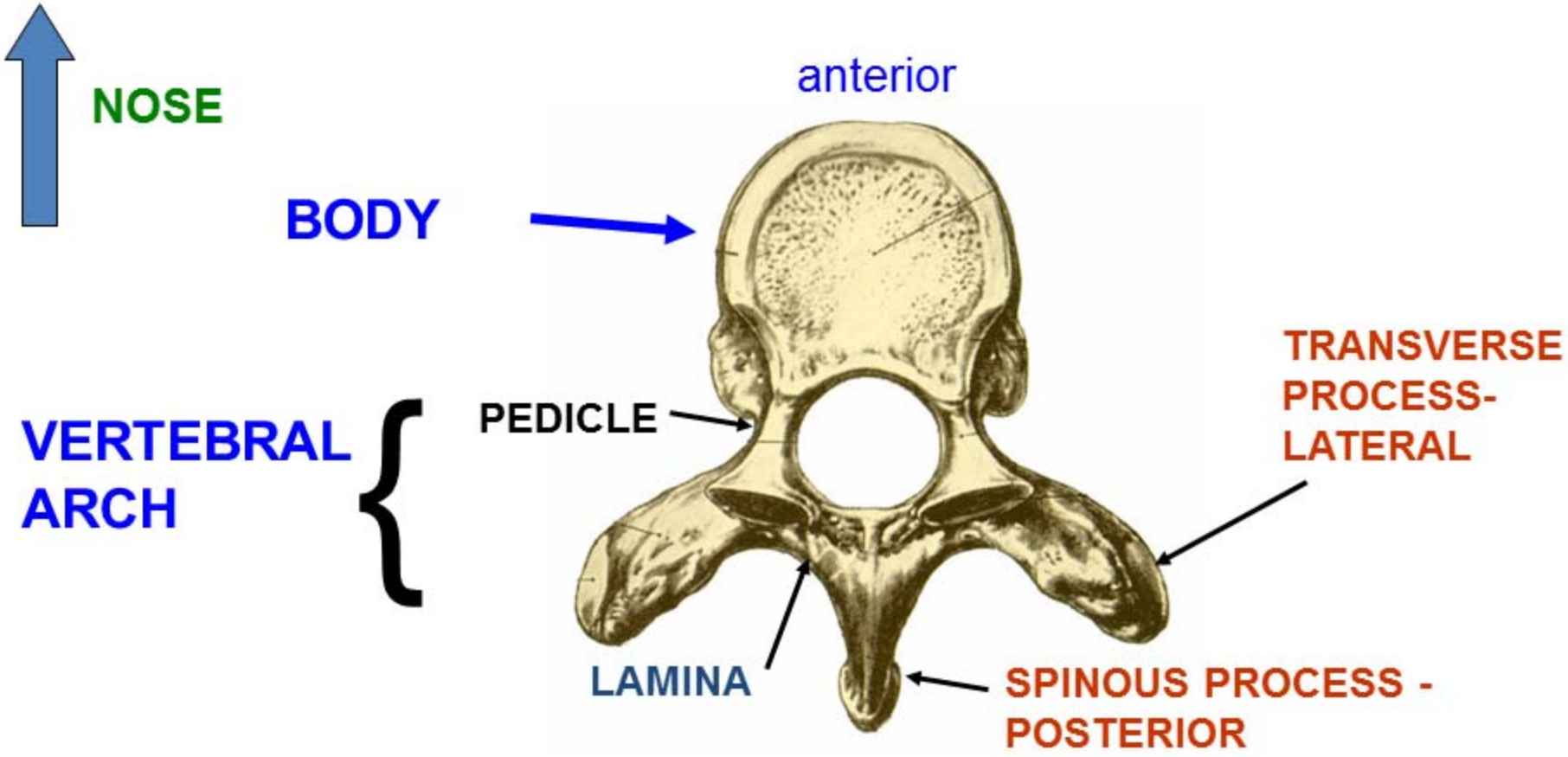
REVIEW OF VERTEBRAE AND PROSECTIONS

(Spinal cord, Autonomics, Scoliosis)

