Ocular Anatomy and Physiology Basics
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Orbit
Bones:

Lacrimal
- Ethmoid
- Frontal
- Greater wing of sphenoid

Zygoma
- Temporal
- Lesser wing of sphenoid
- Maxilla

Ocular Adnexa:
Lids
- Tarsal plate
- Lid margin
- Grey line
- Lashes
- Meibomian glands

Muscles:
- Levator (III nerve, superior branch)
  Raises upper lid
- Muller’s (sympathetic system)
  Opens eyes wide
- Orbicularis Oculi (VII nerve)
  Squeezes lids closed

Canthi
- Medial
  - Caruncle
  - Plica semilunaris
- Lateral

Lacrimial structures

Glands
- Lacrimal
- Accessory
- Meibomian

Tear layer
- 3 layers
  - mucin, aqueous, lipid

Conjunctiva
- Bulbar
- Palpebral (or tarsal)
- Fornix/cul de sac

Extraocular muscles
- Rectus muscles (4 per eye)
  - Superior, medial, inferior, lateral
    - They “live where they work”
- Oblique muscles (2 per eye)
  - “the commuter muscles” superior lives above, pulls eye down (depressor)
  - Inferior lives below, pulls eye up (elevator)
Globe Structures

Sclera/limbus
- Sclera: tough keratinized lamellar tissue, similar to cornea EXCEPT it’s opaque
  - Lamina cribrosa
  - Pars plana
- Limbus: the place where the sclera and the cornea meet
  - Highly vascular
  - Served by anterior ciliary arteries
    - Limbal “flush” in iritis…. Dilated vessels here

Cornea
- Total power of curve approx. 43 Diopters (think K readings)
- 5 Layers:
  - Epithelium
  - Bowman’s
  - Stroma
  - Descemet’s
  - Endothelium
    - One layer thick
    - Does NOT regenerate
    - Responsible for DETURGESCENCE

ANTERIOR SEGMENT

filled with aqueous

Anterior chamber
- Space between posterior cornea and lens

Posterior chamber
- Space between lens and anterior face of vitreous

Angle structures
- trabecular meshwork, Schlemm’s canal, Schwalbe’s line
- iris
- ciliary body
  - ciliary muscle
  - ciliary process
    - Aqueous

Lens, zonules

Accommodation
- relaxed ciliary muscle = tight zonules = thin lens == least power = distance vision
- contracted ciliary muscle = loose zonules = “fat” lens == most power = near vision

POSTERIOR SEGMENT

Vitreous

Retina
- Layers of the retina
- Other landmarks
  - pars plicata
  - RPE
  - Optic cup
  - Optic disc
  - Fovea/foveola
Choroid
  Blood supply
Optic nerve
  Nerve fibers from the nerve fiber layer.
    Like an organic fiber optic cable

Visual pathway
  Optic chiasm
    Where the nasal fibers from each eye cross to create a left and right visual field
    Structures nearby: sella turcica, pituitary gland
      Lesion in this area: produces bi-nasal or bi-temporal field defects
  Optic tract
  LGN
    First synapse of nerve fibers after retina
    Ocular dominance columns here
    Amblyopia and suppression occur here
  Optic radiations
    Meyer’s Loop
Visual cortex