

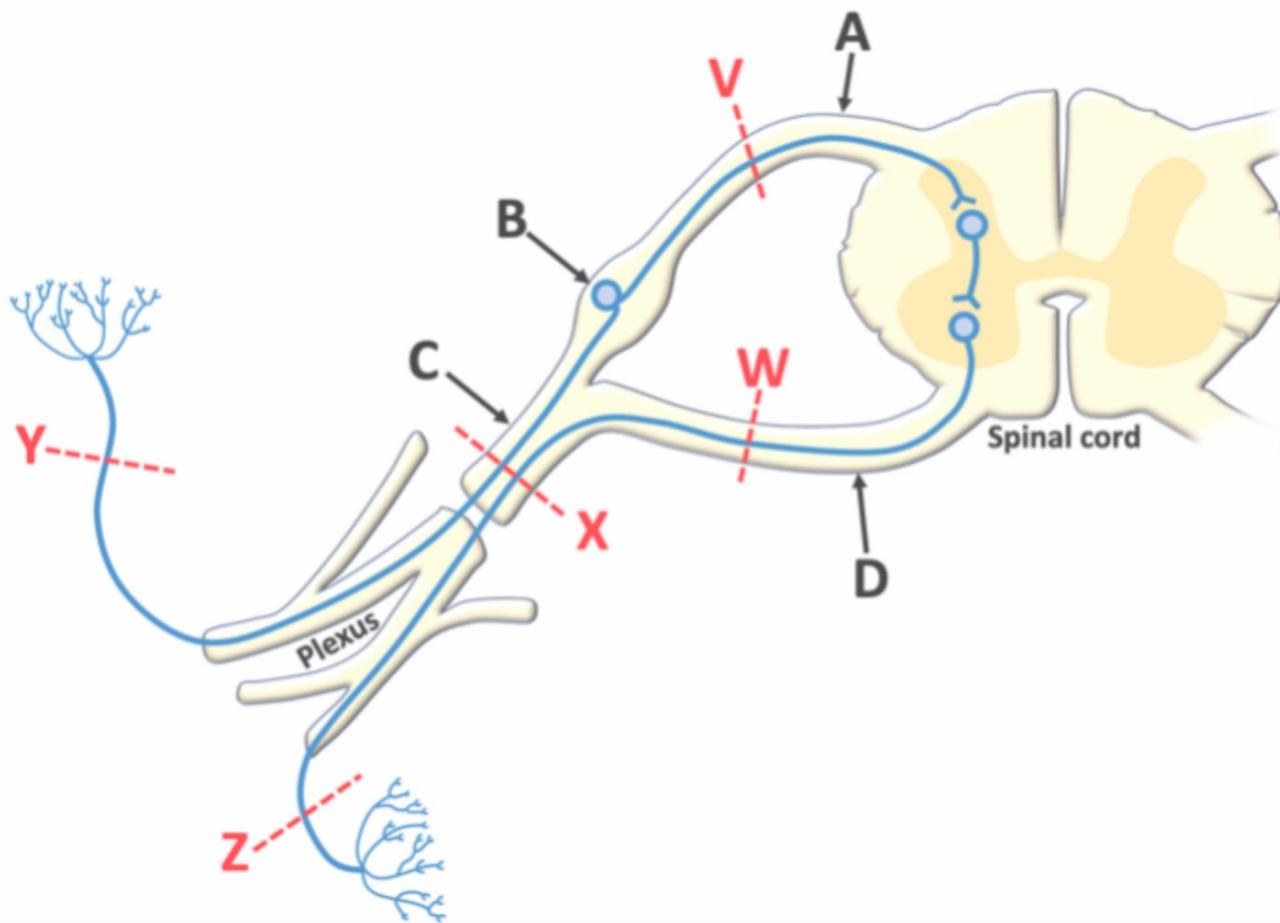
IMPERIAL

# Tutorial – disorders of the PNS

Dr Paul Strutton [p.strutton@imperial.ac.uk](mailto:p.strutton@imperial.ac.uk)



# Part 1A – spinal cord section



Name the structures A, B, C & D

A – dorsal root (afferent)

B – dorsal root ganglion

C – mixed spinal nerve

D – ventral root (efferent)



## Part 1B – lesions

V, W, X, Y, Z are possible sites of lesions (injury or disease). In each case explain what kind of deficit(s) the lesion would produce and how it would be distributed in the body.

