Learning Outcomes

HIGH LEVEL - Science

- Describe the structure and function of the back and spine (8a)
- Outline the functional anatomy and physiology of the spinal cord and peripheral nerves (8a)
- Describe the anatomical relationship of the spinal cord and peripheral nerve roots to the vertebral column (8a)
- Describe the physiology of nerve conduction (8a)
- Explain the difference between upper and lower motor neurone lesions (8a,b)
- Explain the pathological mechanisms responsible for the development of back-pain (8a)

HIGH LEVEL - Science

- Describe the features of medically significant causes of back pain (red flag symptoms and signs) including metastatic disease their investigation and management (8b-f,16a,b)
- Outline the physiology of bone health (8a)
- Describe the epidemiology of back pain and sickness related absence from work (9a-f)
- Apply knowledge about the social aspects of chronic illness to understanding patients' experiences of back pain, and to clinical practices of information, support and referral (10a-d)

HIGH LEVEL - Practical

- Perform an examination of the spine (13c,14a,b)

- Perform a neurological examination of the upper and lower limbs (13c,14a,b)

HIGH LEVEL - Professional

- Describe the role of palliative care teams in supporting patients (22a,b)

- Describe the legal framework of work and ill health and processes for sickness and disability certification (20g)

LO – The Case

- Explain the underlying mechanisms of low back pain using background knowledge of relevant anatomy
- Know the incidence of low back pain in primary care and the initial management (e.g.NICE guidance)
- Know the epidemiology of low back pain
- Know the following conditions: non-specific / mechanical low back pain, degenerative disc disease, facet joint arthrosis, spondylolysis, spondylolisthesis, inflammatory back pain, disc prolapse, spinal stenosis, cauda equina syndrome

LO – The Case

- Describe the red flags which may suggest more serious spinal pathology
- Describe the yellow flags which may limit recovery and rehabilitation
- Explain the social and economical burden due to sickness from work related to back pain
- Explain the legal framework of work and ill health and processes for sickness and disability certification
- Apply knowledge about the social aspects of chronic illness to understanding patients experiences of back pain, and to clinical practices of information, support and referral

LO – Anatomy Session

- Know the macroscopic and microscopic anatomy of the bones, ligaments and muscles around the spine, the intervertebral disc, the spinal cord, meninges and nerves
- Demonstrate the main spinal cord motor and sensory tracts and the deficits that result as a consequence to injury
- Explain the different spinal cord syndromes – anterior, posterior, central and Brown-Sequard
- Explain the difference between upper and lower motor neuron lesions with clinical examples
- Be familiar with normal radiological imaging of the spine – X-rays, CT and MRI
- Demonstrate the anatomical landmarks and principles for performing epidural and spinal injection / catheter insertion

LO – Nerve Plenary

- Describe the physiology of normal nerve conduction at a cellular level including the maintenance of a resting and action potentials via sodium and potassium gated channels
- Describe transmission of an electrical signal along a nerve axon and the role of the myelin sheath
- Describe the release of neurotransmitters at pre-synaptic junctions and subsequent generation of a post-synaptic action potential
- Describe the afferent and efferent pathways involved in the detection of a peripheral stimulus and the resulting motor response
- Describe the response of a nerve to injury in terms of neural regeneration, comparing and contrasting the peripheral and central nervous systems.
- Demonstrate understanding of nerve physiology and synapses with specific example of mechanism of action of local anaesthetic and other agents e.g. depolarising muscle relaxants

LO – Bone Plenary

- Know the structure and function of bone and articular cartilage
- Explain the role of osteoblasts and osteoclasts in normal bone remodelling
- Know the relationship between calcium, vitamin D and parathyroid hormone in normal bone remodelling
- Describe the bones response to injury and the normal healing process for a fracture
- Describe the factors that prevent normal fracture healing
- Understand the concept of osteoporosis as a state of reduced bone mineral density and the resultant increased risk of fracture
- List protective factors and risk factors for the development of osteoporosis
- Name at least two medications used in osteoporosis for fracture prevention
- Describe the clinical consequences of vitamin D insufficiency (rickets and osteomalacia)

