

430 Ophthalmology Team

1th lecture:

ORIENTATION, HISTORY TAKING, AND EXAMINATION

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The slides were provided.

Source: recording & some pictures of the slides

Important Notes in **red**
slides as they are gray

Doctor notes in **blue**

Our notes in **green**

Highlighted: possible MCQ or OSCE questions mentioned or pointed out by the doctor

COMPONENTS OF THE COURSE:

- Lectures
- Clinics
- OR
- Clinical sessions

The Objectives of This Course:

- To know the basic anatomy and physiology of the eye and the surrounding tissue.
- To recognize and assess the common ophthalmic diseases, and know how to handle common ophthalmic emergencies.
- To know how to handle common ophthalmic diagnostic instruments and know about common procedures.
- History
- Examination
- Mastering clinical skills in external examination, tonometry ,direct and indirect ophthalmoscopy, visual acuity, visual fields, motility alignment and papillary exam.

Mark Distribution:

- 10% Clinical Skills
- 30% MCQS
- 60% Finals: 40% SAQs (20 questions) and 20% OSCEs(2 sations)

Recommended textbooks

1. Required Text(s)

a. Lecture notes Ophthalmology (latest edition)

By: Bruce James (published by Blackwell Science)

b. Basic Ophthalmology (latest edition)

By: Cynthia A. Bradford (latest edition)

(published by American Academy of Ophthalmology)

c. Practical Ophthalmology: A manual for Beginning Residents (latest edition) [\(extra\)](#)

By: Fred M. Wilson (published by American Academy of Ophthalmology)

2. References

- Vaughan and Asbury's general Ophthalmology
By: Paul Riordan-Eva (published by LANGE)
- Clinical Ophthalmology: A Systematic Approach
By: Jack T. Kanski (published by Butterworth Heinemann)

Why should you be interested in the eye?

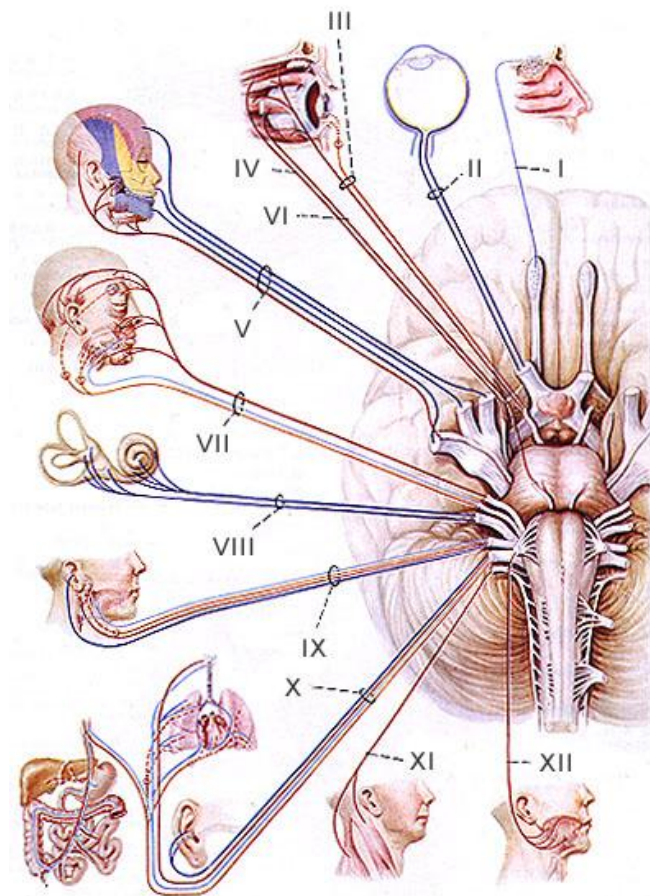
If there is a barrier between the examiner and the patient: a barrier with an opening of 1 square inch through which the examination can be performed. Which square inch you will choose?!!

