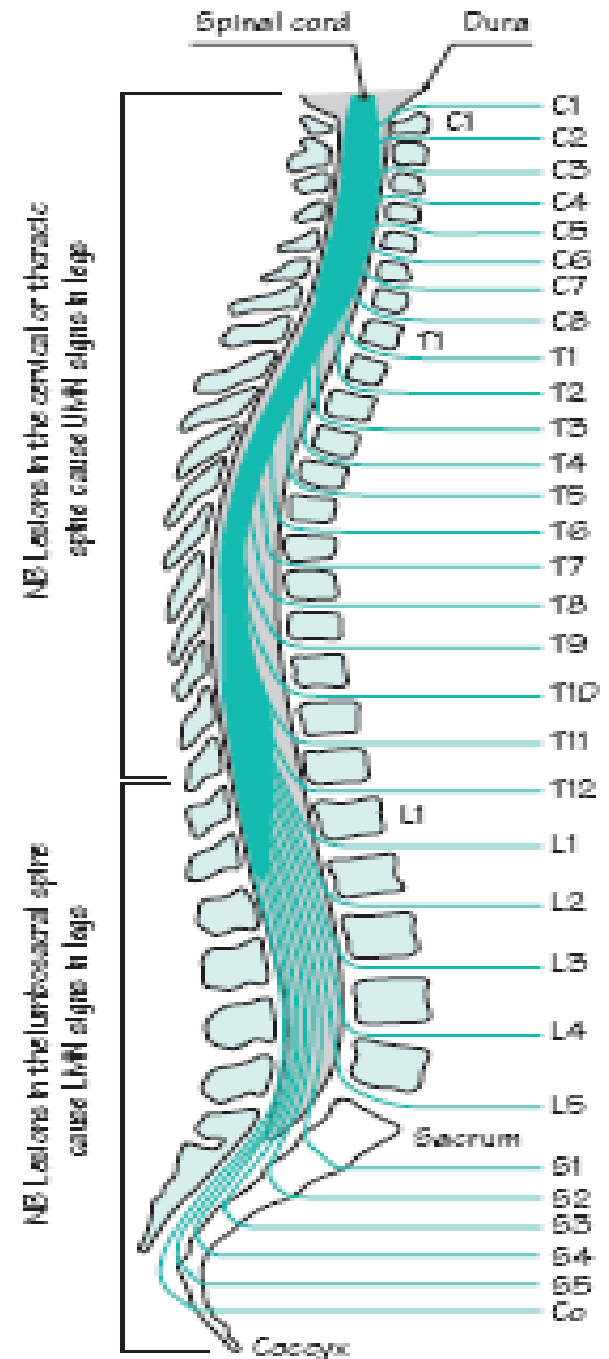


# **Spinal Cord Disorders**

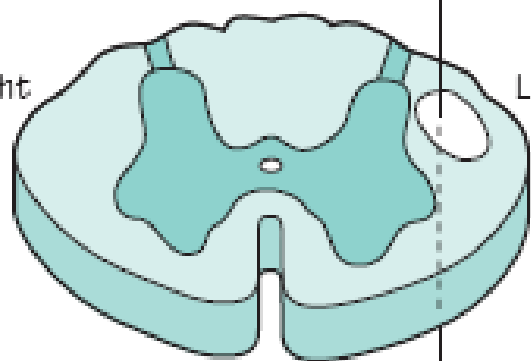
# Anatomical Consideration

- ▶ Cord ends at lower border of L1 V
- ▶ Lesion of the spine till D10 = UMNL
- ▶ Lesions in the lumbosacral spine = LMNL



