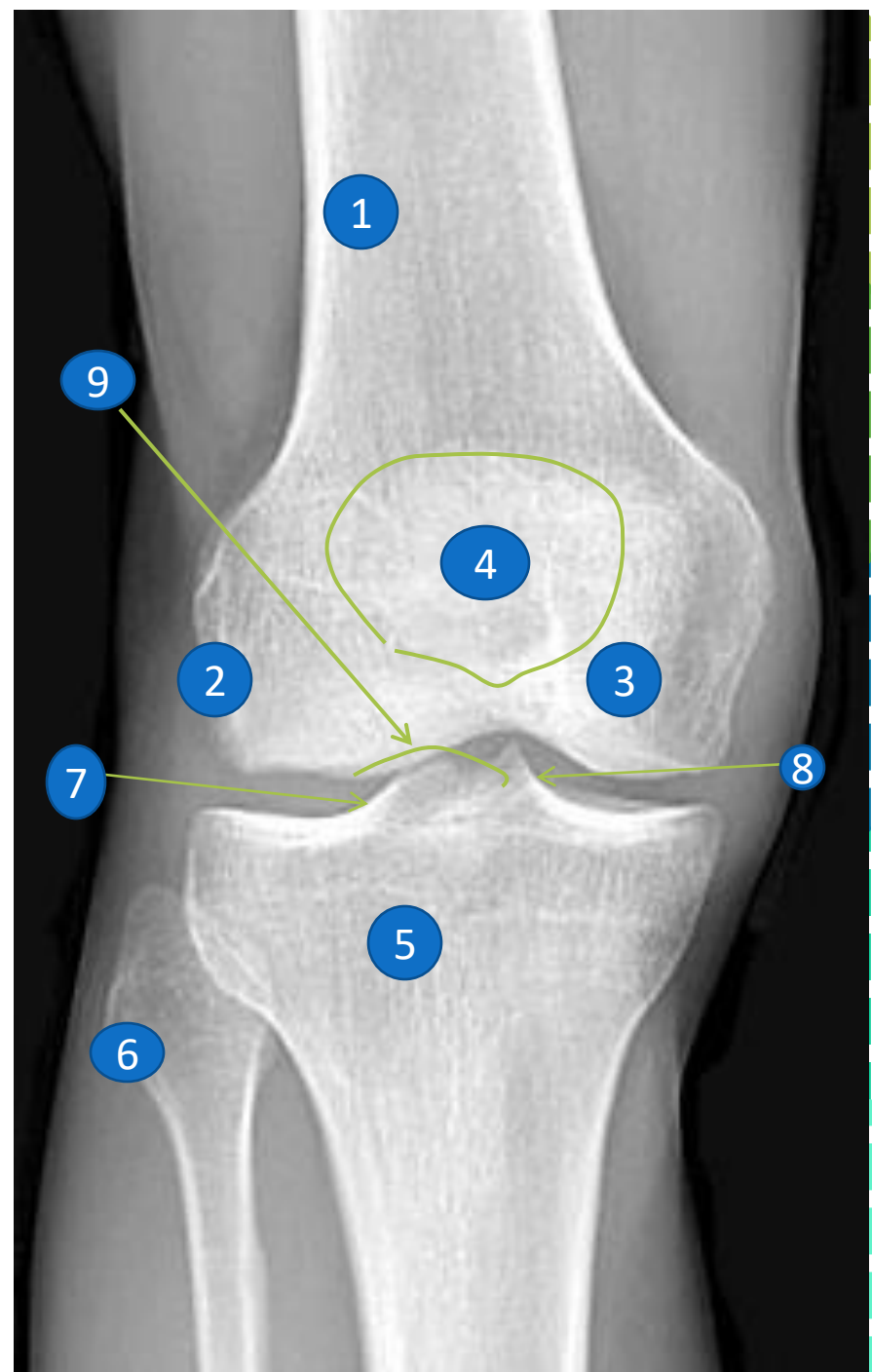


- 1- Sacroiliac joint
- 2- Sacrum
- 3- Sacral neural foramen
- 4- Iliac bone
- 5- Femur head
- 6- Symphysis pubis
- 7- Ischium
- 8- Greater trochanter
- 9- Femur neck
- 10- Pubic bone (inferior ramus)
- 11- Femur shaft



