Lab 2 Introduction: Vertebral Column; Spinal Cord; Spinal Nerves; Back Muscles

Students:

- **Unlike most lab sessions, which are dissection-based, this session is a "prosection lab."**
- Assemble in 6 groups, each having 12–13 students.
- There are 6 learning stations situated around the labs. Pick a station to start at.
- Groups will spend about 20 minutes at each station, rotating around the labs until they have visited all the stations.
- Faculty and PALs will facilitate discussions at the stations.
- Focus on the bolded terms and make sure you have identified all the relevant structures.

Lab 2, Station 1: Vertebral Column

The Vertebral Column as a Whole

COMPLETE ANATOMY

Vertebral column

Identify these features of the vertebral column:

- **Primary curvatures**
  - Thoracic and sacral

QUESTION

Primary curvatures = What is the concept?

- **Secondary curvatures**
  - Cervical and lumbar

QUESTION

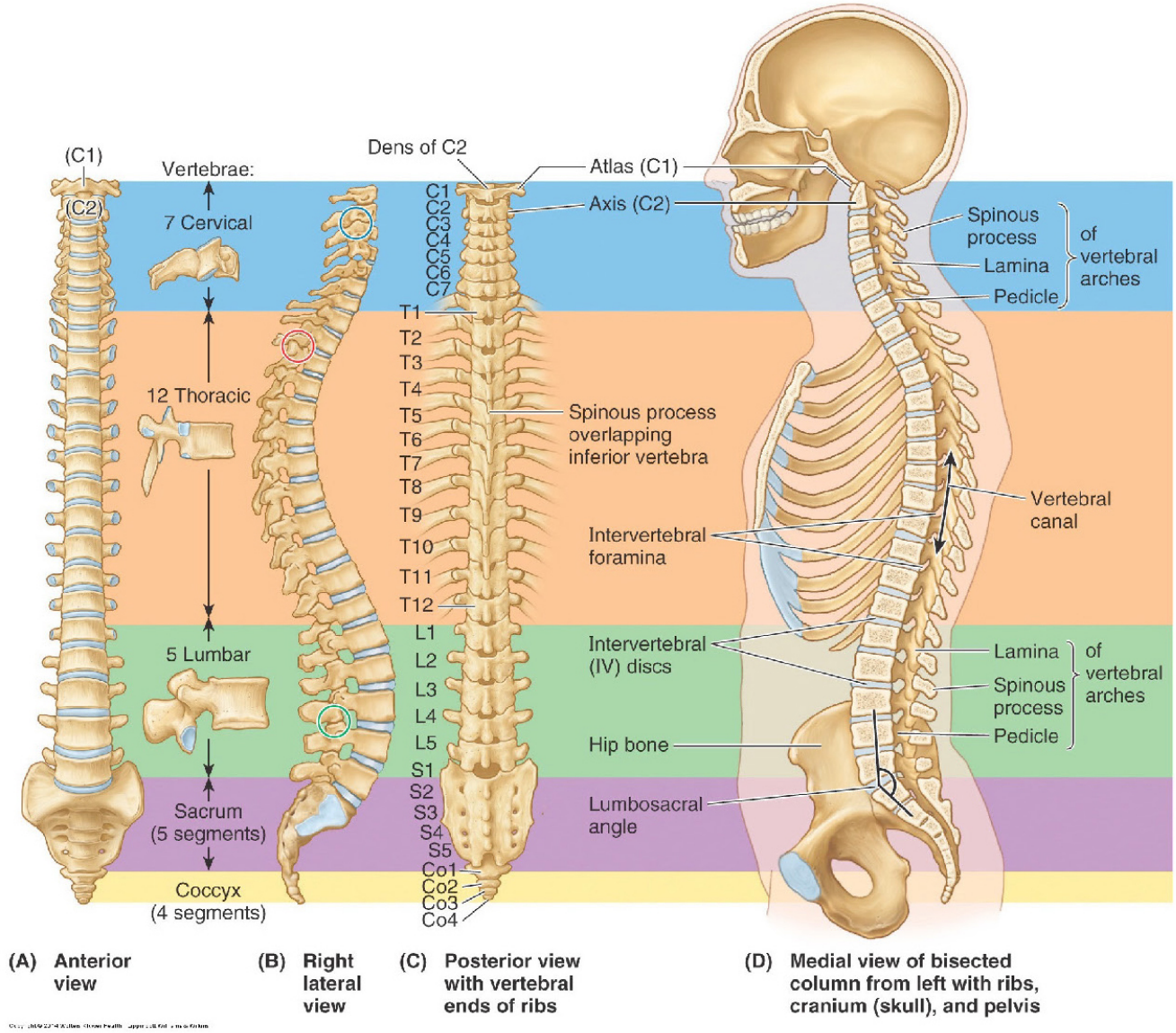
Secondary curvatures = When are these acquired?

- **Cervical vertebrae (7)**
- **Thoracic vertebrae (12)**
- **Lumbar vertebrae (5)**

QUESTION

Food always helps one to learn, eh? Try this one out: **Cereal @ 7, Tacos at 12, Lasagna @ 5**.

- **Sacrum**
- **Coccyx**
- **Vertebral canal—what does it contain?**
- **Intervertebral foramina—which structures traverse these?**



Common Features of All Vertebrae

Identify these characteristics of a typical vertebra:

- **Vertebral body**
- **Vertebral arch**
  - **Pedicle**
  - **Laminae**
- **Transverse processes**—note the **articular facets** for ribs
- **Spinous process**
- **Superior and inferior articular processes**
- **Superior and inferior notches**

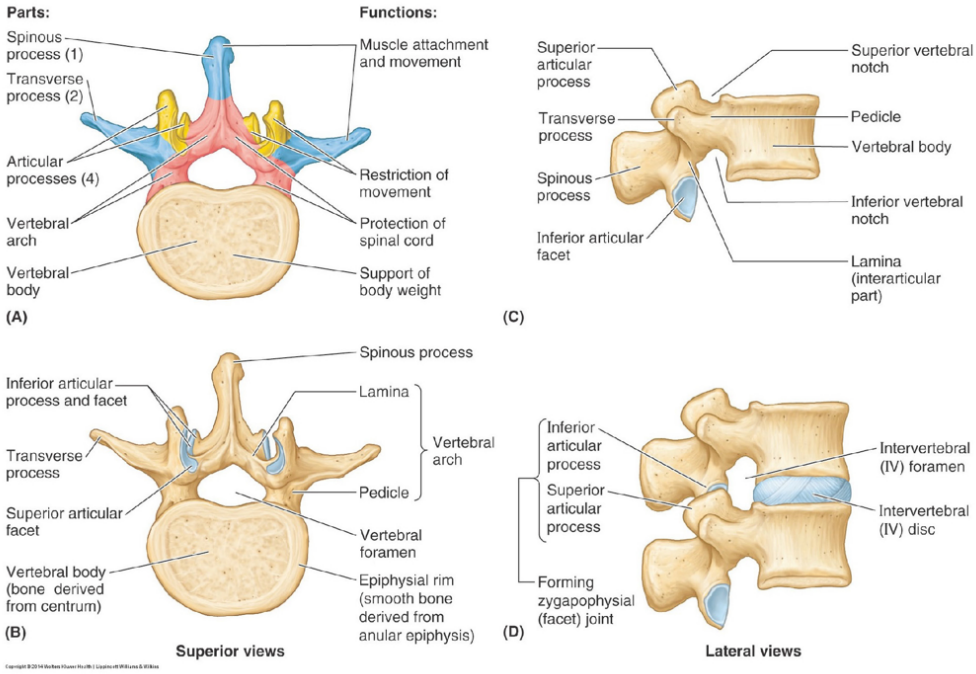


Figure 2.2. Characteristics of a typical vertebra. Clinically Oriented Anatomy, 7th ed., Figure 4.2.

QUESTION

Stack two vertebrae on one another: How are the intervertebral foramina formed?

NOTE

Make sure you can identify the above structures in vertebrae from different regions.

Unique Features of Specific Vertebrae

Certain characteristics are specific to regions of the vertebral column or individual vertebrae. Review the unique features of cervical, thoracic and lumbar vertebrae in the sections below.

Cervical Vertebrae

COMPLETE ANATOMY

Cervical vertebra

A typical cervical vertebra has the following features:

- Small square bodies with a large vertebral foramen
- Presence of a foramen in each transverse process (foramen transversarium) — **What do they contain?**
- Short bifid spinous process

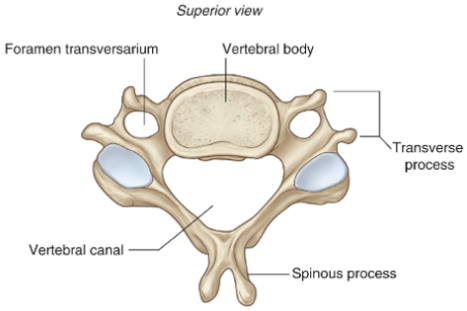


Figure 2.3.

Because the first two cervical vertebrae have special articulations to allow for head movement, they have some unique features:

- **Atlas (C-1)**: has no body—instead, it has **anterior** and **posterior arches**
- **Axis (C-2)**: the body has a vertical extension called the **dens**

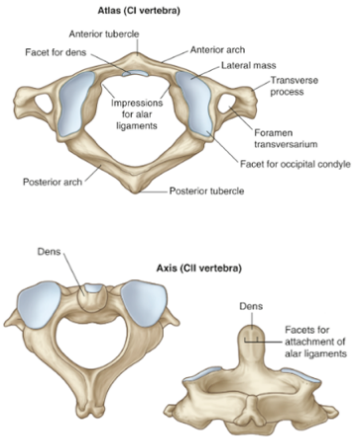


Figure 2.4.

Thoracic Vertebrae

COMPLETE ANATOMY

Thoracic vertebra

Note the sloping, overlapping, spinous processes.

- Identify the **costal facets** on the vertebral bodies and on the transverse processes. **Which structures articulate on the costal facets?**

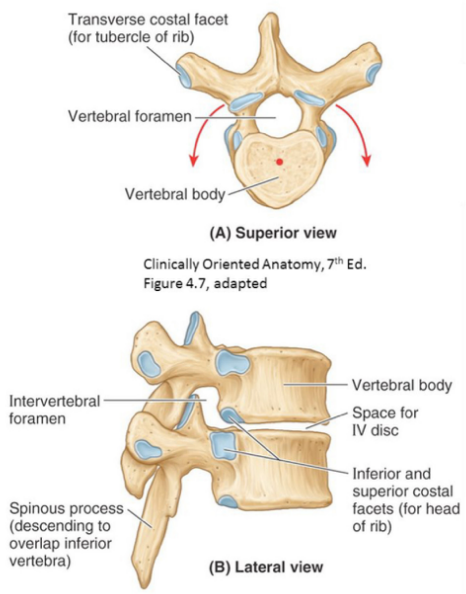


Figure 2.5.

Lumbar Vertebrae

COMPLETE ANATOMY

Lumbar vertebra

These are wide and stout, with blunt spinous processes.