V – Damage to dorsal root leads to loss of sensation in dermatome supplied by the corresponding spinal nerve. This would probably not be detectable if only one root affected as there is considerable overlap of dermatome innervation by adjacent spinal nerves.

W – Damage to ventral root leads to weakness of muscles supplied by the corresponding spinal nerve. Most limb muscles are innervated by 2 or more spinal nerves therefore paralysis is unlikely unless all spinal roots are damaged.



## Part 1B – lesions continued...

V, W, X, Y, Z are possible sites of lesions (injury or disease). In each case explain what kind of deficit(s) the lesion would produce and how it would be distributed in the body.

X – Damage to the spinal nerve leads to combined effects of V and W.

Y – Damage to a sensory nerve (e.g. in the skin) leads to loss of sensation in the area of distribution of that peripheral nerve.

Z – Damage to a muscle (motor) nerve leads to weakness/paralysis of the muscle supplied by that peripheral nerve.



## Part 1B – lesions continued...

V, W, X, Y, Z are possible sites of lesions (injury or disease). In each case explain what kind of deficit(s) the lesion would produce and how it would be distributed in the body.

In the diagram in part A, lesions Y and Z are shown affecting nerve branches close to their targets and would therefore have a purely sensory or motor effect. More proximal lesions to peripheral nerves would probably affect both motor and sensory function.

Contrasting the effects of V/W and Y/Z demonstrates the effect of the plexus which redistributes the axons from spinal nerves into the peripheral nerves.



## Part 1B – lesions continued...

Suggest common medical scenarios which might result in a lesion occurring at each point.

Spinal root and spinal nerve damage is most often a consequence of strain injuries to the spine, e.g. prolapsed or herniated intervertebral disc.

Peripheral nerves may be affected by trauma or disease (peripheral neuropathy)

The brachial plexus may be affected by trauma to the shoulder joint. The lumbosacral plexus is much better protected and therefore unlikely to be injured.



## Part 2: A really sore leg

A 50-year-old patient has pain in his right leg. He reports that it extends from his buttock, down his thigh, calf and into his toes and that it gets worse when he moves. He describes the pain as stabbing, burning or shooting and has pins and needles in his right leg. He says that he feels as though his right leg is weaker than the left.



## Part 2 - question 1

Which structures are involved to produce the symptoms?

The anterior and posterior nerve roots of lumbar spinal nerves L5 and S1. The dermatomal distribution of L5/S1 nerves is the buttock, back of thigh, front and back of calf, big toe and side of foot.



## Part 2 - question 2

What is the name of the condition?

