

Basic Eye Exam
ASORN -Annual Meeting
San Francisco, CA

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Learning Objectives

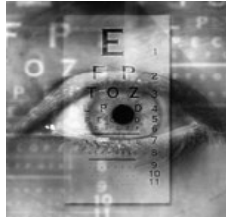
- Identify the major anatomical landmarks identified in the basic eye exam.
- List at least five elements of the basic eye exam.
- Discuss the nurse's /technician's role in performing the basic eye exam.

Back to the Basics

- Two fundamental principles to keep everything simple.
 - There are really only 3 complaints a patient can have.
 - OR
 - If a patient has pathology, you should almost always be able to actually see it and identify it in the clinic without having to invasive or expensive procedures.

The 3 Complaints a Patient Can Have

- "My eye doesn't look right."
- "My eye doesn't feel right."
- "My eye doesn't see right."



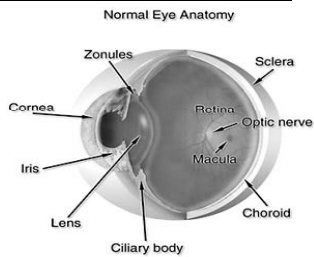
What questions should you be asking?

- "What can or can't my patient see?"
- "What can or can't I see in my patient?"



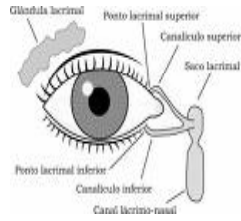
Ocular Anatomy & Physiology

- Adult Eyeball = spherical, 25mm
 - About 4/5 of eye positioned in bony orbit



Ocular Anatomy

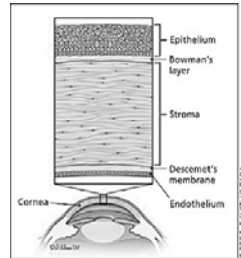
- Eyelids – Protects eye from injury
- Adnexa – Conjunctiva, canthi, meibomian glands
- Lacrimal system – tear production and drainage



Cornea

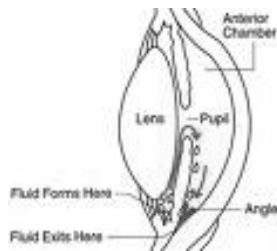
Clear, Transparent, Avascular Tissue

- Contributes 70 % of eye's refractive power
- Has Five Layers
 - Epithelium
 - Bowman's Membrane
 - Stroma
 - Descemet's Membrane
 - Endothelium



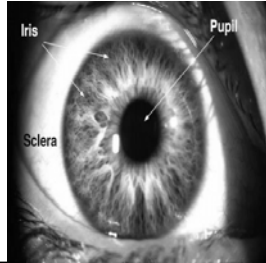
Aqueous Humor

- Clear, colorless, watery substance
- Produced by ciliary body
- Provides mechanism to control IOP



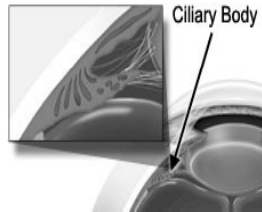
Uveal Tract

- Iris = separates the anterior chamber and posterior chamber
- Forms colored part of eye
- Center aperture is pupil
 - Contracts to constrict pupil
 - Relaxes to dilate pupil



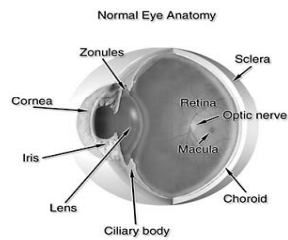
Ciliary Body

- Continuous with Iris
- Helps to regulate IOP
- Responsible for production of IOP



