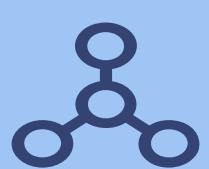


history taking and examination

Course Objectives

1. To know the basic ophthalmic anatomy and physiology.
2. To know how to assess and manage common ophthalmic diseases.
3. To know how to triage and treat common ophthalmic emergencies.
4. How to use simple ophthalmic diagnostic instruments.
5. To acquire basic knowledge of some common ophthalmic operations or procedures.



Team leader: Shahad AlTayash



Done by: Alanoud AlMansour, Durrah AlHamdi,
Ghada AlMuhanna, Munira AlHadlg



Revised by: Rotana Khateeb

Resources :

Dr. Almousa slides and notes, 436 teamwork,
Book (Lecture notes in Ophthalmology)

- Editing file

Color index

- **Important**
- **Notes**
- **Book**
- **Extra**
- **Golden note**



Title size : 50
Font : Roboto condensed (bold)
Text Color:#344372
Highlight color : #c9daf8

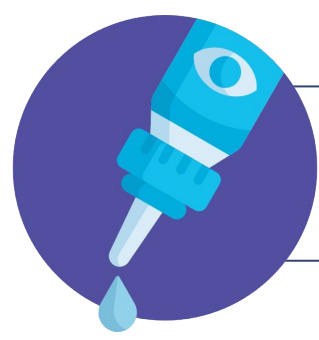


Subtitle size: 30
Font: roboto condensed (bold)
Text color:#5379A7

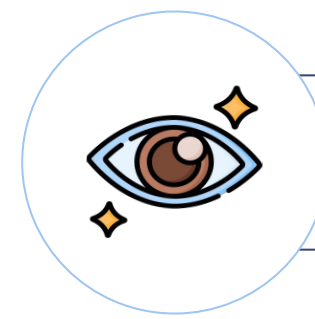
Body size: 25
Font: lora
Color: black

Notes Size: 24
Font : Lora
Color:#6d9eeb

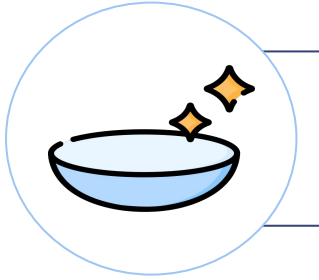
Text	Text	Text
Text	Text	Text
Text	Text	Text



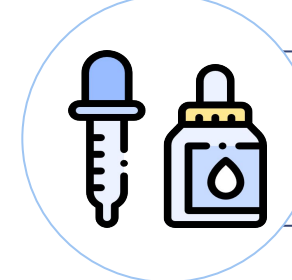
Text



Text



Text



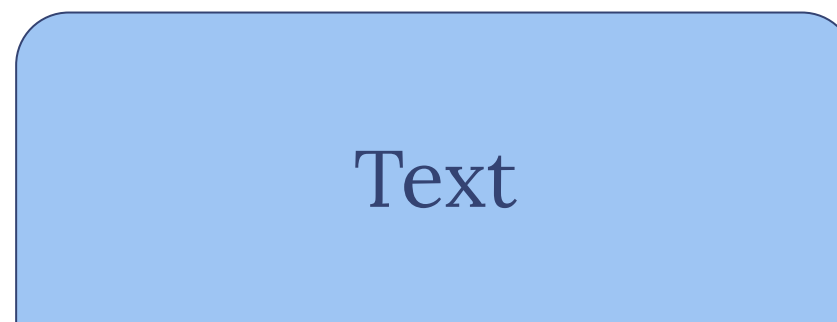
Text



Text



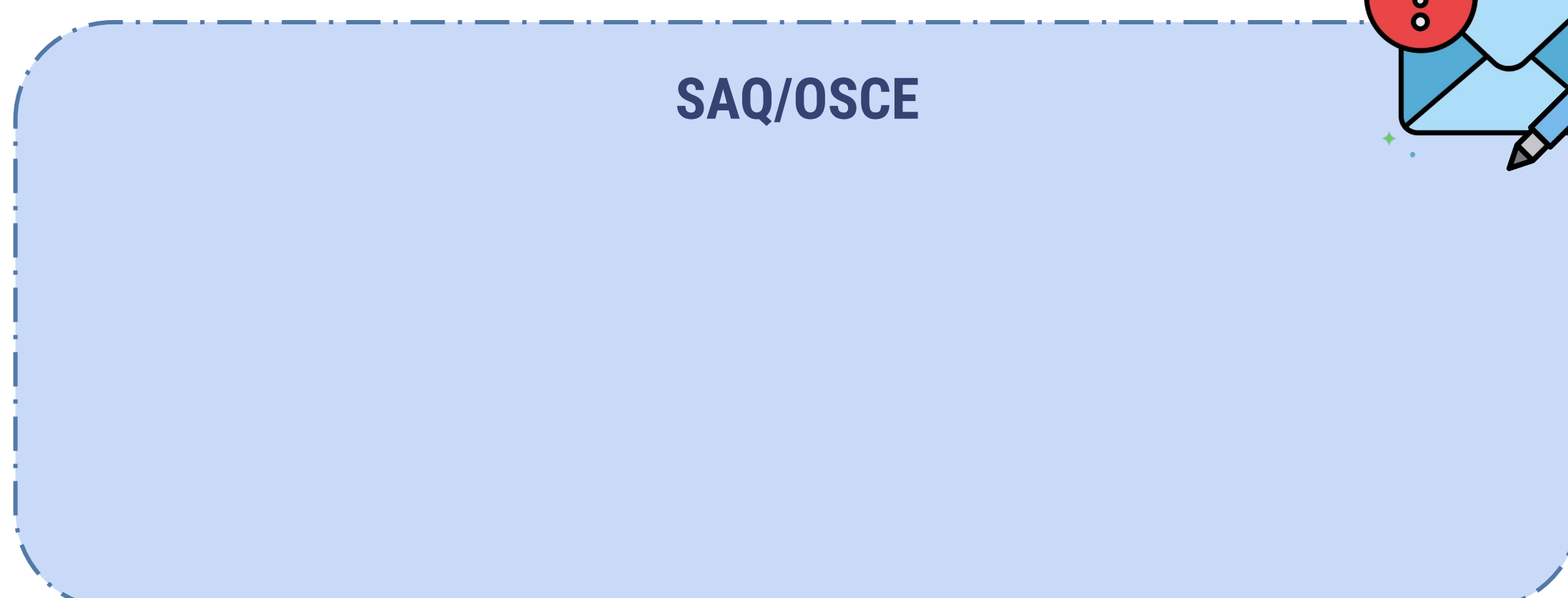
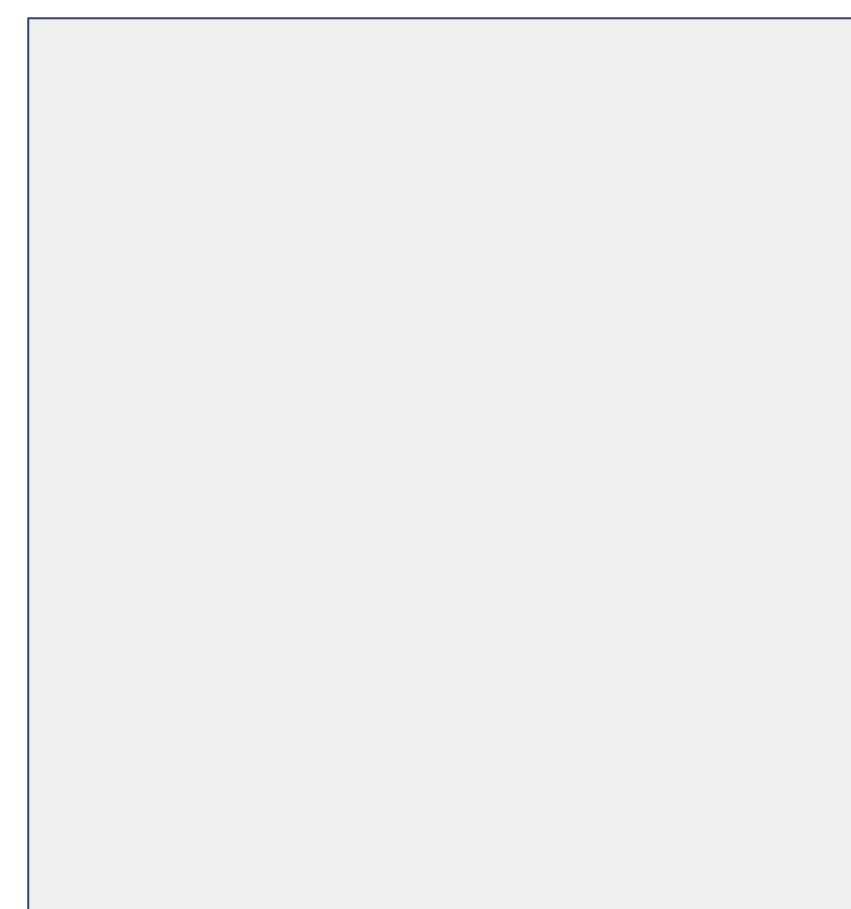
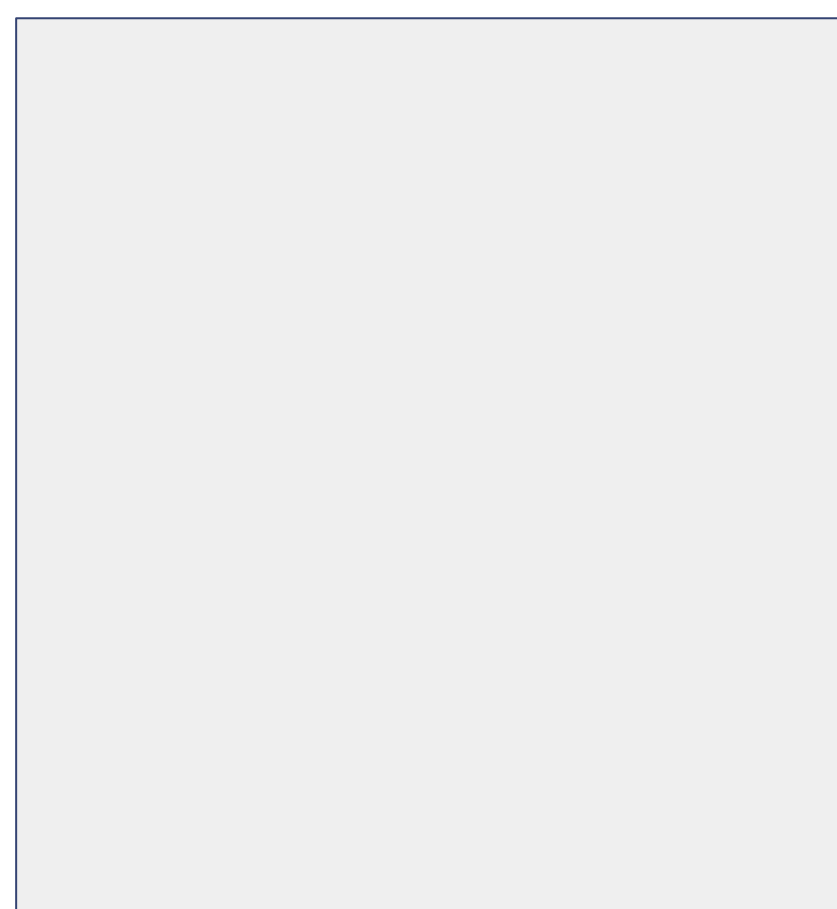
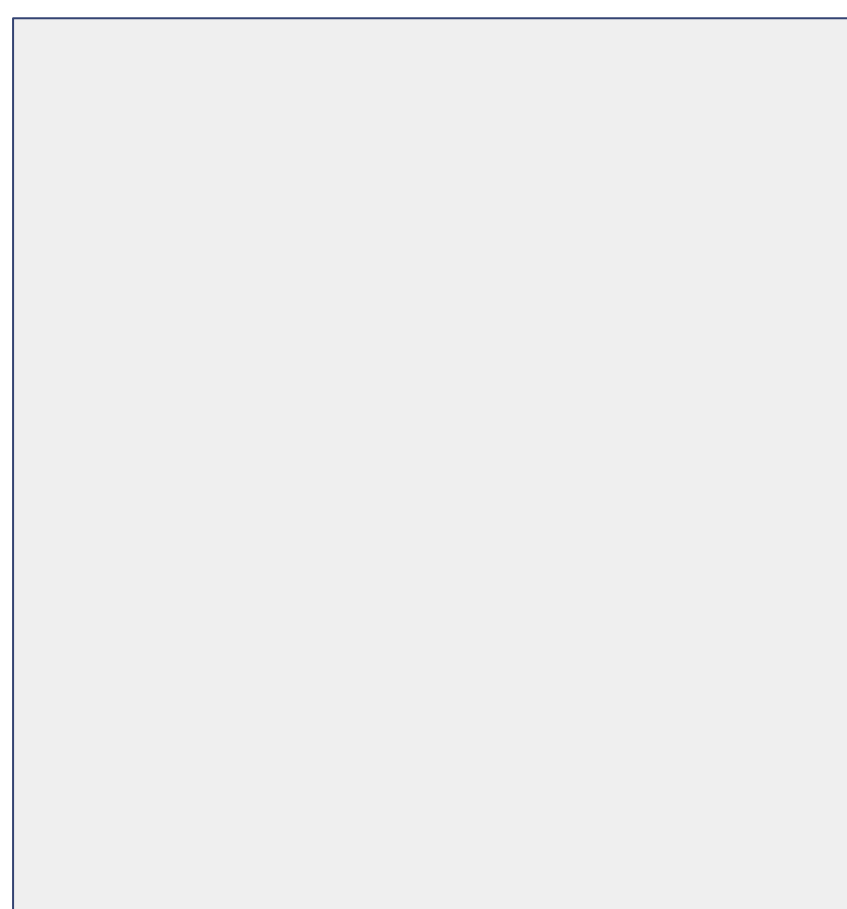
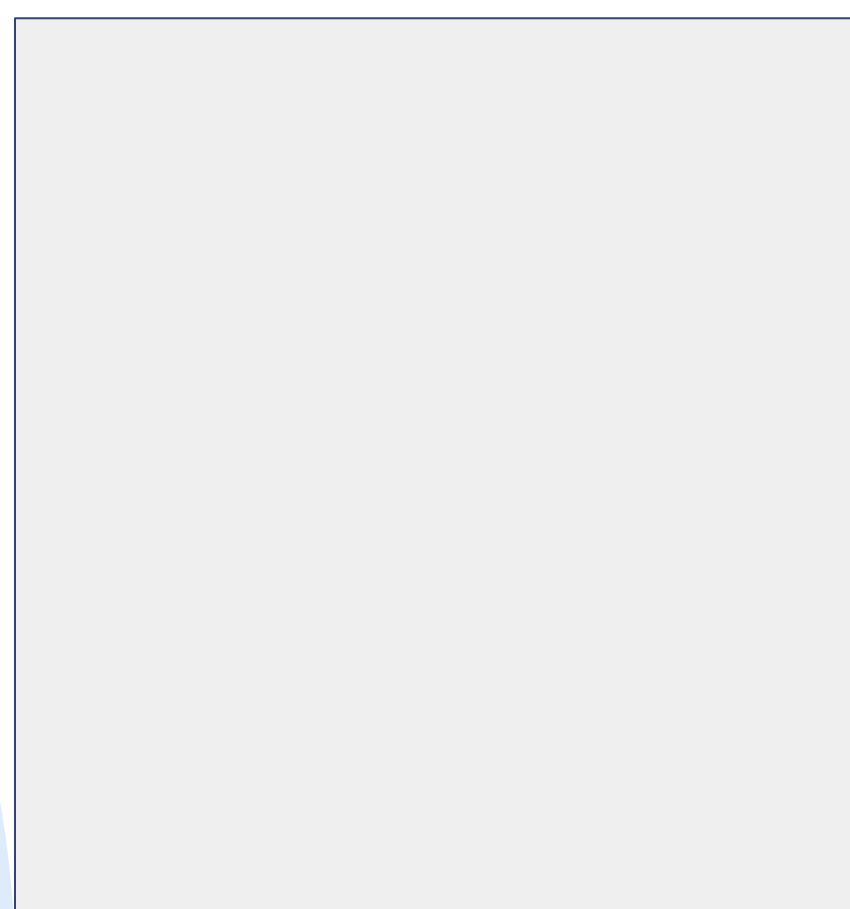
Text