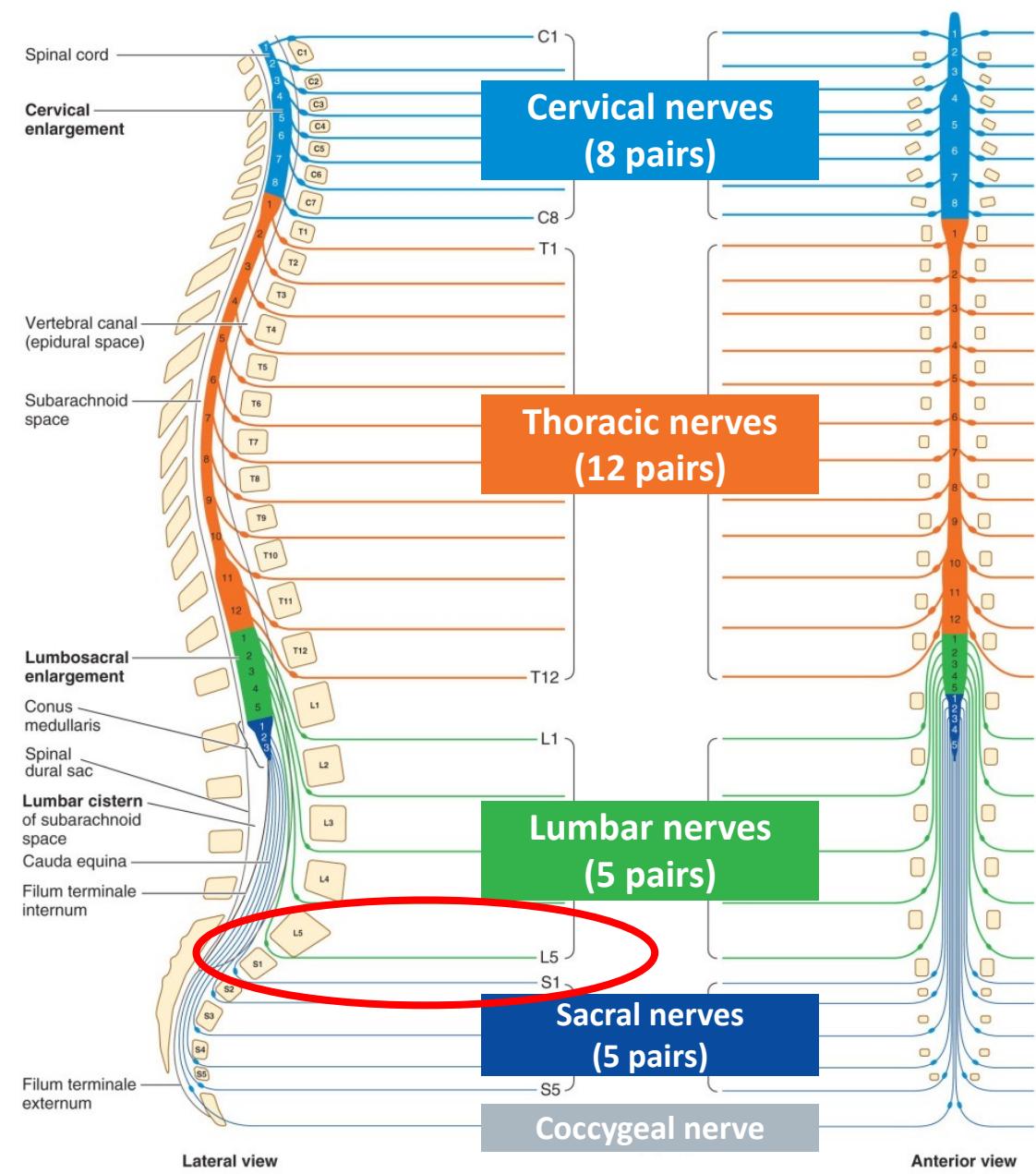
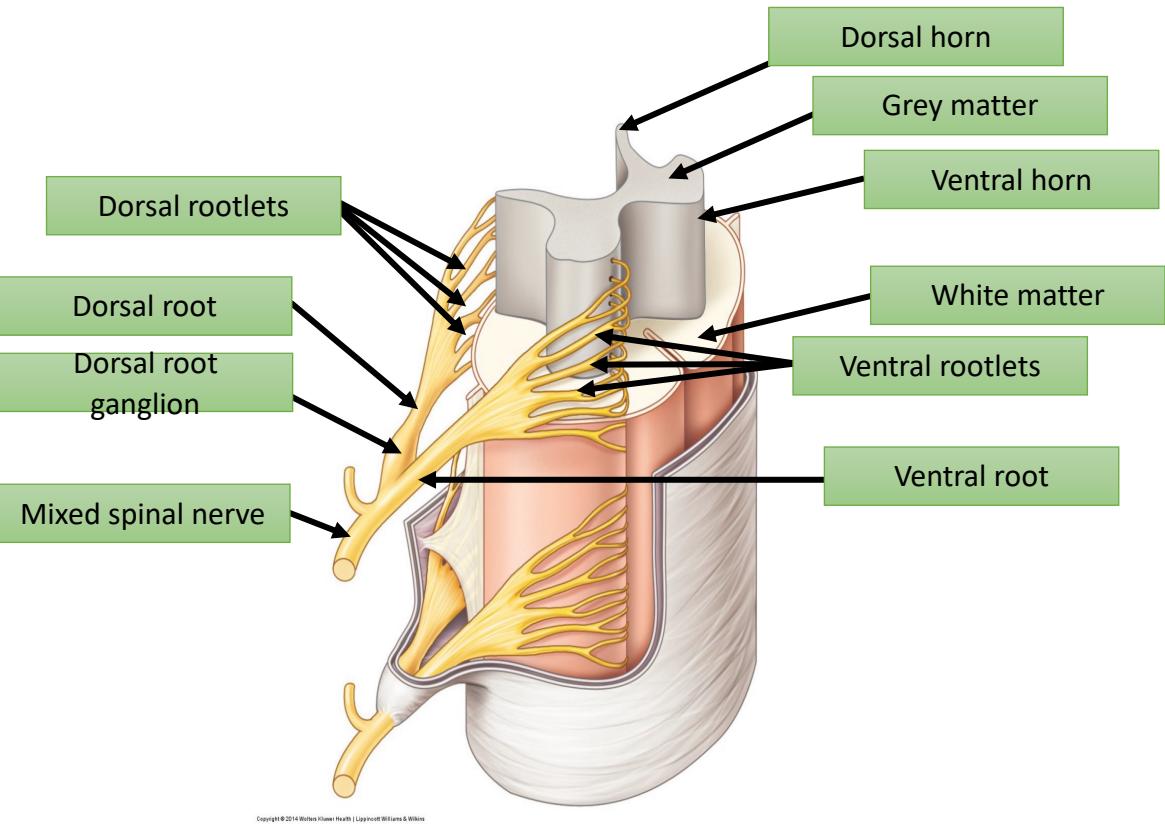
Lumbar spinal radiculopathy (Latin radix meaning “root” and Greek pathos meaning “suffering” or “disease”). Also known more commonly as sciatica.

