

ophthalmology
Team

#1- Orientation, History Taking, and Examination (Part II)

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Doctor's note Team's note Not important
Important **431 teamwork in a yellow box**

Objectives of The Comprehensive Ophthalmic Evaluation:

1. Obtain an ocular and systemic history.
2. Determine the optical and health status of the eye and visual system.
3. Identify risk factors for ocular and systemic disease.
4. Detect and diagnose ocular diseases.
5. Establish and document the presence or absence of ocular symptoms and signs of systemic disease.
6. Discuss the nature of the findings and the implications with the patient.
7. Initiate an appropriate response.
(e.g. further diagnostic tests, treatment, or referral).

History Taking & Physical Examination

HISTORY

- It is a gathering information process from the patient guided by an educated and active mind.
- It is a selective guided and progressive elicitation and recognition of significant information
- History by skilled person can arrive at the proper diagnosis in 90% of patients.
- It gives vital guidance for:
 - Physical examination
 - Laboratory work
 - Therapy
- Failure to take history can lead to missing vision or life threatening conditions.

Chief complaint: "The patient's own words"

"She cannot see with the right eye"

You should not come to conclusion that her problem is nearsightedness and write down "Myopia of RE".

- The patient needs will not be satisfied until he/she has received an acceptable explanation of the meaning of the chief complaint and its proper management.

History of the Present Illness:

- Detailed description of the chief complaint to understand the symptoms and course of the disorder.
- Listen and question and then write down in orderly sequence that make sense to you.
- The time sequence

when, How fast, what order did events occur?

- Frequency, intermittency
- Location, Laterality
- Severity
- Associated symptoms
- Documentation (old records, photo)

e.g ptosis, proptosis, VII N palsy.

Examples:

- ➔ *gradual painless decrease vision both eyes for 1y.*
- ➔ *Sudden painless decrease vision RE for 10 min.*

“Cannot see with right eye (RE)”!

- Only distance vision blurred?
 - Blind spot is present in the center of visual field (VF)?
 - Right side of visual field of the RE lost?
 - Right VF of both eyes lost?
 - A diffuse haze obscures the entire field of RE?
-
- ❖ Each of these has different diagnostic implication
 - ❖ Most pt. has difficulty providing precise and concise description

Disturbances of vision:

- Blurred or decreased central vision
- Decreased peripheral vision. (*glaucoma*)
- Altered image size.
(*micropsia, macropsia, metamorphopsia*).
- Diplopia (*monocular, binocular*)
- Floaters
- Photopsia (*flash of light*)
- Color vision abnormalities.

- Dark adaptation problems.
- Blindness (*ocular, cortical*).
- Oscillopsia (*shaking of images*).

DDx of Acute Visual Loss: (Always remember these 4)

1. Age-related Macular Degeneration (AMD)
 2. Vascular Occlusion (DM, HTN)
 3. Retinal Detachment
 4. Acute Glaucoma
- Morning visual disturbances → **Eye dryness.**
 - Blurring of vision for 20mins → **Migraine aura.**
 - Patient still complains of problems with his/her vision although all his exams and investigations are normal → **Do visual field exam (could be stroke!)**
 - There are two types of color blindness. Complete and partial (most common), both are diagnosed by ishihara's test.
 - "Convergence insufficiency" is a condition that can **cause pain** especially in pediatric patients.
 - Refractive errors never cause pain.
 - **Ciliary injection (red eye) is mainly caused by 4 things:**
 1. Acute conjunctivitis
 2. Acute iritis
 3. Acute glaucoma
 4. Acute keratitis (*corneal ulcer; a combination of conjunctivitis and iritis*)

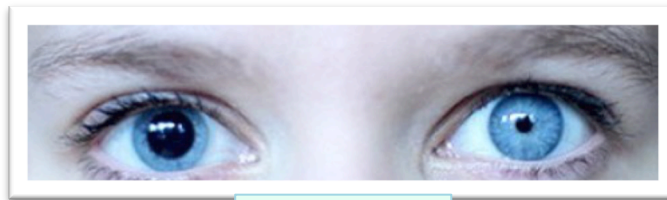
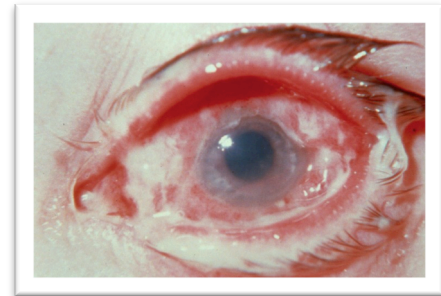
Ocular pain or discomfort:

- Foreign body sensation
- Ciliary pain (*aching, severe pain in or around the eye, often radiating to the ipsilateral forehead, molar area*)
- Photophobia
- Headache
- Burning
- Dryness
- Itching: *patient rub the eye vigorously (allergy)*
- Asthenopia (*eye strain*)
- Abnormal ocular secretions:
 - Lacrimation, epiphora
 - Dryness

- Discharge (*purulent, mucopurulent, mucoid, watery*)

Abnormal ocular secretions:

- Lacrimation, epiphora
- Dryness
- Discharge (*purulent, mucopurulent, mucoid watery*)
- Redness, opacities, masses
- Anisocoria



Anisocoria

Family History

- Many eye conditions are inherited. **Examples:** RE, glaucoma, strabismus, retinoblastoma, neoplastic, vascular disorders
- Familial systemic disease can be helpful in ophthalmic evaluation and diagnosis. **Examples:** Atopy, thyroid diseases, DM, certain malignancies.
- Ask about any eye problem in the family background?
- Ask specifically about corneal diseases, glaucoma, cataract, retinal diseases or other heritable ocular conditions.