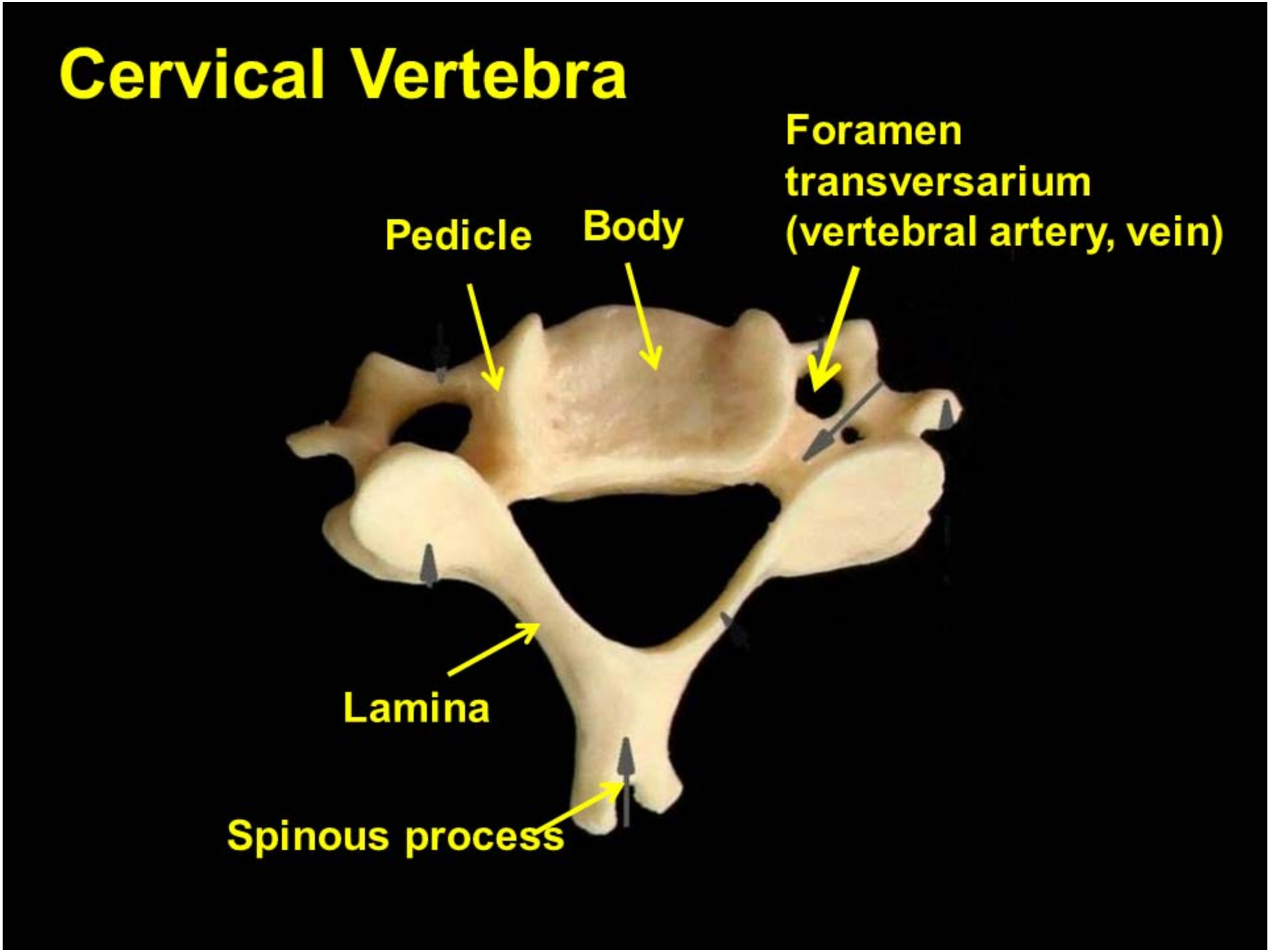
Ortho/Neuro Block 1

2021

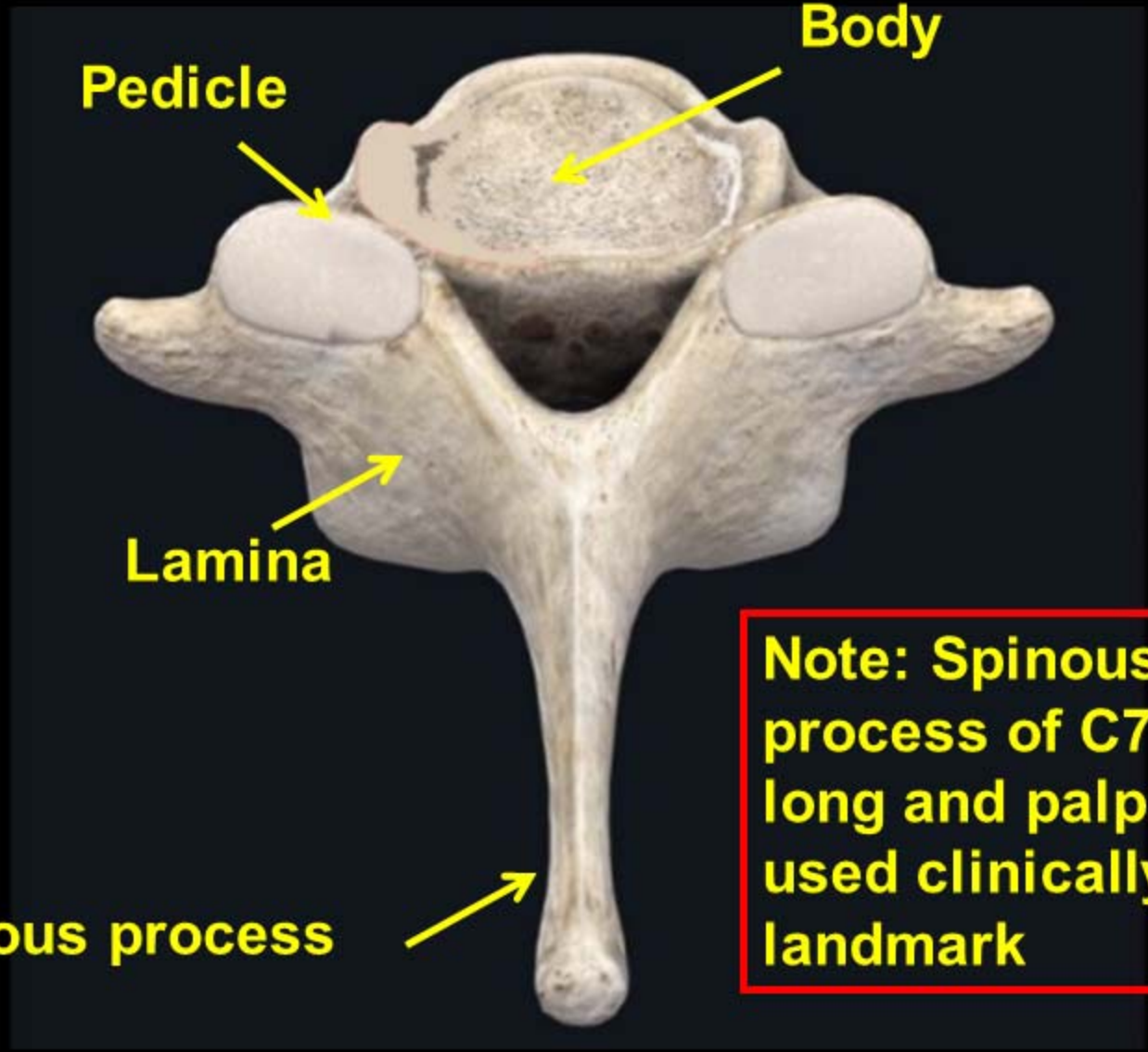
ANATOMY OF TYPICAL VERTEBRA



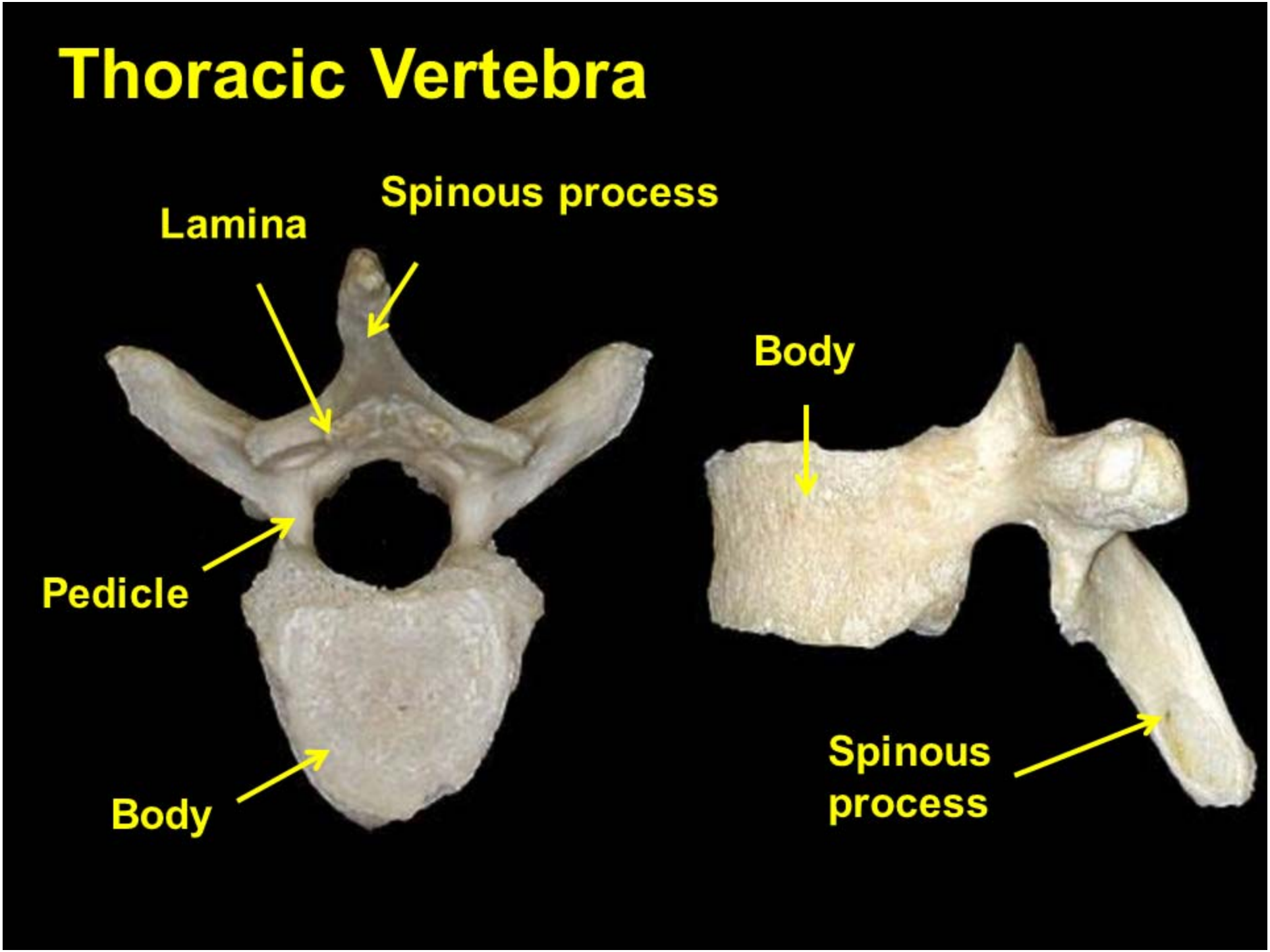
Cervical Vertebra



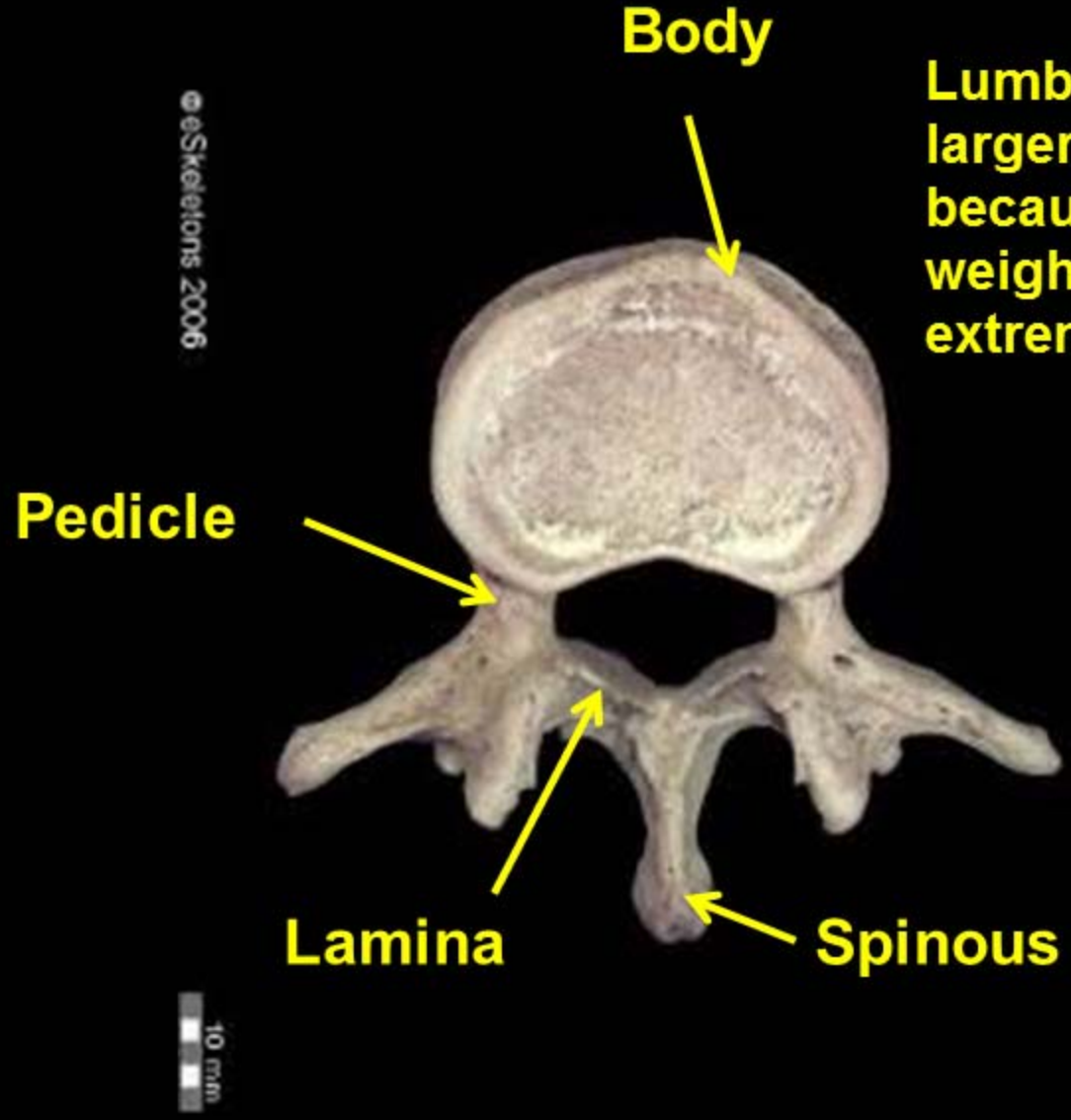
C7 (Vertebra prominens)



Note: Spinous process of C7 is long and palpable; used clinically as landmark

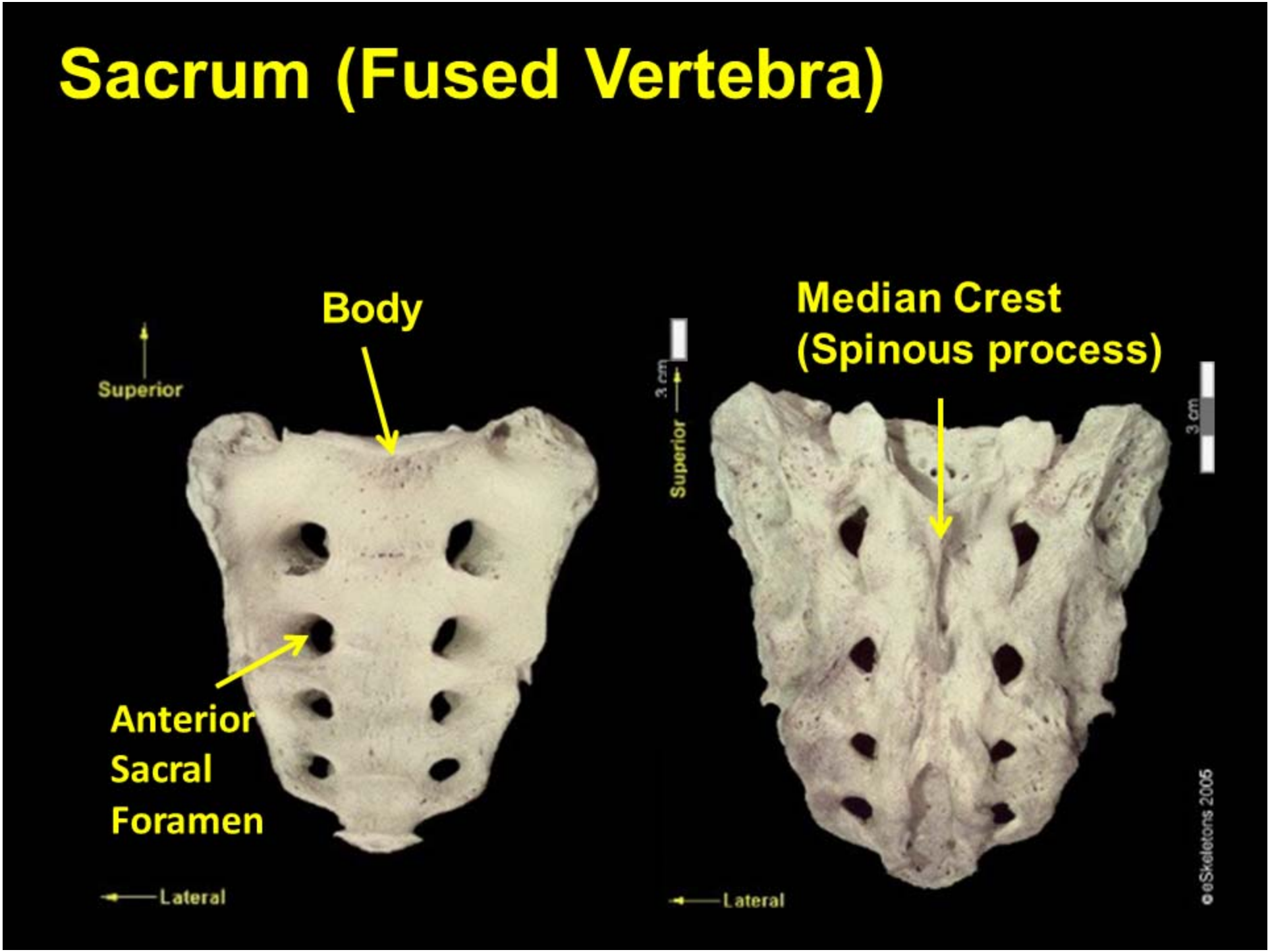

Thoracic Vertebra
Lamina
Spinous process
Pedicle
Body
Body
Spinous process

Lumbar Vertebra



Lumbar vertebra are larger, stouter, etc. because they support all weight of head, upper extremities and trunk

Sacrum (Fused Vertebra)



VIRTUAL TOUR / REVIEW OF STRUCTURES ON PROSECTIONS OF SPINAL CORD, AUTONOMIC NERVOUS SYSTEM AND SCOLIOSIS

STRUCTURES TO I DENTIFY ON PROSECTIONS OF SPINAL CORD, SYMPATHETIC CHAIN (AUTONOMICS), SCOLIOSIS

The structures to identify are the labeled structures on the pictures of the prosections.

Prosection 44 Spinal Cord

Spinal Cord
Conus Medullaris
Dura Mater
Cauda Equina
Filum Terminale
Dorsal root of Spinal Nerve
Denticulate Ligament

Prosection 80 Sympathetic Chain in Thorax

Sympathetic chain
Aorta
Communicating Ramus
Intercostal nerves (ventral rami of spinal nerves)