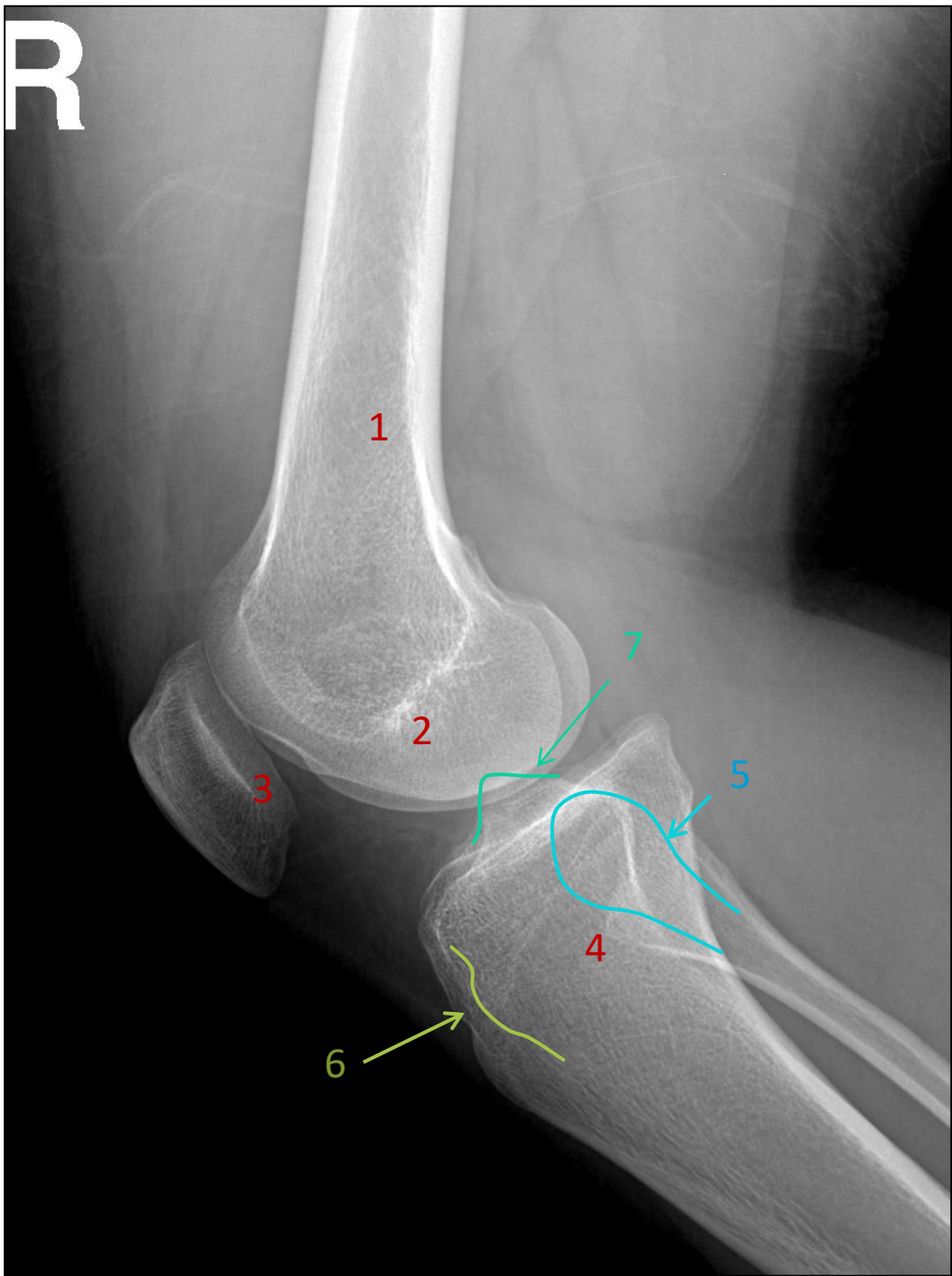
X-ray

- 1- Femur
- 2- Lateral condyle
- 3- Medial condyle
- 4- Patella
- 5- Tibia
- 6- Fibula
- 7- Lateral tibial spine
- 8- Medial tibial spine
- 9- Intercondyle



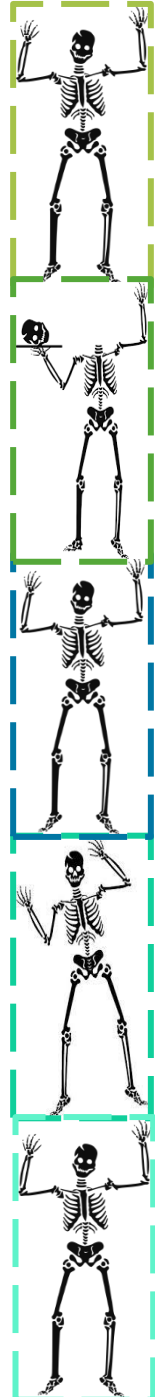
X-ray

- 1- Femur
- 2- Femur condoyle
- 3- Patella
- 4- Tibia
- 5- Fibula
- 6- Tibial teberosity
- 7- Tibial spine





