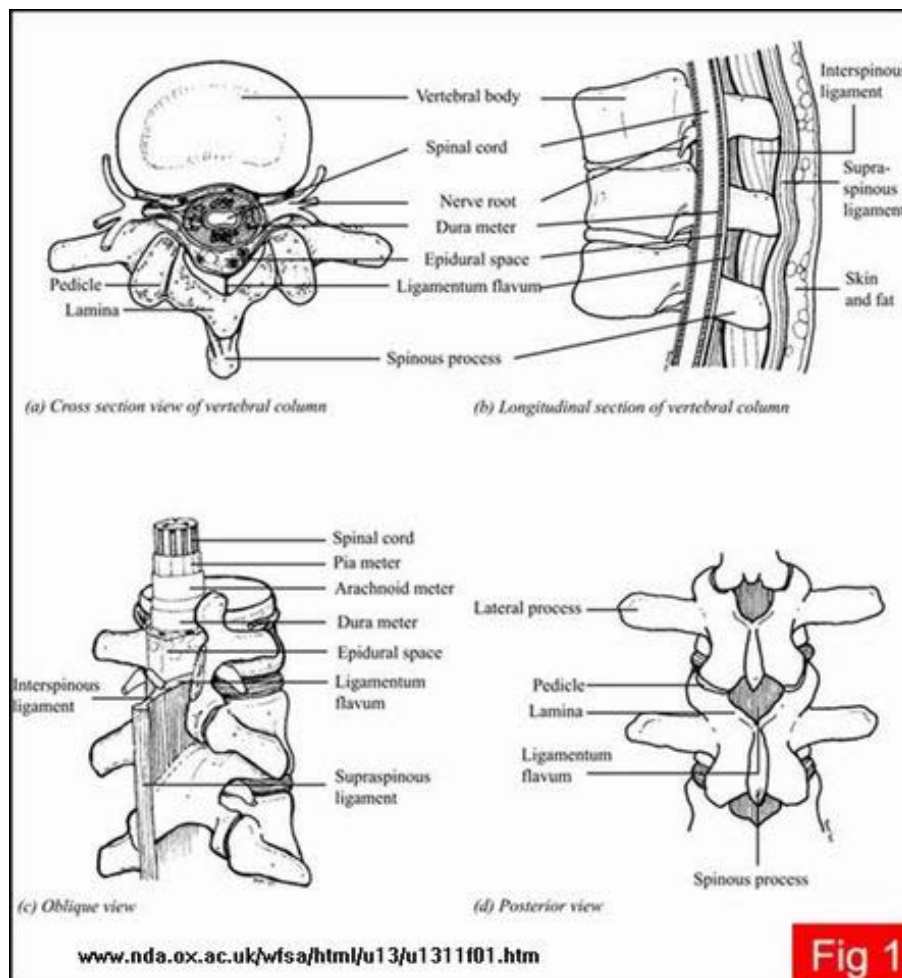


# Spinal and Epidural Anatomy

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## VERTEBRAL COLUMN

The vertebral column consists of 7 cervical vertebrae, 12 thoracic vertebrae, 5 lumbar vertebrae, and the 5 fused sacral and 4 fused coccygeal vertebrae. A vertebra is made up of the vertebral body and bony arch. The transverse process arises from the junction of the pedicle and laminae. The spinous process arises from the joining of the laminae. The spinous processes in the lumbar region are nearly horizontal in the upright patient, whereas the thoracic spinous processes are oriented in a position approaching vertical. Clinically, this implies what the orientation of the long axis of the needle should be.

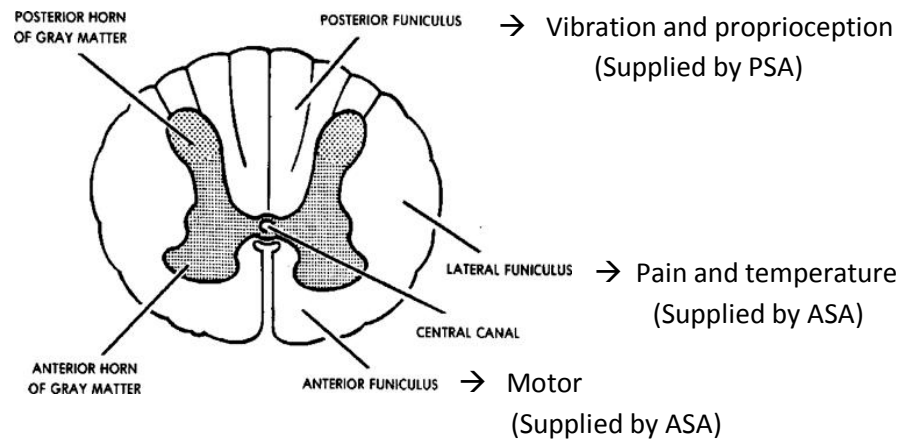


## SPINAL CANAL

Contents of the spinal canal include the spinal cord, pia, arachnoid, dura mater, and cerebrospinal fluid.

