Introduction

- Orbits are a pair of bony cavities.
- **Location** - on either side of root of nose.
- **Shape** - Four-sided pyramid.
- **Apex** - directed at the optic canal.
- **Base** - directed forward.
- **Medial walls** - parallel to each other.
- **Lateral walls** - at right angle to each other.
Contents of Orbit

- **Eyeball.**
- **Muscles** - Voluntary & Involuntary.
- **Fasciae of orbit** - Periorbita & Fascia Bulbi.
- **Nerves** -
  - Optic.
  - Oculomotor.
  - Trochlear.
  - Abducent.
  - Branches of Ophthalmic nerve.
  - Sympathetic nerves.
- **Parasympathetic ganglion** - Ciliary ganglion.
- **Vessels** -
  - Ophthalmic artery.
  - Superior and inferior Ophthalmic veins.
- **Lacrimal gland.**
- **Orbital fat.**
Periorbita (Orbital Fascia/Orbital Periosteum)-

• Loosely attached to the bones that form boundaries of the orbit.

• Easily stripped off from the bone.

• At the optic canal and superior orbital fissure, it is continuous with the endocranium (periosteum lining the interior of the skull).

• At the orbital margins and inferior orbital fissure, it is continuous with the periosteum covering the exterior of the skull.
• Across the inferior orbital fissure, it is supplemented by **orbitalis** muscle.

• At orbital margin, projects into both eyelids as **orbital septum**.

• Forms the **lacrimal fascia**.

• Sends one process to hold the **fibrous pulley** for the superior oblique muscle.
Eyeball
INTRODUCTION

- An organ of sight.

LOCATION:

- Anterior 1/3rd of orbital cavity.

- Embedded in the fat.
**Fascia Bulbi (Tenon’s capsule)**

- Forms a membranous envelope of the eyeball.

**Extent** - From optic nerve to the limbus (sclerocorneal junction).

- Separates the eyeball from the orbital fat.

- Separated from sclera by the **episcleral space (Sub-Tenon’s space)**.
Fascia bulbi contd...

Structures piercing the Fascial bulbi:

- Ciliary vessels and nerves.
- Tendons of four recti and two oblique muscles of the eyeball.
Ligaments of Eyeball

• Lateral check ligament.
• Medial check ligament.
• Suspensory ligament.

**Lateral check ligament**-
- From the fascial sheath of lateral rectus to the Whitnall’s tubercle of Zygomatic bone.

**Medial check ligament**-
- From the fascial sheath of medial rectus to the posterior lacrimal crest of Lacrimal bone.

**Suspensory ligament of Lockwood**-
- It is a fascial hammock which connect both the check ligaments below the eyeball.
- It supports the eyeball.
- It is expanded in the middle and blends with the fascial sheaths of inferior rectus and inferior oblique.
POLES

- Anterior pole.
- Posterior pole.

**Anterior Pole:**
- Central point of corneal curvature.

**Posterior pole:**
- Central point of scleral curvature.
OPTICAL AXIS:
- An antero-posterior line joining both poles.

VISUAL AXIS:
- A line extending from anterior pole to the fovea centralis.
- Fovea centralis lies slightly lateral to the posterior pole.
**EYEBALL**

**EQUATOR:**
- An imaginary line around the eyeball, equidistant from the two poles.

**MERIDIAN:**
- Any imaginary plane from pole to pole and cutting the equator at right angle.
- A meridional section may be horizontal or sagittal.

**DIAMETER:** ~24 mm.
Tunics (Coats) Of Eyeball

- 3 tunics - outer tunic.
  - intermediate tunic.
  - inner tunic.

**OUTER TUNIC:**
- Consists of:
  - Sclera.
  - Cornea.
- Fibrous in nature.

**INTERMEDIATE TUNIC:**
- Consists of (from behind forwards):
  - Choroid.
  - Ciliary body.
  - Iris.
- Pigmented and vascular.

**INNER TUNIC:**
- Consists of:
  - Retina.
- Nervous in nature.
TUNICS (COATS) OF EYEBALL CONTD...

- **Sclera** represents an expansion of dural sheath of optic nerve.
- **Choroid** is derived from an expansion of pia-arachnoid.
- **Retina** is developmentally a part of brain and is derived from diencephalon.
The thick, tough, white outer covering of the eyeball.

Opaque and forms posterior 5/6th of outer tunic of eyeball.
In front, continuous with the cornea at **sclero-corneal junction (limbus)**.

Behind, continuous with the dural sheath of optic nerve.

Composed of a dense network of **collagen** fibers.
SCLERA contd...

- External surface is covered by **fascia bulbi** (Tenon’s capsule).
- Separated from fascia bulbi by **episcleral space**.
SCLERA contd...

- Receives the insertion of 6 extra-ocular muscles (4 recti and 2 obliqui).
STRUCTURES PIERCING THE SCLERA

- Optic nerve.

- Posterior ciliary vessels and nerves.

- Venae vorticosae

- Anterior ciliary arteries.

- Aqueous veins.
OPTIC NERVE:

- Pierces the sclera 3 mm. to the nasal (medial) side of posterior pole.

- Central artery and vein of retina also pierces the sclera within the substance of optic nerve.

- Where the fibers of optic nerve pierce the sclera that area is sieve like; hence called lamina cribrosa sclerae.
STRUCTURES PIERCING THE SCLERA CONT'D...