1. Diagnostically and functionally, it is the most important **square inch** of the body surface. So, it is an opening of 1 square inch through which the examination can be performed.
2. Of all the organs of the body, the eye is most accessible to direct examination.
3. The external anatomy of the eye is visible to inspection with an unaided eye and with fairly simple instruments.
4. The health or disease of a large portion of the body can be determined simply by looking at the eye.
5. The eye is so intimately connected with the rest of the body that it reveals enormous amount of general information.
6. The eye is the only part of the body where the blood vessels and central nervous system tissues can be viewed directly.

Examples for its connections with other systems:

❖ NEUROLOGICAL CONNECTIONS:

- The 12 cranial nerves provide us with a large part of our information about the brain. Of these the eye examination evaluates CN II, III, IV, V, VI, VII, and VIII. (7 nerves.)
- In addition it provides information about the autonomic pathways. (sympathetic/parasympathetic)



II	Vision and Pupillary light reflex
III, IV, VI	Eye movement
V	Corneal reflex
VII	Lid movement and corneal reflex
VIII	If it abnormal can cause nystagmus

- The study of the CN III, IV, V, and VI can evaluate the brainstem, cavernous sinus, and apex of orbit.

- Unilateral dilated pupil after head injury can occur due to pressure on pupil constrictor fibers of CN III.
 - CN VI involved in mastoid infection (petrous ridge): [abducent nerve palsy](#)
 - Parotid gland, Inner ear disease of CN VII.
 - Nystagmus : CN VIII
 - The best known connection between the [brain](#) and the eye is the ON ([optic nerve](#)).
 - The visual pathways which extend from front to back across the brain can be studied easily and safely using perimetry (visual field). It can differentiate accurately between lesions of the temporal, parietal, and occipital lobes.
 - In addition, the ON has important clinical relationships to the pituitary gland, the middle ventricles, the venous sinuses, the meningeal and bony structures of base of the skull.
 - ON has the diagnostically useful capability of swelling with increased ICP (papilledema). Or visibly pale (optic atrophy) when its nerve fibers damaged at any point from Retina to LGB.
- NOTE:** Papilledema is not just ON swelling, it is swelling **BILATERALLY** due to increase ICP, however if the swelling is on one side only we call it optic nerve swelling with increased ICP not papilledema.

In brief different abnormality in the visual field can indicate different diseases in the brain (we can know the tumor or the lesion place by the visual field). We can also know if there is raised intracranial Pressure by optic nerve swelling.

By looking in the eye we can assess 7 of the cranial nerves and different lesions in the brain by optic nerve.

❖ FOCAL BRAIN LESIONS LIKE:

Vascular occlusions

Hemorrhage

Neoplasm

❖ DIFFUSE BRAIN LESIONS LIKE:

1. Infections
2. Demyelinating disorders → nerve damage. [Example Multiple Sclerosis](#)

❖ VASCULAR CONNECTIONS:

1. **Venous flow disorder:** cavernous sinus thrombosis([serious](#)), carotid – cavernous fistula (orbital congestion)
2. **Arterial emboli** can reach the retina from carotid artery, heart valves, subacute endocarditis.
3. **Hematological disorders** of all types can manifest in the fundus.
4. **Specific disease of the vessels like:** PAN, temporal arteritis, HTN

❖ METABOLIC DISORDERS:

Almost all metabolic disorders can affect the eye:

1. DM: retinal detachment, cataract, RE, ophthalmoplegia.
2. Hypothyroidism: cataract.
3. Wilson's disease ([sunflower cataract and yellow cover in the cornea](#)).

❖ THYROID EYE DISEASE: Exophthalmos, Lid retraction.

- ❖ **INFECTIONS:** (Syphilis, Toxoplasmosis, Rubella,)
- ❖ **MUCOCUTANEOUS DISORDERS:** SJS (*Stevens-Johnson syndrome*), pemphigus
- ❖ **ELASTIC TISSUE:** (Pseudoxanthoma elasticum)
- ❖ **ALLERGY:** VKC (Vernal keratoconjunctivitis)
- ❖ **CHROMOSOMAL ABNORMALITIES:** Trisomy: 13, 15, 21.

The eye is a delicate indicator of poisoning:

- Morphine addict → meiotic pupil
- Lead poisoning, vitamin A intoxication → papilledema

- I could go on and on about the discoveries possible in our most important square inch. **"EYE"**
- 90% of our information reaches our brain via sight.
- Unfortunately, of all the parts of the body, the eye is the most vulnerable to any minor injury.