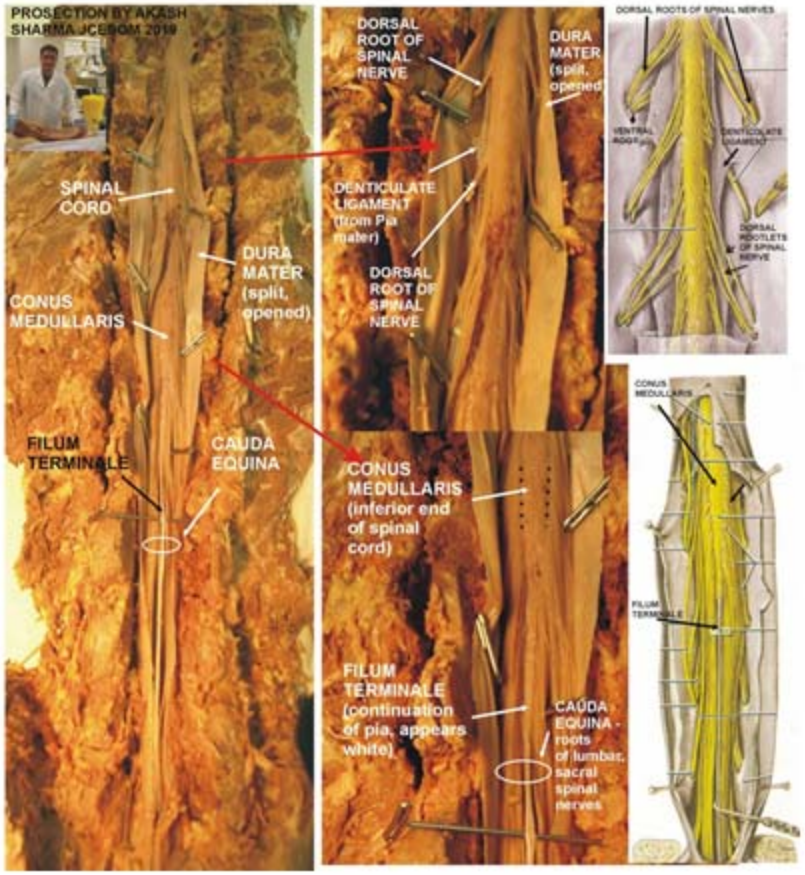
Prosection 138 Scoliosis

Spines of Lumbar Vertebrae
Supraspinous ligament

SPINAL CORD

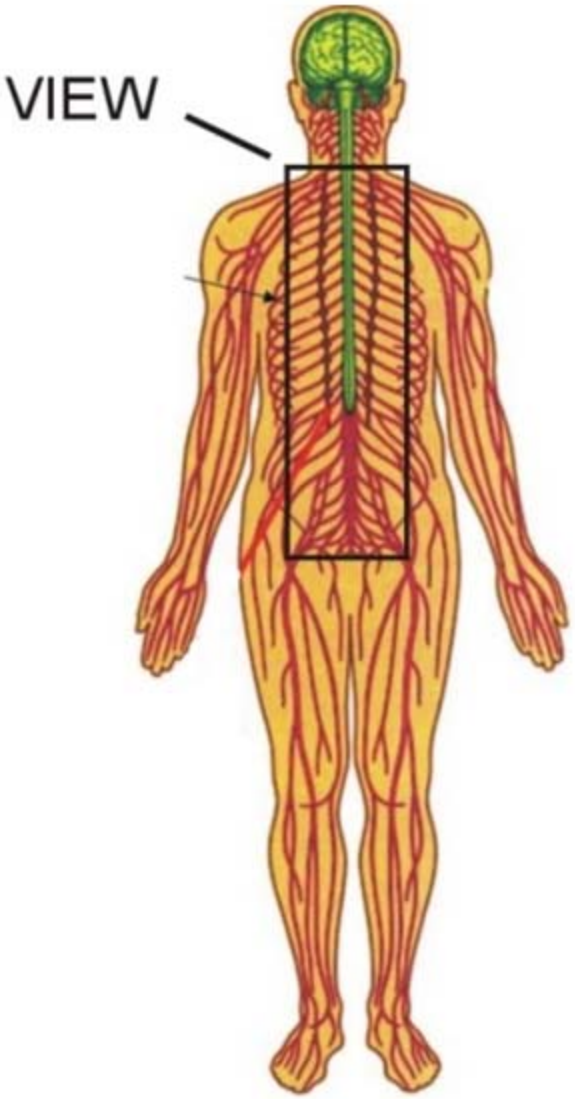
SPINAL CORD

44



PROSECTION BY AKASH SHARMA JCESOM 2019

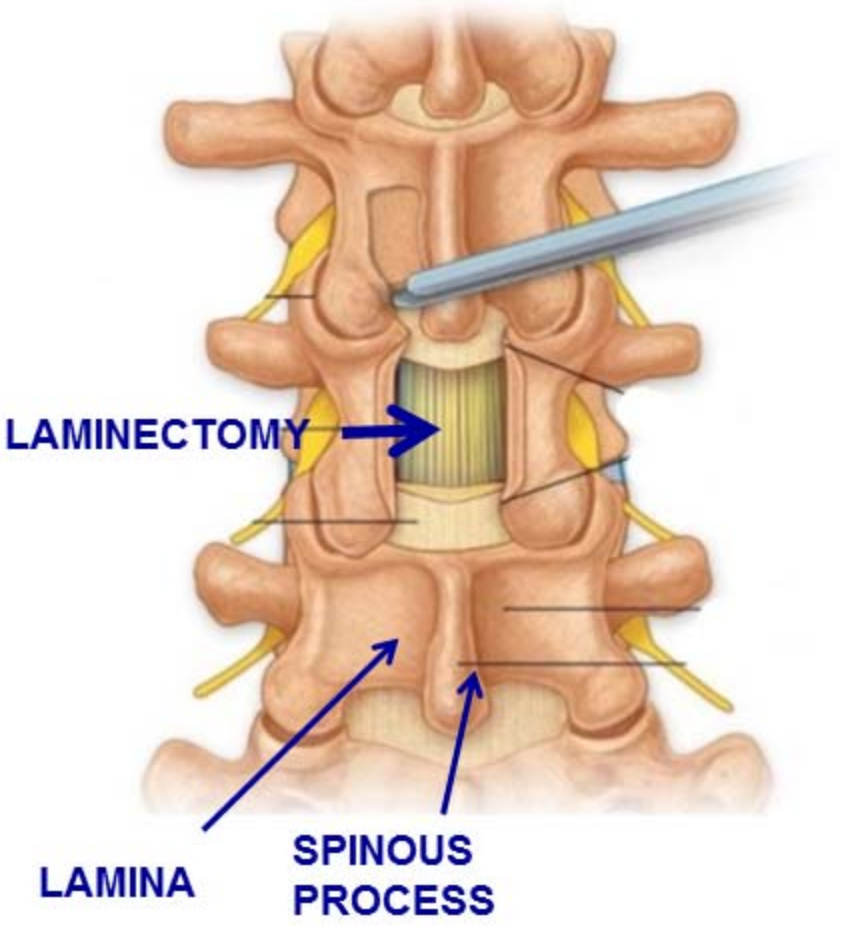
YOU, TOO, CAN BE FAMOUS IF YOU DO A PROSECTION; SEE DR. ZILL

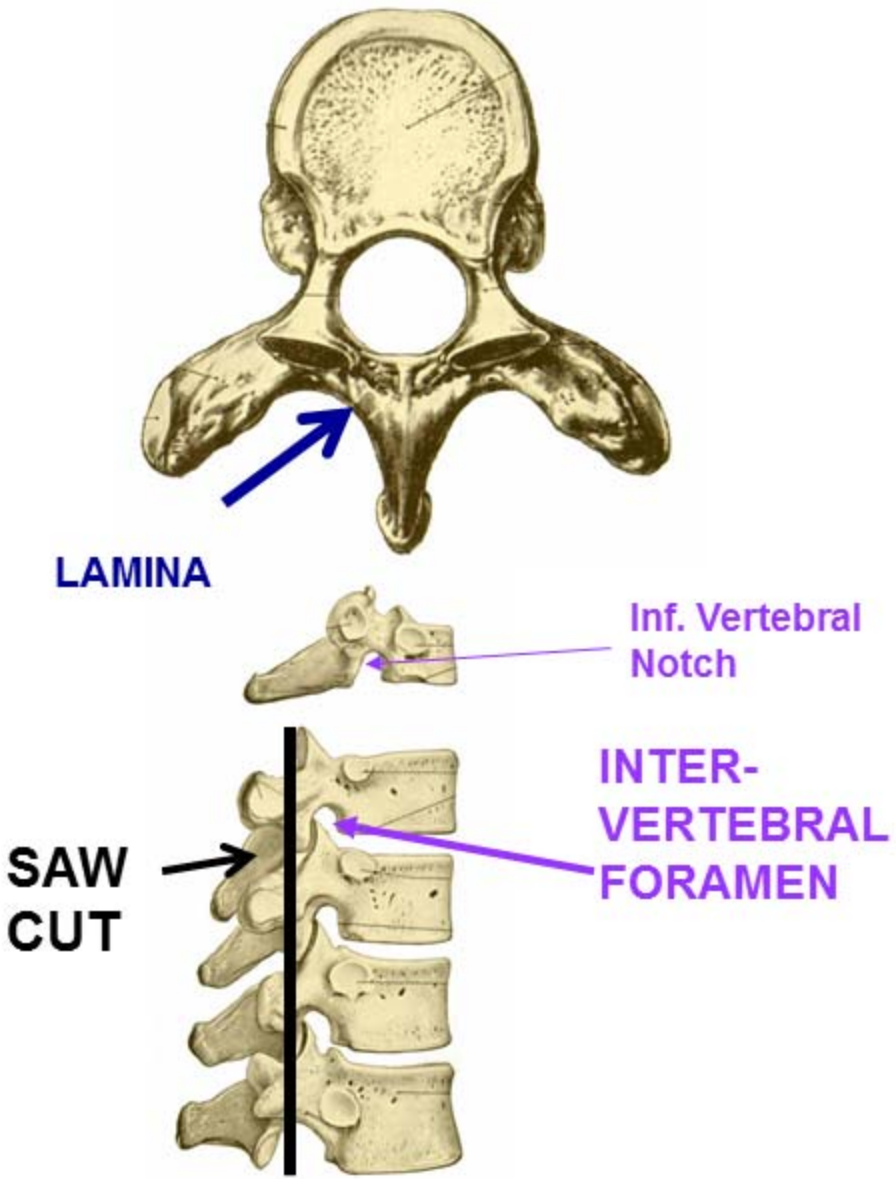


APPROACH/METHOD USED IN SPECIMEN ISOLATION

The vertebral column, containing the spinal cord, is isolated and removed.

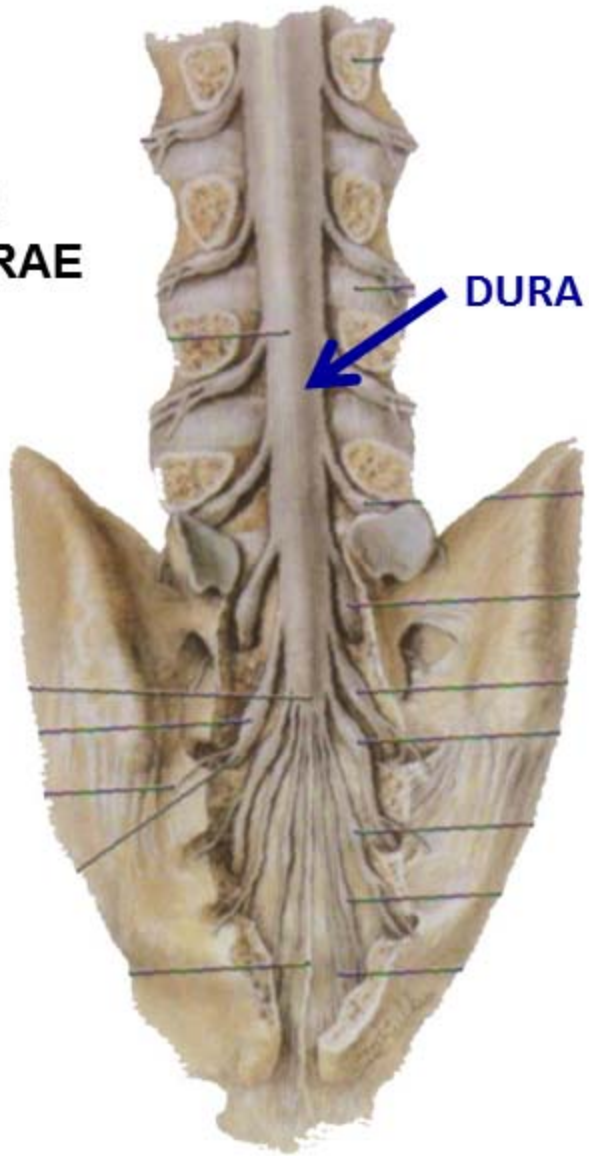
NOTE: PROSECTION PROCEDURE: SIMILAR TO LAMINECTOMY BUT EXTENDED FURTHER





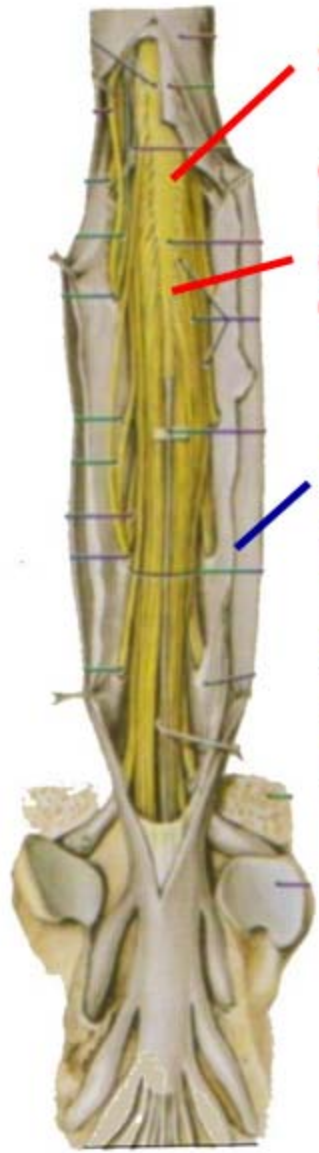
DURA MATER IN VERTEBRAL CANAL –
CANAL OPENED AFTER REMOVE SPINES, LAMINAE

LUMBAR VERTEBRAE



LOOK AT TOP (SUPERIOR) PART TO SEE INTACT DURA

DURA MATER CUT OPEN TO EXPOSE SPINAL CORD IN DURAL SAC



STRUCTURES TO ID

Prosection 44 Spinal Cord

Spinal Cord
Conus Medullaris
Dura Mater
Cauda Equina
Filum Terminale
Dorsal root of Spinal Nerve
Denticulate Ligament

