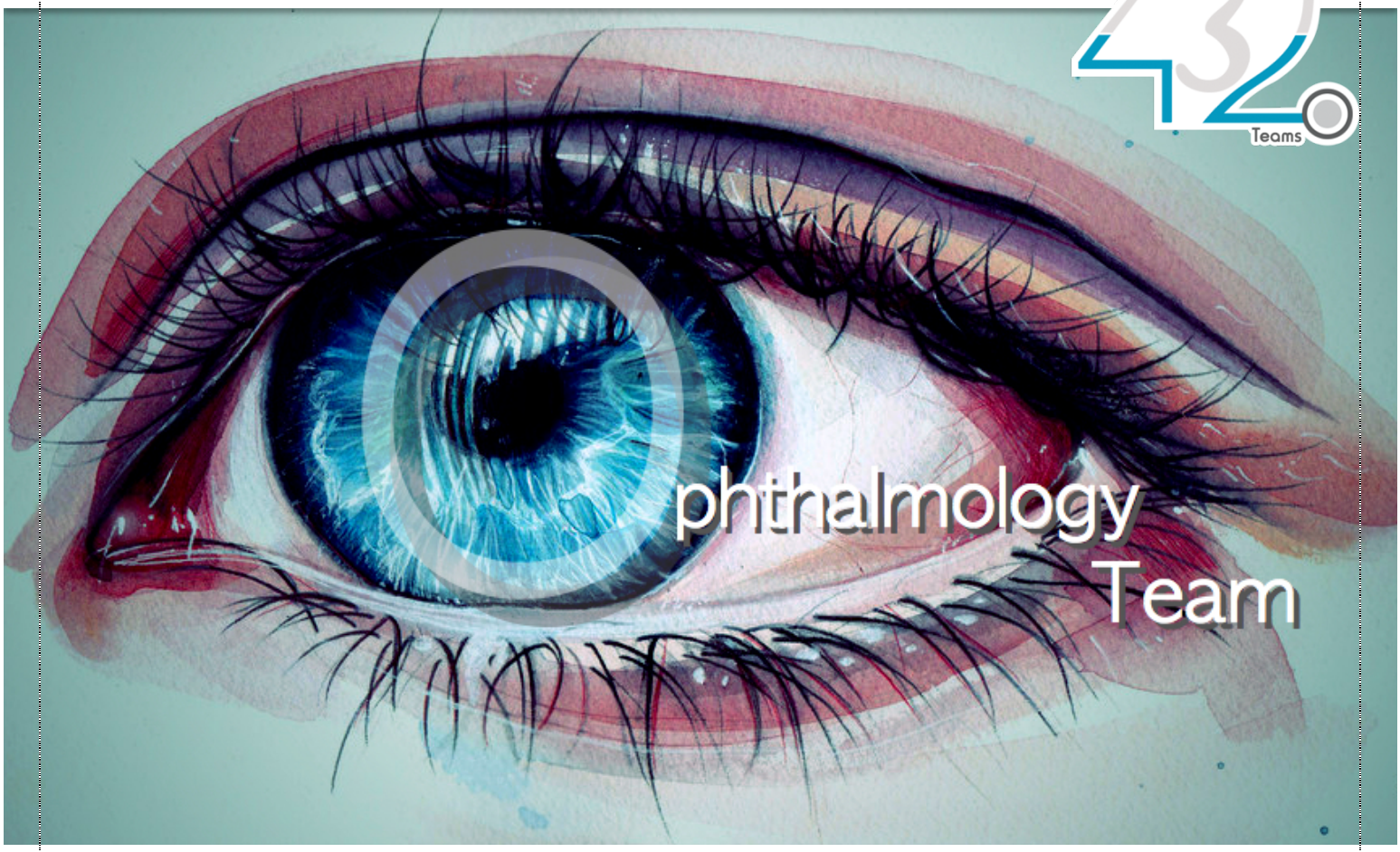


#1- Orientation, History Taking, and Examination (Part I)

