Guide the basic anatomy

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Eyeglobe

- coats of the eyeglobe:
- outer
- middle
- inner layer
- filling of the eyeglobe
- Aqueous humor is transparent, watery fluid similar to plasma, but containing low protein concentrations. It fills both the anterior and the posterior chambers of the eye
- Crystalline lens
- Vitreus body (humor) is a transparent, colorless, gelatinous mass that fills the space in the eye between the lens and the retina

The chambers of the eye

Aqueous humor fills both the anterior and the posterior chambers of the eye

- anterior chamber in front of the iris
- posterior chamber immediately behind the iris
- communication through pupil
- filled with clear aqueous humor

Vitreus chamber = filled with vitreus body

Gel – 4 ml

98 % watter

collagen fibers lattice - hyaluronic acid

Outer layer – sclera + cornea

- sclera (5/6) "skeleton of the eye"
- > **cornea** (1/6) part of the dioptric system of the eye (+40 diopters)
 - horizontal diameter : 10,6mm (10-13 mm)
 - thickness in centre: 0,55 mm (**550 microns**), in periphery: 1mm -corneoscleral limbus—border (junction) between sclera and cornea





CORNEA:

- is the "eye's optical window"
- smooth surface covered with tear film
- extremely sensitive (any injury to the cornea exposes sensory nerve endings and causes intense pain with reflexive tearing and involuntary eye closing)
- the slit lamp is the primary instrument used in evaluating the cornea (if we set the beam of the slit lamp to about 45 degrees, we see the cornea in cross section)



transparent, no vessels, no pigment

5-6 layers : epithelium,

Bowman membrane, stroma, Descemet membrane, Dua's layer, endothelium

- sensitive innervation – branch n. trigeminus

New corneal structure "Dua's layer."

(according to a paper from 2013 by Harminder Singh Dua's group at the University of Nottingham is a layer of the cornea that had not been detected previously)

- The most posterior = located between the corneal stroma and Descemet's membrane
- 10–20 microns
- This has been termed as pre-Desccemets layer or Dua's layer (DL)
- made of collagen

Nourishment of the cornea:

The cornea is nourished with nutritive metabolites (amino acids and glucose) from three sources:

1.Diffusion from the capillaries at its edge.2.Diffusion from the aqueous humor.3.Diffusion from the tear film.



- White opaque-collagen fibres
- Fibrous layer is relatively avascular structure
- Posterior scleral foramen lamina cribrosa
- Thin around insertion of extrinsic muscles (all 6 ocular muscles insert into the sclera)
- Thick around optic nerve 1 mm
- In the angle of the anterior chamber, the sclera forms the <u>trabecular</u> <u>network and the canal of Schlemm</u>.

Trabecular network

In the angle of the anterior chamber, the sclera forms the trabecular network and the canal of Schlemm.

The aqueous humor drains from there into the intrascleral and episcleral venous plexus.

Middle layer = uvea

(vascular pigmented layer)

Position:

the uveal tract lies between the sclera and retina.

- iris (iris)
- ciliary body (corpus ciliare)
- choroid (choroidea)

Iris

regulation of the entering light

- Consists of 2 layers:
- Anterior stromal layer
- Posterior pigmented epithelial layer

(protects the eye against excessive incident light)

- <u>two muscles</u>
 - sphincter pupilae m. circular fibres miosis
 - dilatator pupilae m. radial fibres mydriasis
- Supplies with major and minor vascular circle (not visible)
- colour depends on the amount of pigment melanin (developing – to 6th month of life)

Ciliary body

- Is continuation of the iris extends from the root of the iris to the ora serrata, where it joins the choroid.
- It consists of anterior pars plicata and the posterior pars plana

FUNCTION :

- 1. <u>ciliary muscle (accomodative muscle)</u> is responsible for accommodation.
- 2. on the surface of ciliary body app.60-80 ciliary processes

(nonpigmented layer of the epithelium covering the ciliary processes produces the aqueous humor)

Between ciliary processes – lens zonules are attached

Choroid – middle layer of the eyeball

- contains vessels and lot of pigmented cells
- Function as, lymphatic nodule", <u>supplies</u> <u>nourishment to the outer layers of the retina</u> (feeds pigmented epithelium of the retina and a layer of rods and cones)
- The blood flow through the choroid is the highest in the entire body

Inner layer of the eyeglobe = Retina

- transparent membrane
- 10 layers

Regions of the retina

- The central retina- macula lutea contains pigment xantophyl
- within the macula fovea at the centre foveola depressed pit point of greatest visual acuity
- <u>Cones</u>- colour perception
- D 7 mil macula

Description - peripheral retina - night vision, detect movement - 130 mil.

LENS – part of anatomy of the anterior segment

Size of the lens :

9 mm in diameter at the equator

3,5-4 mm in diameter at the anterior-posterior plane

These measurements vary with the degree of tension on the zonular fibers caused <u>by accomodation of the eye</u> <u>during focusing</u>

Lens(crystaline lens)

- biconvex, transparent, avascular structure
- situated behind the iris fixed by zonules zonular fibres (Zonula ciliaris Zinii) – connect the lens to the ciliary body
- consists of: capsule, epithelium, cortex a nucleus
- an adult lens weighs about 220 mg