



No Wonder You Don't See Well

Lynn E; Lawrence, CMSgt(ret), USAF
CPOT, ABOC, COA, OSC

1

Objectives

This lecture will focus on common eye diseases and their impact on vision. It will identify the disease, characteristics of the disease and the affects of the disease on a patient's vision. The course will also discuss clinical presentations and testing associated with the disease.

2

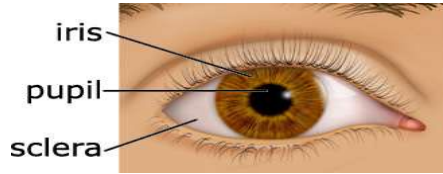
Overview

- Identify common eye diseases
- Discuss the characteristics of each disease
- Identify characteristics of each disease
- Testing procedures



3

Anatomy



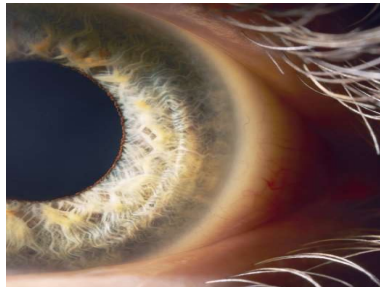
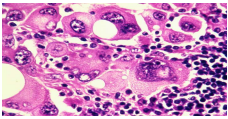
What function does the pupil have?

4

Blue Eyes

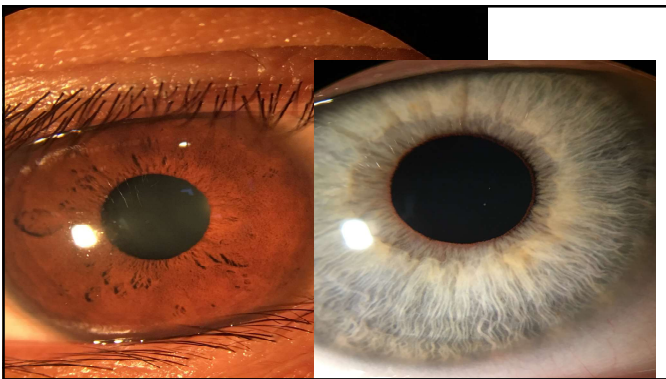
- More Like to have:

- Melanoma
- AMD
- Photophobia
- Better with pain



<http://www.msn.com/en-us/health/medical/7-things-your-eye-color-says-about-your-health/ar-BBtNSGg?li=AAa0dz8&ocid=IDMD&page=4&fullscreen=true#image=4>

5

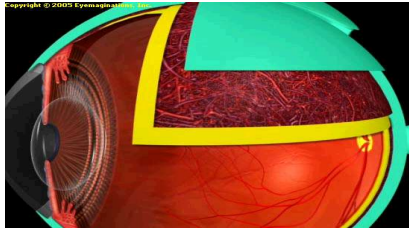


6

3 Layers

- Fibrous Layer
 - *Cornea
 - *Sclera
- Vascular Layer
 - *Choroid
 - *Ciliary body
 - *Iris
- Nerve Layer
 - *Retina
 - *Macula
 - *Optic nerve

Anatomy and Physiology of the Eyeball



What is the main function of each layer?

7



Cornea

What is it called when blood vessels grow onto the cornea?

What happens when a patient gets a scar in the visual pathway?

- Index of refraction is 1.37
- Approximately .5mm in thickness
- Transparent Organ (no blood vessels / avascular)
- Primary function is refraction of light rays
- Refractive power approx + 45.00 D

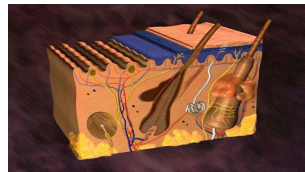
What is the crossover point for the nasal optic nerves?

8

The Eyelid

• 7 Layers of the eyelids

1. Skin-thinnest layer
2. Subcutaneous connective tissue
3. Striated Muscle
4. Sub-muscular connective tissue
5. Tarsal plate or fibrous layer
6. Smooth muscle
7. Conjunctiva (Bulbar/Palpebral)



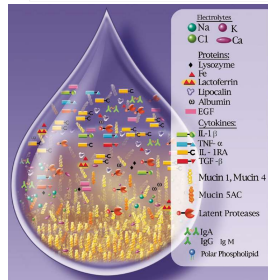
How are Hordoleum and Chalazions treated?

