Orientation, History taking & Examination

Dr. Abdullah Al-Mousa
Dept. of Ophthalmology
College Of Medicine
King Saud University

Orientation

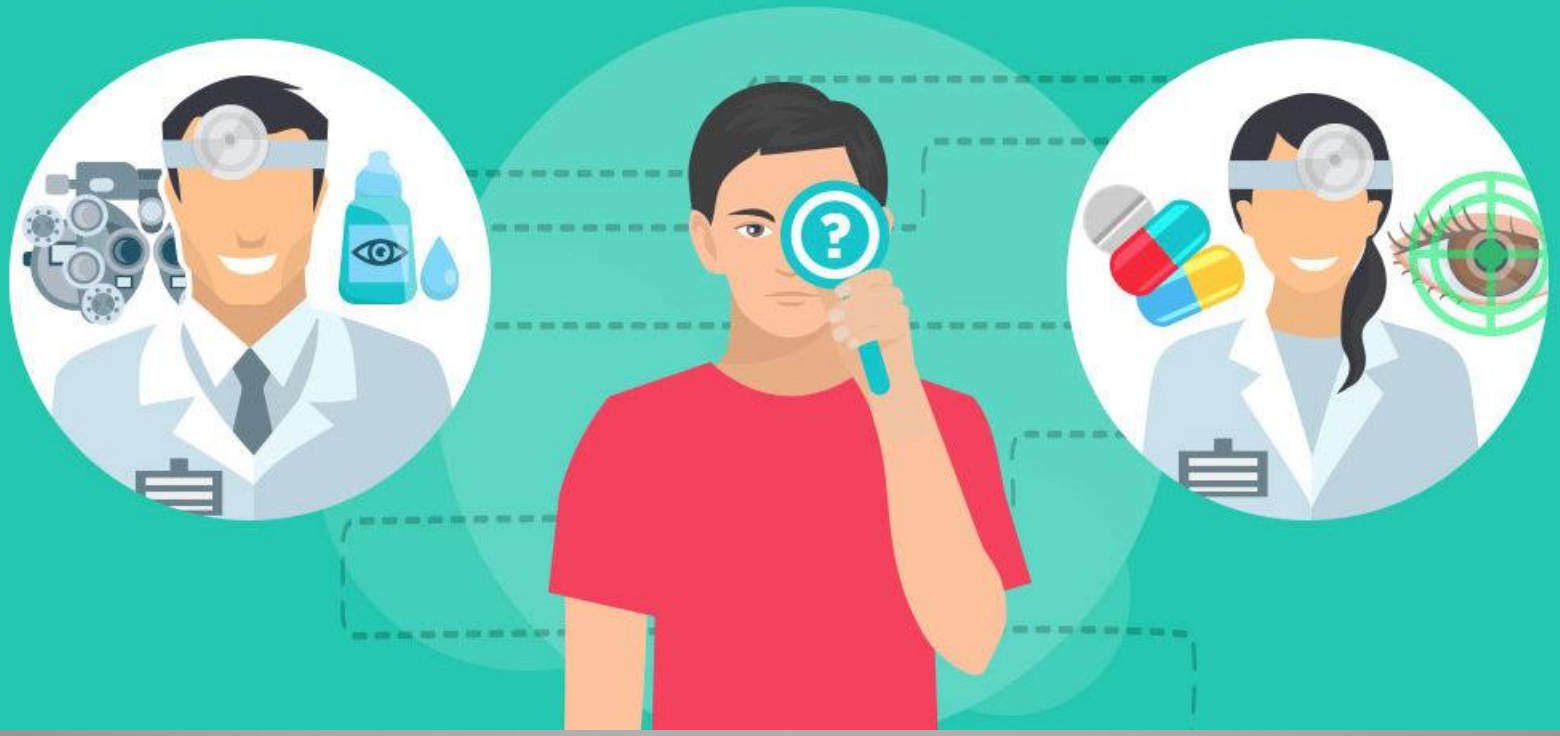
OPT 432 Course

قال الله تعالى:

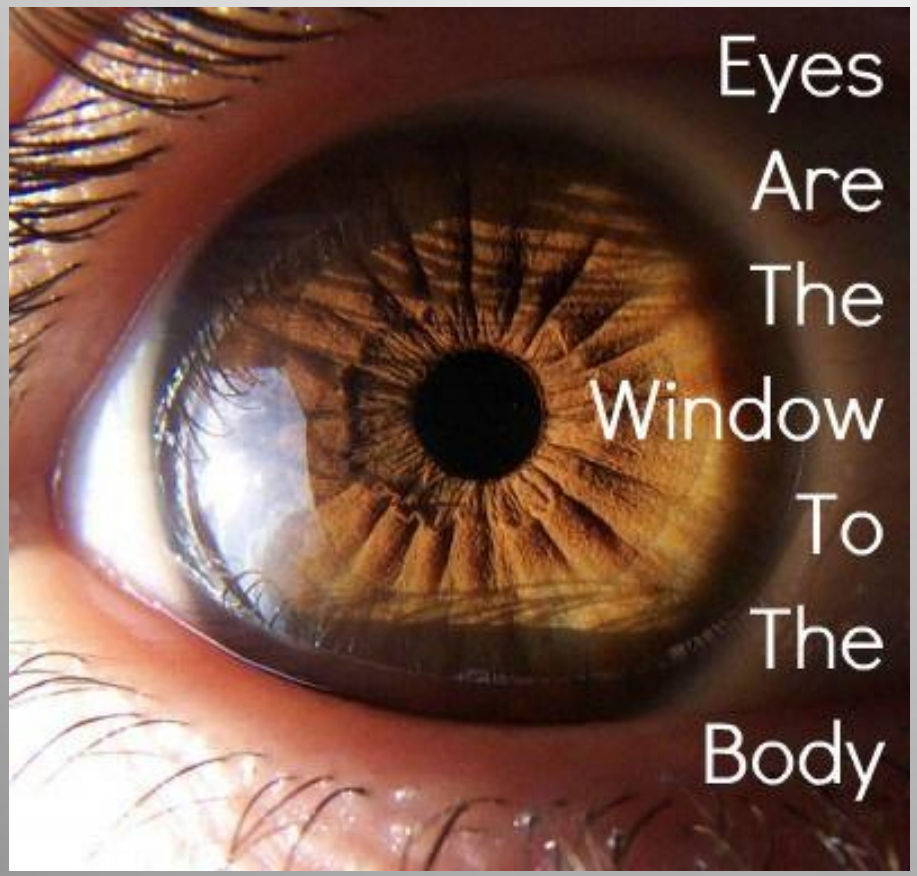
{قُلْ هُوَ الَّذِي أَنشَأَكُمْ وَجَعَلَ لَكُمُ السَّمْعَ وَالْأَبْصَارَ وَالْأَفْئِدَةَ قَلِيلاً مَّا تَشْكُرُونَ} [الملك:23]

{وَاللَّهُ أَخْرَجَكُمْ مِنْ بُطُونِ أُمَّهَاتِكُمْ لا تَعْلَمُونَ شَيْئاً وَجَعَلَ لَكُمُ السَّمْعَ وَالْأَبْصَارَ وَالْأَفْئِدَةَ} [النحل:78].

OPTOMETRIST vs OPHTHALMOLOGIST

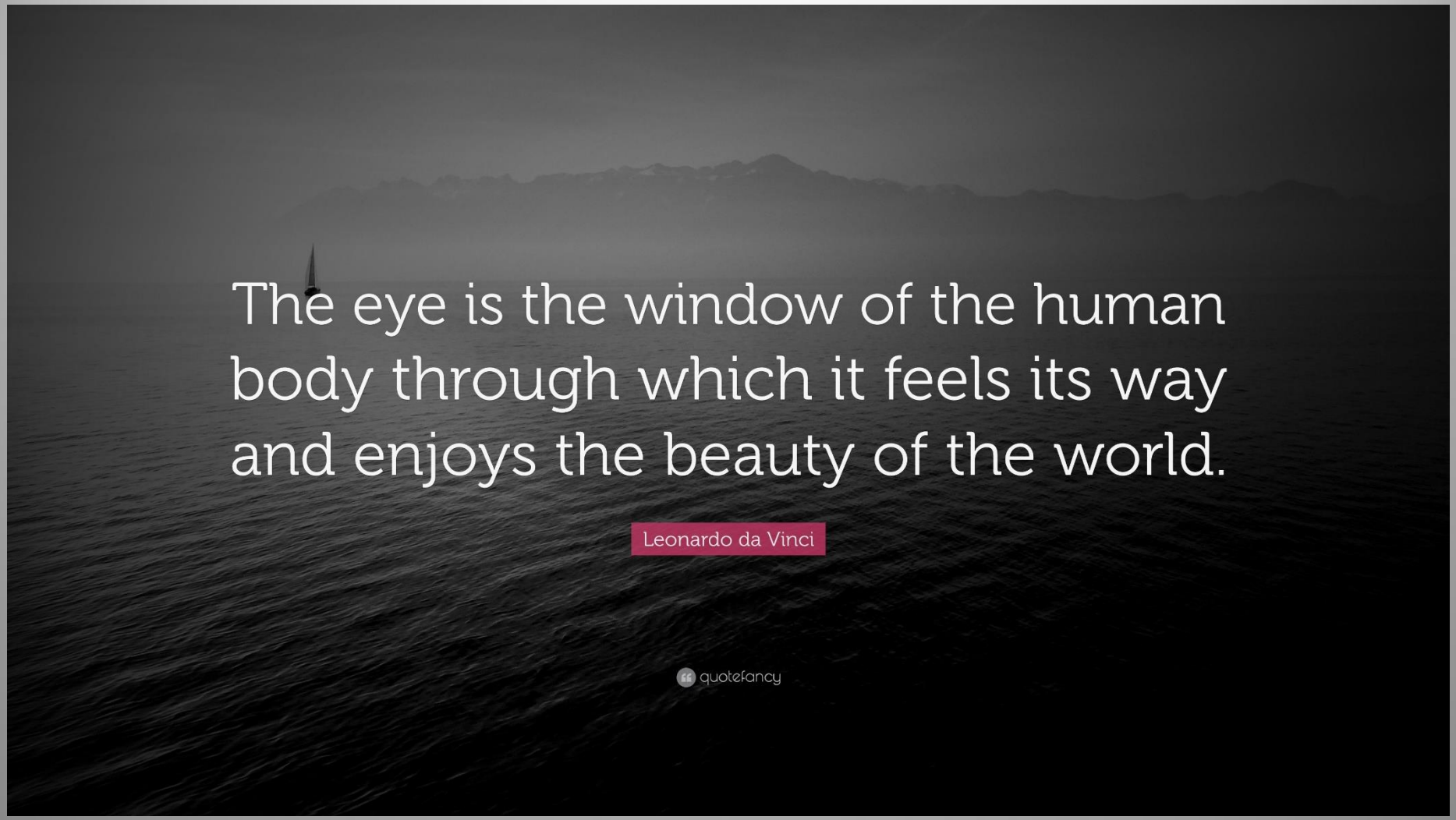


Ophthalmologist vs Optometrist



Why should you be interested in the eye?

Internet is a window to the world


The eye is the window of the human body through which it feels its way and enjoys the beauty of the world.
Leonardo da Vinci
quotefancy

Objectives of this course

1. To know the basic ophthalmic anatomy and physiology.

2. To know how to assess and manage common ophthalmic diseases.

Objectives of this course

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.

Components of the course

- Lectures
- Clinical sessions
- Outpatient clinics
- Emergency Room

Marks distribution

	Attendance of lectures	Clinical skills assessment	Clinic log book	Final MCQ Exam	Final SAQ Exam
Marks	10	10	10	30	40

Lectures

1. History taking and ophthalmic exam
2. Basic anatomy and physiology of the Eye
3. Lid, Lacrimal, and Orbit Disorders
4. Ocular emergencies and red eye
5. Strabismus, Amblyopia and Leukocoria
6. Acute Visual Loss

Lectures

7. Chronic Visual Loss
8. Refractive Errors
9. Ocular manifestations of systemic diseases
10. Neuro-ophthalmology
11. Ocular Pharmacology and Toxicology

Clinical skill session/Assessment

1. Visual acuity, Tonometry, Ophthalmoscopy & external exam [5 marks]

2. Visual field, Pupil Examination, Ocular motility & alignment [5 marks]

Clinical skill session/Assessment

To minimize contact and to reduce time in the hospital:

- Students will be required to prepare for the clinical session by:
  - Reading the provided handouts
  - Watching the video links

Will be posted on blackboard

Clinical skill session/Assessment

- The tutor will discuss the clinical skills with the group using manikin heads to practice examination skills.
- During the session he/she will assess each student and give marks on his performance.

[5 marks per session]

Clinical skill session/Assessment

Duration of **GROUP 2:** 13.09.2020 - 05.11.2020

Week (3)		GROUP 2		
DAY	**DATE**	**TIME**	**TITLE**	**LECTURER**
Sun	27.09.2020	08:00 am to 10:00 am	VA-Ophthalmoscopy, Tonometry, External Exam (**A + B**)	Dr. Saeed Al Wadani
		10:00 am to 12:00 am	Pupil, VF, Motility Alignment (**A + B**)	Dr. Majed Al Kharashi
Wed	30.09.2020	08:00 am to 10:00 am	Pupil, VF, Motility Alignment (**C + D**)	Dr. Majed Al Obailan
		10:00 am to 12:00 am	VA-Ophthalmoscopy, Tonometry, External Exam (**C + D**)	Dr. Abdullah Al Kharashi

Questions?

Recommended textbooks

1. Required Text(s)

a. Lecture notes in Ophthalmology (latest edition)

By: Bruce James (published by Blackwell Science)

b. Basic Ophthalmology (latest edition)

By: Cynthia A. Bradford

(published by American Academy of Ophthalmology)

c. EYE EMERGENCY MANUAL An Illustrated Guide (Second Edition)

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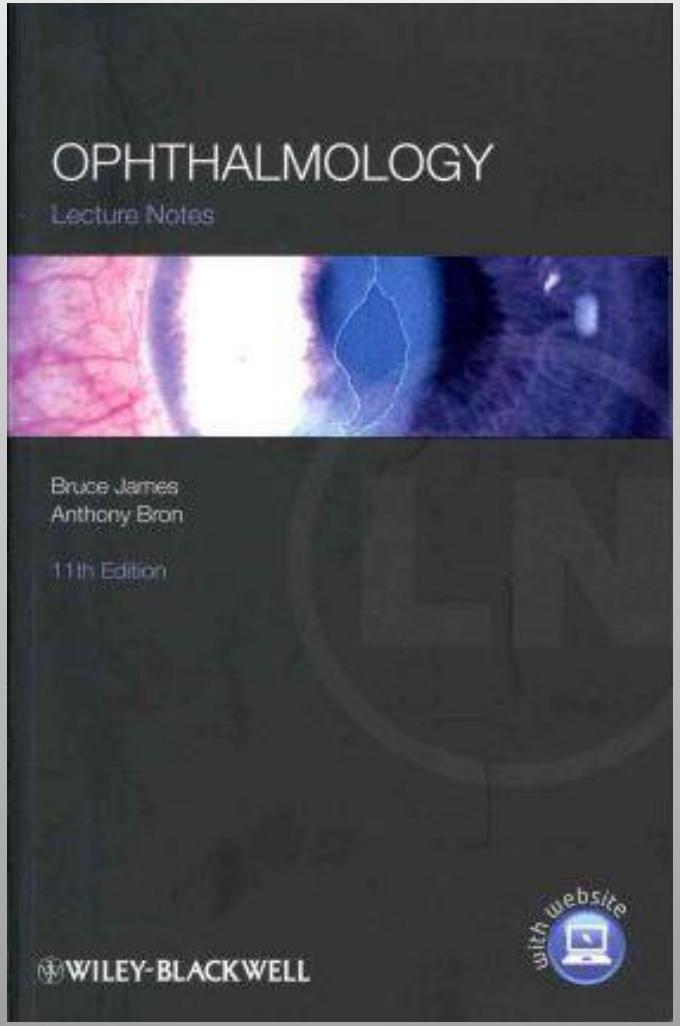
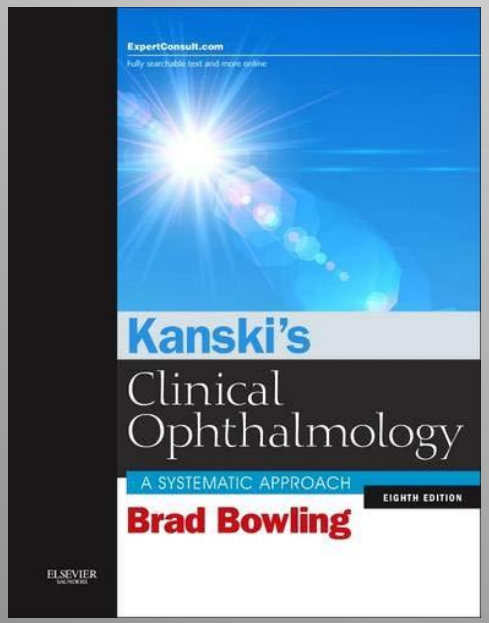
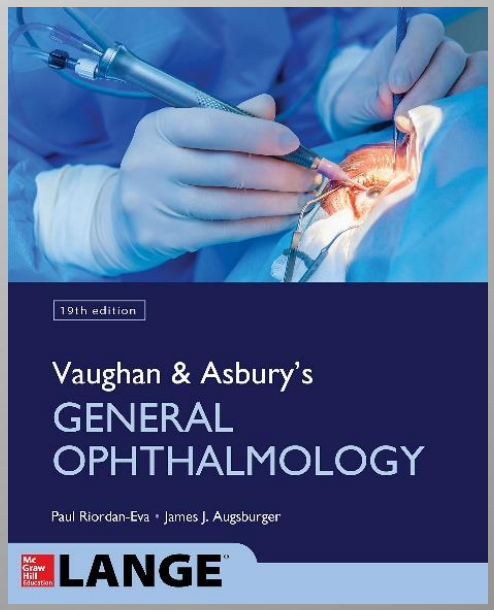


2. References

- 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)