WHAT ARE THE 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:

- 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:

- (a) physical examination

(b) laboratory work

(c) Therapy

- Failure to take history can lead to missing vision or life threatening conditions.

HISTORY:

○ **Chief complaint:**

"The patient's own words"

"she cannot see with the RE"

- 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 ask and then write down in orderly sequence that makes sense to you.

Ask about:

- * The time sequence: When, how fast, what order did events occur?
- * Frequency, intermittency: **on and off? How fast?**
- * Location, Laterality: **RE, LE, bilateral, complete eye or part, which part...**
- * Severity
- * Associated symptoms **pain, discharge, visual complaints, poor vision**
- * Documentation (old records, photo)
 - e.g ptosis, proptosis, VII N palsy.(facial nerve palsy)
 - Gradual painless decreased vision in both eyes for 1 year.
 - Sudden painless decrease vision in RE for 10 minutes.

Examples:

When the patient say "cannot see with RE"!! Maybe he means:

- ? Only distance vision blurred.
- ? Blind spot is present in the center of VF
- ? Right side of VF 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). **Micropsia: see things smaller, macropsia see things bigger, Metamorphopsia: see things crocked)**
- Diplopia (monocular, binocular)
- Floaters **الذباب الطائر**

- Photopsia (flash of light)
- Color vision abnormalities.
- Dark adaptation problems.
- Blindness (ocular, cortical).
- Oscillopsia (shaking of images)

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
- Asthenopia (eye strain)

Abnormal ocular secretions:

- Lacrimation, epiphora (increase in tears amount) (Epiphora is a result of a failure of tear drainage caused by mechanical obstruction or lacrimal pump failure. Lacrimation is excessive tearing caused by reflex hypersecretion.)
- Dryness
- Discharge (purulent, mucopurulent, mucoid, watery)

Redness, opacities, masses

Anisocoria (different size pupil): can be due to space occupying lesion pressing on oculomotor nerve. Can be physiological but in physiological the difference is usually less than 1 mm.

○ Family history:

Many eye conditions are inherited: **glaucoma, strabismus, retinoblastoma, neoplastic, vascular disorders**

Familial systemic disease can be helpful in ophthalmic evaluation and diagnosis: **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. **Albino: have no pigment in the retina**

Ask questions designed to confirm or exclude your tentative diagnosis

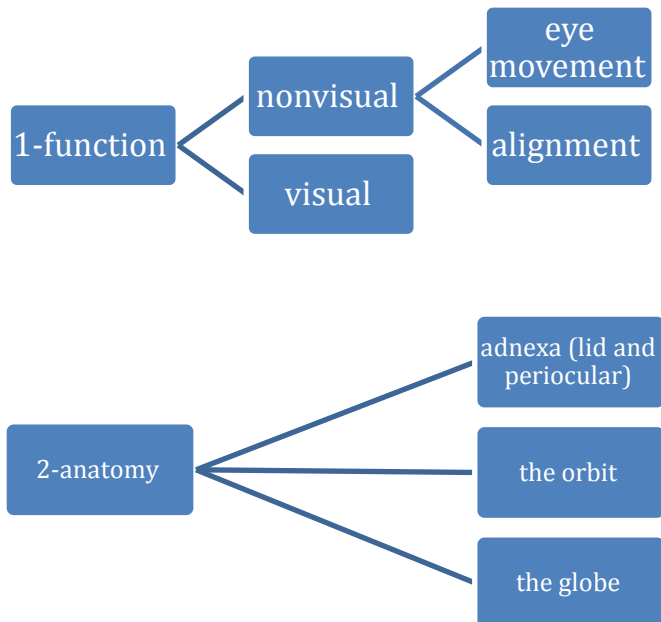
- Significant positive
- Significant negative

“Significant is equal to expected”

- Predict the physical and lab findings that are likely to be present.
- Any discrepancy between the history and physical examination requires explanation.