Systemic Review

- Ask questions designed to confirm or exclude your tentative diagnosis
 - significant positive
 - significant negative
 - "Significant is equal to expected"
- Predict the physical and lab findings likely to be present.
- Any discrepancy between the history and physical examination requires explanation

Summary of Hx Taking

History of Present Illness: Explore every complaint with the “basic questions” -- when did it start, what’s it like, is there anything that makes it better or worse, are you taking any medications for relief, etc..

Specific HPI review of systems:

1. Floaters and flashing lights

- These are the classic symptoms of a retinal detachment and retinal tears!
- Ask EVERY patient about these symptoms.
- Ask if they’re new or have worsened recently.

2. Transient vision loss

- Migraine vessel spasm in the young / micro-emboli in the elderly.
- Curtains of darkness might indicate an ischemic event or a retinal detachment, so explore these symptoms in detail.

3. Blurry vision

- Is the vision always blurry?
- Does it worsen when reading or watching TV? *People blink less when watching TV and develop dry eyes.*
- Is this a glare problem at night that might indicate cataracts?
- Is this a patient with poor glycemic control with resulting hyperosmotic swelling of their lens?

4. Red, painful eyes

- Ask about the nature of the pain (is this a scratchy pain, aching pain, or only pain with bright light).
- Is there discharge that might indicate an infection?

5. Chronic itching and tearing

- Is it in both eyes?
- Think about allergies or blepharitis.

6. Headaches and scalp tenderness

- Think of temporal (giant cell) arteritis and ask about other collaborating symptoms like jaw claudication, polymyalgias, weight loss, and night sweats.

PMH:

- Diabetes, hypertension, and coronary artery disease.
- Thyroid problems and asthma (*you might need to prescribe a beta-blocker and you don't want to set off bronchospasm*).

POH (past ocular history):

- Past clinic visits and surgeries.
- Specifically: cataract surgeries, eye trauma, and glaucoma.

Family History:

Focus on history of glaucoma and blindness. *Patients will often confuse glaucoma with cataracts, so be sure to ask.*

Allergies:

We sometimes give Diamox to control eye pressure so make sure your glaucoma patient isn't allergic to sulfa drugs.

Medications:

- Current eyedrops taken, and why.
- Are they using a regular eyedrop? How about vasoconstricting Visine
- Check if your patient is taking an oral beta-blocker already, *in case you want to start a beta-blocking eyedrop.*

This was quoted and reorganized from OphthoBook.

Ophthalmic Examination

-The purpose is to evaluate:

→ Function

- Visual
- Nonvisual (eye movement, alignment)

→ Anatomy of the globe

- Adnexa (lids + periocular tissue)
- Orbit

-Vision:

1. How to test it?

1. Display of different –sized targets shown at a standard distance from the eye.
2. Snellen chart.
3. 20/20, 6/6
4. Uncorrected, corrected

2. Testing poor vision:

- If the patient is unable to read the largest letter <(20/200)
- Move the patient closer e.g. 5/200
- If patient cannot read:
 - Count fingers (CF)
 - Hand motion (HM)
 - Light perception (LP)
 - No light perception (NLP)

Know these terms

-Ophthalmic Examination

- Visual acuity
- External examination
- Motility and alignment
- Pupil examination
- Slit lamp biomicroscopy
- Tonometry

- Ophthalmoscopy
- Gonioscopy

(To observe the anterior chamber angle if the angle is open or narrow or if the eye can be dilated safely. Its most important function is in determining whether a patient's \uparrow IOP is due to an "open angle" or "closed angle" mechanism)

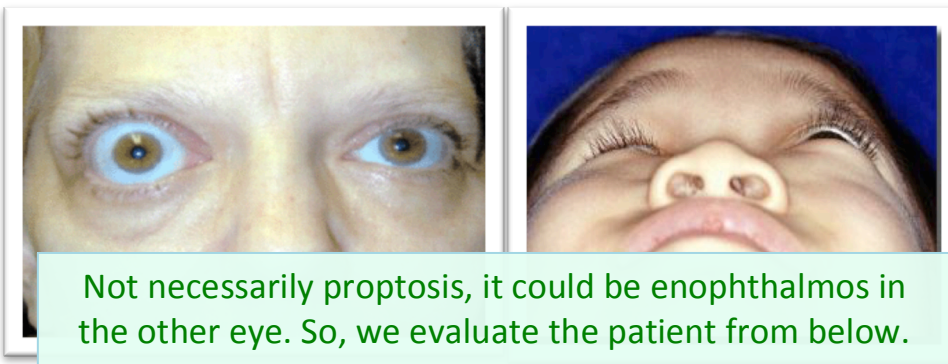
- Retinoscopes

External Examination

- Evaluate by gross inspection and palpation.
- Ocular adnexa. (lid, periorcular area)
- Skin lesions, growths, inflammatory lesions.
- Ptosis
- Proptosis, exophthalmos, enophthalmos
- Palpation of bony rim, periorcular soft tissue.
- General facial examination e.g. enlarged preauricular lymph node, temporal artery prominence.



