Cranial Nerve Assessment

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- 12 cranial nerves

- 9-12 in medulla
- 5-8 in pons
- 3-4 in midbrain

1st cranial nerve (olfactory)

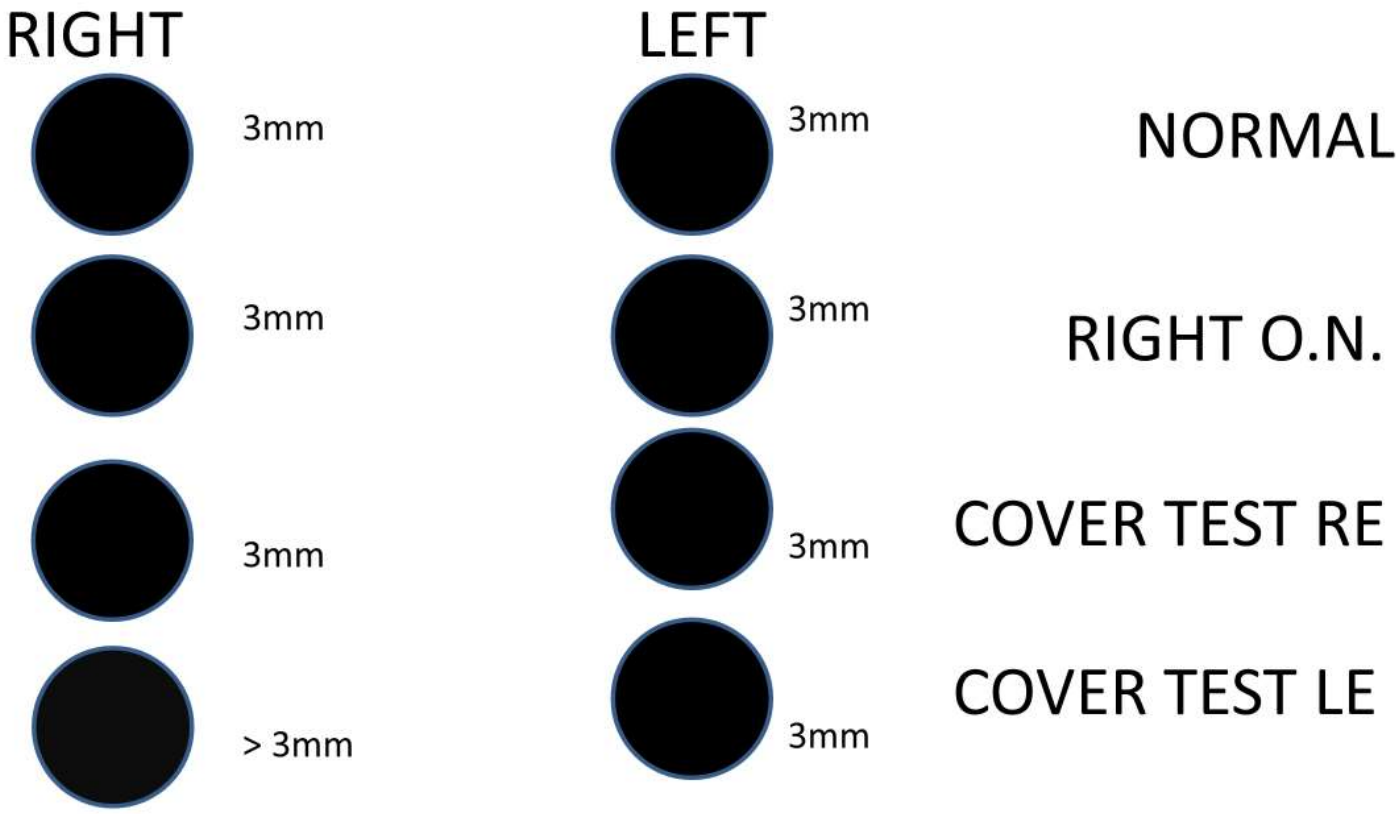
- Anosmia
  - Common causes
    - Trauma
    - Meningoima
    - Covid

- Lies on cribiform plate, passes to hippocampus area on the same side unilateral cortical lesions do not cause anosmia unless it involves the olfactory tract

