ORBIT

DESCRIBE EXTRAOCULAR MUSCLES UNDER THE FOLLOWING HEADINGS, ORIGIN, INSERTION, RELATIONS, ACTION, NERVE SUPPLY AND APPLIED ANATOMY(LE)

Extraocular muscles are- voluntary and involuntary

Voluntary muscles

Four recti – superior, inferior, lateral, medial

Two obliqui – superior and inferior

Levator palpebrae superioris

Involuntary muscles

Superior tarsal muscle

Inferior tarsal muscle

Orbitalis

Voluntary muscles

Recti muscles

origin

Four recti arise from tendinous ring or common annular tendon which is attached to the apex of orbit

Lateral rectus – additional tendinous head from the orbital surface of greater wing of sphenoid

Insertion

sclera, posterior to limbus

superior oblique

Origin

Superior oblique- body of sphenoid, superomedial to optic canal

Insertion

Tendon of superior oblique passes through a fibrocartilagenous pulley in the frontal bone and is inserted into sclera behind the equator of eyeball

Inferior oblique

Origin

Inferior oblique – orbital surface of maxilla, lateral to lacrimal groove

Insertion

Below and posterior to superior oblique

Levator palpebrae superioris

Origin

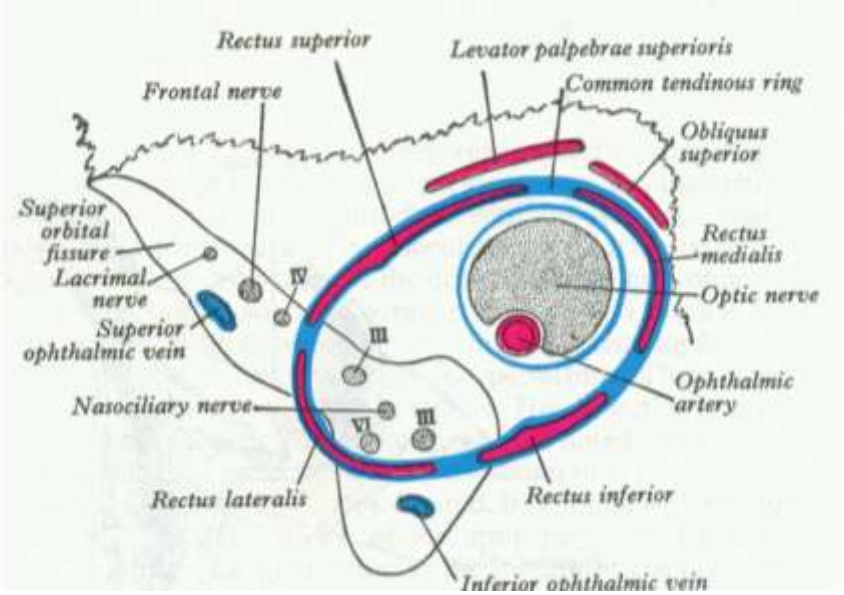
lesser wing of sphenoid, superior to optic canal

Insertion

flat tendon splits into

superior (voluntary) - anterior surface of superior tarsus and skin of upper eyelid

inferior (involuntary) lamella upper margin of superior tarsus and superior fornix



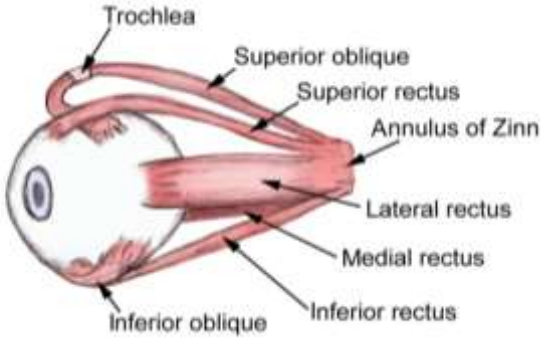


Diagram to show the origin and insertion of extra ocular muscles.

Nerve supply

Superior oblique – trochlear nerve

Lateral rectus -abducent nerve

Superior , medial, inferior recti, inferior oblique, part of Levator palpebrae superioris – oculomotor nerve

The involuntary extraocular muscles are supplied by postganglionic sympathetic fibres from superior cervical ganglion.

