Unit 2: Vertebral Column, Spinal Cord, Suboccipital Triangle

Prior to dissection be sure to study the vertebral column as well as the individual vertebrae.

An articulated vertebral column or one strung on cord is necessary for this study (Plates 13; 4.1, 4.3). The column consists of 7 cervical, 12 thoracic, 5 lumbar, 5 fused sacral and 3 or 4 fused coccygeal vertebrae (Plates 17, 18, 154, 155, 157; 4.4, 4.9 - 4.17). Look first at a vertebrae column from the mid-thoracic region or upper lumbar region and identify on it the body, vertebral arch, vertebral foramen, pedicles, laminae, spinous process, transverse processes and articular processes (Plates 154, 155; 4.4, 4.5, 4.12, 4.13). Note on the sides of the body and on the transverse processes the articular surfaces for ribs. The upper and lower surfaces of the pedicles have notches, the upper one being the smaller. Now, fit two vertebrae together as they would be in life and observe that the notches form boundaries of intervertebral foramina. The spinal cord would be located in the vertebral foramen and the spinal nerves would pass through the intervertebral foramina. Compare the size and shape of the vertebral body to those in different regions of the column. The vertebral bodies become larger and stronger towards the inferior end of the column. The atlas does not have a body. It is replaced by an anterior arch. Compare the transverse processes in the different regions. Note that the transverse processes in the cervical region have a transverse foramen in each of them (Plates 18, 21; 4.10, 4.15, 4.16). Transverse foramina are found only in the cervical region. Find the area of articulation of the ribs on the transverse process and body of the thoracic vertebrae (Plates 154, 187; 1.12, 1.13, 4.12). Compare the spinous processes of each region for size, shape and direction. Note that the CV1, the atlas, has a tubercle instead of a spinous process (Plates 17; 4.9, 4.12A). Note that most of the cervical vertebrae have bifid spinous processes (Plates 17, 18; 4.9, 4.12B).

Dissection Instructions:

Remove the deep muscles of the back from CV5 to the lower sacrum to expose the laminae of the vertebrae. Using chisel and mallet, cut through the laminae adjacent to the articular process and remove all the exposed laminae and spinous processes so that the vertebral canal is opened from the cervical to sacral regions (Figure 2-1). Take care to preserve the spinal nerves as they leave the spinal cord and exit through the intervertebral foramina.

Clean the extradural fat and internal vertebral venous plexus from the dura mater (Plates 173; 4.20). Follow one or two thoracic spinal nerves laterally until they divide into ventral/anterior and dorsal/posterior primary rami (Plates 169, 170; 4.40, 4.44, 4.46).
Open the dura mater by a longitudinal incision along its entire exposed length (Plates 160, 169; 4.40, 4.41, 4.45A). In a living person, the arachnoid mater is immediately adjacent to the dura, but in the cadaver, the subdural space is usually exaggerated. Study the arachnoid and then open it as you did the dura. Identify dorsal/posterior and ventral/anterior roots and note that they do not join to form a spinal nerve until after they enter the lateral extension of the dura. The dura fuses to the nerves before reaching the dorsal root ganglion. The pia mater is the spinal meninges that directly covers the spinal cord. Identify the denticulate ligament, an extension of pia mater to the dura. It separates the dorsal/posterior and ventral/anterior roots.

Locate the lower end of the spinal cord, the conus medullaris (Plates 160, 161; 4.41 - 4.44, 4.48). The pia mater that surrounds the spinal cord continues inferiorly as the filum terminale. The collection of dorsal and ventral roots below the spinal cord is called the cauda equina. The dural sac ends at the level of SV2, where the coccygeal ligament begins. The coccygeal ligament (filum of dura mater) is the fused filum terminale and dura. It ends by attaching to the coccyx.

The suboccipital triangle and contents should be studied on the prosection. (Plates 178; 4.38, 4.39, Table 4.5 and figures-p.332).

The reason for learning about the suboccipital triangle is to remind those who attempt to draw cerebrospinal fluid from the cisterna magna that the vertebral artery is near and should not be punctured. The cisterna magna is a subarachnoid space containing cerebrospinal fluid below the cerebellum in the skull.
The following structures of the suboccipital triangle need to be identified on the prosections:
rectus capitis posterior major muscle  vertebral artery
rectus capitis posterior minor muscle  greater occipital nerve
superior oblique muscle  suboccipital nerve
inferior oblique muscle

Be sure to identify all of the following in this unit:
cervical vertebrae  anterior longitudinal ligament
thoracic vertebrae  posterior longitudinal ligament
lumbar vertebrae  ligamentum flavum
sacral vertebrae  thoracic spinal nerves
coccygeal vertebrae  anterior/ventral primary ramus
vertebral arch  posterior/dorsal primary ramus
body  dura mater
vertebral foramen  arachnoid mater
pedicle  anterior/ventral root
laminae  posterior/dorsal root
spinous process  dorsal root ganglion
transverse process  spinal nerve
articular process  pia mater
intervertebral foramen  denticulate ligament
atlas  conus medullaris
axis  filum terminale
facets for articulation of ribs  cauda equina
intervertebral disc