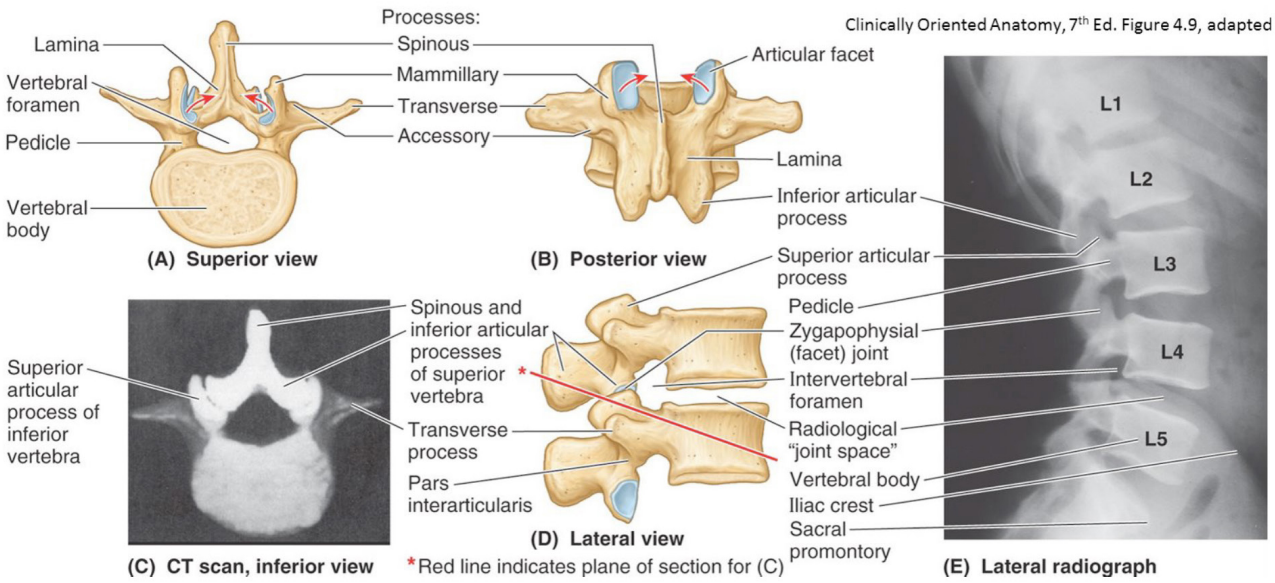


Figure 2.6.

EXERCISE

Can you match an isolated vertebra to the region it belongs to?

Lab 2, Station 2: Vertebral Column 2

COMPLETE ANATOMY

Sacrum

- **Sacrum** (5 fused vertebrae)
  - **Promontory**
  - **Alae** (singular is Ala = "*wing*"). There are two of these, on either side of the promontory
  - **Anterior and posterior sacral foramina**
  - **Sacral canal**
  - **Sacral hiatus**
- **Coccyx** (4 vertebrae fused into 1-2 pieces)

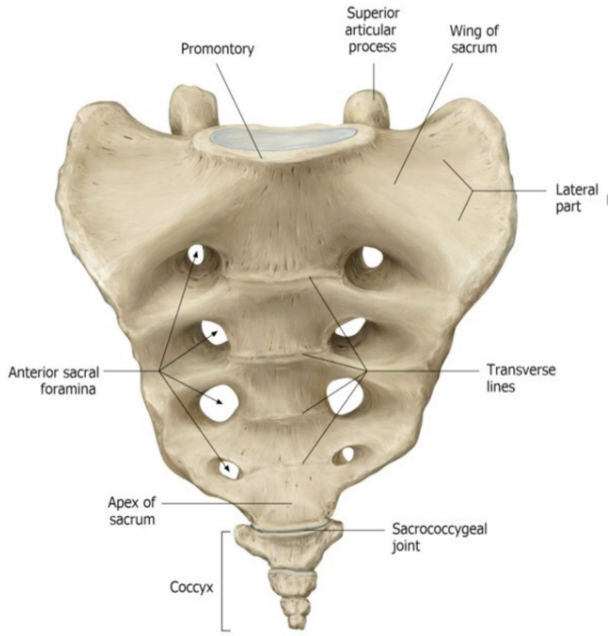


Figure 2.7. Sacrum and coccyx, anterior view. From Gilroy, Atlas of Anatomy, 2nd ed., Illustrator: Karl Wesker, ©2018 Thieme Medical Publishers, Inc. All rights reserved.

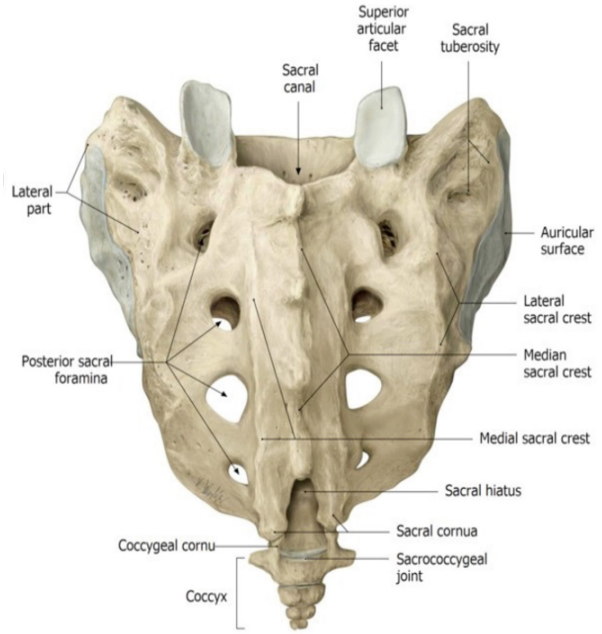


Figure 2.8. Sacrum and coccyx, posterior view. From Gilroy, Atlas of Anatomy, 2nd ed., Illustrator: Karl Wesker, ©2018 Thieme Medical Publishers, Inc. All rights reserved.

Joints of the Vertebral Bodies

Study these on an isolated cadaver vertebral column specimen.

- Adjacent vertebral bodies are joined together by **intervertebral discs—** producing an **intervertebral joint**. Each of these joints is technically known as a **symphysis**. An IV disc also joins L-5 to the sacrum.

QUESTION

What is the definition of a symphysis? *Hint: it is defined by its cartilage.*

IV joints firmly unite the vertebral bodies and prevent them from moving on one another. They also function to absorb and dissipate forces transmitted along the vertebral column.

Each IV disc has two parts:

- **Annulus fibrosis**: Composed of rings of fibrocartilage
- **Nucleus pulposus**: The super-hydrated gelatinous core of the disc

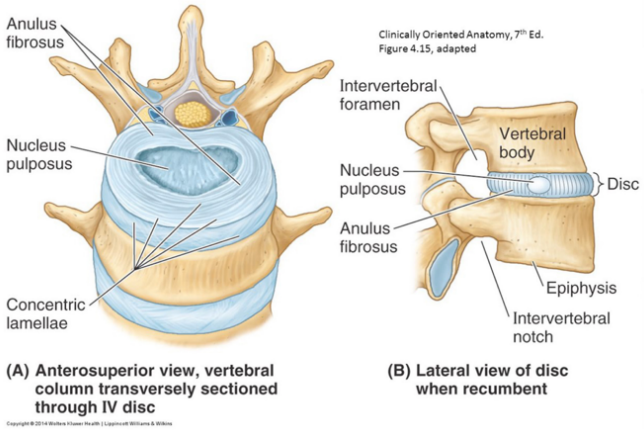


Figure 2.9.

QUESTION

Do you recall the embryonic origin of the nucleus pulposus?

Also, locate these features on the spine specimen:

- **Intervertebral foramina**: These transmit ***spinal nerves***
- **Dura mater**
- **Epidural space**

QUESTION

What is a herniated disc? In which direction do disc herniations usually occur? Why? What is the neurological danger?

Joints of the Vertebral Arches

- **Zygapophyseal (facet) joints**: Articulations between superior and inferior articular processes of adjacent vertebrae. These are plane joints that allow gliding movements. Locate these on the skeleton in lab.

Degenerative changes in facet joints are common sources of back pain.

NOTE

Although only a small amount of movement is possible at an individual facet joint—together, the joints allow flexion, extension, lateral bending, and rotation of the vertebral column.

Craniovertebral Joints

- **Atlanto-occipital joint**: The articulation between C-1 and the skull (condyles of the occipital bone).
- **Atlanto–axial joint**: The articulation between C-1 and C-2.

QUESTION

These joints facilitate movements of the head on the spine. What are these? [*Don't shake your head—you got this!*]

Ligaments of the Vertebral Column

Study these on an isolated lumbar spine cadaveric specimen.

COMPLETE ANATOMY

Ligaments of the vertebral column

Two longitudinal ligaments run vertically along the anterior and posterior aspects of the vertebral bodies—from skull to sacrum.

- **Anterior longitudinal ligament**: Limits spine extension (prevents hyperextension) and anterior movement of IV discs
- **Posterior longitudinal ligament**: Limits spine flexion and posterior movement of the IV discs.

Another ligament is segmental and runs between the laminae of adjacent vertebrae.

- **Ligamentum flavum**: best seen within the vertebral canal. They contain an abundance of elastic fibers—this gives the ligament a yellow color (thus the name!). They limit flexion of the spine and provide recoil to return the spine to vertical after it has been flexed.

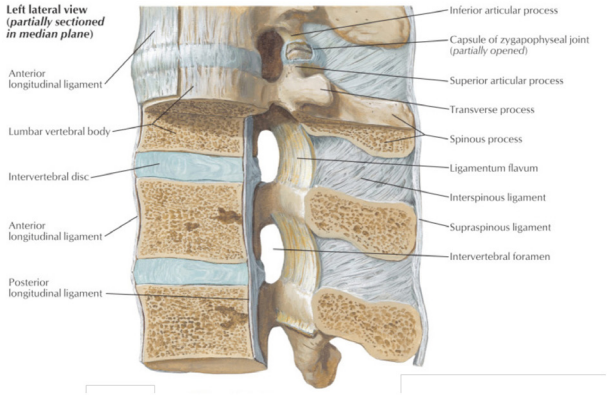


Figure 2.10. Netter, Atlas of Human Anatomy, 7th ed., Plate 168.

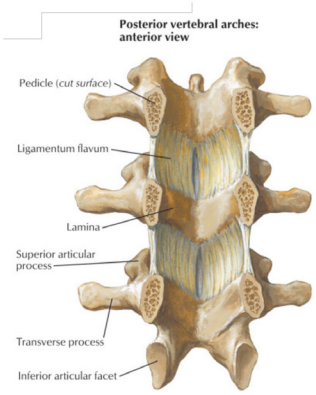


Figure 2.11. Netter, Atlas of Human Anatomy, 7th ed., Plate 168.

Lab 2, Station 3: Imaging of the Vertebral Column

Radiography of the Spine

Radiography involves using radiation (x-rays) to provide images of the tissues, organs, and bones, that comprise the human body.

To create a radiograph, a patient is positioned so that the part of the body being imaged is located between an x-ray source and an x-ray detector. When the machine is turned on, x-rays travel through the body and are absorbed in different amounts by different tissues, depending on the radiological density of the tissues they pass through.