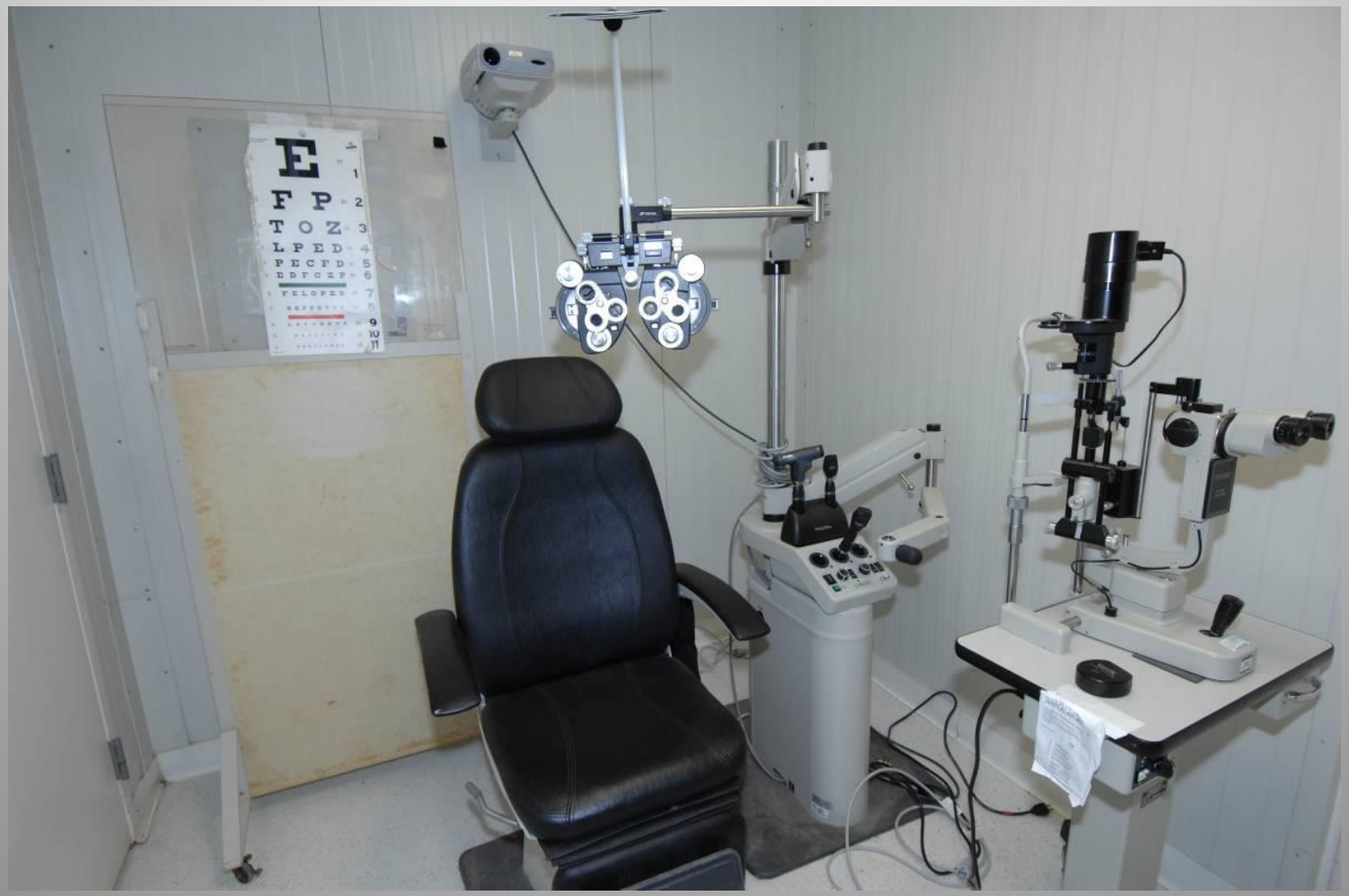




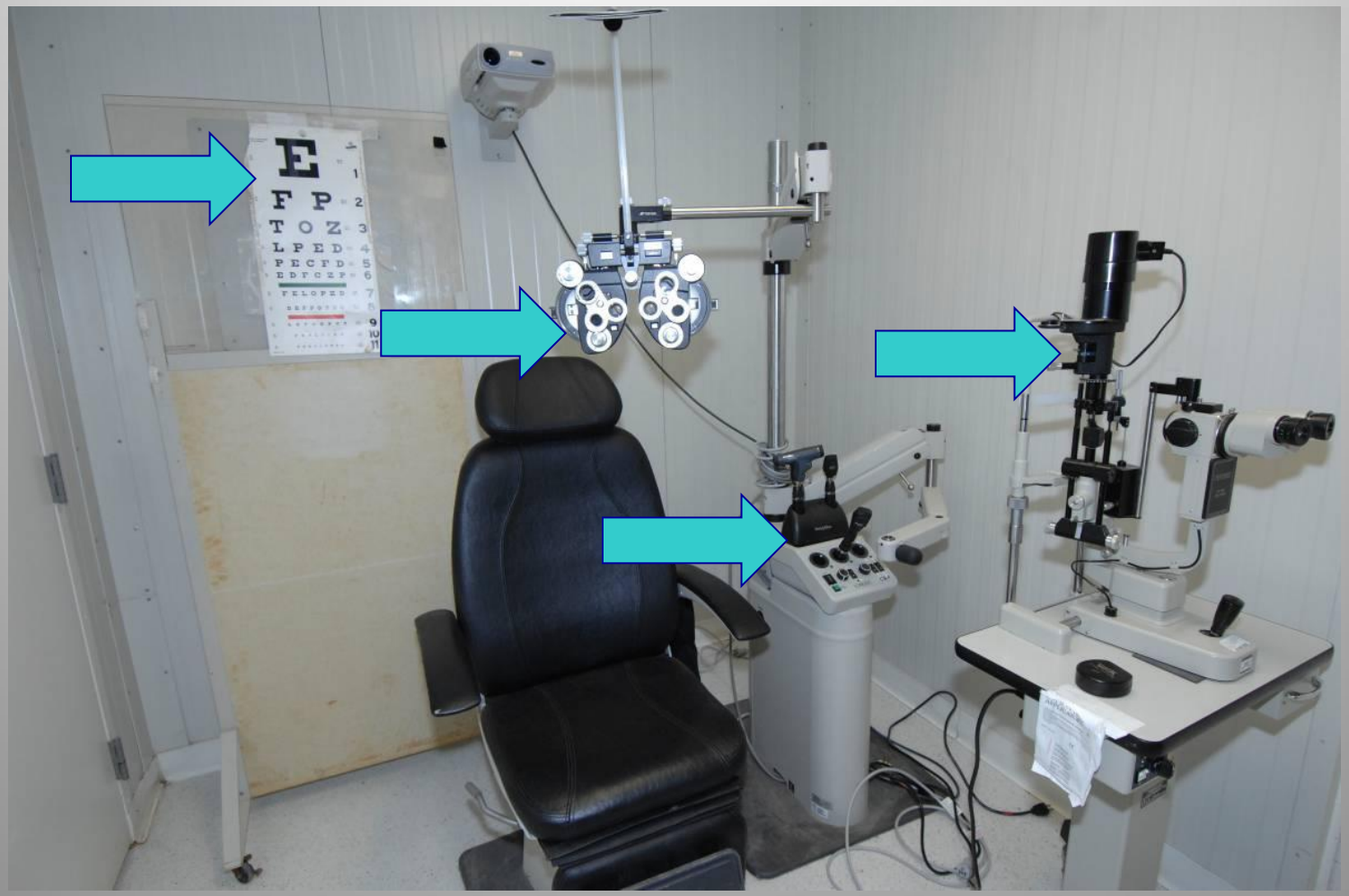
c. Electronic Materials & Web Sites

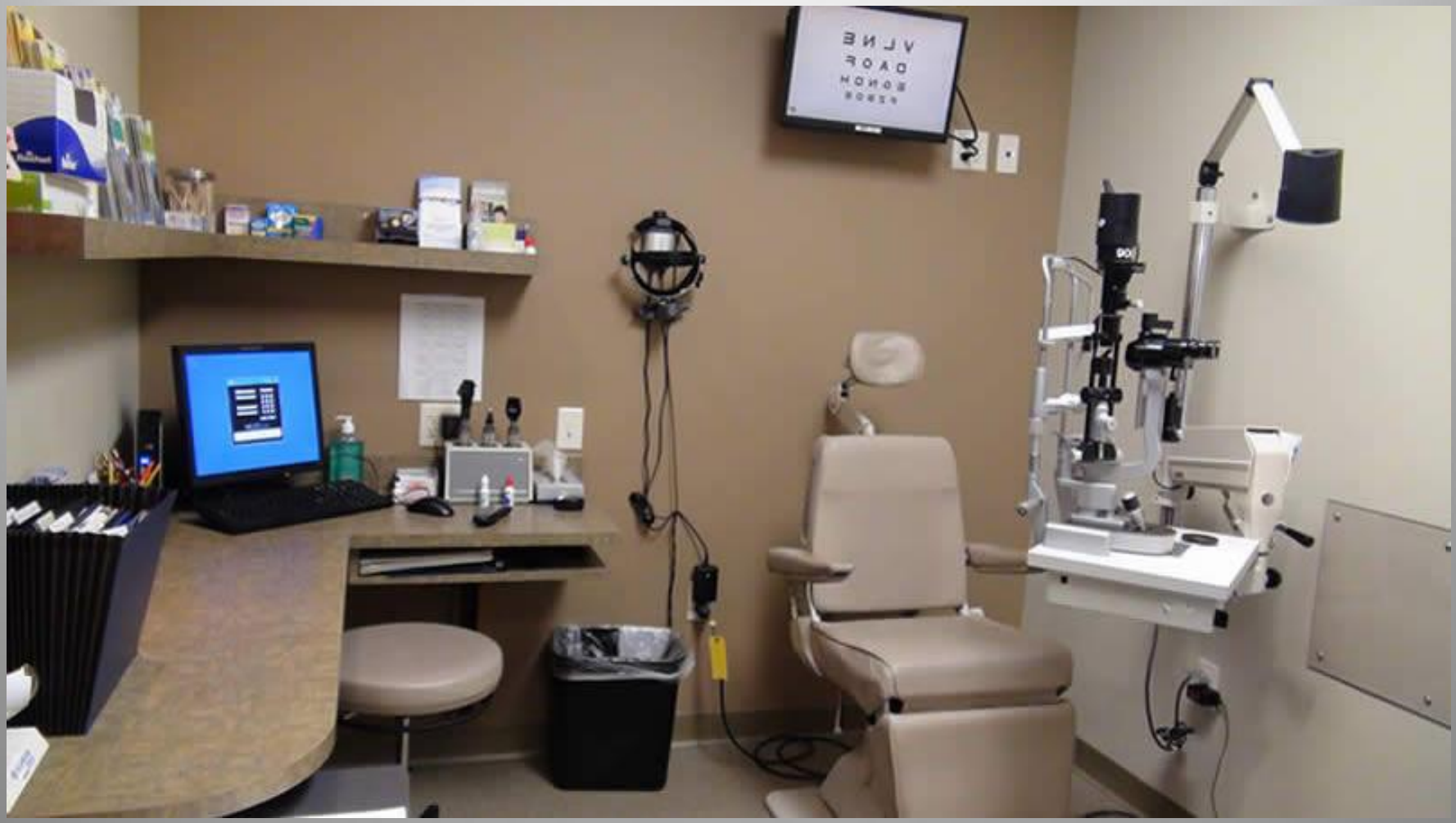
1. KSU electronic database /online Library
2. Lecture handouts (pdf)
3. PubMed
4. Medscape
5. The digital journal of ophthalmology (djo.harvard.edu)
6. Up to date.com
7. E medicine
8. Eyewiki.org
9. Ophtho-book [timroot.com]