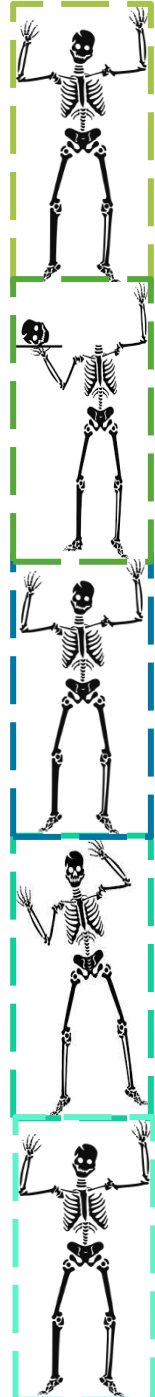
Congenital hip dislocation

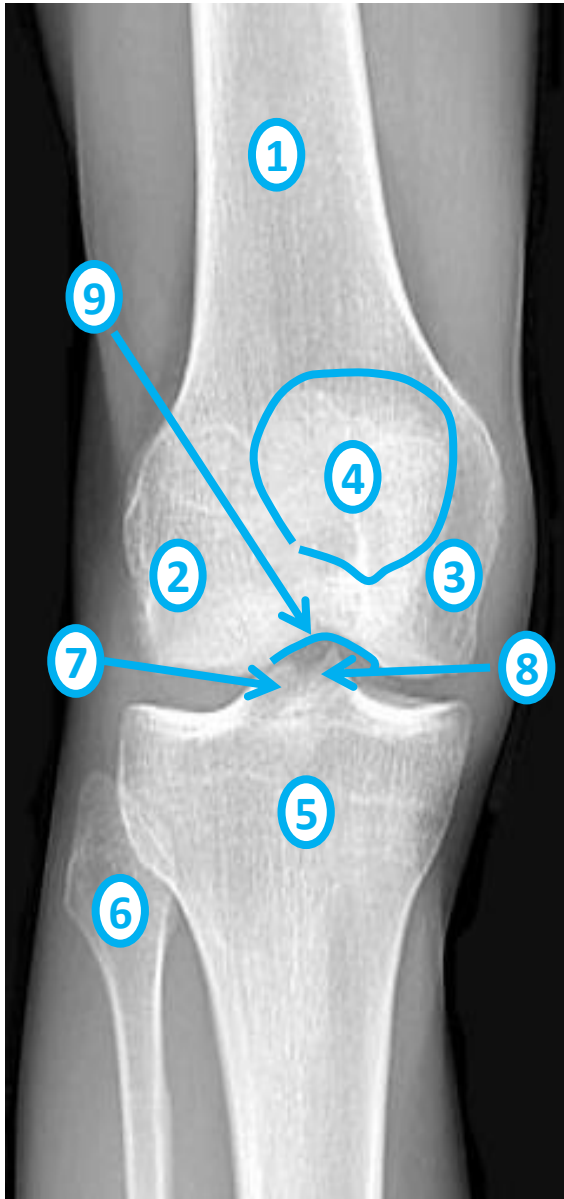


Knee



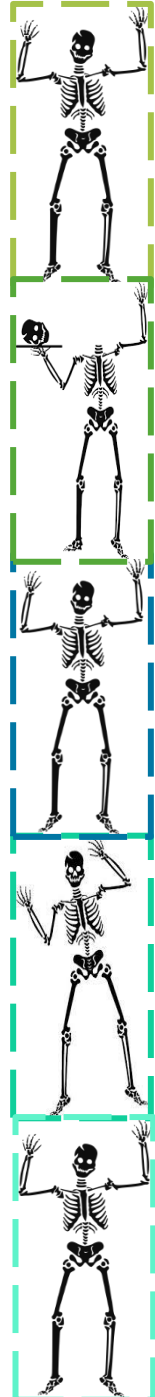
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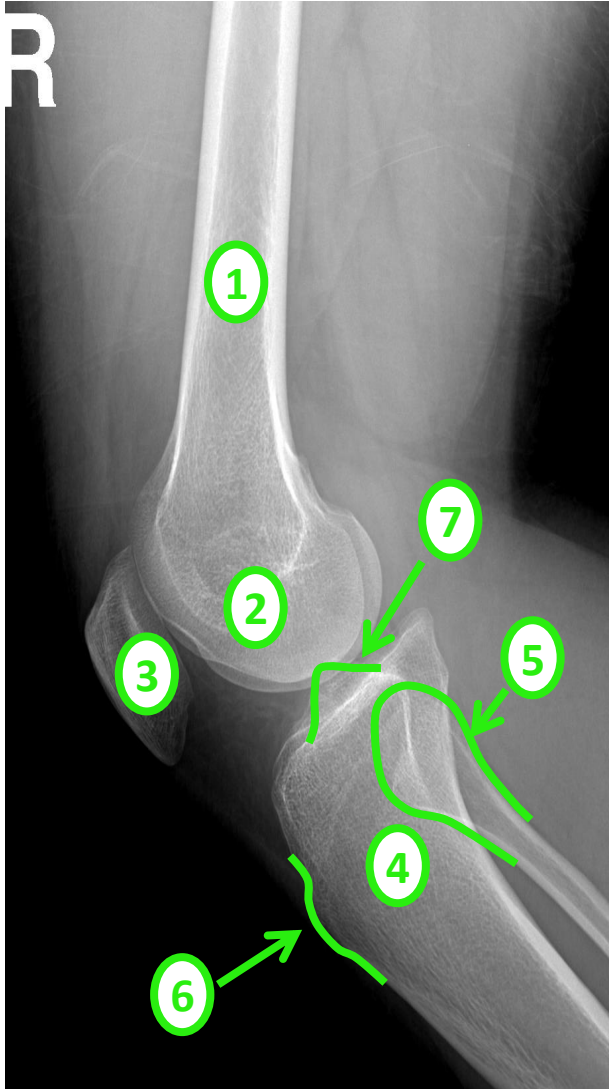




