

Disorders of the cerebellum

cerebellar syndrome

- incoordination of eye movements (nystagmus),
- speech (dysarthria),
- the upper limbs (intention tremor) and
- gait (ataxia).

The symptoms and signs occur on the same side as (**ipsilateral** to) the lesion in the cerebellum.

Lesions of the sympathetic nervous system

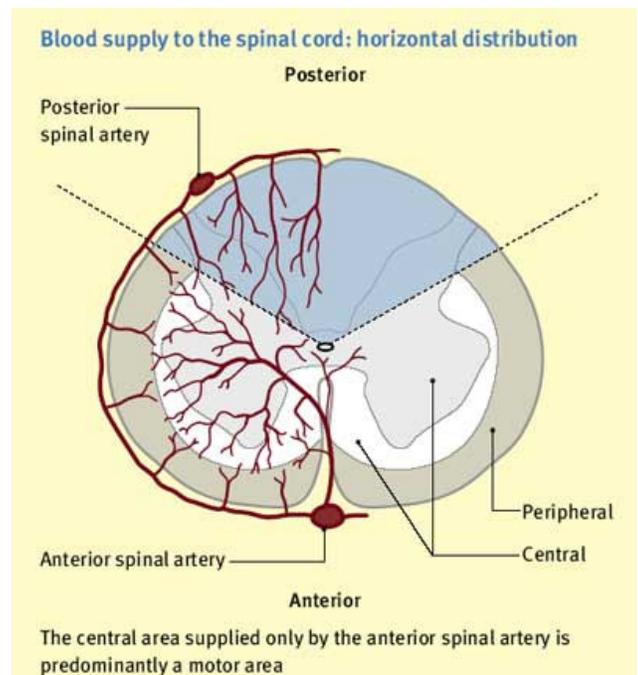
Horner's syndrome refers to drooping of the eyelid (ptosis) and constriction of the pupil (miosis)

Causes :

- damage to the sympathetic nerves to the levator palpebrae superioris and the radial (pupillodilator) fibres of the iris.
- The sympathetic nerves may be damaged as they descend in the brain stem (by stroke or tumour)
- and the spinal cord (by an expanded cavity or syrinx), as they emerge in the first thoracic nerve root (by tumour of the apical lung) and as they ascend in the sympathetic plexus around the carotid arteries (by swelling of the arteries in a migrainous attack).

Disorders of blood supply of the spinal cord

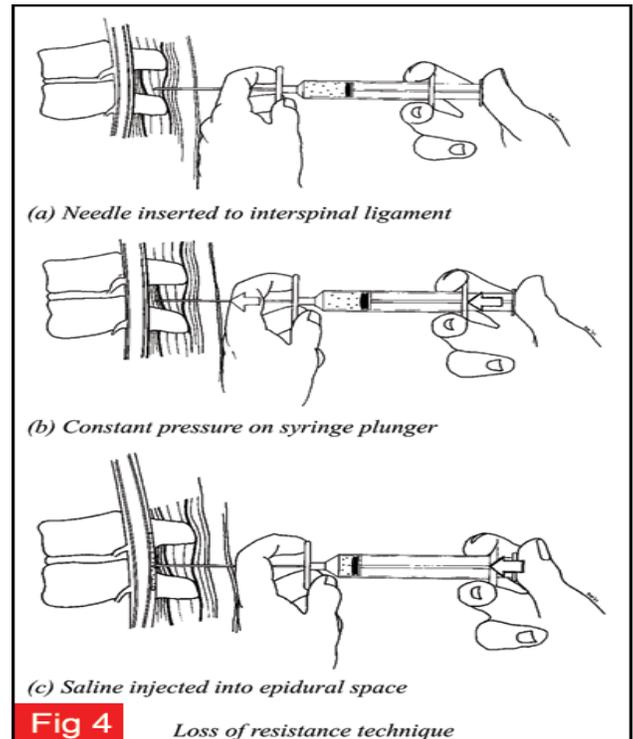
The spinal cord and its blood supply are most vulnerable in the thoracic segment and in the anterior portion of the cord. **Occlusion of the anterior spinal artery** leads to an acute thoracic cord syndrome with paraplegia and incontinence. The spinothalamic modalities of pain and temperature are preferentially lost, whereas the proprioceptive functions of the dorsal columns are relatively preserved.