Actions

Superior oblique

depression

abduction

intortion

Inferior oblique

elevation

abduction

extortion

Inferior rectus

depression

adduction

extortion

Superior rectus

elevation

adduction

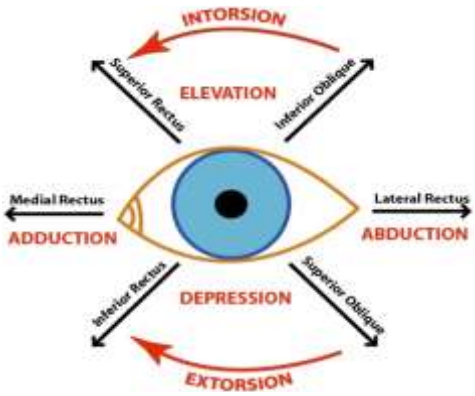
intortion

Medial rectus

adduction

Lateral rectus

Abduction



Applied anatomy

Squint – weakness or paralysis of muscle

Nystagmus- involuntary, rythmical oscillatory movements of eye

OBLIQUE MUSCLES OF EYEBALL (SE)

There are two oblique muscles- superior and inferior obliques

Superior oblique:

origin

Superior oblique- body of sphenoid, superomedial to optic canal

Insertion

Tendon of superior oblique passes through a fibrocartilagenous pulley in the frontal bone and is inserted into sclera behind the equator of eyeball

Nerve supply

Trochlear nerve

Action:

depression

abduction

intortion

Inferior oblique:

origin

Inferior oblique – orbital surface of maxilla, lateral to lacrimal groove

Insertion

Inferior oblique –is inserted into sclera a little below and posterior to superior oblique behind the equator of eyeball

Nerve supply

Oculomotor nerve

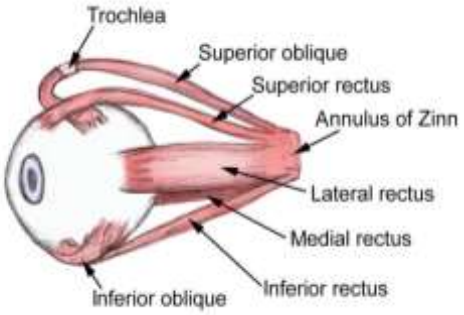
Action:

elevation

abduction

extortion

Diagram to show the origin and insertion of oblique muscles



NAME THE EXTRAOCULAR MUSCLES AND GIVE THEIR NERVE SUPPLY (SA)

Extraocular muscles are as follows

Voluntary muscles

Four recti – superior, inferior, lateral, medial

Two obliqui – superior and inferior

Levator palpebrae superioris

Involuntary muscles

Superior tarsal muscle

Inferior tarsal muscle

Orbitalis

Nerve supply

Superior oblique – trochlear nerve

Lateral rectus- abducent nerve

Superior , medial, inferior recti, inferior oblique, part of Levator palpebrae superioris – oculomotor nerve

LATERAL RECTUS MUSCLE(SA)

Origin:

Lateral rectus arise from tendinous ring or common annular tendon attached to the orbital surface of apex of orbit

It has an additional tendinous head from the orbital surface of greater wing of sphenoid.

Insertion:

It is inserted into the sclera , posterior to the limbus

Nerve supply

Abducent nerve

Action

Abduction or lateral rotation of the eye.

NERVE SUPPLY OF LEVATOR PALPEBRAE SUPERIORIS (SA)

Levator palpebrae superioris consists of superior and inferior lamellae.

Superior lamella is voluntary and is supplied by Oculomotor nerve

Inferior lamella is involuntary and is supplied by postganglionic sympathetic

fibres from superior cervical ganglion

DESCRIBE OCULOMOTOR NERVE UNDER FOLLOWING HEADINGS: A) ORIGIN B) COURSE C) RELATIONS D) DISTRIBUTION E) APPLIED ANATOMY (LE)

Introduction:

Oculomotor nerve is the 3rd cranial nerve

It supplies all extraocular muscles EXCEPT Superior oblique &Lateral Rectus muscle It also supplies intraocular muscles

Origin:

Occulomotor nuclear complex

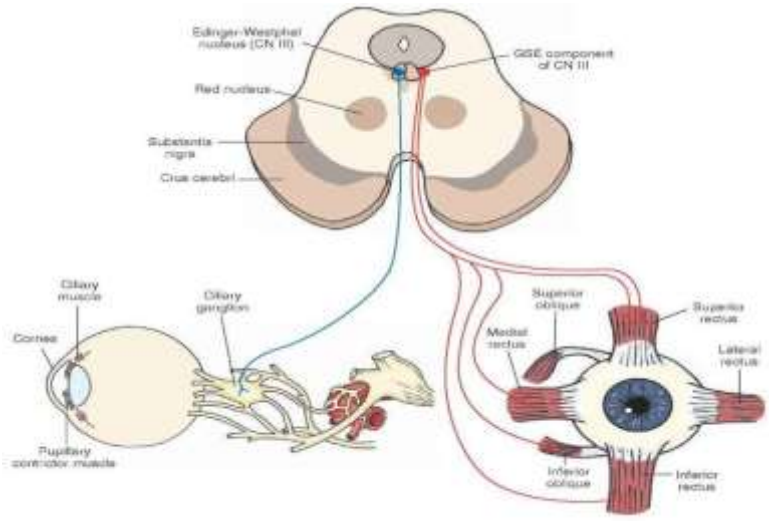
It is a combination of Occulomotor Nucleus and Edinger Westphal nucleus (parasympathetic fibers)

Situation:

Central grey matter of **midbrain** at the level of **superior colliculus**.