Lateral corticospinal  
or pyramidal tract

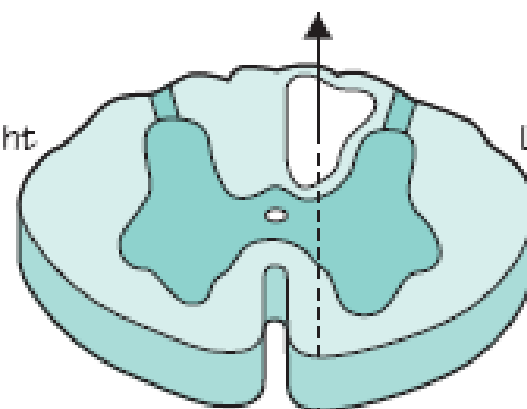
Right Left



To left leg

Posterior column

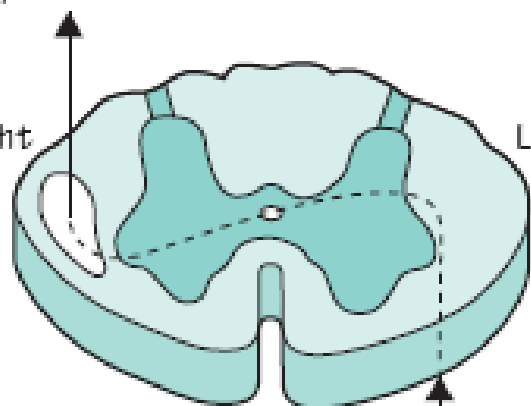
Right Left



From left leg

Lateral spinothalamic tract

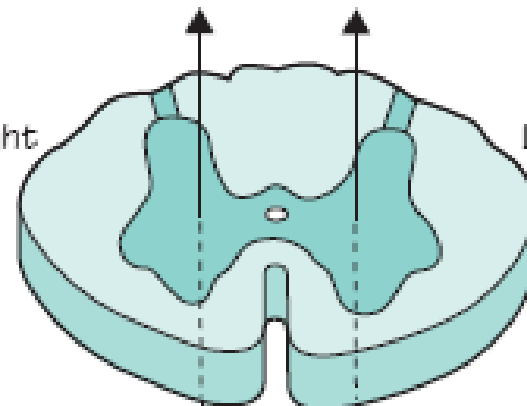
Right Left



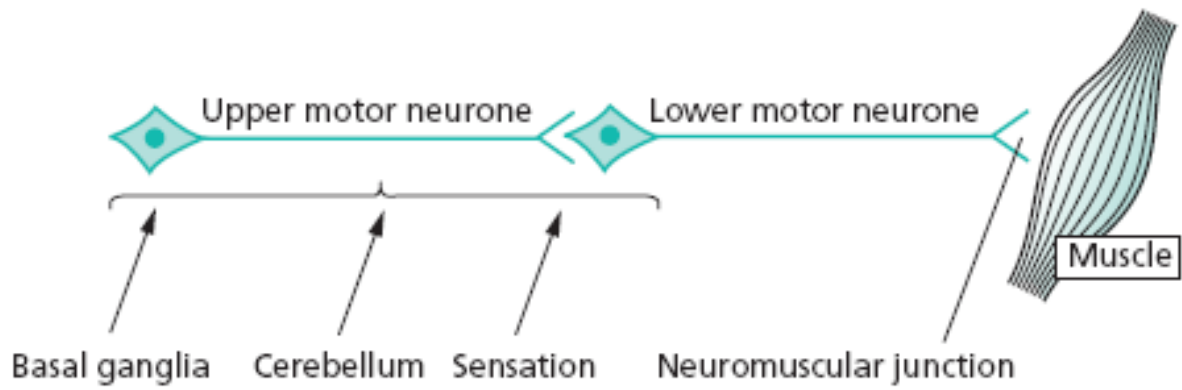
From left leg

Very important, but anatomically  
poorly defined pathways

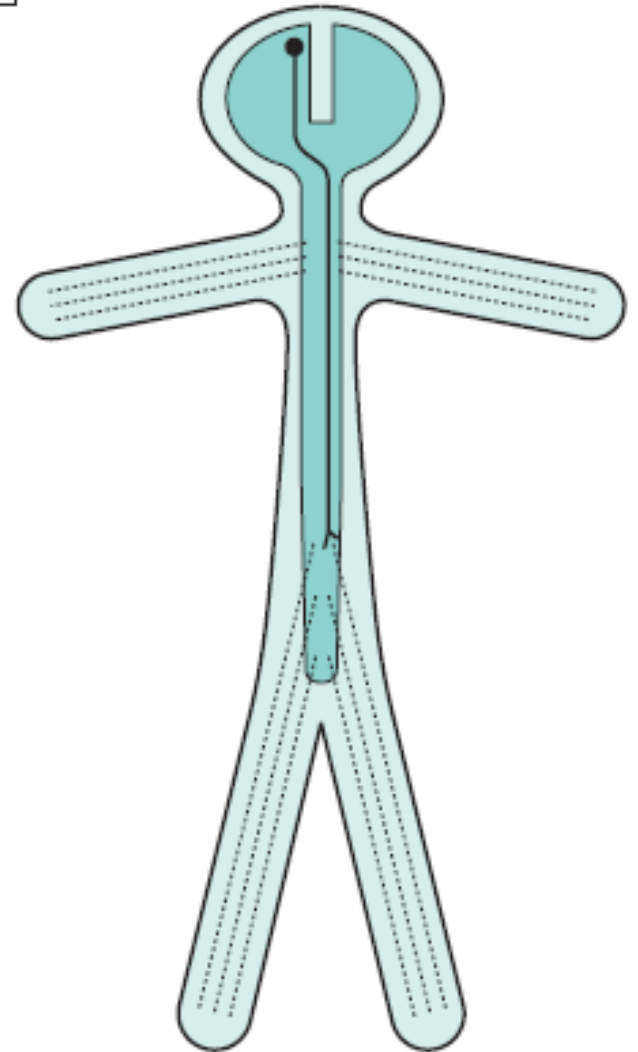
Right Left

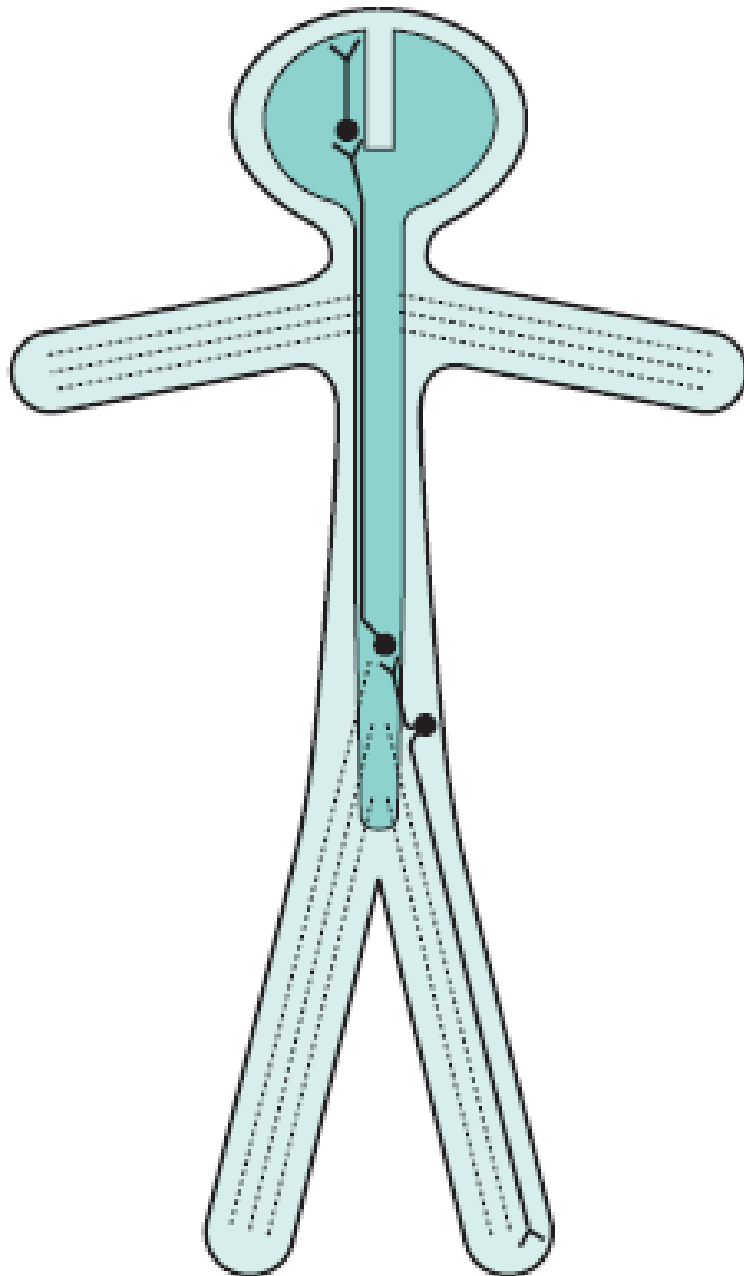


Bladder, bowel and sexual function



## UMNL and LMNL





## Pain and temperature sensation in the left leg

### Third sensory neurone:

- cell body in thalamus
- axon travels to sensory cortex

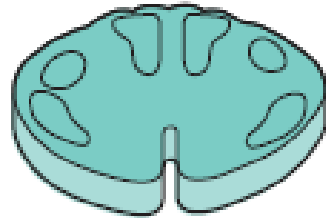
### Second sensory neurone:

- cell body in lumbar spinal cord on the left
- axon crosses to the right and ascends to thalamus in lateral column of spinal cord