Retinoblastoma. Very imp!
Please read about it

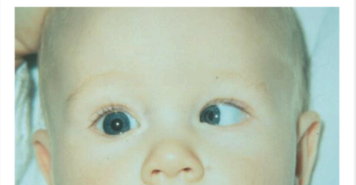


Not necessarily proptosis, it could be enophthalmos in the other eye. So, we evaluate the patient from below.

Ocular motility:

Evaluate:

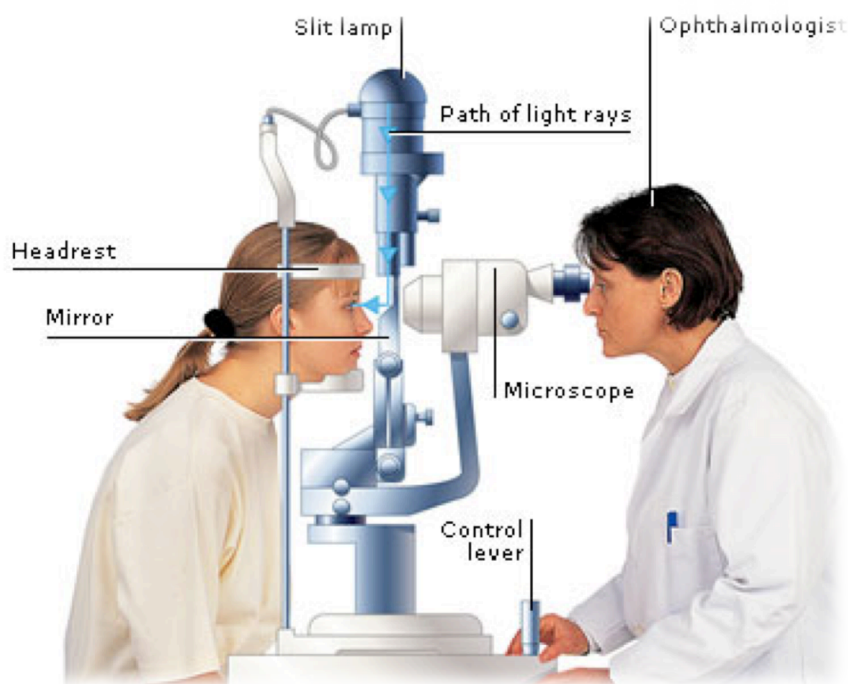
1. **Alignment**
2. **Movements**
 - Follow a target with both eyes in each of the four cardinal directions of gaze.
 - Note
 - ✓ speed / smoothness
 - ✓ range
 - ✓ symmetry



Misalignment of the eyes

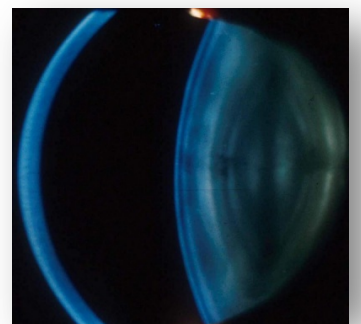
- ✓ unsteadiness of fixation (e.g nystagmus)
- Examine for size, shape, reactivity to both light and accommodation.
- Direct response and consensual response.
- Afferent pupillary defect (APD / Marcus Gunn pupil) *you should know exactly how to do it for OSCE!*
- Efferent pupillary defect.
- Pupillary abnormalities:
 - neurologic disease
 - previous inflammation – adhesion
 - acute intraocular inflammation - spasm
 - atony
 - prior surgical trauma
 - effect of systemic or eye medication
 - benign variation of normal

Slit lamp examination:



- Is a table-mounted binocular microscope with special illumination source.
- A linear slit beam of light is projected onto the globe – optic cross section of the eye.

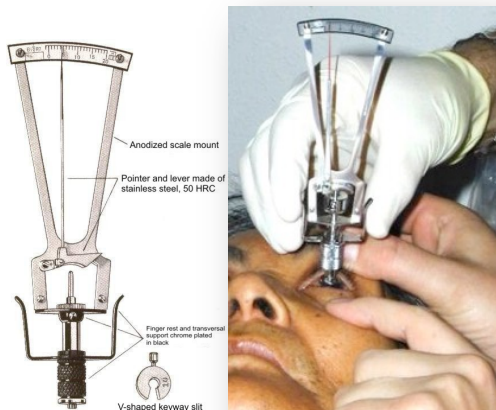
Slit lamp alone, the anterior half of the globe (anterior segment) can be visualized.