9

Tear Anatomy

- Antimicrobial proteins
- Growth factors & suppressors of inflammation
- Soluble mucin helps stabilize tear film
- **Electrolytes for proper osmolarity (295-300)**
 - pH slightly alkaline (7.4)

A complex mixture of proteins, mucins, and electrolytes coated by a lipid layer



10

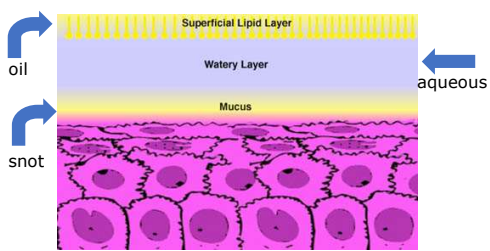
The Impact Of Tears On Vision

- Refractive Status
- Health of the Cornea, the most refractive surface of the eye
- Visual Acuity
- **Fluctuating vision**

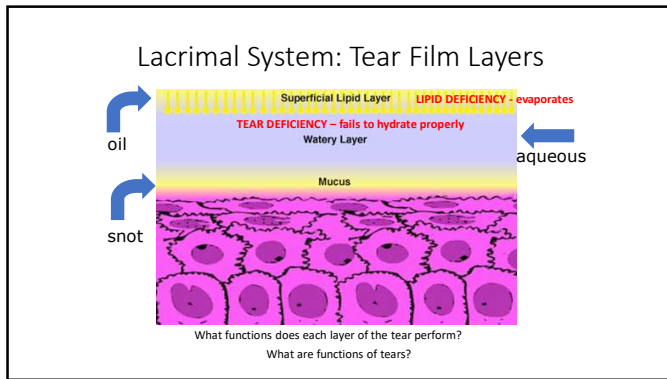


11

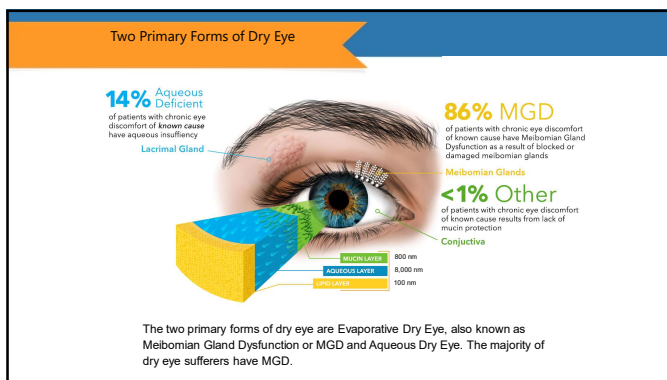
Lacrimal System: Tear Film Layers



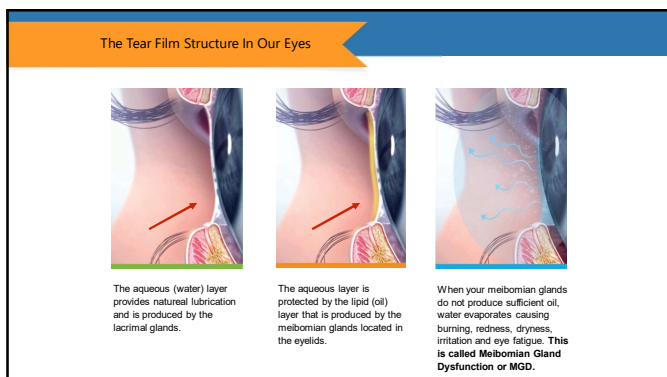
12



13



14



15

Dry Eye

Symptoms

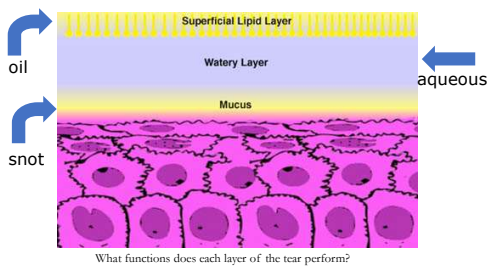
- A stinging, burning or scratchy sensation in your eyes
- Stringy mucus in or around your eyes
- Increased eye irritation from smoke or wind
- Eye fatigue
- Sensitivity to light
- Difficulty wearing contacts
- Periods of excessive tearing
- **Blurred vision, often worsening at the end of the day** (reading/computer)