Text



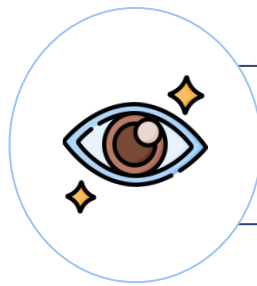
Text



SAQ/OSCE



The Visual Pathway & Importance of the Eye



Visual Pathway:

- Brief idea of the mechanism of vision: light → transparent cornea → anterior chamber → pupil → lens (convex-shaped) → clear vitreous → retina → stimulation of photoreceptors → horizontal, amacrine and bipolar cells (1st order neuron) → retinal ganglion cells (2nd order neuron) → optic nerve → decussation of fibers in the chiasm → optic tract → lateral geniculate body (3rd order neuron nucleus) → primary visual cortex (3rd order neuron axons) → secondary visual cortex.
- In order to have the cornea properly clear, it has to have proper lubrication by the tears distributed by the eyelid.
- The pupils control the amount of light entering the fundus by dilatation & constriction.
- The function of the lens is to refract light.
- The convex lens will converge the light to fall on the retina (specifically on the fovea).

- ❖ Light enters the eye via the refractive media, namely the cornea, anterior chamber, lens and vitreous, and stimulates the retina posteriorly.
- ❖ Light stimulates the photoreceptors, ie., the rods and cones. Through a series of other retinal nerve cells, the end result is that the retinal ganglion cell (RGC) is stimulated. The RGC sends its axon, or fiber, in the nerve fiber layer to the optic disc and then down the optic nerve.

❖ Phototransduction: by photoreceptors (rods and cones).

- Cones are responsible for color vision and central visual field & are present mainly in the macula.
- Rods are responsible for night vision and peripheral visual field & are distributed on the periphery of the retina.

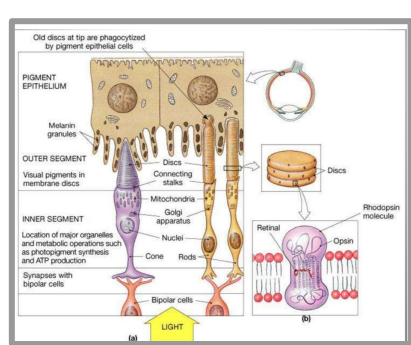
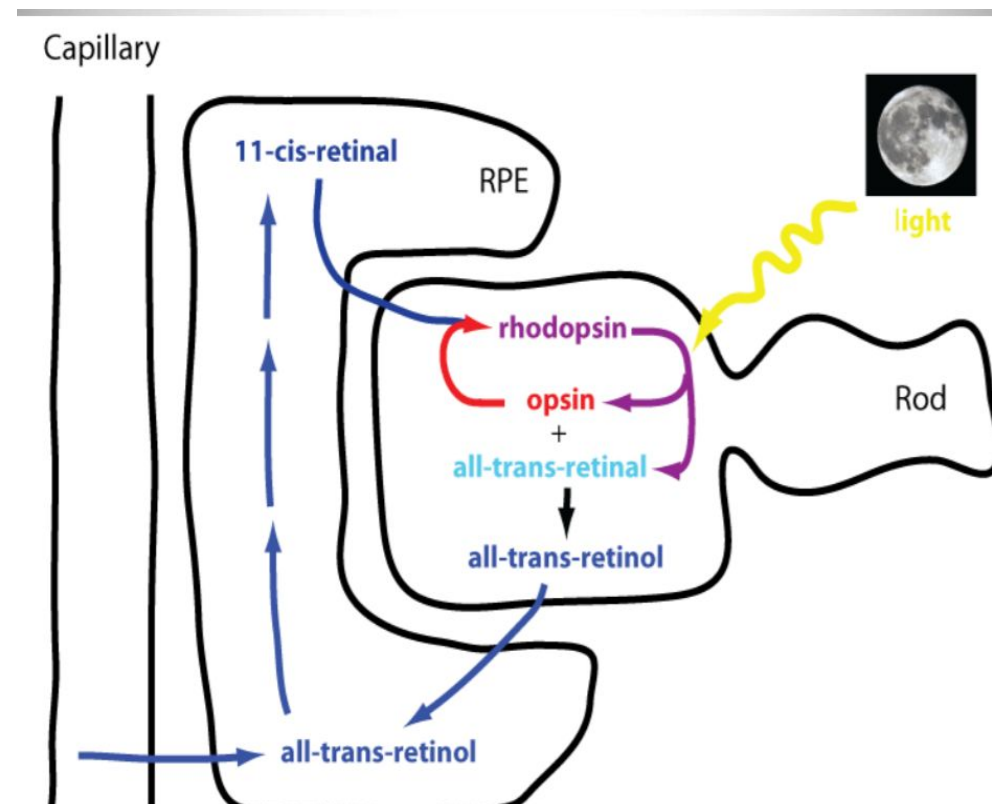
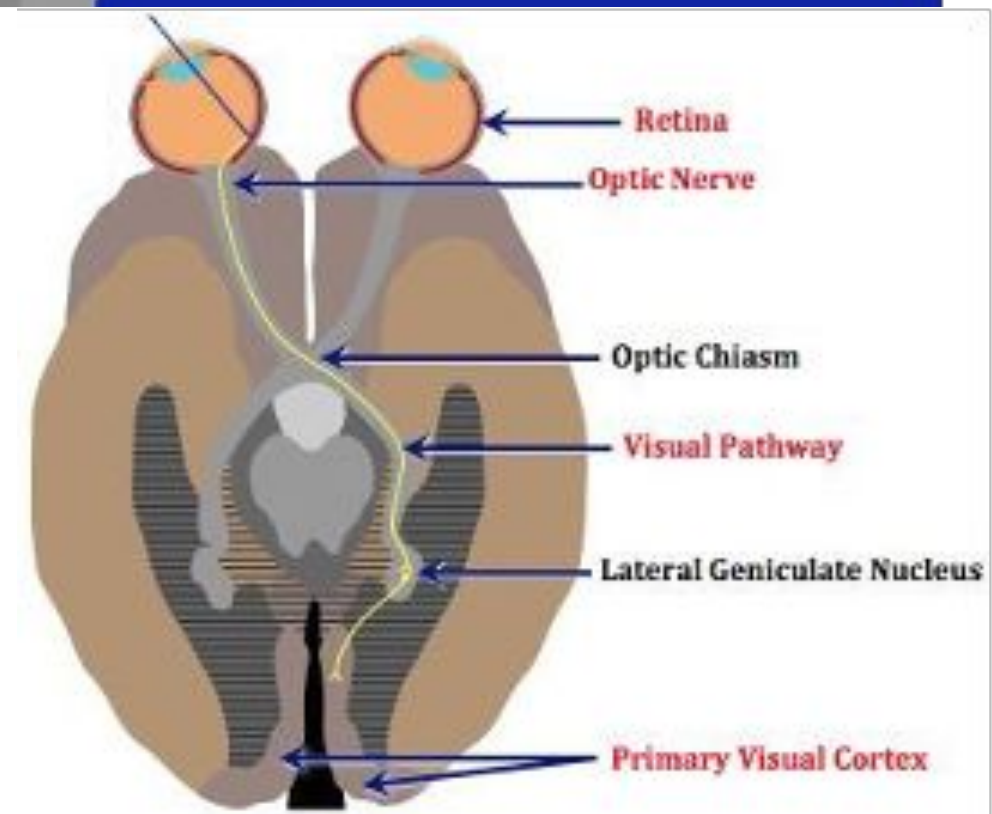
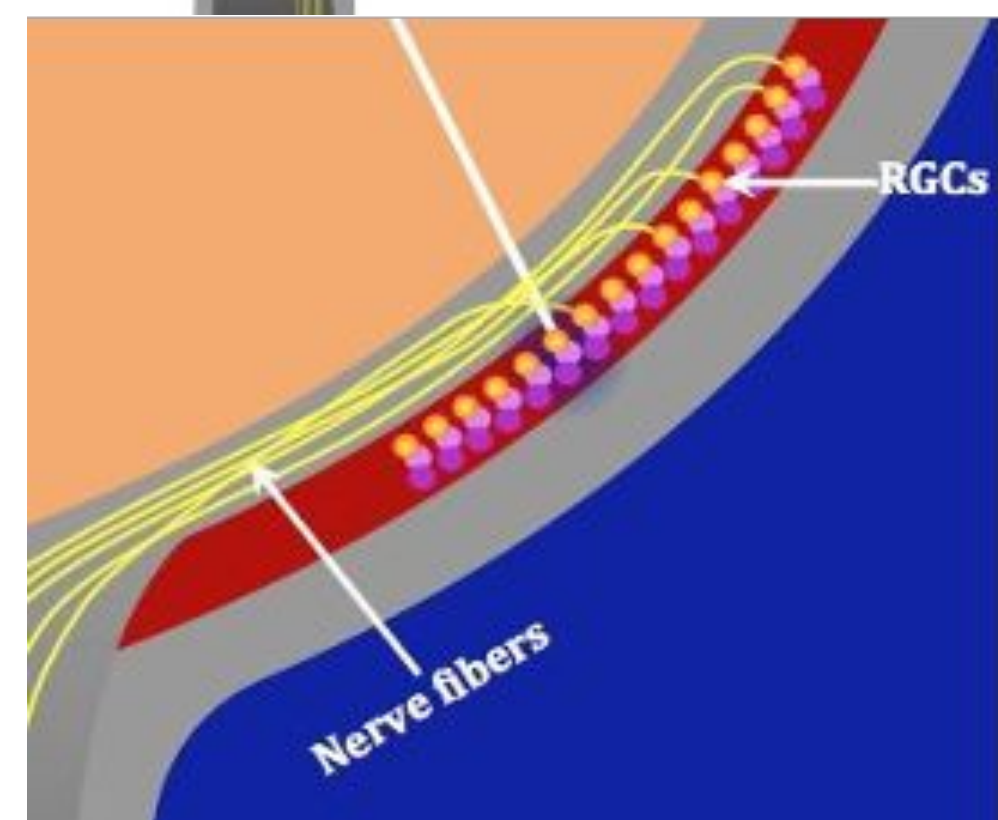
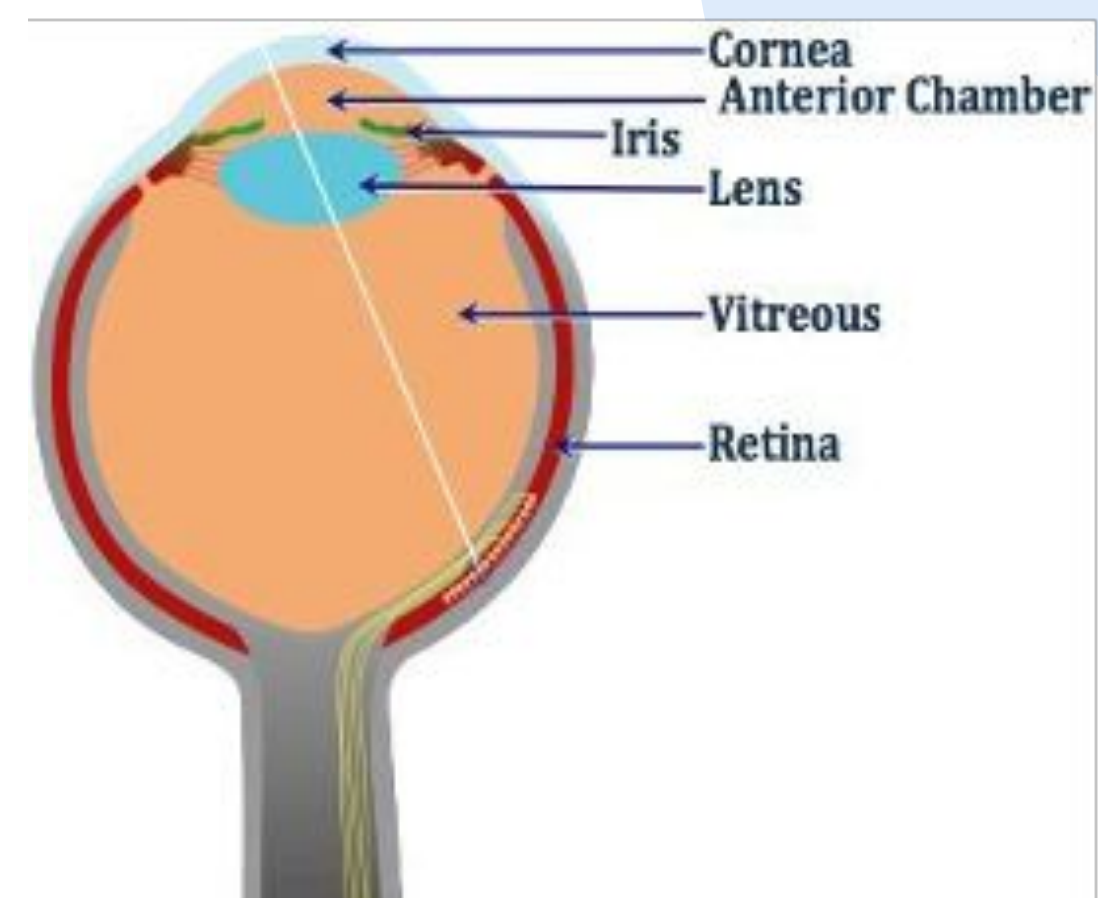
❖ Image processing: by horizontal, bipolar, amacrine and RGCs.