Lumbar puncture and epidural anaesthesia

The lowest part of the spinal canal does not contain the spinal cord; consequently, hollow needles can be safely inserted into the subarachnoid space in order to remove CSF for :

- diagnostic purposes (**lumbar puncture**) or
- to inject radio-opaque substances for the radiological delineation of the spinal canal and its contents (**myelography**).
- Similarly, anaesthetics may be introduced into the epidural space in surgical procedures (**epidural block**).



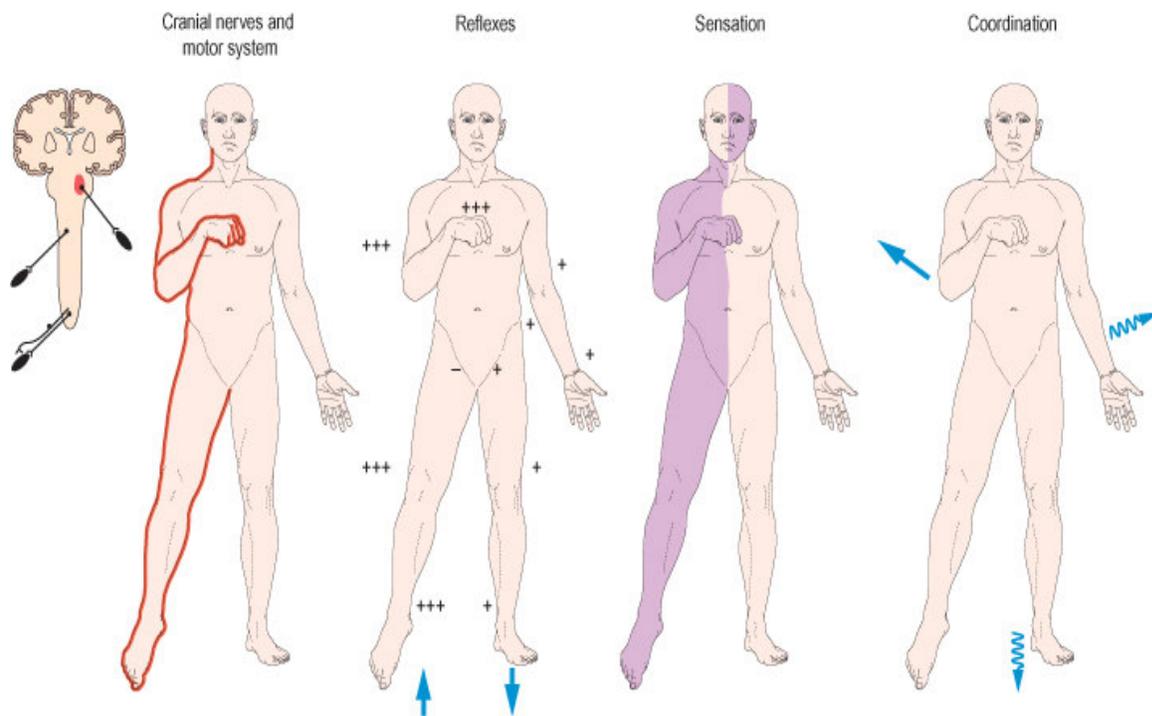
Spinothalamic tract lesions

The spinothalamic tracts can be selectively damaged in **syringomyelia**, in which the central canal becomes enlarged to form a cavity compressing adjacent nerve fibres. The second-order neurons subserving pain and temperature are damaged as they decussate in the ventral white commissure, close to the central canal, causing a selective loss of pain and temperature awareness in the upper limbs. This is termed a **dissociated sensory loss**, since light touch and proprioceptive sensation are retained. The patient injures and burns the hands painlessly, and joints of the limbs become disorganised without discomfort (**Charcot's joints**).