Treatment

- Depends on the cause
- Drops must address the problem if used
- Punctal Plugs
- Surgery may be necessary

16

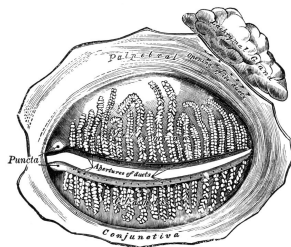
Tear Film Layers



17

Tear Components

- Lipid Layer – prevents evaporation
- Aqueous Layer - hydration
- Mucus Layer – sticks tear to the eye
- Other components

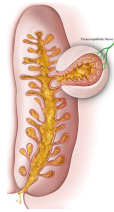


18

Lipid Secretion: Meibomian Glands



Left:
Transillumination of eyelid
showing
meibomian glands

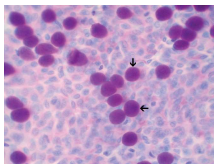


Right:
Secretion of lipid at lid
margin

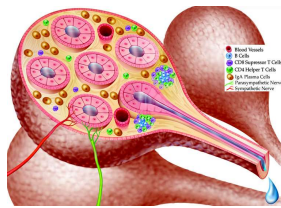
- The lipid layer restricts evaporation to 5-10% of tear flow
 - Also helps lubricate

19

Mucin Secretion: Goblet Cells



Superficial layer of bulbar conjunctiva.
Goblet cells violet, epithelial cells blue.



- Soluble mucins
 - Lower surface tension allowing tear film to spread over surface

Lipid Aqueous Mucin

20

Medications that cause dryness

- Glaucoma medications
- Certain types of drugs used to treat high blood pressure, such as central-acting agents and diuretics
- Antihistamines and decongestants
- Birth control pills
- Certain antidepressants
- Pain relievers, such as ibuprofen (Advil, Motrin, others) and Naproxen (Aleve)
- Isotretinoin-type drugs for treatment of acne

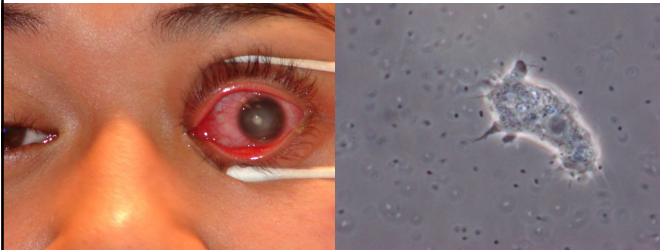
21

Risk factors

- Increasing age
- Being a woman
- Taking medications that can cause dry eyes
- Having laser eye surgery
- Undergoing radiation therapy, such as is used to treat cancer, aimed at the eyes
- Eating a diet that is low in vitamin A, which is found in liver, carrots and broccoli, or low in omega-3 fatty acids, which are found in fish, walnuts and vegetable oils

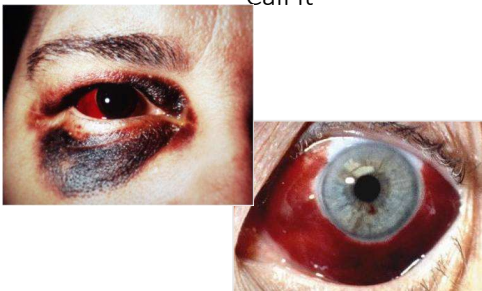
22

Contact Lenses – Acanthomeba



23

Call it



24

Subconjunctival Hemorrhage

Symptoms

Causes

- Redness on the white portion of the eye due to bleeding between the conj and sclera

- Dehydration
- Sneezing
- Coughing
- Constipation
- Straining
- Heavy Lifting


25

Trauma – Compromised globe



26

Kid trauma



27

Bugs – Eye Worms



28

Call it



Normally at
3 and 9 o'clock

29

Pinguecula ...is small like penguin

Symptoms

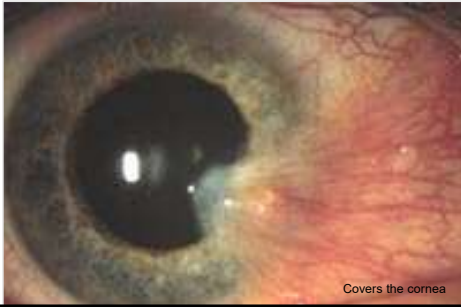
- Irritations at the 3 and 9 o'clock positions

