

## Spinal Nerves

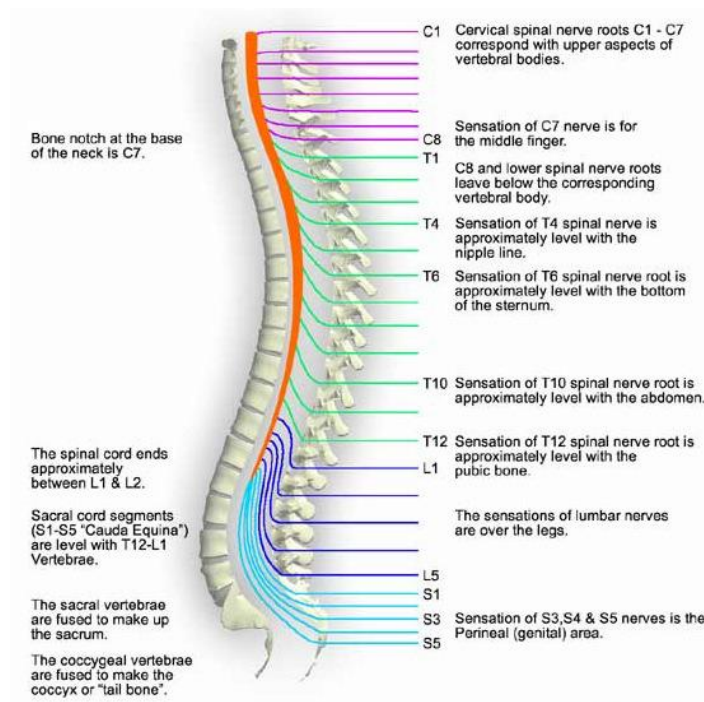
### Anatomy of the Spinal Cord

To discuss the spinal nerves and how they work we first have to understand the anatomy of the spinal cord and column. The spinal column supports the head and protects the spinal cord, which is attached to the brain and extends down the centre of the back. It is approximately the width of a human finger. Along with the brain it forms the central nervous system. It is made up of millions of nerve fibres which transmit electrical signals to and from the limbs, trunk and organs. The spinal column is made up of 33 vertebrae which are divided up as follows:

<b>Cervical</b>	Neck	7	Supply movement and feeling to the arms, neck and upper trunk
<b>Thoracic</b>	Upper Back	12	Control the muscles and organs of the chest and abdomen
<b>Lumbar</b>	Lower Back	5	Supply the legs
<b>Sacral</b>	Sacrum	5 (Fused)	The bladder, bowel and sexual organs
<b>Coccygeal</b>	Coccyx or tailbone	4 (fused)	

### Spinal Cord Numbering

Spinal nerves carry information to and from different segments along the spinal cord, and are numbered according to their location, similar to the numbering of the vertebrae. There are 31 pairs of spinal nerves, along the spinal cord, they exit the spinal column through holes in the vertebrae called foramen.



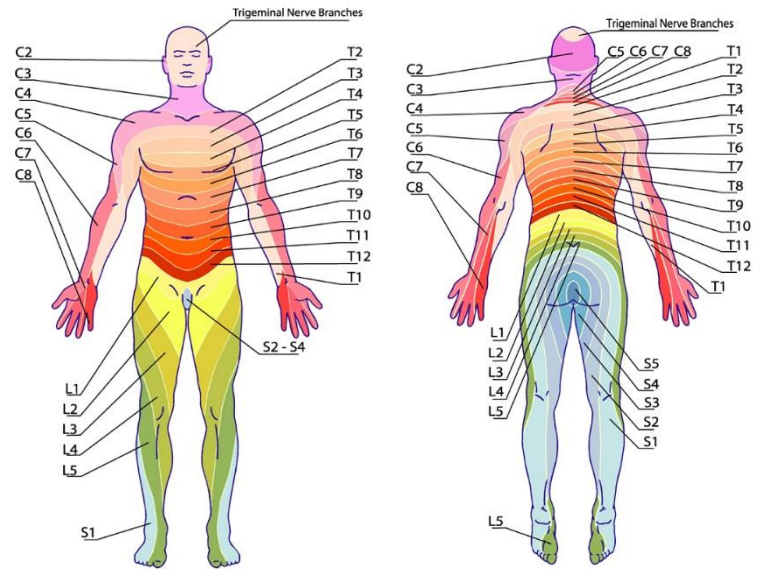
The diagram to the left shows clearly the spinal cord and where the spinal nerves exit in relation to the vertebrae. You will notice that the cervical nerves exit above the vertebral body, and then at C8 they exit below. This allows for one more cervical spinal nerve, C8, which does not have an equivalent numbered vertebral body. The neck has seven vertebral bodies.

## Dermatomes and Myotomes

A dermatome is an area of skin supplied by a single spinal nerve whilst a myotome is a group of muscles supplied by a single spinal nerve.

Irritation or injury to the spinal nerve root through conditions such as spinal stenosis and disc herniation can lead to a sensory deficit in the distribution of the dermatome, or a motor deficit in the distribution of the myotome.

The areas innervated by each nerve root are outlined in the diagram to the right.



## Radiculopathy

Radicular symptoms occur because of irritation of a nerve root. These symptoms can include pain, numbness and tingling.

The table below outlines common radicular syndromes.

Disc Level	Nerve Root	Motor Deficit	Sensory Deficit	Reflex Compromise
<b>Lumbar</b>				
L3-4	L4	Quadriceps	Anterolateral thigh Anterior knee Medial leg and foot	Knee
L4-5	L5	Extensor hallucis longus	Lateral thigh Anterolateral leg Middorsal foot	Medial hamstrings
L5-S1	S1	Ankle plantar flexors	Posterior leg Lateral foot	Ankle
<b>Cervical</b>				
C4-5	C5	Deltoid Biceps	Anterolateral shoulder and arm	Biceps
C5-6	C6	Wrist extensors Biceps	Lateral forearm and hand Thumb	Brachioradialis Pronator teres
C6-7	C7	Wrist flexors Triceps Finger extensors	Middle finger	Triceps
C7-T1	C8	Finger flexors Hand intrinsic	Medial forearm and hand, ring and little fingers	None
T1-T2	T1	Hand intrinsic	Medial forearm	None

Neurologists and neurosurgeons are not the only experts in this field. Orthopaedic surgeons have a deep level of understanding of spinal nerves necessary for them to assess spinal injuries.

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**Reference:** *The American Medical Association's Guides to the Evaluation of Permanent Impairment, 5th Edition, Chapter 15*