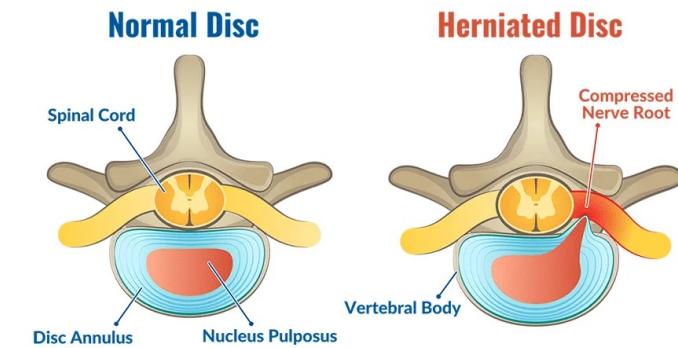
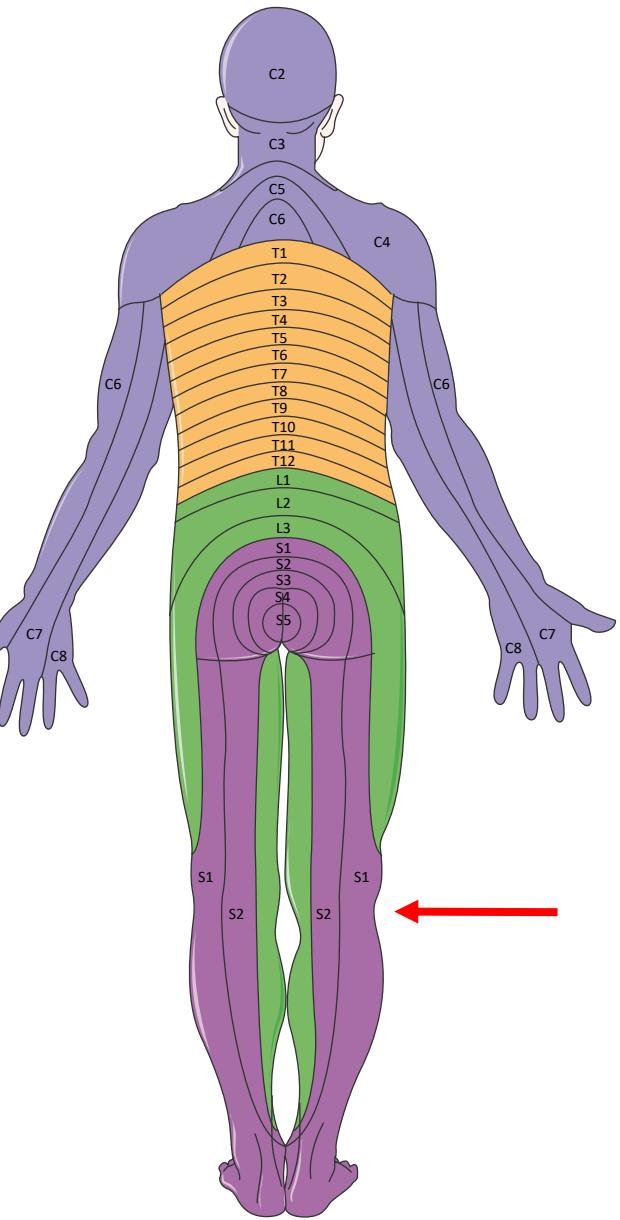
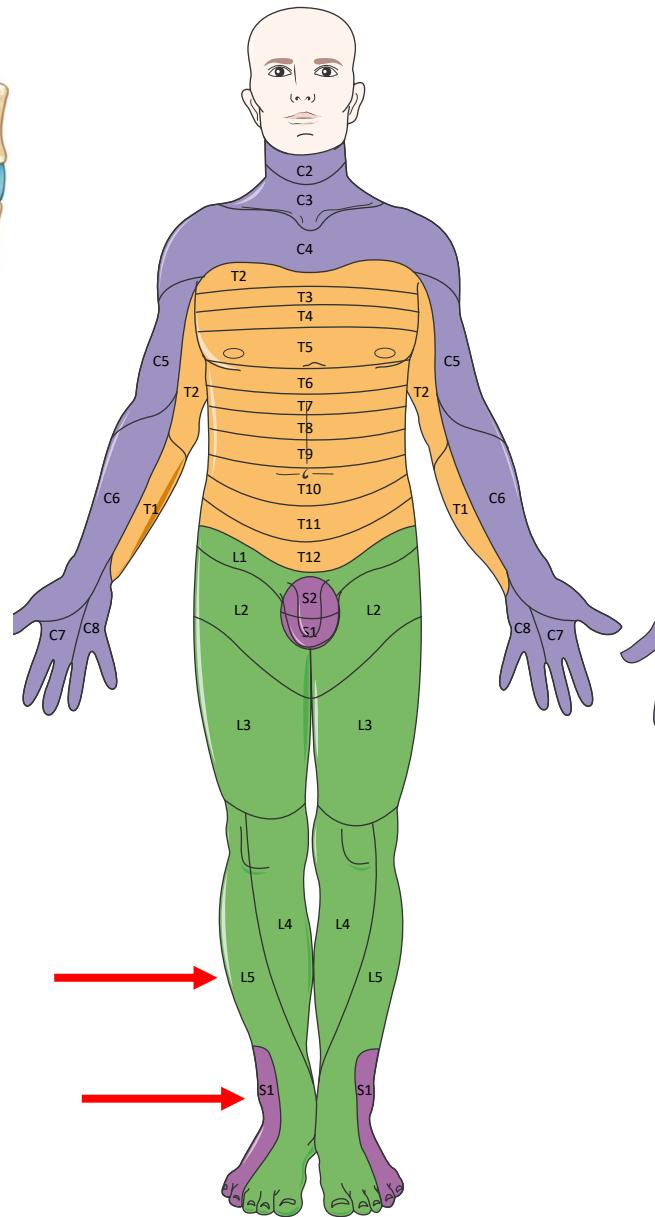
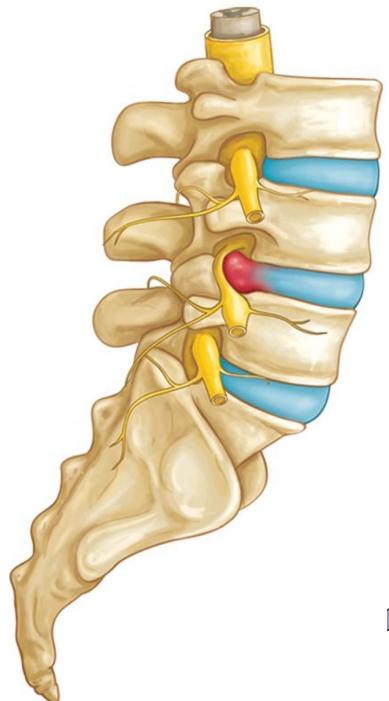
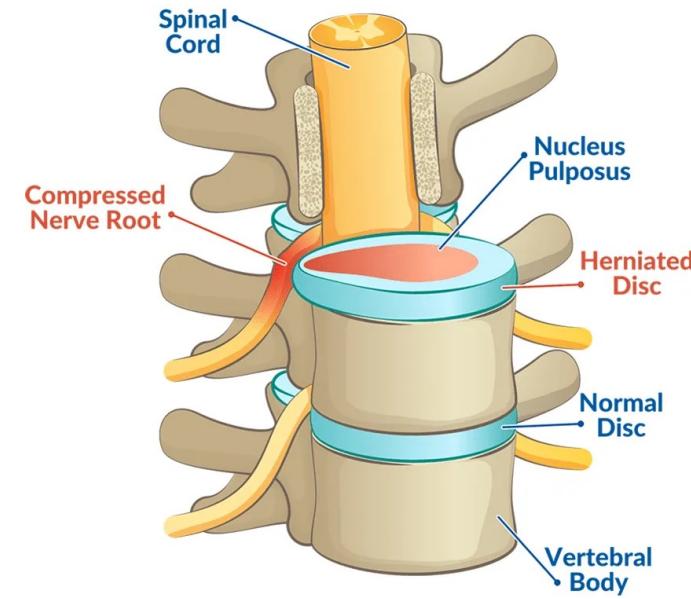


## Part 2 - question 3

What could be the cause of the condition?

Compression of the spinal nerves can arise from a herniated (slipped) disc, narrowing of the intervertebral foramina where the nerves emerge (foraminal stenosis) or slippage of the vertebrae with respect to one another (spondylolisthesis). Other non-disc causes include malignancy (e.g. metastatic bone disease), arthritis, bone growths, piriformis syndrome (where the nerves are compressed by the contraction of the piriformis muscle in the buttocks).







## Part 2 - question 4

What treatment options are available?

- Pain killers (nonsteroidal anti-inflammatory drugs, e.g. ibuprofen).
- Exercise and stretching (e.g. Pilates).
- Epidural injections (into the space around the dura mater) - these can be delivered into the caudal part of the spine (sacral hiatus), rather than the site commonly used for e.g. pain relief during childbirth (L3/L4 space).
- Decompression surgery/discectomy. These don't always provide full pain relief!

The straight leg raise (SLR) test can help to confirm diagnosis. This test stretches the sciatic nerve and recreates the pain felt by the patient. Imaging can be used if necessary.