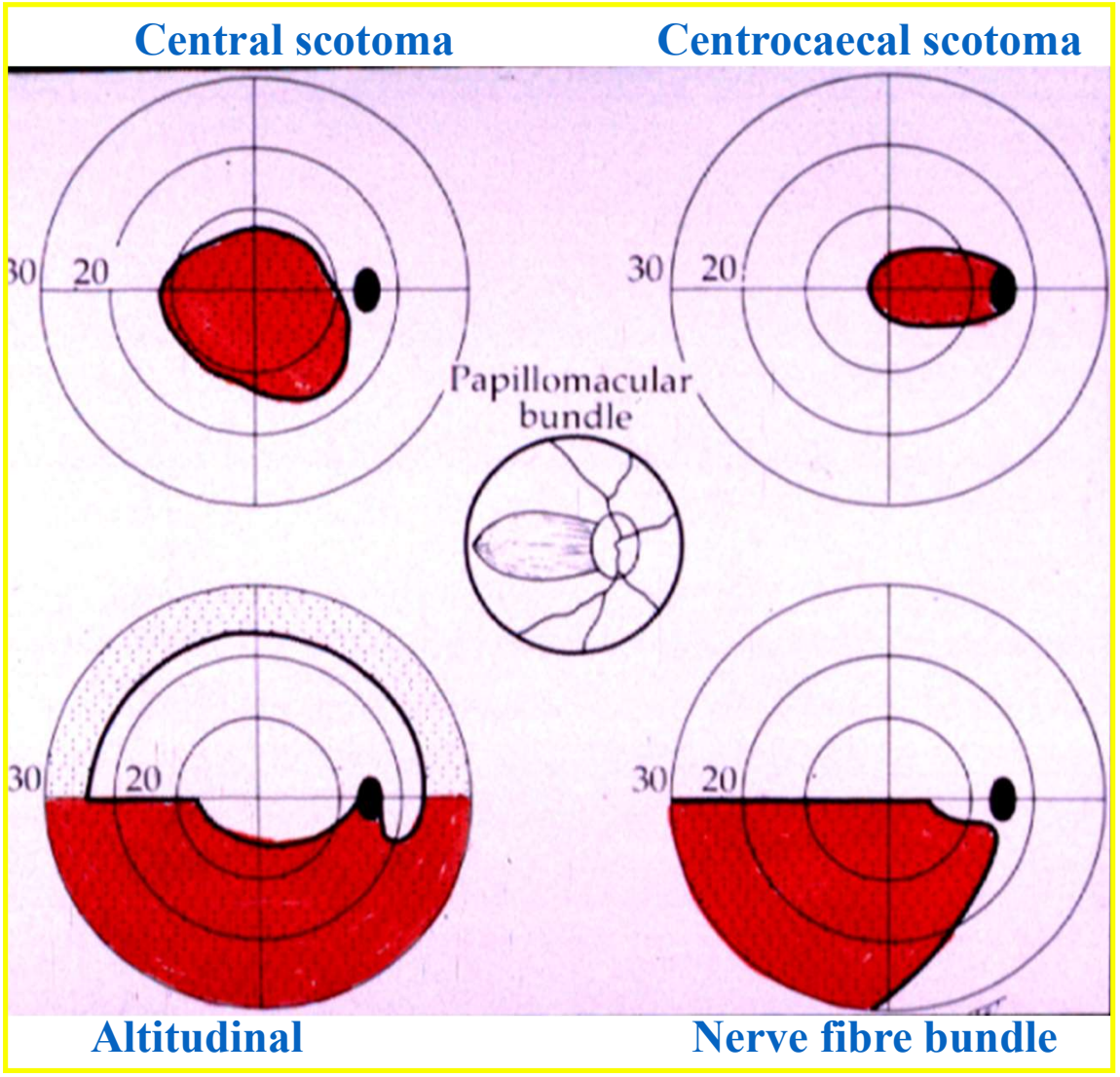
2nd cranial nerve (optic)