Done by: Shaikha Aldossari

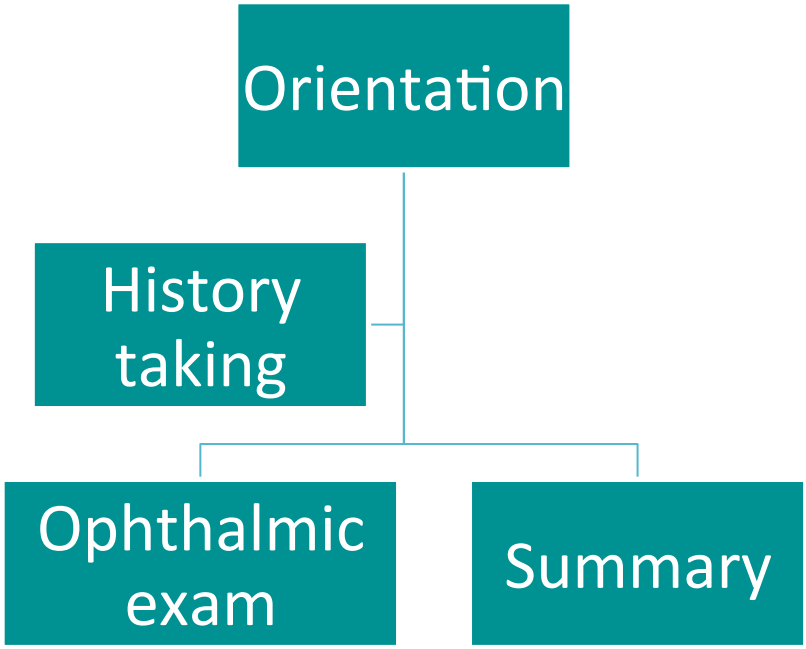
Revised by: Alanoud Alyousef

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

Objectives:

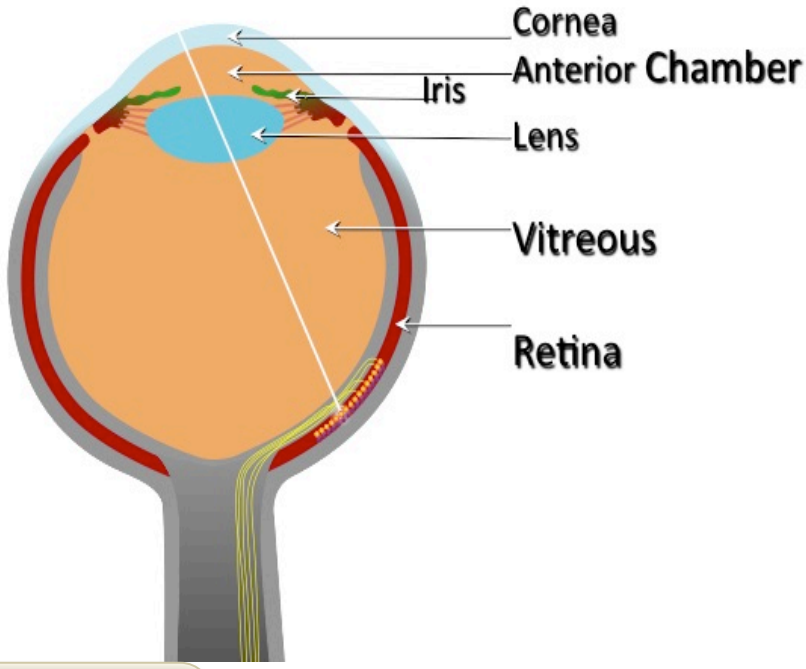
1. To know the basic ophthalmic anatomy and physiology.
2. To recognize assessment and management of common ophthalmic diseases.
3. To know how to handle common ophthalmic emergencies.
4. To handle simple ophthalmic diagnostic instruments.
5. To be aware of common ophthalmic operations.

Note: The doctor stressed a lot on the first 2 lectures and said that around 90% of the exam questions come from there.