Treatment

- Medications / Ointments
- Sunglasses

30

Call it



31

Pterygium...is large like pterodactyl

Symptoms

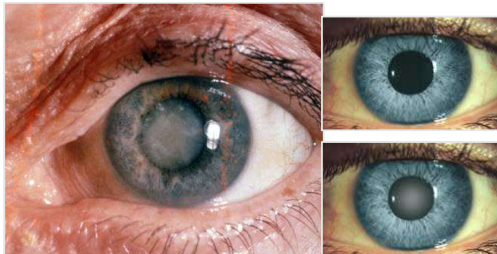
- Eye irritation
- FB sensation
- Redness
- Dryness
- Induced astigmatism
- Reduced vision

Treatment

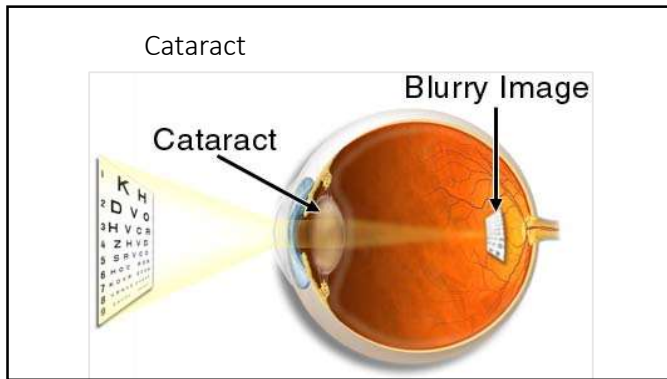
- Removal through surgical excision
- Surgery is very painful
- Can grow back

32

Call it



33



34

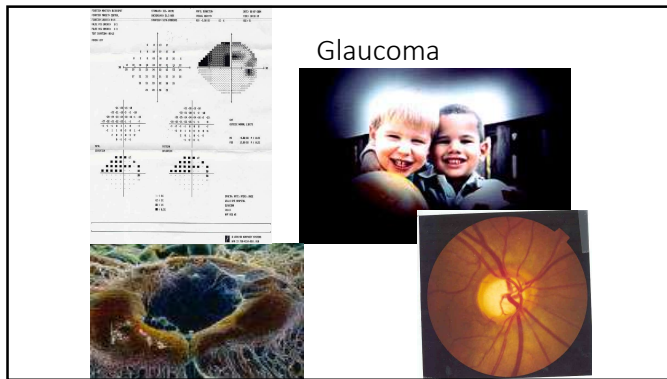
Cataract

<p>Symptoms</p> <p>NSCs are the most common type of cataract and many consider them to be a normal maturation of the lens. Over time, the lens becomes larger and brunescent (yellow or brown), especially in the denser central nucleus. If this process goes on long enough the opacity eventually leads to visual obstruction and problems with glare. The lens can become so big that it pushes the iris forward, placing the patient at increased risk for angle closure glaucoma.</p>	<p>Treatment</p> <ul style="list-style-type: none"> • Surgery: • Cataract Extraction and IOL implant <ul style="list-style-type: none"> • There are different types of IOLs and different locations in which they can be placed
--	--

35



36



Glaucoma

37

Types of Glaucoma

Not curable/but treatable in most cases

- Low-tension/ normal tension glaucoma
- Angle-closure glaucoma
- Congenital glaucoma
- Secondary glaucoma

NORMAL EYE GLAUCOMATOUS EYE

38

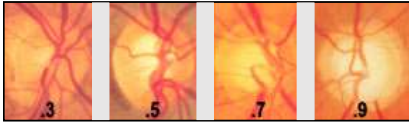
Congenital Glaucoma

- Children are born with a defect in the angle of the eye that slows drainage of aqueous. The children usually have obvious symptoms such as cloudy eyes, sensitivity to light, and excessive tearing.
- Early intervention could lead to a great outcome