LO – Spinal Pathology 1

- Be familiar with the epidemiology and main causes of spinal cord injury
- Be familiar with the presenting features of spinal cord injury including spinal shock, neurogenic shock and autonomic dysfunction
- Explain the initial physiological consequences of spinal cord injury on the cardiovascular and respiratory systems
- Explain the concept of complete and incomplete spinal cord injury
- Explain the initial management and investigation of patients with spinal cord injury
- Explain the different spinal cord syndromes – anterior, posterior, central and Brown-Sequard
- Explain the presenting features of cauda equina syndrome
- Identify the main causes of cauda equina syndrome
- Recognise cauda equina syndrome as a surgical emergency and understand the initial steps in its investigation and management
- Recognise the serious causes of back pain in a child

LO – Spinal Pathology 2

- Be familiar with the epidemiology of spinal metastases and metastatic spinal cord compression
- Identify key clinical features that would raise suspicion of metastatic spinal disease
- List the more common malignancies which metastasize to bone
- Explain the ways in which spinal metastases can cause spinal cord compression
- Recognise metastatic spinal cord compression as a medical / surgical emergency and understand the initial steps in its investigation and management
- Recognise the difficulty in the management of some cases of metastatic spinal cord compression and be aware of sources of support (palliative care / oncology / Macmillan / support groups etc.)
- List the presenting features and risk factors for spinal infections
- Explain the ways in which spinal infections can cause spinal cord compression
- Recognise spinal infection as a serious condition and understand the initial steps in its investigation and management
- Recognise epidural abscess as a surgical emergency
- List the more common infective agents that can cause spinal infections (including tuberculosis)

LO – History Examination

- Be able to conduct an appropriate history from a patient with a spinal complaint / condition
- Describe and determine the nature of the pain in terms of Site, Onset, Character, Radiation, Associations, Time course, Exacerbating / relieving factors and Severity (SOCRATES)
- Describe and determine any associated features such as arm / leg pain, weakness, numbness, bladder / bowel involvement
- Be able to screen for any red flag features
- Be able to screen for any yellow flag features

LO – History Examination

- Assess risk factors for the complaint / condition
- Determine the medications / treatments which have been utlilised
- Outline a full employment history and its impact on the clinical problem
- Determine the functional limitations which have resulted as a consequence of the pain
- Outline a full social history including smoking history and sports activities
- Make an enquiry as to the emotional consequences of the spinal complaint / condition
- Ascertain and address the ideas, concerns and expectations of a patient with a spinal complaint

LO – History Examination

- Be able to conduct an appropriate physical examination on a patient
- Perform a physical inspection of the spine (assess for normal thoracic kyphosis and lumbar lordosis, presence of any spinal deformities, scoliosis, skin changes)
- Palpate any region of interest for tenderness
- Palpate vertebral spinous processes for tenderness and paraspinal muscles for muscle spasm
- Assess cervical and thoracolumbar spine movements actively and passively – flexion / extension / lateral bending / left and right rotation

LO – History Examination

- Perform Schobers test – measure the lumbar spine flexion
- Perform Adams forward bending test to assess for any fixed spinal deformity
- Assess straight leg raising (Lasègue's sign)

LO – History Examination

- Perform a neurological examination of the upper and lower limbs
  - Assess gait and Rombergs sign
  - Inspection of the limbs
  - Assess muscle tone
  - Assess power / strength (MRC – Medical Research Council grading) according to the myotomes described by the American Spinal Injury Association (ASIA)
  - Assess deep tendon reflexes – hyper and hyporeflexia
    - Biceps, brachioradialis, triceps, knee and ankle
  - Assess for clonus
  - Assess plantar responses
  - Perform Hoffmans test
  - Perform a full sensory dermatomal examination as described by the American Spinal Injury Association (ASIA)
  - Coordination
  - Assess for saddle anaesthesia and anal sphincter tone

LO – Palliative Care

- Discuss how psychosocial and spiritual issues may impact on patients and their families
- Recognize the importance of patient-centred rather than doctor-centred care
- Define terminal illness and palliative care
- Describe the holistic nature of palliative care
- Summarize the services provided by a specialist palliative care unit
- Appreciate the multidisciplinary nature of palliative care
- Summarize how specialist palliative care links into primary care

Community

- Have you completed the workbook for this Case?

- Discuss adaptation to major life changes, such as bereavement; comparing and contrasting the abnormal adjustments that might occur in these situations
- Determine the extent to which patients want to be involved in decision-making about their care and treatment