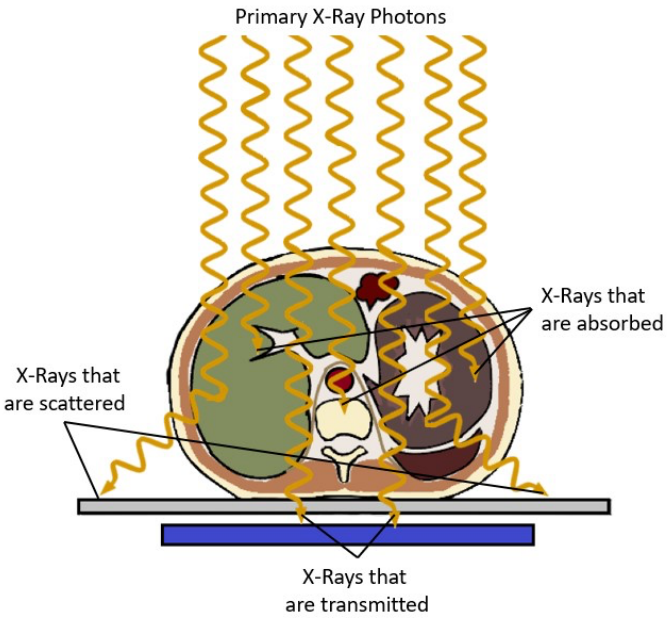


Figure 2.12. Digital Radiographic Exposure: Principles & Practice; 2022 by Carla M. Allen.

For example, bones readily absorb x-rays and therefore appear whiter than other tissues against the black background of a radiograph. Conversely, x-rays travel more easily through less radiologically dense tissues, such as fat, muscle, and air-filled cavities such as the lungs. These structures are displayed in shades of gray on a radiograph.

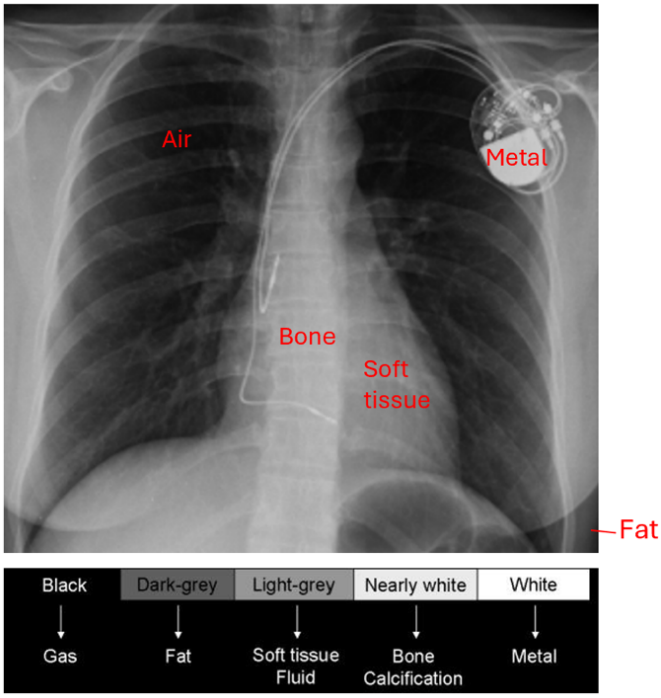


Figure 2.13.

The vertebral column's bony composition make x-rays an ideal modality for quick evaluation, such as checking for fractures after mild or moderate trauma.

Altering the way the body is placed relative to the detector creates specified projections (the path the x-ray beams take through the body) that are used to examine structures from different angles.

Some examples of common spinal projections are shown here:

Figure 2.14. Lateral lumbosacral.

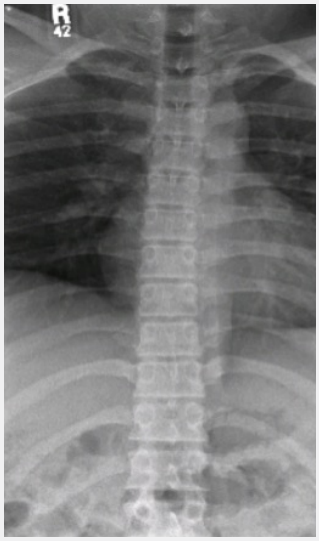


Figure 2.15. AP thoracic spine.

Figure 2.16. Oblique cervical spine.

Figure 2.17. Open mouth odontoid.

QUESTION

Which projection would provide the best view for evaluating the normal curvatures of the spine? Which view would show evidence of scoliosis?

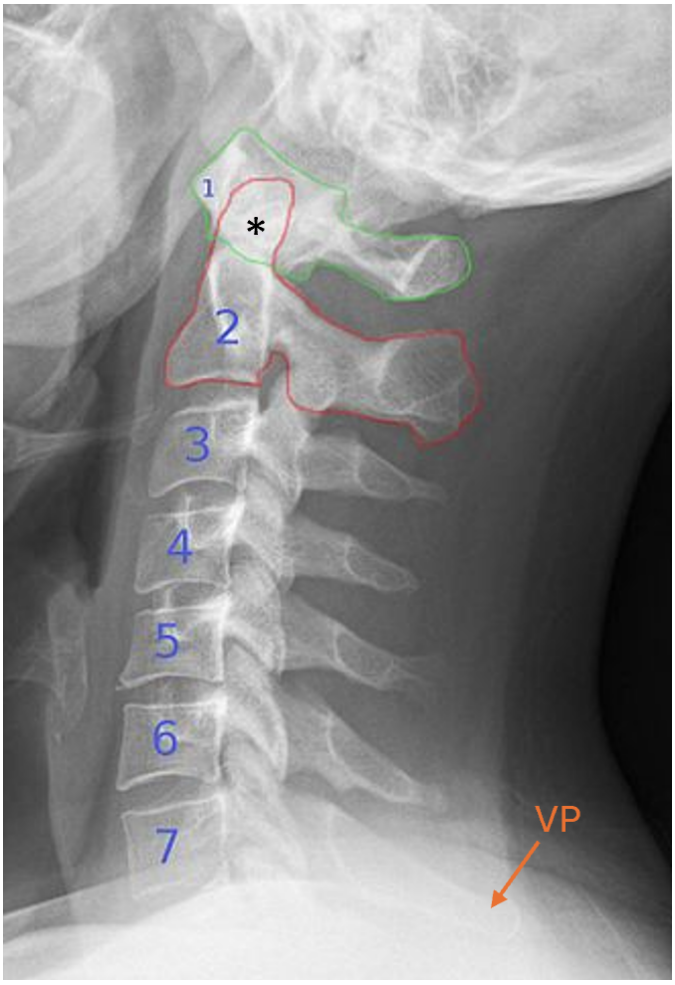
Lateral Spine Radiographs

Lateral view x-rays are important when:

- Checking for proper alignment of vertebrae and normal spinal curvatures
- Inspecting individual vertebrae for fractures, bone spurs, slippage, etc.
- Assessing intervertebral disc degeneration

Figure 2.18.

Lateral Cervical



Key structures to view in the cervial region:

- Atlas (C1)
- Axis (C2)

  *Dens
- C7

  Spinous process = vertebra prominens (VP)

Figure 2.19.

QUESTION

Hyperextension of the neck would damage which part of the cervical vertebrae?

Lateral Thoracic

Normal alignment of the thoracic vertebrae creates a slightly kyphotic curvature.

The rib cage can act to stabalize the thoracic spine even in the case of vertebral fractures

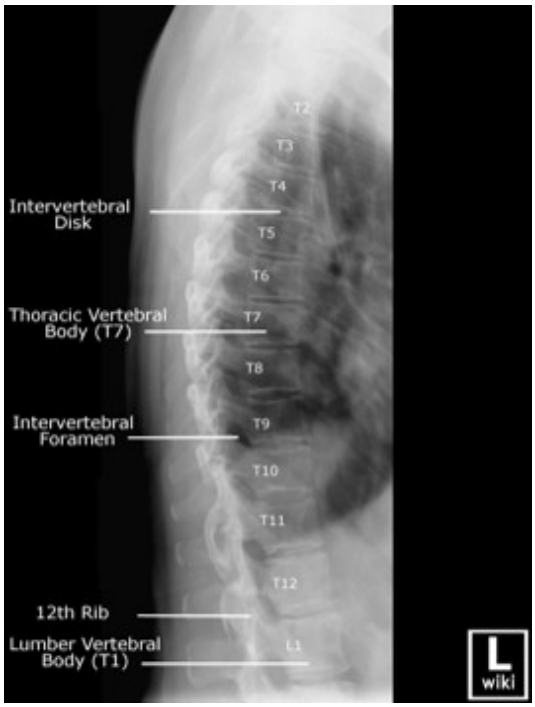


Figure 2.20.

Lateral Lumbar

See if you can identify the features of the vertebral column you are learning in the lateral lumbar radiograph shown below.

Hint: use the slider bar to see the answers!

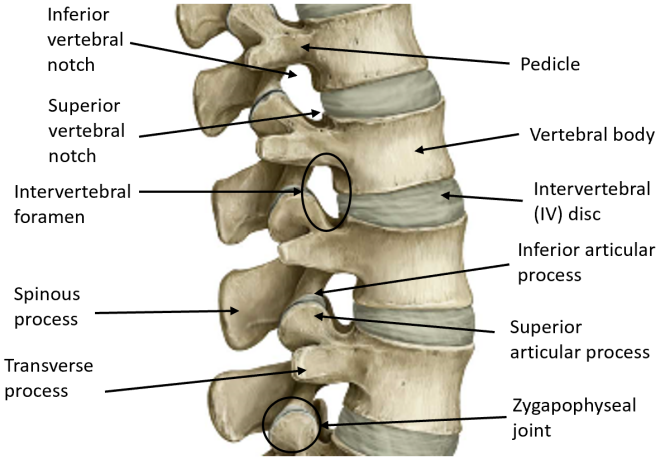


Figure 2.21.

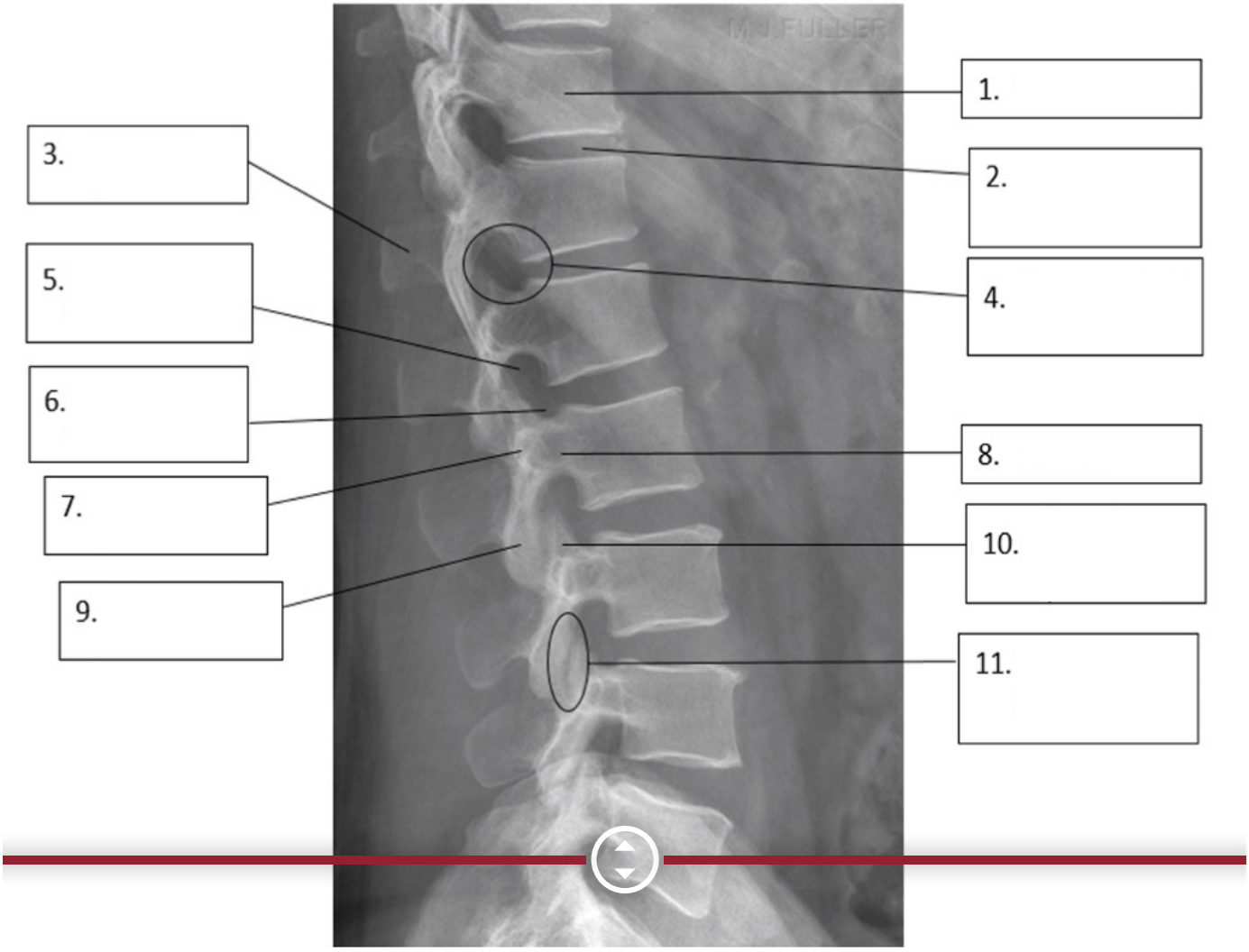


Figure 2.22.