❖ Output to optic nerve: via RGCs and nerve fiber layer.

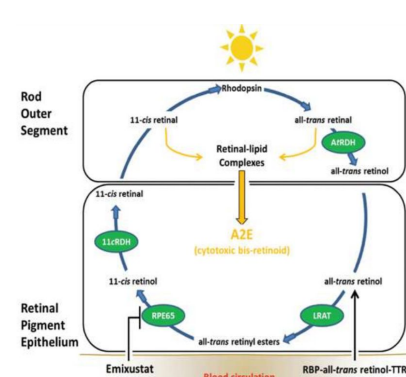
- ❖ From the optic nerve, the nasal fibers (half of the fibers) cross over at the chiasm to the opposite optic tract, and the other half remain on the same side. The fibers in the optic tract synapse in the lateral geniculate nucleus of the thalamus.
- ❖ Neurons in the lateral geniculate nucleus then project to the occipital lobe, to the primary visual cortex. From there, there is further processing with projections to other cells in the visual cortex and elsewhere, resulting in conscious visual perception.

Rods transduction pathway (bleaching of visual pigment):

- ❖ Opsin and retinal in rhodopsin are essential for light vision.
- ❖ light strikes the rhodopsin → rhodopsin breaks into opsin and all trans-retinal → All-trans retinal is reduced to all-trans retinol by the photoreceptor to be absorbed by the retinol pigment epithelium → All-trans retinol will undergo many reactions to turn into 11 cis-retinal
- ❖ 11 cis-retinal can turn back to rhodopsin and the cycle continues



❖ Extra image



❖ Extra image

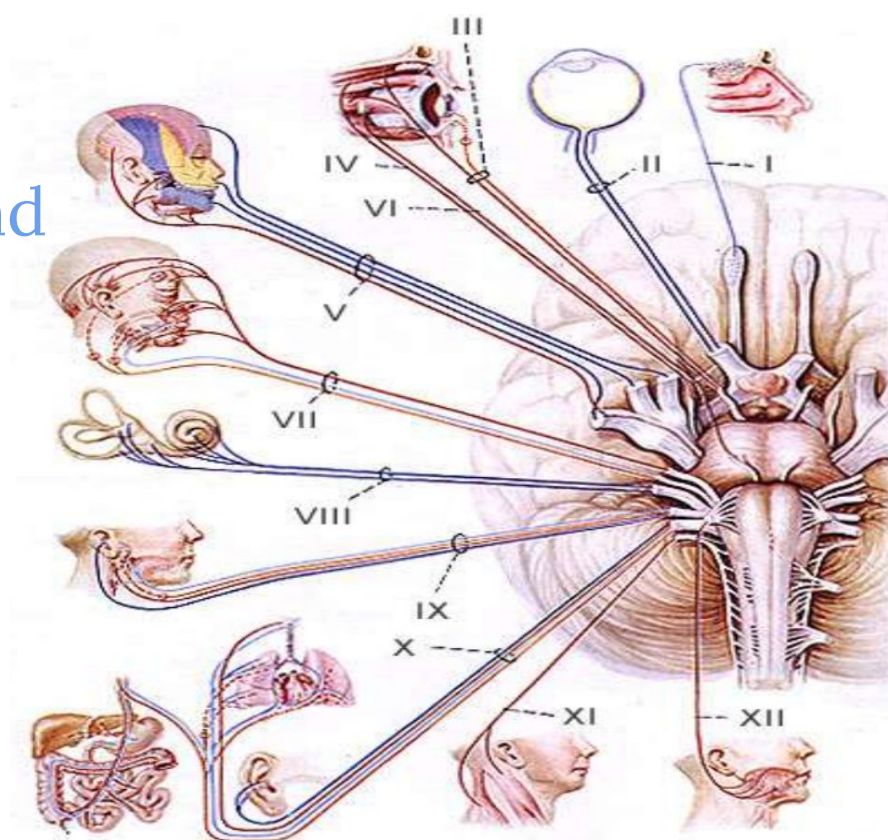
Importance of eyes: “The eye is the window to the body”

- ❖ Diagnostically and functionally, it is the most important square inch of the body surface.
- ❖ The eye is so intimately connected with the rest of the body (vascular and neurological connections) that it reveals enormous amount of general information.
- ❖ Eye is the only part of the body where blood vessels and central nervous system tissues can be viewed directly.
- ❖ 90% of our information reaches our brain via sight.
- ❖ Unfortunately, of all the parts of the body, the eye is the most vulnerable to minor injury.
 - The eyes are the most vulnerable to minor injury bc they're open to the outside world (exposed) thus we always advise people who work in manual labor to wear eye protection goggles.

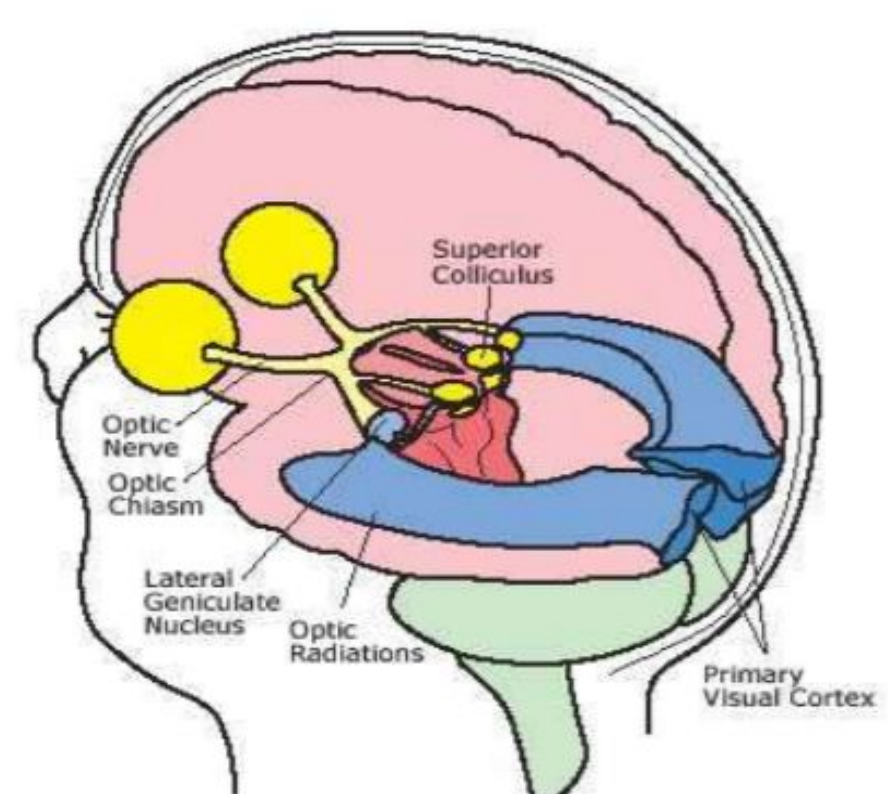
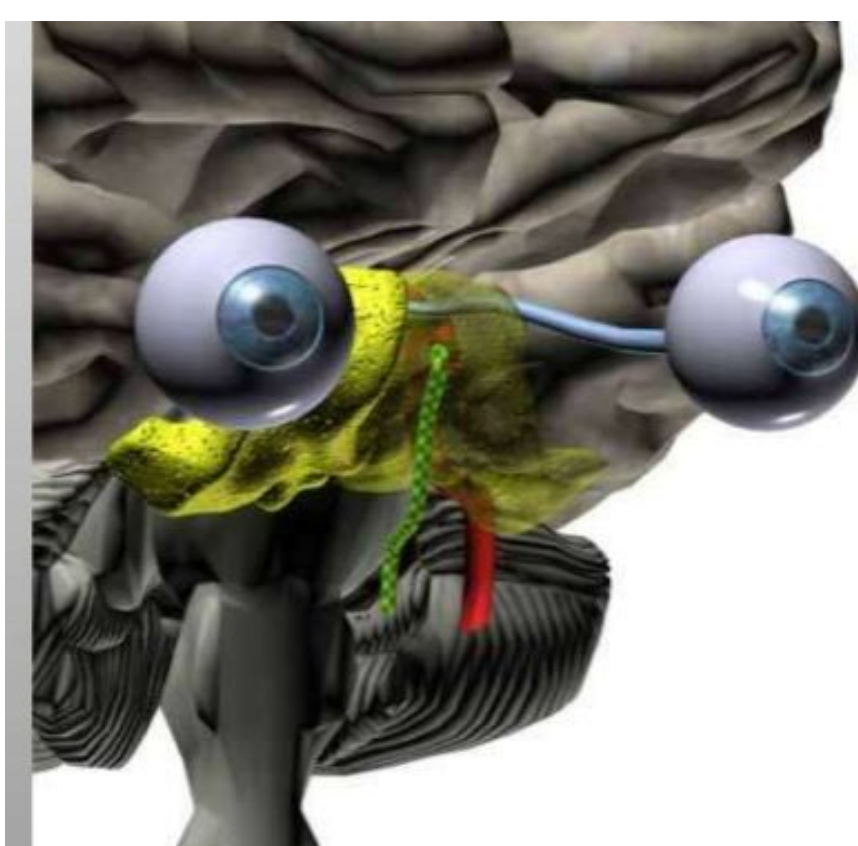
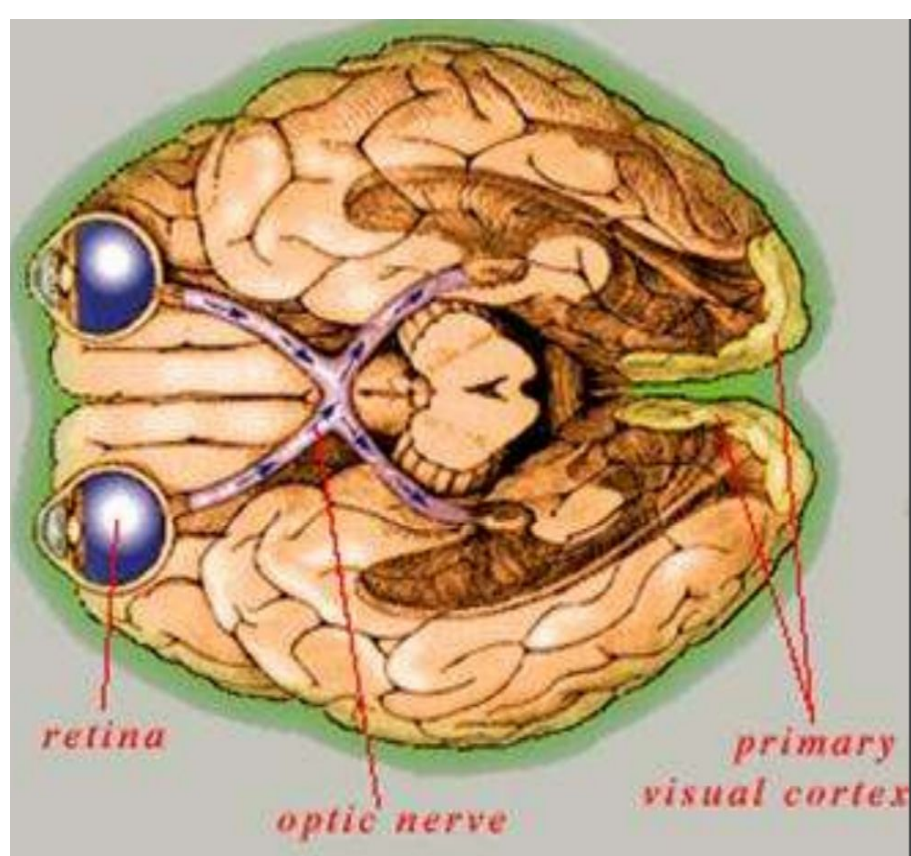
Neurological connections:

- ❖ 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, VIII (7 CNs).
 - CN 2 (optic nerve) is responsible for the vision
 - CN 3 (oculomotor nerve) from its name is responsible for the movement of the eye. (supplies the muscles around the eye)
 - CN 4 (trochlear nerve) innervates superior oblique muscle (SO4).
 - CN 5 (trigeminal nerve) the ophthalmic branch is responsible for the sensation of the globe, eyelids & forehead.
 - CN 6 (abducent) innervates lateral rectus muscle.
 - CN 7 (facial nerve) is responsible for closure of the eyelid; in facial nerve palsy, patient is unable to close the eye.
 - CN 8 (vestibulocochlear nerve); Responsible for balance, eye movements & hearing. (the vestibular part is responsible for controlling the eye movement, and trochlear part is responsible for hearing)

- ❖ In addition, it provides information about the autonomic pathways (sympathetic/parasympathetic) by looking for pupillary reaction:
 - pupil constriction → (para-sympathetic)
 - pupil dilation → (sympathetic).



- ❖ The retina and optic nerve are physical extensions of the brain.
 - For example CNS lymphoma could involve the retina and the patient might present with eye problems
- ❖ **The best-known connection between the brain and the eye is the optic nerve.**
- ❖ The visual pathway, which extends from front to back across the brain can be studied easily and safely using perimeter. It can differentiate accurately between lesions of the **temporal, parietal, and occipital lobes.**
- ❖ **In addition, the optic nerve** has important clinical relationships to the **pituitary gland** (the optic nerve decussation at the chiasm is on top of the pituitary stalk, so any pathology in the pituitary will affect the visual field), **the middle ventricles**, the **venous sinuses**, the meningeal and bony structures of base of the skull (patients with meningitis, venous sinus congestion or skull base fractures can manifest with either cranial nerve palsies or optic nerve abnormalities)
- ❖ The normal optic nerve head has distinct margins, a pinkish rim and, usually, a central, pale, cup.
- ❖ The central retinal artery and vein enter the globe slightly nasally in the optic nerve head, referred to ophthalmoscopically as the optic disc.
- ❖ In optic disc edema there is unclear disc margin.



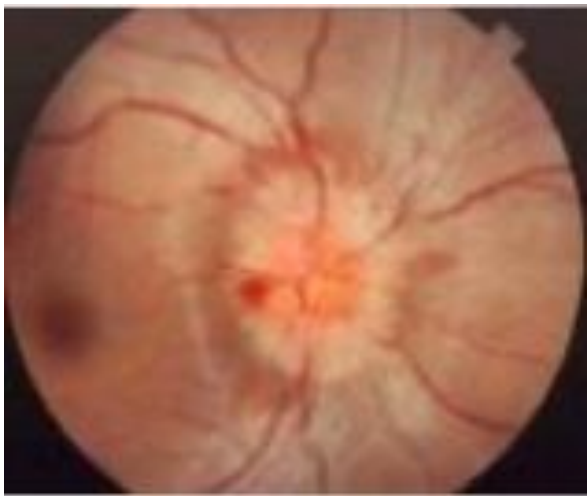
Optic disc edema (papilledema)

- ❖ The optic nerve has the diagnostically useful capability of swelling (congested veins + disc) with \uparrow ICP (papilledema).
- ❖ Venous sinus obstruction with \uparrow ICP will reflect on the optic nerve with swelling.
- ❖ It used to describe a **bilateral** swelling in the optic nerve due to increase in the ICP
- ❖ Optic nerve could be swollen due to many causes such as ischemic or inflammatory optic neuropathy but we don't call this papilledema bc it wasn't caused by the high ICP!
- ❖ If not treated it might cause optic atrophy
- ❖ Papilledema is the term given to bilateral disc swelling associated with raised intracranial pressure (ICP), accelerated hypertension and optic disc ischemia.
- ❖ Visual loss is uncommon with the papilledema of hypertension and/or raised intracranial pressure.

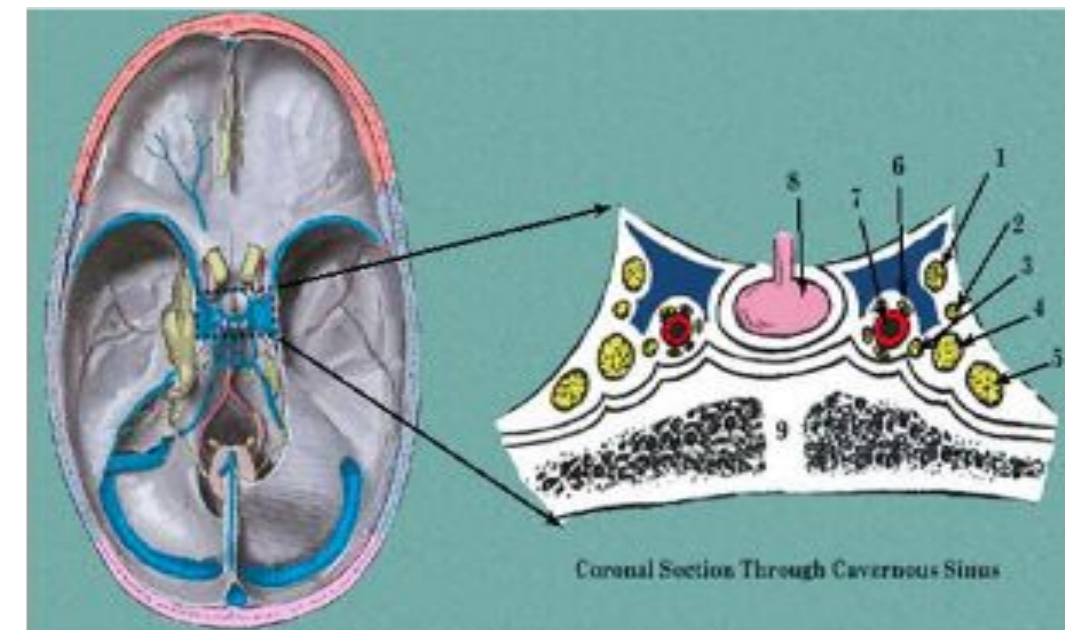
Optic atrophy

- ❖ The optic nerve could be visibly pale (**optic atrophy**) (**white yellowish**) normally it's (**pink**) when its nerve fibers are damaged at any point from **retina to LGB**.
 - E,g, patient with papillary adenoma causing compression and pressure on the chiasm for a long period of time \rightarrow optic atrophy with decreased visual acuity.
 - Any pathology in the visual pathway behind the LGB will not manifest in the optic nerve; for example, if someone has primary cortex infarction, it will not cause optic nerve atrophy. the patient will be blind but optic nerve will be normal.
- ❖ A pale optic disc represents a loss of nerve fibers at the optic nerve head.
- ❖ The vision is usually reduced, and color vision affected.
- ❖ On examination, the usual vascularity of the disc is lost.
- ❖ Comparison of the two eyes is of great help in unilateral cases, as the contrast makes pallor much easier to see.
- ❖ A relative afferent pupillary defect will usually be present (RAPD+).

You have to differentiate between the two pictures!

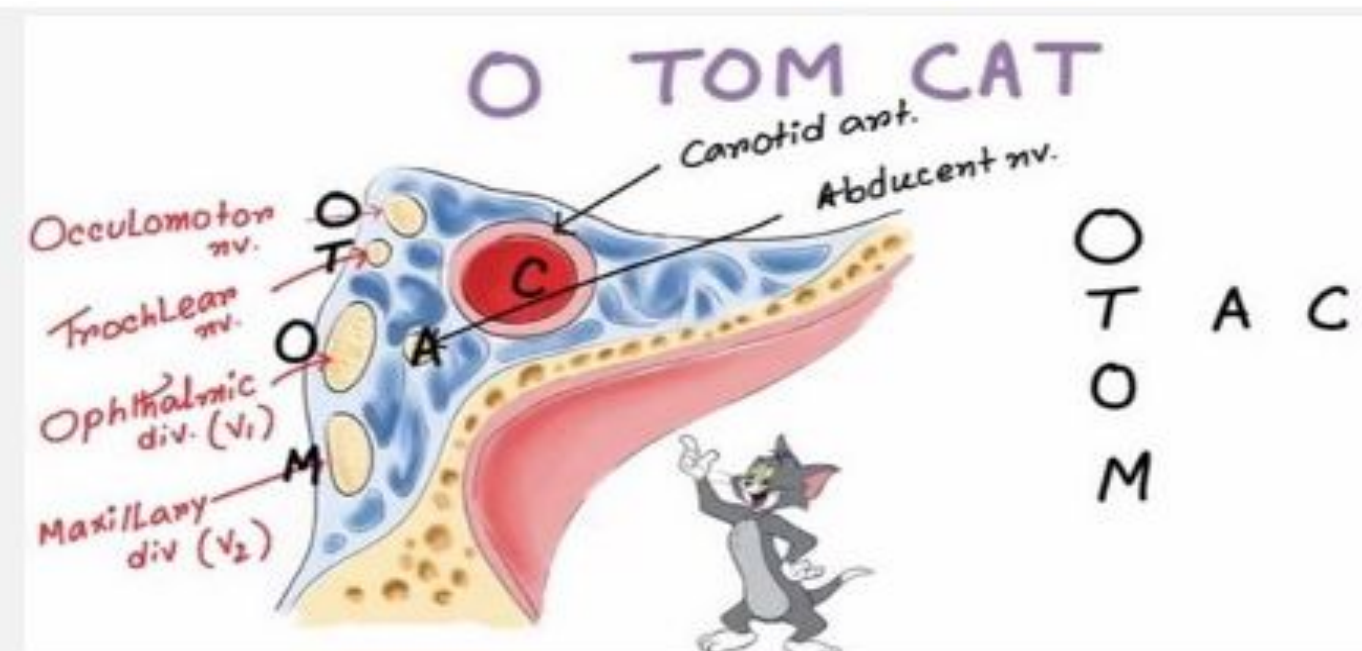


- ❖ The study of CN III, IV, V, VI can evaluate the **brainstem, cavernous sinus & apex of orbit** (these areas are in front of each other & any pathology in each of these can affect the cranial nerves that innervate the eye, so pt presents w/ eye manifestation).
- ❖ **Structures that go through the cavernous sinus are:** oculomotor nerve, trochlear nerve, 2 divisions of trigeminal nerve (ophthalmic & maxillary branches) & abducent nerve (CN 3,4,5&6) as well as sympathetic fibers around the internal carotid artery innervating the eye & forehead.
- ❖ if someone has cavernous sinus thrombosis or cavernous carotid fistula, pt will have multiple cranial neuropathies & restricted eye movements.