X-ray

- 1) Femur
- 2) Lateral condyle
- 3) Medial condyle
- 4) Patella
- 5) Tibia
- 6) Fibula
- 7) Lateral tibial spine
- 8) Medial tibial spine
- 9) Intercondylar notch



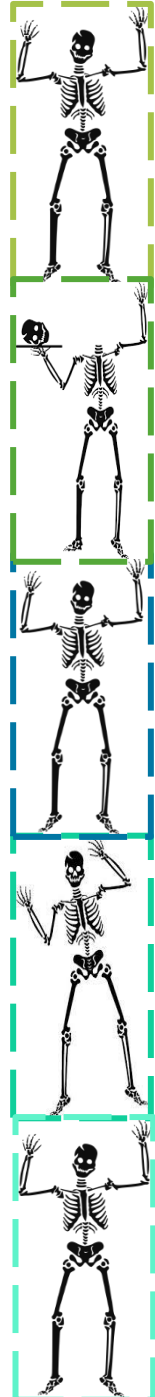


X-ray

- 1) Femur
- 2) Femur condoyle
- 3) Patella
- 4) Tibia
- 5) Fibula
- 6) Tibial tuberosity
- 7) Tibial spine



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Severe osteoarthritis



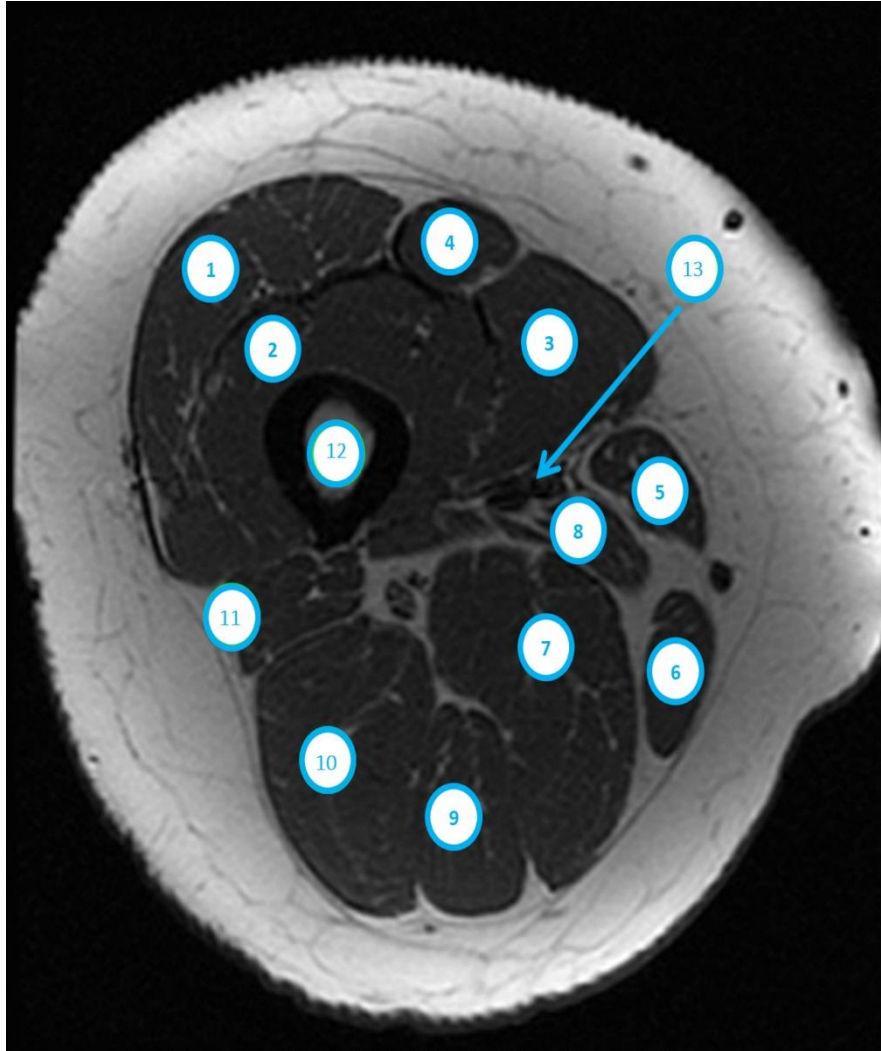
Thigh



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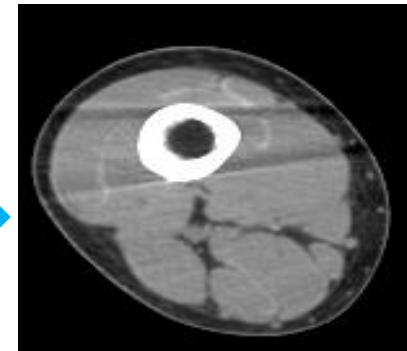