EXAMINATION:

The Purpose is to evaluate:

**Ophthalmic examination:**

- Visual acuity
- External examination
- Motility and alignment
- Pupil examination
- Slit lamp biomicroscopy
- Tonometry: intraocular pressure 10-21mmHg
- Ophthalmoscopy
- Gonioscopy: for the eye angle to know if it is open or close (open angle glaucoma, angle closure glaucoma)
- Retinoscope

Vision:

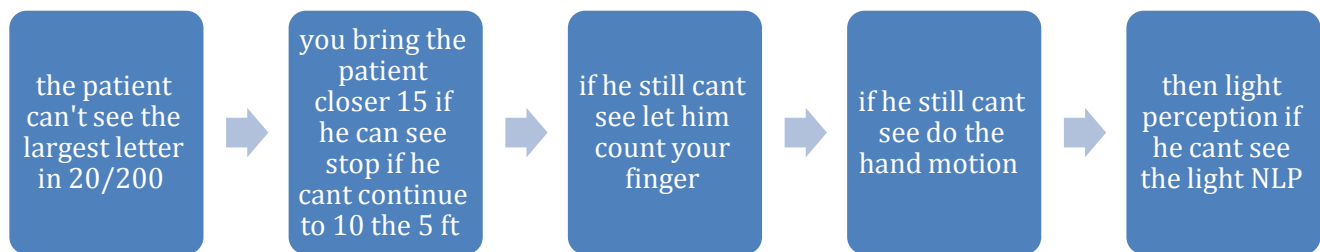
- Vital signs (MUST)
- Good vision
 - 1-intact neurological visual pathology
 - 2-structurally healthy eye
 - 3- Proper focus
- Subjective

How to test the vision?

- Display of different sized targets shown at a standard distance from the eye.
- Snellen chart, [tumbling E-chart for illiterate.](#), [Ellen for children](#)
- 20/20 (feet), 6/6 (meters)
- Uncorrected, corrected

Testing poor vision:

- If the patient is unable to read the largest letter <(20/200) (The patient sees from 20 feet what the normal person can see from 200 feet)
- Move the patient closer e.g. 5/200
- If patient cannot read:
 - counting fingers (CF)
 - hand motion (HM)
 - Light perception (LP)
 - No light perception (NLP)

**External Examination:**

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

Ocular Motility:**Evaluate:**

- **Alignment:** misalignment such as ptosis

- **Movements**

- Follow a target with both eyes in each of the four cardinal directions of gaze. (Upper right lift , lower right lift)
- Note:
 - Speed
 - Smoothness
 - Range
 - symmetry
 - unsteadiness of fixation example nystagmus

OSCE: EXAMINE something but I honestly couldn't figure out what: 1:01..

Pupils:

Examine for size, shape, reactivity to both light and accommodation.

- Direct response and consensual response.
- Afferent pupillary defect (Marcus Gunn pupil)
- Efferent pupillary defect.

Pupillary abnormalities:

- Neurologic disease
- Previous inflammation – adhesion
- Acute intraocular inflammation: spasm or atony
- Prior surgical trauma
- effect of systemic or eye medication
- Benign variation

EXAMINATION TOOLS:**1-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.

2-Tonometry:

For pressure

- 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 – 20 mmHg.

Types:

- 1-Schiotz tonometer: **the first one, it is no longer used.**
- 2-Goldman applanation tonometer: **most accurate we need anesthesia and Fluorescence**
- 3- Tonopen tonometer: **we change the tip for hygiene not accurate**
- 4- Perkin tonometer: **same as Goldman used in pediatrics**
- 5- Air-puff tonometer: **irritative**

Diagnostic Medication:

1. Topical anesthesia e.g. tetracaine, benoxinate used prior to ocular contact with diagnostic lenses instruments and also before corneal scrapping.

2. Dilating drops:

- The pupil pharmacologically dilated by either stimulating the iris muscle with sympathomimetics e.g. Phenylephrine or by inhibiting the sphincter muscle with anticholinergics e.g. tropicamide.

3-Ophthalmoscopy: VERY IMPORTANT

It is one of the most important things in the course.

Direct ophthalmoscopy:

- 1- handheld instrument.
- 2- standard part of the general medical examination.
- 3- Portable

Indirect Ophthalmoscope:

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.