SPINAL CORD 44

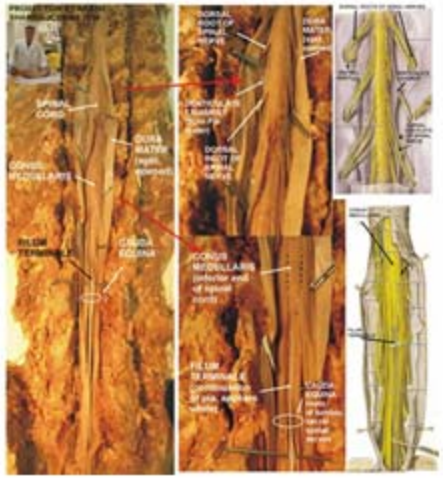


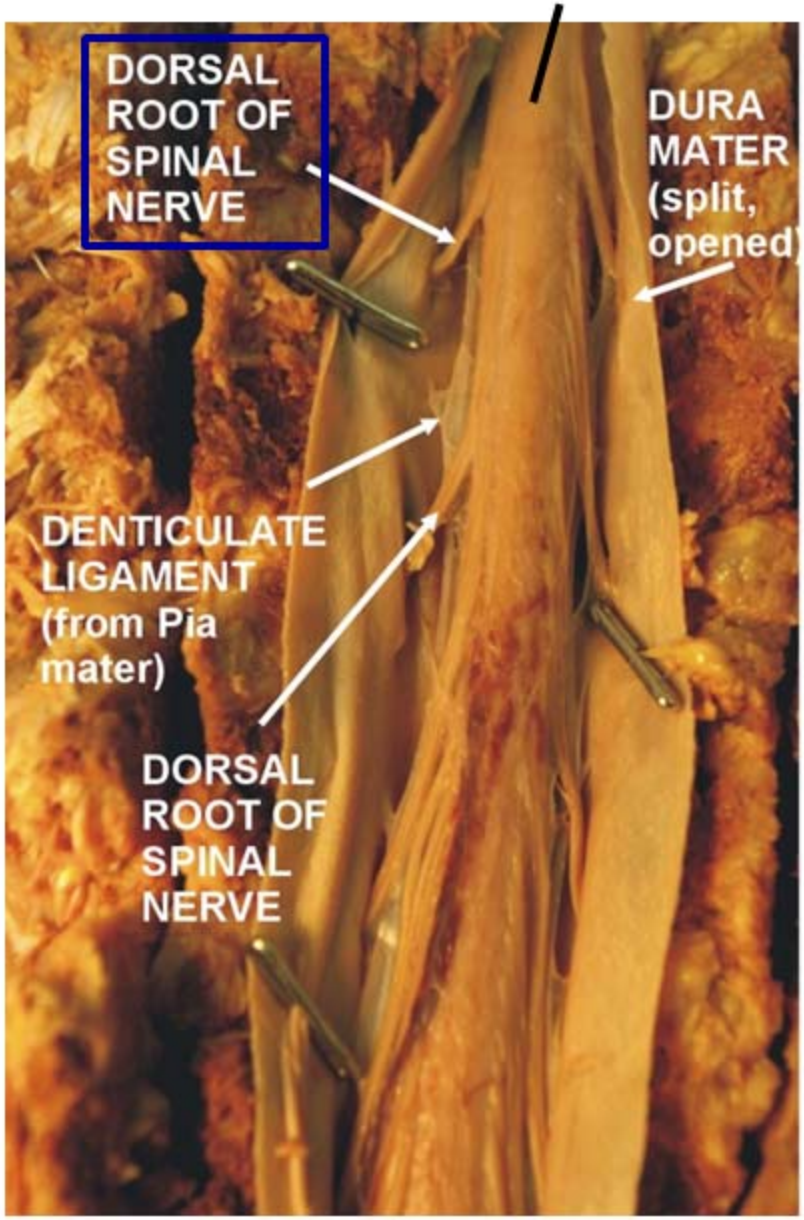
Diagram (ventral view)

SENSORY (AFFERENT) ONLY
DORSAL ROOT

VENTRAL ROOT

MOTOR (EFFERENT) ONLY

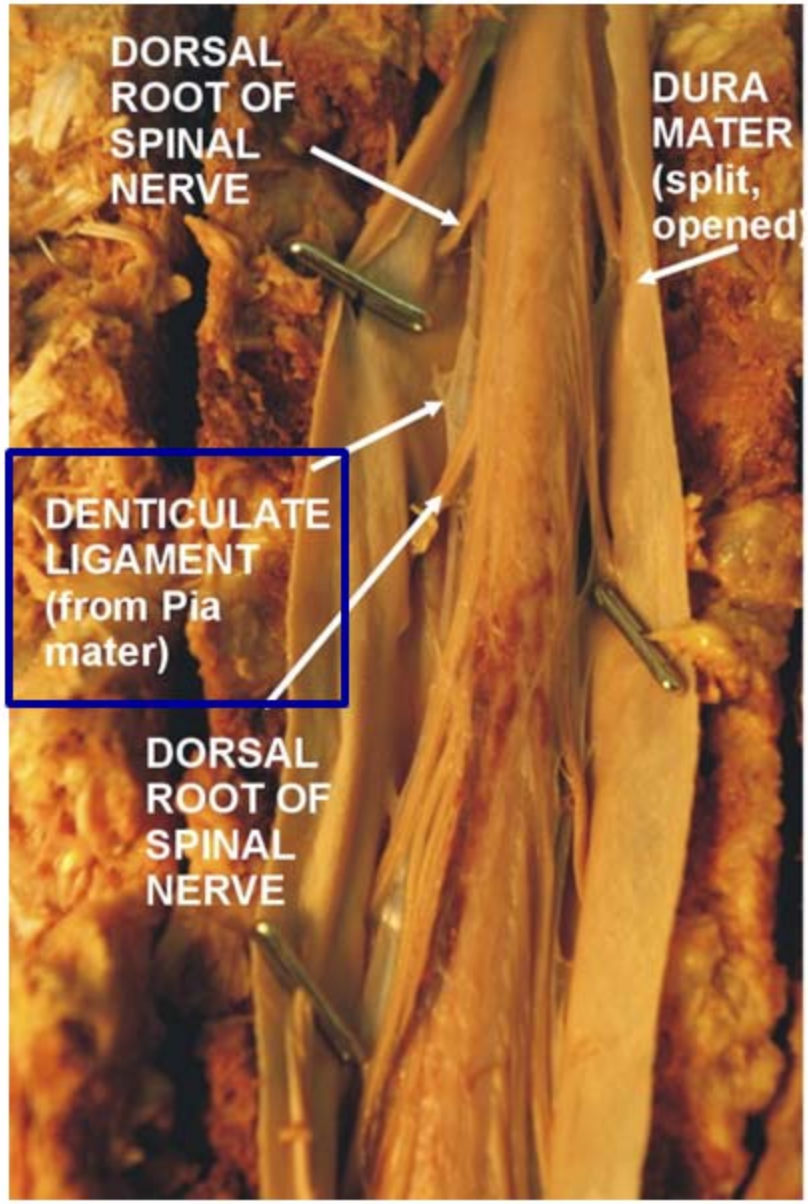
SPINAL CORD

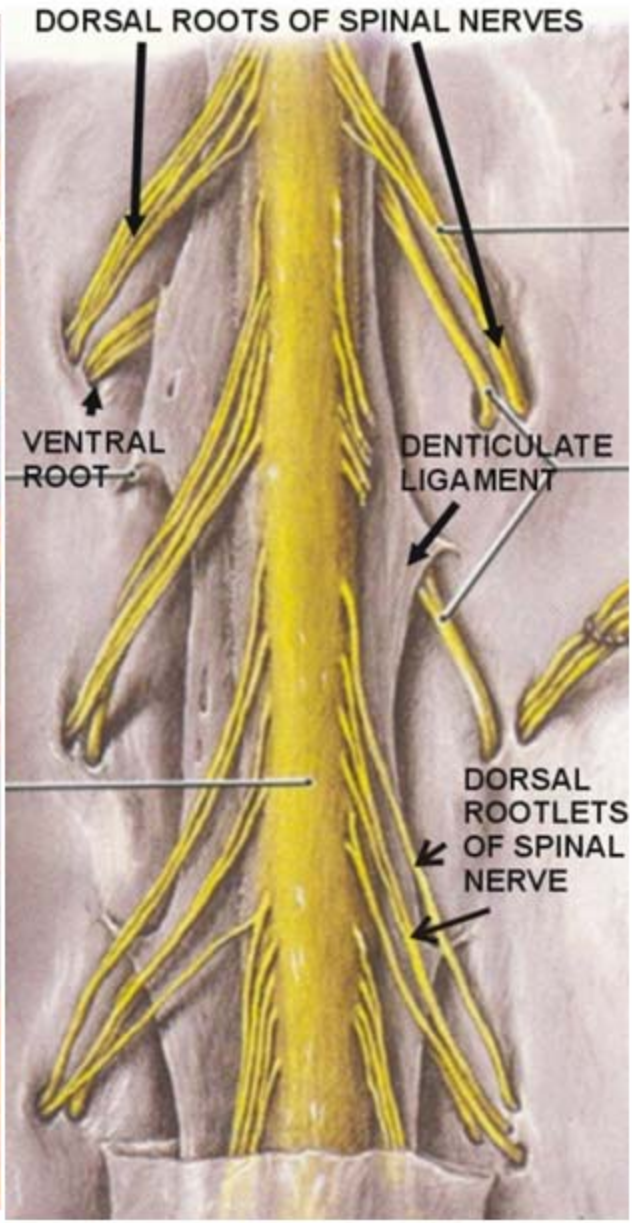


Dura opened and spread apart from dorsal side

See spinal cord and dorsal rootlets uniting to form Dorsal root inside dura

Remember: Get orientation on anatomical pictures (look before you leap); PROSECTION IS DISSECTED FROM DORSAL SIDE



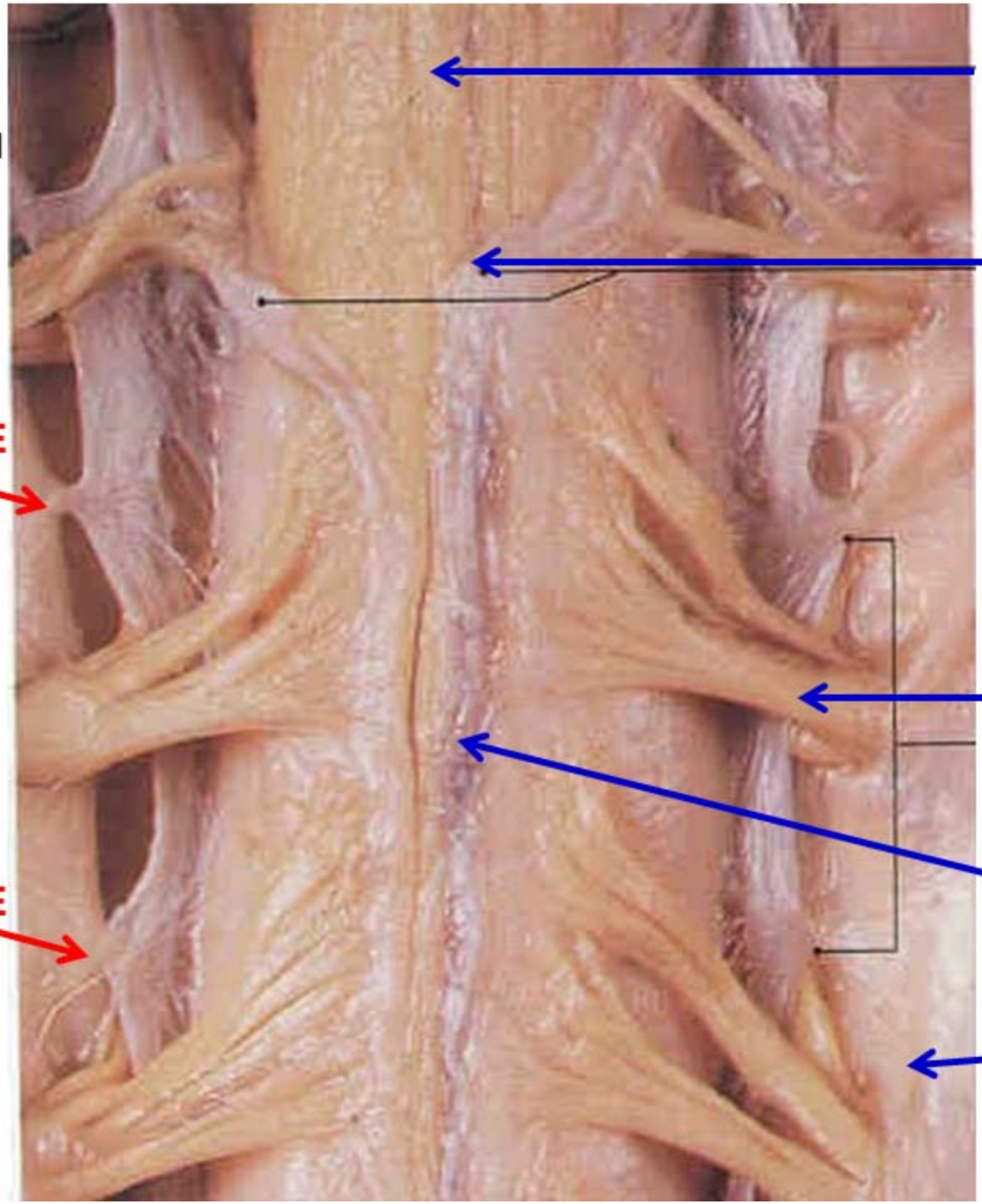


- Pia mater is closely adherent to spinal cord;

- Pia has extensions to inner side of Dura called Denticulate ligaments

- Denticulate ligaments are attached between the dorsal and ventral roots and used as surgical landmarks for severing dorsal roots (intractable pain)