Clinic



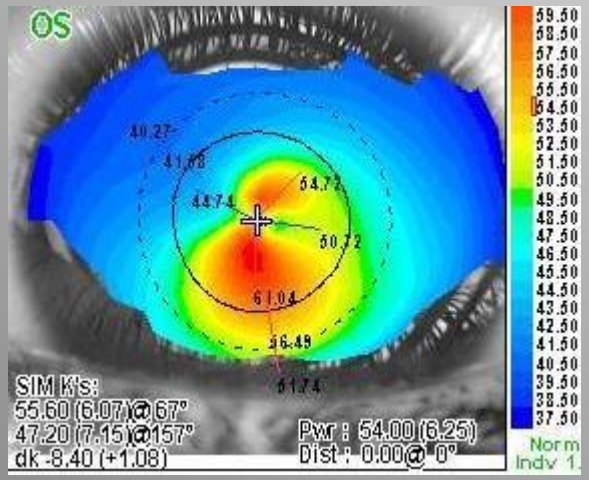
Basic eye clinic

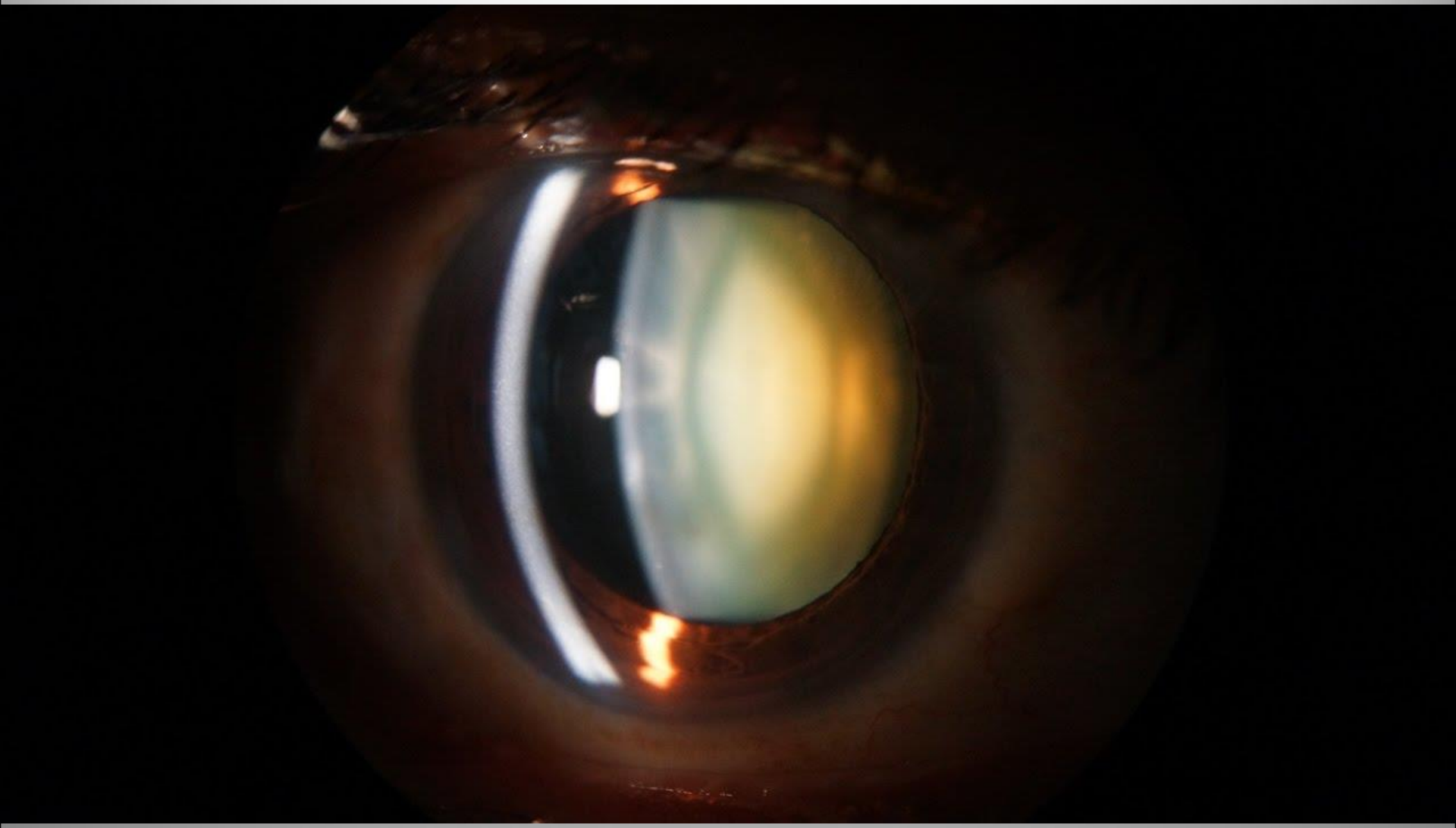




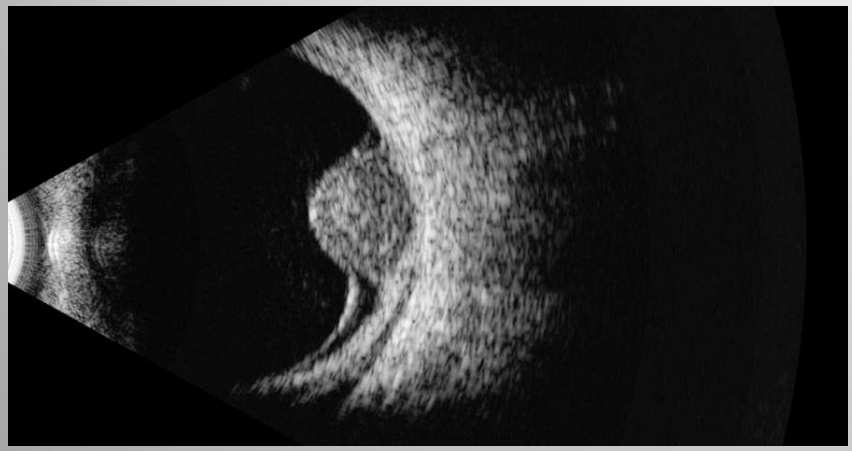
More advanced equipment

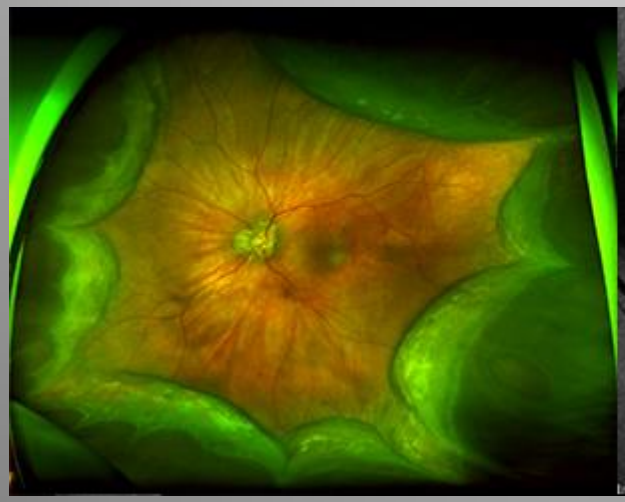
Ophthalmic imaging

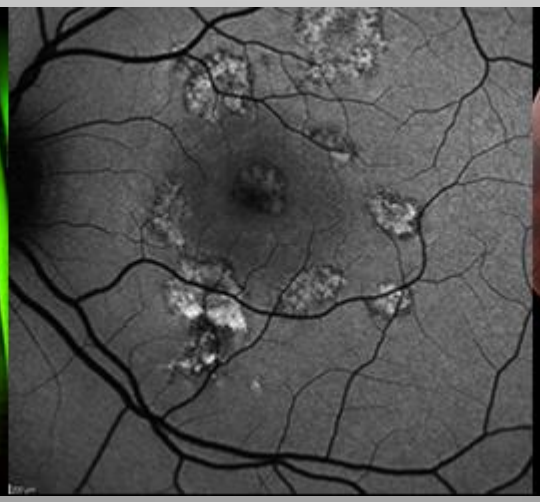


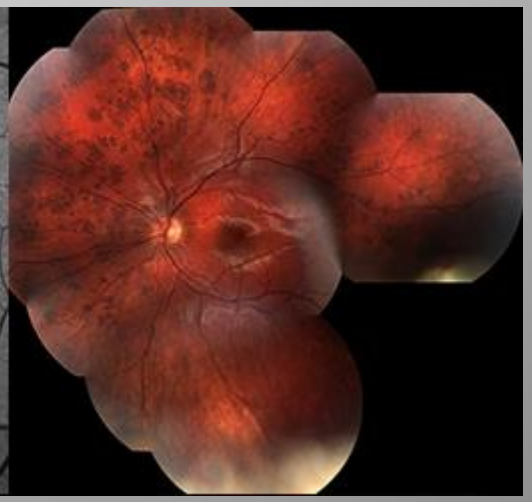


Ophthalmic imaging

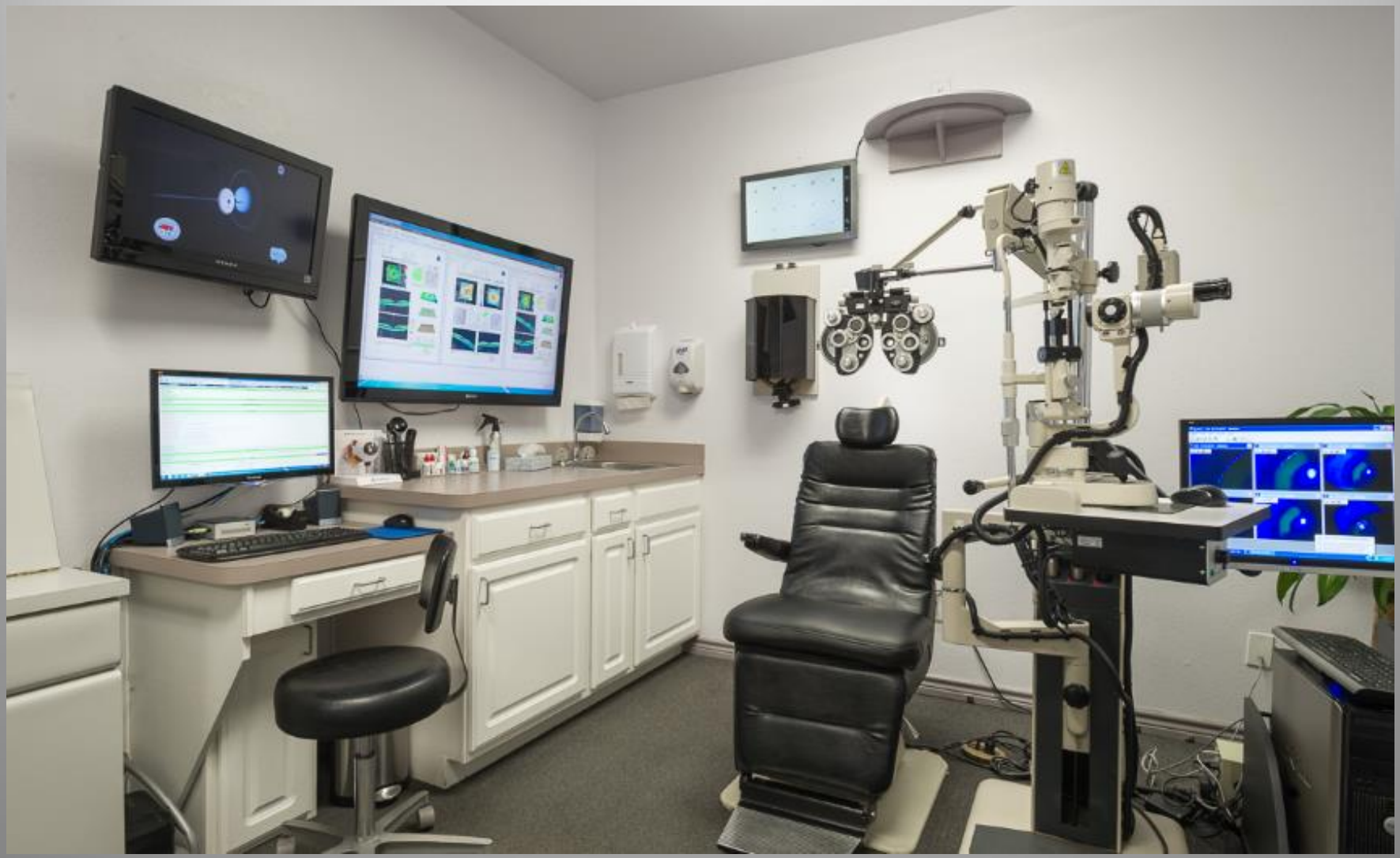








Modern eye clinic



Ophthalmology clinic student logbook

كلية الطب
College of Medicine

Case No. **of 5**

Date:

MRD No: **Age:** **Sex:**

Chief Complaint and HPI:

.....
.....
.....
.....

Diagnostic Features:

.....
.....
.....
.....

Diagnostic Test / Procedure used:

.....
.....
.....
.....

Clinical Impression:

.....
.....
.....

Management / Advice:

.....
.....
.....
.....

Learning objectives from the case:

.....
.....
.....

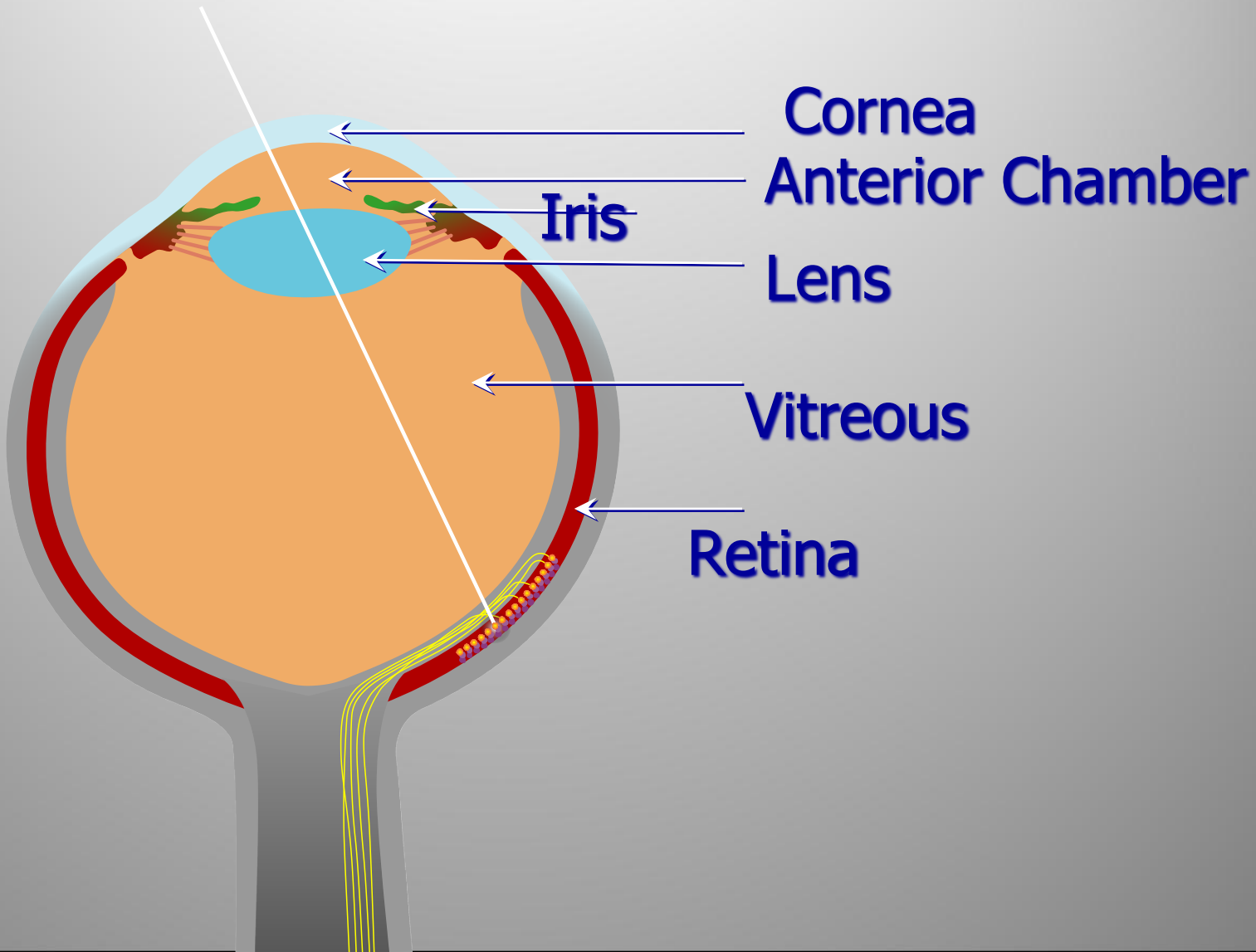
Consultant signature:

.....

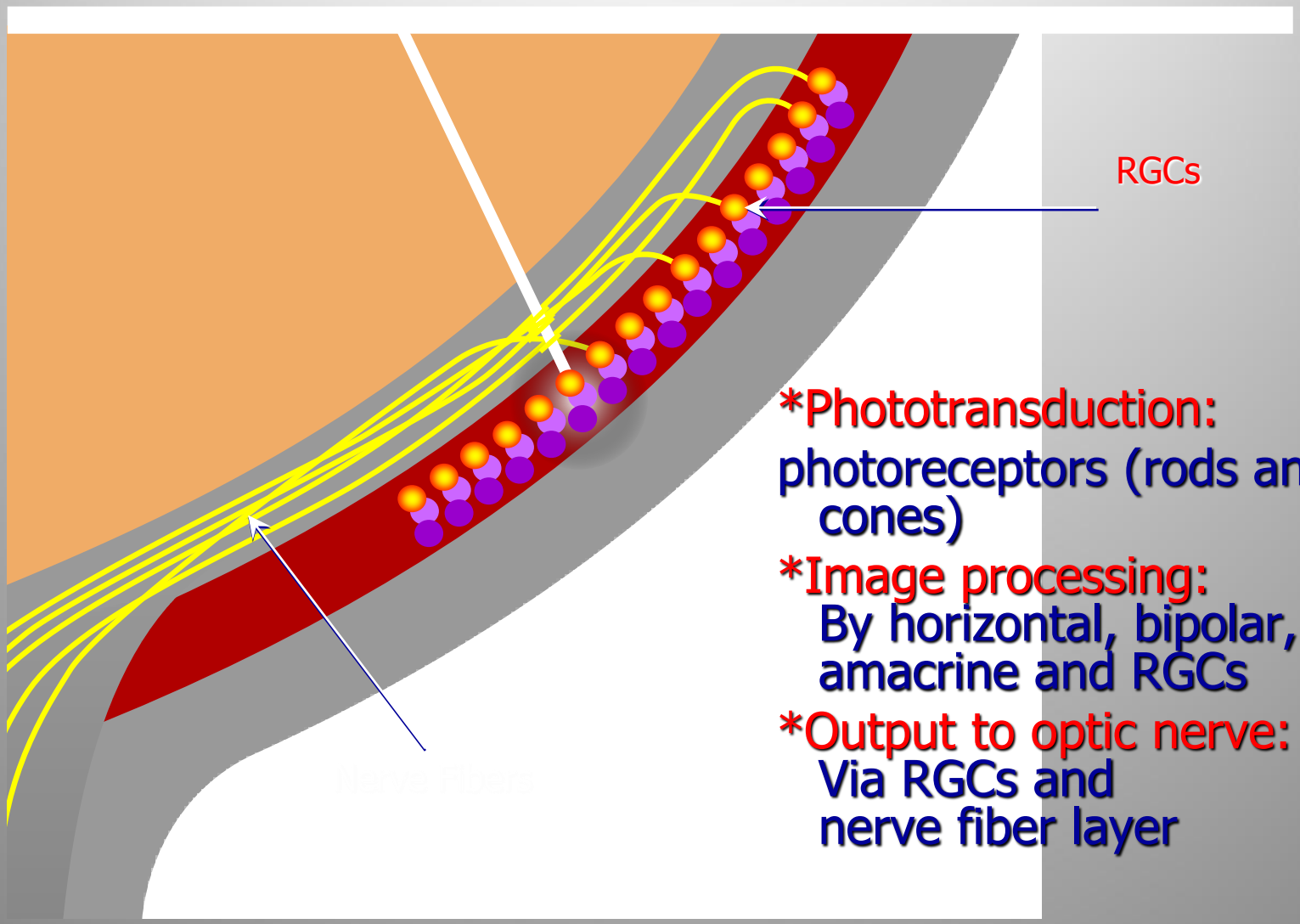
Questions?

