

Nerves of the Orbit

Optic Nerve

The optic nerve enters the orbit from the middle cranial fossa by passing through the optic canal . It is accompanied by the ophthalmic artery, which lies on its lower lateral side.

. The nerve is surrounded by sheath of pia mater, arachnoid mater, and dura mater. It runs forward and laterally within the cone of the recti muscles and pierces the sclera at a point medial to the posterior pole of the eyeball. Here, the meninges fuse with the sclera so that the subarachnoid space with its contained cerebrospinal fluid extends forward from the middle cranial fossa, around the optic nerve, and through the optic canal, as far as the eyeball. A rise in pressure of the cerebrospinal fluid within the cranial cavity therefore is transmitted to the back of the eyeball.

Lacrimal Nerve

The lacrimal nerve arises from the ophthalmic division of the trigeminal nerve. It enters the orbit through the upper part of the superior orbital fissure and passes forward along the upper border of the lateral rectus muscle . It is joined by a branch of the zygomaticotemporal nerve, which (parasympathetic secretomotor fibers). The lacrimal nerve ends by supplying the skin of the lateral part of the upper lid.

Frontal Nerve

*The frontal nerve arises from the ophthalmic division of the trigeminal nerve. It enters the orbit through the upper part of the superior orbital fissure and passes forward on the upper surface of the levator palpebrae superioris beneath the roof of the orbit . It divides into the **supratrochlear** and **supraorbital nerves** that wind around the upper margin of the orbital cavity to supply the skin of the forehead; the supraorbital nerve also supplies the mucous membrane of the frontal air sinus.*

Trochlear Nerve

The trochlear nerve enters the orbit through the upper part of the superior orbital fissure. It runs forward and supplies the superior oblique muscle

Oculomotor Nerve

The **superior ramus** of the oculomotor nerve enters the orbit through the lower part of the superior orbital fissure. It supplies the superior rectus muscle, then pierces it, and supplies the levator palpebrae superioris muscle. The **inferior ramus** of the oculomotor nerve enters the orbit in a similar manner and supplies the inferior rectus, the medial rectus, and the inferior oblique muscles. The nerve to the inferior oblique gives off a branch that passes to the ciliary ganglion and carries parasympathetic fibers to the sphincter pupillae and the ciliary muscle (see below).

Nasociliary Nerve

The nasociliary nerve arises from the ophthalmic division of the trigeminal nerve. It enters the orbit through the lower part of the superior orbital fissure. It crosses above the optic nerve, runs forward along the upper margin of the medial rectus muscle, and ends by dividing into the **anterior ethmoidal** and **infratrochlear nerves**

Branches of the Nasociliary Nerve

■ ■ The **communicating branch to the ciliary ganglion** is a sensory nerve. The sensory fibers from the eyeball pass to the ciliary ganglion via the short ciliary nerves, pass through the ganglion without interruption, and then join the nasociliary nerve by means of the communicating branch.

■ ■ The **long ciliary nerves**, two or three in number, arise from the nasociliary nerve as it crosses the optic nerve. They contain sympathetic fibers for the dilator pupillae muscle. The nerves pass forward with the short ciliary nerves and pierce the sclera of the eyeball. They continue forward between the sclera and the choroid to reach the iris.

■ ■ The **posterior ethmoidal nerve** supplies the ethmoidal and sphenoidal air sinuses

■ ■ The **infratrochlear nerve** passes forward below the pulley of the superior oblique muscle and supplies the skin of the medial part of the upper eyelid and the adjacent part of the nose. Later, it leaves to enter the lacrimal gland.

■ ■ The **anterior ethmoidal nerve** passes through the anterior ethmoidal foramen and enters the anterior cranial fossa on the upper surface of the cribriform plate of the ethmoid. It enters the nasal cavity through a slitlike

*opening alongside the crista galli. After supplying an area of mucous membrane, it appears on the face as the **external nasal branch** at the lower border of the nasal bone, and supplies the skin of the nose down as far as the tip*

Abducent Nerve

The abducent nerve enters the orbit through the lower part of the superior orbital fissure. It supplies the lateral rectus muscle.

Ciliary Ganglion

*The ciliary ganglion is a parasympathetic ganglion about the size of a pinhead and situated in the posterior part of the orbit. It receives its preganglionic parasympathetic fibers from the oculomotor nerve via the nerve to the inferior oblique. The postganglionic fibers leave the ganglion in the **short ciliary nerves**, which enter the back of the eyeball and supply the sphincter pupillae and the ciliary muscle. A number of sympathetic fibers pass from the internal carotid plexus into the orbit and run through the ganglion without interruption.*