- Vision
- Visual fields
- Colour vision
- Pupil response
- Fundoscopy

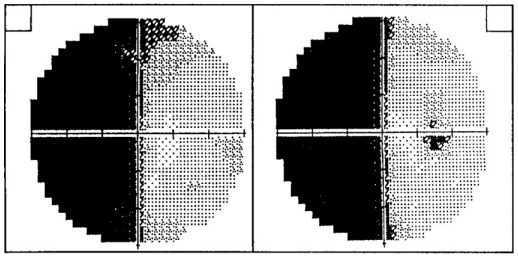
Pupils – RAPD


RIGHT
LEFT
3mm
3mm
NORMAL
3mm
3mm
RIGHT O.N.
3mm
3mm
COVER TEST RE
> 3mm
3mm
COVER TEST LE

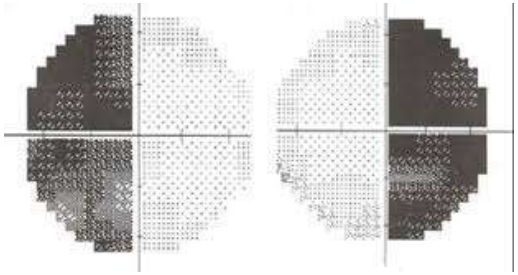
Visual field defects



Visual field defects

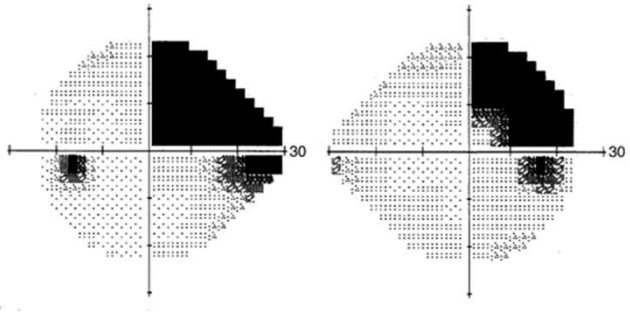


Homonymous hemianopia

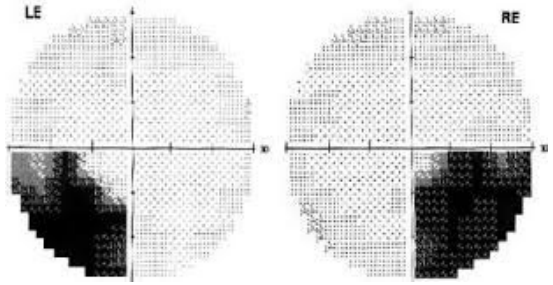


Bitemporal hemianopia

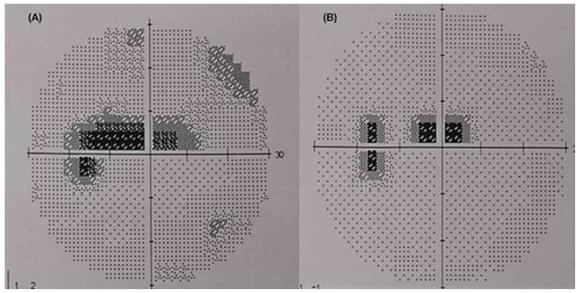
Visual field defect



Superior quadrantinopia

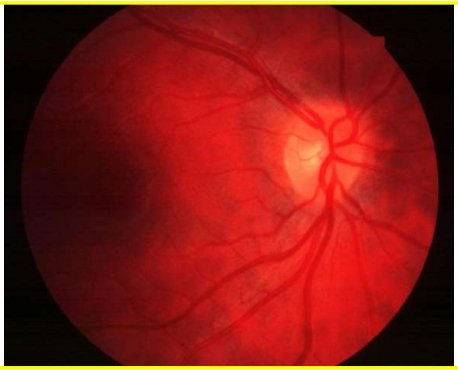
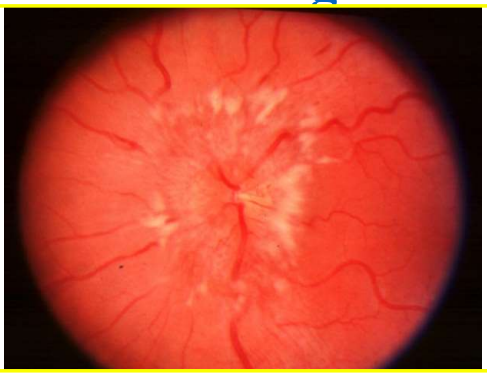