The EYE

The Visual Pathway



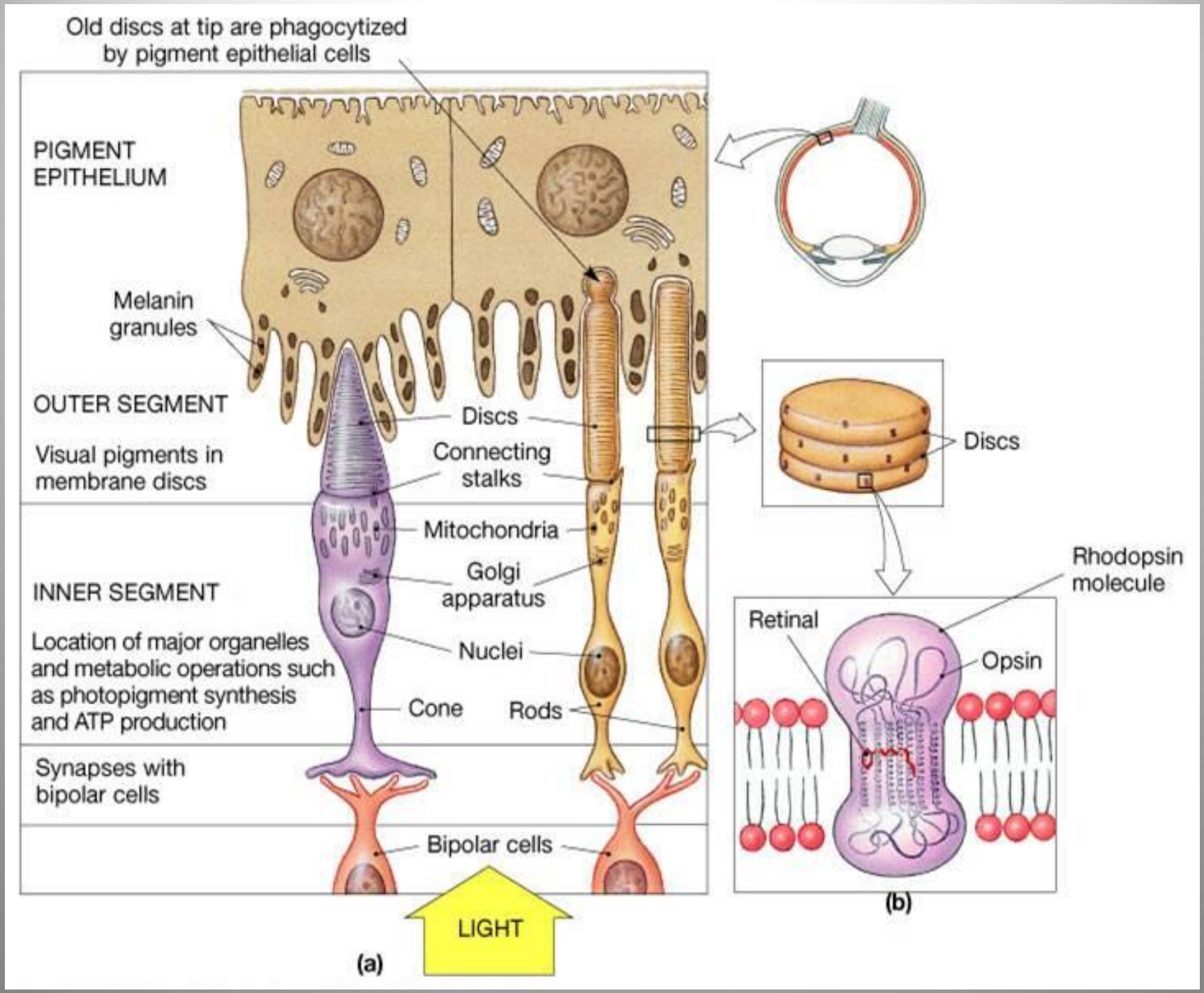
The Visual Pathway

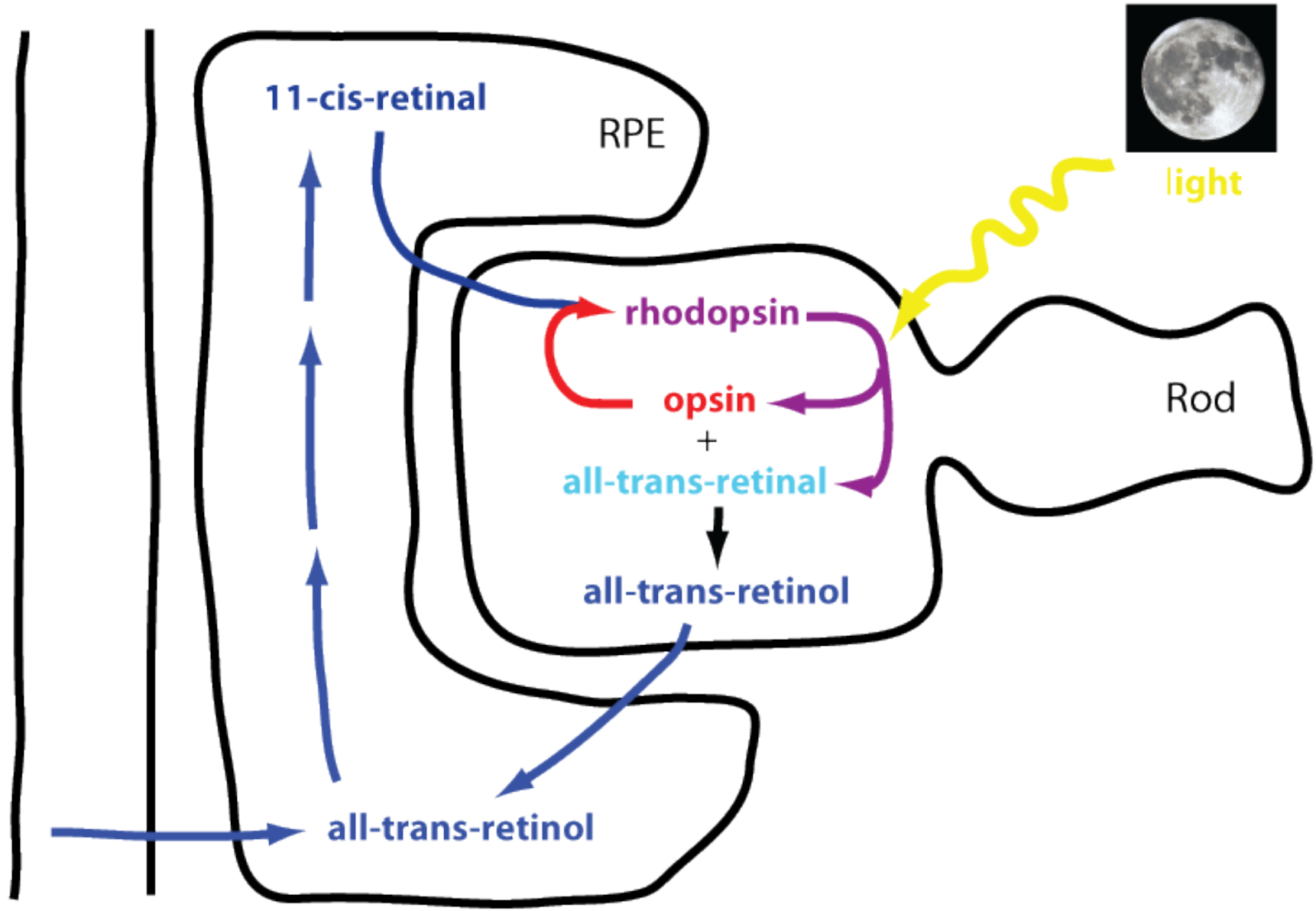


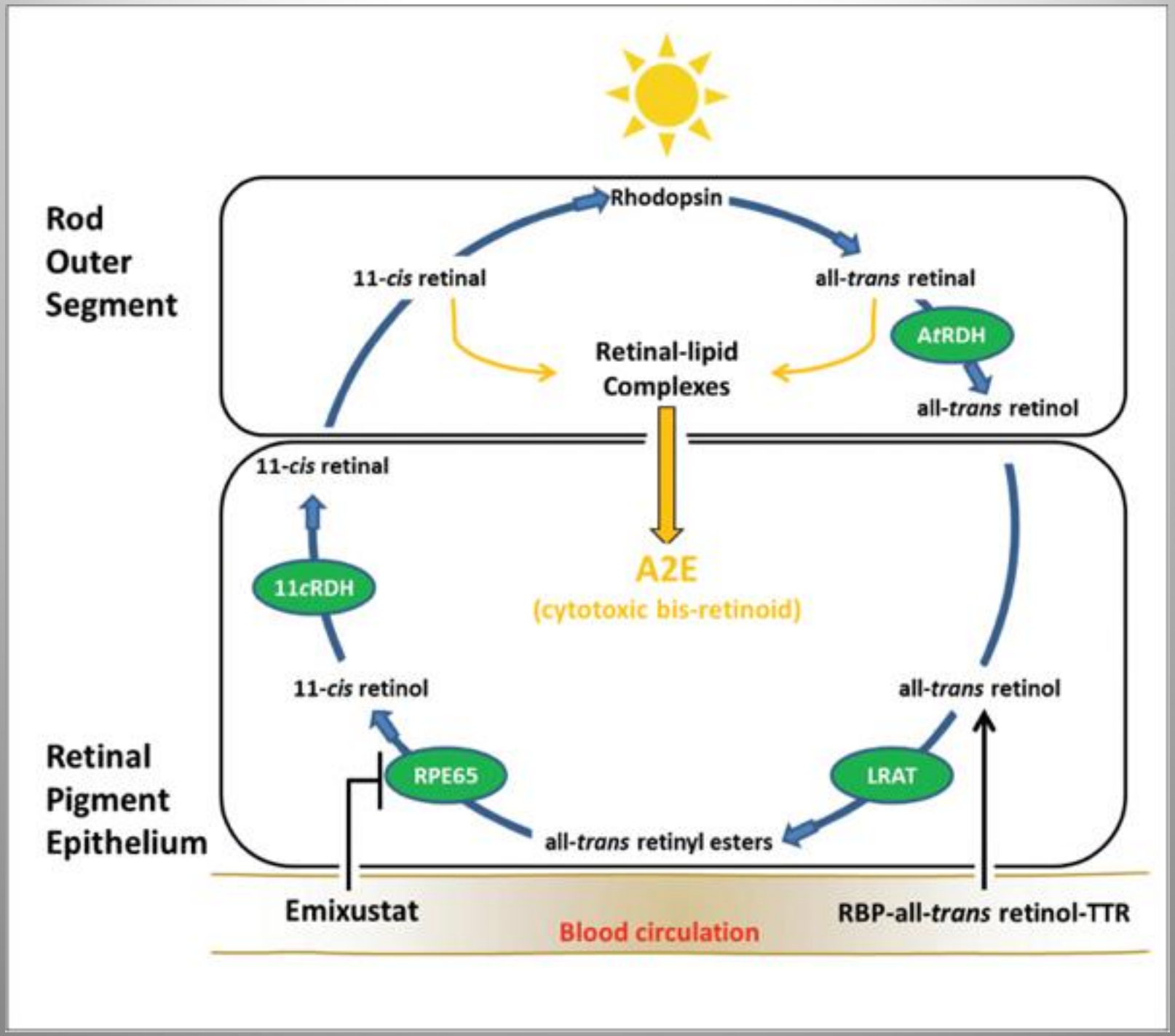
*Phototransduction:
photoreceptors (rods and cones)

*Image processing:
By horizontal, bipolar, amacrine and RGCs

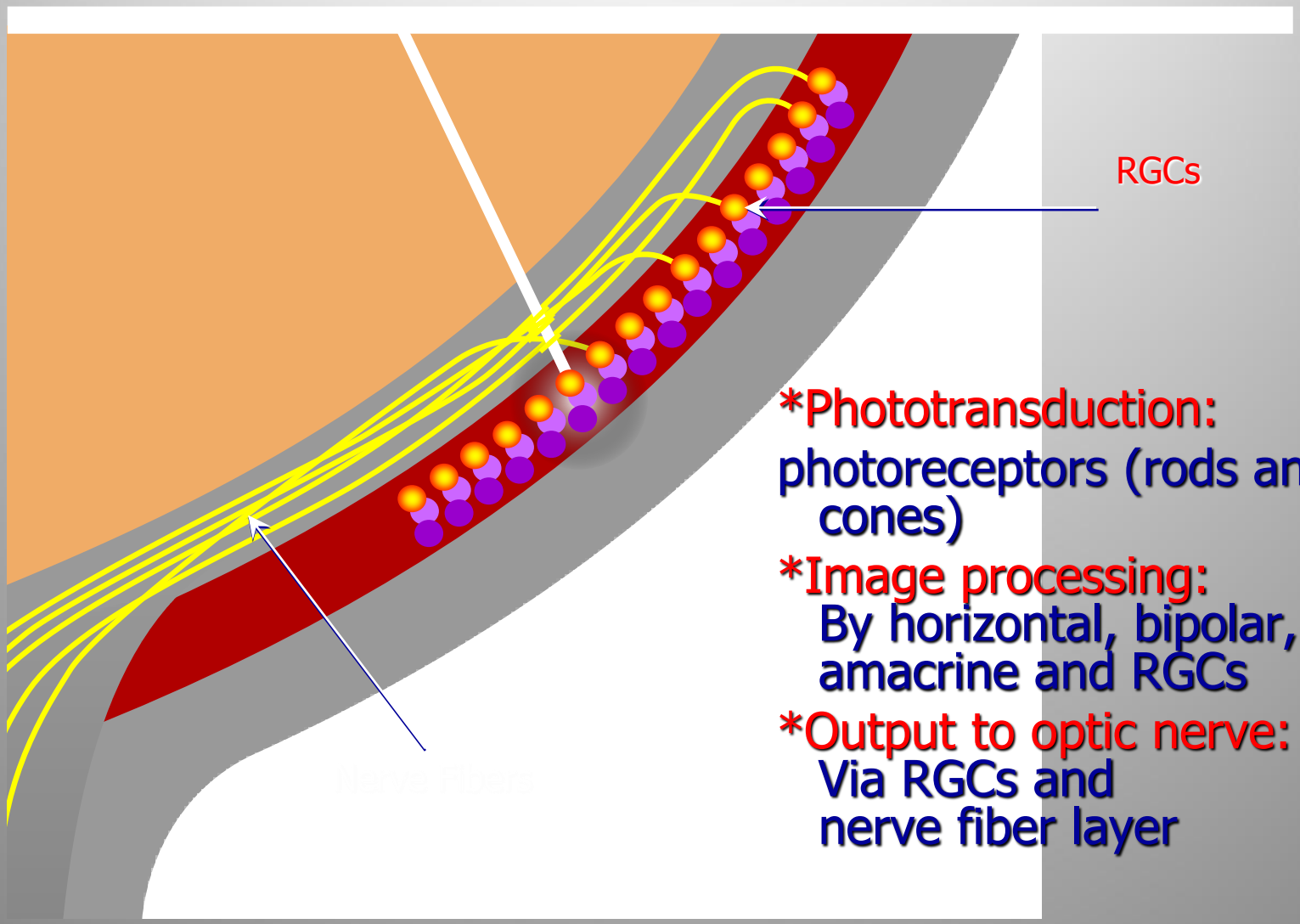
*Output to optic nerve:
Via RGCs and nerve fiber layer


Old discs at tip are phagocytized by pigment epithelial cells
PIGMENT EPITHELIUM
Melanin granules
OUTER SEGMENT
Visual pigments in membrane discs
Discs
Connecting stalks
Mitochondria
Golgi apparatus
INNER SEGMENT
Location of major organelles and metabolic operations such as photopigment synthesis and ATP production
Nuclei
Cone
Rods
Synapses with bipolar cells
Bipolar cells
LIGHT
(a)
Discs
Rhodopsin molecule
Retinal
Opsin
(b)


Capillary
11-cis-retinal
RPE
light
rhodopsin
opsin
+
all-trans-retinal
Rod
all-trans-retinol
all-trans-retinol


Rod
Outer
Segment
Rhodopsin
11-cis retinal
all-trans retinal
AtRDH
Retinal-lipid
Complexes
all-trans retinol
11-cis retinal
11cRDH
A2E
(cytotoxic bis-retinoid)
11-cis retinol
all-trans retinol
Retinal
Pigment
Epithelium
RPE65
LRAT
all-trans retinyl esters
Emixustat
Blood circulation
RBP-all-trans retinol-TTR

The Visual Pathway



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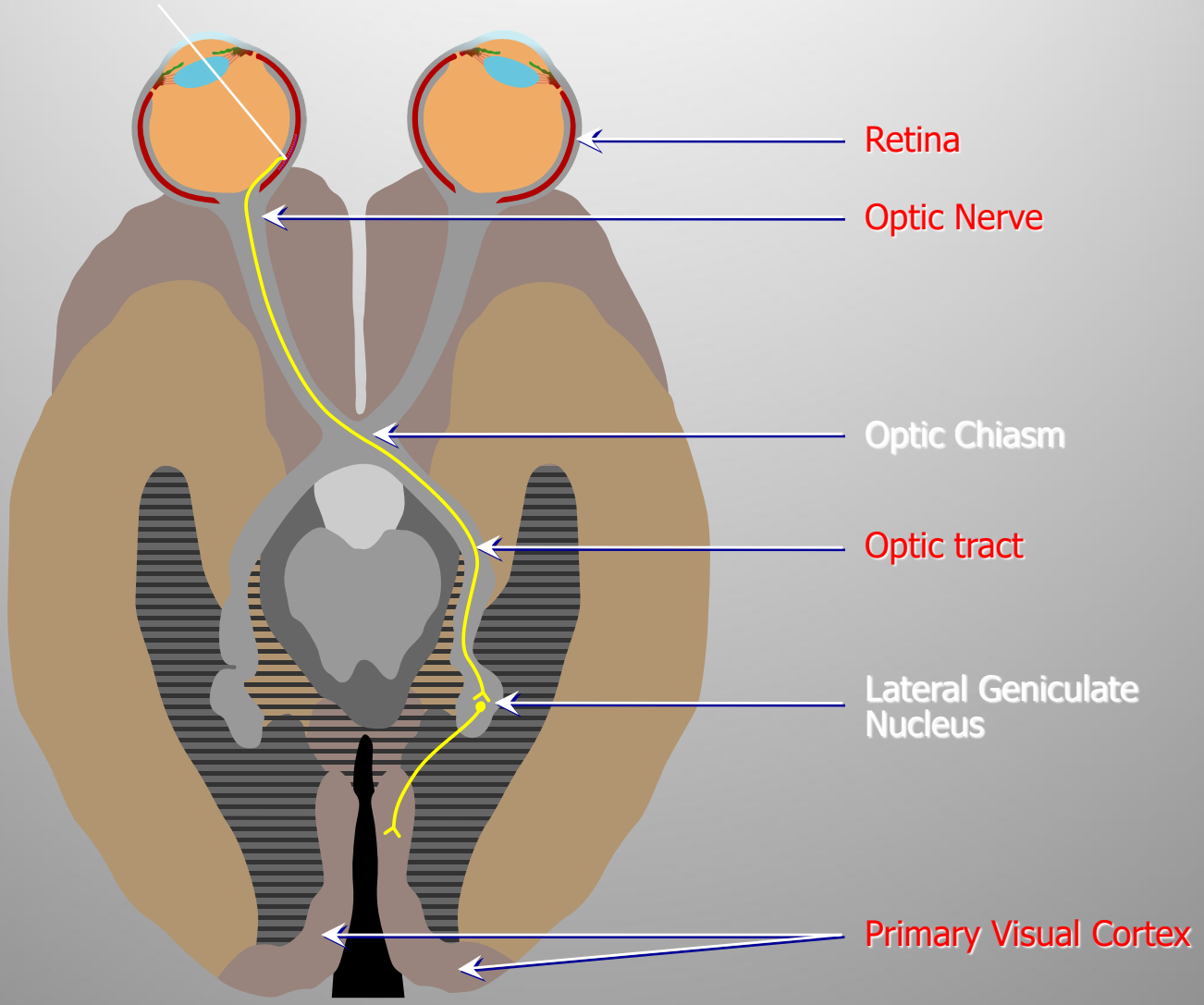


“The eye is the window to the body”

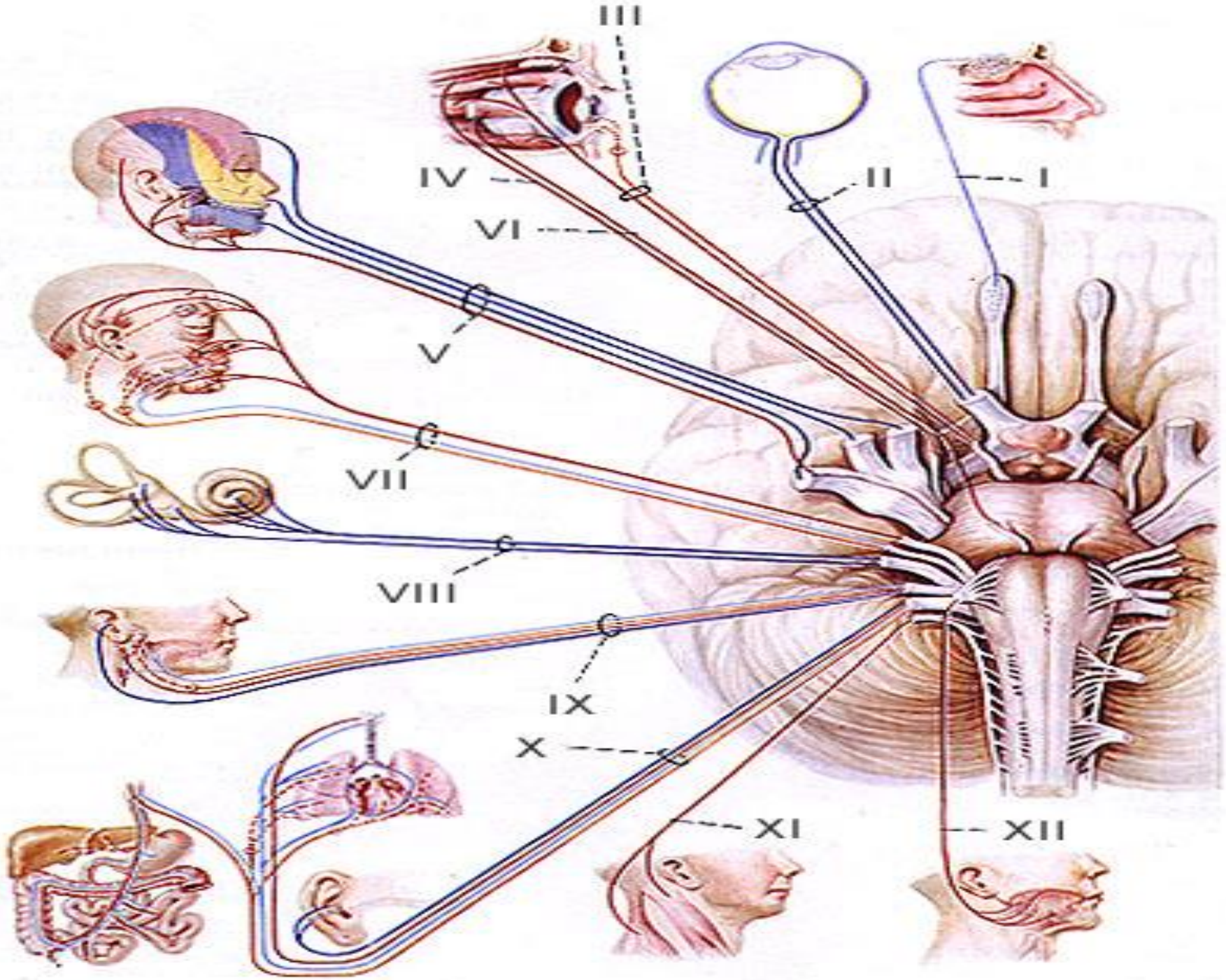
- The eye is so intimately connected with the rest of the body that it reveals enormous amount of general information.