MRI

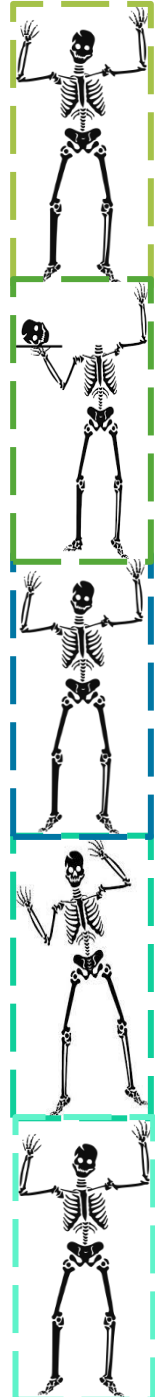


- 1) Vastus lateralis muscle
- 2) Vastus intermedius muscle
- 3) Vastus medialis muscle
- 4) Rectus femoris muscle
- 5) Sartorius muscle
- 6) Gracilis muscle
- 7) Adductor magnus muscle
- 8) Adductor longus muscle
- 9) Semimembranosus muscle
- 10) Semitendinosus Muscle
- 11) Biceps femoris muscle
- 12) Femur
- 13) Femoral artery

CT-SCAN



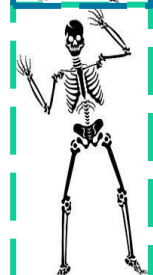
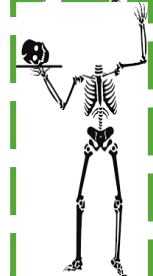
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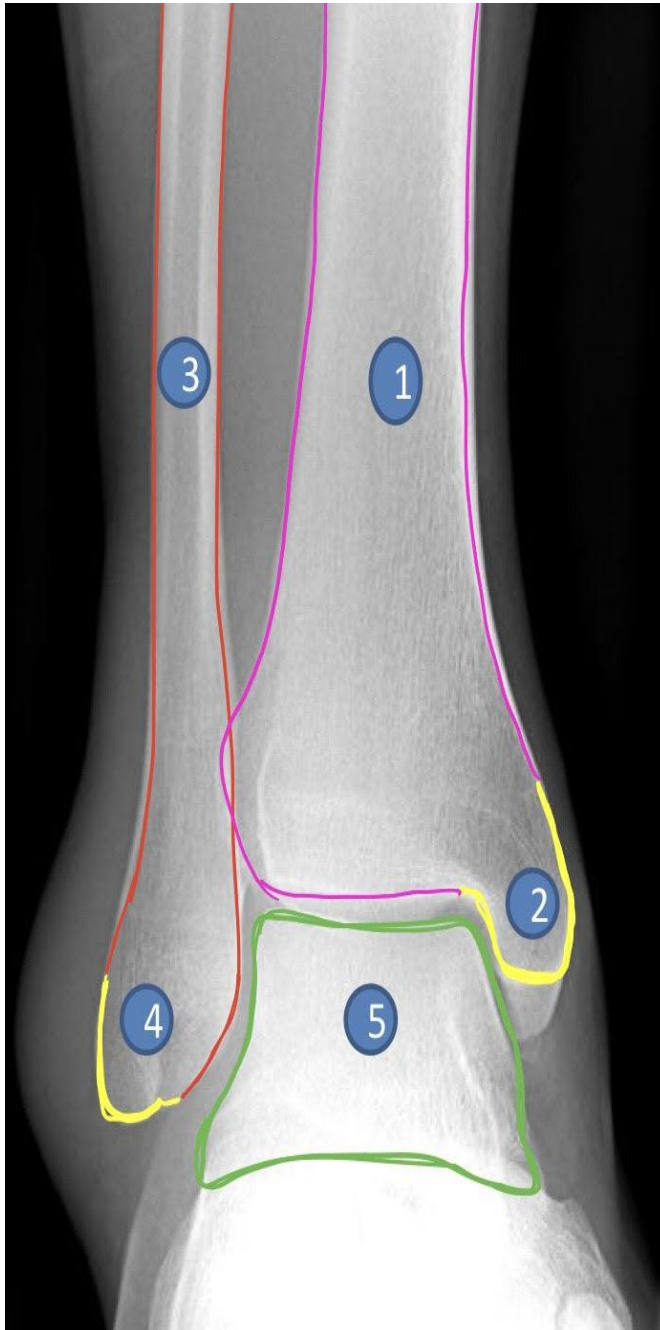