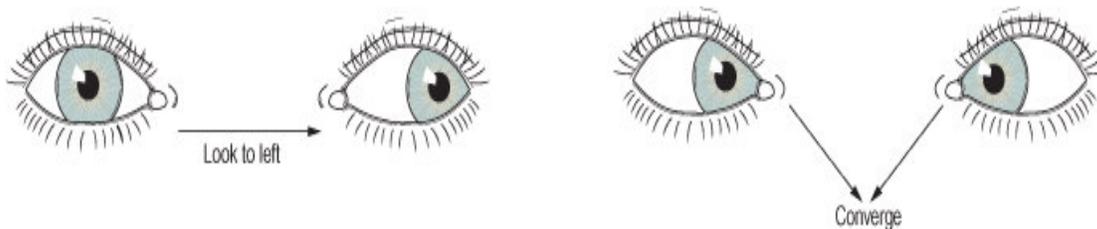
Selective surgical destruction of the spinothalamic tracts (**cordotomy** or **tractotomy**) is sometimes performed for the neurosurgical relief of intractable pain from a variety of causes.

Brain stem lesions

A unilateral brain stem lesion caused by stroke, tumor or multiple sclerosis causes ipsilateral cranial nerve dysfunction, contralateral spastic hemiparesis, hyperreflexia and an extensor plantar response (upper motor neuron lesion), contralateral hemisensory loss and ipsilateral incoordination. A bilateral lesion destroys the 'vital centres' for respiration and the circulation, leading to coma and death. Multiple sclerosis can affect eye movements through demyelination of the medial longitudinal fasciculus, which interferes with conjugate ocular deviation. Typically, on horizontal gaze, the abducting eye moves normally but the adducting eye fails to follow. Adduction is preserved on convergence. **Internuclear ophthalmoplegia** is the term used to describe this disorder.



© Elsevier. Crossman & Neary: Neuroanatomy 3e - www.studentconsult.com



© Elsevier. Crossman & Neary: Neuroanatomy 3e - www.studentconsult.com

Lesions of cranial nerves III, IV and VI

A third (Oculomotor) cranial nerve palsy

Is caused by a lesion of oculomotor nucleus in midbrain or compression by aneurysm or tumor leads to ptosis, dilatation of pupil that is unresponsive to light & accommodation reflexes and inability to move eyeball upwards, downwards and inwards (adduction).

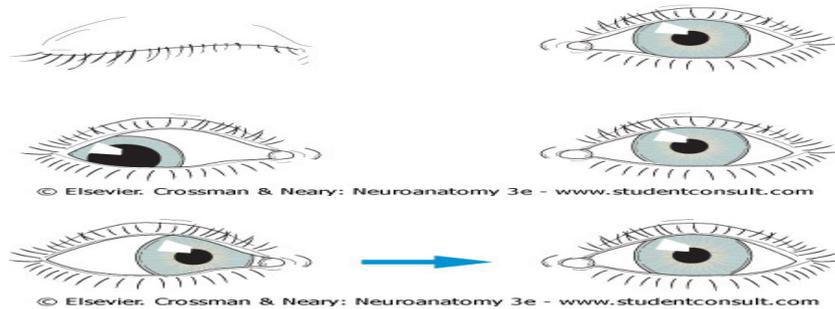
A sixth (Abducent) cranial nerve palsy

Is caused by a lesion of the abducens nucleus in the pons or by compression of the peripheral course of the nerve by an aneurysm or tumour. It leads to inability to move the eyeball outwards (abduction).

Combined unilateral palsies of III,IV,and VI

Combined unilateral palsies of III,IV,and VI during their course in cavernous sinus,superior. Orbital fissure or within the orbit . The effects of such unilateral lesions are:

- ptosis
- dilation of the pupil that is unresponsive to light or accommodation
- paralysis of all eye movements.