POSTERIOR CILIARY VESSELS AND NERVES:

- Pierce the sclera around the optic nerve.
STRUCTURES PIERCING THE SCLERA contd...

VENAE VORTICOSAE:

- ~4-5 in number.
- Pierce the sclera midway between the attachment of optic nerve and the sclero-corneal junction.

ANTERIOR CILIARY ARTERIES:

- Derived from muscular arteries of 4 recti.
- Pierce the sclera close to the sclero-corneal junction.

AQUEOUS VEINS:

- Drain the aqueous humor from the sinus venosus sclerae.
- Pierce the sclera close to the sclero-corneal junction.
CORNEA

- The clear front window of the eye.

- Transparent and **avascular** structure.

- Forms **anterior 1/6th** of the outer tunic of eyeball.

- The cornea transmits and focuses light into the eye.

**NUTRITION OF CORNEA:**

- **3** sources:
  - Loops of capillaries at the periphery of conjunctivo-corneal junction.
  - Aqueous humor.
  - Lacrimal secretions.
LAYERS OF CORNEA

Composed of 5 layers (from outside inwards):

1) A-Corneal epithelium.

2) B-Bowman’s membrane or anterior limiting membrane.

3) C-Substantia propria (stroma) [Connective tissue].

4) D-Descemet’s membrane or posterior limiting membrane.

5) E-Endothelium.
LAYERS OF CORNEA contd...

CORNEAL EPITHELIUM:
- Non-keratinized **stratified squamous epithelium**.
- Surface cells present microvilli.
- At sclero-corneal junction, continuous with the conjunctiva.

BOWMAN’S MEMBRANE:
- Acellular, densely packed layer of fine collagen fibers.

SUBSTANTIA PROPRIA:
- Composed of ~200-250 superimposed flattened lamellae of collagen fibers.
- Collagen fibers are embedded in ground substance rich in **chondroitin sulphate** and **keratosulphate**.
- Ground substance also contains **fibroblasts**.
LAYERS OF CORNEA contd...

DESDEMET’S MEMBRANE:

- Acellular, homogenous, collagenous layer.

ENDOTHELUM:

- Single layer of cuboidal cells.
CHOROID

- Sandwiched between the sclera and the retina.
- Dark-brown in colour.
- Posteriorly, it is pierced by the optic nerve.
- External surface is separated from the sclera by supra-choroid lamina.
- Supra-choroid lamina is composed of loose network of elastic and collagen fibers.
CHOROID contd...

- **Supra-choroid lamina** is traversed by long posterior ciliary vessels and nerves.

- Internally, choroid is firmly adherent to the pigmented layer of retina.
CILIARY BODY

- Extends as a complete ring from the anterior part of choroid at the **ora serrata** of retina to the periphery of iris at sclero-corneal junction.

- Triangular in section.

- Apex is directed posteriorly to join the choroid.

- Outer surface is in contact with the sclera.

- Inner surface faces the vitreous body.
CILIARY BODY contd...

- Provides attachments to the suspensory ligament (zonular fibers) of lens and the peripheral margin of the iris.

- Inner surface is divisible into 2 annular zones:
  
  i. Pars plana (outer zone).
  
  ii. Pars plicata (inner zone).
CILIARY BODY contd...

PARS Plicata:

- In anterior 1/3rd.

- Presents 70-80 ciliary processes.

- Ciliary processes radiate meridionally from the periphery of the iris.

- Inner ends of ciliary processes project into the periphery of posterior chamber of eye and secrete aqueous humor.
CILIARY BODY contd...

PARS PLANA:

- Limited at the periphery by ora serrata.

- Base of the ciliary body gives attachment to periphery of iris near its centre.
STRUCTURE OF CILIARY BODY

- Consists of:
  - Stroma - consists of loose fasciculi of collagen fibers.
  - Ciliaris muscle - Unstriped muscle.
  - Muscle of accommodation.
  - Bilaminar epithelium.
**IRIS**

- Circular, pigmented and contracile diaphragm.
- Immersed in aqueous humor between cornea and lens.
- Peripheral margin is attached to the base of ciliary body near its centre.

**PUPIL:**
- A circular aperture near the centre of iris.
MUSCLES OF IRIS

- Sphincter pupillae.
- Dilator pupillae.
CHAMBERS OF EYEBALL

- Anterior chamber.
- Posterior chamber.
Posterior part of retina is called **optic part**.

It consists of:

- Outer pigmented part.
- Inner nervous part (**neuro-retina**).

It extends from attachment of optic nerve (**optic disc**) behind to the crenated margin, **ora serrata**, in front where the neuro-retina ceases.
STRUCTURE OF OPTIC PART OF RETINA

10 layers:

- Nerve fiber layer
- Ganglion cell layer
- Inner plexiform layer
- Inner nuclear layer
- Outer plexiform layer
- Outer nuclear layer
- Photoreceptor layer
- Pigment epithelium

Cells:

- Inner limiting membrane
- Axons at surface of retina passing via optic nerve, chiasm and tract to lateral geniculate body
- Ganglion cell
- Müller cell (supporting glial cell)
- Bipolar cell
- Amacrine cell
- Horizontal cell
- Rod
- Cone
- Pigment cells of choroid
Thank You