Cavernous Sinus Components
Mnemonic:

O TOM CAT



- ❖ A unilateral dilated pupil after a head injury can occur due to pressure on pupil constrictor fibers of CN III.
 - Brain Herniation, hemorrhage, aneurysm of posterior communicating artery can compress CN III.
 - What investigations would you do if you have a patient with 3rd nerve palsy with dilated pupil?
 - order a CT ANGIO or MRA (angio).
 - How do we know if CN IV is involved in addition to CN III? patient will not be able to look down (damaged CN III) and eyes won't intort (CN IV damaged).

Fibers	Innervation	Function
Somatic motor (general somatic efferent)	Supplies four of the six extraocular muscles of the eye and the levator palpebrae superioris muscle of the upper eyelid	controlling the muscles responsible for the precise movement of the eyes for visual tracking or fixation on an object
Visceral motor (general visceral efferent)	Parasympathetic innervation of the constrictor pupillae and ciliary muscles.	Involved in the pupillary light and accommodation reflexes.

- ❖ CN VI palsy is involved in mastoid infection (petrous ridge). Patients with inner ear infection or abscess collection may present with ear pain and 6th nerve palsy.
 - Commonest cause of abducens nerve palsy? TRAUMA. Why? because it has a very long course and each course is perpendicular to each other.
- ❖ CN VII palsy is involved in parotid gland & inner ear disease. Some patients with parotid tumor or infection can present with facial palsy.
- ❖ CN VIII disease is involved in nystagmus.
- ❖ Focal brain lesions like vascular occlusions, hemorrhage, or neoplasm.
- ❖ Diffuse brain lesions like infections, demyelinating disorders → nerve damage.
- ❖ **Third cranial nerve, oculomotor nerve:**
- ❖ Supplies all the muscles of the eye EXCEPT lateral rectus and superior oblique.
- ❖ Paralysis will lead to ptosis and squint (eye deviated out and little down) & pupil might be affected.
- ❖ It has two fibers:
 - Inside the nerve: deep fibers responsible for the muscles.
 - Surface of the nerve (periphery): superficial parasympathetic fibers.
- ❖ Muscles only paralysis is always due to medical reasons. Example: If CN III is affected due to ischemia because of DM or HTN, the fibers supplying the muscles will be affected.
- ❖ If there is a tumor compressing the periphery it will affect both peripheral and central part of the nerve. There will be **muscles paralysis & pupil dilation** (loss of parasympathetic activity → unopposed sympathetic). It is an emergency situation. (surgical)
- ❖ **The difference between medical & surgical third nerve palsy is pupil affection.**

SAQ/OSCE

Question: What are the structures in the cavernous sinus?

1- In the wall: THREE nerves

- Superior & inferior divisions of CN III (Oculomotor nerve)
- CN IV (Trochlear nerve)
- Ophthalmic and maxillary divisions of CN V (Trigeminal nerve)

2- Inside the cavernous sinus: ONE artery + ONE nerve

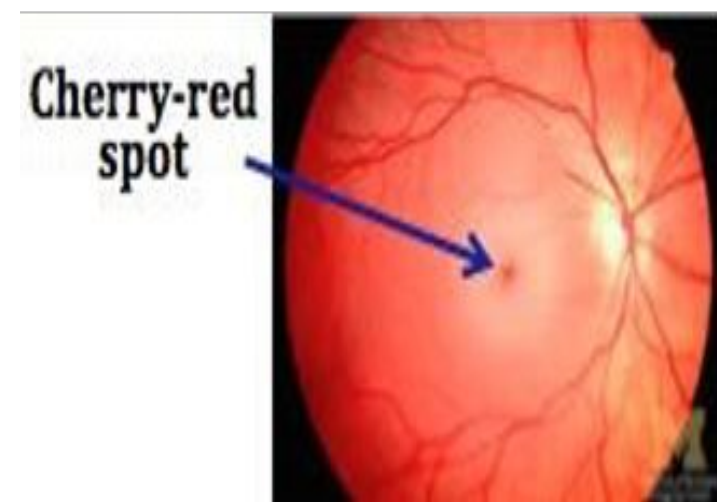
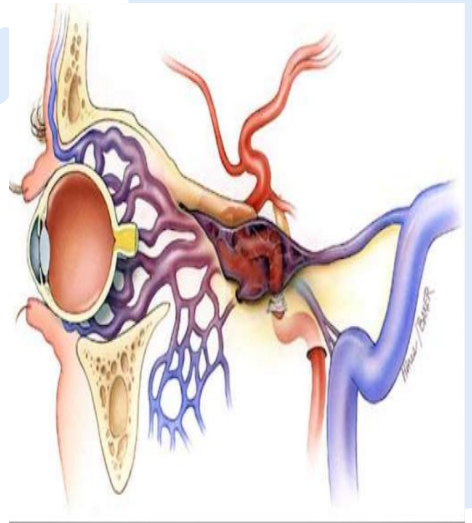
- Carotid artery.
- CN VI (Abducens nerve)

“هذي أهميتها لما يجيك سؤال عن cavernous sinus thrombosis





Vascular connections:

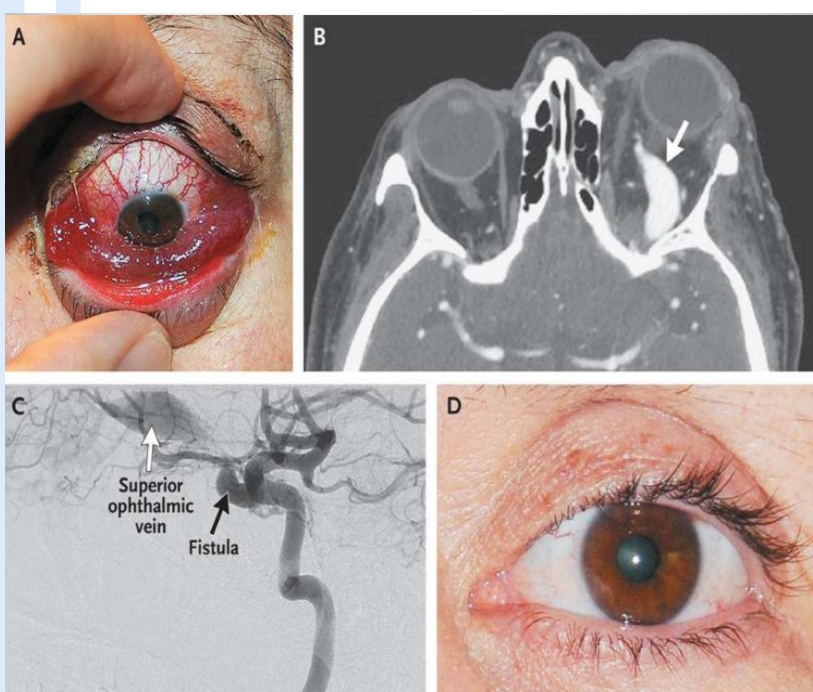


❖ Venous flow disorder:

- Cavernous sinus thrombosis (occlusion).
- Cavernous sinus is the venous drainage of the eye. The eye will be bulging, injected & congested sometimes with paralysis because the nerves are in the cavernous sinus.
- Carotid – cavernous fistula (orbital congestion). **Redness and swelling of the eyelids**
 - Pic A: Bulging and swelling of the conjunctiva
 - All the venous drainage around the eye would go to the superior & inferior ophthalmic vein → cavernous sinus → sigmoid sinus → SVC.
 - So if we have a thrombosis in the cavernous sinus or a fistula it will cause venous or vascular congestion
- The eye will be bulging, injected, congested, same as cavernous sinus thrombosis. The difference is that **the eye is pulsating (bruit)**.
- A fistula may develop between the internal carotid artery, in the cavernous sinus, and the cavernous sinus itself. **As a result, the orbital veins are exposed to a high intravascular pressure.**
- **Signs & symptoms:**
 - **The eye is proptosed** and the conjunctival veins are dilated and engorged.
 - A bruit may be heard with a stethoscope over the eye, in time with the radial pulse.
 - Eye movements are reduced because of extra-ocular muscle engorgement.
 - **Increased IOP** secondary to increased pressure in the veins draining the eye.
- **Management:**
 - The fistula can be closed by embolizing and thrombosing the affected vascular segment.
- In cavernous sinus thrombosis and carotid – cavernous fistula patients usually present with **unilateral proptosis**, unilateral redness, swelling that can be severe to the point that the eye is closed & orbital congestion.
- **Arterial emboli can reach the retina from** carotid artery, heart valves, subacute **endocarditis**.

❖ Specific disease of the vessels like:

- Polyarteritis nodosa (PAN), SLE.
 - **Both PAN & SLE can cause scleritis** (scleritis is covered in detail in red eye lecture).
- HTN.
- **Temporal arteritis, also known as giant cell arteritis (GCA)**. “very important and you have to know it in detail.”
 - This is an autoimmune vasculitis occurring in patients generally over the age of 60.
 - It affects the ophthalmic artery (not retinal).
 - Whitening of the retinal vessels and hemorrhage.
 - **Signs & symptoms:**
 - Visual symptoms: irreversible and usually **sudden loss of vision**, diplopia.
 - Polymyalgia rheumatica symptoms: headache, pain in the shoulders and hips, malaise.
 - Others: **jaw claudication** (pain on chewing) & **scalp/temporal tenderness** (eg. on combing).
 - Fever and constitutional symptoms.
 - **Diagnosis:**
 - **Elevated** erythrocyte sedimentation rate (ESR) & **C-reactive protein (CRP)** (e.g. ESR = 100 mm/h).
 - **Temporal artery biopsy**. If you miss the diagnosis the patient will have loss of vision in the other eye.
 - **Management:** IV Steroids to protect the other eye. **Steroids will not reverse the visual loss but can prevent the fellow eye being affected.**



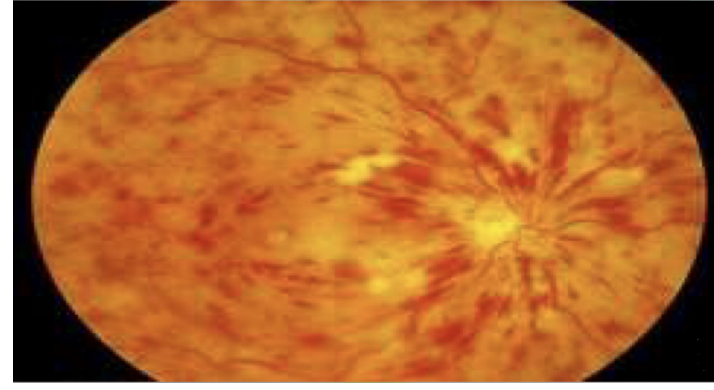
Extra from 435 team

- Carotid-cavernous fistula (orbital congestion) has the same clinical presentation (proptotic, retinal edema) of cavernous sinus except that it has increased IOP, and thrill + pulsating **eyes (Bruit)** orbital congestion.
- **Came in the exam:** central retinal artery occlusion/ history: of multiple bone fractures, what is the diagnosis? Retinal central artery fat embolism.
- Case: a 60-year-old pt w/ heart disease and using penicillin injections (meaning that he has bacterial endocarditis and might have a possibility of embolism manifestations leading to central retinal artery occlusion)
- Best initial investigation in temporal arteritis is ESR, followed by C-reactive protein, then Biopsy (a negative biopsy does not rule out the dx due to the focal and segmental nature of the infiltrates).
- When a patient complains of any changes in vision, rule out DM first!

Arterial emboli
can reach the retina from carotid artery, calcification of heart valves, subacute endocarditis and traumatic bone fracture.



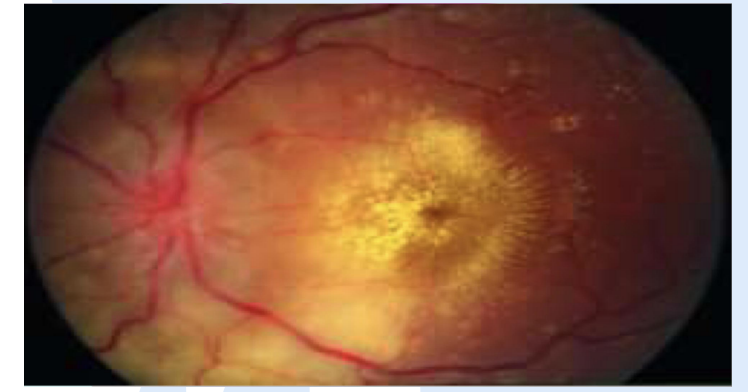
Systemic coagulopathy
- Present as vein occlusion in the eye



Systemic vasculitis
- Manifests in the fundus and cause vasculitis & ischemia



Hypertension
- (Chronic or uncontrolled HTN)



Hematological disorders:

- ❖ All types can manifest in the fundus. (e.g. severe anemia, leukemia or lymphoma)
- ❖ For example, in sickle cell retinopathy the sickle cells will cause vascular occlusion → ischemia in the retina and inter retinal hemorrhage.
- ❖ Signs of sickle cell retinopathy:
 - Tortuous veins.
 - Peripheral hemorrhages.
 - Capillary non-perfusion.
 - Pigmented spots on the retina.
 - New vessel formation, classically in a 'sea fan' pattern, which may occur as a result of peripheral retinal artery occlusion which may cause vitreous hemorrhage and traction retinal detachment.
- This may require treatment with laser photocoagulation and vitrectomy.

