

ANATOMY OF THE SPINAL CORD

The vertebral canal extends from the foramen magnum to the sacral hiatus. It is formed by the dorsal spines, pedicles and lamina (the neural arch) of successive vertebrae (7 cervical, 12 thoracic, 5 lumbar, 5 sacral) and the ligaments and discs connecting them. The curves of the vertebral column are mirrored in the canal in the cervical and lumbar regions (**Hogan et al, 2002**).

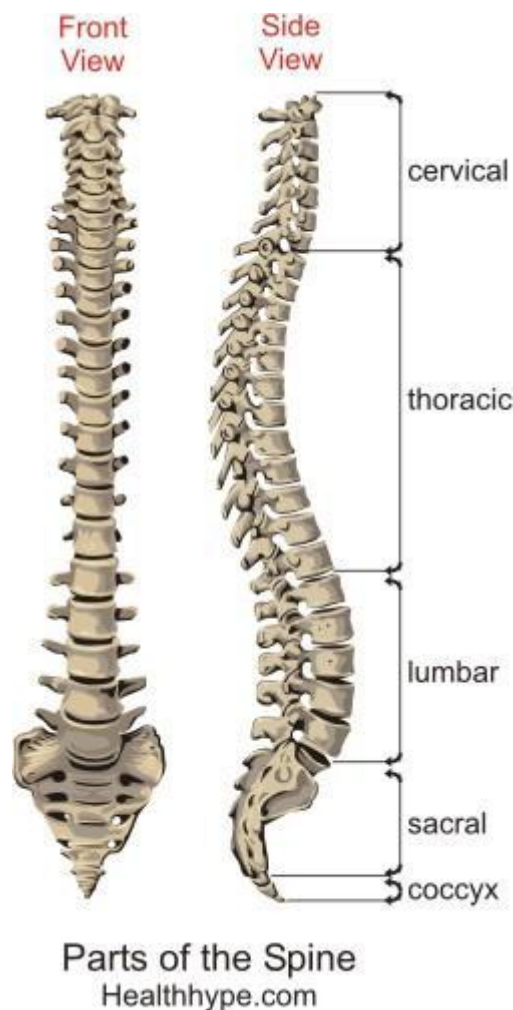


Figure (1): Parts of the spine (**Hogan et al, 2002**).

Anterior longitudinal ligament:

Is a strong band being attached to the occiput and the anterior tubercle of the atlas above and to the front of the sacrum below (Westbrook et al, 1993).

Posterior longitudinal ligament:

Is attached to the posterior border of the body of the axis above and to the sacrum below (Westbrook et al, 1993).

Ligamentum flavum:

It consists of yellow elastic fibers, which runs on the anterior and inferior aspects of one lamina to the posterior and Superior aspects of lamina below. Laterally, it blends with the capsule of the facet joint. From here it extends backwards and medially to meet its opposite fibers in the median plane and with the interspinus ligament (Westbrook et al, 1993).

Interspinous ligament:

It is a thin ligament, the fibers of which are attached along the length of the spinous process uniting the lower border of one with the upper border of its caudal neighbor, in the anterior surface it blends with ligamentum flavum. (Hogan et al, 2002).

Supraspinous ligament:

This unites the apices of the spines of the lumbar and thoracic vertebrae and continues above as ligamentum nuchae. In laborers

calcification of the spine may extend along the fibres of this tough ligament (Igarashi et al, 1998).