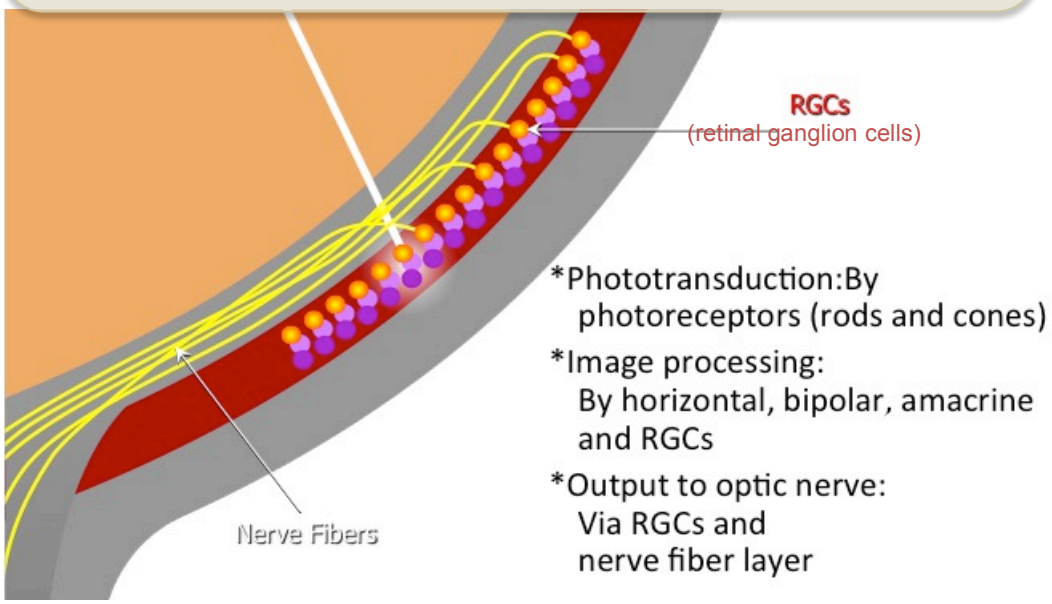
EYE

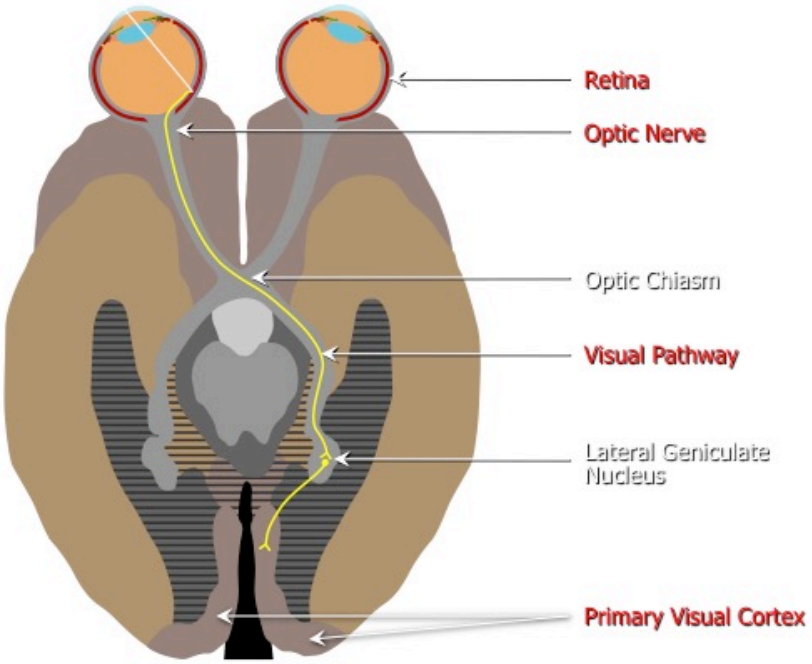
The Visual Pathway



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 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.





From the optic nerve, about half of the fibers cross over at the chiasm to the opposite optic tract, and the other half remains 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.