Ankle



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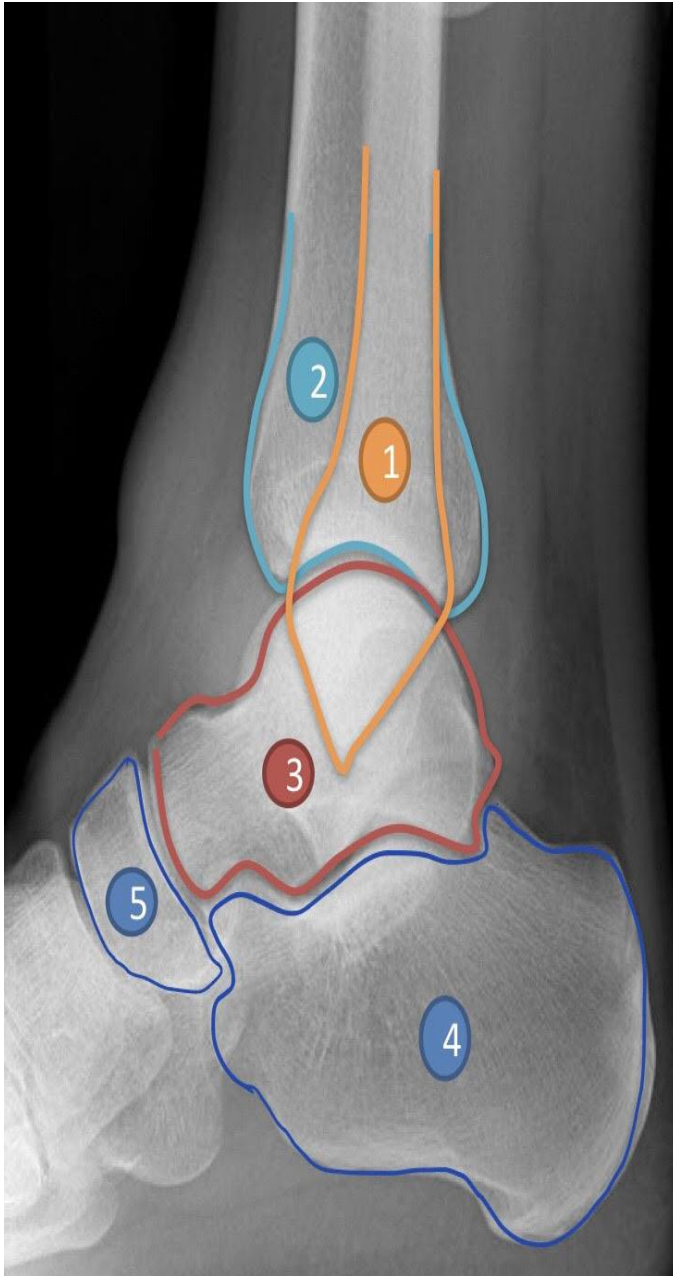




X-ray

- 1- Tibia
- 2- Medial malleolus
- 3- Fibula
- 4- Lateral malleolus
- 5- Dome of talus





X-ray

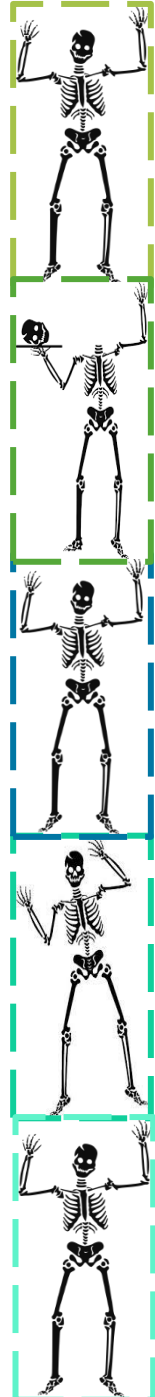
- 1- Fibula
- 2- Tibia
- 3- Talus
- 4- Calcaneus
- 5- Navicular

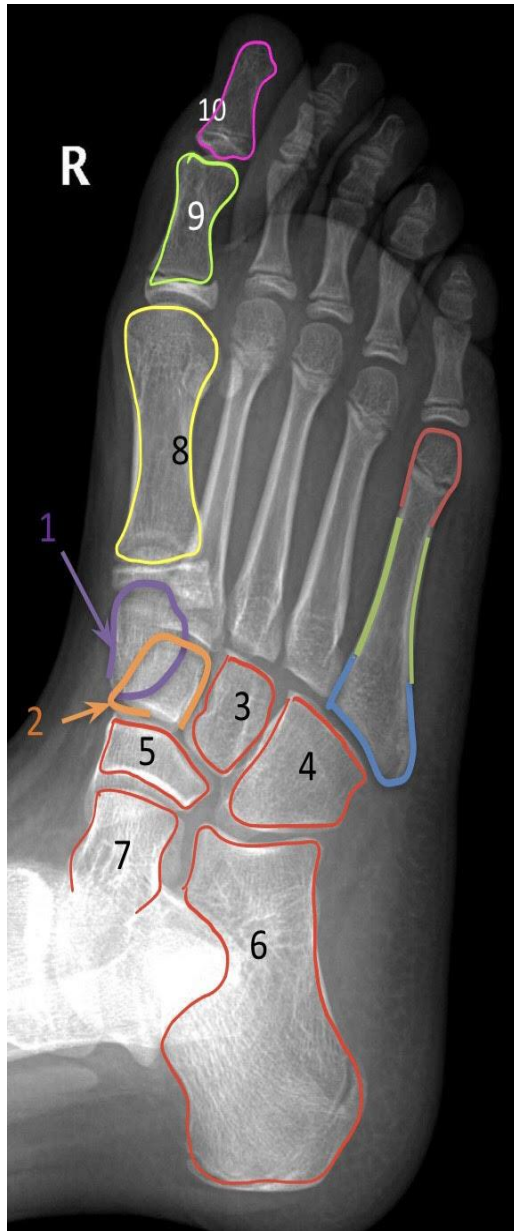


Feet



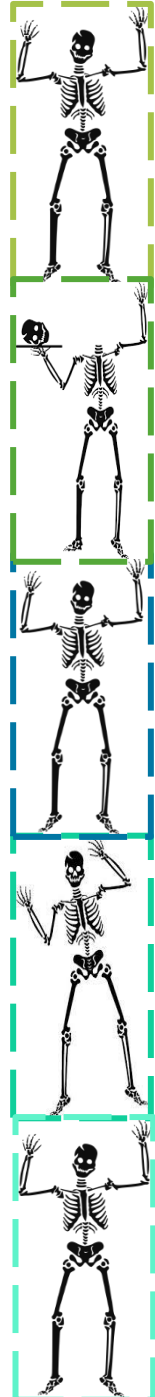
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X-ray