Inferior quadrantinopia



Centro-caecal defect

Optic disc changes

Normal	Swelling
	
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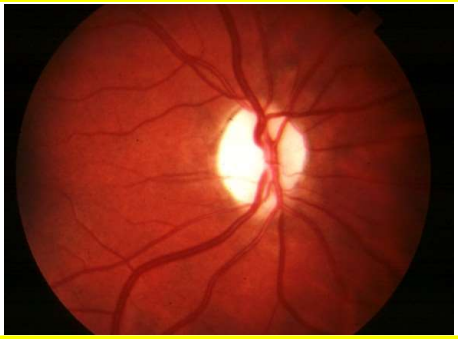
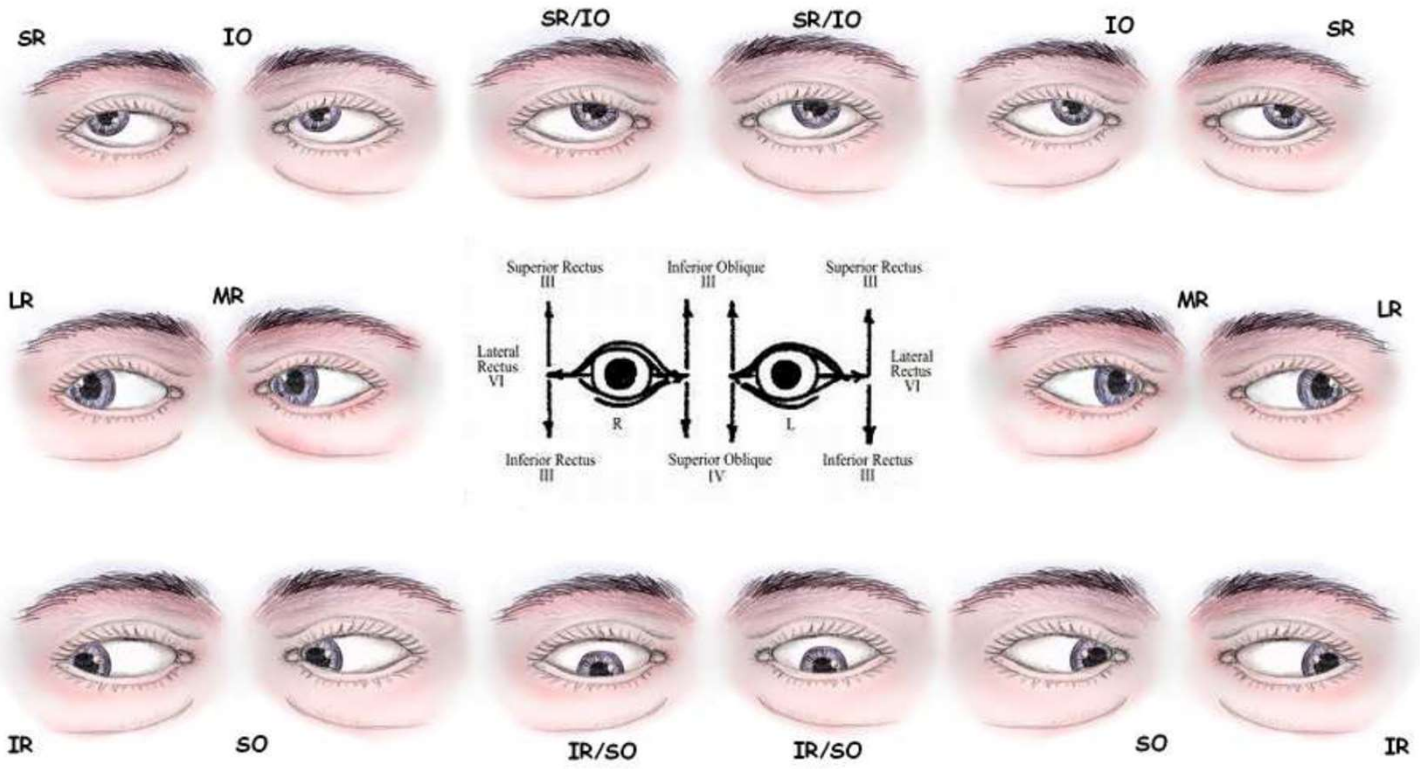
Optico-ciliary shunts	**Atrophy**
	