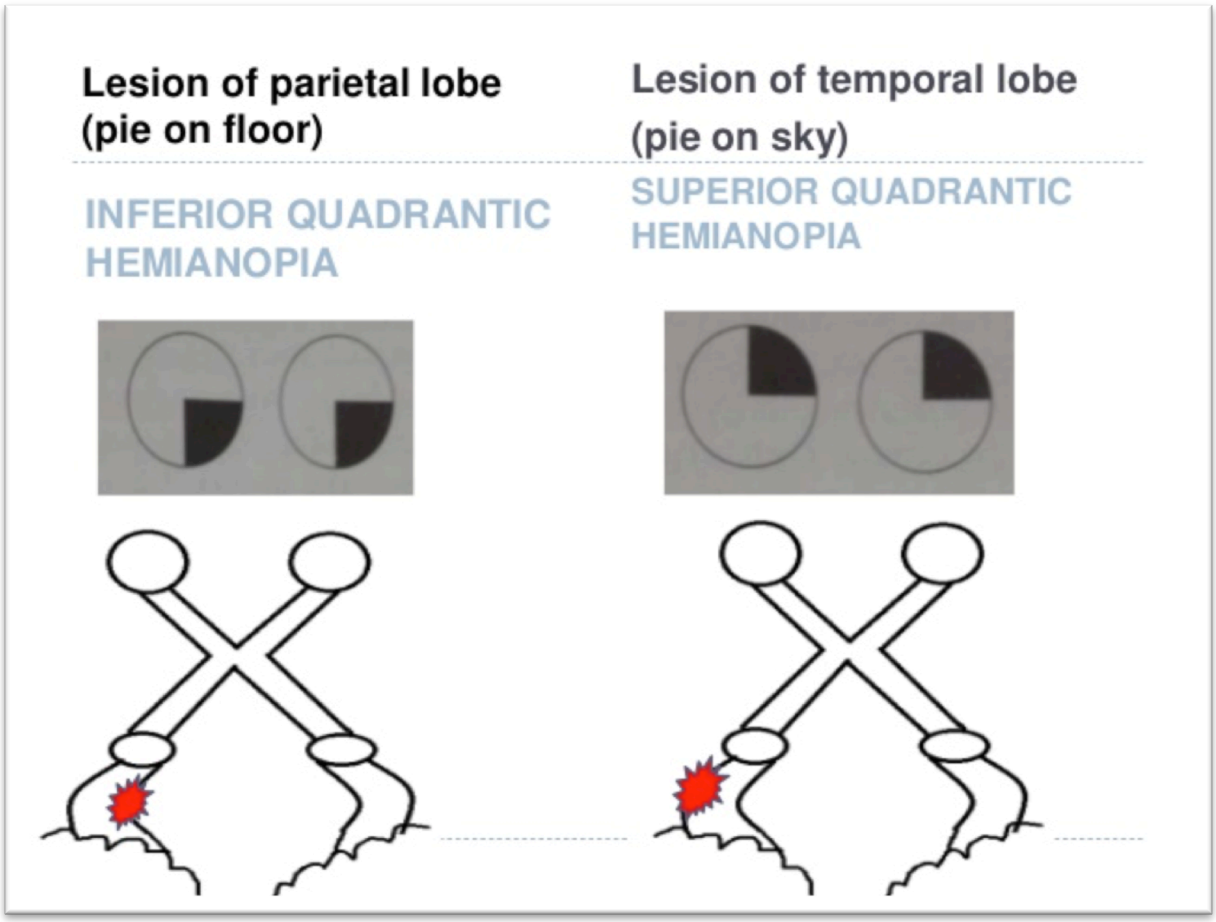
- Diagnostically and functionally, it is the most important *square inch* of the body surface.
- The eye is so intimately connected with the rest of the body that it reveals enormous amount of general information.
- Eye is the only part of the body where blood vessels and central nervous system tissues can be viewed directly.

Examples:

1. Neurological connections

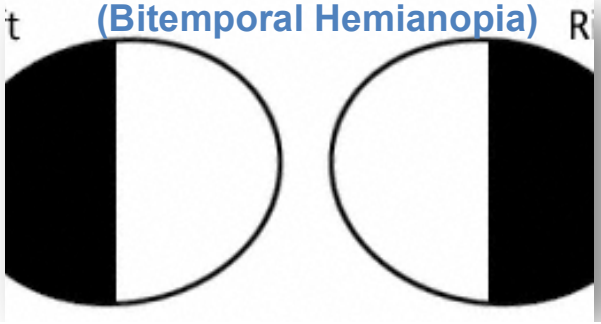
- The 12 cranial nerves provide us with a large part of our information about the brain. Of these, the eye examination evaluates CN II, III, IV, V, VI, VII, VIII. **(7 cranial nerves)**