### Dorsal root ganglion cell:

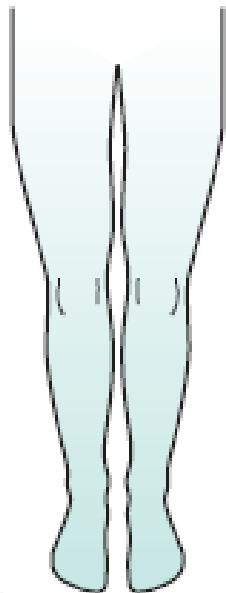
- distal axon from the left leg, via peripheral nerve, lumbosacral plexus and spinal nerve
- proximal axon enters cord via dorsal root of spinal nerve, and relays with second sensory neurone

# CLINICAL SYNDROMES

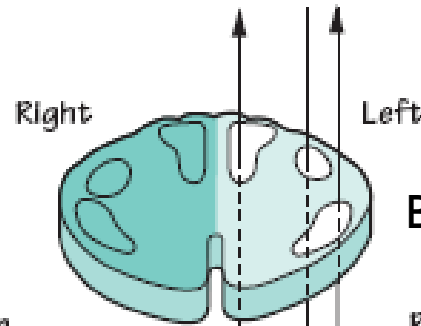


Complete spinal cord lesion

No downward or upward transmission of impulses



(a)



**Brown-Sequard Synd**

Right-sided spinal cord lesion

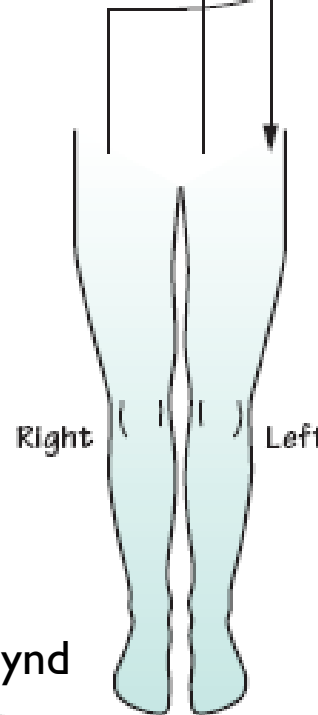
No neurotransmission in :

Right pyramidal tract  
∴ UMN signs right leg

Right posterior column  
∴ position and vibration sense loss right leg

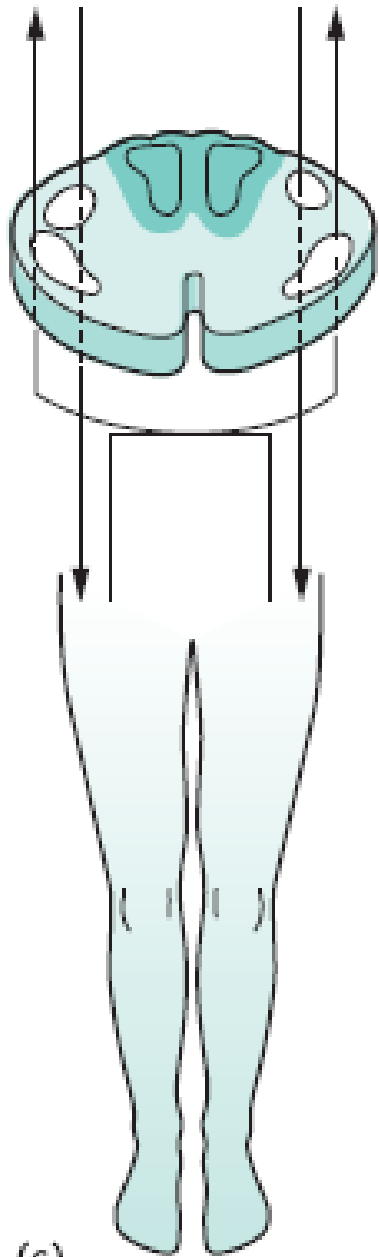
Right spinothalamic tract  
∴ pain and temperature sense loss left leg

Effect upon bladder variable, probably just intact



**Clinical Brown-Sequard Synd**

(b)