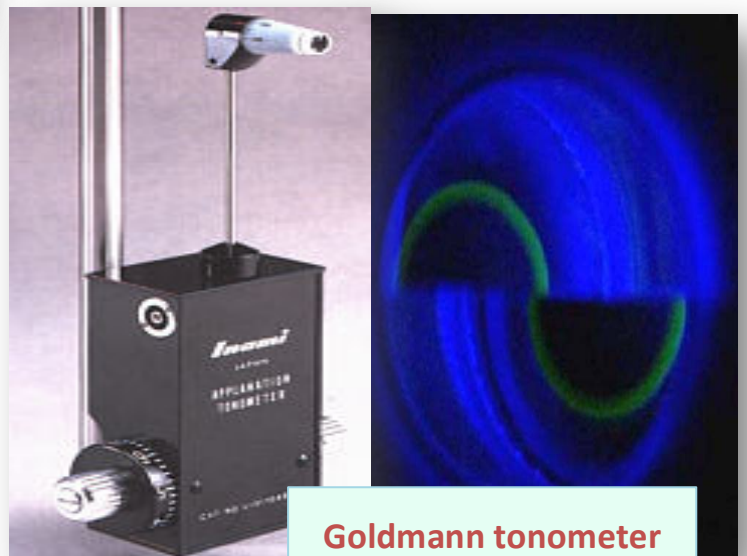
Tonometry:

- Tonometry is a procedure performed to determine the intraocular pressure (**IOP**). It is an important test in the evaluation of patients at risk from glaucoma. Most tonometers are calibrated to measure pressure in millimeters of mercury (mmHg).
- The globe is a closed compartment with constant circulation of aqueous humor.
- This maintains the shape, and relatively uniform pressure within the globe.
- Normal pressure **10 – 21 mmHg**.

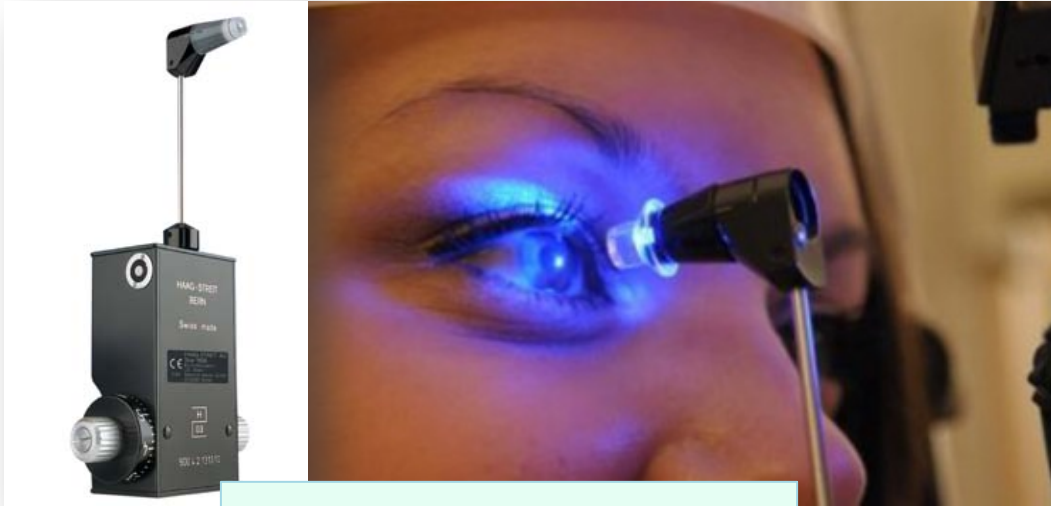
Types of tonometry:



Schiotz tonometer. Very important for SAQ! Please make sure you spell the full name right.