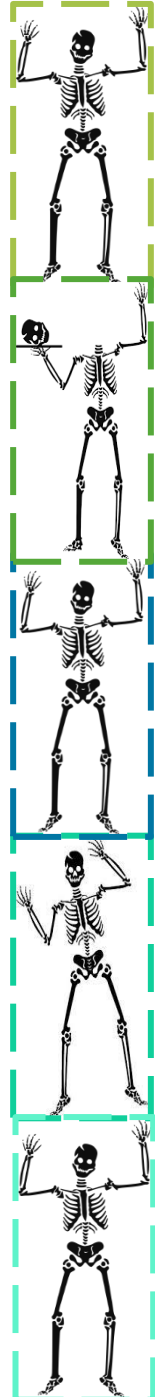
- 1- Medial cuneiform bone
- 2- Intermediate cuneiform bone
- 3- Lateral cuneiform bone
- 4- Cuboid bone
- 5- Navicular bone
- 6- Calcaneal bone
- 7- Talus
- 8- Metatarsal bone (1st toe)
- 9- Proximal phalanx (1st toe)
- 10- Distal phalanx (1st toe)

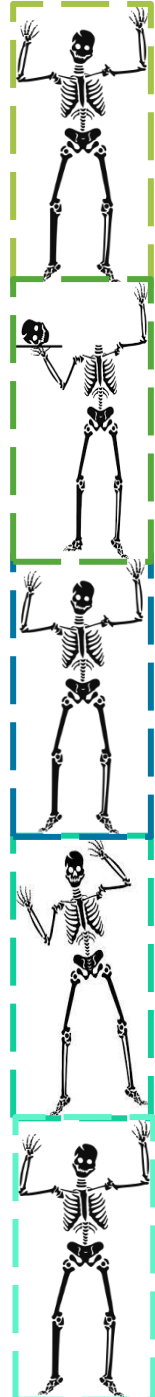
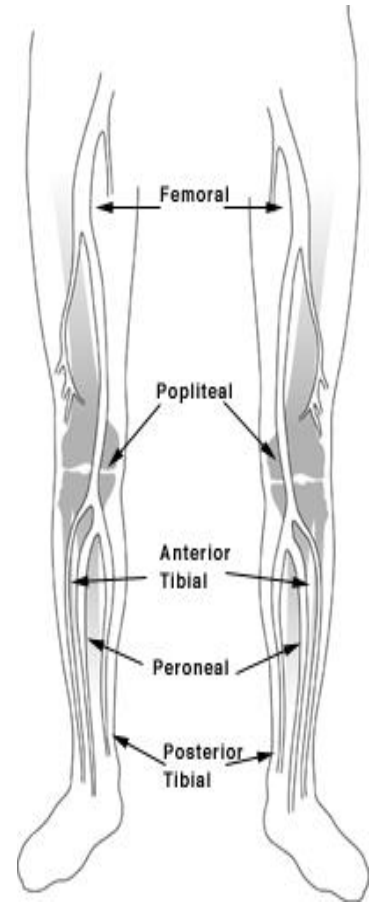
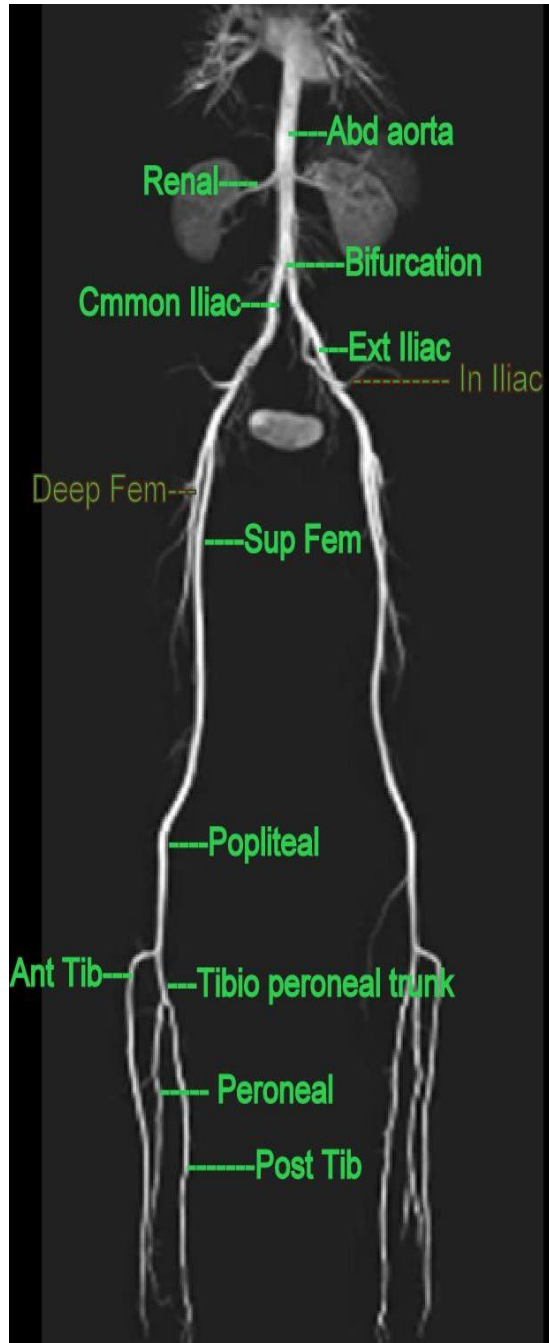