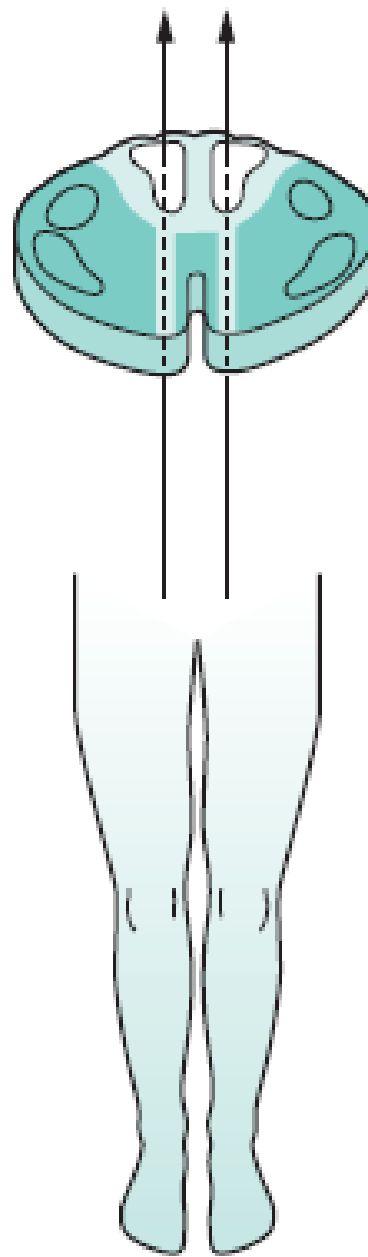


Posterior column spinal cord lesion

No neurotransmission in either posterior column  
 $\therefore$  position and vibration sense loss in both legs

Bladder probably intact

(c)



Anterolateral column spinal cord lesion

No neurotransmission in :

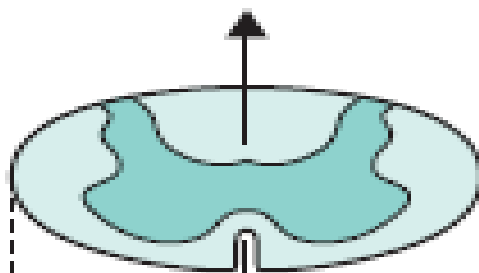
Either pyramidal tracts  
 $\therefore$  UMN signs both legs

Either spinothalamic tracts  
 $\therefore$  pain and temperature sense loss **both** legs

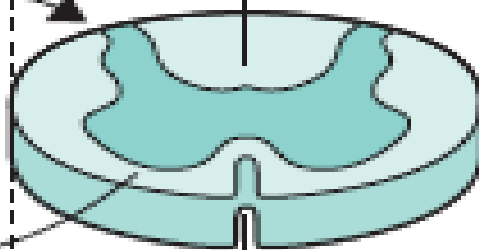
Tracts to bladder, bowel etc.  
 $\therefore$  Incontinence, retention, constipation

(d)

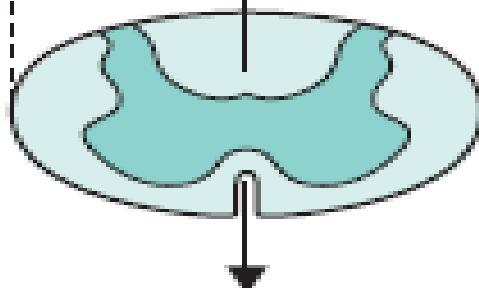
Tract symptoms  
and signs



Segmental  
symptoms  
and signs



Lesion



Tract symptoms  
and signs

## LAND MARK: LEVEL M/S

Composite symptoms of  
Tract and segmental lesions

M

LMNLWK  
Myotome

Lost Reflex

S

S loss  
Dermatome

Radicular  
pain

Pyramidal Weakness E

Superficial S C

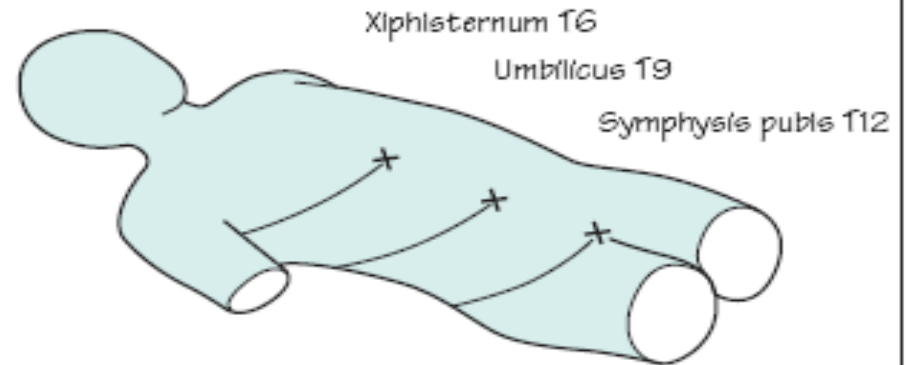
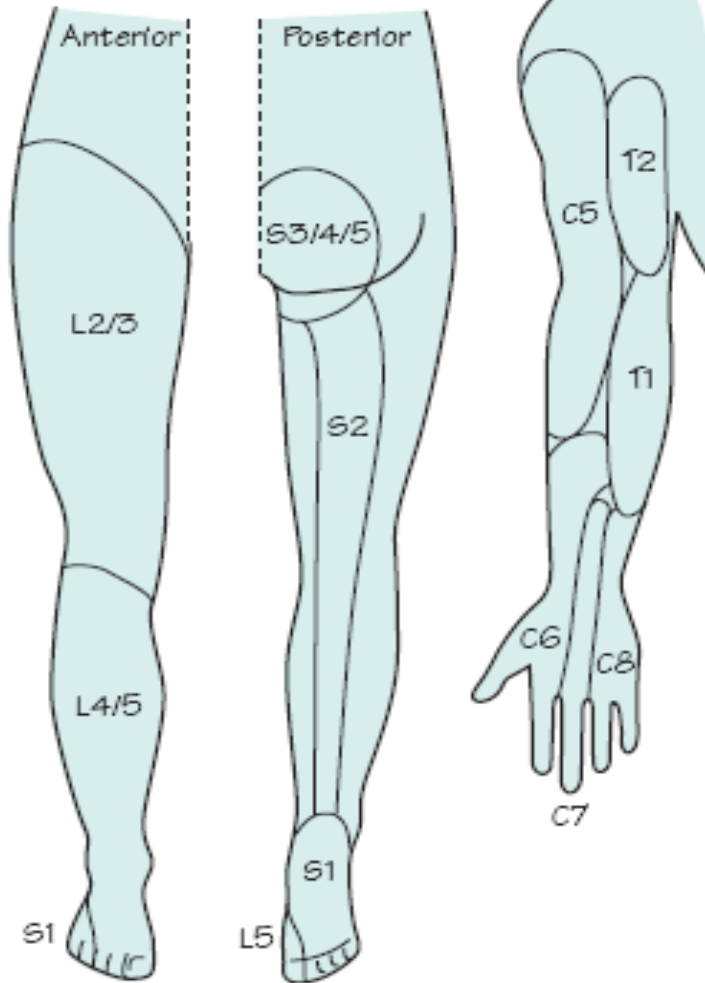
Deep S E