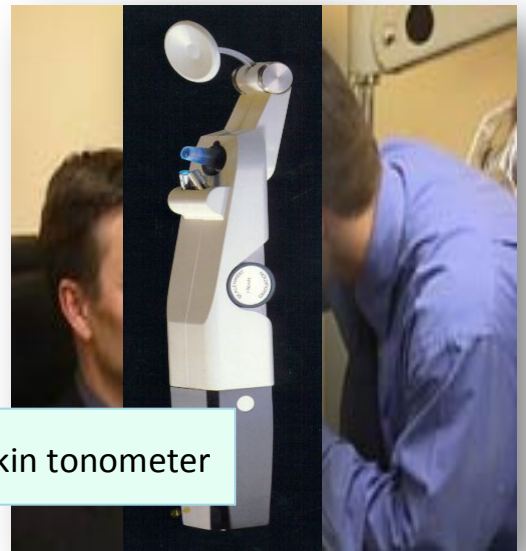
Goldmann tonometer



Glodmann applantation tonometer



Tonopen tonometer



Perkin tonometer

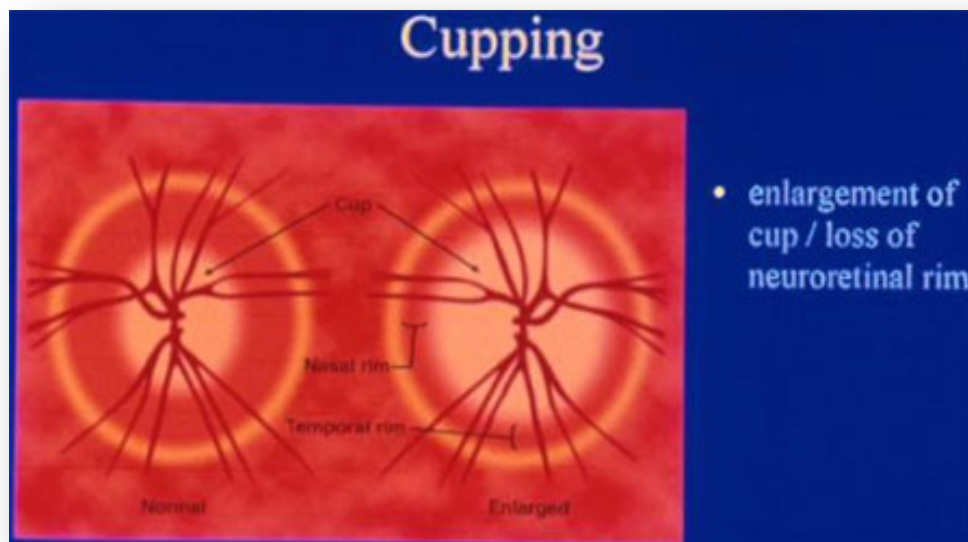
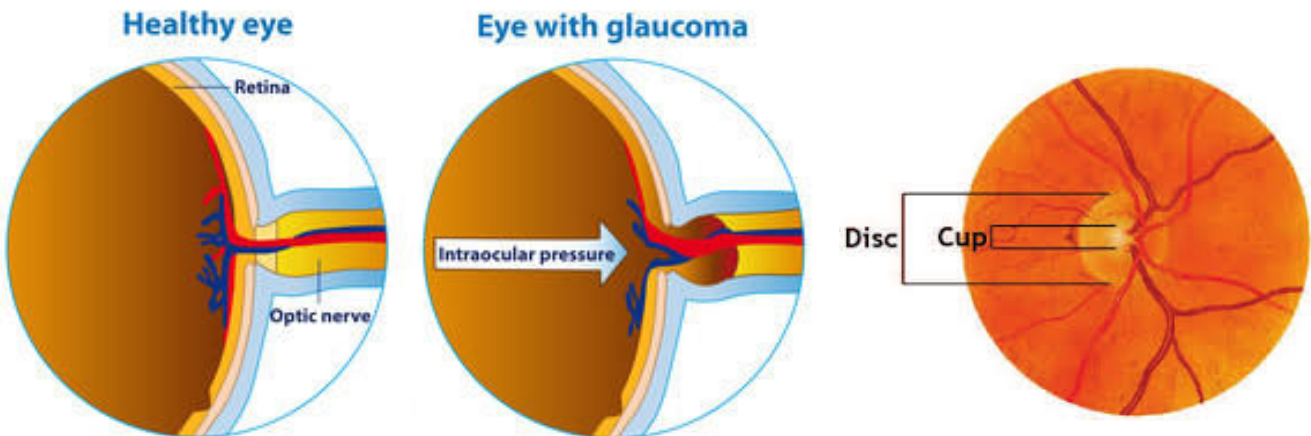


Air-puff tonometer

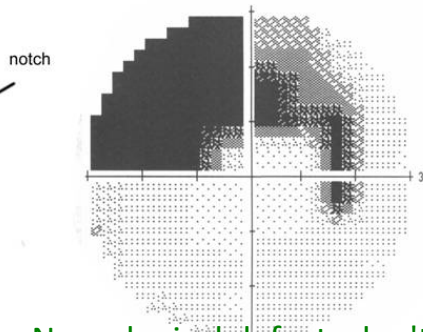
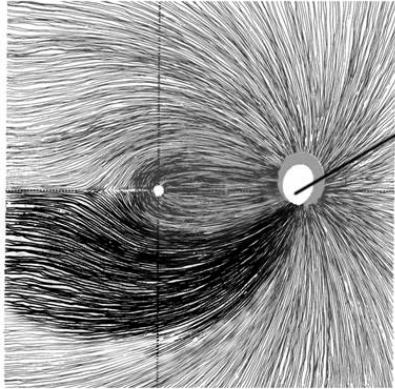
-Glaucoma

Diagnosis made by checking:

1. IOP
2. Disc **cupping**
3. Visual field defect



Retinal nerve fiber layer

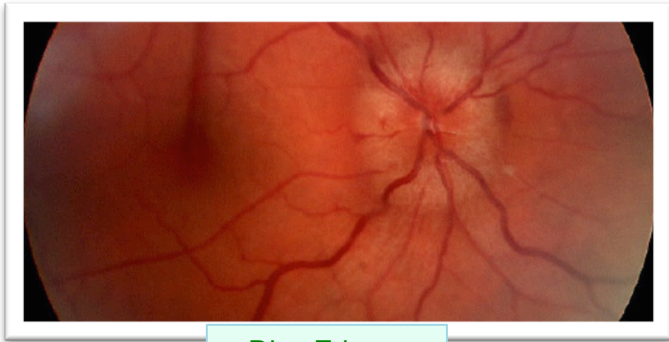


Neurological defects don't respect horizontal/vertical lines of visual field

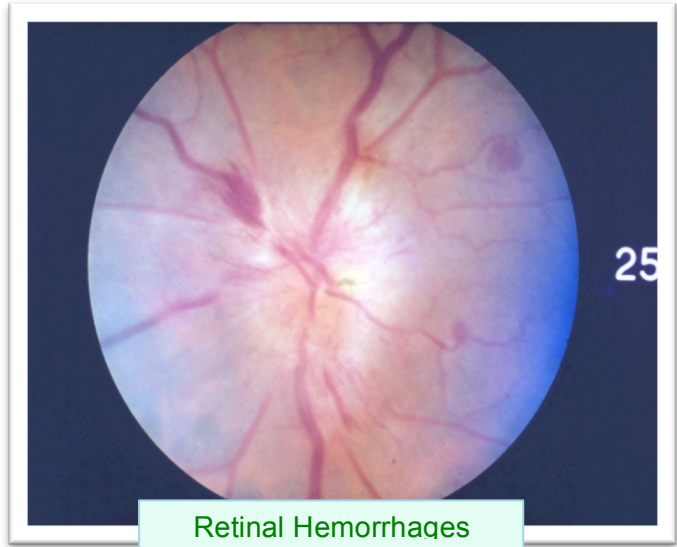
-Ophthalmoscopy

	Direct ophthalmoscopy	Indirect ophthalmoscope
Advantages	<ol style="list-style-type: none"> 1. Handheld instrument. 2. Standard part of the general medical examination. 3. Portable. 	<ol style="list-style-type: none"> 1. provide much wider field of view 2. less magnification (3.5X with 20D lens) 3. brighter light source – better view. 4. Binocular – stereoscopic view. 5. Allow entire retina examination till the periphery.
Disadvantages	-	<ol style="list-style-type: none"> 1. Inverted retinal image. 2. Brighter light is uncomfortable to the patient.
Shape		

Both are used for **fundoscopic**

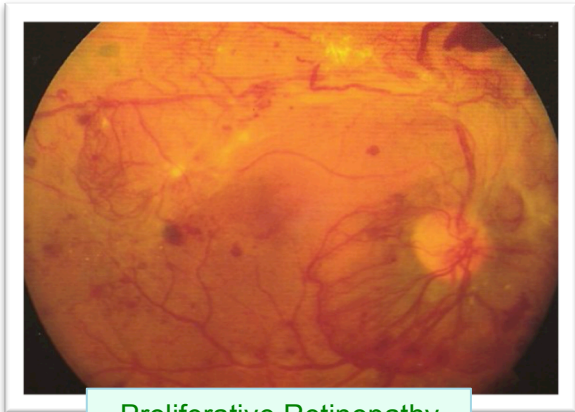


Disc Edema

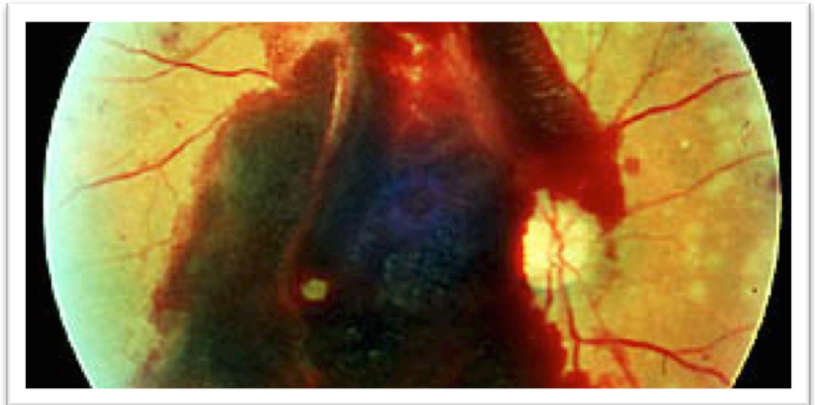


Retinal Hemorrhages

exam.



Proliferative Retinopathy



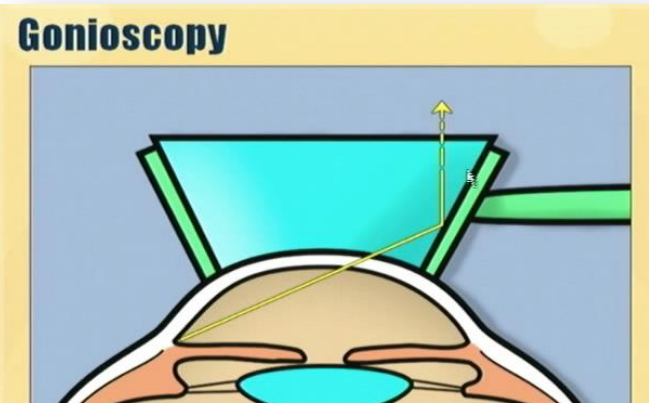
Vitreous Hemorrhage

-Special lenses:

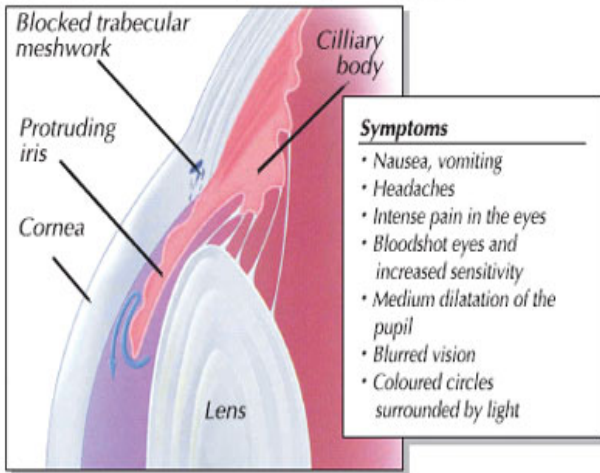
Important for exam!

- Goniolens
- other lenses allow evaluation of the posterior segment.