PICTURE FROM OVERVIEW LECTURE



SPINAL CORD

PIA MATER

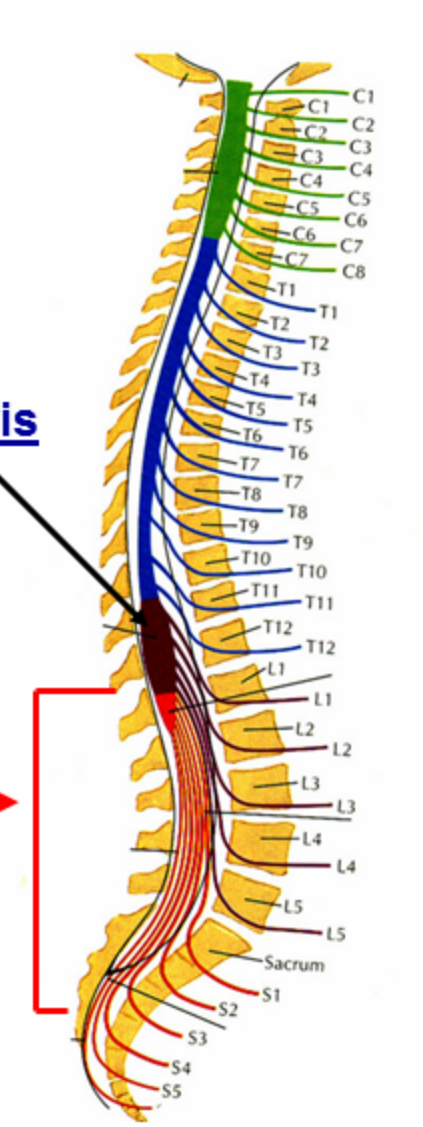
DENTICULATE LIGAMENT

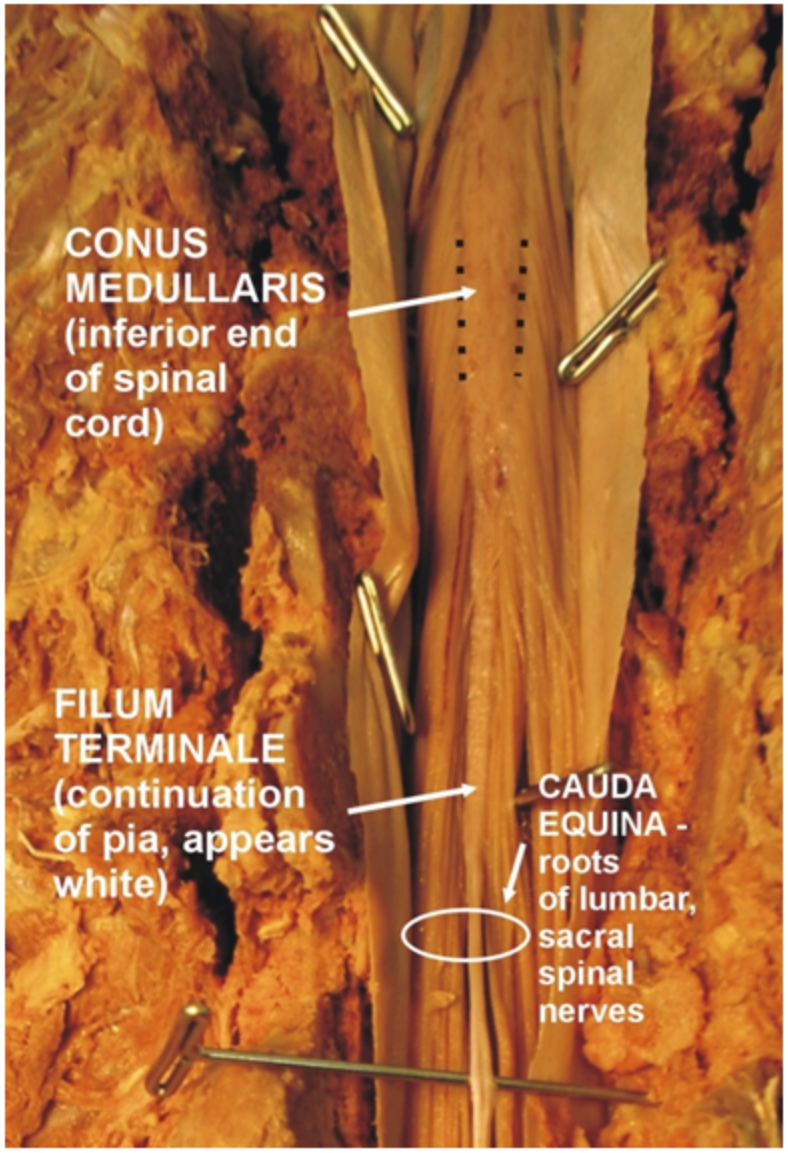
VENTRAL ROOT

BLOOD VESSEL

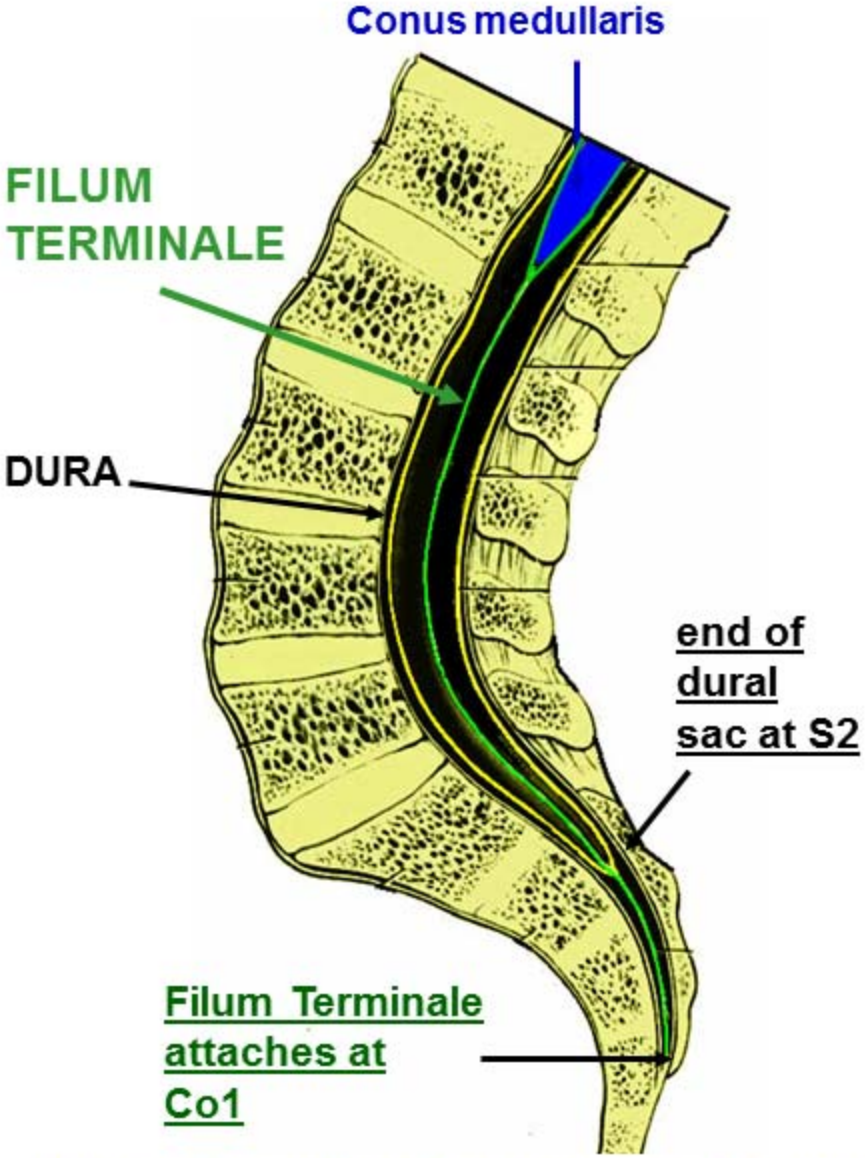
DENTICULATE LIGAMENT

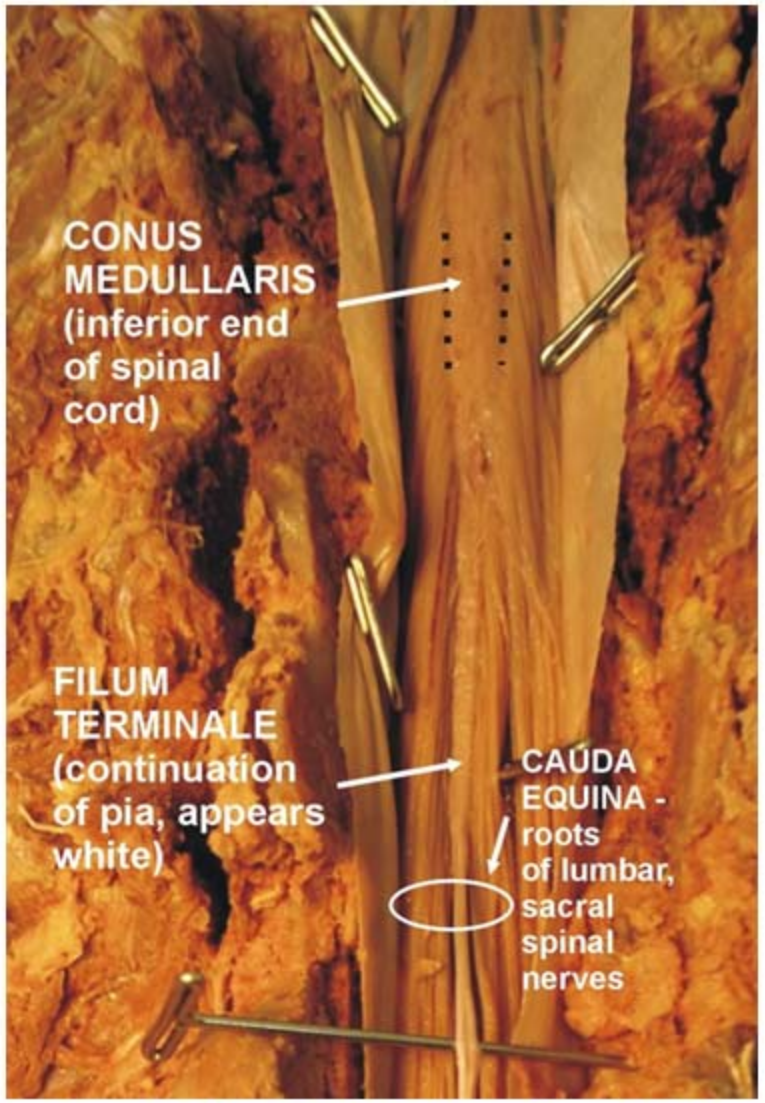
DURA MATER



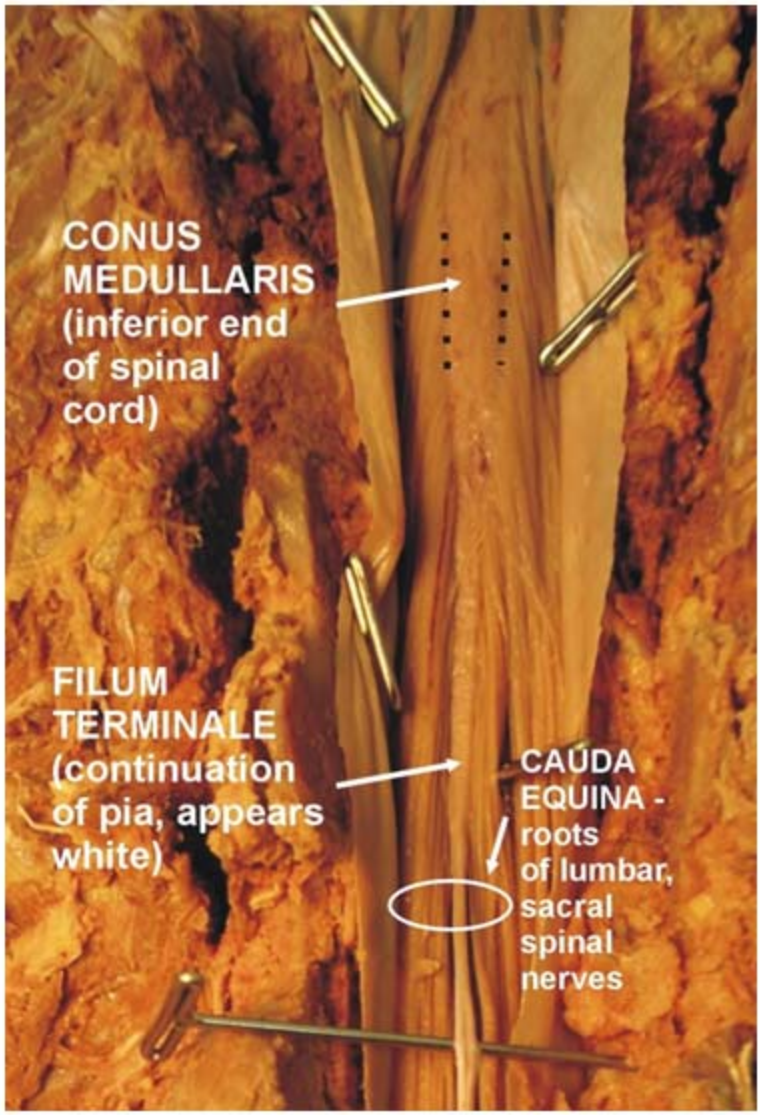


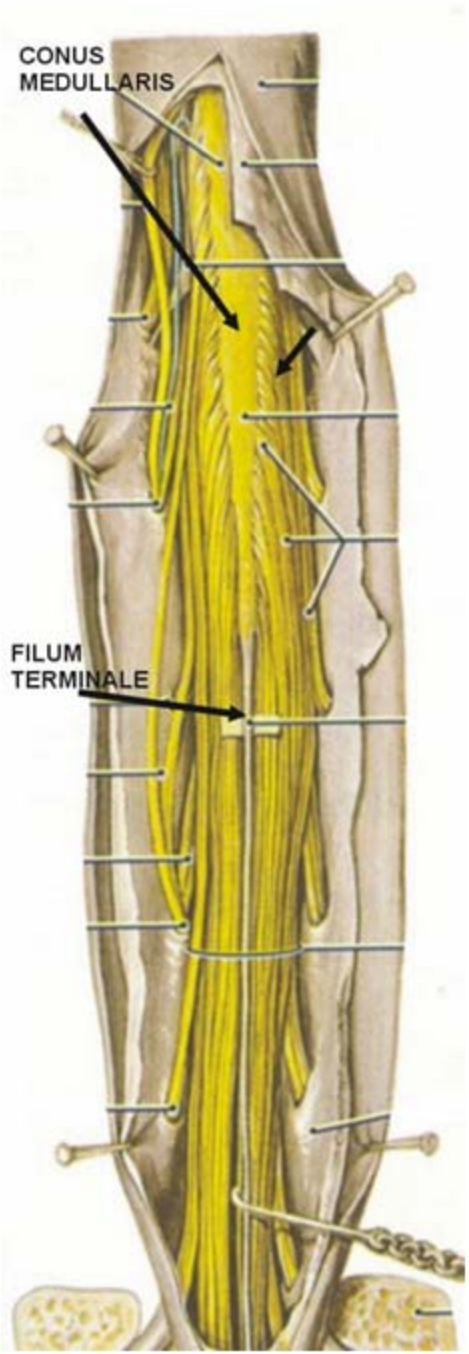
Spinal cord ends as conus medullaris (it is shaped like a cone); nerve roots continue inferiorly (below L1 in adult) to exit correct intervertebral foramina





Pia mater extends below cord to form a ligament, the Filum Terminale; Filum terminale is found among roots of Cauda equina (it looks white); Filum terminale extends down below to attach at first coccygeal vertebra (Co1)



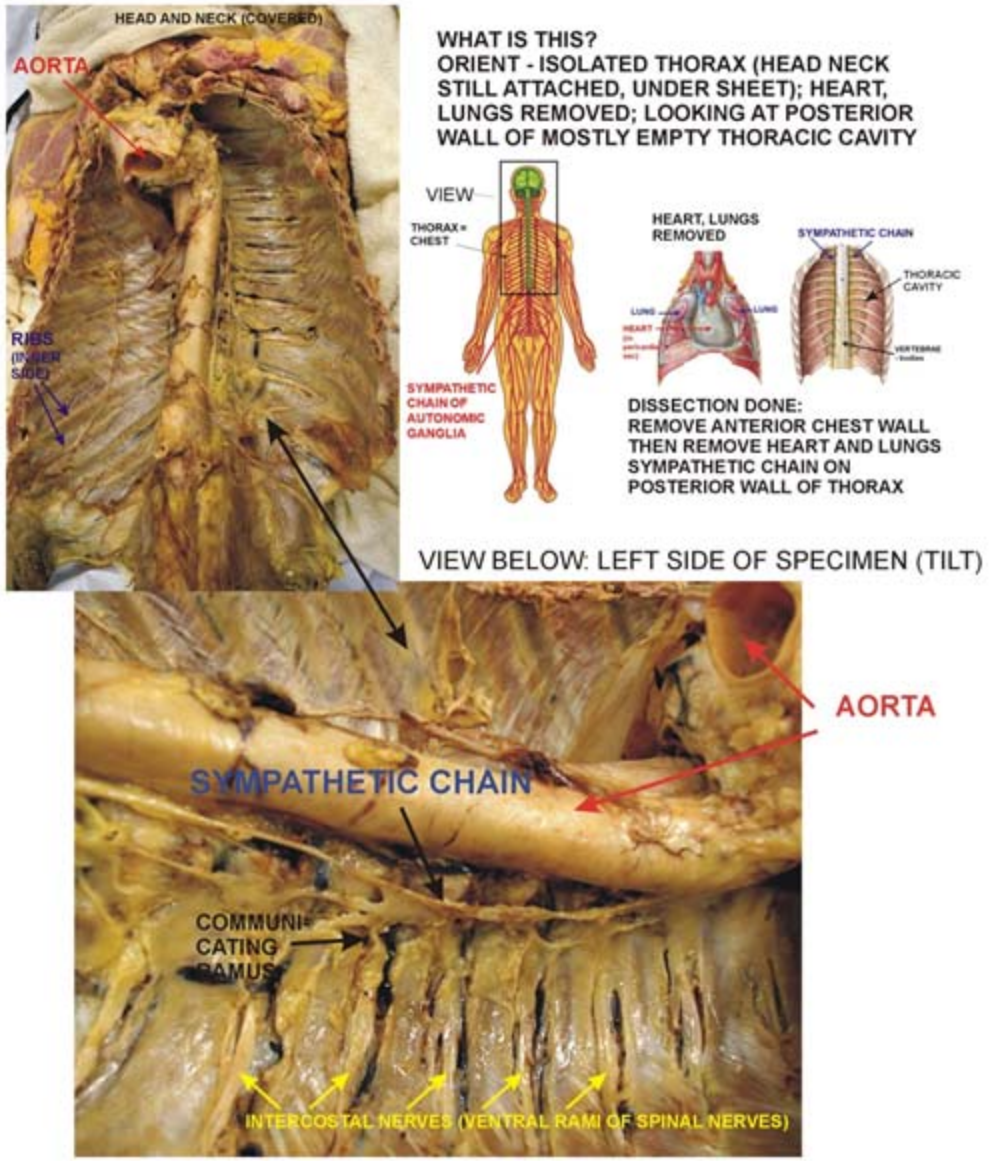


- On the practical, you can tell the Filum terminale from the roots of Cauda equina because the Filum terminale looks white;