39

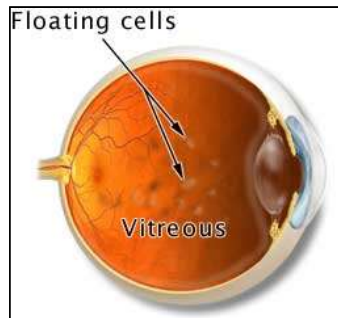
Glaucoma...acute and open angle

- Increased intraocular pressure
- Increased cupping (cup to disc ratio)
- Decrease in peripheral vision
- Optic Nerve Head (ONH) involvement



40

Call it



41

Floater

- | Symptoms | Treatment |
|---|----------------|
| • Status of vitreous | • Dilated exam |
| • Age of patient | • Surgery |
| • Could be nothing/could be something ☺ | • Vitrectomy |
| • Post Vitreous Detachment (PVD) | |

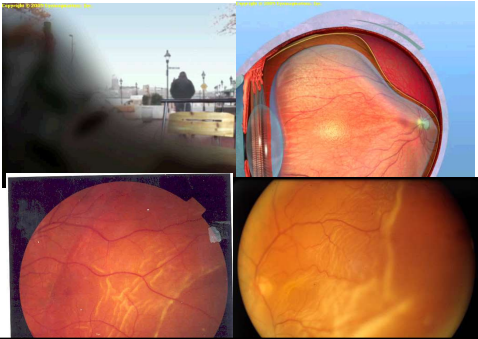
42

Call It!!!



43

Call it



44

Retinal Detachment

Symptoms

- Veil in vision
- Part of vision missing
- Flashes of light

Treatment

- Send to retina specialty immediately
- Depends on its intensity
- Scleral buckle
- Laser reattachment

45

Call It???



46

Macular Degeneration



47

Dry Macular Degeneration

- The need for increasingly bright light when reading or doing close work
- Increasing difficulty adapting to low light levels, such as when entering a dimly lit restaurant
- Increasing blurriness of printed words
- A decrease in the intensity or brightness of colors
- Difficulty recognizing faces
- A gradual increase in the haziness of your overall vision
- A blurred or blind spot in the center of your field of vision
- Hallucinations of geometric shapes or people, in cases of advanced macular degeneration

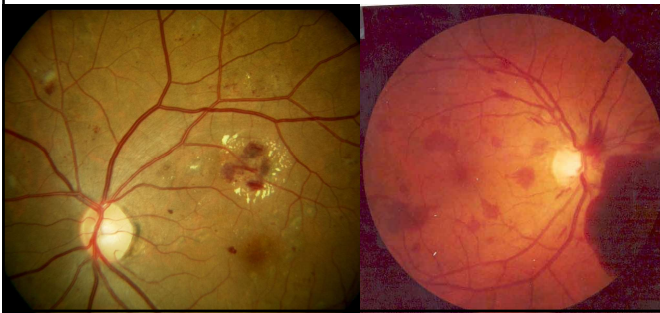
48

Wet Macular Degeneration

- Blood vessels growing in the macula
- Fluid build up
- Visual distortions, such as straight lines appearing wavy or crooked, a doorway or street sign looking lopsided
- Decreased central vision
- Decreased intensity or brightness of colors
- Well-defined blurry spot or blind spot in your field of vision
- Abrupt onset
- Rapid worsening
- Hallucinations of geometric shapes, animals or people, in cases of advanced macular degeneration
- Retinal Ophthalmologist

49

Call it



50

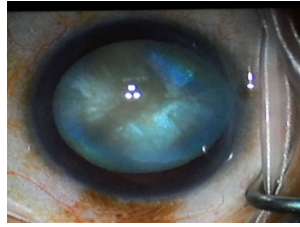
Diabetic Retinopathy

- Diabetic retinopathy often has no early warning signs. Even [macular edema](#), which may cause vision loss more rapidly, may not have any warning signs for some time. In general, however, a person with macular edema is likely to have blurred vision, making it hard to do things like read or drive. In some cases, the vision will get better or worse during the day.
- As new blood vessels form at the back of the eye as a part of *proliferative diabetic retinopathy* (PDR), they can bleed ([ocular hemorrhage](#)) and blur vision. The first time this happens, it may not be very severe. In most cases, it will leave just a few specks of [blood](#), or spots, floating in a person's visual field, though the spots often go away after a few hours.