- Eye is the only part of the body where blood vessels and central nervous system tissues can be viewed directly.

Examples

Neurological connections

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


III
IV
II
I
VI
V
VII
VIII
IX
X
XI
XII

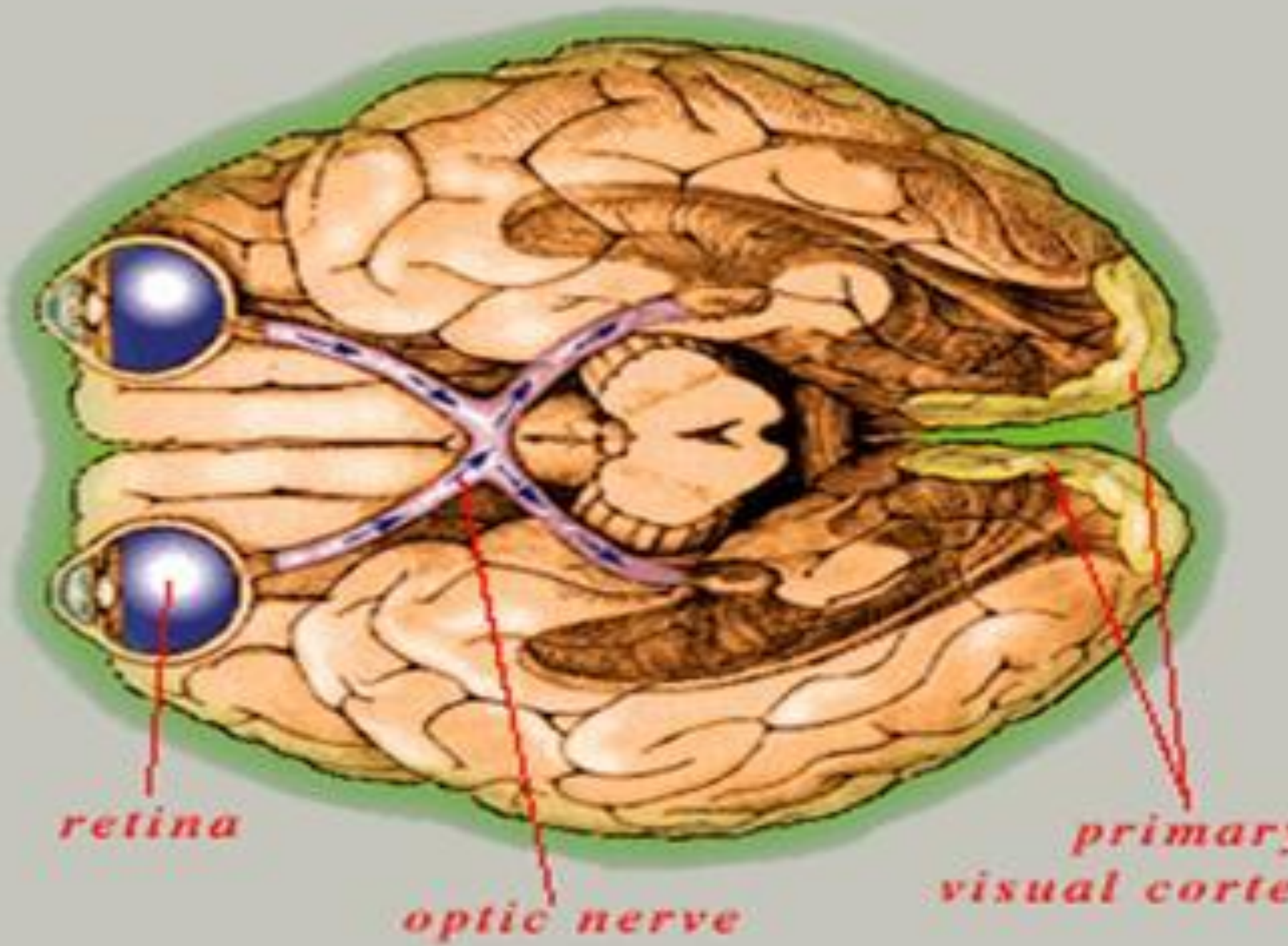
The retina and optic nerve

- Are physical extensions of the brain.

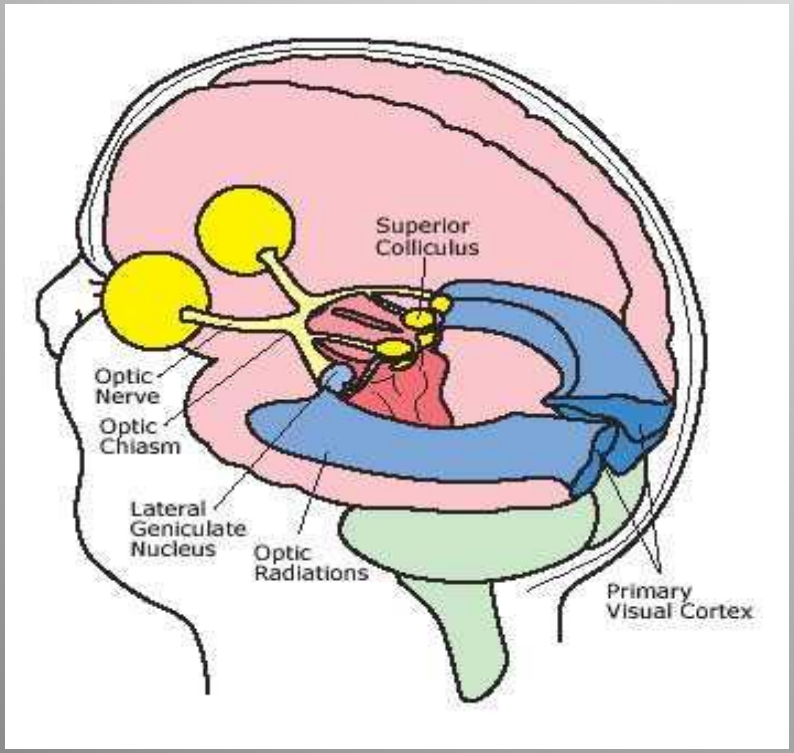
The visual pathways:

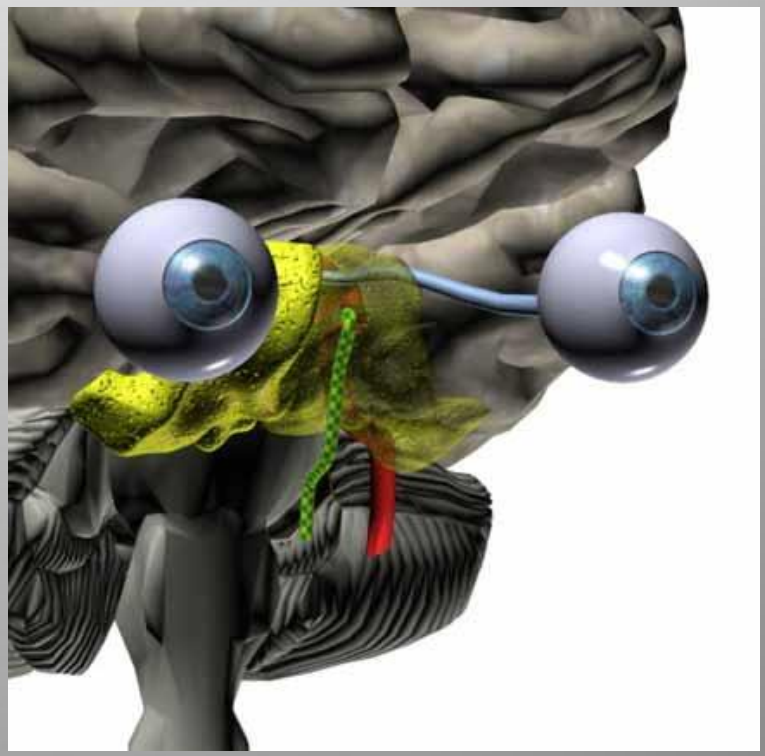
- Extends from front to back across the brain can be studied easily and safely using perimetry.

- Perimetry can differentiates accurately between lesions of the temporal, parietal, and occipital lobes.

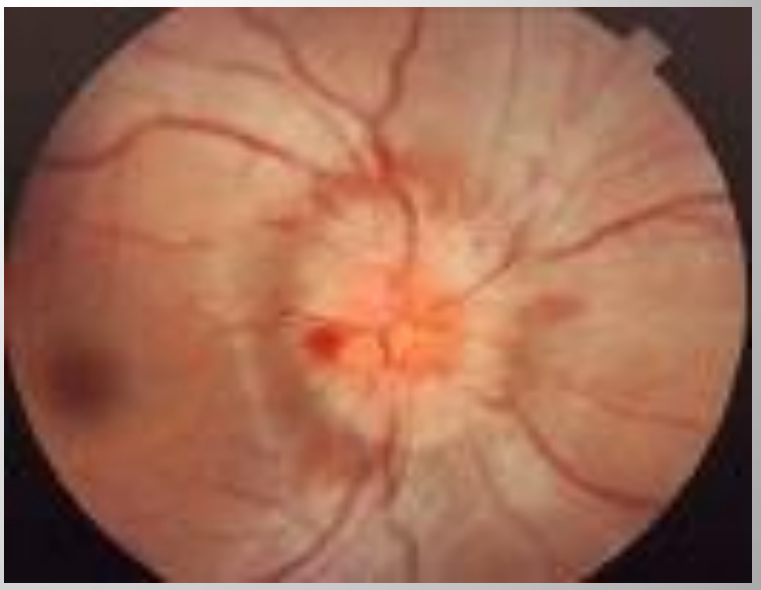

retina
optic nerve
primary
visual cortex

- **In addition,**
  - the ON has important clinical relationships to the pituitary gland, the middle ventricles, the venous sinuses and bony structures of base of the skull.



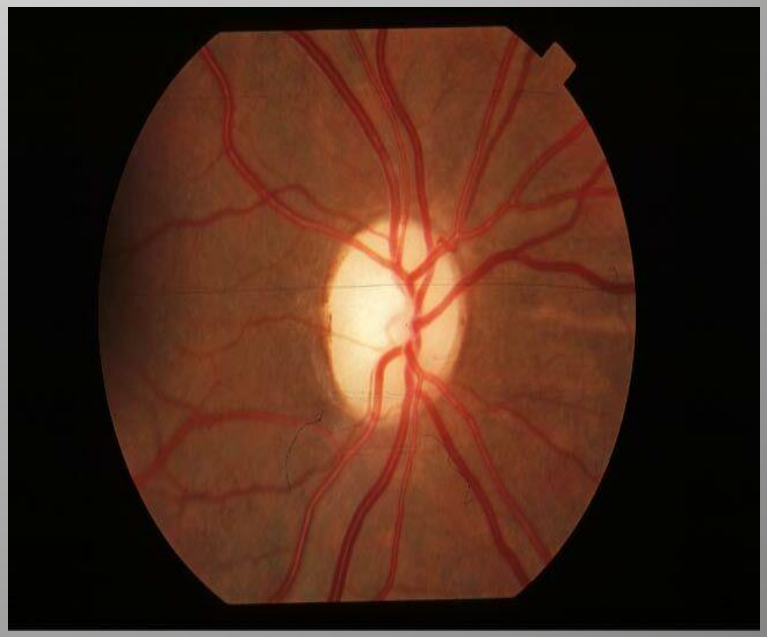


ON has the diagnostically useful capability of swelling with ↑ ICP (*papilledema*).



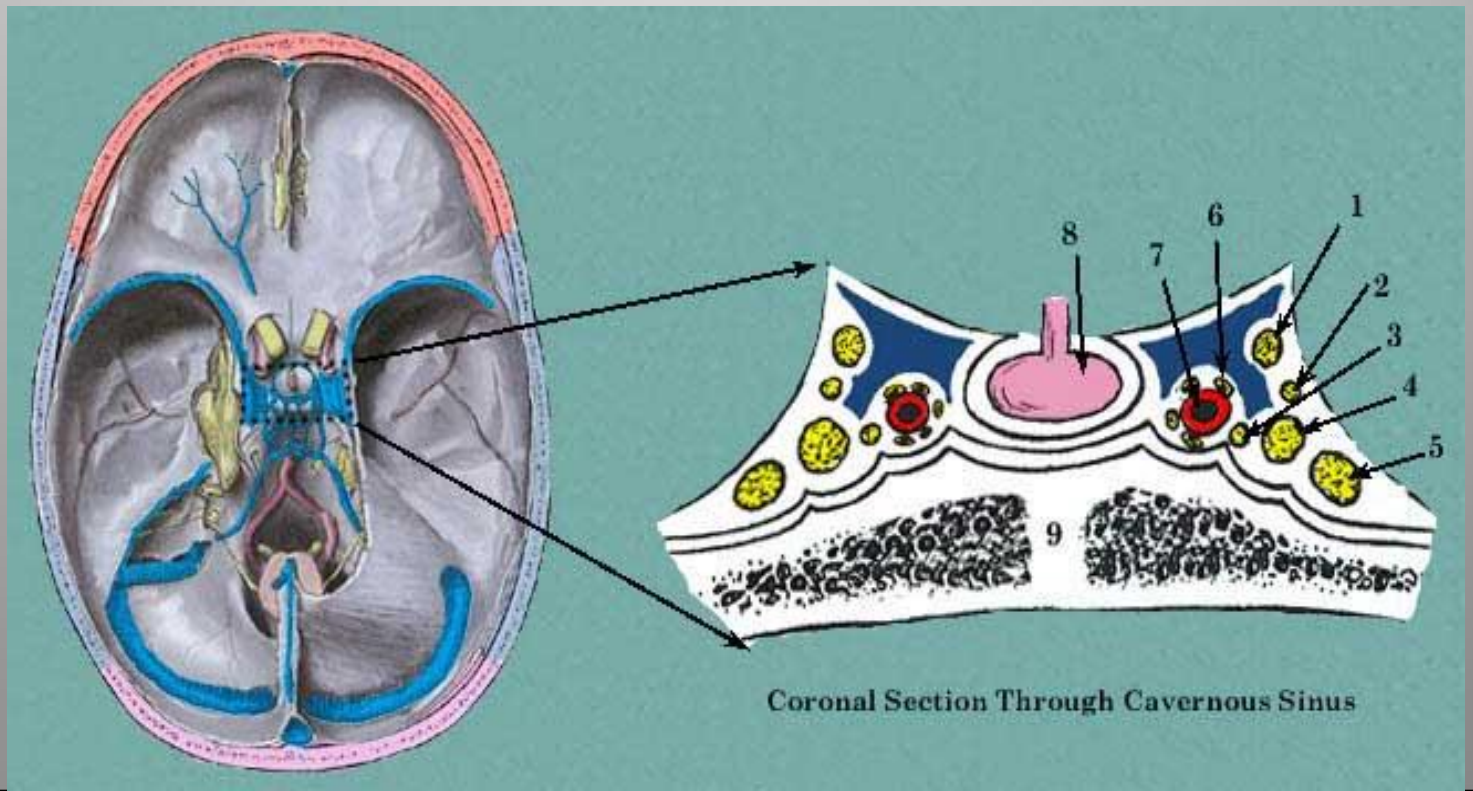
OR

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



The study of CN III, IV, V, VI a clinician can evaluate:

1. The brain stem
2. Cavernous sinus
3. Orbital apex



Unilateral dilated pupil after head injury → pressure on pupil constrictor fibers of CN III.