Course & Relations:

The nerve **emerges** from the **medial side of the crus cerebri of midbrain**



Passes forwards in the inter-peduncular cistern.

Lies between posterior cerebral & superior cerebellar arteries.

Passes forwards in the **lateral wall** of **cavernous sinus** where it is related to

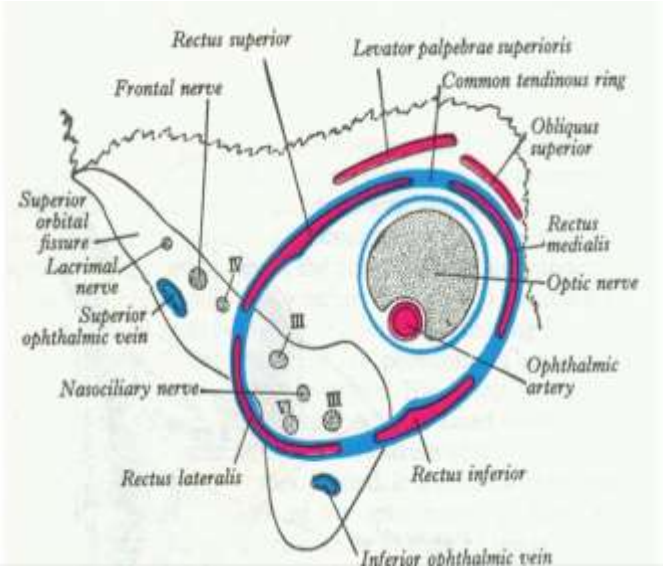
Trochlear nerve

Ophthalmic nerve

Maxillary nerve

In the anterior part of the sinus the nerve divides into **superior & inferior division.**

Both the divisions enter the orbit through the middle part of superior orbital fissure along with the nasociliary nerve.



Distribution:

Superior division supplies

Superior Rectus &

Levator palpebrae superioris muscle.

Inferior division supplies

Inferior Rectus muscle,

Inferior Oblique muscle &

Medial Rectus muscle.

Nerve to Inferior oblique gives motor root to the ciliary ganglion

Applied Anatomy:

Complete division of Oculomotor nerve results in:

Ptosis (drooping of the upper eyelid).

Lateral squint due to unopposed action of lateral rectus.

Dilatation of the pupil (paralysis of sphincter pupillae).

Loss of accommodation (paralysis of ciliaris).

Diplopia (double vision).

OPTIC NERVE (GROSS FEATURES) (SE)

It is the 2nd cranial nerve and nerve of vision.

It is made up of the axons of ganglionic cells of retina.

Contains 1.2 million myelinated nerve fibers.

Dimension & parts of optic nerve:

Total length – 4 cm

Parts-

Intraorbital part -25mm

Intracanalicular part – 5mm

Intracranial part-10 mm

Coverings:

It is covered by the three meninges.

Duramater
Arachnoidmater
Piamater

Course and relations:

Optic nerve begins at optic disc (blind spot)
Emerges from posterior part of eyeball about 3 mm nasal to posterior pole.
Ends in the cranial cavity by forming optic chiasma with opposite side optic nerve.

Relations:

In the orbit:

Posteriorly
surrounded by recti muscles.

Laterally
ciliary ganglion

Medially
pierced by central artery and vein of retina about 12 mm behind eyeball.

Above
crossed by nasociliary nerve, ophthalmic artery & superior ophthalmic vein. Below- nerve to medial rectus

In the optic canal:

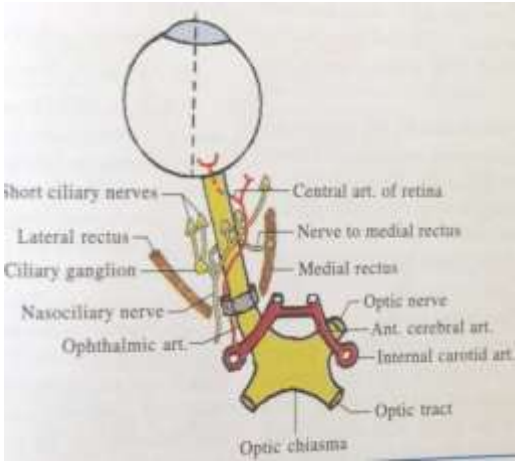
Laterally
ophthalmic artery

Medially
sphenoid and ethmoidal sinuses

In the cranial cavity:

Laterally
internal carotid artery

Above
anterior cerebral artery, gyrus rectus



CILIARY GANGLION – TYPE, LOCATION & CONNECTIONS.(SE)

It is a **peripheral parasympathetic ganglion**

Topographically related to nasociliary nerve

But functionally related to Occulomotor nerve

Location

Near apex of orbit between optic nerve and lateral rectus muscle

Connections:

There are **three roots**

Motor (parasympathetic) root, Sympathetic root and Sensory root

Motor (Parasympathetic) Root-

Derived from nerve to inferior oblique muscle.