QUESTION

The notch forming the TOP half of an invertebral foramen is named the INFERIOR vertebral notch. What gives!?

Clinical Examples

INFORMATIONAL ONLY

The examples shown here and in later sections of this page, are to help you see how imaging anatomy can be applied to the clinical setting. You are not expected to know, or be able to identify these pathologies at this point in your training.

Figure 2.23. Calcification of the anterior longitudinal ligament.

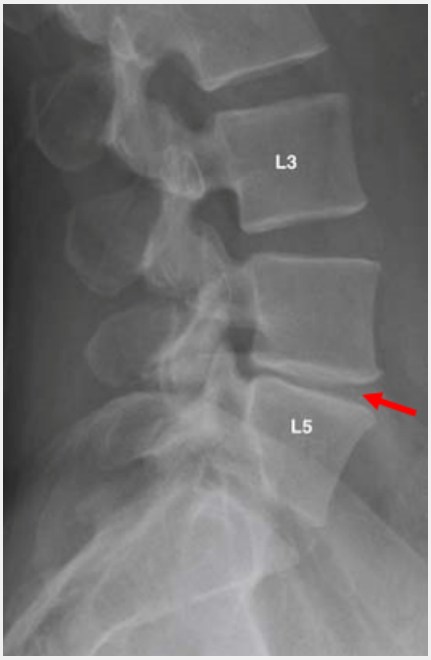


Figure 2.24. Disc space narrowing at L4/L5.

Figure 2.25. Kyphosis before and after spinal fixation.

Figure 2.26. Fracture of C7 spinous process.

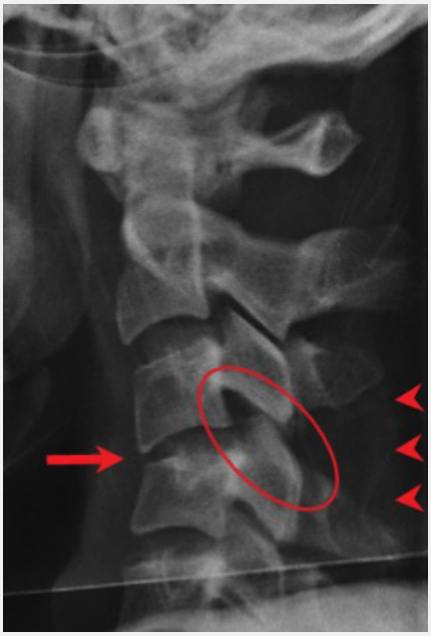


Figure 2.27. Hyperflexion injury with acute angulation at C3/4 (arrow), facet joint subluxation (circle) and interspinous widening (arrow heads).

Figure 2.28. Compression fracture of anterior vertebral body.

Anterior Posterior (AP) Spine Radiographs

The AP designation indicates the x-ray travels from anterior to posterior, with the back of the patient closest to the detector.

Figure 2.29.

In AP radiographs, the spinous processes are seen enface (viewed front on), over lapping the vertebral bodies and intervertebral discs. The pedicles, also visualized enface, project as oval densities on either side of the bodies.

Use the diagrams and complete anatomy link to identify the labeled structures in the AP thoracolumbar radiograph below.

COMPLETE ANATOMY

AP lumbar spine

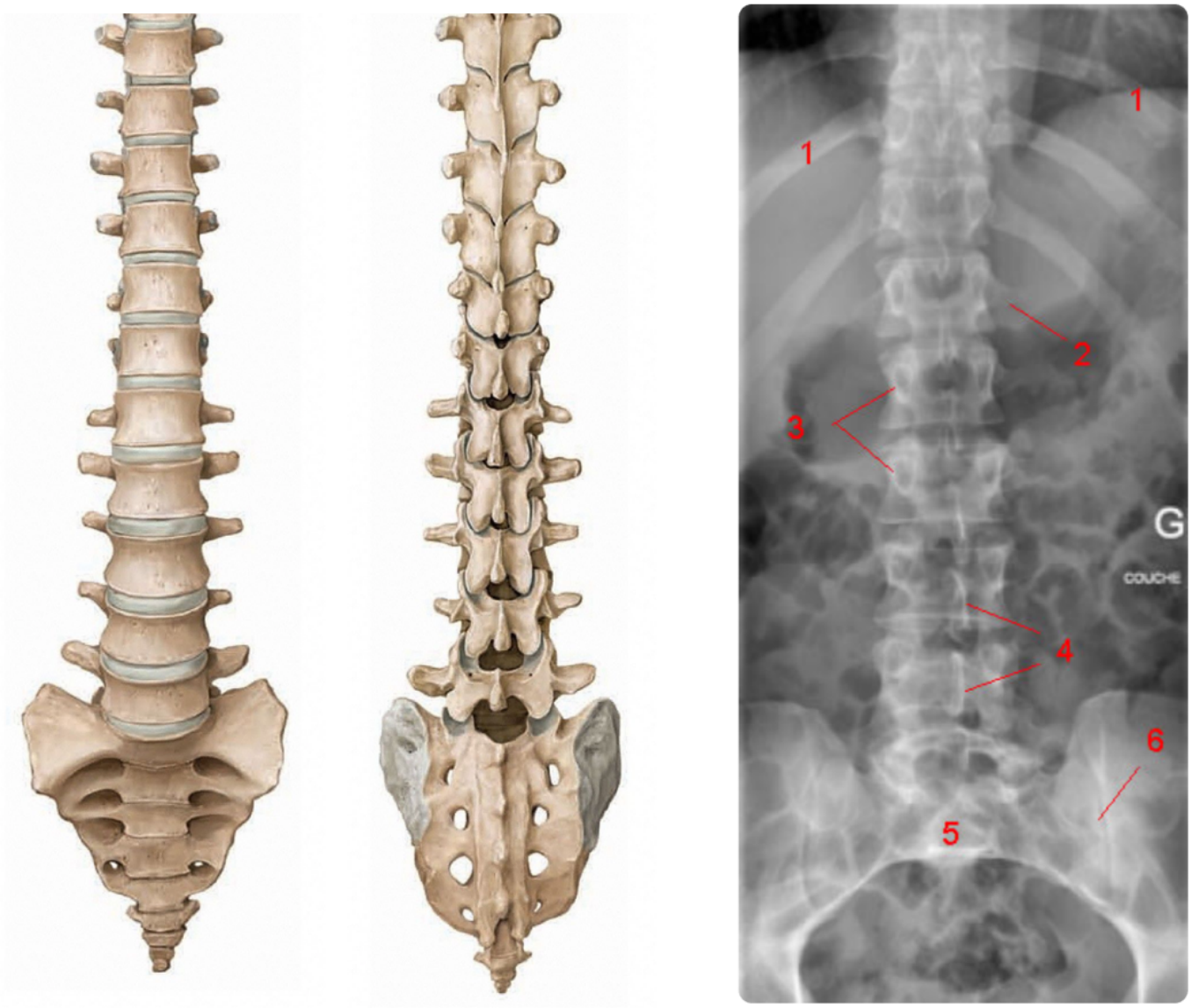


Figure 2.30.

Clinical Examples

Figure 2.31. Scoliosis. *Lateral deviation of the spine.*

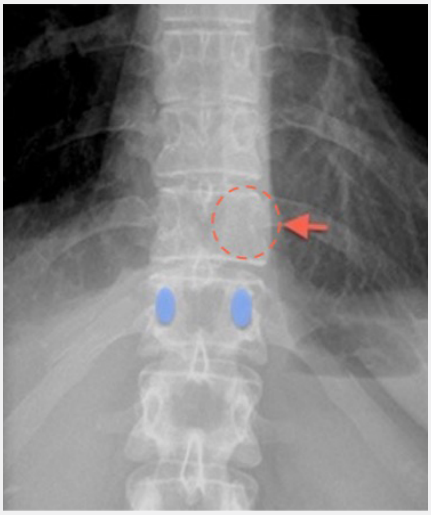


Figure 2.32. Pedicle sign: left pedicle of T11 is radiolucent. *Sign of lytic metastatic tumor.*

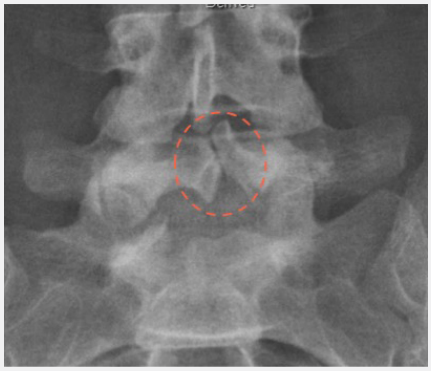
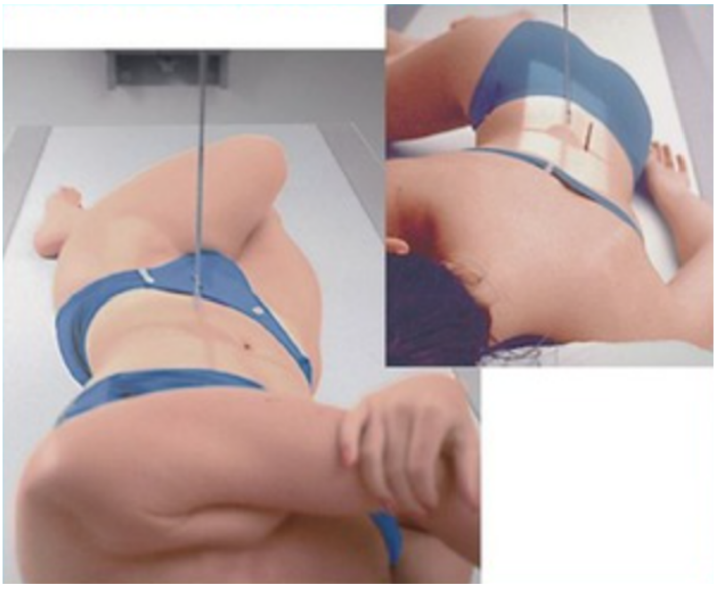


Figure 2.33. Spina Bifida Occulta. *Incomplete closure of the vertebral arch.*

Oblique Spine Radiographs

Oblique radiographs can be utilized to visualize the spine from additional angles (between AP and lateral). Positioning for oblique radiographs requires rotation at approximately 45 degrees.