- it is also a direct extension of the cone of the Conus medullaris in the midline.

SYMPATHETIC CHAIN AND SPINAL NERVES IN THORAX

80



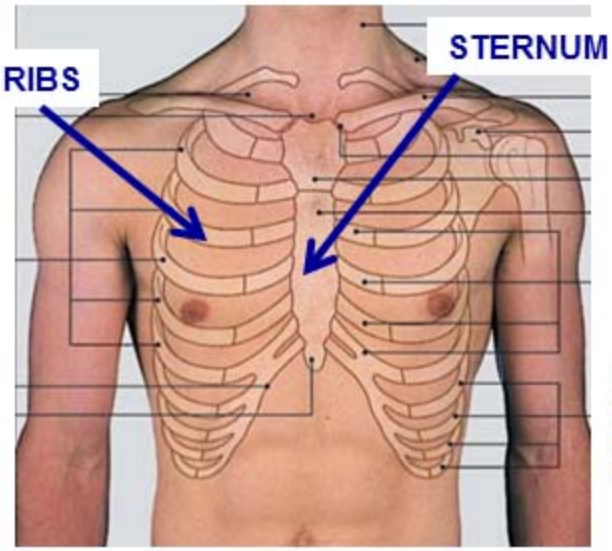
SYMPATHETIC CHAIN

STRUCTURES TO ID

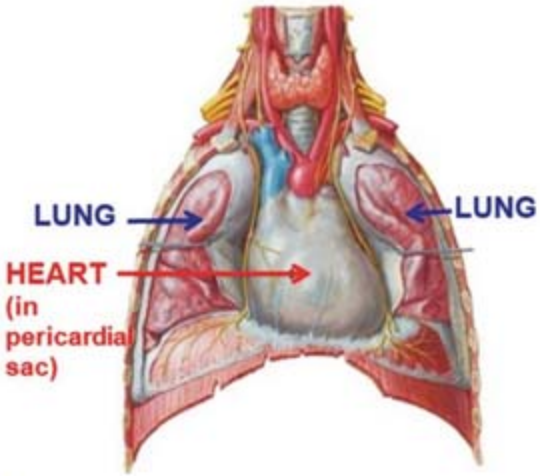
Prosection 80
Sympathetic Chain in Thorax

Sympathetic chain
Aorta
Communicating Ramus
Intercostal nerves (ventral rami of spinal nerves)

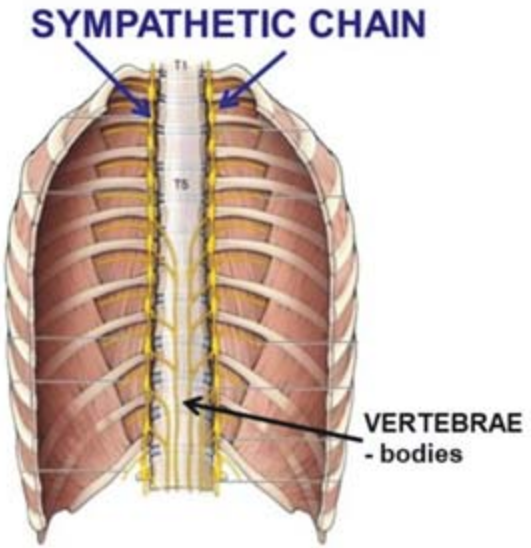
DISSECTION PROCEDURE: REMOVE ANTERIOR WALL OF CHEST (THORAX), THEN REMOVE HEART AND LUNGS (ALSO ESOPHAGUS



REMOVE ANTERIOR WALL OF CHEST (THORAX): RIBS, BREAST BONE (STERNUM) THEN REMOVE HEART AND LUNGS



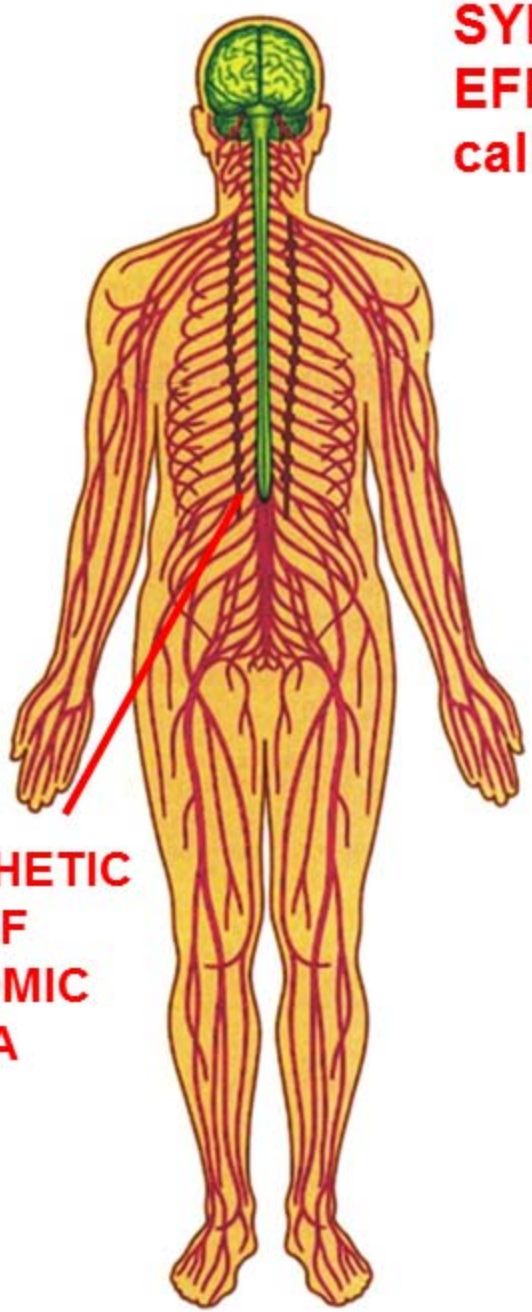
REMOVE HEART AND LUNGS (ALSO ESOPHAGUS)



SEE EMPTY CHEST (THORACIC) CAVITY; RIBS, VERTEBRAE ON POSTERIOR WALL, SYMPATHETIC CHAIN ON POSTERIOR WALL NEXT TO VERTEBRAE