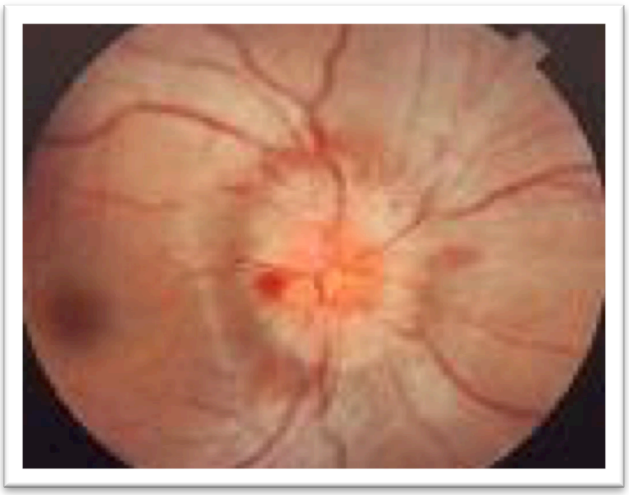
- In addition, it provides information about the autonomic pathways. (sympathetic /parasympathetic)
- The best known connection between the brain and the eye is **the optic nerve** (ON).
- The visual pathway, which extends from front to back across the brain can be studied easily and safely using **perimetry**. 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.
-

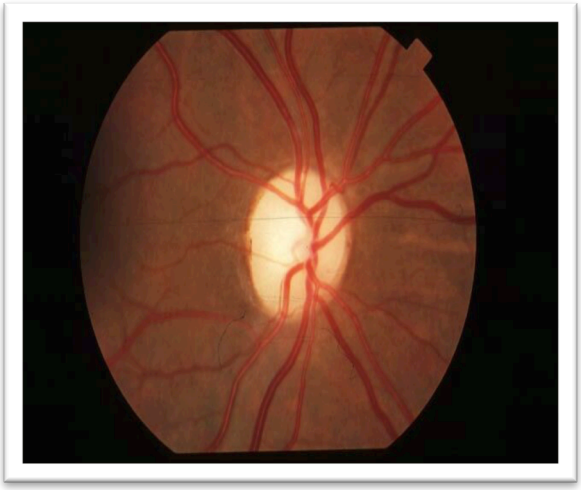
Pituitary Gland and Visual Field





ON has the diagnostically useful capability of swelling with ↑ ICP *(papilledema)*.

