# Breaking Down the Eye Exam

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## What will you learn ?

- The basic anatomy of the eye
- Parts of an exam

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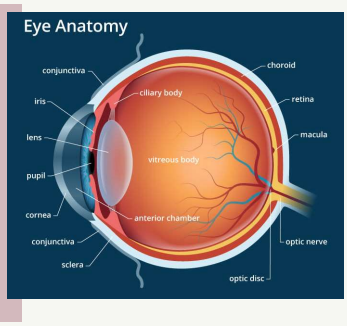
## The Anatomy of the Eye

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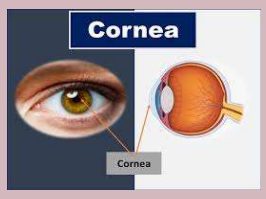
- ***This structure is the most powerful refractive media of the eye***
  - Lens
  - Cornea
  - Tear Film
  - Aqueous Humor

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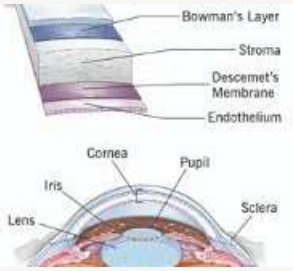
## Cornea

**The most anterior part it the eye**

- Allows light to enter the eye
- 5 Layers
  - Epithelium , Bowmans Layer, Stromatolites, Descemts membrane , Endotheiium
- Avascular

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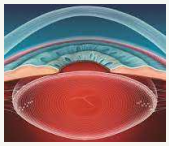
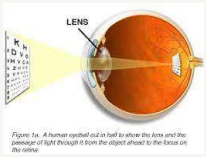
## Crystalline Lens

**The second most powerful refractive medium**

- Provides the focusing power to the eye
- Allows the eye to focus from distance to near objects (accommodation )
- Ciliary Muscle alters the shape of the lens
- Change the focal distance to the retina and brings the image into sharp focus
- Cataracts



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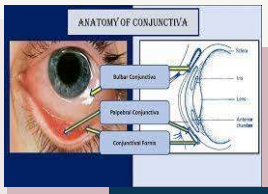
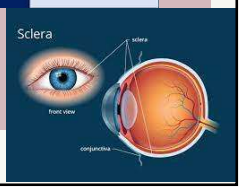
## Conjunctiva and Sclera

- The Sclera is the white part of the eye that surrounds the cornea.
  - It gives shape, structure and protection
- ***What portion of the conjunctiva covers the sclera?***
  - Bulbar Conjunctiva
  - Palpebral Conjunctiva
- ***What portion covers the inner surface of the eyelids?***
  - Bulbar Conjunctiva
  - Palpebral Conjunctiva

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## Lacrimal System

**Glands and Ducts**

- Lacrimal Gland supples the tear to the eye
  - Located Superior temporal to the eye
- Lacrimal Duct is the drainage system for tears to reach the eyes
- Nasolactimal Duct is the drainage system for the tears to leave the eye
  - The tears enter the puncta to drain out


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## Iris and Pupil

**What's your eye color?**

- Iris is the colored part of the eye
- Made up of two muscles
  - Dilator muscle and Sphincter muscle
- The muscles control the center hole- Pupil
  - Allows light to pass through
- Together they control how much light enters the eye

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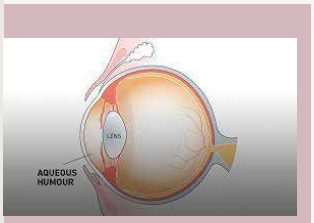
- ***What provides nutrients for the lens and cornea and carries away waste products?***
  - Choroid
  - Lacrimal Gland
  - Vitreous Humor
  - Aqueous Humor

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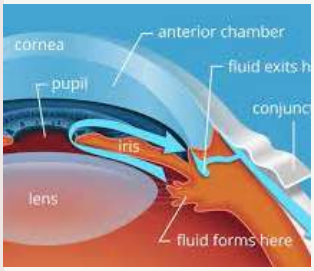
## Anterior Chamber and Aqueous humor

- Anterior chamber is the area inside the eye behind the cornea and in front of the lens.
- It's filled with the clear watery fluid produced by the ciliary body - Aqueous humor
  - Maintains the intraocular pressure
  - Also fills the posterior chamber of the eye which lies between the iris and the front of the lens.