-Importance of Gonioscopy

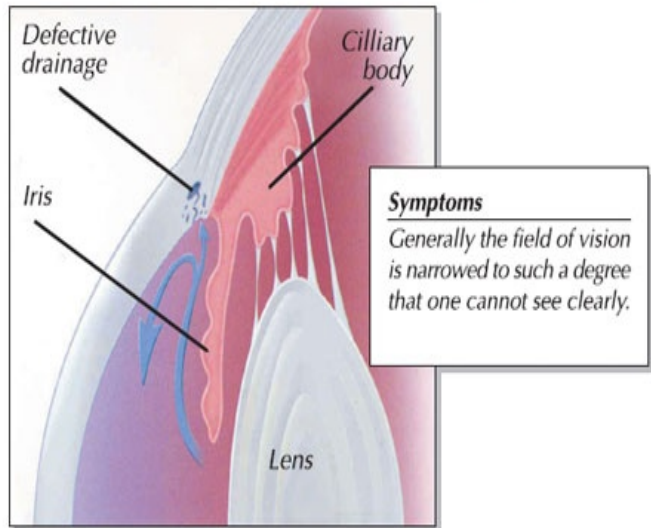


CLOSED ANGLE GLAUCOMA



The angle between the iris and the cornea narrows or closes, blocking the drainage of the aqueous humor.

OPEN ANGLE GLAUCOMA



The angle is open but drainage is defective.

Gonioscope can tell if it's open or closed angle glaucoma

-Retinoscopy

Used to determine Refractive error (can tell if your vision is 20/20)



Retinoscope



Summary of Ophthalmology Examinations

Start with WIPE!

A. Direct Ophthalmoscope

- 1- Dim the room's light, check function of ophthalmoscope.
- 2- Ask patient to fix his vision on a specific point in the distance
- 3- Use ophthalmoscope in your right hand & right eye to examine the patient's right eye (left hand for left eye)
- 4- Assess red reflex (From 1m – arm length)

Comment on anything that interferes with the passage of light that will diminish the red reflex (e.g. large vitreous hemorrhage, cataract)

- 5- Shine light beam from ophthalmoscope into pupil:
 - From position approximately 12 inches from the patient and about 15 degrees lateral to patient's line of vision (Follow red reflex approaching from superiotemporal area) (*Don't cover patient visual field*)
 - Move in toward patient's eye on the 15 degree line up to the point where your own fingers holding the ophthalmoscope contacts patient's cheek
- 6- Place your left hand on the patient head to fix it
- 7- Examine the posterior segment of the eye
 - a. Optic disc for:
 - i. Clarity of disc outline
 - ii. Color (yellowish-orange)
 - iii. Cup:disc ratio
 - iv. Sharpness of disc margin
 - v. Presence of abnormalities surrounding the disc
 - vi. The blood vessels of the disc
 - b. Vessels
 - c. Macula
 - d. Fovea (foveal light reflex) (ask patient to look at the light)
 - e. Retinal background
- 8- Repeat the test on the left eye

B. Ocular Motility and alignment

Motility

- 1- Inspect the primary gaze (No deviation) and head tilt or turn
- 2- Ask patient to follow a target (finger, pencil, or penlight) held at a comfortable distance from the patient (*'Look at the tip of my pen, follow it with your eyes, keeping your head still and letting me know if any time you see double or feel pain.'*)
- 3- Move the target in (+ and x) way (*cardinal directions*)
- 4- Pause during each gaze position to detect nystagmus
(*Note : Direction of nystagmus is it vertical or horizontal*)
- 5- Inspect for:
 - normal and abnormal movements in each direction
 - relation of upper lid to globe as patient moves eye vertically from above downward
- 6- Ask patient about presence of diplopia (*double vision*)

Alignment

1- Corneal light reflex

- Ask patient to fixate on far object
- Shine the light and look for the reflex (should be central)
 - *if it is nasal>exotropia, Temporal>esotropia, inferior>hyepertropia...*

2- Cover-uncover test (for -tropia)

- Ask patient to fixate his eye on a far target
- Do cover-uncover test on one eye. (*Note any movement of uncovered eye*).
 - *If eye turns **outward** > it was inward so it is **esotropia**.. etc*
- Repeat for the other eye
- Repeat fixating on near object?

3- Do alternate cover test (for -phoria)

- Ask patient to fixate on a far target (15 or so inches)
- Move the cover rapidly from one eye to another (*Note any movement of uncovered eye*).
 - *If eye turns **outward** > it was inward so it is **esotropia**.. etc*

4- Repeat all 3 fixating on near object (just mention it)

Watch: <https://www.youtube.com/watch?v=TxEQWtIXtrl>

C. Pupillary Reflex

- 1- Ask patient to concentrate on distant target.
- 2- Inspect the size and symmetry of the pupil in open light.
- 3- Near reflex (In open light)
 - a. Ask patient to look into distance and then at your finger
 - b. Comment on Accommodation, convergence and miosis
- 4- Dim room light, check torch light (BRIGHTEST)
- 5- Direct pupillary reflex:
 - a. Come from temporal region
 - b. Comment on reactivity
- 6- Indirect pupillary reflex:
 - a. Shine light on the same eye
 - b. Observe other eye
- 7- Repeat for the other eye!
- 8- Swinging flashlight test:
 - a. Shine the light 2-3 seconds on each pupil
 - b. Comment if the patient have relative afferent pupillary defect (Equal constriction or not)

D. Visual fields

- 1- At the level of patient's head, arm length apart.
- 2- If you examine the right eye of the patient, ask the patient to look to your left eye and cover his left one (*and don't move his eye*)
- 3- Hand positioned halfway between you and your patient.
- 4- Ask the patient to identify how many fingers are displayed or when he can see the fingers (*don't let the patient look directly at fingers*)
- 5- Compare patient's field of vision against yours
- 6- Test each of the four quadrants
- 7- Repeat for the other eye!