51

Changes in Vision

- The crystalline lens gets thicker
- The patient gets more hyperopic as blood sugar and A1C level increases, less hyperopic as the blood sugar and A1C gets lower



Expect vision changes when A1C is over 7.0

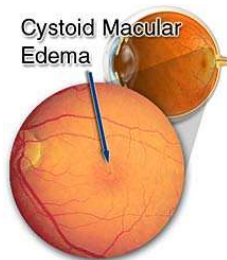
52



53

Cystoid Macula Edema

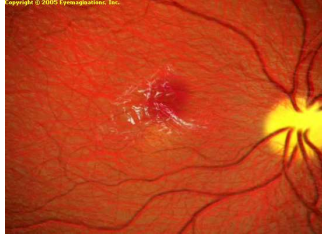
- Documented as "CME"...or swelling of the [macula](#), typically occurs as a result of disease, injury or more rarely, eye surgery. Fluid collects within the layers of the macula, causing blurred, distorted central vision. CME rarely causes a permanent loss of vision, but the recovery is often a slow, gradual process. The majority of patients recover in 2 to 15 months.



54

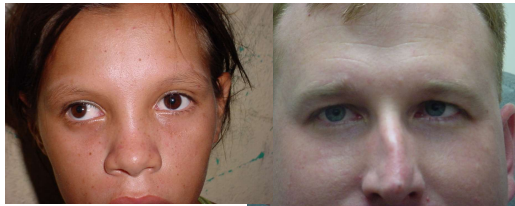
Macula Pucker

- Swelling in the macula



55

Call both photos



56

Strabismus

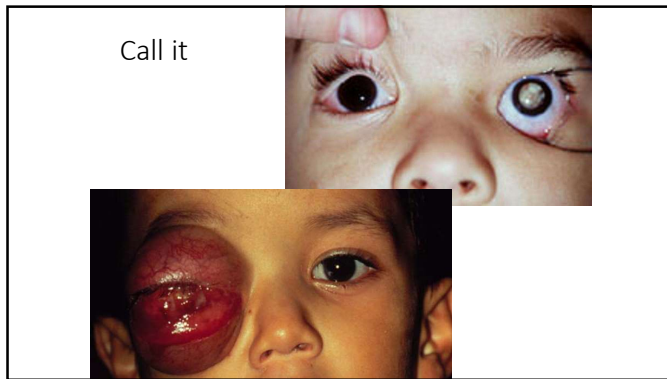
symptoms

Strabismus: A condition in which the visual axes of the eyes are not parallel and the eyes appear to be looking in different directions. The danger with strabismus is that the brain cones may come to rely more on one eye than the other and that part of the brain circuitry connected to the less-favored eye fails to develop properly, leading to amblyopia (blindness) in that eye.

treatment

- Vision Therapy
 - Glasses
 - Patching
 - Dilation
- Surgery

57



58

Retinoblastoma / Leukocoria

- A white color in the center circle of the eye (pupil) when light is shone in the eye, such as when taking a flash photograph
- Eyes that appear to be looking in different directions
- Eye redness
- Eye swelling
- Retinoblastoma occurs when nerve cells in the retina develop genetic mutations that cause the cells to continue growing and multiplying when healthy cells would die. This accumulating mass of cells forms a tumor. Retinoblastoma cells can invade further into the eye and nearby structures. Retinoblastoma can also spread (metastasize) to other areas of the body, including the brain and spine.