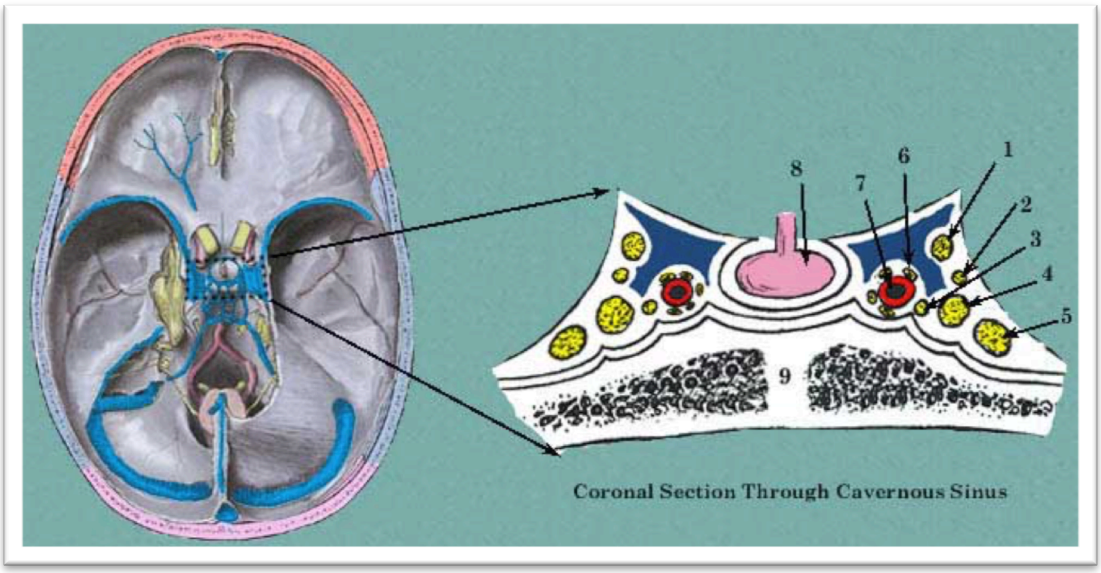
Or



Visibly pale *(optic atrophy)* when its nerve fibers damaged **at any point from Retina → LGB.**

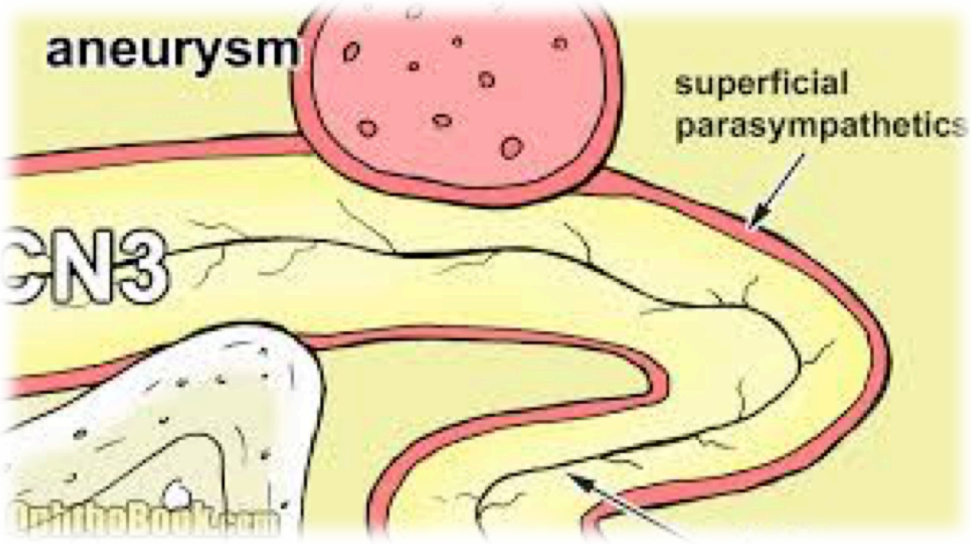
- In SAQ, *(short answer question exam)* "Disc edema" is a better answer than "papilledema" which is more specific to ↑IOP.

- 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.
- **CN VI** involved in **mastoid infection**. (petrous ridge)
- Parotid gland, Inner ear disease → CN VII.

- Nystagmus → CN VIII.
- **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)*

- **How do we know if CN IV is involved in addition to CN III?**
  1. Patient won't be able to look down. (damaged CN III)
  2. Eyes will NOT intort. (damaged CN IV)

Focal brain lesions like:

- Vascular occlusions
- Hemorrhage
- Neoplasm

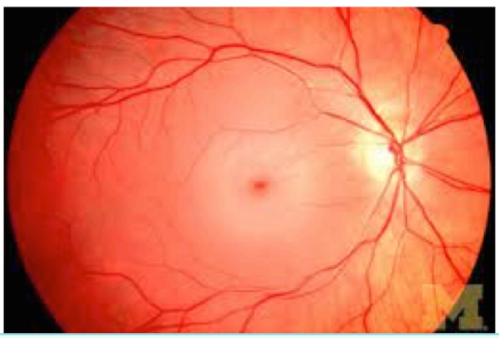
Diffuse brain lesions like:

- Infections
- Demyelinating disorders → nerve damage.