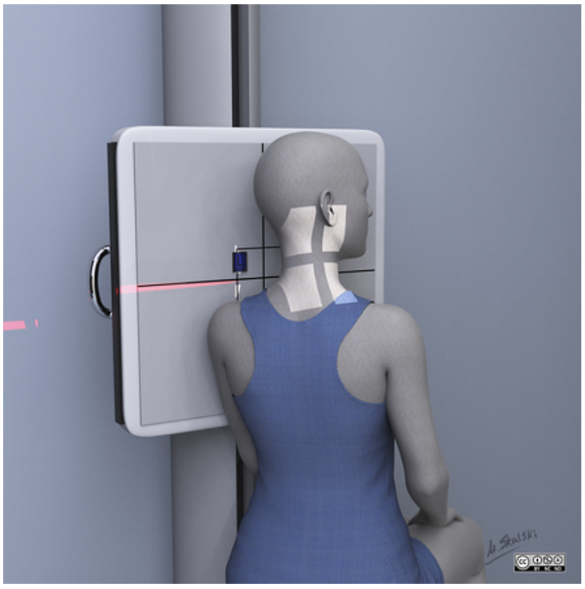


Figure 2.34.

The lumbar spine oblique view is used to visualize the articular facets and pars interarticularis of the lumbar spine. Clinicians often refer to the appearance of the lumbar vertebrae in the oblique view as the Scottie dog.

Can you see the resemblance?

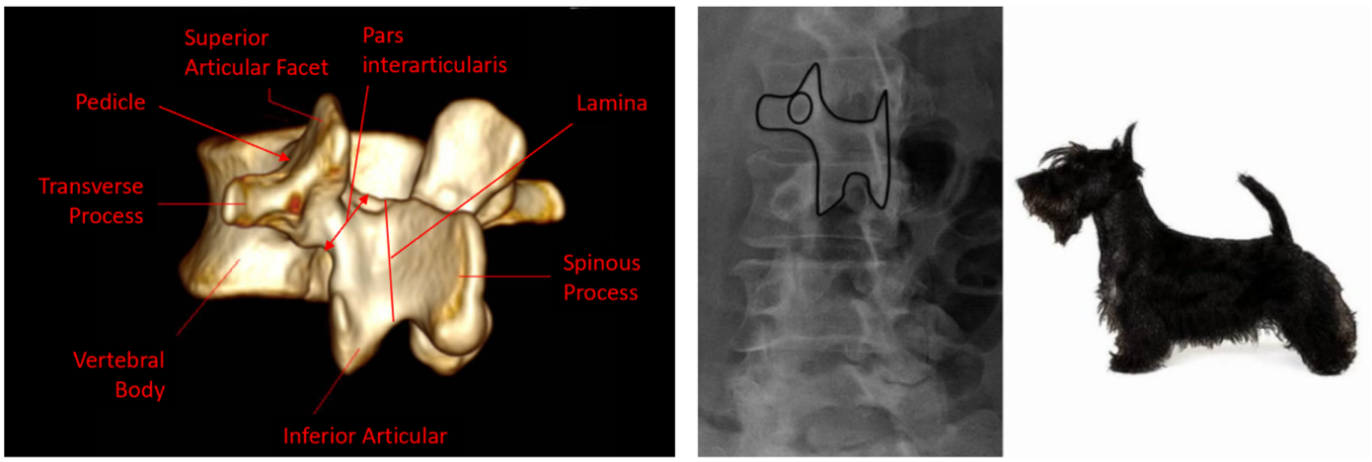


Figure 2.35.

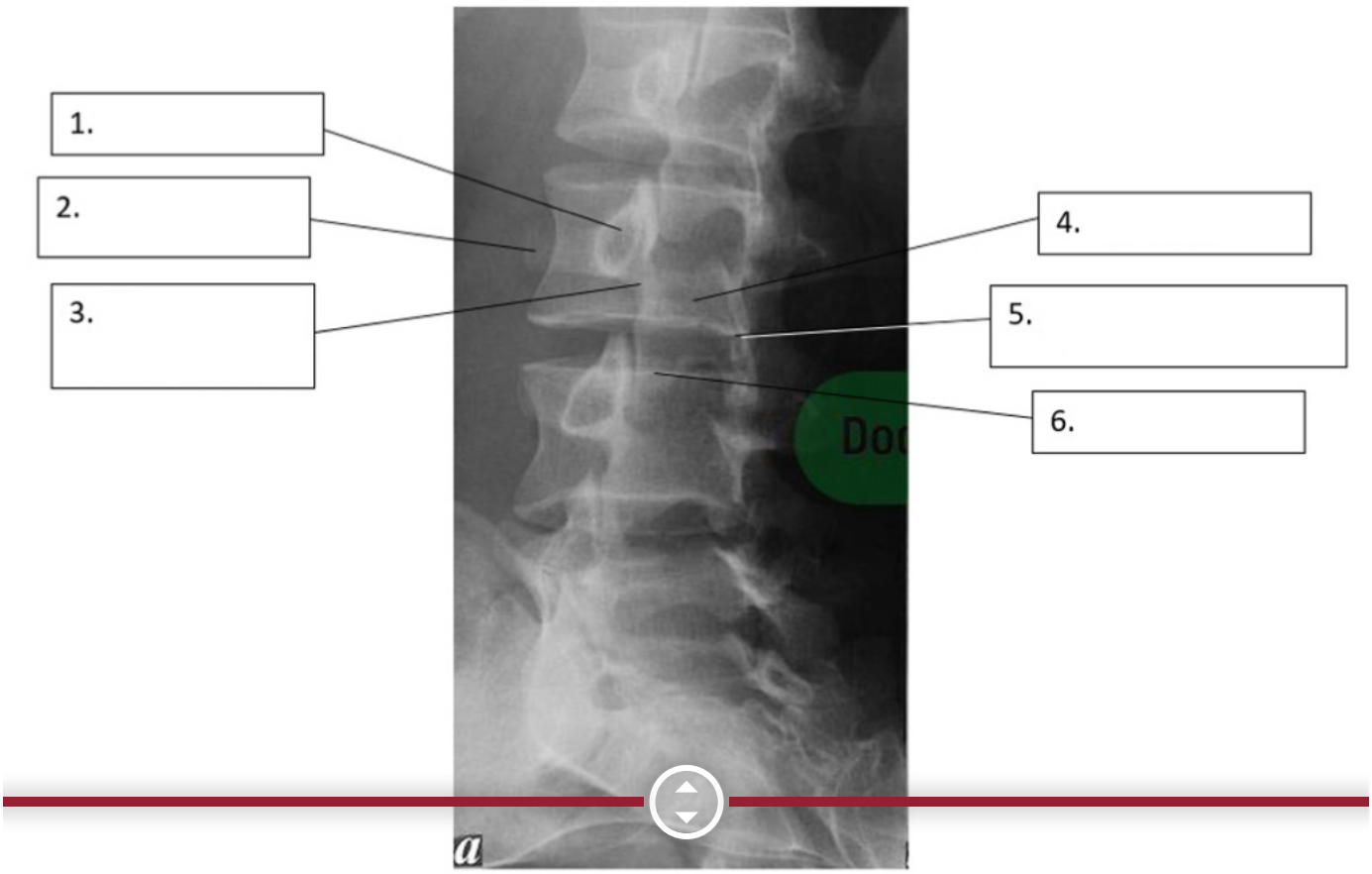


Figure 2.36.

Clinical Example

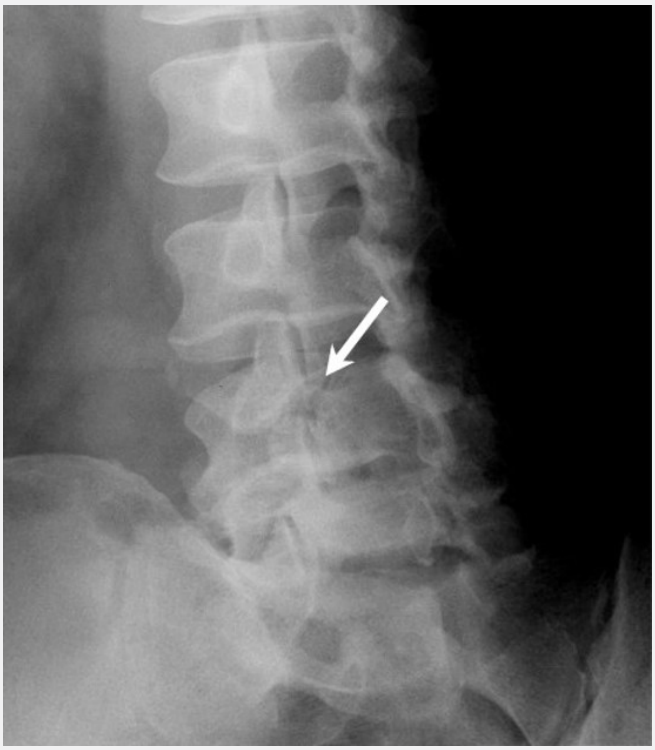


Figure 2.37.

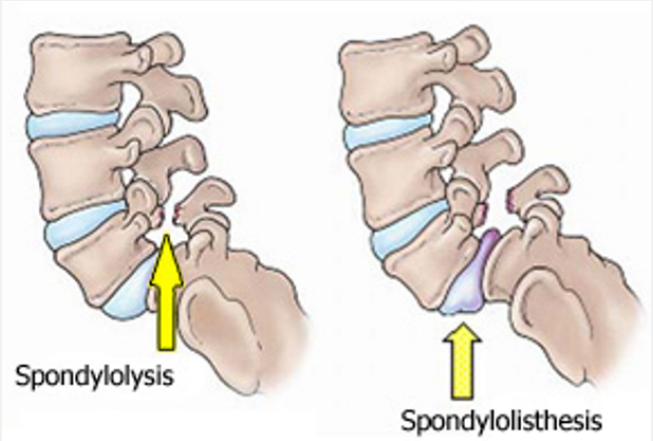


Figure 2.38.

A break appearing in the “neck” of the Scottie dog correlates to a fracture of the pars interarticularis = spondylolysis.

This type of fracture can lead to spondylolisthesis = slippage of one vertebral body relative to an adjacent one.

Sectional Imaging

Radiologic sectional images (CT, MRI) are acquired and displayed according to anatomic planes that pass through the body.

- Sagittal
- Coronal (frontal)
- Axial (transverse)

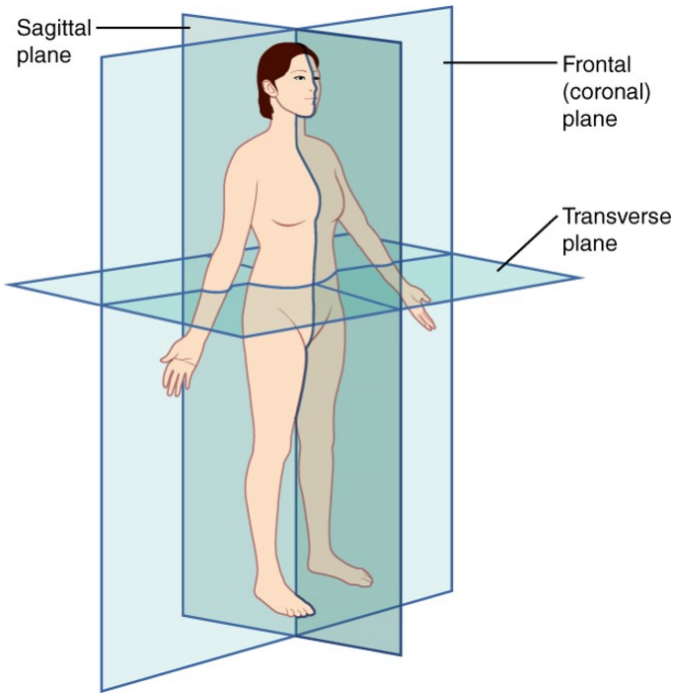


Figure 2.39.