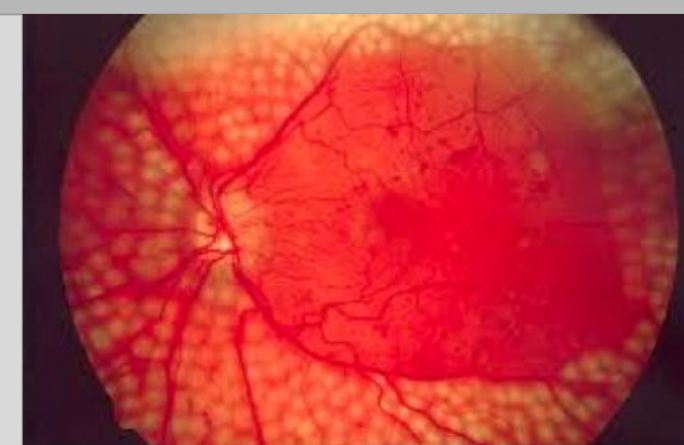
Metabolic disorders:

- ❖ Almost all metabolic disorders can affect the eye:
- ❖ **Diabetes Mellitus:** diabetic retinopathy (proliferative & non-proliferative), cataract, refractive error caused by hyperglycemia or ophthalmoplegia due to diabetic vasculopathy (it can cause cranial nerve palsies such as 3rd, 4th or 6th cranial nerve palsy).
 - Most eyes problems are because of DM
 - Diabetic retinopathy is the most common cause of irreversible blindness in people below 50 years of age.

436 team images: very important for exam



Proliferative Diabetic Retinopathy (PDR)
New vessels in the retina due to diabetes. The vessels are fragile and can bleed. If it bleeds it will lead to vitreous hemorrhage and retinal detachment.
(New dilated tortuous proliferative vessel in the retina)



Pan-retinal Photocoagulation (PRP)
Laser treatment of the other picture. Early detection and treatment will change the ischemic retina to anoxic retina. New vessels will be destroyed and central vision will be saved. There will be visual field defect, but the macula will be saved and the vision will be maintained.
(Retinal scars)

- ❖ Wilson's disease: copper accumulation in the body, deficiency of α -ceruloplasmin. (KF ring)
 - Copper accumulation in the cornea will cause Kayser-Fleischer ring, corneal ring: a green ring around the cornea in the periphery).
- ❖ Hypo-parathyroidism → cataract.
- ❖ Thyroid eye diseases:
 - Hyperthyroidism: Graves' disease.
 - The patient may sometimes complain of:
 - A red painful eye (associated with globe exposure caused by proptosis).
 - If the redness is limited to part of the eye only, it may indicate active inflammation in the adjacent muscle.
 - Double vision.
 - Reduced visual acuity (sometimes associated with optic neuropathy).



■ On examination:

- Bilateral exophthalmos (also known as proptosis which is protrusion of the eye from the orbit “pushing forward”, we call it exophthalmos only if it’s related to a thyroid disease. If not related we say proptosis)
- Lid retraction (upper part of sclera is seen) and lid lag.
- The conjunctiva may be chemosed (oedematous swelling of the conjunctiva) and the eye injected over the muscle insertions.
- There may be **restricted eye movements** or squint (also termed restrictive thyroid myopathy, exophthalmic ophthalmoplegia).

- The inferior rectus is the most commonly affected; Its movement becomes restricted and there is mechanical limitation of the eye in upgaze.
- Involvement of the medial rectus causes mechanical limitation of abduction, thereby mimicking a sixth nerve palsy.

-In severe cases, there will be so much pressure in the orbit that leads to optic neuropathy.

- Compressive optic neuropathy due to compression and ischemia of the optic nerve by the thickened muscles. This leads to field loss and may cause blindness.

- **The commonest cause of unilateral & bilateral proptosis is thyrotoxicosis.**

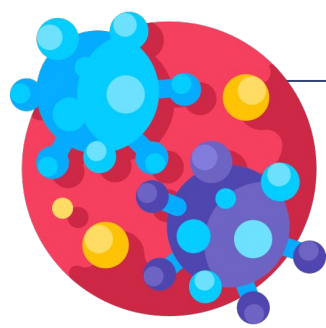
■ Investigations:

- **A CT or MRI scan shows enlargement of the rectus muscle.**
- Thyroid function test

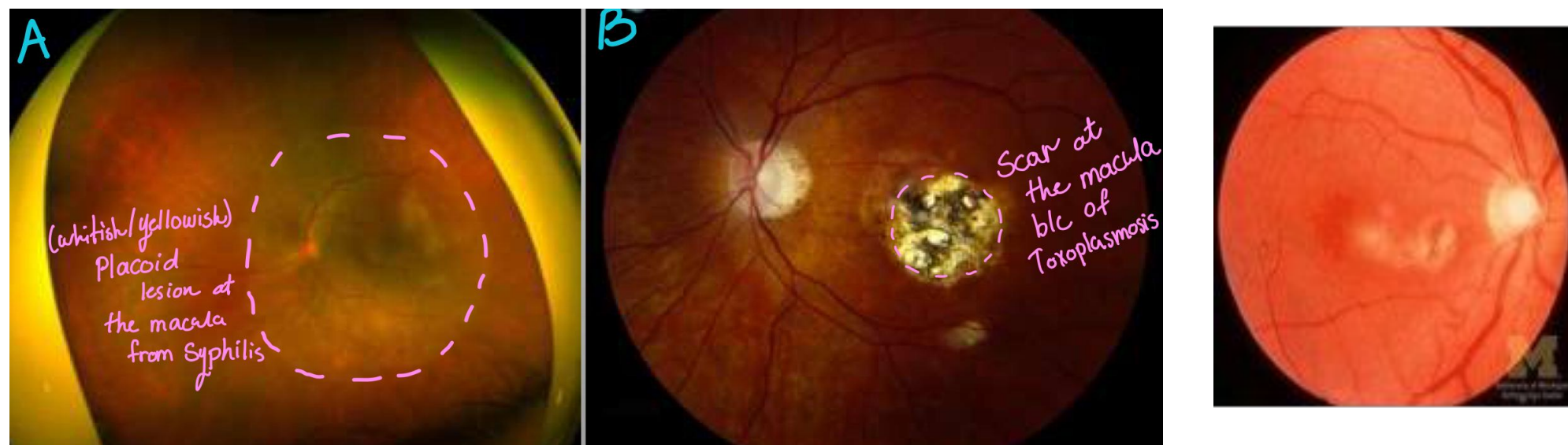
■ Treatment:

- Corneal exposure and optic nerve compression require urgent treatment with systemic steroids, radiotherapy or surgical orbital decompression.

- thyroid eye disease, also known as infiltrative ophthalmopathy “ graves ophthalmopathy“. Since they have **increased IOP** we preform visual field exam



Infections:

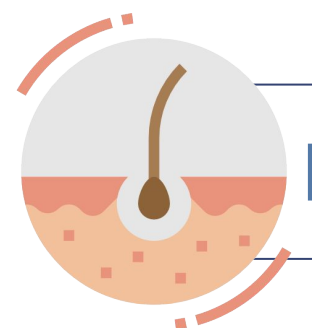
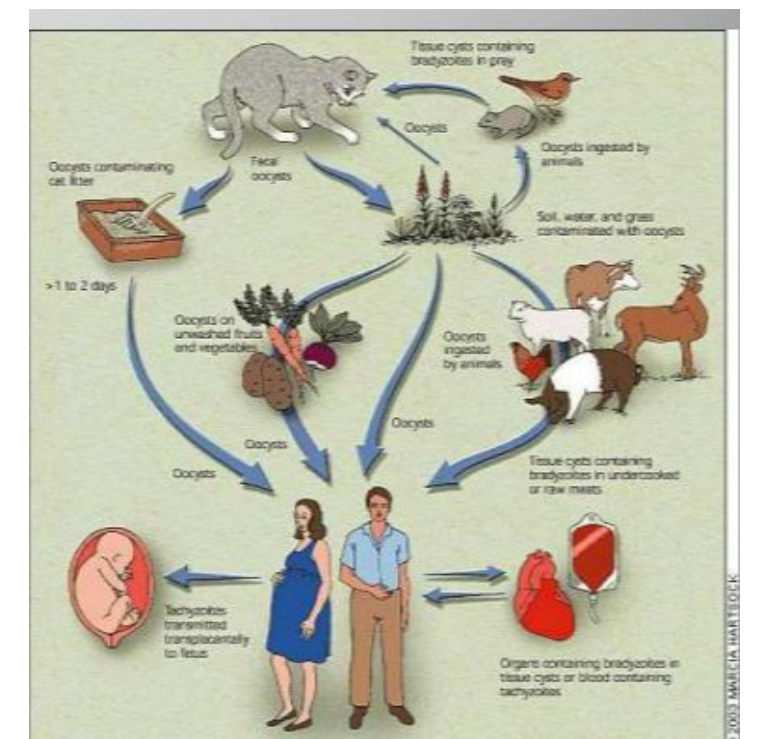


❖ Syphilis, toxoplasmosis & rubella.

- Syphilis and Rubella also can cause retinitis (inflammation of the retina).
- Congenital syphilis causes interstitial keratitis which is any vascular keratitis that affects the corneal stroma without epithelial involvement.
 - Pic A: this patient came complaining of decrease in vision, the dr found this typical lesion of syphilis and ordered a syphilis test and the patient was +ve

❖ Toxoplasmosis

- The retina is the principal structure involved, with secondary inflammation occurring in the choroid (retinochoroiditis).
- An active lesion is often located at the posterior pole, appearing as a creamy focus of inflammatory cells.
- Inflammatory cells cause a vitreous haze, and the anterior chamber may also show evidence of inflammation.
- Thus, the patient may complain of hazy vision and floaters, and the eye may be red and painful.
- The clinical appearance is usually diagnostic.



Mucocutaneous disorders:

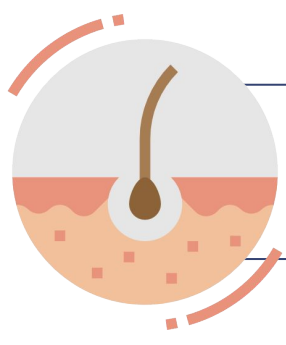


❖ Steven-Johnson Syndrome (SJS), pemphigus.

- Blistering & ulceration of the skin & mucous membranes in reaction to chemicals like drugs and medications or infection.
- Eyelid and conjunctival ulceration.
- Scar tissue formation between eye and eyelid.

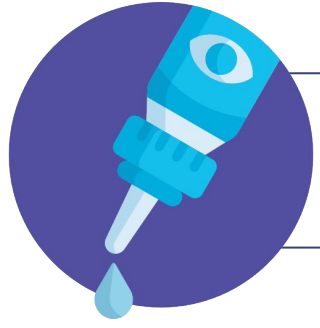
❖ Loss of goblet cells occurs in most forms of dry eye, but particularly in cicatricial conjunctival disorders such as erythema multiforme (Stevens-Johnson syndrome). In this there is an acute episode of inflammation causing macular ‘target’ lesions on the skin and discharging lesions on the eye, mouth and vulva. In the eye this causes conjunctival shrinkage with adhesions forming between the globe and the conjunctiva (symblepharon).





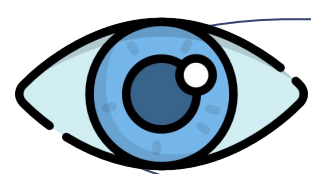
Elastic tissue disorders:

- ❖ Pseudoxanthoma elasticum: degeneration of the retina in which the patient can develop neovascularization.
 - Sub-retinal neovascular membranes may also grow through elongated cracks in Bruch's membrane called angioid streaks.



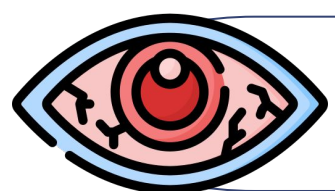
Allergies:

- ❖ Vernal keratoconjunctivitis (VKC)
 - A severe form of allergic conjunctivitis could result in Vernal keratoconjunctivitis
 - Also called (spring catarrh or catarrh vernal) causes cobblestone papillae. الربيعي الرمد حساسية Common in najran and jizan (dusty areas and children with other known allergies like eczema), unfortunately they treat it wrongly with steroids which leads to complications of chronic steroid use, including steroid-induced cataracts and glaucoma, have been described in up to 20% of patients.
 - Causes chronic allergic reaction in the eye: chronic mucous discharge, chronic ulceration of the conjunctiva and chronic rubbing of the eye leading to corneal pathology and astigmatism.
 - Ig-E mediated; it often affects boys with a history of atopy.
 - It is usually seasonal but may be present all year long & may become chronic.
 - Signs & symptoms:
 - Itchiness.
 - Photophobia.
 - Lacrimation.
 - Papillary conjunctivitis on the upper tarsal plate (papillae may coalesce to form giant cobblestones).
 - Limbal follicles and white spots.
 - Punctate lesions on the corneal epithelium.