CN VI palsy → mastoid infection (petrous ridge)

Parotid gland, Inner ear disease → CN VII palsy

Nystagmus → CN VIII disease

Vascular connections

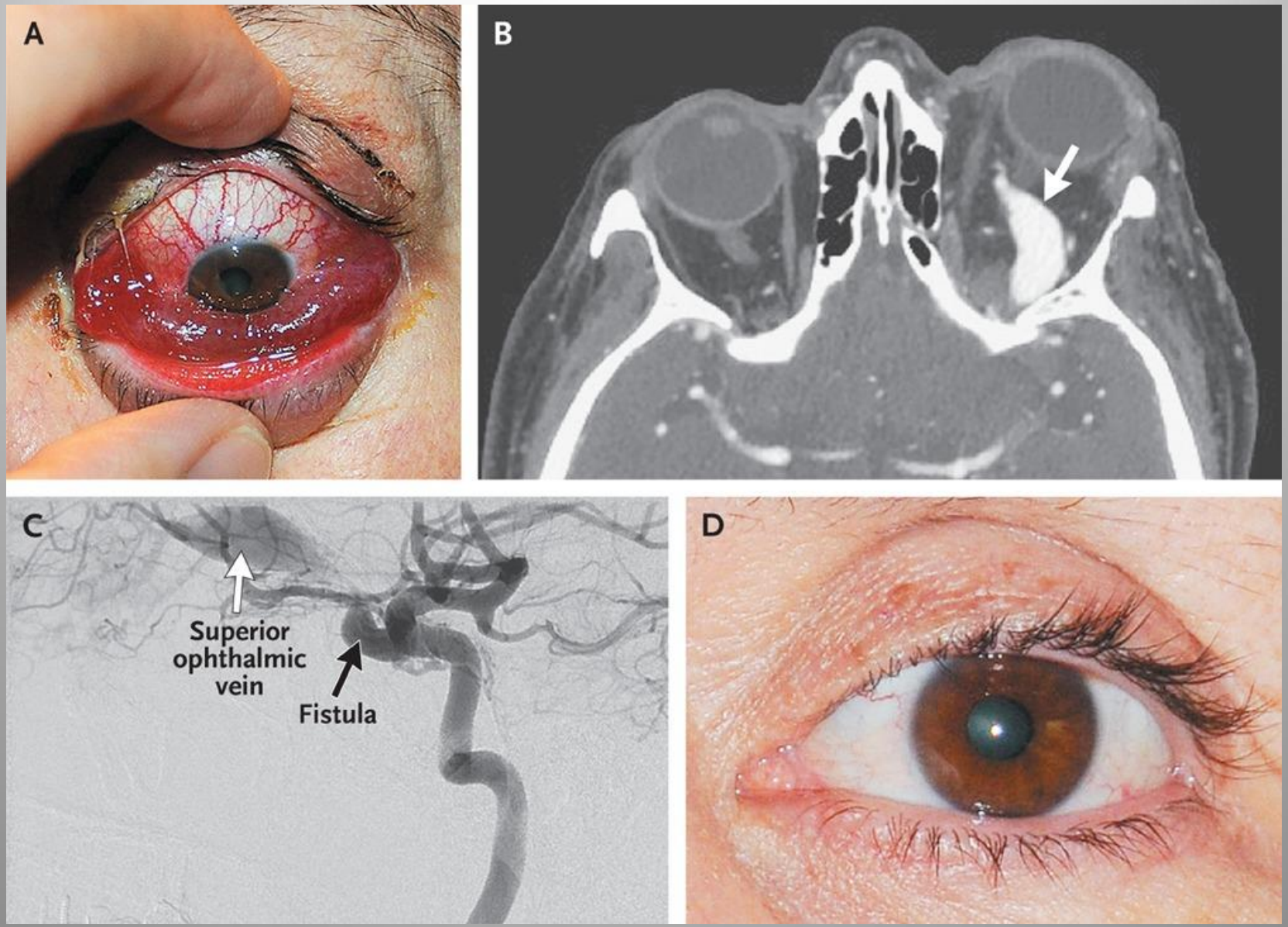
- **Venous flow disorders:**

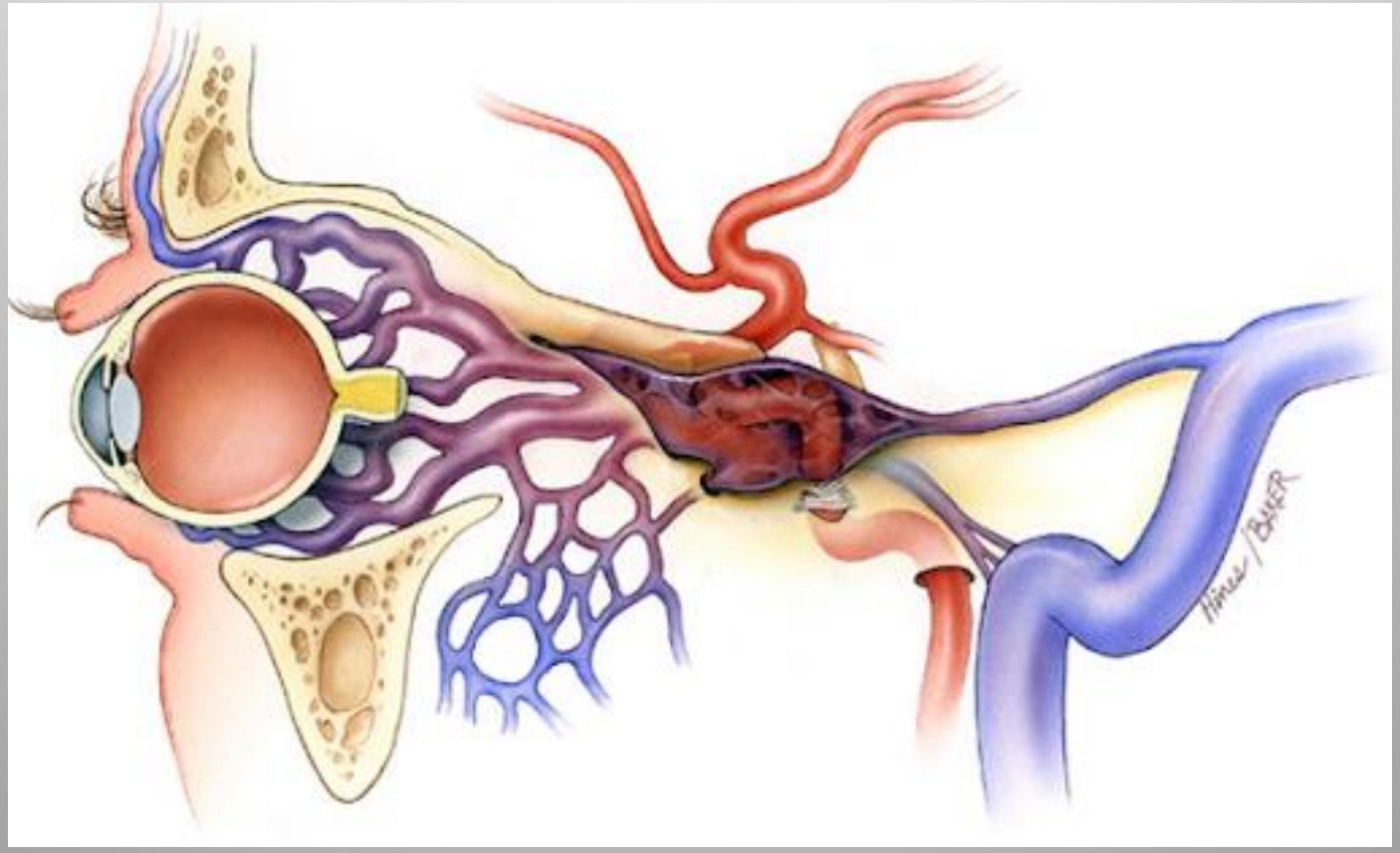
  cavernous sinus thrombosis

  OR

  carotid cavernous fistula

  (orbital congestion)

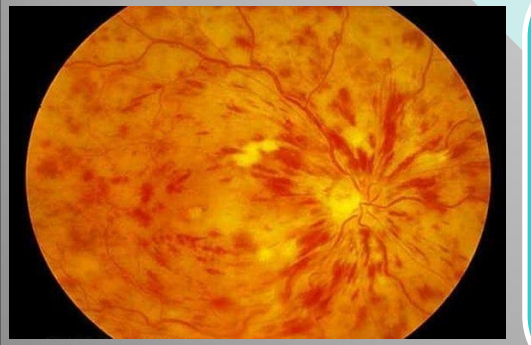

A
B
C
Superior ophthalmic vein
Fistula
D


HOWARD | BAKER

Arterial emboli

- can reach the retina from carotid artery, heart valves, subacute endocarditis.

Hypertension



Systemic coagulopathy

Systemic vasculitis

- Hematological disorders of all types can manifest in the fundus.

- Metabolic disorders can affect the eye:

  DM :DR, cataract, refractive error, ophthalmoplegia.

  Hyperthyroidism : Graves disease

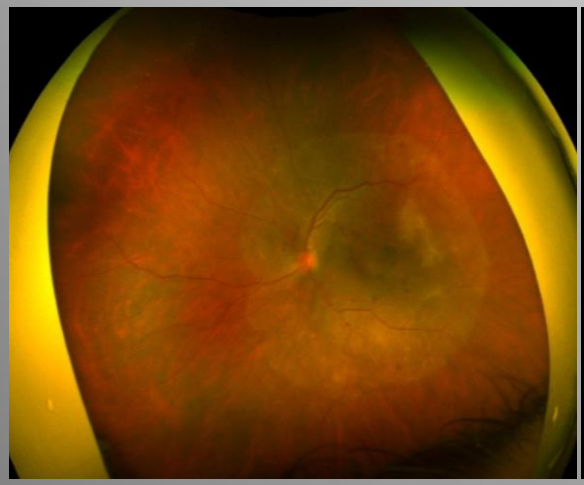
  Wilson's disease. KF ring

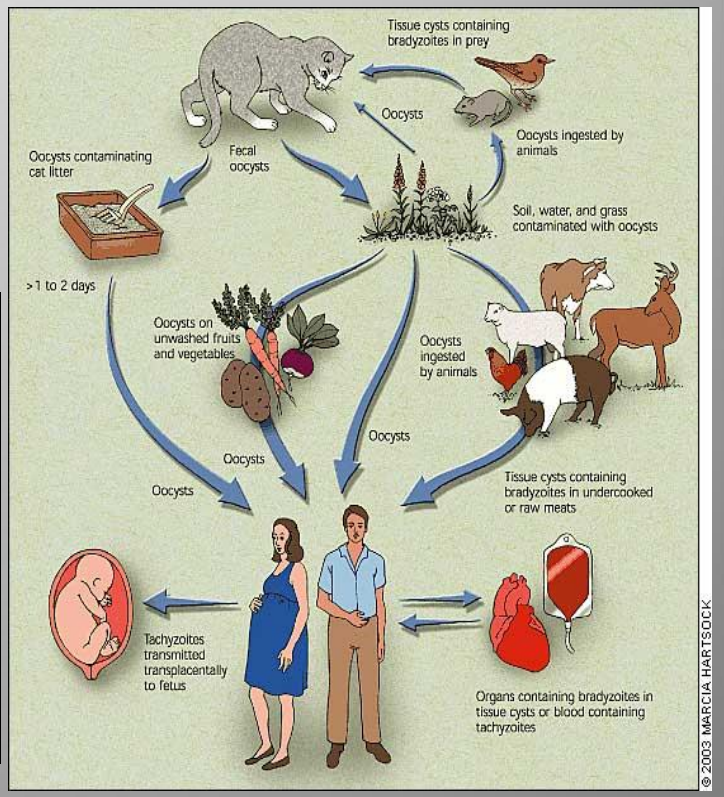
❖ Thyroid eye disease:

Exophthalmos, Lid retraction.

❖ Infections:

(Syphilis, Toxoplasmosis & Rubella)

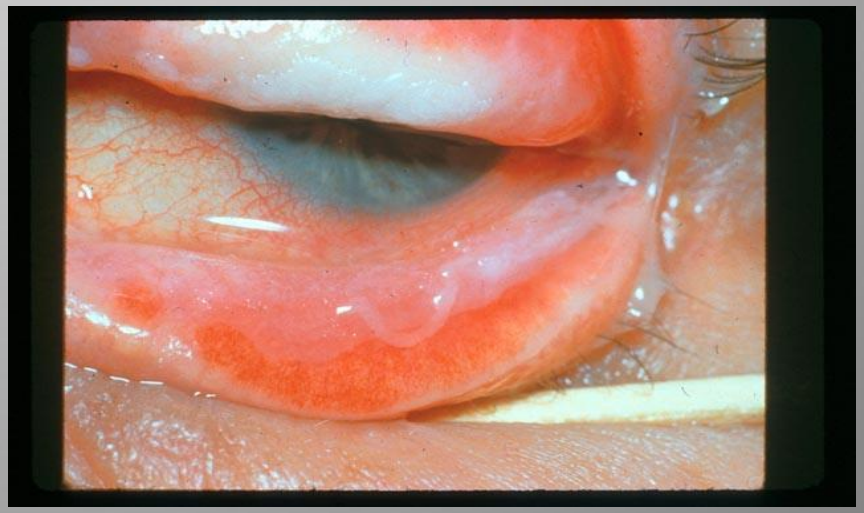




- Mucocutaneous disorders:
  SJS, pemphigus

- Elastic tissue disorders:
  (Pseudoxanthoma elasticum)

- Allergy disorders:
  Vernal keratoconjuctivitis



- The eye is a delicate indicator of poisoning:
  - -Morphine addict → miotic pupil
  - -Lead poisoning, vitamin A intoxication → papilledema

- 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.

What are the components of a comprehensive ophthalmic evaluation?

- Obtain an ocular and systemic history.
- Identify risk factors for ocular and systemic disease.
- look for symptoms and signs of ocular or systemic disease.

- reach a provisional diagnosis

- 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"*

"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 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.

- 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
- 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).

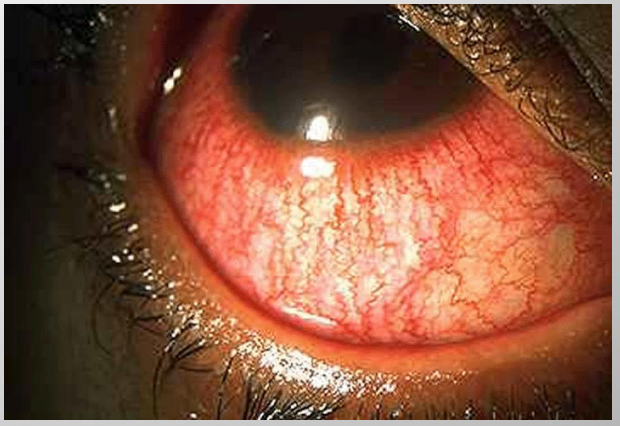
Ocular pain or discomfort:

- 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)

- Redness, opacities, masses



- Anisocoria

Family history:

- Many eye conditions are inherited

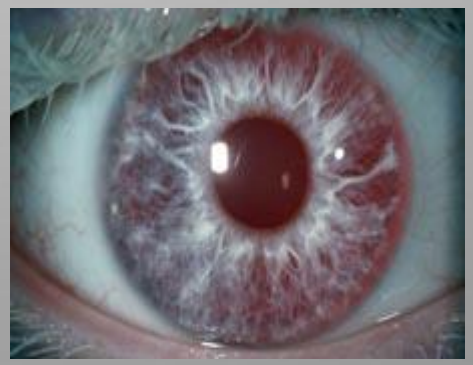
  Refractive error, glaucoma, strabismus, retinoblastoma, neoplasia & vascular disorders

- 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.



- 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

Ophthalmic examination

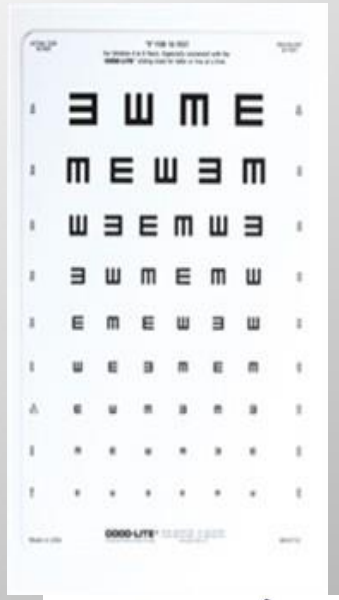
- Visual acuity
- External examination
- Motility and alignment
- Pupil examination
- Slit lamp bio-microscopy
- Tonometry
- Ophthalmoscopy
- Gonioscopy
- Retinoscopy/refraction

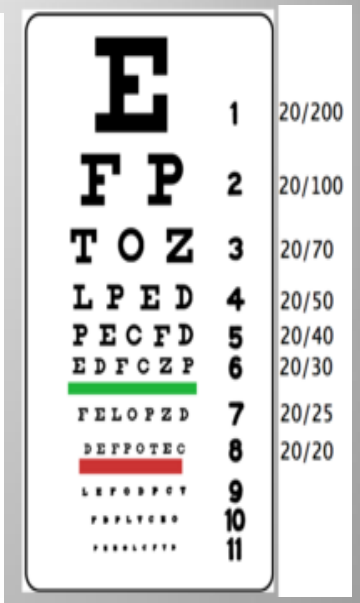
Visual acuity:

- It is a vital sign (MUST)
- Good vision
  - intact neurological visual pathology
  - structurally healthy eye
  - Proper focus
- Subjective

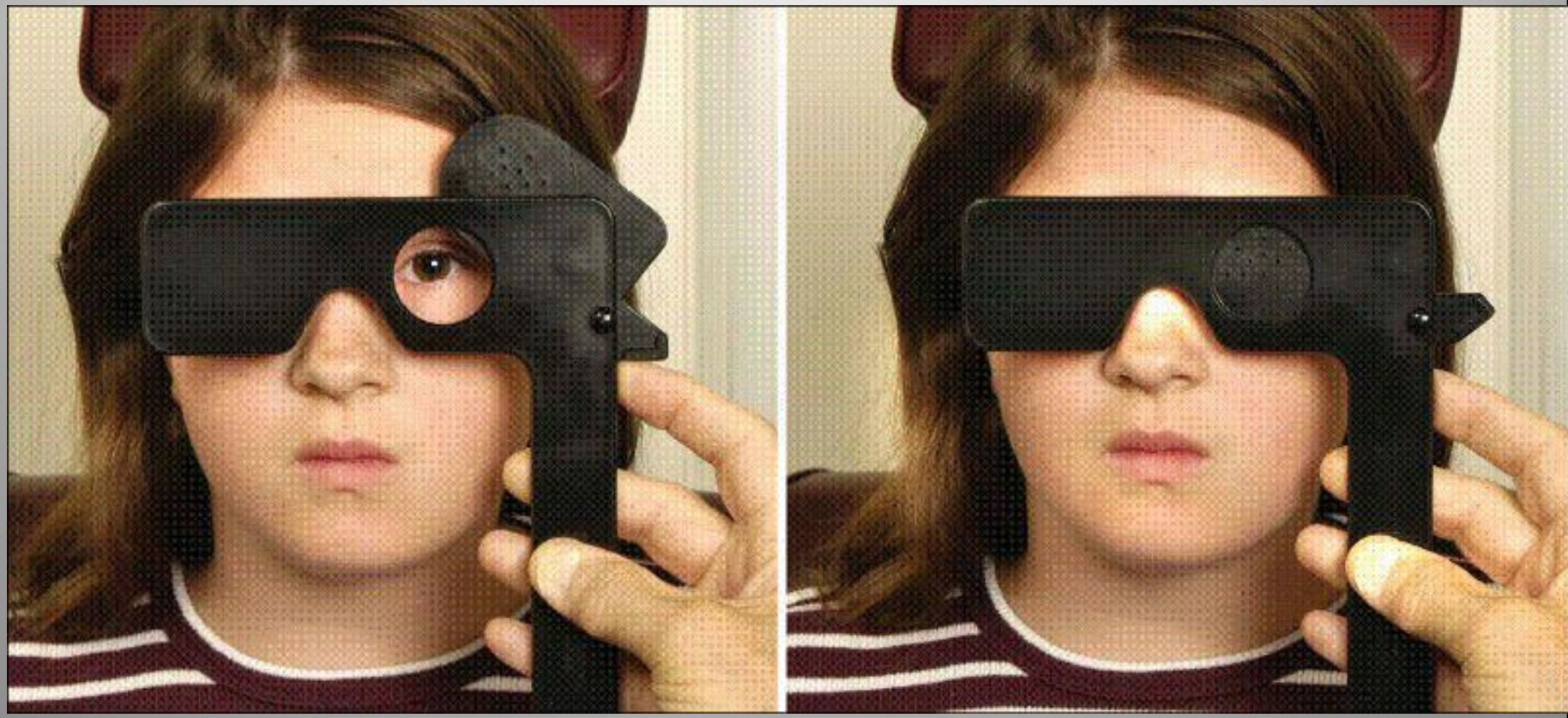
How to test vision?