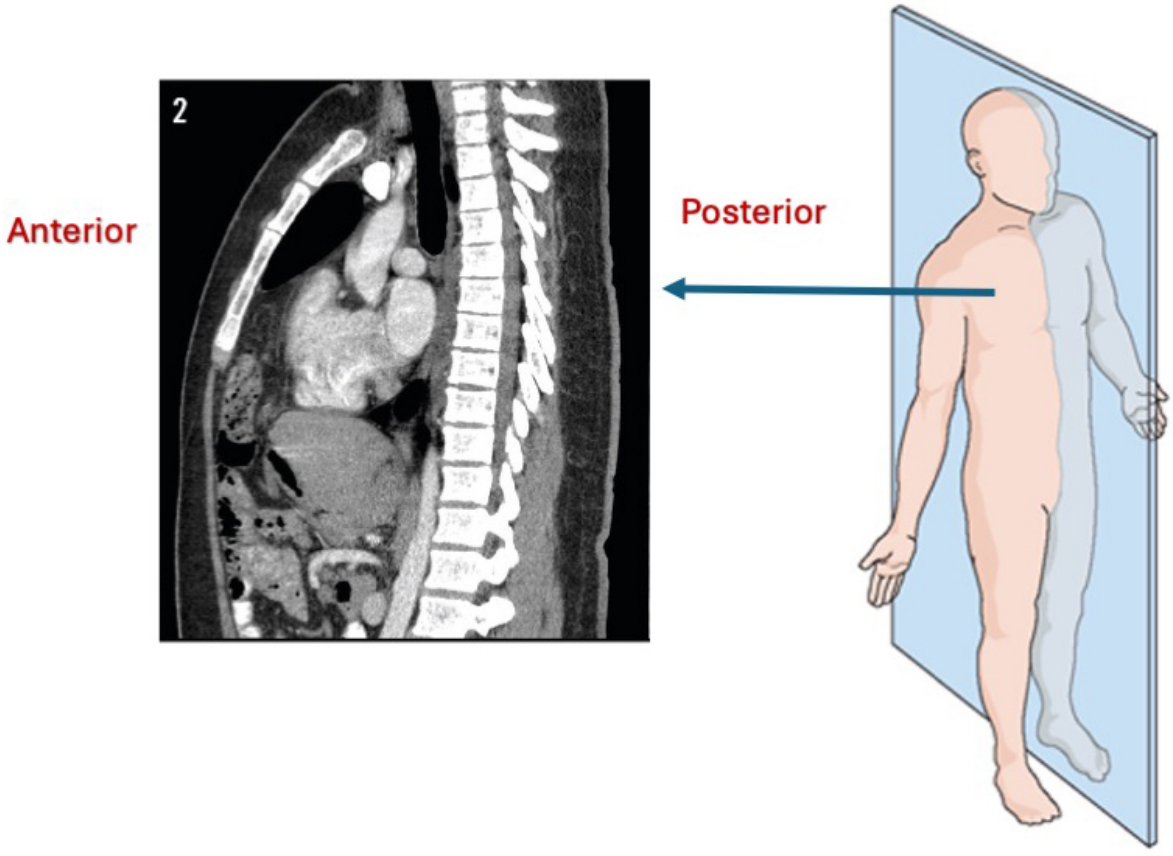


Figure 2.40. Sagittal Plane

A vertical plane that passes through the body, dividing it into left and right portions.

Sagittal images traditionally are shown as though the patient is looking to the viewer's left.

• • •

Accessing Donor CT Scans on PACS

Inland Imaging has graciously provided you with CT scans for each of the donors you will be working with in lab. You should plan to access your donor scan on a regular basis to practice identifying anatomical structures and to explore the potential pathologies present in your donor.

For this lab, open the CT scan of your donor and practice identifying structures of the vertebral column in each of the three planes. Be sure to note any abnormalities or pathologies you see – these are things you can share during your capstone presentation at the end of the year.

OPEN PACS ANYWHERE

Step 1

Enter/select the following information:

- Username: wsustudent
- Password: Spring20?
- Log on to: Nuvodia

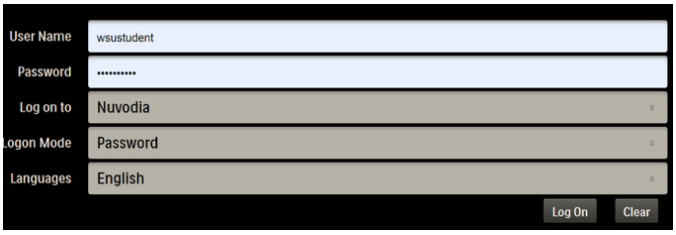


Figure 2.43.

Step 2

If you don't see your donor number on the list, search with **wsu, your cadaver number** (wsu, 00193).

Three scan regions will be available (red arrows):

- Lower extremity
- CHAP = Chest, Abdomen, Pelvis
- Head/Neck

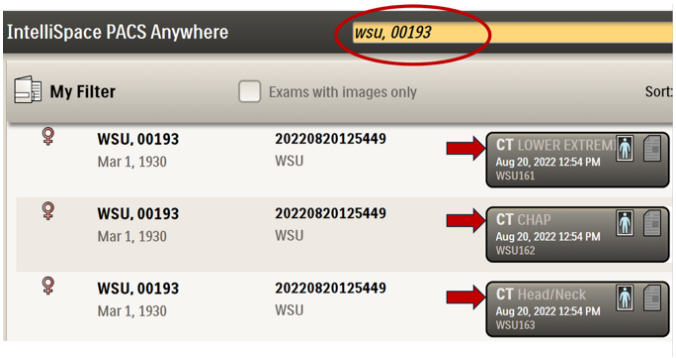


Figure 2.44.

Step 3

Select different series to view different sectional planes (axial, frontal, sagittal) or the 3D reconstructions.

Figure 2.45.

Additional Instructions

The MedTech site has a page with additional instructions and a video on how to use PACS.

GO TO PACS INTRUCTIONS

Lab 2, Station 4: Spinal Cord

COMPLETE ANATOMY

Spinal nerves

Identify the following on the spinal cord prosection or isolated spinal cord:

- **Dorsal and ventral roots**—because the cadaver is prone, only the dorsal roots will be easily visible. **Rootlets** gather together to form the roots.
- **Dorsal root ganglion**—**what does this contain?**
- **Spinal nerves—formed by the union of dorsal and ventral roots**
- **Dorsal rami of spinal nerves** (in the cadaver these are loose, because they are detached from the overlying skin and muscles on the posterior side of the body)
- **Ventral rami of spinal nerves** (In the thorax these become the **intercostal nerves** as they pass between the ribs)
- **Conus medullaris** of spinal cord
- **Filum terminale** (made of pia mater)
- **Cauda equina—which structures form the strands of the cauda equina?**

QUESTION

The inferior-most tip of the spinal cord is at which vertebral level in the adult?

- **Spinal meninges**—these are the protective coverings of the spinal cord
  - **Dura mater**
  - **Arachnoid mater**
  - **Pia mater**

The arachnoid and pia may be difficult to see in the prosection— nonetheless you should understand their locations and relationships.

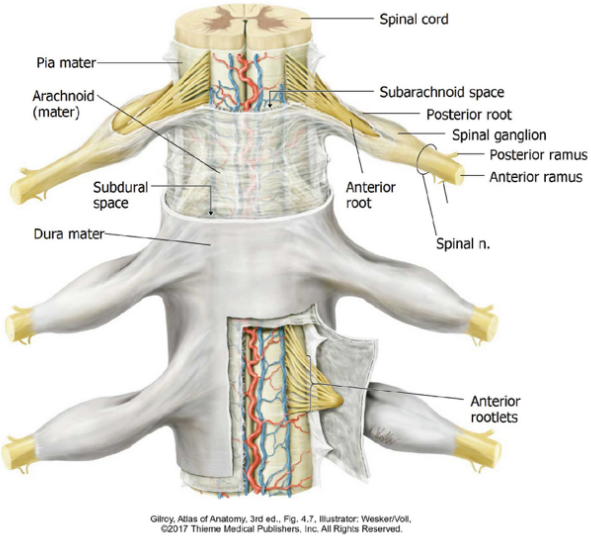


Figure 2.46.

Spaces associated with the meninges:

- **Epidural space—**located within the vertebral canal, between the bone and dura mater. Contains fat and vessels.
- **Subdural space—**a "potential space" between the dura and arachnoid. In a normal individual the space does not exist since the two layers of meninges are touching. The dura and arachnoid are adjacent—so together are called the **thecal sac**.
- **Subarachnoid space—This space cannot be appreciated in the cadaver because it is collapsed. Why? What does it contain in the living body?**

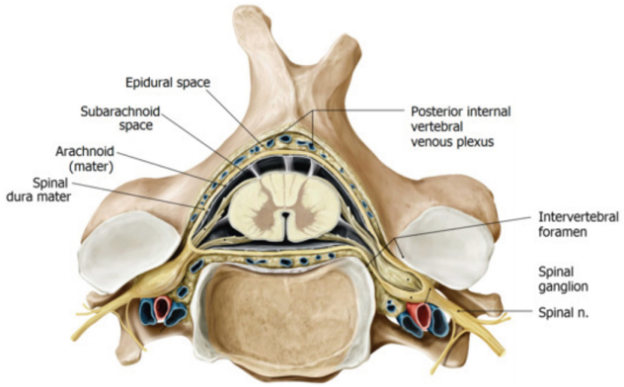


Figure 2.47. Spinal cord in situ: transverse section. From Anatomy: An Essential Textbook, 2nd ed., ©2018 Thieme Medical Publishers, Inc. All rights reserved.

DISCUSSION: SPINAL CORD AND SPINAL NERVES

Spinal cord **segments** are the physical regions of the spinal cord that give rise to the ventral and dorsal roots that form the individual spinal nerves—they are named and numbered the same as the spinal nerve they give rise to (example = L-1 spinal cord segment gives rise to the roots that form L-1 spinal nerve).

The spinal cord contains 31 segments—corresponding to the 31 pairs of spinal nerves. The sacral and coccygeal segments are compressed within the tip of the spinal cord (in the **conus medullaris**).