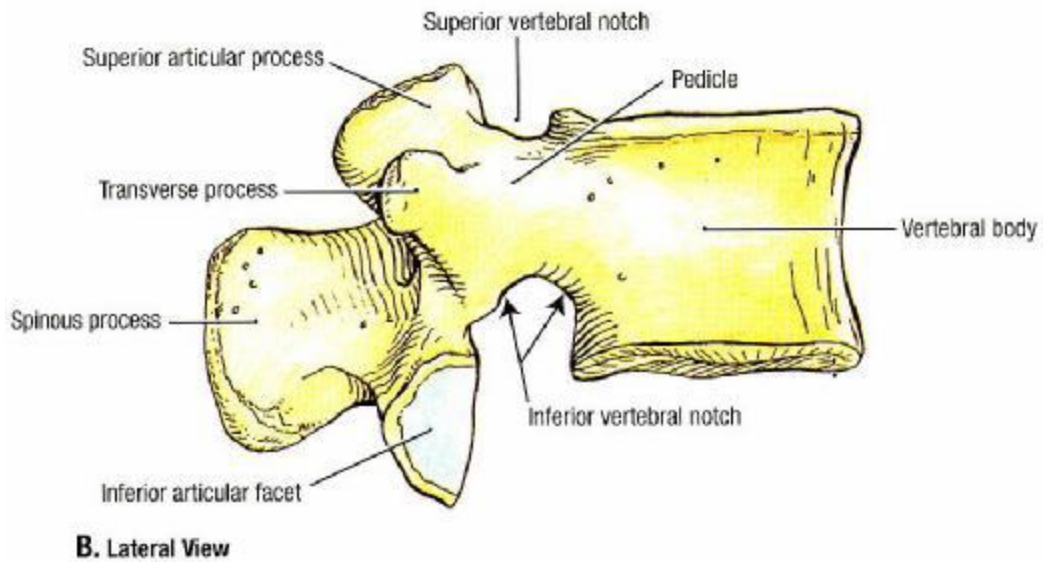


Figure (2): the typical vertebra (Capogna et al, 1997)

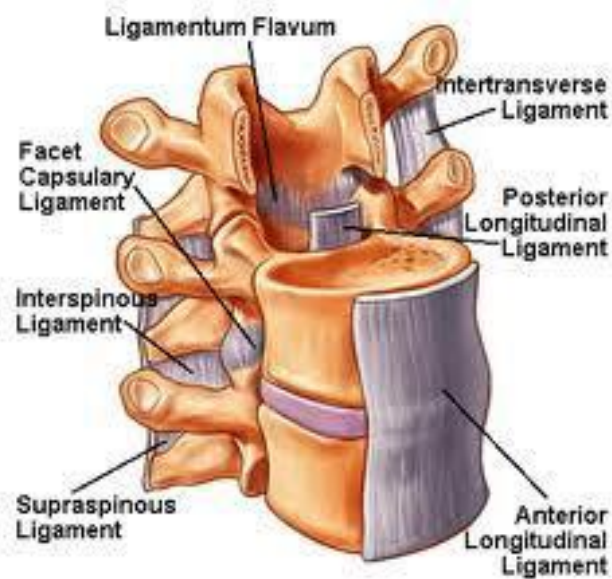


Figure (3): The ligaments of the spinal cord (Capogna et al., 1997).

Spinal cord:

It is 42-45 cm in length occupying the upper 2/3rd of vertebral canal. At its rostral end it is continuous with medulla oblongata and extends down to the superior border of the L2 vertebra or sometimes up to the superior border of L3. Below it ends as conus medullaris from the apex of which filum terminale descends as far as the coccyx. Spinal cord is covered by 3 layers – dura, arachnoid and pia matters (**Hirabayashi et al, 1997**).

Spinal nerves:

It includes 31 pairs; each having a dorsal and a ventral root. The anterior and posterior roots cross the subarachnoid space, passes through the dura (**Westbrook et al, 1999**).

The spinal meninges:

The dura matter: is firmly attached to, and extends caudally from, the foramen magnum. The sac usually terminates at the lower border of the second sacral segment where it is pierced by the filum terminale.

The arachnoid mater: is closely applied to the inner surface of the dura mater, but there is a potential space, the subdural space, between them (**Westbrook et al, 1999**).