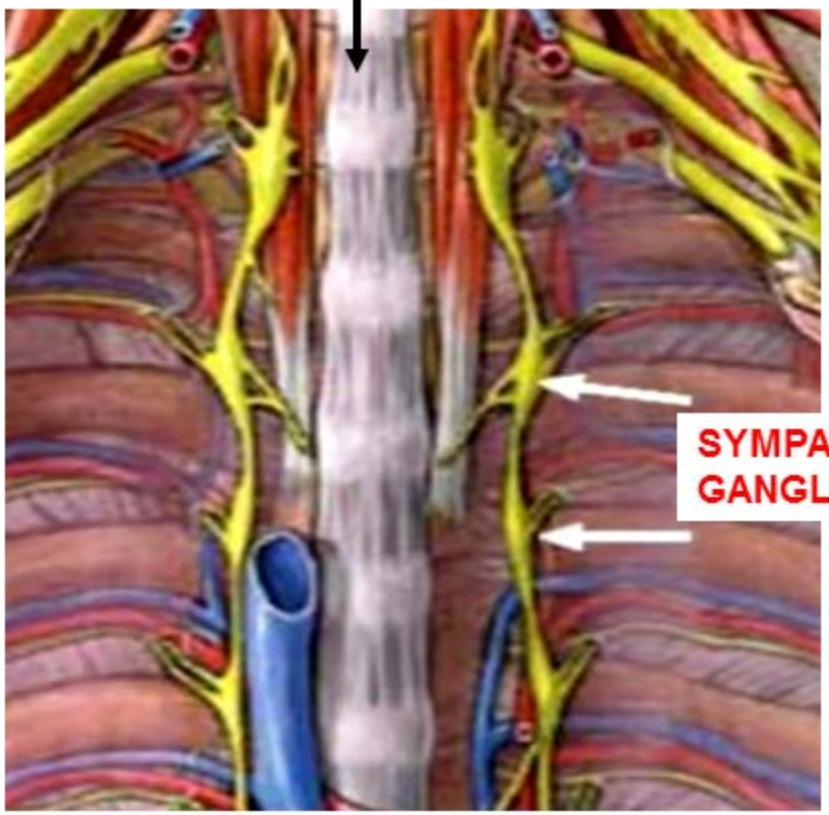
THIS SLIDE FOR ORIENTATION ONLY: DO NOT MEMORIZE

SYMPATHETICS HAVE WIDESPREAD EFFECTS BY SYMPATHETIC CHAIN - called Paravertebral Ganglia



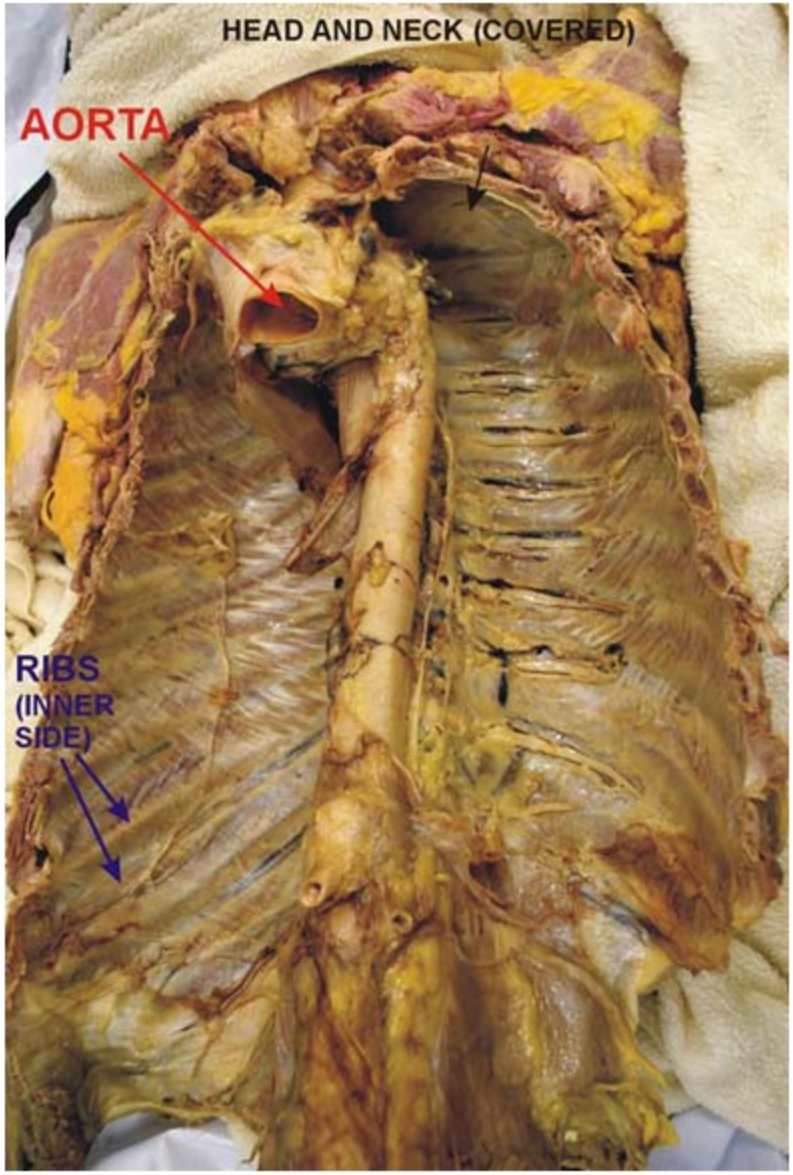
SYMPATHETIC CHAIN OF AUTONOMIC GANGLIA

Bodies of Thoracic Vertebrae (anterior side)



View of the anterior side (front) of vertebrae inside the thorax (chest cavity); chain of ganglia are on sides of vertebrae (paravertebral)

SUPERIOR



INFERIOR

ORIENTATION

- Aorta is major output of heart (which has been removed); aorta arches to left and gives off major arteries to head and upper extremity; aorta then descends through thorax (anterior to the vertebrae) to supply abdomen, pelvis and lower extremities.

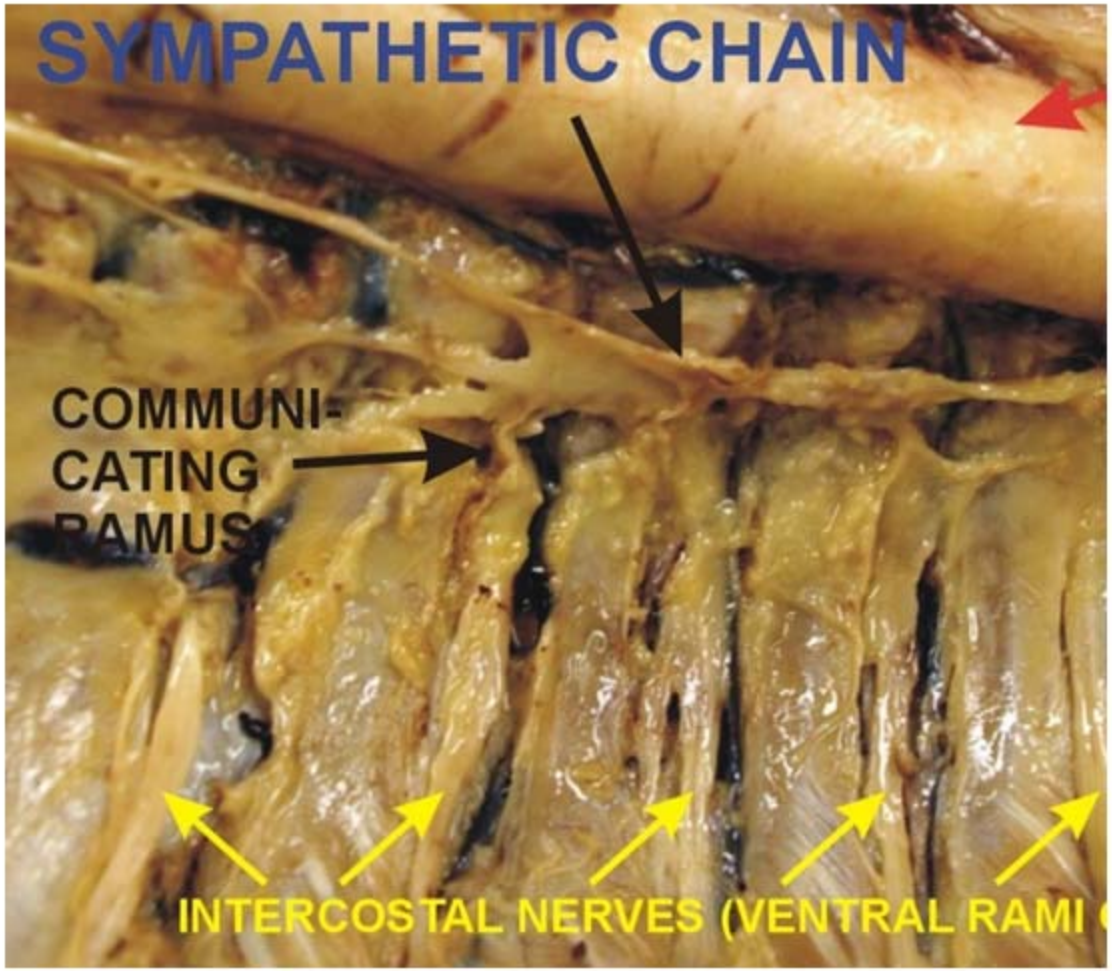
- Ribs (12) form the bony thoracic wall and extend around the thoracic cavity from the vertebrae to the sternum (anterior wall removed)

ROTATE THE SPECIMEN 90 DEGREES: VIEW THE SYMPATHETIC CHAIN BY TILTING IT SOMEWHAT AWAY FROM YOU

INFERIOR NOTE; ORIENTATION SUPERIOR

- In the thorax, the Sympathetic chain is located adjacent to (on the sides of) the thoracic vertebrae.
- The chain consists of ganglia (look like swellings) that are interconnected (ascending and descending pathways)
- The ganglia are connected to spinal nerves (in the thorax called intercostal nerves) that course between the ribs.

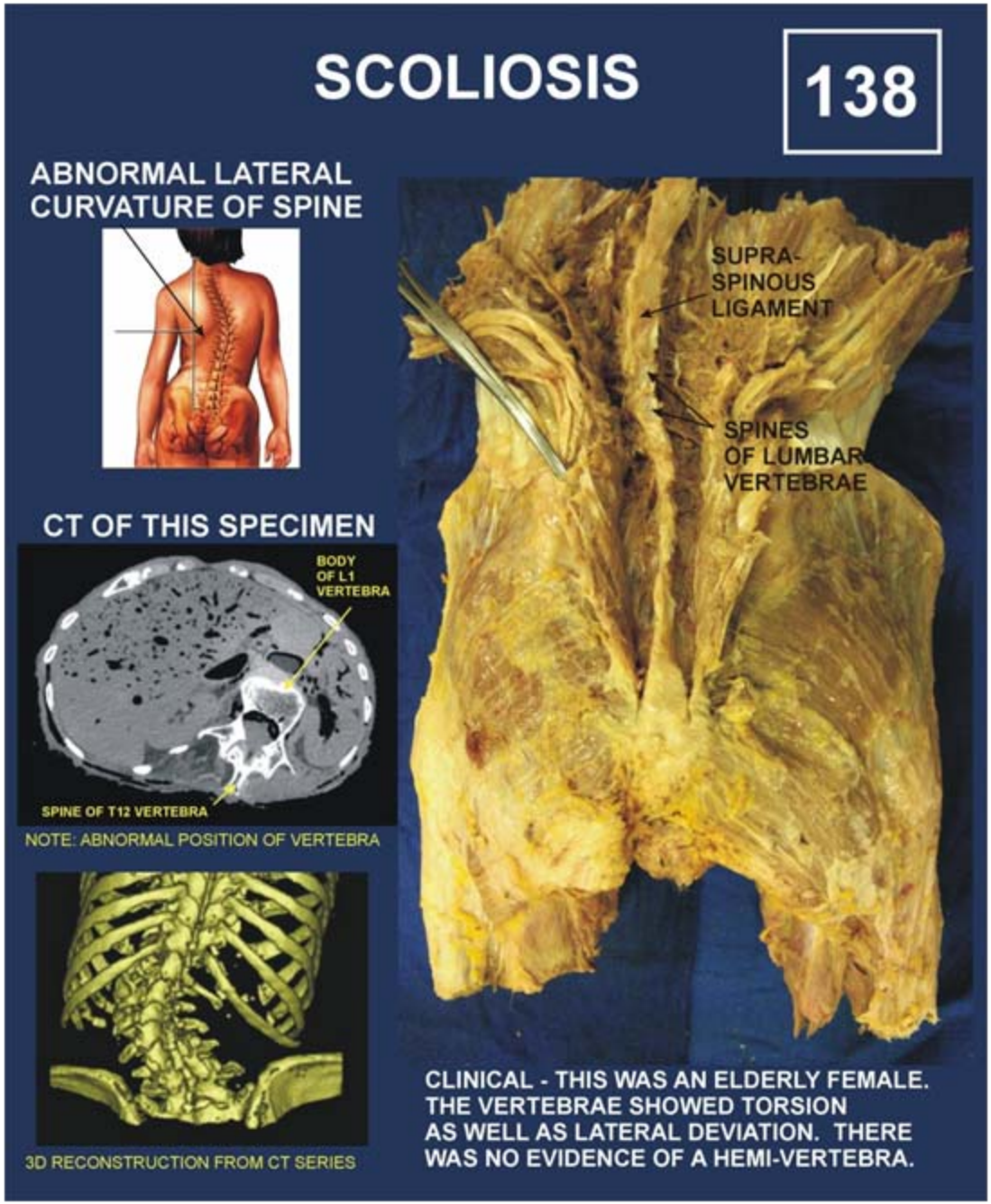
SYMPATHETIC CHAIN CLOSE UP



- COMMUNICATING RAMI - The ganglia are connected to spinal nerves (in the thorax called intercostal nerves) by Communicating rami

- Communicating rami (formally Grey Communicating Rami) look like neural tissue linking Sympathetic chain and spinal (intercostal nerves)

Communicating rami are small and difficult to see.

