

### Eye muscles + movements

Muscles	Nerve Supply	Action
Superior Rectus	III	Up & out
Medial Rectus	III	Medial
Inferior Rectus	III	Down & Out
Inferior Oblique	III	Up & in
Superior Oblique	IV	Down & In
Lateral Rectus	VI	Lateral
Sphincter pupillae	Parasympathetic	Constricts pupil
Dilator pupillae	Sympathetic	Dilates pupil

### Pathway - Constriction:

Bright Light

Afferent impulse to optic nerve

Midbrain @ superior colliculus

2nd order neuron to Edinger-Westphal nucleus on same & opposite side

Posterior commissure

Efferent fibres leave in oculomotor nerve

Ciliary Ganglion

Constrictor fibres

### Pathological/medical causes of constriction:

Sympathetic dysfunction, Argyll Robertson, Horner's syndrome

### Pathway - Dilation:

Sympathetic fibres from ipsilateral hypothalamus

Lateral aspect of BS to spinal cord

Travels through anterior roots of C8, T1 - Enters sympathetic chain

Superior Cx ganglion - postganglionic fibres

Ascends through wall of ICA

Enters and leaves cranium

Ciliary ganglion to iris

Joins CNIII, V1

### Pathological/medical causes of dilation:

Migraine, OCP, anticholinergic drugs, antidepressants, NSAIDs, antihistamines, Holmes Adie pupil, parasympathetic dysfunction

### Anisocoria

Unequal pupil sizes (normal size should be 2-6mm)

Abnormal pupil is the one which does not react to light/darkness

Larger pupil in bright light/Small pupil in darkness



### Ptosis (eyelid drooping)

#### Look at:

Scleral injection (sympathetic dysfunction dilates vessels)

Angle of medial and lateral canthus (decreased in drooping)

Larger gap between the folds of the eye

Obscured Iris

Is the eyebrow drooping instead?

How much of eye is drooping? Sympathetic - partial, CN III - Complete

### Argyll Robertson Pupil

Damage to periaqueductal area @ midbrain (neurosyphilis, midbrain lesion, diabetics, alcoholic neuropathies)

Small, irregular pupils

unresponsive to light, reactive to accommodation (efferent)

If accommodation + convergence failed - think parkinsons/tumour of the pineal region

### Holmes-Adie/Tonic Pupil

Degeneration of nerve cells in the ciliary ganglion

Affects females more

More likely to be unilateral

**If associated with loss of knee jerks, impairment of sweating = Holmes-Adie Syndrome**

Dilation of pupil causes mistiness/blurred vision/eye pain in bright light

### S&S

Slow/no reaction to direct + consensual light

Slow pupillary reaction constriction with accommodation

Slow dilation occurs with relaxed accommodation

Reacts to pilocarpine (constricts pupil)

### Homer's Syndrome

Interruption of the sympathetic chain

Causing: Ptosis, miosis, anhidrosis

#### Can occur at:

BS	Tumour, vascular causes, syringobulbia
Cx	Tumour, syringomyelia
Anterior Roots of C8-T1	Tumour, lower plexus palsy
Middle Fossa	Tumour, granuloma
ICA	Trauma, occulsation, dissection (causes anhidrosis)
Cx sympathetic chain	Carcinoma at apex of lung (Pancoast tumour)



### Lesions:

Where	S&S
Canverneous sinus	Horners + CN VI, V, IV abnormality
Postcx ganglion on right	Right runk, Right Arm + leg, face and eye
Pre cx ganglion on right	Spare right leg, effects right arm, face and eyes
Descending pathways on right (hypothalamus - spinal cord)	Trunk and lower limb, arm + face on right side

### Marcus Gunn

AKA - Relative afferent pupil defect (RAPD)

Swinging light test - pupils dilate when bright light is swung from affected eye to unaffected eye, pupil constriction normal in unaffected eye

Causes
Lesion of optic nerve
Glaucoma
MS
Severe retinal disease



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