Disadvantage:

1. Inverted retinal image.
2. Brighter light is uncomfortable to the Patient

4-Special Lenses:

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

5-Retinoscope: For refractive error not for the retina



papilledema



Optic atrophy

Cavernous sinus thrombosis

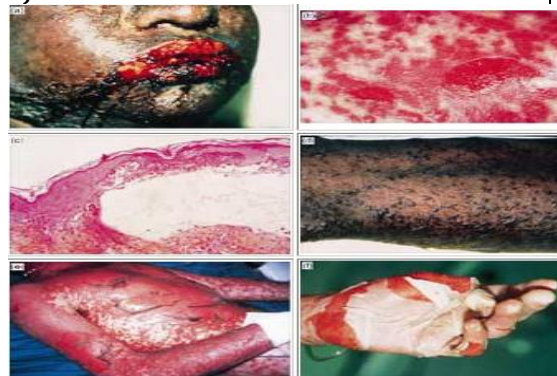


Orbital congestion

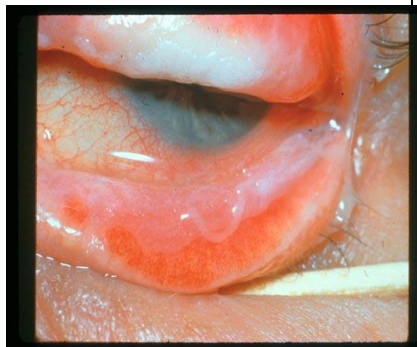
exophthalmos



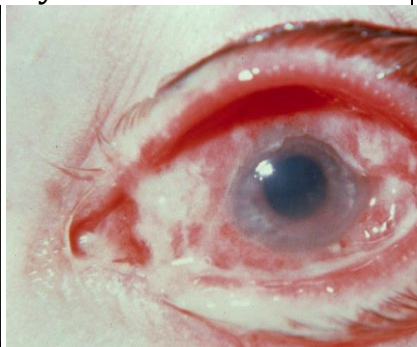
Sjs



VKC



dryness



Discharge



anisocoria



ptosis



Basal cell carcinoma

Ptosis



Neuro fibroma of the eye

Albino eye (no pigmentation)



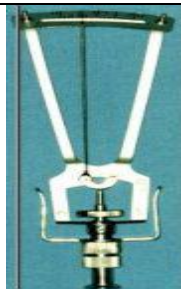
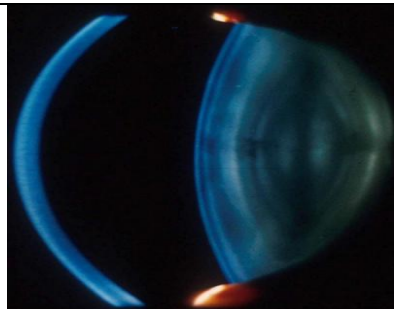
Slit lamp



retinoblastoma



Misalignment of the eyes

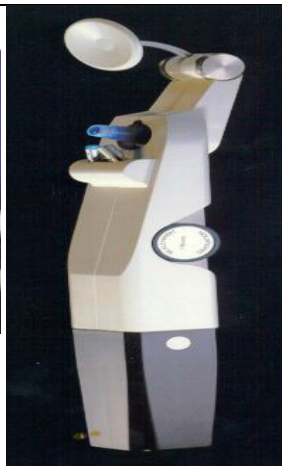


Slit lamp

Schiotz tonometer

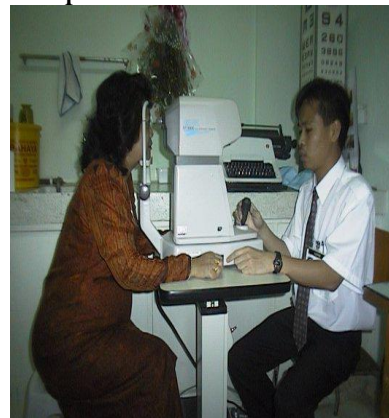
Goldman tonometer

tonopen



perkin

Air puff



Indirect ophthalmoscope



direct