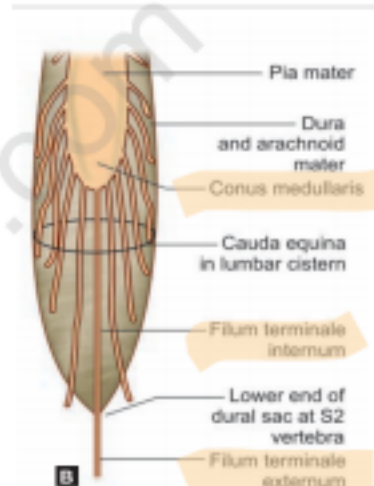
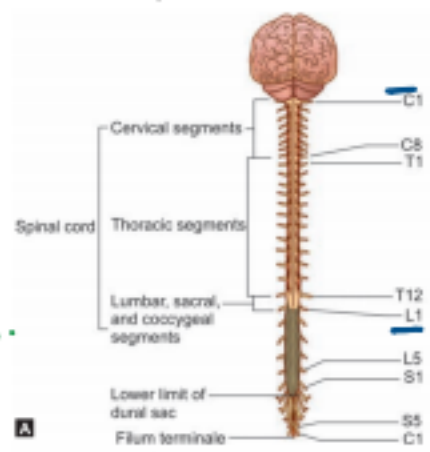


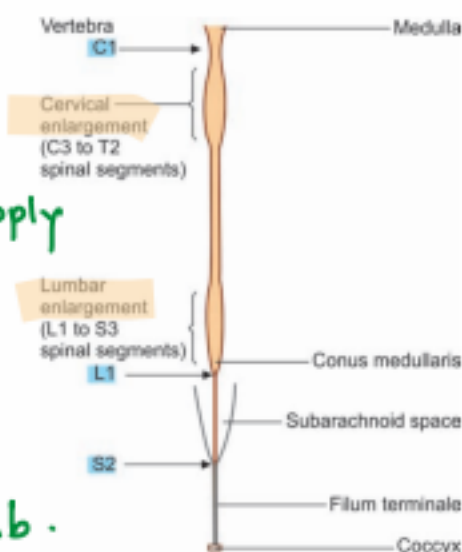
Spinal Cord

/ Spinal Medulla (Medulla spinalis L.)

- 2/3rd of vertebral canal.
- Upper border of C₁ to lower border of L₁.
- The lowest part is conical and is called **conus medullaris**.
- The conus is continuous, below, with a fibrous cord called **filum terminale** which is prolongation of pia mater and is attached to posterior surface of first piece of coccyx.



- 45 cm in length.
- Two enlargements ;
 (a) Cervical (C₃ to T₂) - Supply to Upper limb
 (b) Lumbar (L₁ to S₃) - enlargement Supply lower limb.

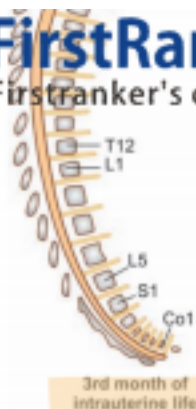


Age-wise changes :-

- In early stages (3rd month) both are same size.

At birth, spinal cord only reaches to L₃ of vertebral column as vertebral column has high growth.





3rd month of intrauterine life



At birth



From 7th year of life onwards

→ In Adult, spinal cord is at L1 of vertebral column.

• Due to this difference in growth, the spinal nerve roots become longer and thus constitute the **Cauda Equina**.

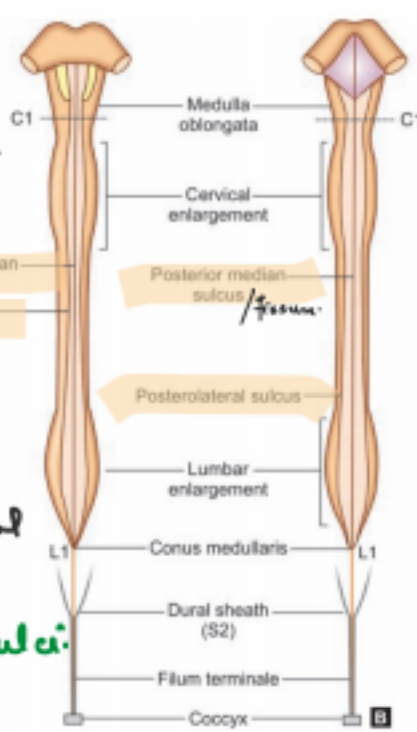
FUNCTIONS OF SPINAL CORD

The spinal cord has three major functions:

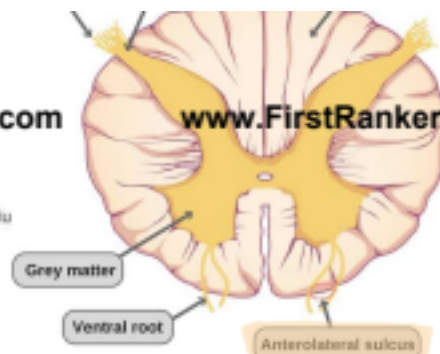
1. It acts as a pathway for motor information, which travels down the spinal cord.
2. It serves as a passage for sensory information in the reverse direction.
3. It is a centre for coordinating simple reflexes.

