Anatomy and development of eye

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Anatomy of the eye

- The eyeball
- The visual pathway
- Orbit, extraocular muscles and appendages of the eye

Eyeball

- Dimensions
- Coats of the eyeball
- Segments and chambers of the eyeball

The eyeball

- Is a cystic structure kept distended by the pressure inside it
- It is a spherical structure
- The central point on the maximal convexities of the anterior and posterior curvatures of the eyeball is called the anterior and posterior poles respectively
- The equator of the eyeball lies at the mid plane between the two poles
Dimensions of eyeball
- Anterioposterior diameter: 24 mm
- Horizontal diameter: 23.5 mm
- Vertical diameter: 23 mm
- Circumference: 75 mm
- Volume: 6.5 ml
- Weight: 7 gm

Coats of eyeball
- Three coats: outer (fibrous coat), middle (vascular coat) and inner nervous (nervous coat)
- Fibrous coat:
  - A dense strong wall which protects the intraocular contents
  - Cornea: anterior 1/6th transparent part
  - Sclera: posterior 5/6th opaque part

Cornea
- Is transparent structure which is set onto sclera like a watch glass
- Accounts for approximately 7% of the ocular surface

Sclera
- The white part of the eyeball is called the sclera
- Is made of a tough fibrous material
- The outer surface is covered by Tenon's capsule

Limbus
- Junction of the cornea and sclera
- Conjunctiva is firmly attached at the limbus
Conjunctiva

- Translucent mucous membrane which lines the posterior surface of eyelids and anterior aspect of the eyeball

Vascular coat (Uveal tissue)

- Is a pigmented layer
- Consists of three parts: iris, ciliary body, and choroid
- Supplies nutrition to the various structures of the eyeball

IRIS

- Anterior most part of the uveal tract
- Is the colorful part of the eye.
- Is a thin circular disc corresponding to the diaphragm of camera
- Pupil = is aperture of about 4mm in the centre of iris which regulates the amount of light reaching retina

Ciliary body

- Is forward continuation of choroid at ora serrata

Choroid

- Posterior most part of the vascular coat of the eyeball
- Extends from optic disc to ora serrata
- Its inner surface is smooth, brown and lies in contact with retina
- Its outer surface is rough and lies in contact with the sclera

Nervous coat (retina)

- Is the inner most coat of eyeball
- Is responsible for vision
- Extends from optic disc to ora serrata

Fig. 1.1. A drawing of a section through the human eye with a schematic representation of the retina.
Segments and chambers of the eyeball

- Lens divides the eyeball into two segments: anterior and posterior
- Lens is a transparent, biconvex, crystalline structure placed between iris and vitreous in a saucer-shaped depression, the patellar fossa
- Lens is suspended from ciliary body by zonules
- Anterior segment
  - Includes crystalline lens and structures anterior to it: iris, cornea, and two aqueous humour filled spaces: anterior and posterior chambers

Anterior segment

- Anterior chamber
  - Is bounded anteriorly by the back of the cornea, and posteriorly by the iris and part of ciliary body
  - Contains about 0.25 ml of aqueous humour
  - It is 2.5 mm deep in the centre in normal adults
- Posterior chamber
  - It is bounded anteriorly by the posterior surface of iris and parts of ciliary body, and posteriorly by the lens and its zonules and laterally by the ciliary body

Posterior segment

- Includes structures posterior to lens: vitreous humour, retina, choroid and optic disc
- Vitreous
  - is an inert, transparent, jelly-like structure that fills the posterior four-fifth of the cavity of the eyeball
  - the vitreous body forms two thirds of the eye's volume and gives the eye its shape
  - is about 4 ml in volume
Visual pathway

- Each eyeball acts as a camera
- It perceives the images and relays the sensations to the brain (occipital cortex) via visual pathway
- Visual pathway comprises optic nerves, optic chiasma, optic tracts, geniculate bodies and optic radiations

Orbit, extraocular muscles and appendages of the eye

- Orbit: bony cavity containing the eyeball
- Extraocular muscles (EOM) and fascial sheaths suspend each eyeball in orbit
- EOM: responsible for movement of the eyeball
  - 4 recti and 2 obliques
  - Rectus muscles: superior (SR), inferior (IR), medial (MR) and lateral (LR)
  - Oblique muscles: superior (SO) and inferior (IO)
- Eyelids: Lies anterior to eyeball and acts as a shutter protecting the eyeball
- For smooth functioning, the cornea and conjunctiva are kept moist by tears which are produced by lacrimal gland and drained by lacrimal passages
- Appendages of the eye: eyelids, eyebrows, conjunctiva and lacrimal apparatus

THANK YOU