Bladder





# Dermatomes & Myotomes



Shoulder abduction	C5	Biceps Jerk	C5/6
Elbow flexion	C5/6	Supinator Jerk	C5/6
Elbow extension	C7/8	Triceps Jerk	C7/8
Finger extension	C7/8		
Finger flexion	C7/8		
Small hand muscles (e.g. finger abduction)	T1		
Hip flexion	L2/3	Knee Jerk	L3/4
Knee extension	L3/4	Ankle Jerk	S1/2
Foot/toe dorsiflexion	L4/5		
Foot/toe plantar flexion	S1/2		
Knee flexion	L5/S1		
Hip extension	L5/S1		

# FOCAL SPINAL CORD DISORDERS

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## **Anatomically:**

- ▶ Extradural (Bony pain, root pain)
- ▶ Intadural (root pain)
- ▶ Intramedullary (painless, bilateral symmetrical)

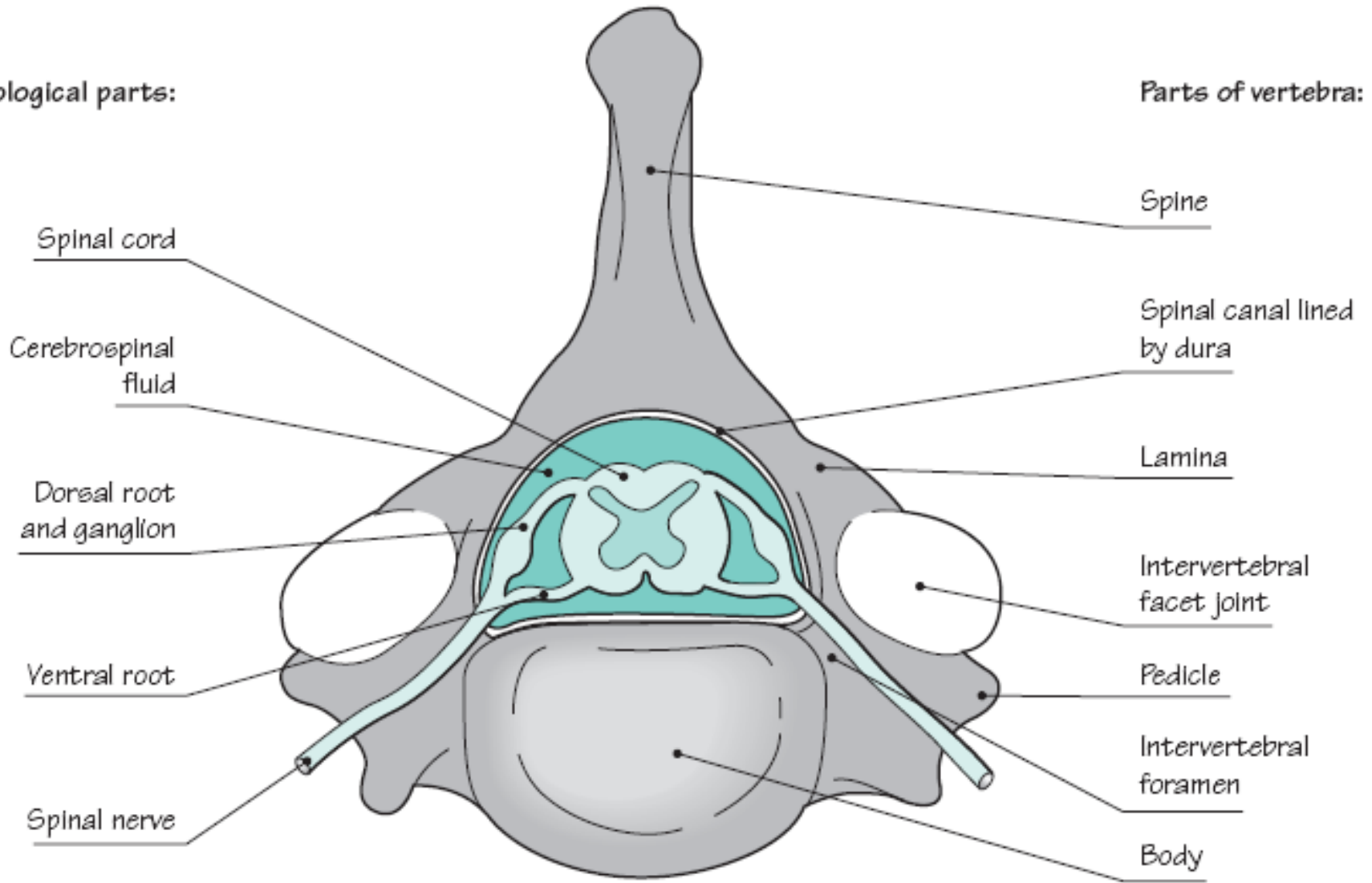
## **Etiologically:**

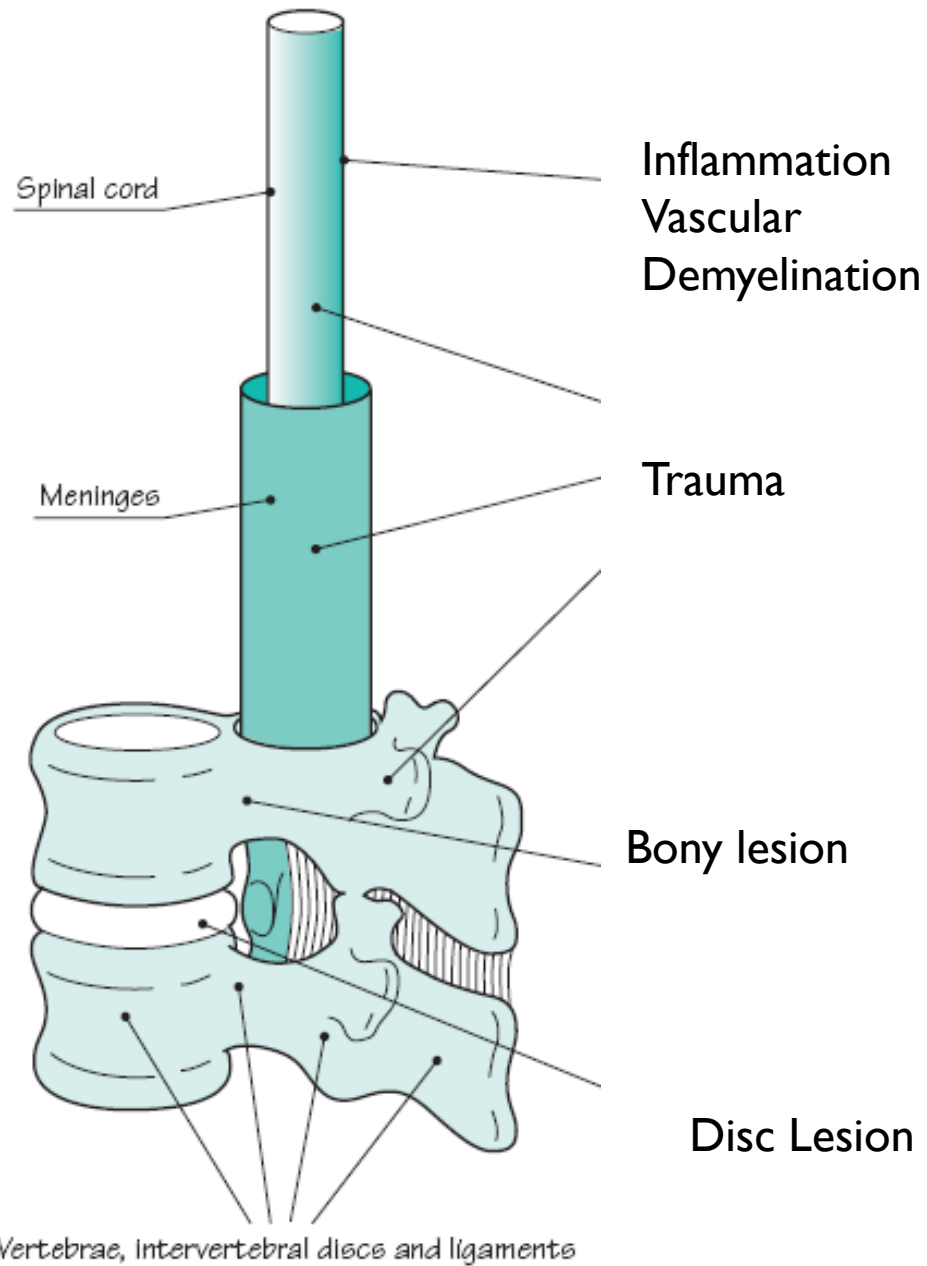
- ▶ Acute Disorders.
  - ▶ Gradual Progressive Disorders.
- 



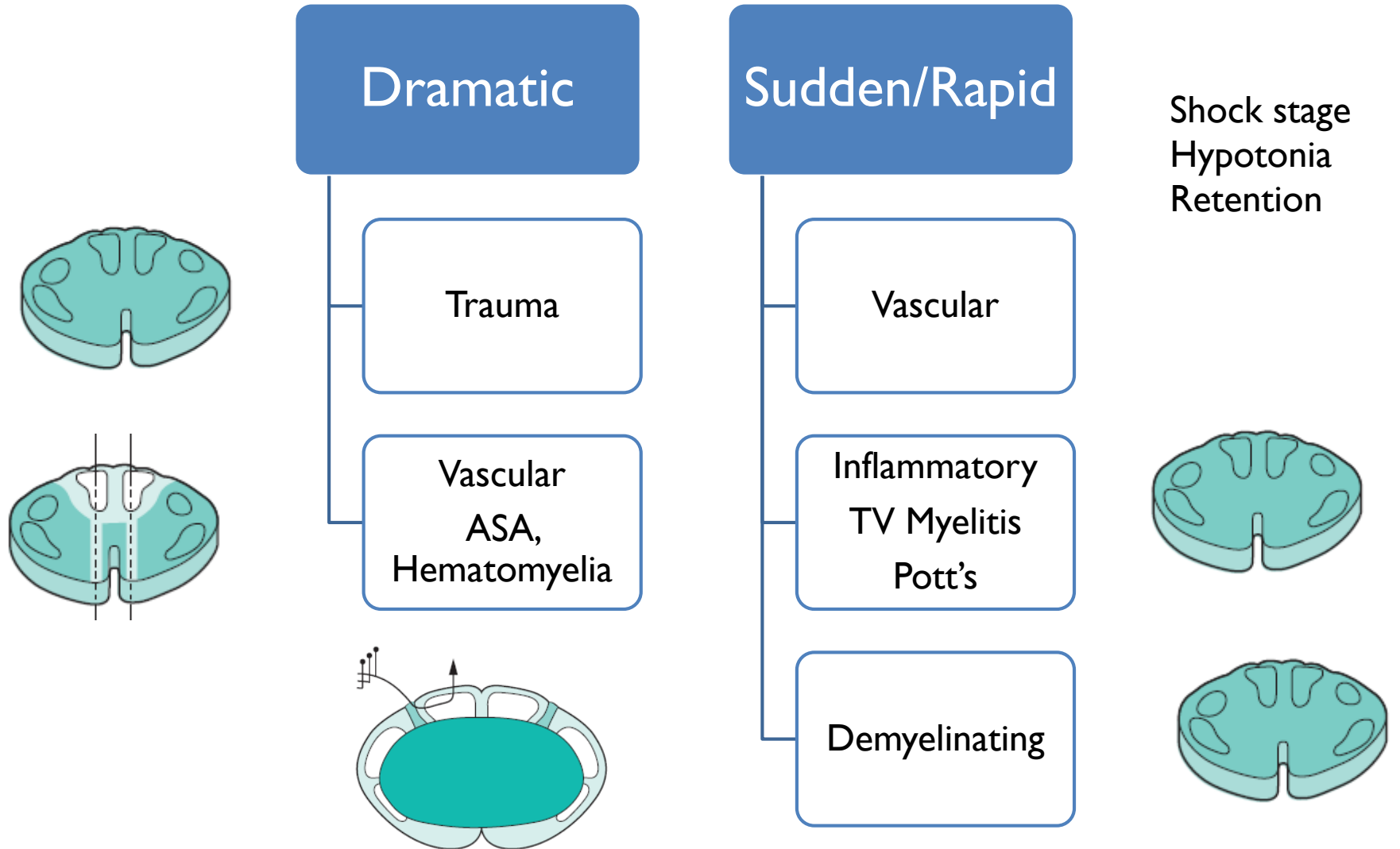
Neurological parts:

Parts of vertebra:





# ACUTE FOCAL SPINAL CORD DISORDERS



# Gradual Progressive Focal Sp C Dis

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## SOL

- ▶ Tumour
- ▶ Syringomyelia
- ▶ Vertebral disorder
- ▶ Pott's Disease





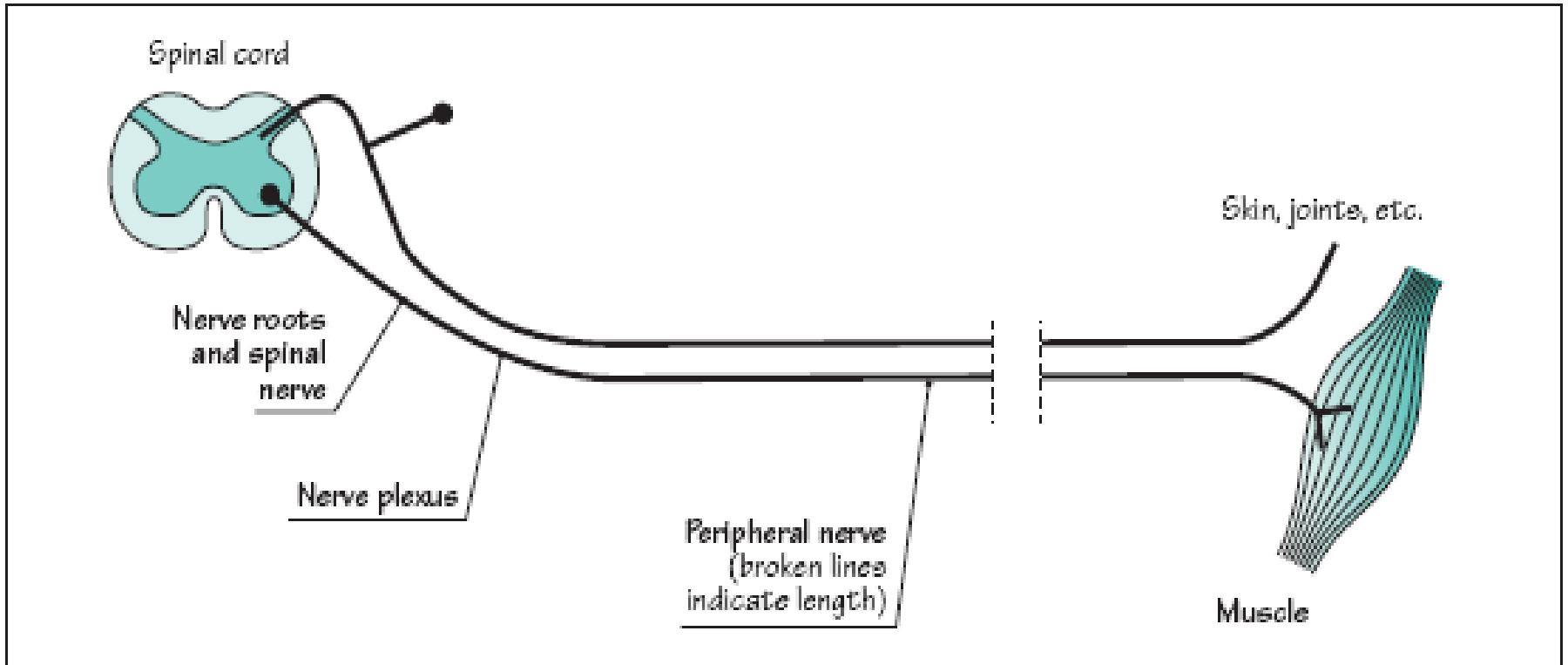
Low cervical cord compression due to prolapsed discs (arrows).



High signal in the upper cervical cord due to multiple sclerosis (arrow).