Chromosomal abnormalities :

- ❖ Trisomy: 13, 15, 18 & 21.
 - Basically, patient can have eye defects or cataract develop in their eyes.



Eye poisoning :

Dr Skipped it

- ❖ The eye is a delicate indicator of poisoning:
 - Morphine addict (opiate intoxication): leads to miotic pupil.
Constricted pinpoint pupil = morphine overdose or pontine hemorrhage.
 - Dilated pupil = cocaine or amphetamine.They have the same presentation the only difference is hyperpyrexia with pontine hemorrhage.
 - Lead poisoning, vitamin A intoxication (example for acne treatment) lead to papilledema.
 - After lead poisoning is treated or after taking methanol, patient can manifest with optic atrophy.

What are the components of a comprehensive ophthalmic evaluation?

1. Obtain an ocular and systemic history.
 - Patient complaining of smth floating in their eyes and they have a history of chronic DM
2. Identify risk factors for ocular and systemic disease.
 - Someone with recent eye surgery? Increase risk of infections
3. look for symptoms and signs of ocular or systemic disease.
 - Diabetic patient coming with eye problems & they're on renal dialysis or had a leg amputation? You think of diabetic retinopathy
4. reach a provisional diagnosis
5. Initiate an appropriate response: e.g. further diagnostic tests, treatment, or referral.

History

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.



Chief complaint:

“The patient’s own words”

What brought the patient in? “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 presenting illness :

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? A gradual decrease in vision is not as worrisome as a sudden decrease
- Frequency, intermittency
- location, Laterality * Severity * Associated symptoms
- Documentation (old records, photo) e.g ptosis, proptosis, VII N palsy.

Gradual painless decrease vision both eyes for 1y

Sudden painless decrease vision re for 10 min.

“cannot see with RE”!!

- 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:

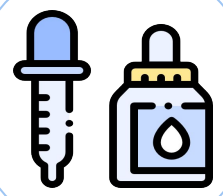
- Blurred or decreased central vision **diabetic retinopathy, macular degeneration**
- Decreased peripheral vision (glaucoma)
- Altered image size. (micropsia, macropsia, metamorphopsia الصورة (فيها تموجات وتعرجات). Difference between the two eyes
- Diplopia (monocular indicative of a problem with they eye itself , binocular indicative of a problem with the muscles moving the eye)
- Floaters مثل الذبابة في النظر anything floating in the vitreous fluid

- Photopsia (flash of light) زي البرق في طرف العين
- Color vision abnormalities when going from light to dark room. Most common inherited disease: retinitis pigmentosa. Acquired: Vitamin A deficiency
- Dark adaptation problems
- Blindness (ocular, cortical)
- Oscillopsia (shaking of images)



Ocular pain or discomfort:

- Foreign body sensation **most common and is mostly due to dryness**
- Ciliary pain **with scleritis, iritis, uveitis** (aching, severe pain in or around the eye, often radiating to the ipsilateral forehead, molar area)
 - Burning
 - Dryness
 - Itching: patient rub the eye vigorously (allergy)
 - Asthenopia (eye strain) **عدم القدرة على الرؤية القريبة**
- Photophobia **can be due to injury, trauma, corneal abrasion**
- Headache

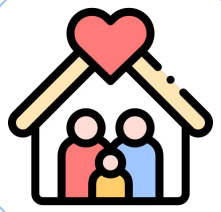


Abnormal ocular secretions:

- Lacrimation, epiphora
- Dryness
- Discharge (purulent **with bacterial infections**, mucopurulent, mucoid, watery **with viral infection**)
- **Redness** (if localized most likely episcleritis, if diffuse uveitis)
- **opacities, masses**
- **Anisocoria** different sized pupils. If a patient has Anisocoria and ptosis = 3rd nerve palsy



Purulent discharge in the conjunctiva



Family history:

Many eye conditions are **inherited**

(Refractive error, glaucoma, strabismus, retinoblastoma, neoplasia & vascular disorders)

- Familial systemic disease can be helpful in ophthalmic evaluation and diagnosis (Atopy, thyroid diseases, DM, some malignancies)
- Ask about any eye problem in the family background?
- Ask specifically about corneal diseases, glaucoma, cataract, retinal diseases or other heritable ocular conditions.

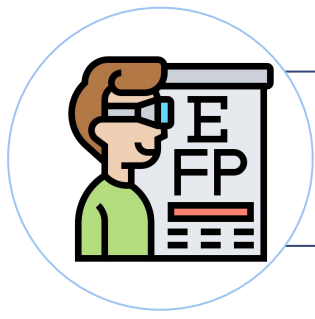


Occulomucosal albinism

- Ask questions designed to confirm or exclude your tentative diagnosis
 - significant positive
 - significant negative
- predict the physical and lab. finding likely to be present.
- any discrepancy between the history and physical examination requires explanation .

Ophthalmic examination

- ❖ Visual acuity
- ❖ External examination
- ❖ Motility and alignment
- ❖ Pupil examination
- ❖ Slit lamp biomicroscopy
- ❖ Tonometry
- ❖ Ophthalmoscopy
- ❖ Gonioscopy
- ❖ Retinoscopes

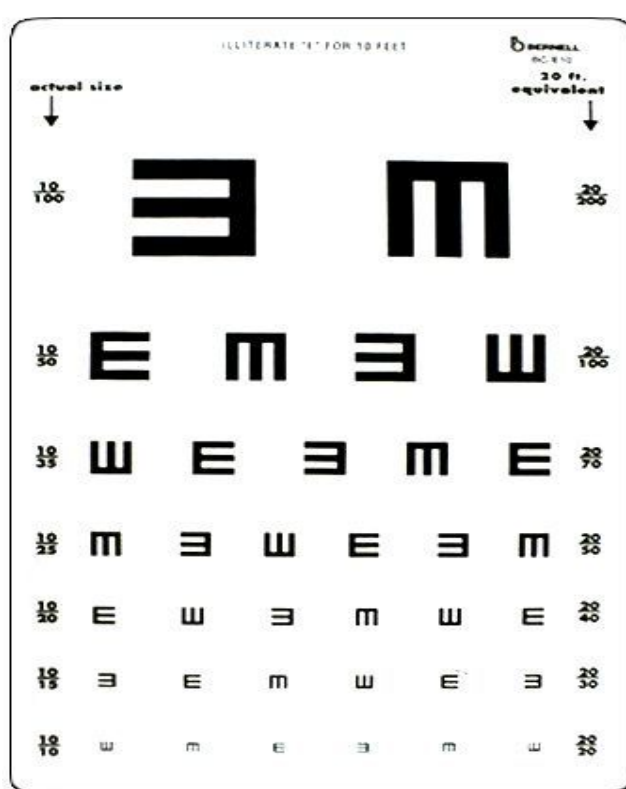


Visual acuity:

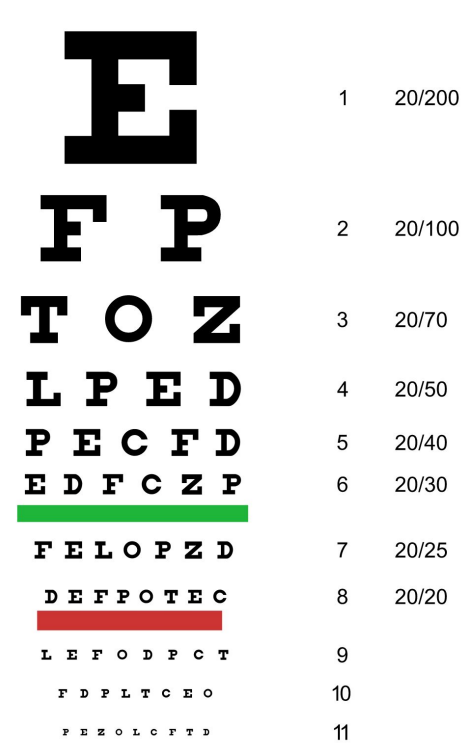
- It is a **vital sign** (MUST)
- Good vision :
 - ➔ intact neurological visual pathology
 - ➔ structurally healthy eye
 - ➔ Proper focus
- Subjective **this is considered a disadvantage**

How to test vision?

- Display of different sized targets shown at a standard distance from the eye.
- **Snellen chart.**
- 20/20, 6/6
- Uncorrected, corrected



Tumbling E chart



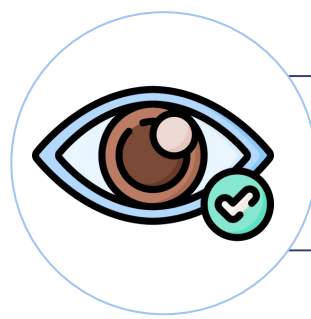
Snellen's chart



Allen chart used for kids

Testing poor vision:

- If the patient is unable to read the largest letter $<(20/200)$ **this means that this patient cannot see at 20 ft what a normal person can see at 200 ft**
- **Move the patient closer** e.g. 5/200 **this means that this patient can see at 5 ft what a normal person can see at 200 ft**
- If patient cannot read: **we do these step wise, for example if he cannot count fingers then we test hand motion**
 - count fingers (CF)
 - hand motion (HM)
 - Light perception (LP)
 - No light perception (NLP)



External examination:

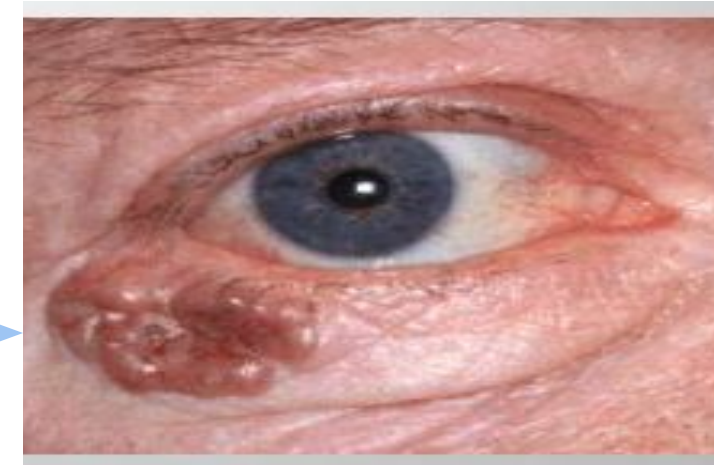
- ❑ Evaluate by gross inspection and palpation.
- ❑ Ocular adnexa. (lid, periocular area)
- ❑ Skin lesions, growths, inflammatory lesions.
- ❑ Ptosis **partial vs complete**



- ❑ Proptosis, exophthalmos, enophthalmos



- ❑ Palpation of bony rim, periocular soft tissue.



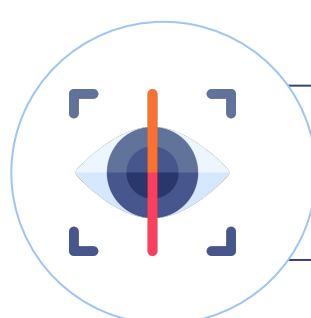
- ❑ General facial examination e.g. enlarged preauricular lymph node, temporal artery prominence.

Upper eyelid : preauricular lymph nodes

Lower eyelid: mandibular lymph nodes



Including the eyelids, eyebrows and skin around the eye



Ocular motility :

Evaluate : 1) Alignment 2) Movements

- ❑ Misalignment of the eyes



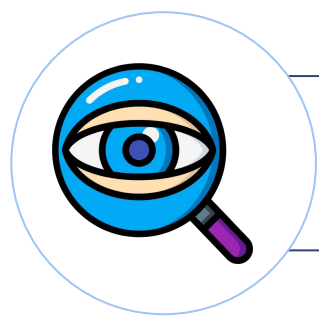
Esotropia



Oculomotor lesion

Movement:

- ❑ Follow a target with both eyes in each of the four cardinal directions of gaze.
- ❑ Note
 - Speed
 - Smoothness
 - Range
 - Symmetry
 - Unsteadiness of fixation e.g nystagmus



Pupils :



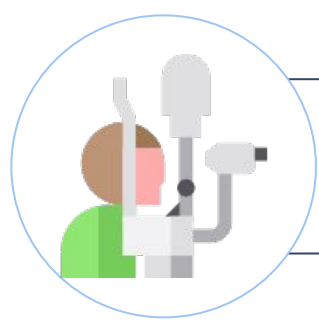
Examine for **size, shape, reactivity** to both light and accommodation.

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



Causes of 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.