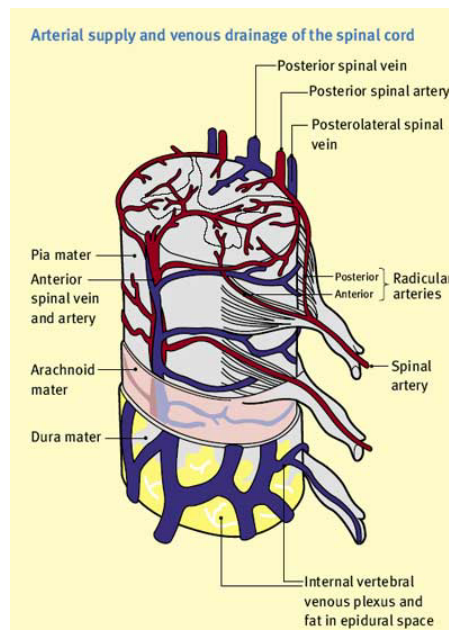
## SPINAL CORD

The spinal cord in cross-section can be divided into the gray matter (neuron cell bodies, dendrites, and glial cells), and white matter (ascending and descending pathways). Dorsal (posterior) funiculi provides position, deep touch, and vibratory sensation. Anterolateral funiculi provides pain and temperature sensation. Ventral (anterior) funiculi provides motor. The spinal cord extends from the foramen magnum to L1 in adults and L3 in infants. The dural sac ends at S2 in adults and S3-4 in infants.



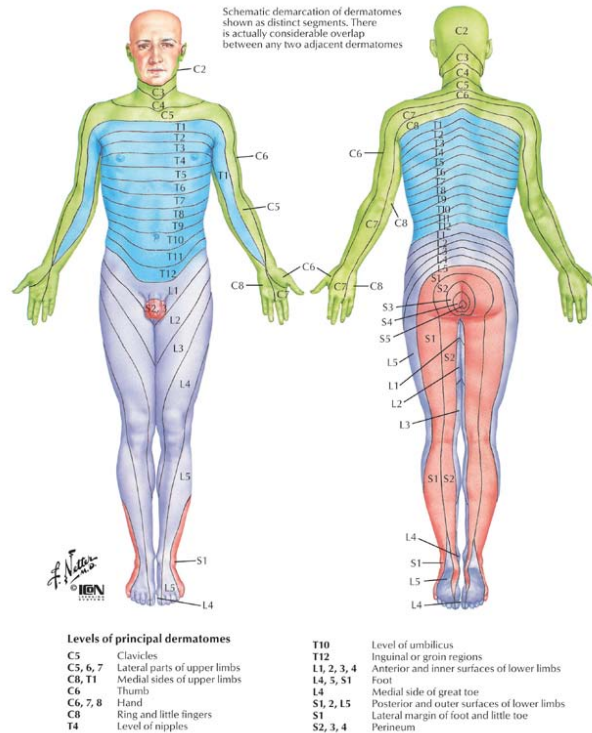
## BLOOD SUPPLY TO THE CORD

Blood supply to the spinal cord is via a single anterior spinal artery and paired posterior spinal arteries. The anterior spinal artery arises from the vertebral arteries. It is supplied along its course by 4-10 radicular arteries (which arise from the aorta, the largest being the Artery of Adamkiewicz, usually located T9-T11). It supplies blood to the anterior two-thirds of the cord. The paired posterior spinal arteries also arise from the vertebrals at the base of the brainstem and supply the posterior one-third of the cord. Circumflex arteries are minute arteries that allow for communication between the anterior and posterior arteries.



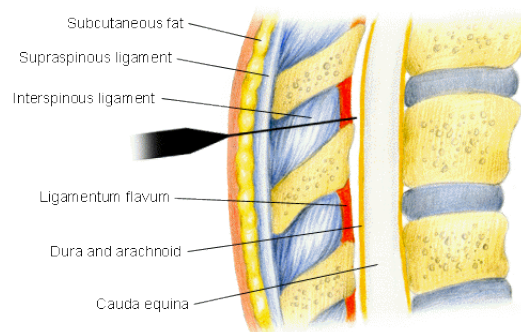
## SPINAL NERVES

There are 31 pairs of spinal nerves (8 cervical, 12 thoracic, 5 lumbar, 5 sacral, and 1 coccygeal). The first 7 cervical nerves exit above their respective foramina. The 8<sup>th</sup> cervical nerve exits below the C7 vertebra. All subsequent nerves exit through vertebral foramen below their corresponding vertebrae and supply a specific dermatome. Preganglionic nerves of the sympathetic nervous system originate from the spinal cord at the T1 to L2 levels. They travel with spinal nerves before separating to form the sympathetic ganglionic chain.



## LIGAMENTS

The laminae of adjacent vertebrae are connected by the ligamentum flavum. The posterior spinous processes of adjacent vertebrae are connected by the interspinous ligaments. The tips of the spinous processes of adjacent vertebrae are connected by the supraspinous ligaments.



## SUBARACHNOID SPACE

Cerebrospinal fluid is found in the spinal space between the pia and arachnoid, or subarachnoid. Another term for this space is the subarachnoid space.

## EPIDURAL SPACE

The epidural space is a potential space. It contains connective tissue, venous plexuses, and adipose tissue. It is found between the connective tissue covering the vertebrae and the ligamentum flavum posteriorly and the dura mater anteriorly. Laterally it is bound by the pedicles and the intervertebral foramina. It extends from the foramen magnum, where the dura is fused to the base of the skull, to the sacral hiatus. The plica mediana dorsalis is a connective tissue band that may extend from the dura mater to the ligamentum flavum, which divides the posterior epidural space into right and left compartments. Clinically, this is significant because it may affect the spread of epidurally injected medications.