Normal eye movements and muscles tested



3rd cranial nerve (oculomotor)

- Examination
  - ? Ptosis/proptosis
  - Eye movement abnormalities
    - Down and out
  - Pupils

    Normal or enlarged
  - Accommodation
- Problems with reading

4th cranial nerve (trochlear)

- Eye movement
  - Intorsion and depression
    - E.g. problems walking down stairs

6th cranial nerve (abducens)

- Used in driving the car
- Abduction

Cranial nerve palsy effects

- III – Eye is down & out, with dilated pupil unreactive to direct light, ptosis
- IV – Eye elevated (hypertropia). Head tilted to unaffected side.
- VI – Eye may be turned inward (esotropia). Head turns laterally on looking to affected side.

- Conjugate gaze abnormalities - gaze centres in frontal & occipital lobes connect to CN nuclei (III & IV in midbrain, VI in pons). Horizontal conjugation relies on co-ordination between VI & III via the medial longitudinal fasciculus (internuclear ophthalmoplegia, lesion is on the side of the medial rectus palsy) & vert by III & IV coord.
    - Deviation of both eyes to one side (causes: ipsilateral frontal stroke or tumour, contralateral brainstem lesion or contralateral frontal epileptic stim)
    - Supranuclear palsy
    - E.g. Steele-Richardson (Vert & then horizontal, neck rigidity, dementia)
    - Distinguished from CN palsy by:
        - Affects both eyes
        - Pupils often fixed & unequal
        - Usually no diplopia
        - Reflex movements (on neck ext/flexion) are intact

5th cranial nerve (trigeminal)

- Sensory
  - Ophthalmic and maxillary divisions to face, mouth and nose
  - Pain and temperature component extends to upper cervical spine, hence referred pain to retro-ocular pain with headache
  - Testing
    - Corneal reflex and conjunctival, nasal sensation
    - Can be affected in C-P angle tumours

- Motor
  - Mandibular nerve – used for mastication
  - Testing
    - Open jaw, deviation to the side of the weakened muscle
    - Brisk jaw reflex (pseudo-bulbar palsy)

7th cranial nerve (facial)

- Anatomy
  - Brainstem
  - CP angle
  - stylomastoid foramen
  - Parotid gland (5 divisions)
- Testing
  - Frontalis not involved in upper motor neuron facial nerve palsies
  - Does not cause ptosis
  - No facial sensory loss
  - Loss of taste in anterior 2/3 of tongue
  - Test VIth and VIII CN

8th cranial nerve (vestibulocochlear)

- Cochlear division (hearing)
  - Bilaterally represented
  - Rub the tragus on one side and then on the other side speak

- Vestibular
- Sensory neural for inner ear (cochlear) conduction
- Bony conduction is for external or middle ear disease
- Weber's test - 256Hz tuning fork on centre of forehead. If nerve deafness sound heard more on side of normal ear, if conductive deafness then sound heard more on affected side.
- Rinne's test - 256Hz tuning fork on mastoid process then next to EAM. Sound becomes louder unless conductive deafness.

9th cranial nerve (glossopharyngeal)

- Gag reflex (sensory component)
- Sensation to pharynx

10^{th} cranial nerve (vagus)

- Elevation of soft palate - Say “Ahh”
- Gag reflex (motor component)

11th cranial nerve (spinal accessory)

- Shrug shoulders against resistance
- Turn head against resistance (right SCM turns head to left & vice versa)

12th cranial nerve (hypoglossal)

- Examine for wasting or fasciculation of tongue
- Tongue protrusion – deviation is towards the lesion if unilateral LMN

Multiple cranial nerve lesion

- Unilateral V, VII & VIII palsies suggest cerebellopontine angle lesion (tumour)
- Unilateral IX, X & XI palsies suggest a jugular foramen lesion
- Bilateral X, XI, XII suggest bulbar palsy if LMN changes or pseudobulbar palsy if UMN signs.
- Weakness of eye & facial muscles esp with repetition suggests myasthenia.