- In Figure 2.48, locate the **sacral** spinal cord segments (shown in **RED**). **Opposite which vertebrae are they located? (Are they located opposite sacral vertebrae?)**
- Now locate the **sacral** spinal nerves (also in **RED**). **Where do they exit the vertebral column? Do sacral spinal nerves exit the vertebral column at the same levels as where the sacral spinal cord segments are located?**
- **Which structures make up the individual strands of the cauda equina?**
- **Where is the safest place to do a lumbar puncture procedure (between which vertebrae)? Why?**
- **If a fracture of the body of L-1 vertebra forced a bone fragment directly posterior, what parts of the spinal cord would be affected?**

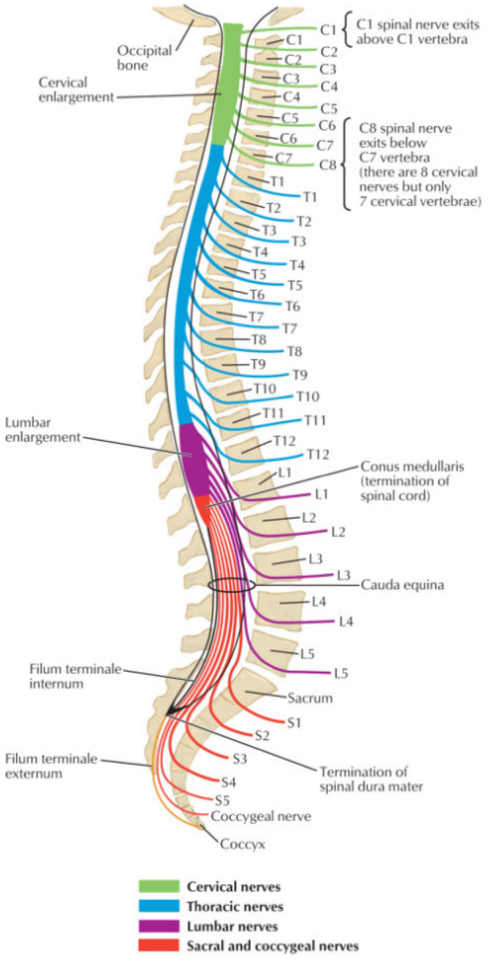


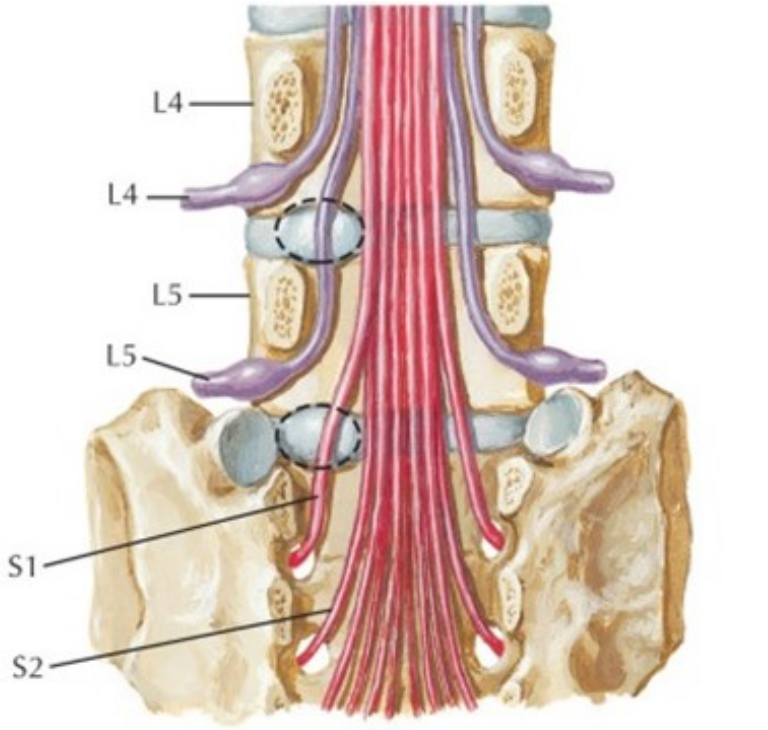
Figure 2.48. Netter, Atlas of Human Anatomy, 6th ed., Plate 161.

CLINICAL CORRELATION

In the upper regions of the spine, a postero-lateral disc herniation affects the spinal nerve passing through the intervertebral foramen at the level of the herniation, because the disc is directly in line with the center of the intervertebral foramen.

However, in the lumbar region (where disc herniations are common) the herniated disc affects the spinal nerve that exits the intervertebral foramen below the herniation (one level down), not the nerve that exits the intervertebral foramen at the level of the disc herniation. This is because IV discs in the lumbar region are located opposite the lower half of the intervertebral foramen, and not the center. Thus, spinal nerves in this region pass through the IV foramina above the disc.

Summary example: A herniated disc between L-4 and L-5 affects the L-5 spinal nerve, and not L-4 (see Figure 2.49).

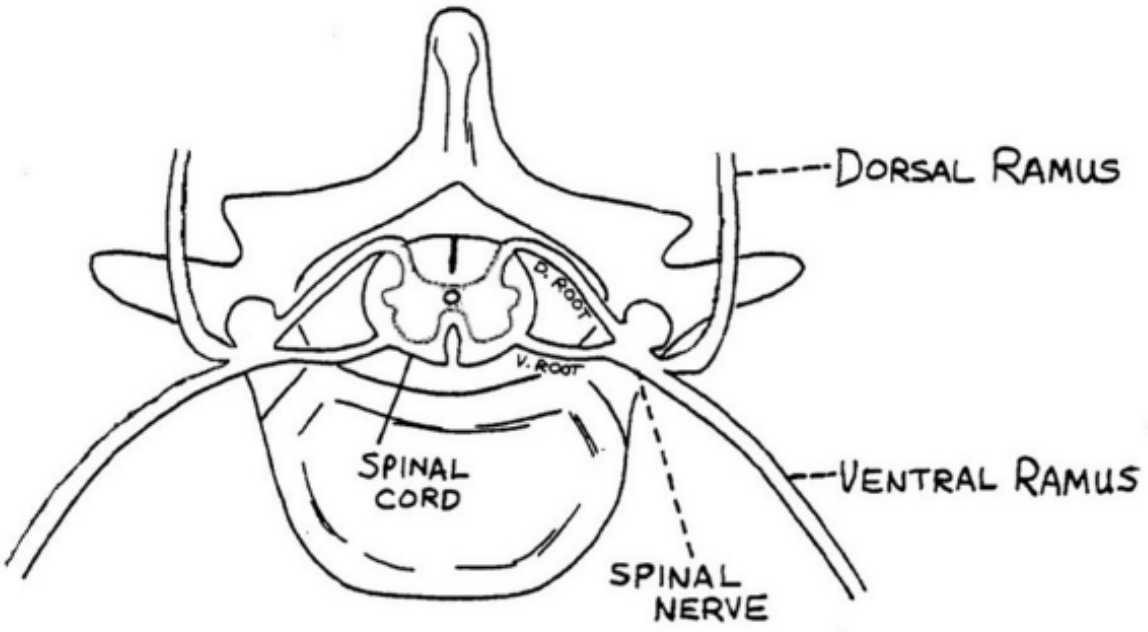


Lumbar disc protrusion (*dashed ovals*) does not usually affect nerve exiting above disc. Lateral protrusion at disc level L4–5 affects L5 spinal nerve, not L4 spinal nerve. Protrusion at disc level L5–S1 affects S1 spinal nerve, not L5 spinal nerve.

Figure 2.49. Netter, Atlas of Human Anatomy, 7th ed., plate 170.

Lab 2, Station 5: Spinal Nerves

Figure 2.49. Draw a cross section of the spinal cord and spinal nerves.



On the whiteboard, draw a cross section of the spinal cord and spinal nerves.

You can omit the vertebra in your drawing if you like. Label the following in your drawing:

- Dorsal and ventral horns of gray
- Dorsal and ventral roots
- Dorsal root ganglion
- Spinal nerve
- Dorsal and ventral rami

QUESTIONS

- Which part carries ONLY sensory nerve fibers?
- Which part carries ONLY motor nerve fibers?
- Which parts are mixed (carry BOTH motor and sensory fibers)?
- What does the dorsal root ganglion contain?

Now, sketch motor and sensory pathways in your spinal nerve drawing.

1. On the LEFT SIDE of your drawing, sketch the following two pathways:

- Trace a motor neuron from the spinal cord (ventral horn of gray) to innervate a muscle on the anterior side of the body (e.g., intercostal muscle).
  - This is a single neuron efferent pathway involving a multipolar neuron. **Where is the cell body of the neuron located? Which root does the motor axon traverse—ventral or dorsal? Which ramus of the spinal nerve does the motor axon traverse—ventral or dorsal?**
- Trace a sensory neuron that transmits a stimulus—from the anterior side of the body—to the spinal cord.
  - This is a single neuron afferent pathway involving a pseudo-unipolar (sensory) neuron. **Where is the cell body of the neuron located? Which ramus of the spinal nerve does the peripheral process of the neuron traverse—ventral or dorsal? Which root does the central process of the neuron traverse to enter the spinal cord—ventral or dorsal? The sensory neuron synapses on an interneuron within the spinal cord. Where does this occur?**

2. On the RIGHT SIDE of your drawing, sketch the following two pathways:

- Trace a motor neuron from the spinal cord (ventral horn of gray) to innervate a muscle on the posterior side of the body (e.g., erector spinae muscle).
  - This is a single neuron efferent pathway involving a multipolar neuron. **Where is the cell body of the neuron located? Which root does the motor axon traverse—ventral or dorsal? Which ramus of the spinal nerve does the motor axon traverse—ventral or dorsal?**
- Trace a sensory neuron that transmits a stimulus—from the posterior side of the body—to the spinal cord.
  - This is a single neuron afferent pathway involving a pseudo-unipolar (sensory) neuron. **Where is the cell body of the neuron located? Which ramus of the spinal nerve does the peripheral process of the neuron traverse—ventral or dorsal? Which root does the central process of the neuron traverse to enter the spinal cord—ventral or dorsal? The sensory neuron synapses on an interneuron after it has entered the spinal cord. Where does this occur?**

Lab 2, Station 6:
Muscles of the Back and Posterior Shoulder

Deep muscles of the back

COMPLETE ANATOMY

Deep muscles of the back

The prosection is in the prone position:

Let's begin with muscles that extend **the spine and head**. These are worth knowing about since back pain and muscle spasm are so common.

Splenius Muscles

Splenius translates to "bandage"—indeed these muscles look like bandages applied to the posterior head and neck.

- Identify the **splenius capitis** and **splenius cervicis** muscles.
  - The splenius muscles arise together from the **nuchal ligament** and C-7 to T-6 vertebral spinous processes.
  - The **splenius capitis** inserts on the skull.
  - The **splenius cervicis** inserts on cervical transverse processes.
  - The splenius muscles extend the head and neck.

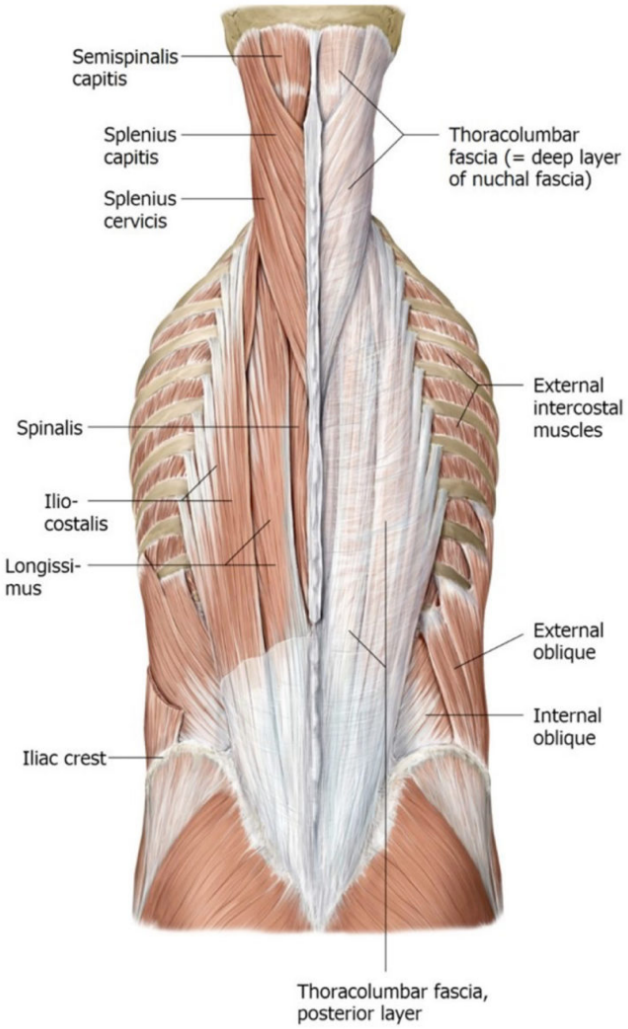


Figure 2.50.