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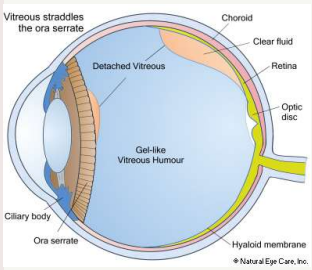
## Vitreous Humor

**The famous floaters!**

- Vitreous chamber is the largest chamber
- Jelly like consistency
- Helps hold the shape of the eye
- Helps the retina stay in place

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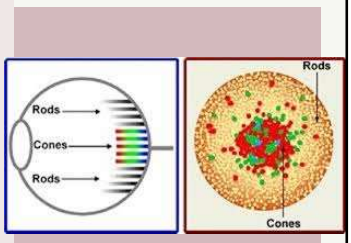
- ***What part of the retina is responsible for the color vision and clear central vision?***
  - Rods Photoreceptors
  - Choroid
  - Cones Photoreceptors
  - Macula

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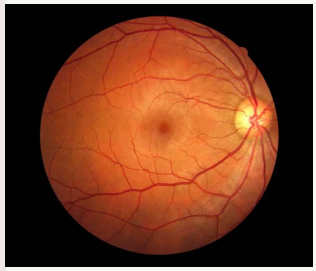
## Retina

**How the brain process light**

- Comprised of layers of photoreceptors
  - Cones - color and central vision in bright light
  - Concentrated in the Macula and foveal center for maximum visual acuity
  - Rods - provides black and white vision , motion detection and in dim light and in the periphery
- The images that fall on the nerve cells and then transmitted to the brain , where they are interpreted



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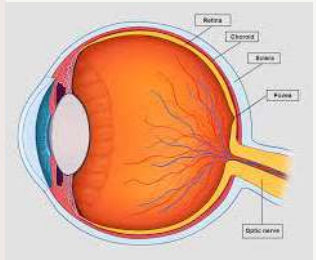
## Choroid

- Middle layer of tissue found between the retina and the Sclera
- Made up almost entirely of blood vessels
- Supply oxygen and nutrients to the outer part of the retina



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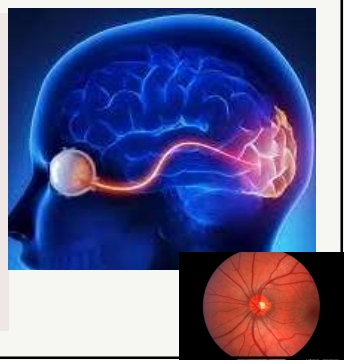
## Optic Nerve

- Carries impulses from the retina to the brain
- Part of the nervous system - CN 2
- Optic disc is the only part of the brain that is visible from the outside



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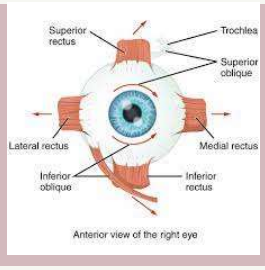
- ***Which muscle is responsible for depression , addiction and extorsion?***
  - Inferior Oblique
  - Inferior Rectus
  - Medical Rectus
  - Superior Oblique

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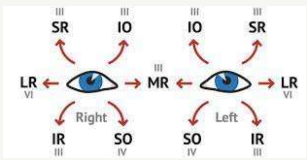
## Extraocular muscles

**Control the eye movement and alignment**

- **Rectus muscle (4) - attach directly to the eye**
  - Superior : upward movement CN 3, adducts , intorsion
  - Inferior: downward movement CN3, addicts and extorsion
  - Medial : Inward CN3
  - Lateral : outward movement CN 6
- **Oblique (2) do not attach directly to the eye**
  - Superior : intorsion CN4 , depression and abduct , sphenoid bone
  - Inferior : extorsion CN3 , elevates and abducts, orbital floor