2. Vascular Connections

1

2

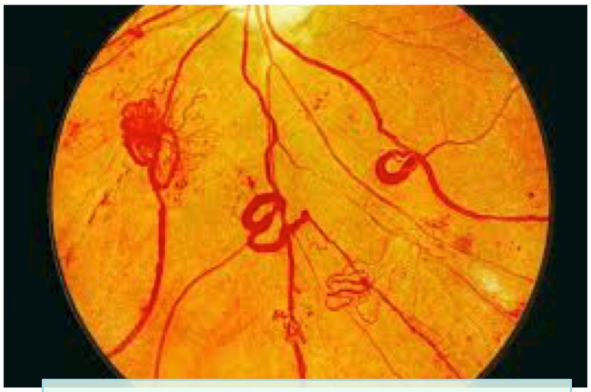


"Cherry Red Spot" from central retinal artery occlusion

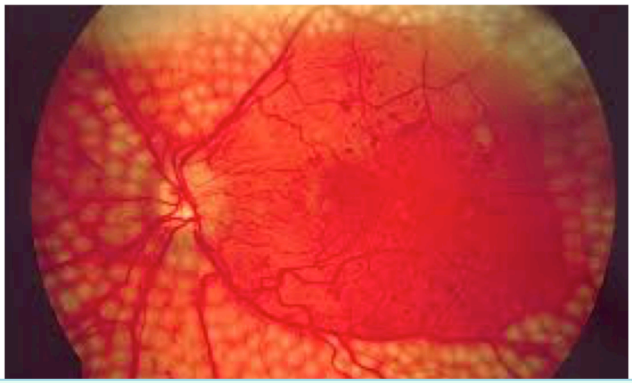
- Venous flow disorder:
  - ➔ Cavernous sinus thrombosis. **(1)**
  - ➔ Carotid – cavernous fistula (orbital congestion**, 2**)

- Arterial emboli can reach the retina from carotid artery, heart valves, sub-acute endocarditis, and/or traumatic bone fractures.
- Specific disease of the vessels like: PAN, temporal arteritis, HTN.
- **Temporal Arteritis (Giant Cell Arteritis)**
  - ➔ Best initial investigation is ESR, followed by C-reactive protein, then biopsy. *(a negative biopsy doesn't rule the dx out due to the focal and segmental nature of the infiltrates)*

- **When a patient complains of any changes in vision, rule out DM first!**
- Hematological disorders of all types can manifest in the fundus.
- Almost all metabolic disorders can affect the eye:
  - ➔ **DM**: Diabetic Retinopathy, cataract, Refractive Errors, ophthalmoplegia.
  - ➔ **Hypoparathyroidism → Cataract**
  - ➔ Wilson's disease → Kayser-Fleischer corneal ring (a brownish-yellow ring around the cornea of the eye)



Dilated tortuous retinal vessels



Proliferative diabetic retinopathy (PDR) treated with pan-retinal laser photocoagulation → common SAQ question!

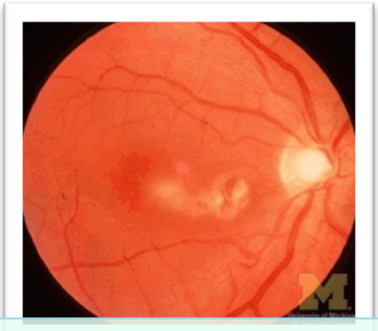
3. Thyroid eye disease:

Exophthalmos, lid retraction.

- ✓ *Also known as infiltrative ophthalmopathy, Graves' ophthalmopathy, or thyroid eye disease (TED).*
- ✓ *Since they have ↑IOP, we perform visual field exam.*

4. Infections:

(Syphilis, Toxoplasmosis, Rubella)



Chorioretinal scar (a result of an old infection or injury) *we can't diagnose it by picture, but by investigations*

5. Allergy:

Vernal keratoconjunctivitis (VKC) or Spring catarrh

- **Commonest eye allergy in KSA, (aka الرمد الربيعي)**

- **Treat with steroids and antihistamines.**
- **Can cause blindness. Why? Chronic use of topical steroids →** Persistent ↑IOP (steroid-induced glaucoma)

6. Mucocutaneous disorders:

SJS, pemphigus.

7. Elastic tissue:

(Pseudoxanthoma elasticum)

8. Chromosomal abnormalities:

Trisomy: 13,15, 21.

9. The eye is a delicate indicator of poisoning:

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

Coma + Pinpoint pupil = Morphine overdose or Pontine hemorrhage.
How to differentiate? Hyperpyrexia is associated with the later.

- 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.

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

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