Erector Spinae Muscles

This is a thick longitudinal column of muscles that fills the concavity of the vertebral column between the spinous processes and transverse processes. The erector spinae span the entire back—from skull to sacrum. ***The erector spinae have three parts:***

- **Spinalis.** The smallest and most medial column of the erector spinae—*runs from "spine to spine."* It arises below from spinous processes in the lumbar and thoracic region and inserts above into spinous processes of upper thoracic vertebrae.

- **Longissimus.** Intermediate column. It arises from the iliac crest and posterior sacrum. It inserts above into the posterior ribs, transverse processes of cervical vertebrae, and to the skull. *The longissimus is the "longest" column of the erector spinae, thus its name.*
- **Iliocostalis.** Lateral column of the erector spinae. *As its name implies—it spans from hip bones to ribs*. It arises with the longissimus from the iliac crest and posterior sacrum. It inserts above on the angles of all the ribs and to the transverse processes of the cervical vertebrae.

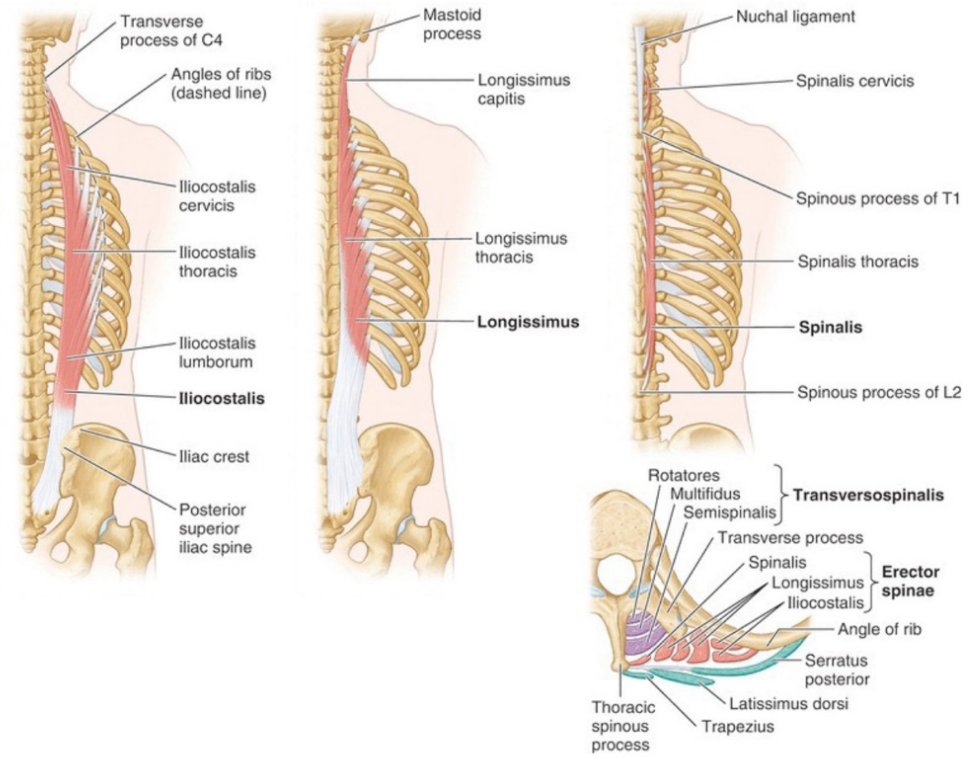


Figure 2.51. Moore, Clinically Oriented Anatomy, 8th ed.

Functions of the erector spinae:

- Returns the head and spine to the erect position after it has been flexed.
- **Supports the spine and keeps it from drifting forward**. Consider this: most the weight in our body is anterior to the spine, especially if a person is carrying extra weight in their midsection. The erector spinae has continuous tone, to prevent forward drift.
- **The erector spinae controls flexion of the head and spine**. The erector spinae contracts during BOTH flexion and extension of the head and spine. As the head and spine move forward during flexion, the erector spinae contracts to allow for smooth flexion to occur, and not a forward "lurch" of the head and spine which would happen due to gravity pulling forward, since most of the weight of the head and trunk is anterior to the spine. Kind of like "paying out rope" to a climber that is rappelling down a mountainside.

- **Innervation of splenius muscles and erector spinae—**Since these muscles are dorsal to the vertebral column, they are innervated segmentally by **dorsal rami of spinal nerves**.

These deep muscles of the back are the only muscles that we will encounter in our anatomy course that are innervated by dorsal rami of spinal nerves.

Superficial Muscles of the Back and Posterior Shoulder Muscles

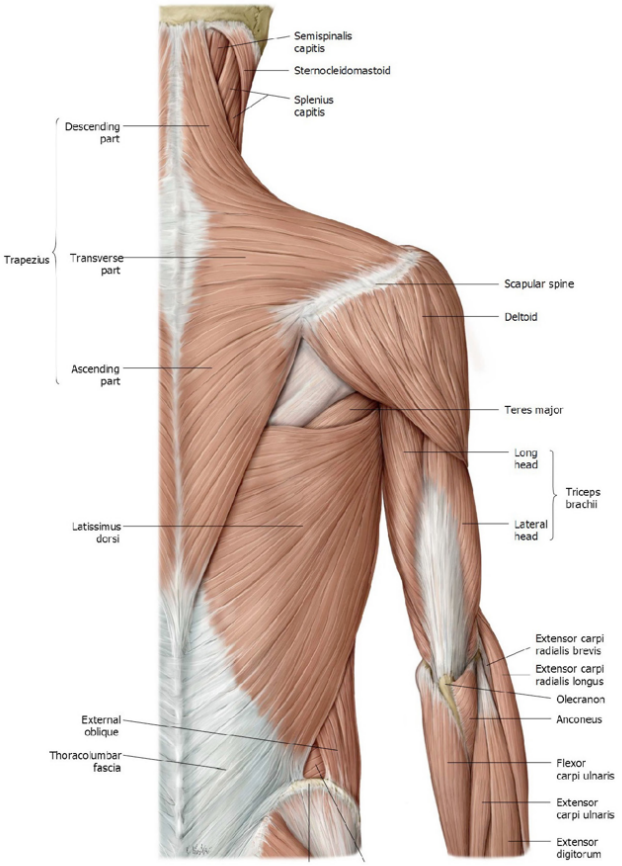
COMPLETE ANATOMY

Superficial muscles of the back & shoulder

These muscles move the scapula and upper limb.

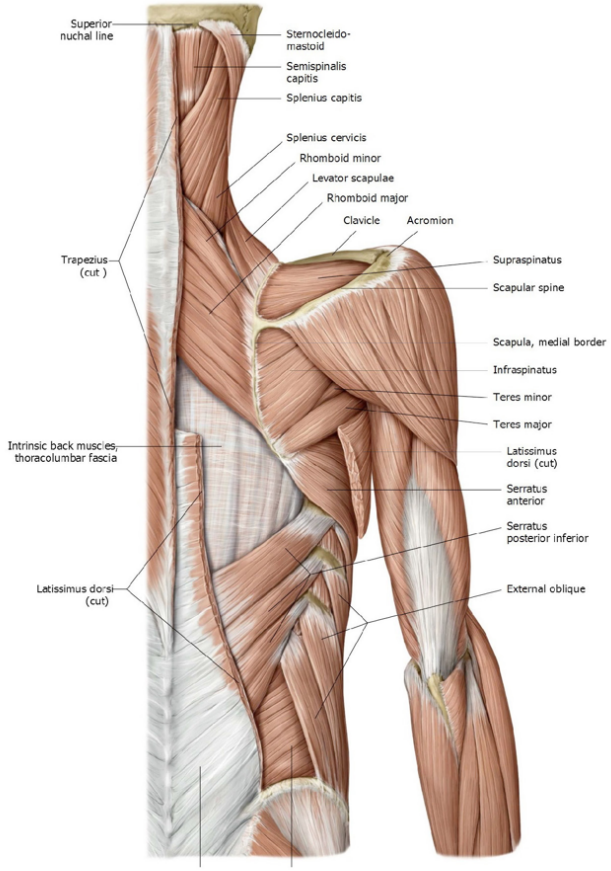
On the ***superficial side*** of the dissection, identify the following muscles:

- **Trapezius**
  - Trace out its **upper portion (descending fibers)**, **middle portion (transverse fibers)**, and **inferior portion (ascending fibers)**. What are the functions of these parts of the muscle?
- **Latissimus dorsi**
- **Posterior part of the deltoid muscle**
- **Triceps brachii—**this muscle is in the posterior arm—we will see it again
  - The **long head** and **lateral head of the triceps** should be visible.



Gilroy, Atlas of Anatomy, 3rd ed., Fig. 25.20 A, Illustrator: Wesker/Voll,

Figure 2.52. Superficial dissection.



Gilroy, Atlas of Anatomy, 3rd ed., Fig. 25.20 B, Illustrator: Wesker/Voll,

Figure 2.53. Deep dissection.

On the ***deep side*** of the dissection, identify the following muscles:

- **Rhomboid muscles** (major and minor)
- **Levator scapulae**
- **Supraspinatus**
- **Infraspinatus**
- **Teres minor**
- **Teres major**

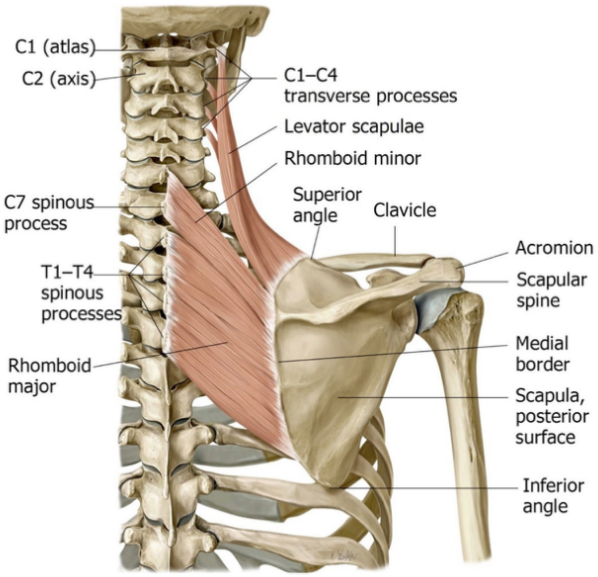


Figure 2.54.

QUESTION

Muscles of the back have at least one attachment to the vertebral column. The deep back muscles (splenius & erector spinae muscles) were covered at the start. There are **5 superficial muscles of the back** covered in this section - can you name them?

We will encounter the muscles of this section again as we move into studying the shoulder. As we do, continue to work on learning the attachments, actions, and innervations of these muscles.