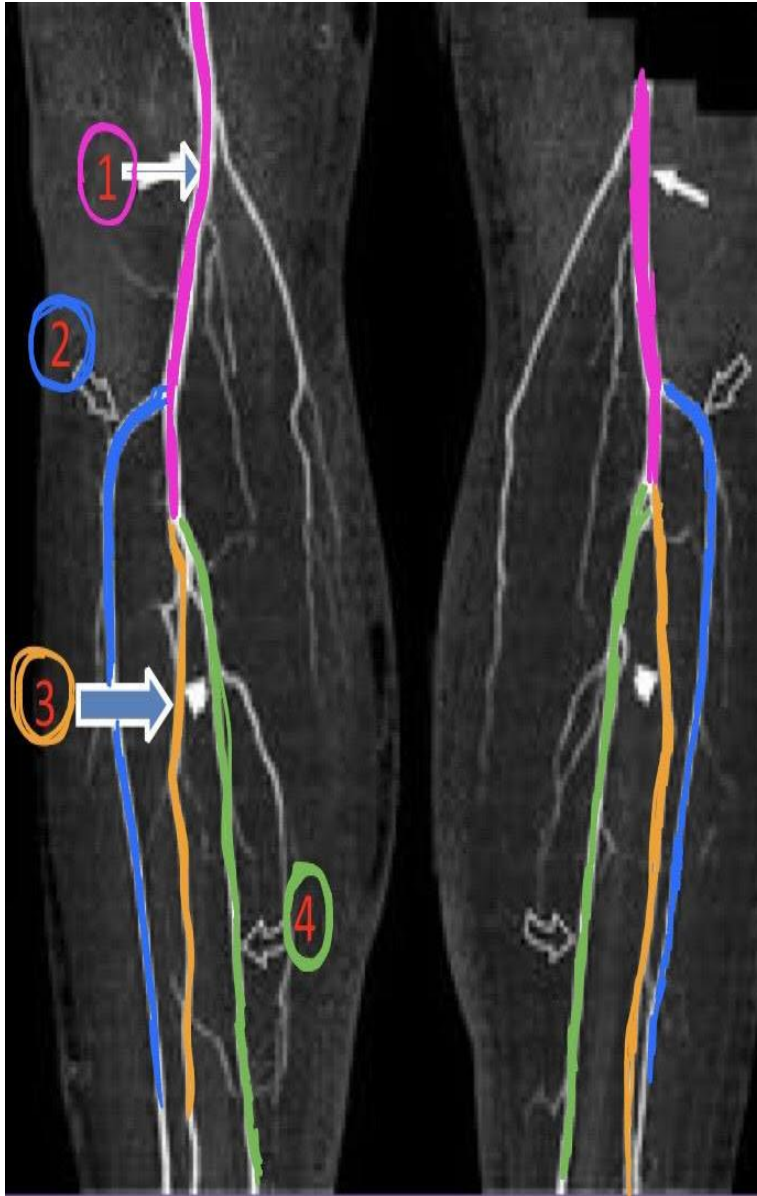
Lower limb vessels



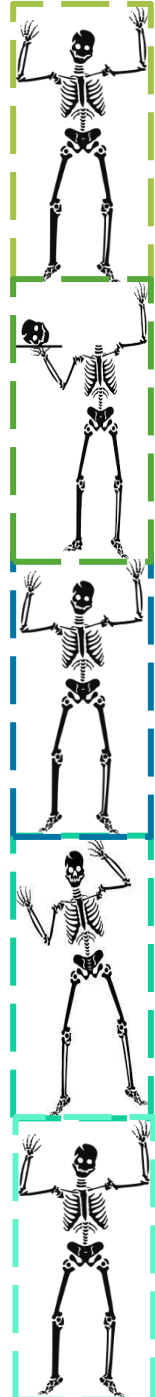
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- 1- Popliteal artery
- 2- Anterior tibial artery
- 3- Peroneal artery
- 4- Posterior tibial artery



THANK YOU

For checking our work.

Contact us on:

 Radiology437@gmail.com

 [@Radiology437](https://twitter.com/Radiology437)

Team Leaders:

Rawan Alharbi

Faisal Alqusaier

Team members:

Abdullah Almeaither

Abdullah Alomar

Homoud al zaid

Mohammad alasqah

Abdullah alsergani

Afnan almustafa

Abdulrahaman Altalasi

Saad alhaddab

Mohannad alamri

Adel alzahrani



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