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





Pinhole Test:

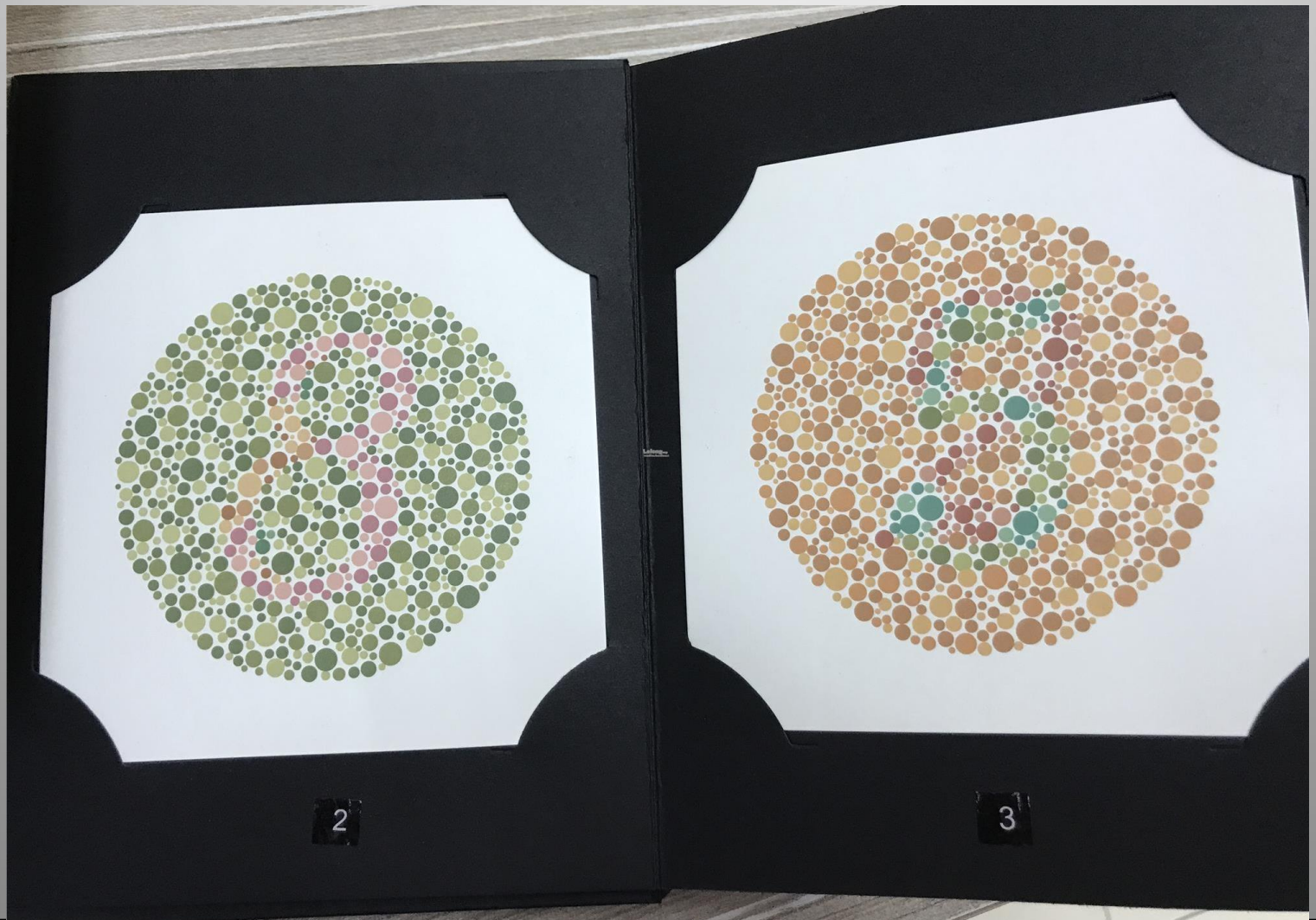


Testing poor vision:

- 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)

Color vision Test:

Ishihara color chart



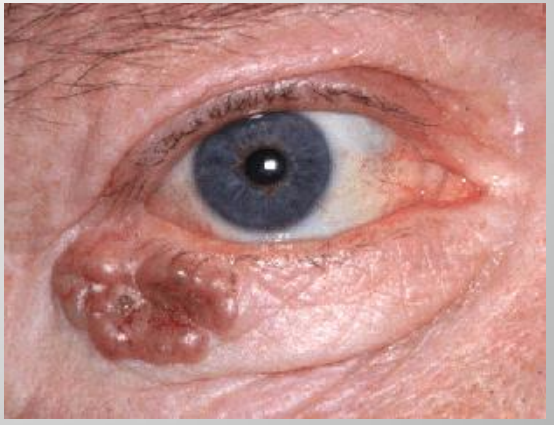
External examination:

- Evaluate by gross inspection and palpation.
- Ocular adnexa. (lid, periocular area)
- Skin lesions, growths, inflammatory lesions.

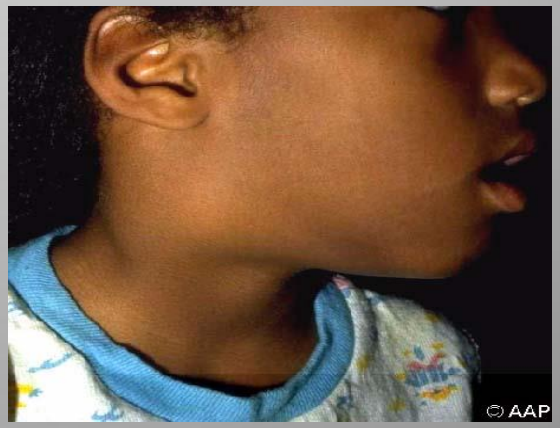
- Ptosis

- Proptosis, exophthalmos, enophthalmos

- Palpation of bony rim, periocular soft tissue.



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

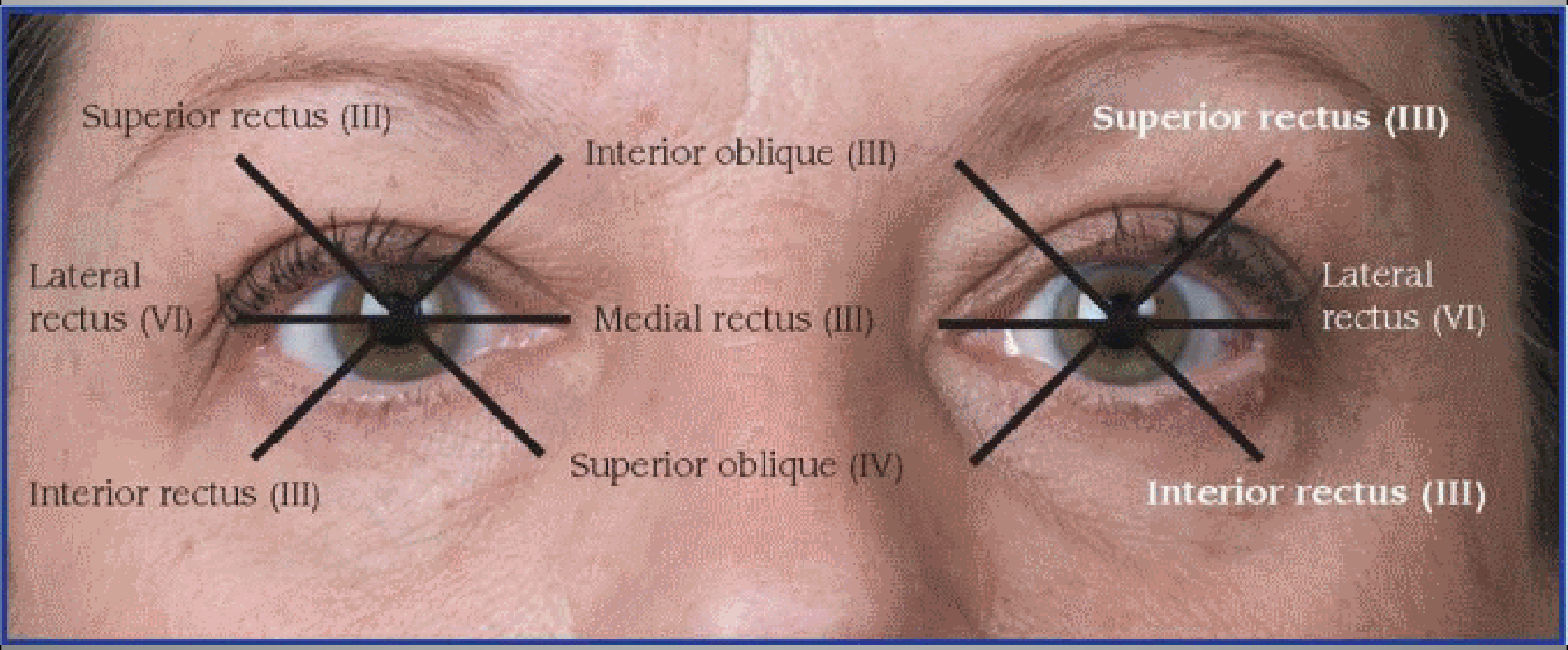


Ocular motility:

Evaluate - ***Alignment***

- ***Movements***

Extraocular Muscles and Direction of Movement



- Misalignment of the eyes

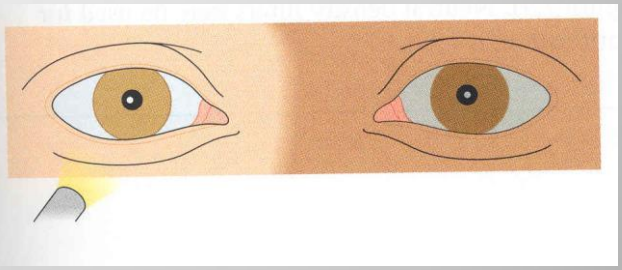
Movement:

- 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)

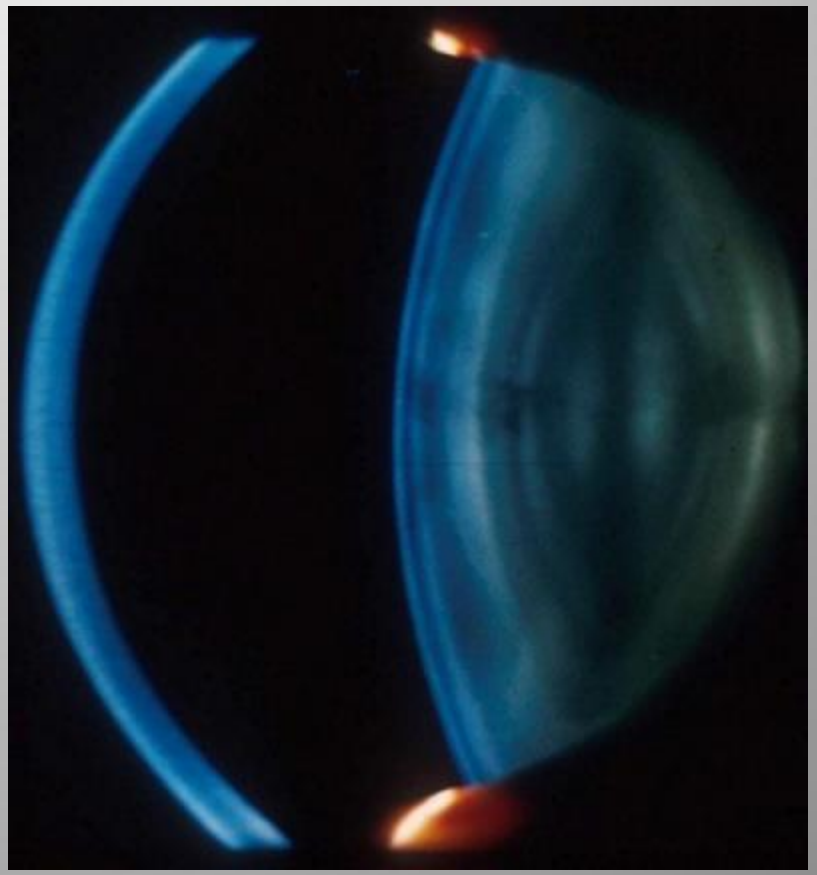
- **Causes of Pupillary abnormalities:**
  - neurologic disease
  - previous inflammation – adhesion
  - acute intraocular inflammation - spasm
    - atony
  - prior surgical trauma
  - effect of systemic or eye medication
  - benign variation of normal

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 global (anterior segment) can be visualized.

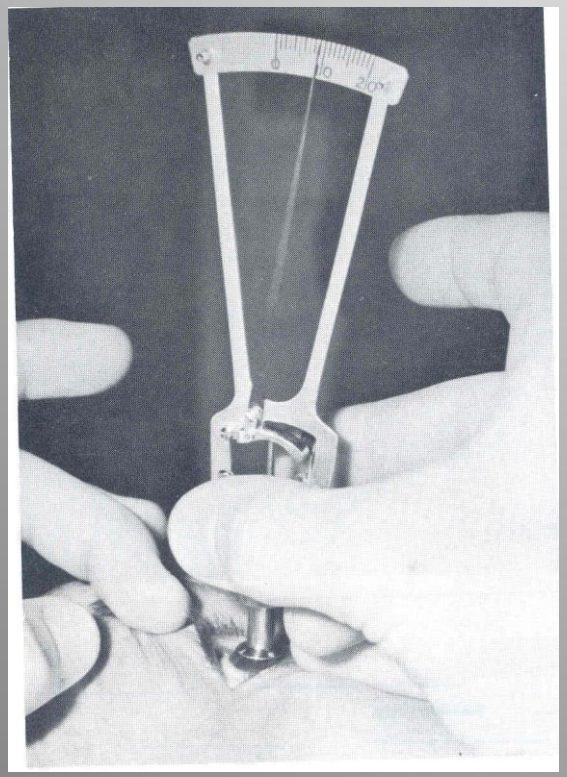


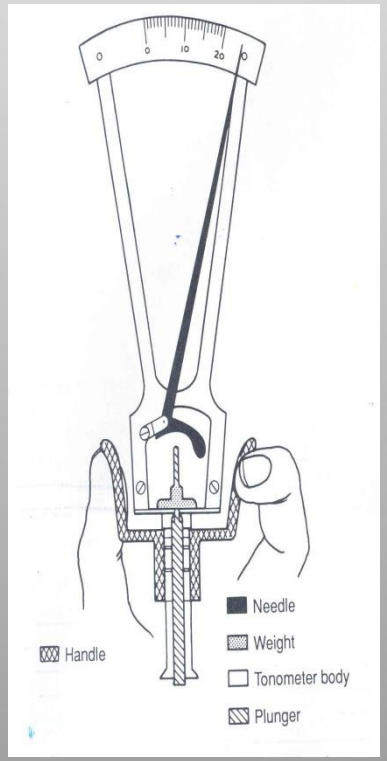
Tonometry:

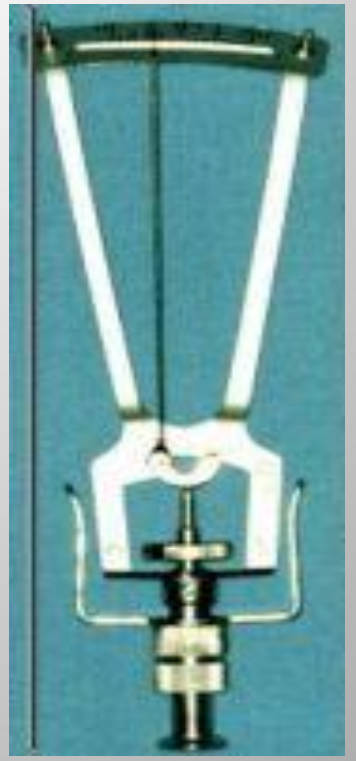
- The globe is a closed compartment with constant circulation of aqueous humor.
- This maintains the shape, and relatively uniform pressure within the globe.
- Normal pressure 10 – 21 mmHg.