# NERVE ROOT LESIONS



- ▶ Prolapsed intervertebral disc
- ▶ Herpes zoster





# Clinical Presentations

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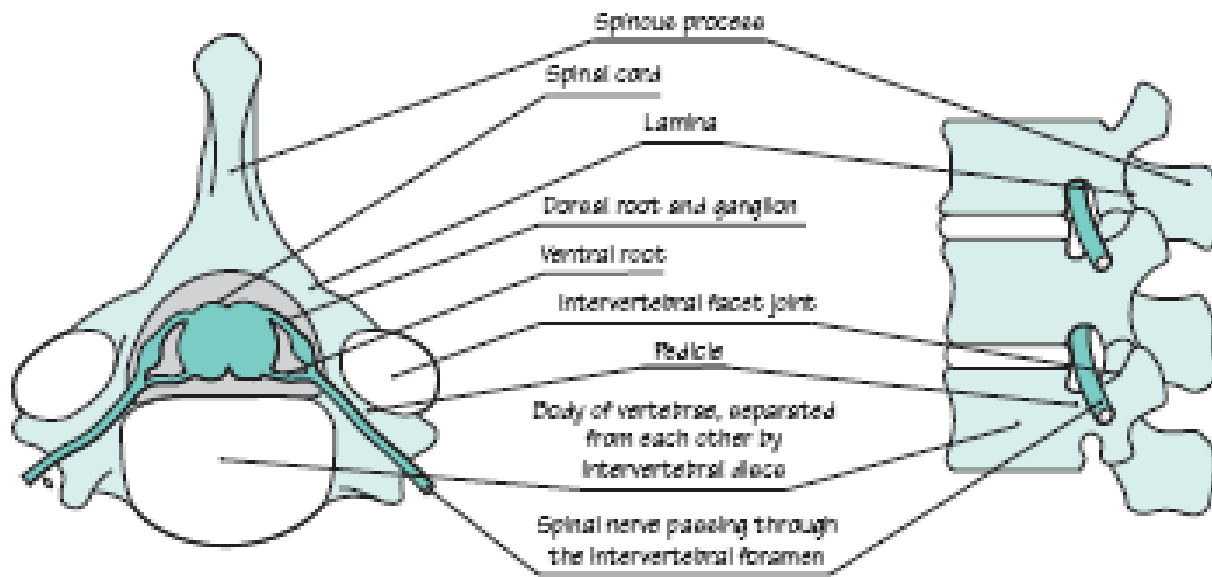
## 1. Skeletal:

- pain, tenderness and limitation in the range of movement in the affected area of the spine;
- reduced straight leg raising on the side of the lesion, in the case of lumbar disc prolapses.

## 2. Neurological:

- pain, sensory symptoms and sensory loss in the dermatome of the affected nerve root;
- lower motor neurone signs (weakness and wasting) in the myotome of the affected nerve root;
- loss of tendon reflexes of the appropriate segmental value;
- since most disc prolapses are posterolateral, these neurological features are almost always unilateral.





(a)



(b)

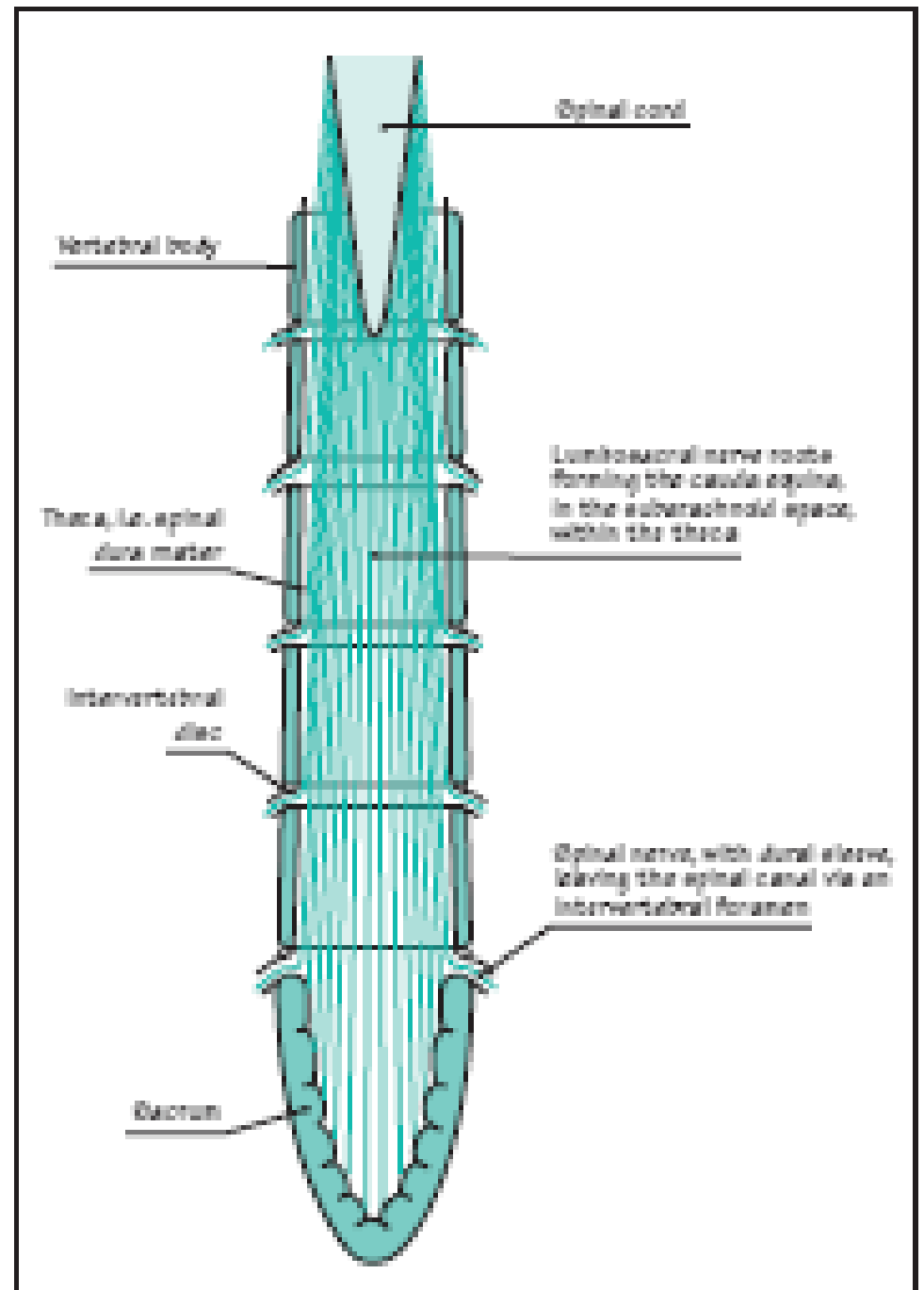
Common nerve roots to be compressed by prolapsed intervertebral discs:

In the arm	C5	In the leg	L4
	C6		L5
	C7		S1
	C8		



# Cauda Lesions

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# SYSTEMIC SPINAL CORD DISORDERS

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- ▶ MND
- ▶ Hereditary spastic paraparesis



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**THANK YOU**

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