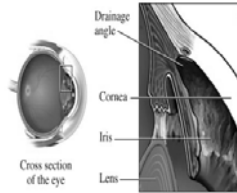
Choroid

- Continuous with iris and ciliary body
- Has three layers to nourish the retina



Angle Structure

- Intraocular structures forming angle posterior to cornea, anterior to iris

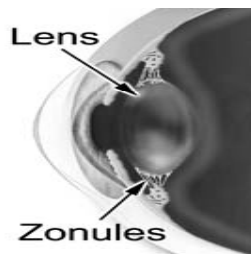


- Canal of Schlemm = drains aqueous from trabeculum out of eye

Lens

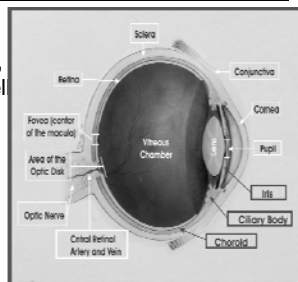
Refractive structure

- Clear, transparent
- 65% water, 35 % protein
- Approximately 4mm thick, 9-10 mm diameter
- Accommodates for distance and near VA



Vitreous

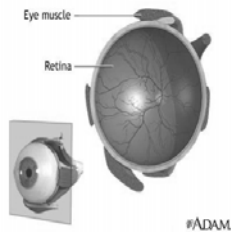
- Clear, transparent, avascular, thick, jelly like substance
- 99% Water, 1 % Collagen
- Occupies 2/3 total eye volume



Retina

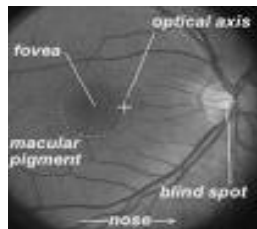
Thin, semi-transparent neural layer

- 0.2 mm thick, surface area approximately 17 cm
- Innermost lining layer of eye
- General function to record and process images



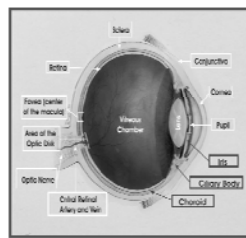
Fundus

- Portion of eye generally seen on dilated exam.
- Has four primary structures
 - Macula lutea
 - Fovea Centralis
 - Optic Disc
 - Central retinal artery and vein



Sclera

- Fibrous, white, opaque
- Portion that comprises 5/6 of eye
- Gives support to eye
- Layers
 - Lamina fusca
 - Stroma
 - Episclera
 - Tenon's Capsule



Extraocular Muscles

- Six Muscles

- **4 Rectus Muscles**

- Medial Rectus – turns eye towards nose
 - Lateral Rectus – turns eye away from nose
 - Superior Rectus – elevates eye
 - Inferior Rectus – depresses eye

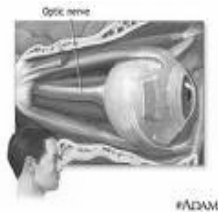
- **2 Oblique Muscles**

- Superior Oblique – intorts, depresses eye
 - Inferior Oblique – extorts, elevates eye



Optic Nerve

- Transmits impulses from retina to brain

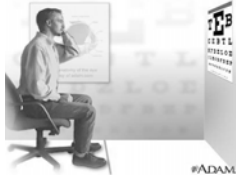


Nursing Assessment of Patient

- Demographic Data
- Reason for Visit
- Personal Health History
- Physical Examination
- Special Assessment, Diagnostic Testing
- Role of Nurse in Patient Education

The Screening Eye Exam

- Eye exams usually occur in two circumstances ~
 - Periodic exams to check general health of the eye.
 - Evaluation of patients who have ophthalmic symptoms.



Basic Components of the Eye Exam

- Visual Acuity
- Confrontation visual fields
- External examination
- Pupillary examination
- Motility and alignment examination
- Ophthalmoscopic examination.



Visual Acuity

- Establish visual acuity in 3 ways.
 - At distance (20 feet) with current glasses on
 - At distance (20 feet) through a pinhole
 - At near (14 inches) with current glasses on

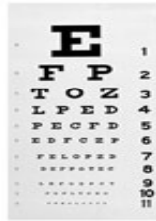


Snellen Test

- Displays block letters of diminishing size, each defined according to the distance at which the line of letters can be read by a person with normal acuity.
- For example, the 20/100 line is the smallest print that a person with normal visual acuity could read correctly at a testing distance of 100 feet.

Snellen Eye Chart

- Snellen acuity is expressed by a numerator and denominator, but it is not a fraction.
- Numerator = testing distance
- Denominator = smallest print the pt. can see.