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# The Eye Exam

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## Parts of the Exam

- Case History
- Entrance Tests
- Subjective Refraction
- Tonometry
- Biomicroscopy
- Dilated Fundus Exam
- Assessment
- Plan

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## Case History

**Why the patient came to be seen today**

- Demographics
- Chief Complaint
- history of present illness
- Social History
- Current Medications
- Allergies to medications

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## Entrance Tests

**What they are and why we need them**

- Lensometry
- Auto Refraction / Retinoscopy
- Pachymetry
- Keratometry
- Topography
- Visual Field
- VA sc/cc
- Cover and Uncover Cover test
- Pupil Testing
- EOMS

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## Lensometry

- Measure the power of spectacle and Contact lenses
- Measures the sphere, cylinder power and axis , prism and Adds

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## Auto Refraction and Retinoscopy

- Retinoscopy is an objective measure of the refractive power
  - Retinoscope
  - Analyze the red reflex in the eye
  - Autofraction does the same quicker

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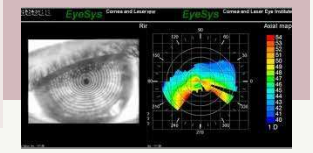
- **Pachymetry**
  - Measure of the corneal thickness
  - Used in monitor progression in some disorders
  - Access if patient is a good candidate for refractive surgery
- **Keratometry**
  - Measures the curvature of the cornea
  - Estimates the focusing power of the cornea, amount of astigmatism and the evaluating the integrity of the front surface of the eye

- **Topography**
  - Measures a thousand of points across the cornea
  - Used in refractive surgery and fitting of specialty contact lens
  - Diagnosing refractive disorders



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## Essential Prelims

- **Visual Acuity**
  - Measures how much detail the eye can see
  - Snellen letters : Testing distance /and the distance the letter should be read
- **Pupil Testing**
  - Test the reaction of pupils to light
  - Detects abnormalities of the retina , optic never , midbrain
- **EOMS**
  - Measures the function of the eye muscles and nerve innervation

- **Visual Field**
  - Measures what a person can see in the peripheral vision while looking straight ahead
  - Confrontation fields or Automated
- **Cover Test**
  - Examines how the eyes work together
  - Access if there is a deviation and how much

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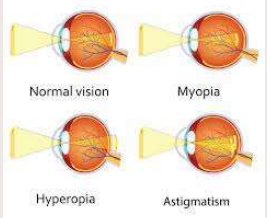
## Subjective Refraction

**What is the eyeglass prescription ?**

- Uses the patients response to get the best correction for them
- Phoropter contain lenses uses to determine how much power the eye has
- **Myopia** - nearsighted , image is focus in front of the retina , long eye corrected by minus lenses
- **Hyperopia** - far sighted , image behind the retina , short eye corrected by plus lenses
- **Astigmatism** - 2 focal points, found in myopia and Hyperopia , lenses added to the correct axis
- **Presbyopia** - the inability to see clearly at near due to lack of accommodation , begins in the 40s , adding reading glasses

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## Ocular Evaulation

**Slit Lamp and More**

- **Biomicroscopy**
  - Magnified view of the ocular structures
  - Fitting contact lenses , checking the health of the front surface as well as the back of the eye uses special lenses
- **Tonomerty**
  - Measures the intraocular pressures
  - Screening for glaucoma
  - NCT vs Goldmann vs Icare

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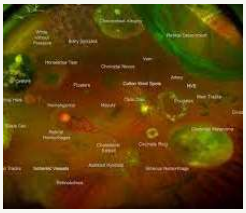
## Dilated Fundus Exam and Fundus Photography

**Evaluating the health of the back of the eyes**

- Dilated Fundus exam requires the pupil to be dilated to get complete look in the back of the eye
  - Blurry vision , photophobia
- Fundus Photography takes a picture of the back of the eye to document the health of the structures of the back of the eye.



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## What did we find and What are we planning to do about it

- **Assessment**
  - Discussing the differential diagnoses and supporting history and exam findings
- **Plan**
  - What is the management and treatment for each problem found

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Thank you. Questions?

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