External Features of Spinal Cord

- The anterior surface is marked by deep **anterior median fissure**, which contains anterior spinal artery.
- The posterior surface is marked by shallow **posterior median fissure**.
- Each half of cord is further subdivided into posterior, lateral and anterior regions by **anterolateral and posterolateral sulci**.
- Rootlets of dorsal/sensory roots enter via **posterolateral sulcus**.
- Rootlets of ventral/motor roots emerge through **anterolateral sulcus**.



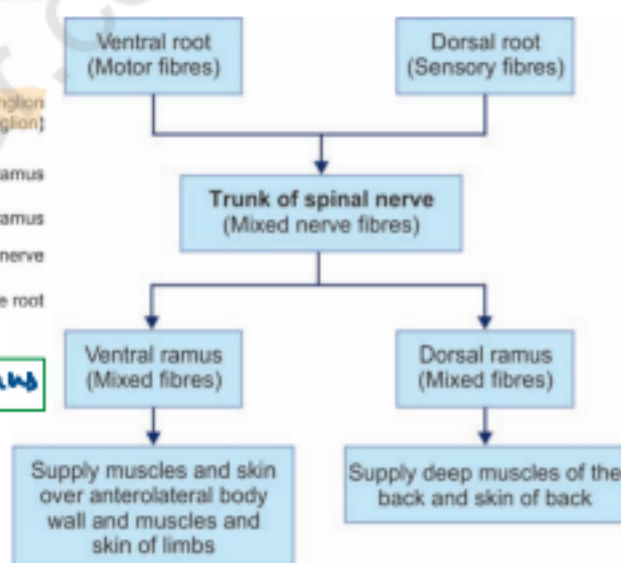
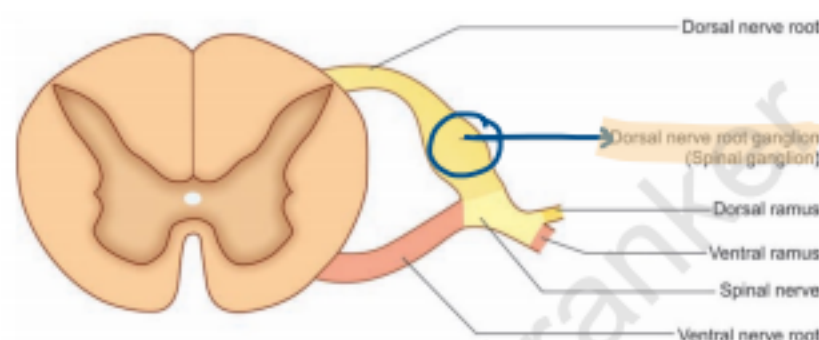
Figures 2.5A and B: External features of the spinal cord: (A) anterior aspect; (B) posterior aspect



Spinal Nerve:

- 31 pairs
 - 8 Cervical
 - 12 Thoracic
 - 5 Lumbar
 - 5 Sacral
 - 1 Coccygeal

- Each spinal nerve arises by two roots:
 - (1) anterior motor root.
 - (2) posterior sensory root.



Spinal Segments

- Spinal Cord - 45 cm
- Vertebral column - 65 cm
- The spinal segments as a rule always lie above their numerically corresponding vertebral bodies.

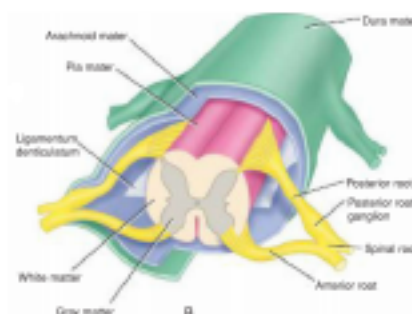


TABLE 2.1: Relation between vertebral levels and spinal segments

Vertebral level	Formula—(to get the number of spinal segment underlying, add the numeral to the number of vertebrae)	Example
Upper cervical C1–C4	Add 0 to the number of vertebra to get the underlying spinal segment	Third cervical vertebra overlies the third cervical segment
Lumbar and sacral	Add 1 to the number of vertebra to get the underlying spinal segment	Fifth lumbar vertebra overlies the first sacral segment