Types of tonometry:

Schiotz tonometer

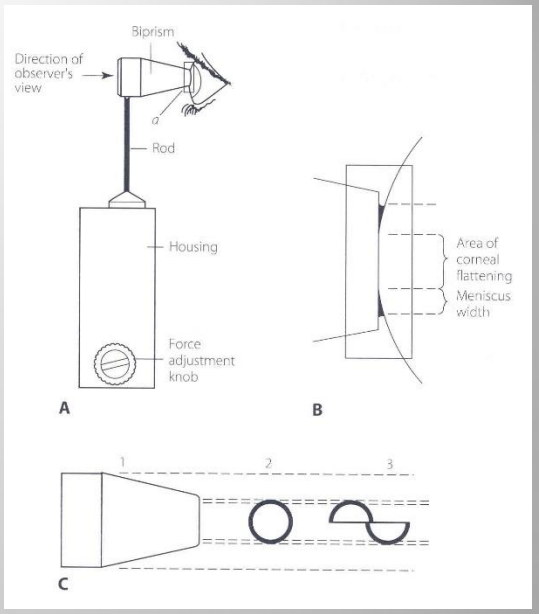


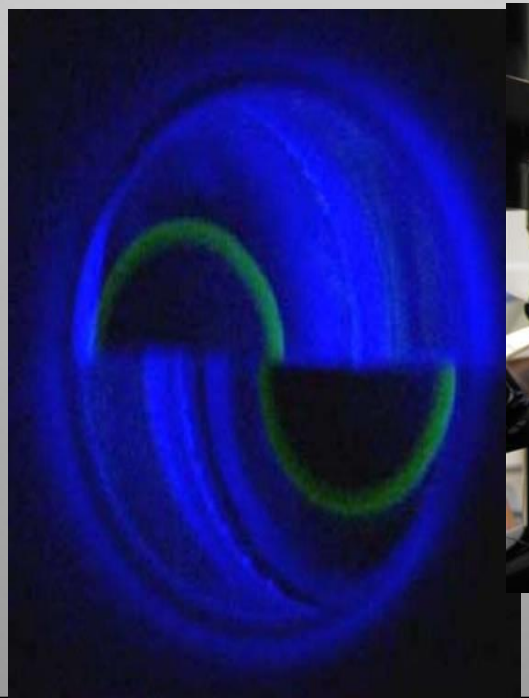


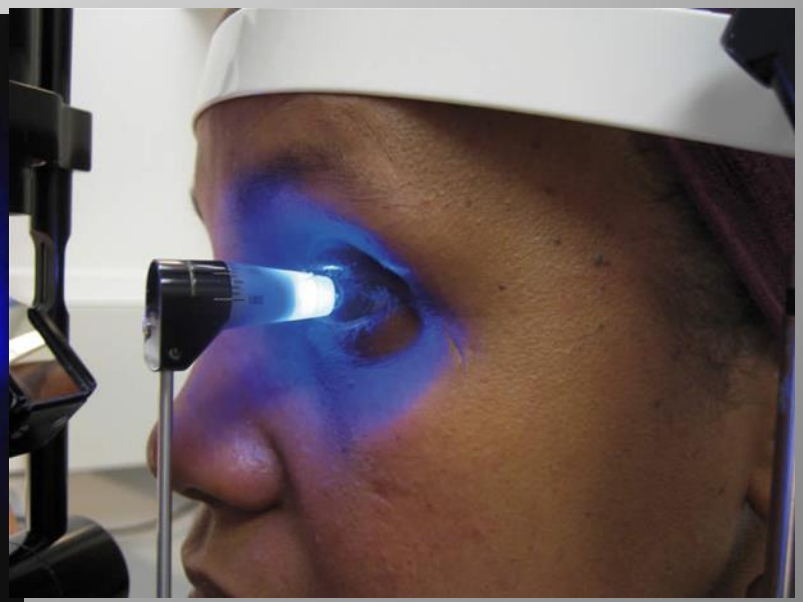


Scale Reading	Plunger Load			
	5.5 g	7.5 g	10.0 g	15.0 g
0.0	41.4	59.1	81.7	127.5
0.5	37.8	54.2	75.1	117.9
1.0	34.5	49.8	69.3	109.3
1.5	31.6	45.8	64.0	101.4
2.0	29.0	42.1	59.1	94.3
2.5	26.6	38.8	54.7	88.0
3.0	24.4	35.8	50.6	81.8
3.5	22.4	33.0	46.9	76.2
4.0	20.6	30.4	43.4	71.0
4.5	18.9	28.0	40.2	66.2
5.0	17.3	25.8	37.2	61.8
5.5	15.9	23.8	34.4	57.6
6.0	14.6	21.9	31.8	53.6
6.5	13.4	20.1	29.4	49.9
7.0	12.2	18.5	27.2	46.5
7.5	11.2	17.0	25.1	43.2
8.0	10.2	15.6	23.1	40.2
8.5	9.4	14.3	21.3	38.1
9.0	8.5	13.1	19.6	34.6
9.5	7.8	12.0	18.0	32.0
10.0	7.1	10.9	16.5	29.6
10.5	6.5	10.0	15.1	27.4
11.0	5.9	9.1	13.8	25.3
11.5	5.3	8.3	12.6	23.3
12.0	4.9	7.5	11.5	21.4
12.5	4.4	6.8	10.5	19.7
13.0	4.0	6.2	9.5	18.1
13.5		5.6	8.6	16.5
14.0		5.0	7.8	15.1
14.5		4.5	7.1	13.7
15.0		4.1	6.4	12.6
15.5			5.8	11.4
16.0			5.2	10.4
16.5			4.7	9.4
17.0			4.2	8.5
17.5				7.7
18.0				6.9
18.5				6.2
19.0				5.6
19.5				4.9
20.0				4.5

Goldmann applanation tonometer







Tonopen

Intraocular Pressure (IOP)

(10-21 mmHg)

Ophthalmoscopy:

- ***Direct ophthalmoscopy:***
- handheld instrument.
- standard part of the general medical examination.
- Portable

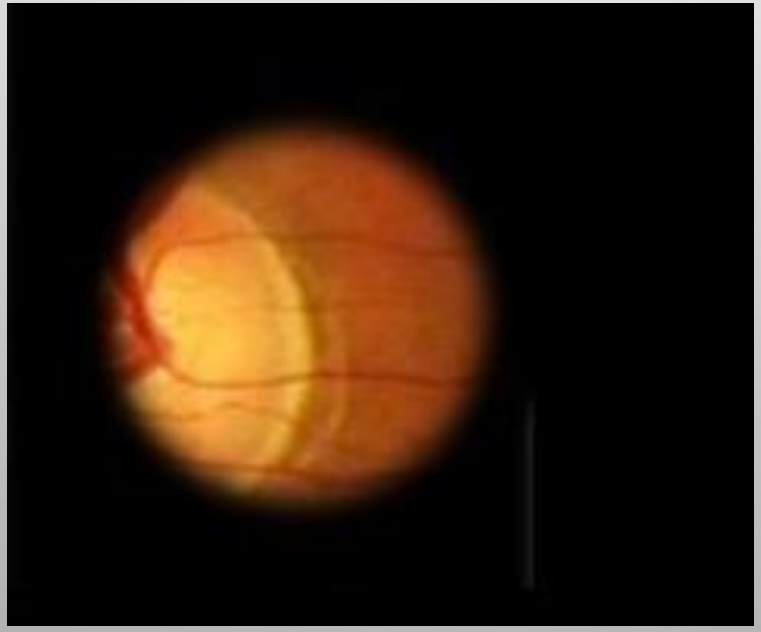
Direct Ophthalmoscope

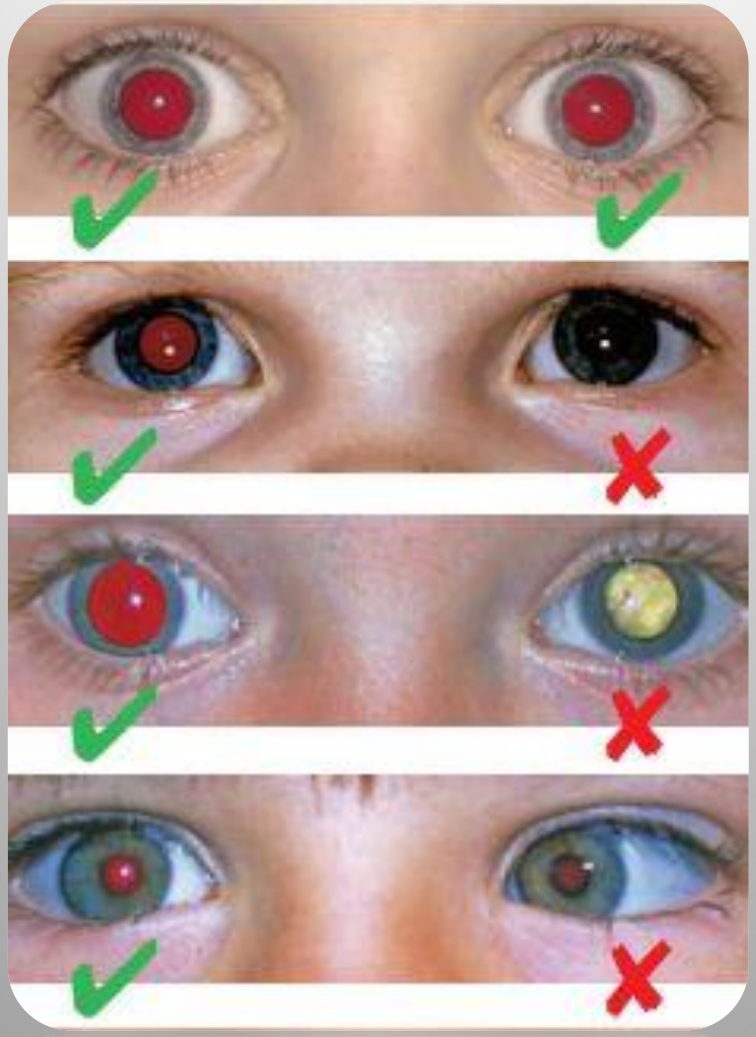
Lenses:

- **Controlled by diopter dial**
  - **Black or green numbers - positive numbers - counterclockwise – plus lenses**
  - **Red numbers – negative numbers – clockwise- minus lenses**

- **Light source:**
  - **Brightness controlled by rheostat**

- **Various apertures:**
  - **Large – usually use this one**
  - **Small - small pupils**
  - **Red free filter - green beam, optic disc pallor and minute vessels changes**
  - **Slit - Anterior eye, elevation of lesions**

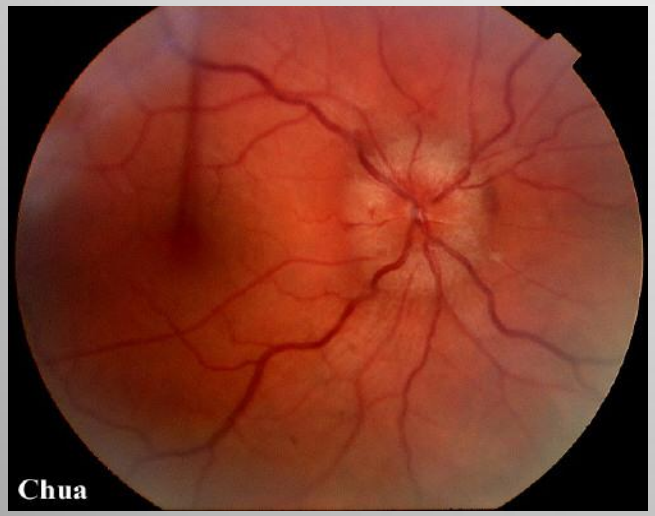




Indirect ophthalmoscope

Indirect Ophthalmoscoy:

1. provide much wider field of view
2. less magnification (3.5X with 20D lens)
3. brighter light source – better view.
4. Binocular – steroscopic view.
5. Allow entire retina examination till the periphery.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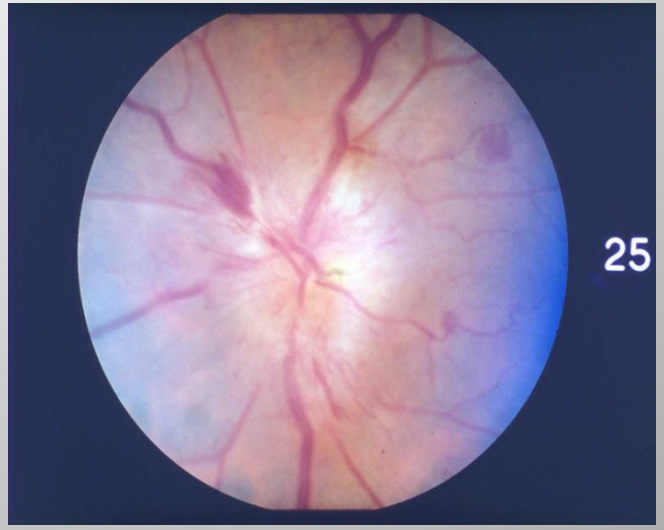
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Disadvantage:

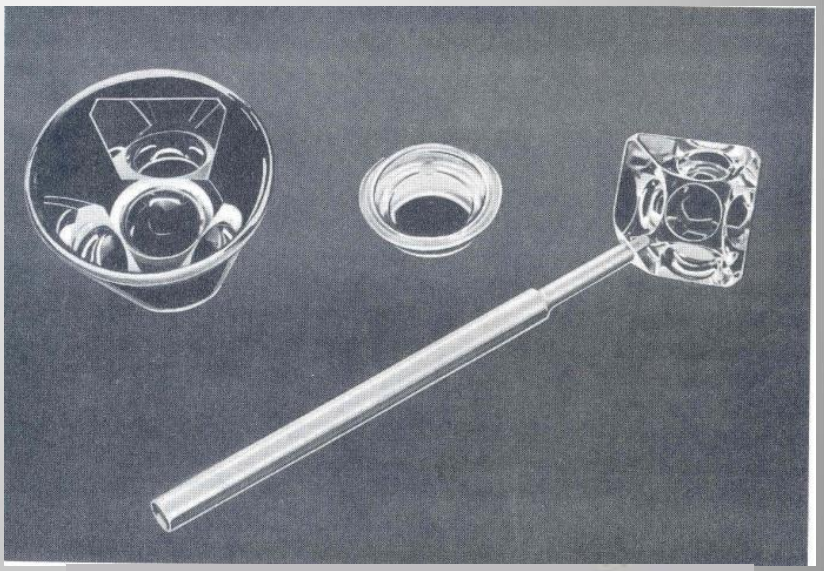
1. Inverted retinal image.
2. Brighter light is uncomfortable to the patient.

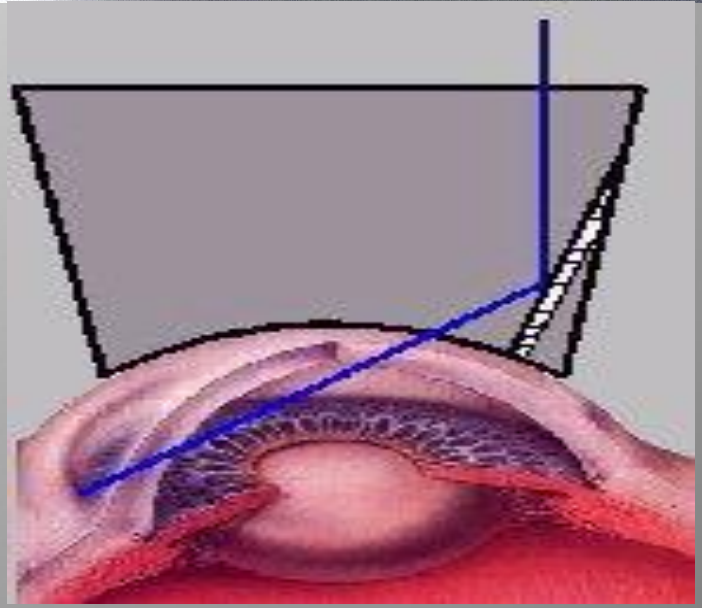
Special lenses:

- Gonioscopy lens

To check the angle of the eye

Open vs. closed





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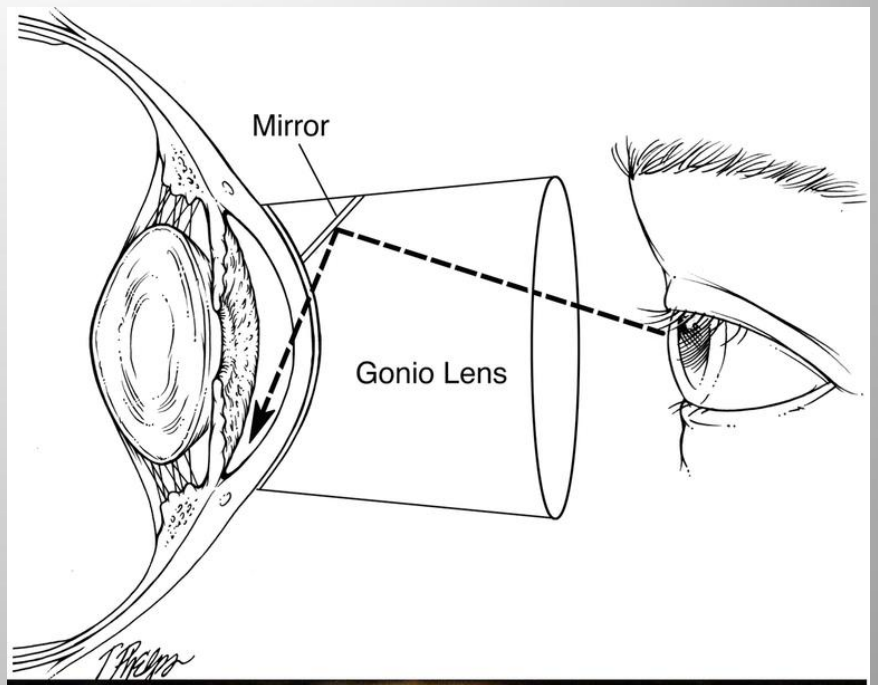

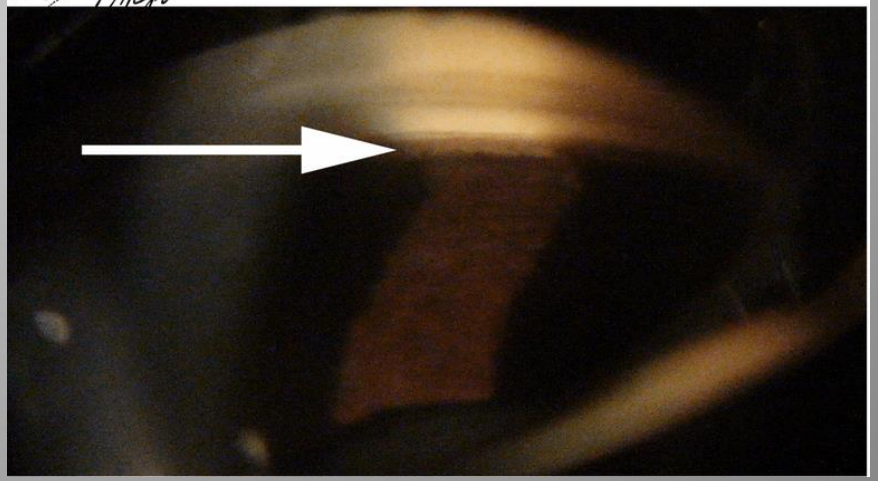

Retinoscope

Retinoscope: for objective refraction

Retinoscopy


Thank you