Comment on:

- 1- Common visual field defect (*Central scotoma - Bitemporal hemianopia - binasal hemianopsia - Homonymous hemianopia - Altitudinal field defects*)
- 2- Localize field defects (*Central scotoma – Enlarged blind spot – Arcuate nasal field defect – Wedge shaped temporal field defect*)

E. Visual Acuity *(The sharpness of near and distance vision)*

- 1- Place Snellen letter chart or the E chart 20 feet away from the patient
- 2- Occlude one eye completely using the palm of their hand or an eye occlude, to allow vision testing in the opposite eye
- 3- Have patient read the letters from the eye chart
- 4- Record visual acuity as a fraction
- 5- Use the pinhole acuity test If the patient cannot discern the symbols on the eye chart

Near Vision :

- 1- If distance visual acuity test is not practical, check for near vision using a reading card, if available, or a Snellen chart .
- 2- Ask patient to wear reading glasses if owned
- 3- Patient holds the near test chart at about 40 cm
- 4- Test each eye separately
- 5- If visual acuity is not recordable with usual tests, check for
 - o "counts fingers"
 - o "hand motion" *(which direction?)*
 - o "light perception" *(from center+4quadrants)*

F. Tonometry

- a. Uses of tonometry *(to measure intra-ocular pressure)*
- b. Types *(Goldmann applanation– tonopen – non contact tonometry “air puff”)*
- c. Requirements
 - i. Goldmann applanation: required topical anesthesia (propacaine), fluorescein dye and tension drops
 - ii. Tono-pen: required topical anesthesia (propacaine)
- d. Normal intra-ocular pressure (10-21)

Dim light: only when doing pupillary reflex or direct ophthalmoscope!

The above and following were quoted from Abeer Al-Suwailem:

On OSCE we had the pupillary reflex station. There were 2 torch lights and we were asked to pick one, please ask about that in clinic I am not sure what's the difference..

Resources:

- Checklists
- Personal clinical/ER notes
- Rapid Ophthalmology book
- Lecture notes
- Previous students' notes

Thanks to Abeer!

Summary

- The eye examination evaluates CN II, III, IV, V, VI, VII, VIII. **(7 cranial nerves)**
- The study of **CN III, IV, V, VI** evaluates the **brain stem, cavernous sinus, and apex of orbit.**
- Unilateral dilated pupil after head injury can occur due to pressure on pupil constrictor fibers of CN III.
- **Bilateral carotid artery aneurysm → Binasal Hemianopia.**
- **A fistula between carotid artery and cavernous sinus → ↑IOP → Thrill + pulsating eyes.**
- **CN III is composed of 2 parts:**
 1. Superficial parasympathetic pupillomotor → Usually affected by compression. (*aka dilated surgical 3rd nerve palsy*)
 2. Deep motor → Usually affected by medical causes like DM/HTN. (*aka surgical 3rd nerve palsy*)
- **When a patient complains of any changes in vision, rule out DM first!**
- **Hypoparathyroidism → Cataract**
- **DDx of Acute Visual Loss: (Always remember these 4)**
 1. Age-related Macular Degeneration (AMD)
 2. Vascular Occlusion (DM, HTN)
 3. Retinal Detachment
 4. Acute Glaucoma
- **Ciliary injection (red eye) is mainly caused by 4 things:**
 1. Acute conjunctivitis
 2. Acute iritis
 3. Acute glaucoma
 4. Acute keratitis (*corneal ulcer; a combination of conjunctivitis and iritis*)
- **Retinoscope** → used to determine Refractive error (*can tell if your vision is 20/20*)
- **Ophthalmoscope** → used for Fundoscopy exam

If you have any questions/suggestions regarding
Ophthalmology teamwork please via:

432OphthalmologyTeam@gmail.com

MCQs:

1. A 10-year-old boy came for his annual eye check-up. Upon examination, the doctor noticed cherry red spot in the macular area. What could this sign represent?

1. Hydroxychloroquine toxicity
2. Niemann pick disease
3. Recurrent Optic neuritis
4. Severe Central Retinal Vein Occlusion

2. SAQ: 34y old lady with h/o of sinusitis

1. What's the diagnosis?
2. What's your treatment?



3. A 55 year-old patient knows to have uncontrolled type 1 diabetes for 25 years came to ER complaining of floaters. Fundus examination revealed mild vitreous hemorrhage and neovascularization at the optic nerve head.

What is the most appropriate immediate management?

- A. Control of blood sugar
- B. Macular laser photocoagulation
- C. Pan retinal photocoagulation
- D. Vitrectomy to remove

Answers:

→ B

→ A: **Orbital cellulitis** (*Hx of sinusitis is a predisposing risk factor*)

B: **IV antibiotics.**

3. C