Lesions of the trigeminal nerve

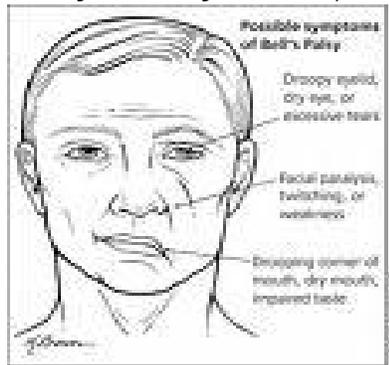
- **Herpes Zoster infection of sensory root of trigeminal N. (shingles)** Leads to severe stabbing pain & eruption of vesicles localised to skin supplied by its branches : ophthalmic , or maxillary or mandibular N..... (**Trigeminal Neuralgia.**)



- **In syringo-bulbia** , central cavitation of medulla caudal to 4th V. leads to destruction of the spinal cord and so, damage of decussating trigemino-thalamic Fs., causing selective loss of pain & temp.sensation (dissociated sensory loss) in the face (cf.syringomyelia). =cavitation of spinal cord

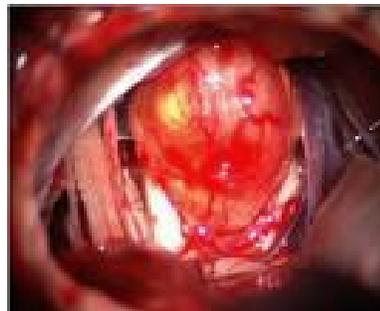
Bell's Palsy :LMN facial paralysis

- It is due to acute unilateral inflammation of facial nerve within the skull (in facial canal).
- Manifested by paralysis of facial muscles of upper & lower parts of face (unilaterally) on the same side of lesion.. pain around ear , - failure to close eye , - absent corneal reflex , - loss of taste sensation in anterior 2/3 of tongue, & hyperacusis =increased sound perception due to paralysis of stapedius.
- If **herpes zoster virus** is the inflammatory agent , a vesicular rash appear in external auditory canal & mucous membrane of oropharynx (**Ramsay Hunt syndrome**).



Acoustic neuroma

- It is a **benign tumor of vestibulocochlear (8th) nerve** leads to compression of the nerve & adjacent structures in **cerebello-pontine angle**.
- So, there is **attacks of dizziness & deafness**.
- With expansion of tumor, ataxia (disturbances of voluntary movement) & paralysis of cranial Ns.(especially V-VII) and the limbs follow due to damage of pyramidal Fs.
- **Unilateral and bilateral acoustic neuromas** occur in the inherited disease neurofibromatosis, in which tumors of the peripheral nerves and skin (neurilemmoma and neurofibroma) can cause cosmetic blemish and deformity



Motor neuron disease and lesions of cranial nerves IX-XII

- Occurs in those over 50 years due to **chronic degeneration of cortico-bulbar tracts** projecting to nucleus ambiguus (sends motor Fs.in 9,10,11 nerves) & hypoglossal nucleus , leading to dysphonia (difficulty in phonation), dysphagia (difficulty in swallowing) , dysarthria (difficulty in articulation) and weakness & spasticity of tongue (**pseudobulbar palsy**).
- There is also degeneration of **nucleus ambiguus & hypoglossal nucleus themselves**, leading to dysphonia,dysphagia, dysarthria and weakness, wasting & fasciculation of tongue (**bulbar palsy**).



- **IX-XII nerves can be damaged** by tumors **in skull foramina**, lead to dysphonia, weakness, wasting & fasciculation of tongue and depression of gag reflex with unilateral wasting of sternomastoid & trapezius Ms.



Team leader : Dr. hams

Dr.noop... Omar H

Dr. S ... M.A.M

ابتسم !! ... همي بروحي

Abo Slo7 ... Cute killer

لقد سارت ركائبنا لتعلو هامة النجم

نردد في ضمير الكون ليس السفح كالقمم