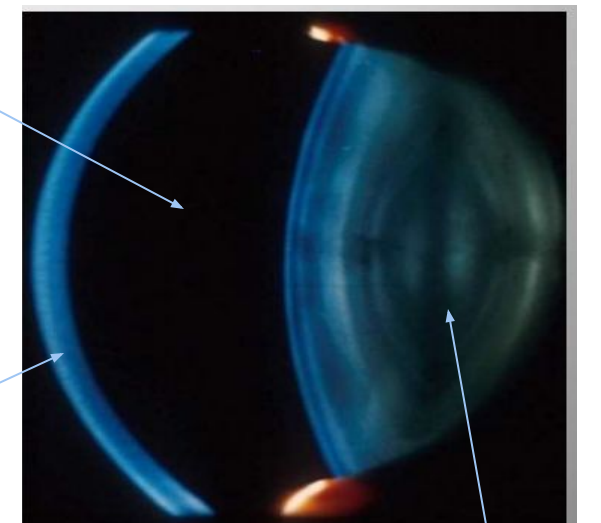
A linear slit beam of light is projected onto the globe optic cross section of the eye.



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

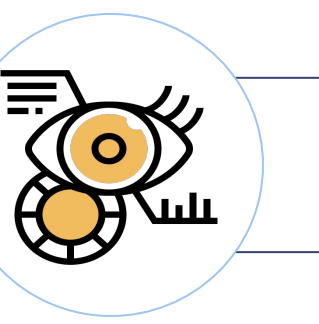
Anterior chamber

Cornea



Iris

Lens

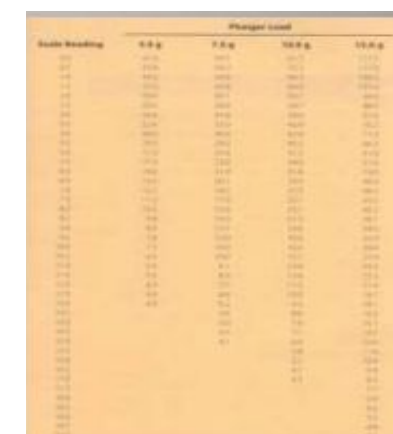
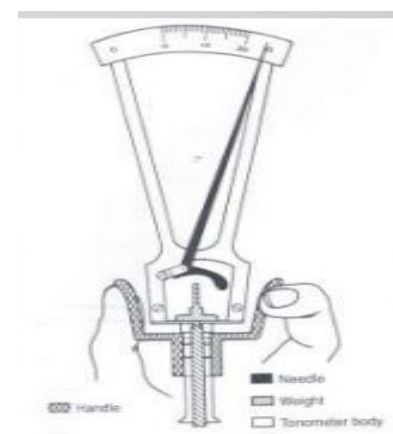


Tonometry:

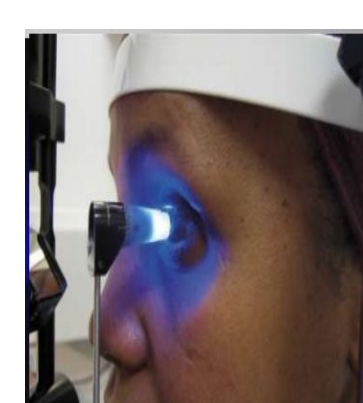
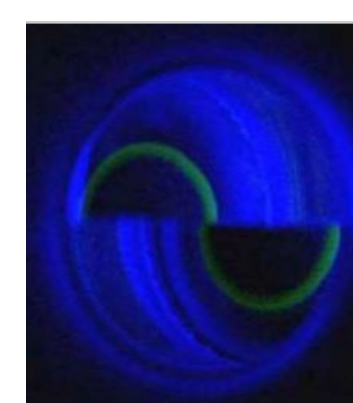
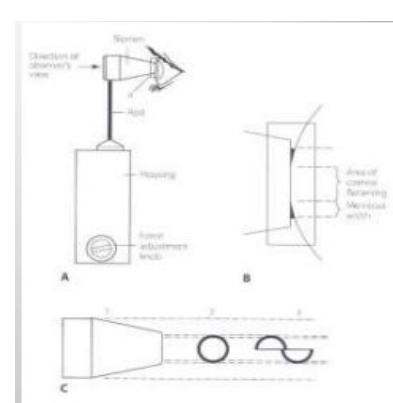
- The globe is a closed compartment with constant circulation of aqueous humor.
The amount produced should be close to the amount absorbed
- This maintains the shape, and relatively uniform pressure within the globe.
- Normal pressure 10 - 21 mmHg.

Types of tonometry:

Schiotz tonometer
Not used anymore

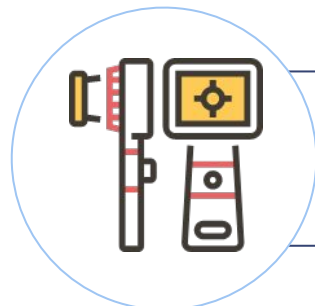


Goldmann applanation Tonometer





Tonopen
Easy to use

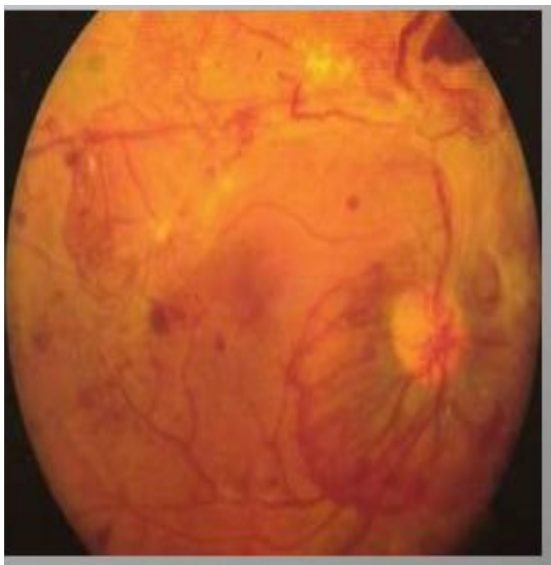




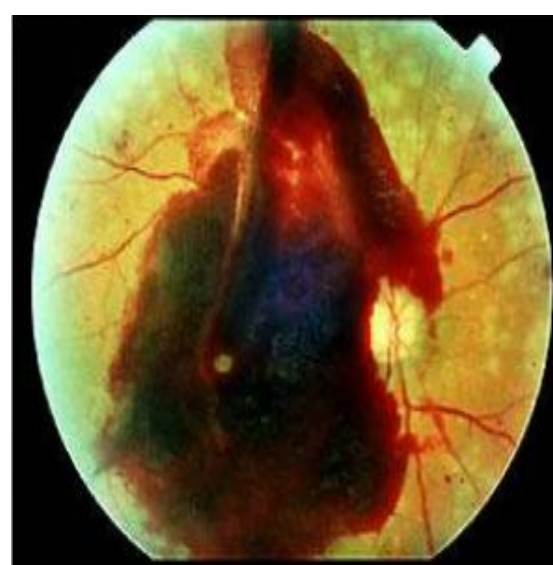
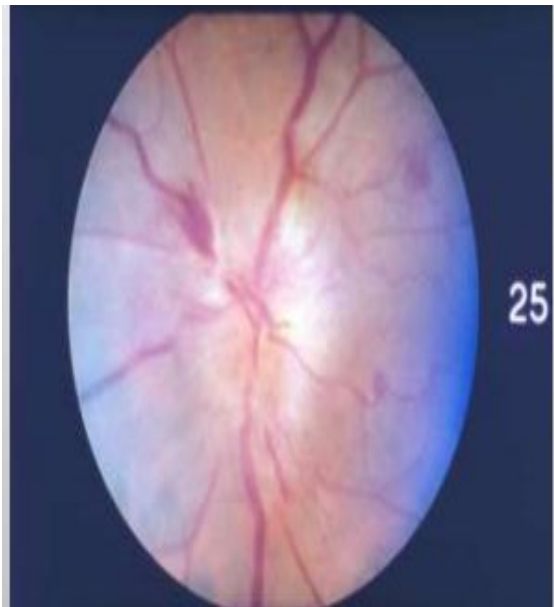
Ophthalmoscopy:

Direct ophthalmoscopy:	Indirect ophthalmoscope:
	
<ul style="list-style-type: none"> • handheld instrument. • standard part of the general medical examination. • Portable 	<p>Advantage : it is used in ophthalmology clinica with they eye dilated</p> <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. 3D view 5. Allow entire retina examination till the periphery
	<p>Disadvantage:</p> <ol style="list-style-type: none"> 1. Inverted retinal image. 2. Brighter light is uncomfortable to the patient.

Indirect Ophthalmoscope Images:



Optic disc swelling



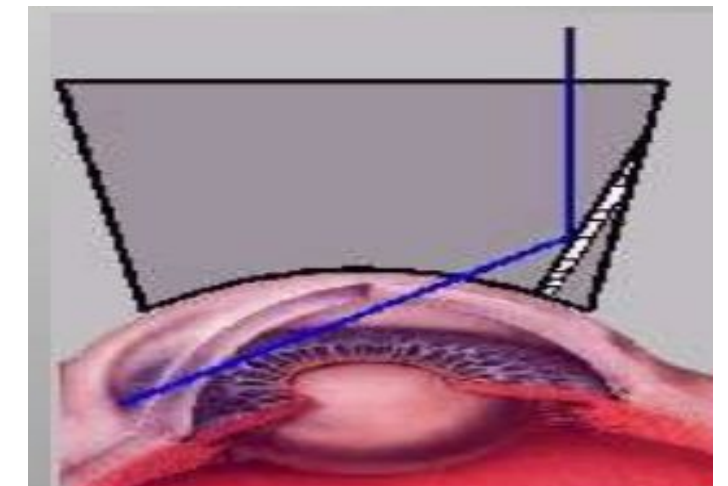
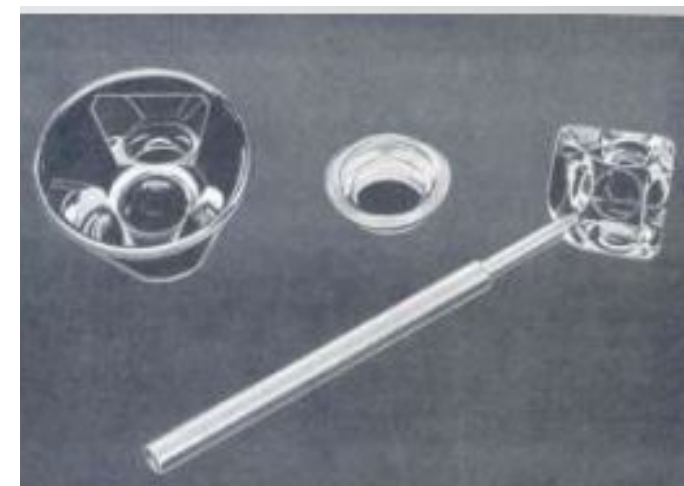
Vitreous hemorrhage



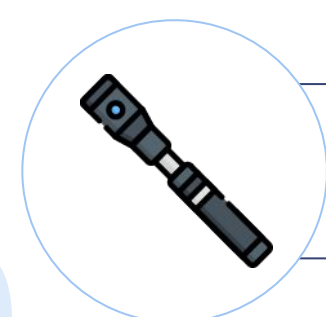
Hemorrhage + new small vessels
This is proliferative diabetic retinopathy

Special lenses:

- ◆ Gonio lens used to know if its open or closed
Angle glaucoma
- ◆ wide field contact lenses allow evaluation of the posterior segment.



Used to check refractive errors in babies (objective refraction)



Retinoscope :



Practice Questions

Q1. A middle-aged female presented with acute unilateral proptosis with restriction of ocular motility. MRI demonstrated fusiform rectus enlargement and orbital fat expansion. Which of the following disorders is the most likely cause?

- A. Cavernous hemangioma
- B. Optic nerve sheath meningioma
- C. Thyroid eye disease
- D. Subperiosteal orbital hemorrhage

Q2. A 63-year-old woman with unilateral ocular pain pulsatile proptosis, and double vision is noted to have marked, dilated episcleral vessels with 35 mmHg intraocular pressure. What is the most likely diagnosis?

- A. Thyroid eye disease
- B. Cavernous sinus thrombosis
- C. Carotid cavernous fistula
- D. Capillary hemangioma

Q3. A 68-year-old man with endocarditis experienced sudden loss of vision in his left eye 3 hours ago. Visual acuity in the right eye is 6/6 and in the left eye is LP. The right pupil responds to light directly but not consensually. The left pupil responds to light consensually but not directly. What would you notice in the ophthalmoscope?

- A. Cherry spot. "Artery"
- B. Deep blot and flame-shaped hemorrhages. "Venous"
- C. cotton wool spot. "Venous"

Q4. 80-year-old male hypertensive patient, presented to the ER with a sudden visual loss, he gave history of jaw claudication, CRP was high. What is the diagnosis?

- A. Optic neuritis.
- B. Central retinal vein occlusion.
- C. Giant cell arteritis.
- D. Retinal detachment

35-year-old female came to the hospital complaining of swelling over her left eyelid associated with redness and fever started 3 days ago. on examination there was mild limitation of movement. What is the possible diagnosis?

- A. Orbital cellulitis
- B. Thyroid ophthalmopathy
- C. Cavernous hemangioma
- D. Dry eye syndrome

Answers

1.C 2.C 3.A 4.C 5.A