Tips for performing Snellen

- Position pt. at designated distance- eye chart well illuminated.
- Test with patient wearing customary eyeglasses or contact lens.
- Test each eye separately and be sure non testing eye is completely occluded.

Near Vision Testing

- The near vision test is used to assess reading vision and to measure visual acuity when distance vision cannot be tested.
- Method identical to Snellen test, except that the near vision card is held at specified viewing distance (~ 14 inches)

Cautions with near vision testing

- Even a slight misestimation of testing distance will cause an incorrect measurement of acuity.
- The acuity measurements will be overestimated in uncorrected myopia and underestimated in uncorrected presbyopia.

Low Vision Testing

- Count Fingers Acuity
 - Ask pt. to count the number of fingers you hold up at a specified distance, generally 1-5 feet. Record CF 1ft.
- Hand Movements Acuity
 - Ask pt. to distinguish your horizontal from vertical hand motions at 1 foot. Record HM 1 ft.
- Light Perception Acuity
 - Ask whether pt. can see bright light shined directly into eyes. Record as LP or NLP

Vision Testing in Children

- For children between ages 2-4 you can use
- Tumbling E chart
- Picture Chart



Pinhole vision testing

- When the vision is noted $<20/60$ a pinhole should be used to attempt to improve VA.
- The pinhole works by only letting light that hits the middle of the cornea reach the retina.



Confrontation Visual Fields

- Confrontation VF measures pts. ability to identify large targets with peripheral vision.



Confrontation Visual Fields

- Sit directly in front of pt. @ 2-3 ft. distance.
- Close your OD, have pt. close OS.
- Ask pt. to look at your OS.
- Position your hand in a plane midway between the pt. and yourself.
- Display 1-2 fingers in each quadrant of visual field ~ approx. 10° from fixation and ask pt. how many finger you are displaying.

Common Causes of VF Abnormalities

- Tumors in the region of optic chiasm
- Cerebral hemisphere tumor or strokes
- Retinal vascular occlusion
- Optic Neuritis
- Ischemic optic neuropathy
- Glaucoma

External Examination

- The external exam screens for abnormalities of the ocular surface (cornea, conjunctiva) and surrounding tissues (eyelids, orbital structures). Corneal epithelial defects can be highlighted by staining the cornea with fluorescein dye.

Penlight Inspection

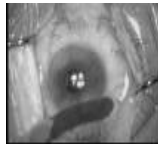
- Under direct penlight illumination, inspect the eyelids and skin of the face around the eye.
- Separate the eyelids to examine the conjunctiva and cornea. Ask the patient to shift gaze direction to provide a more complete view.

Corneal Staining

- Instill topical anesthetic on conjunctiva. Touch a wet fluorescein strip to conjunctival cul-de-sac.
- With ophthalmoscope set between +5 to +10 diopters or with a magnifying loupe, look for green patches or lines on the corneal surface that do not move after patient blinks. Defects will stand out more clearly under cobalt-blue light.

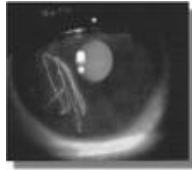
Instillation of Topical Fluorescein

- Place a drop of topical anesthetic on the conjunctiva.
- Touch a wet fluorescein strip to the conjunctival cul-de-sac



Common Causes of External Eye Abnormalities

- Corneal opacities and erosion: infectious and noninfectious keratitis, conjunctival and corneal foreign bodies.



Common Causes of External Eye Abnormalities

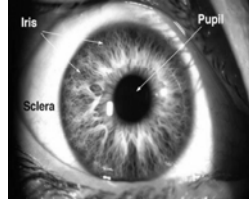
- Proptosis, exophthalmos; Grave's disease, orbital inflammation, orbital tumor, postseptal cellulitis, blunt injury.
- Ptosis: cranial nerve III palsy, Horner's syndrome, myasthenia gravis.
- Swollen eye lids: chalazion, stye, dacryocystitis.
- Eyelid lacerations.

Common Causes of External Eye Abnormalities

- Tearing: dacryocystitis, orbital inflammation, ocular foreign body, atopic allergy, Grave's Disease.
- Discharge: allergic, bacterial, viral, and chlamydial conjunctivitis, dacryocystitis, orbital inflammation.
- Injected, swollen, or hemorrhagic conjunctiva; red eye disorders.