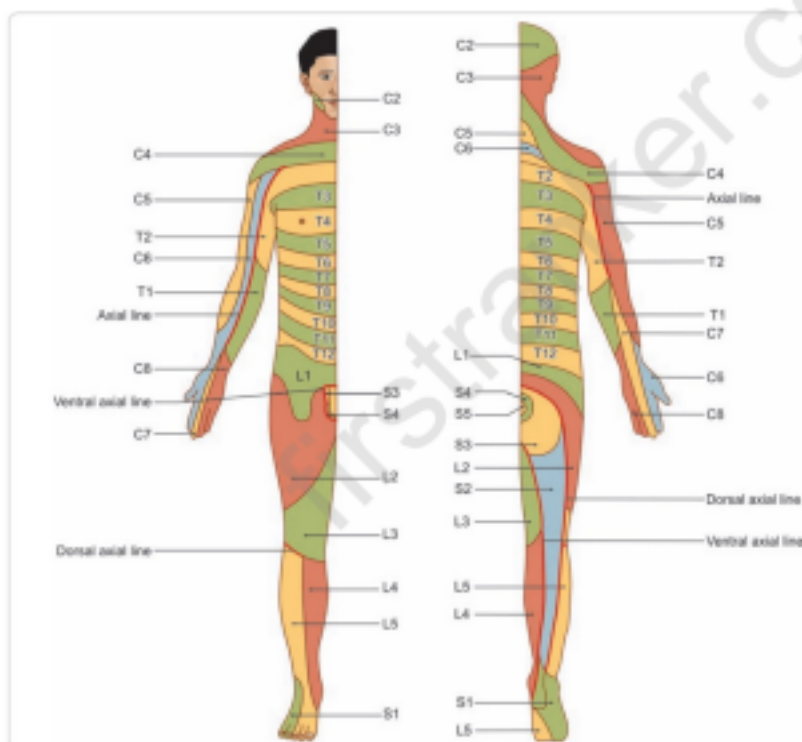
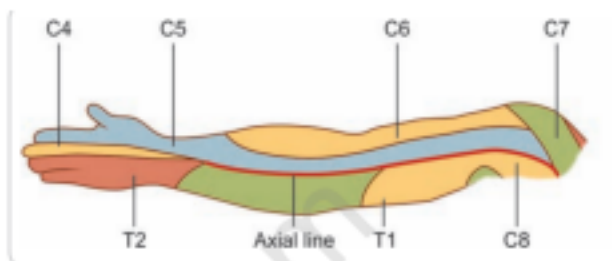
Lower cervical C1-C7	Add 1 to the number of vertebra to get the underlying spinal segment	Fifth cervical vertebra overlies the sixth cervical segment
Thoracic T1-T12	Add 2 to the number of vertebra to get the underlying spinal segment	Fourth thoracic vertebra overlies the sixth thoracic segment
Lower thoracic T7-T9	Add 3 to the number of vertebra to get the underlying spinal segment	Sixth thoracic vertebra overlies the sixth thoracic segment
T10	---	L1-L2 segments
T11	---	L3-L4 segments
T12	---	L5-S1 segments
L1	---	S2-Co segments

Segmental Innervation :-

Dermatomes: Areas of skin supplied by individual spinal nerves are called dermatomes.

The following **dermatomes** are of clinical significance:

- Spinal nerve C1 does not supply any area of skin (C1 has no dermatome).
- Spinal nerve C4 supplies the tip of shoulder.
- Spinal nerves C6, C7, C8 supplies the skin of the hand.
- Spinal nerve T4 supplies the skin over the nipple.
- Spinal nerve T10 supplies the skin over the umbilicus.
- Spinal nerves L5, S1 supplies the skin of the sole.



Myotomes :-

- Group of muscle supplied by a single spinal nerve is called Myotomes.

Features :-

- Generally a muscle is supplied by many segments.



(2) The segment supplying muscles acting on a joint, supply the joint itself and also the skin over it (Hilton's Law)

(3) Muscle with same function supplied by same spinal segment.

Clinical Anatomy

- Injury of spinal cord above C3 causes paralysis of all respiratory muscles and death due to paralysis of diaphragm.
- Injury of spinal cord at C4–C5 level paralyzes all four limbs—**quadriplegia**.
- Injury to spinal nerves C5 and C6 (**Erb's paralysis**) causes loss of abduction of shoulder, loss of flexion of elbow, loss of supination and loss of extension of wrist. Unopposed action of antagonists produces policeman's tip deformity.
- Injury to spinal nerves C8 and T1 (**Klumpke's paralysis**) causes paralysis of intrinsic muscles of the hand causing claw hand.
- Injury of spinal cord between T2 and L1 paralyzes both the lower limbs—**paraplegia**.

Movements	Spinal segments (segments in brackets signify minor contribution)
Movements of the head	C1 to C4
Movements of the diaphragm	(C3) C4 (C5)
Movements of the upper limb	C5 to T1
Abduction of shoulder	C5
Adduction of shoulder	C6, C7, C8
Flexion of elbow	C5, C6
Extension of elbow	C7, C8
Supination of forearm	C6 (C7)
Pronation of forearm	(C6) C7
Flexion of wrist	(C6) C7
Extension of wrist	C6 (C7)
Movements of fingers	C8, T1
Movements of lower limb	L2 to S3
Flexion of hip	L2, L3
Extension of hip	L4, L5
Extension of knee	L3, L4
Flexion of knee	L5, S1
Dorsiflexion of ankle	L4, L5
Plantar flexion of ankle	S1, S2
Inversion of foot	L4
Eversion of foot	(L5) S1
Movements of toes	S2, S3
Evacuation of bladder and bowel	S2 to S4

MedNotes
(mednotes.in)