Convey preganglionic fibers from Edinger- Westphal nucleus.

Fibers synapse with cell bodies of ciliary ganglion.

Sensory Root –

Derived from nasociliary nerve

Conveys sensory fibers from eyeball.

Sympathetic Root-

Derived from internal carotid plexus.

Branches:

Anterior border of the ganglion provides **8- 10 short ciliary branches**.

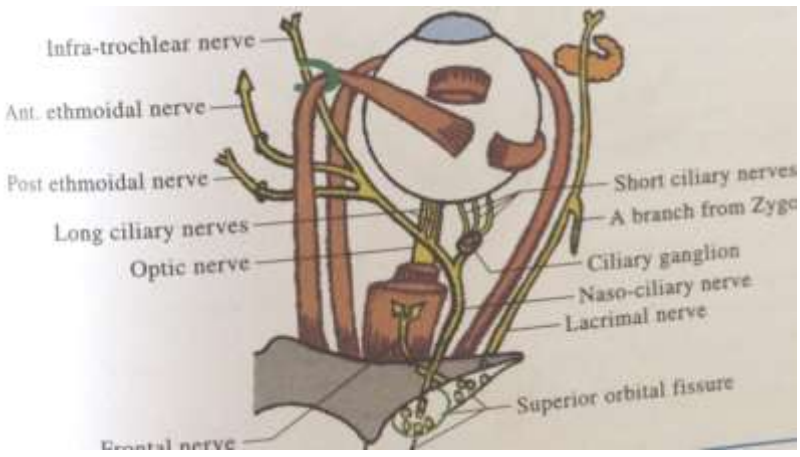
Function:

Short ciliary nerves contain fibers from all the three roots.

Parasympathetic fibers supply sphincter pupillae and ciliaris muscle.

Sympathetic fibers supply blood vessels of eyeball and dilator pupillae muscle.

Sensory fibers carry sensation from the eyeball.



CILIARY GANGLION (SA)

It is a **peripheral parasympathetic ganglion,** located **near apex of orbit.**

Roots: 3 Roots

Motor (Parasympathetic) Root

Derived from nerve to inferior oblique muscle.

Convey preganglionic fibers from Edinger- Westphal nucleus.

Fibers synapse with cell bodies of ciliary ganglion.

Supply sphincter pupillae and ciliaris muscle**Sensory Root** –

Derived from nasociliary nerve

Conveys sensory fibers from eyeball.

Sympathetic Root-

Derived from internal carotid plexus.

Supply blood vessels of eyeball and dilator pupillae muscle.

Branches:

Anterior border of the ganglion provides **8- 10 short ciliary branches**.

MUSCLES SUPPLIED BY 3RD CRANIAL NERVE (SA)

Superior Rectus muscle
Inferior Rectus muscle
Medial Rectus muscle
Inferior oblique muscle
Levator palpebrae superioris muscle

MUSCLES AFFECTED IN OCCULOMOTOR PALSY (SA)

Superior Rectus muscle
Inferior Rectus muscle
Medial Rectus muscle
Inferior oblique muscle
Levator palpebrae superioris muscle

NERVE BRANCHES OF OPHTHALMIC DIVISION OF TRIGEMINAL NERVE(SA)

Opthalmic division of trigeminal nerve gives rise to three branches - lacrimal, frontal & nasociliary nerves.

Lacrimal Nerve

Frontal Nerve – branches
- Supratrochlear nerve
- Supraorbital nerve

Nasociliary Nerve- branches
- Communicating branch to Ciliary ganglion
- 2-3 Long Ciliary Nerves
- Posterior Ethmoidal Nerve
- Infratrochlear Nerve
- Anterior Ethmoidal Nerve

WHAT IS PTOSIS? GIVE REASONS (SA)

Ptosis:

Inability to elevate the upper eyelid is called as Ptosis.

Reasons:

Levator palpebrae superioris muscle is responsible for elevation of upper eyelid.

Lesion/ injury of Oculomotor nerve leads to paralysis of levator palpebrae superioris muscle.

So there will be loss of function of the muscle leading to Ptosis.