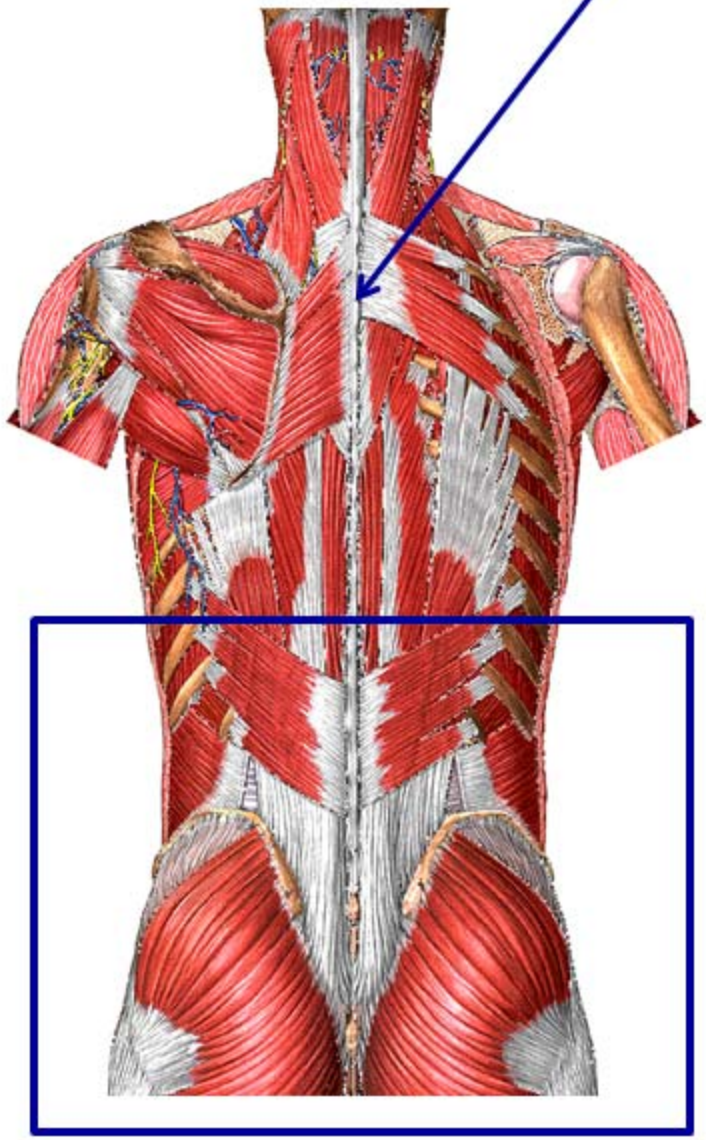


SCOLIOSIS

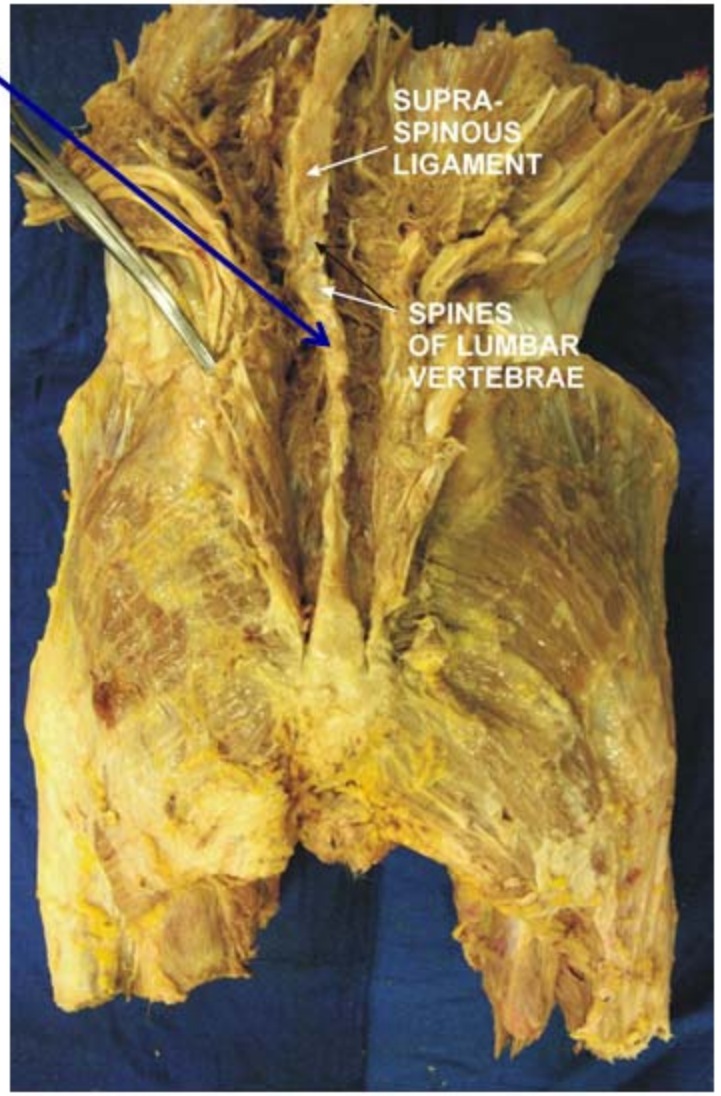
STRUCTURES TO ID

Prosection 138
Scoliosis
- Spines of Lumbar Vertebrae
- Supraspinous ligament

ORIENT TO SPINES OF VERTEBRAE IN MIDLINE

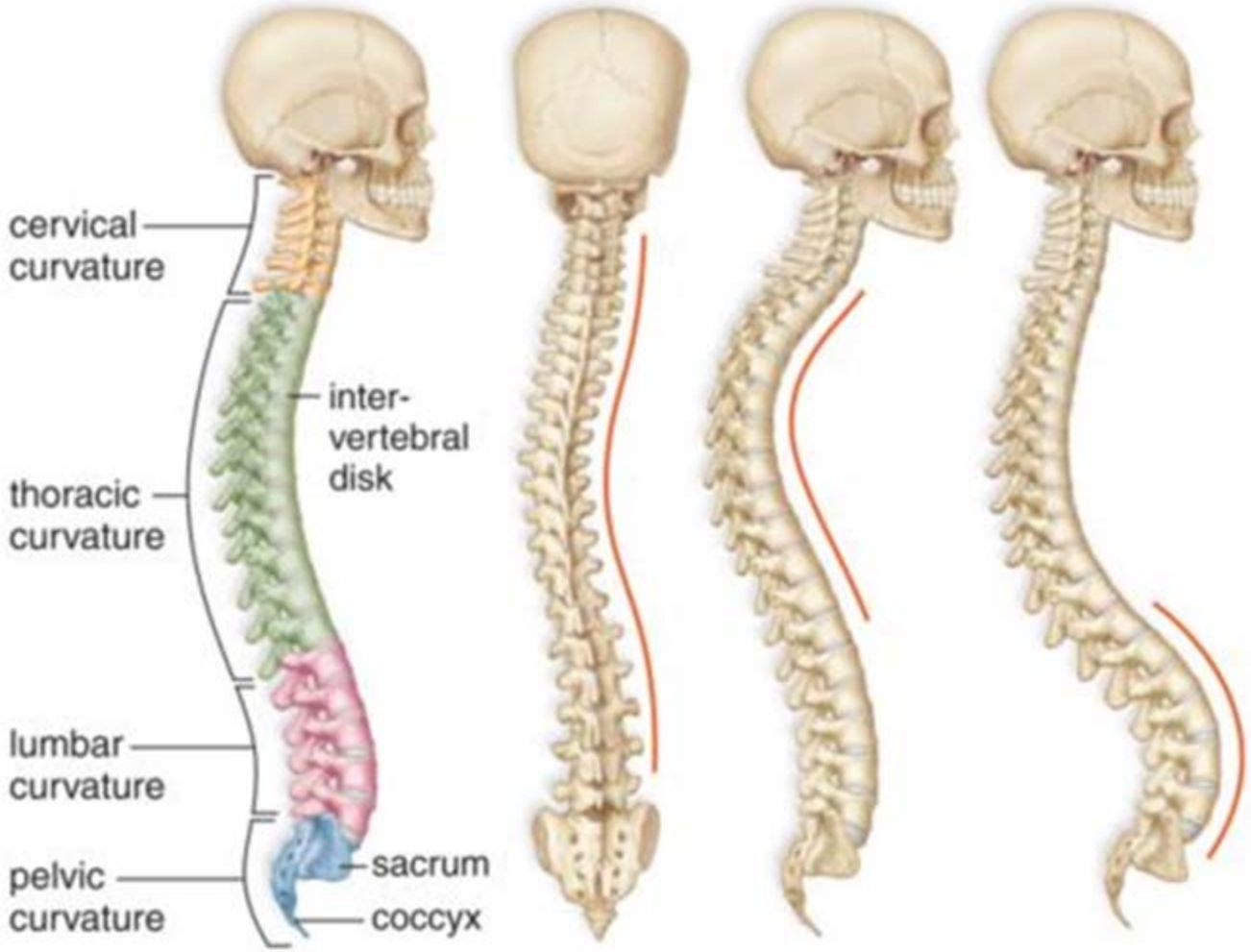


Region of Prosection



Muscles of back (Erector spinae, next block) pulled away from vertebrae.

SPINAL CURVATURES



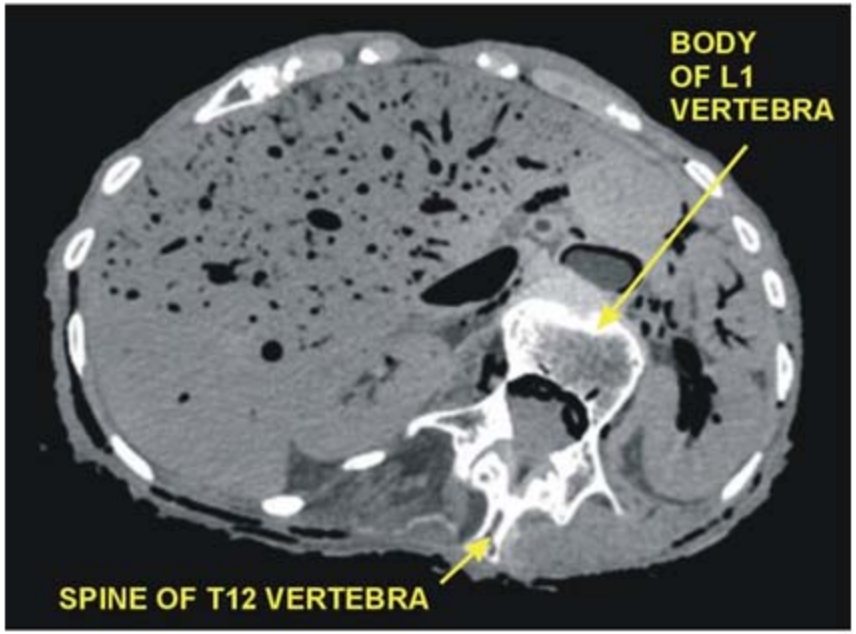
from Dr. Doughtery's lecture

Lateral curvature

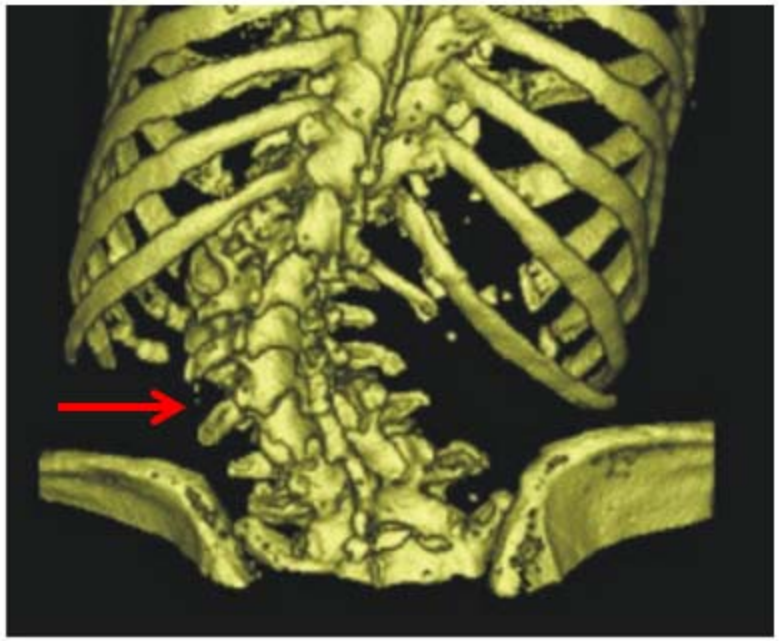
Concave anteriorly

Concave posteriorly

CT SCAN OF CADAVER (TAKEN AT CABELL HUNTINGTON HOSPITAL)



CT SECTION OF LUMBAR VERTEBRAE



3D RECONSTRUCTION OF SPINE FROM CT IMAGES

Scoliosis is characterized by an abnormal Lateral Curvature of the spine but can be accompanied by torsion of vertebrae, as is seen in this specimen.