

Study Guide

Spectacle Course: Module II

Lesson 3: Anatomy of the Eye

The eye can be divided into two categories: Adnexa and Globe

Adnexa

Eyelids

- Help keep the eye moist
- Protect the eye from excessive light or injury
- Prevent foreign bodies from entering the eye

Eyelashes (cilia)

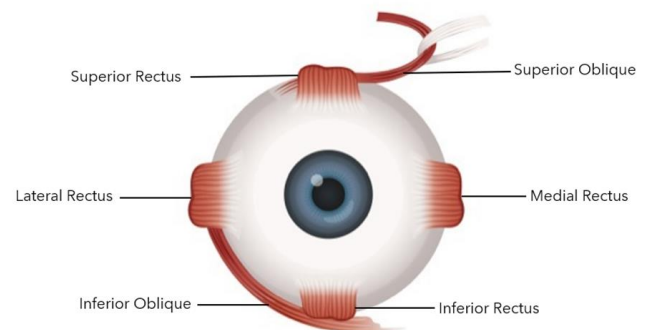
- Serve to protect the eye from foreign bodies such as dust and debris
- Ultra-sensitive to the touch

Lacrimal Gland (tear gland)

- Continuously produces tear fluid which is secreted by the lacrimal ducts to the surface of the eye

Extraocular Muscles

- Lateral Rectus
- Medial Rectus
- Superior Rectus
- Inferior Rectus
- Superior Oblique
- Inferior Oblique
- Phoria: tendency for the eyes to turn
- Tropia: definite turning of the eyes
 - Exo: out
 - Eso: in
 - Hyper: up
 - Hypo: down



Lesson 4: Major Ocular Structures and Functions

Globe

Cornea

- Major refracting body
- Approximately 43.00 D
- Index of refraction = 1.37
- 5 layers:
 - Epithelium: outermost layer, highly regenerative
 - Bowman's Membrane
 - Stroma: comprises of 90% of the total cornea thickness
 - Descemet's Membrane
 - Endothelium: innermost layer

Aqueous Humor

- Index of refraction = 1.34
- Keeps cornea moist, is a source of nutrients to the cornea, responsible for maintaining the pressure inside the eye (intraocular pressure)

Vitreous Humor

- Index of refraction = 1.33

Crystalline Lens

- Approximately 17.00 D
- Index of refraction = 1.42
- Brings rays of light to focus on the retina
- Normally elastic and flexible

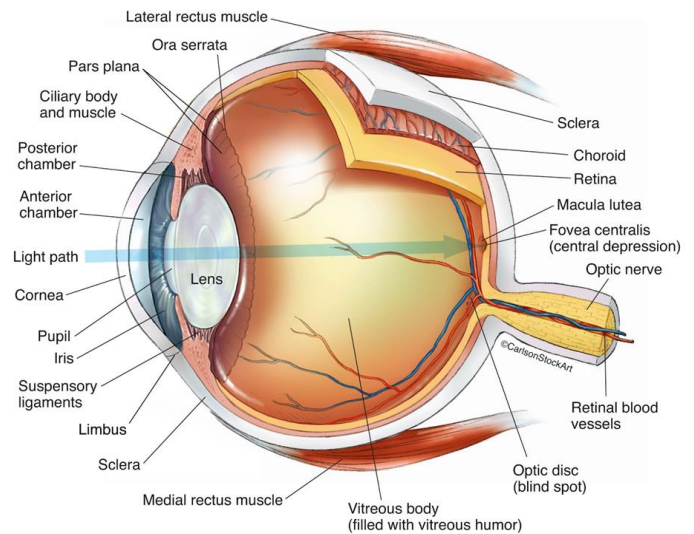
Accommodation

- Ciliary muscles relax, Zonules of Zinn increase tension, lens becomes thinner = clearer distance vision
- Ciliary muscles contract, Zonules of Zinn decrease tension, lens becomes thicker = clearer near vision

Retina

- Innermost coat of the eye
- Goal is to bring light to a sharp focus on retina; is to the eye what film is to a camera
- Comprised of photo sensitive cells or receptors:
 - Rods: night vision, peripheral vision, black & white
 - Cones: day vision, detail, color
- Macula: central area on back of the retina; provides the sharpest vision

Choroid: blood-rich layer underneath the retina that provides nutrients to retina and other parts of the eye



Right Eye (viewed from above)

Sclera: the “white” of the eye; provides protection and helps maintain the eye’s shape

Iris: color part of the eye; regulates the amount of light entering the eye by changing the size of the pupil

Pupil: central opening of the iris where light enters the eye

Optic nerve: carries impulses from the retina to the brain

Chambers of the Eye:

- Posterior chamber: space between the iris and the lens
- Anterior chamber: space between the back of the cornea and the iris
- Vitreous chamber: largest space between the lens and the retina

Lesson 5: Ophthalmic Disorders

Ametropia: blanket term to indicate a refractive error

Amblyopia: disorder that results in loss of vision due to a disturbance in the normal visual pathway development

Aniridia: absence of all or part of iris

Anisometropia: difference of more than 1.00 D or more between the right and left eye prescription

- Example: +5.00 OD, +1.00 OS

Antimetropia: right and left signs of prescription are different

- Example: -1.00 OD, +1.25 OS

Aphakia: a missing or unusable crystalline lens

Anisocoria: unequal pupil size

Asthenopia: ocular discomfort or fatigue

Binocular Deficiencies: relate to two eyes not working in tandem

Blepharitis: inflammation of the eyelids

Convergence: eyes focusing inward to read

Cataract: opacity of the crystalline lens

Diabetic Retinopathy: complication of diabetes where blood vessels in the eye are damaged

Diplopia: double vision

Floater: small particles of collagen fibers that move in the vitreous

Fusion: ability of the brain to convert images coming from each eye into one precise image

Glaucoma: disease of the optic nerve and can cause peripheral vision loss

Heterochromia: two differently colored irises

Hypermetropia: same condition as hyperopia

Iridocyclitis: disorder in which the iris and ciliary body are inflamed

Irregular Astigmatism: most likely related to keratoconus in the absence of ocular injury

Konia: means image

Iseikonia: same size of images

Aniseikonia: images from the right eye and left eye are not the same by more than 5%; brain cannot achieve fusion

Keratitis: inflammation of the cornea

Low Vision (visually impaired): vision cannot be corrected with standard spectacles, contact lenses or medical treatment/surgery.

Macular Degeneration: deterioration of the macula that causes central vision loss

Nystagmus: involuntary oscillation of the eyes

Ocular Albinism: no pigment in the iris or retina

Pseudophakia: where the crystalline lens has been replaced by an intraocular lens

Retinitis Pigmentosa: hereditary disease that is progressive and may cause total blindness

Rubeosis: a growth of abnormal blood vessels in the iris

Scotoma: an area of lost vision in the visual field, sometimes confused with the natural blind spot

Strabismus: "crossed eyes" - misalignment of the eyes where one or both point inwards toward the nose

Stye (hordoleum): inflammation of a sebaceous gland in the eyelid margin

Trichiasis: inversion of the eyelashes

Uveitis: any inflammation in the uvea, including the iris, ciliary body, or choroid

Xanthoma: small, yellowish, benign tumor on the eyelid possibly caused by high cholesterol levels