The subarachnoid space lies deep to the arachnoid mater. It contains CSF, numerous delicate trabeculations running between the arachnoid and pia mater, the spinal cord, the dorsal and ventral nerve roots. The spinal cord extends from medulla oblongata, with which it is continuous, and ends as the conus medullaris at the lower

border of the first lumbar vertebra (the exact level is variable, and is closer to L2 in neonates) the cord tapers caudally except for two expansions, the cervicothoracic enlargement. and the lumbosacral enlargement (Grau et al, 2001).

Piamater: Delicate, highly vascular membrane closely investing the cord and brain and extends into the anterior median fissure. It gives covering to each nerve and consists of two layers. CSF is a clear fluid with a specific gravity of approximately 1.005 at 37°C; it is isotonic with plasma and has a similar ionic profile. The total volume of CSF in adults approximately 130ml and the average daily production is 150ml so that there is a rapid turnover. The normal CSF pressure in the lumbar region is 6-8 cmH₂O in the lateral position and 20-25 cm H₂O when sitting. The pressure fluctuates in time with both arterial pulsation and respiration (Igarashi et al, 2000).

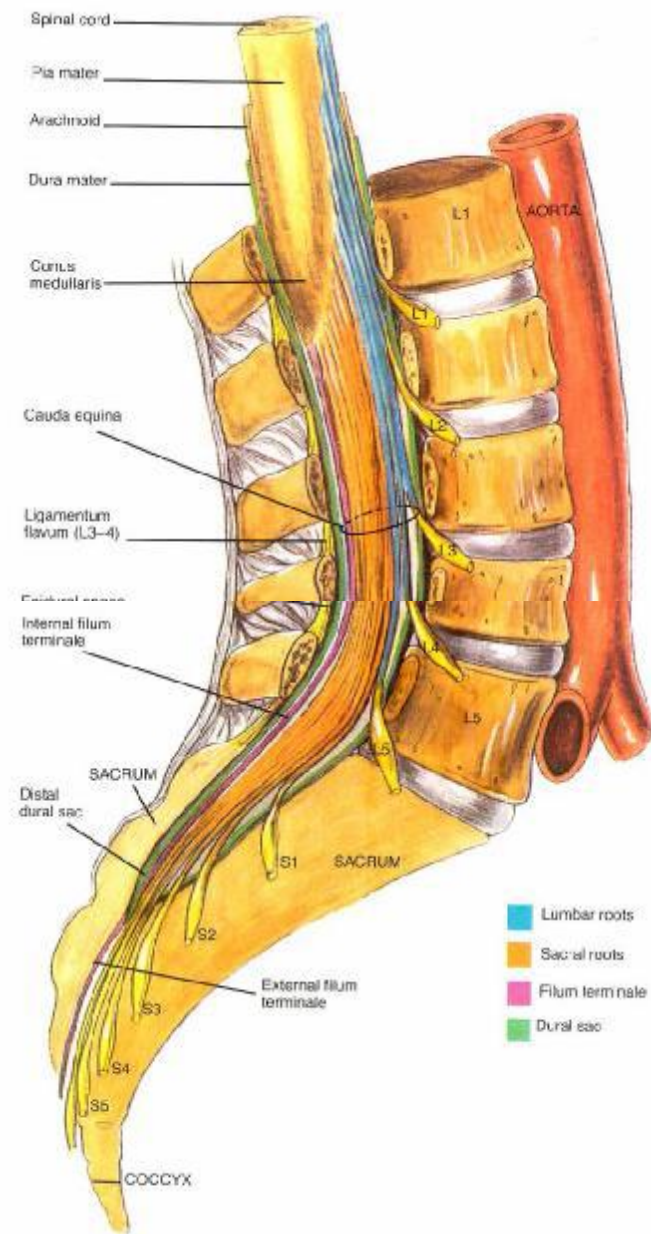


Figure (4): The spinal cord structure (Capogna et al., 1997).