Pupillary Examination

- The pupillary examination detects neurological abnormalities that disturb the pupillary reflex. The three essentials to this test are:



Pupillary Examination

- Measuring pupil size in dim light
- Evaluating pupil response to direct light
- Swinging flashlight test.



Swinging Flashlight Test

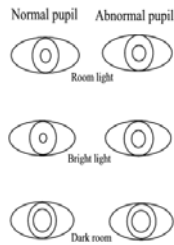
- In normal and abnormal cases, pupils are equal and unconstricted in dim illumination.
- In the normal case, the right & left pupils constrict equally to light directed in the right eye.
- There is no change in pupil size when the light directed quickly at the left eye.

Abnormal Swinging Flashlight Test

- In the abnormal case, both pupils dilate when the light is quickly directed in the left eye.
- The left eye is said to display a relative afferent pupillary defect, probably because the optic nerve is damaged on that side.

Common Causes of Pupillary Abnormalities

- Anisocoria
- Weak reaction to direct light
- Relative afferent pupillary defect
- Optic neuritis
- Ischemic optic neuropathy
- Tumors
- Acute angle closure



Motility and Alignment Examination

- This portion of the examination screens for abnormalities in eye movements and for ocular misalignment (strabismus).
- The three procedures include measurement of ocular movements, the corneal light reflection test, and the cover test.

Ocular Movements

- Ask the patient to follow your finger or a penlight with the eyes as you move it from straight ahead to the far right and left and then up and down. Elevate the upper lid with your thumb as you observe the down gaze.



Measurement of misalignment

- If everything is working in order, the 2 eyes move properly together, and the brain quietly glosses over slight differences.
- If the 2 eyes do not track together, the patient has strabismus.



Corneal Light Reflection Test

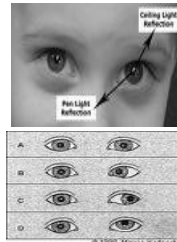
- This procedure compares the position of the corneal light reflection in both eyes.
- If the eyes are aligned, the light reflection appears symmetric in the two eyes.
- If the eyes are not aligned, one image will be displaced.

Corneal Light reflection test

- Have the pt. fixate on a small target you hold adjacent to the penlight. Position the penlight at least 10 feet from pt. eye.
- Shine the light on both corneas simultaneously.
- Compare the positions of the two corneal reflections and record the result as either normal or abnormal.

Corneal light reflection test

- Normal -light centered on both corneas.
- Left Esotropia –outward displacement on left cornea.
- Left exotropia – inward displacement on left cornea.



Charting of corneal light reflex testing.

Symmetric	Normal
Outwardly displaced	Esotropia Convergent misalignment
Inwardly displaced	Exotropia Divergent misalignment
Downward or upward displaced	Hypertropia

Common Causes of Motility and Alignment Abnormalities

- Congenital and Childhood onset strabismus.
- Cranial nerve palsies
- Orbital trauma
- Grave's disease
- Myasthenia gravis
- Stroke
- Brain tumor

Ophthalmoscopic Examination

- Examination of the fundus – retina, vitreous, RPE, choroid, sclera, optic nerve, macula.
- Examination requires dilation.
- Can be either direct or indirect ophthalmoscopy.

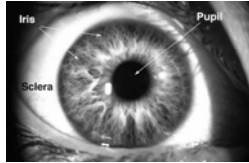
Red Reflex Testing

- The presence of normal red reflexes is an indication that the ocular media are free of opacities and that there is no large refractive error and that eyes are aligned.



Common dilating agents

- Mydriatic agent
 - Produces pupillary dilation by stimulation of iris dilator muscle
- Cycloplegic agent
 - Produces paralysis of ciliary muscle and iris sphincter.



Nurse / Technician Role

- Perform duties within your scope of practice.
- Pt. / Staff education
- Pt. advocate
- 2nd pair of eye and ears to provider.



The Winning Combination

- Clinical Competence
 - +
- Compassionate Caring
 - =
- Excellence in Patient Care



Thank you for your attention.