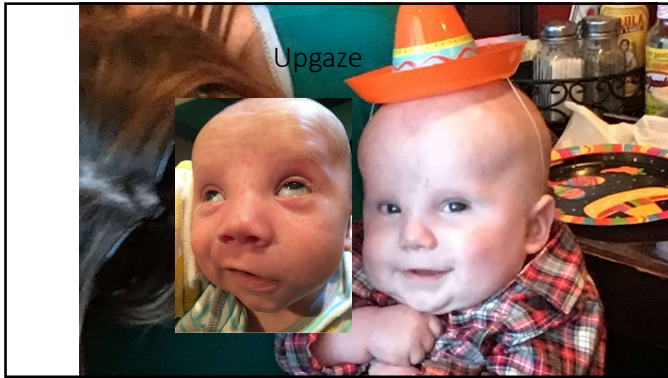
59

Coates Disease

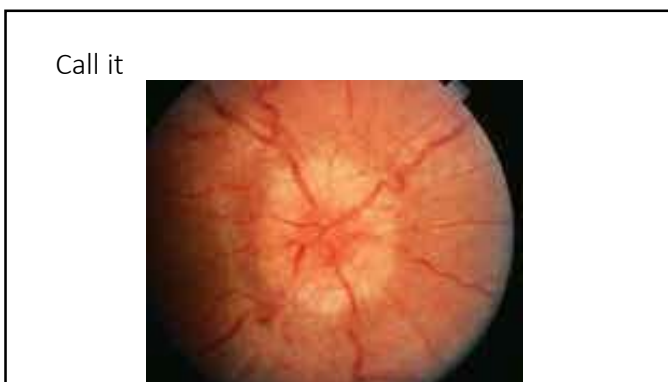
Subretinal material		Coats Disease
Coats disease 	Retinoblastoma (Exophytic) 	
Xanthocoria 	Leukocoria 	

1. Abnormal retinal vessels, *telangiectasia* (anomalous grape-like clusters)
2. Subretinal exudates (yellow in appearance on retina examination)
3. Usually unilateral
4. Detachment can occur
5. Males more frequently affected than females
6. Pathology – leaking anomalous vessels
7. Typical age of diagnosis 8-10 years
8. Treated with laser or cryoablation of leaking vessels.
9. Scleral buckle for detachment
10. After treatment more than half of patients stable or improved.

60



61



62

Papilledema / Optic Neuritis

- **Pain.** Most people who develop optic neuritis experience eye pain that's worsened by eye movement. Pain associated with optic neuritis usually peaks within several days.
- **Vision loss.** The extent of vision loss associated with optic neuritis varies. Most people experience at least some temporary reduction in vision. If noticeable vision loss occurs, it usually develops over the course of hours or days, and may be worsened by heat or exercise. Vision loss may be permanent in some cases.
- **Loss of color vision.** Optic neuritis often affects the perception of colors. You may notice that the colors of objects, particularly red ones, temporarily appear "washed out" or less vivid than normal.
- **Flashing lights.** Some people with optic neuritis report seeing flashing or flickering lights.
- **Multiple sclerosis**
- **Neuromyelitis optica**

63

Call it



64

Central Retinal Vein Occlusion

- Painless loss of monocular vision is the usual presenting symptom of retinal artery occlusion (RAO). Ocular stroke commonly is caused by embolism of the retinal artery, although emboli may travel to distal branches of the retinal artery, causing loss of only a section of the visual field. Retinal artery occlusion represents an ophthalmologic emergency, and delay in treatment may result in permanent loss of vision.
- Immediate intervention improves chances of visual recovery, but, even then, prognosis is poor, with only 21-35% of eyes retaining useful vision. Although restoration of vision is of immediate concern, retinal artery occlusion is a harbinger for other systemic diseases that must be evaluated immediately.

65

Call it



66

Retinitis Pigmentosa

- Retinitis Pigmentosa (RP) is a group of eye diseases that affect the retina. The retina, which is located at the back of the eye, sends visual images to the brain where they are perceived. The cells in the retina that receive the visual images are called photoreceptors. There are two types of photoreceptors: rods (which are responsible for vision in low light) and cones (which are responsible for color vision and detail in high light).
- Signs of RP can usually be detected during a routine eye exam when the patient is around 10 years old. However, symptoms usually do not develop until adolescence.

67

Call it

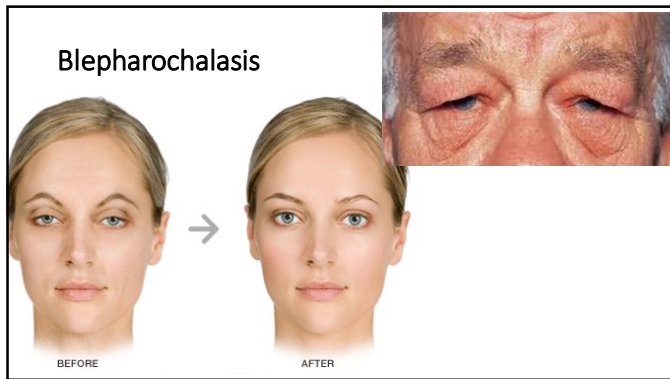


68

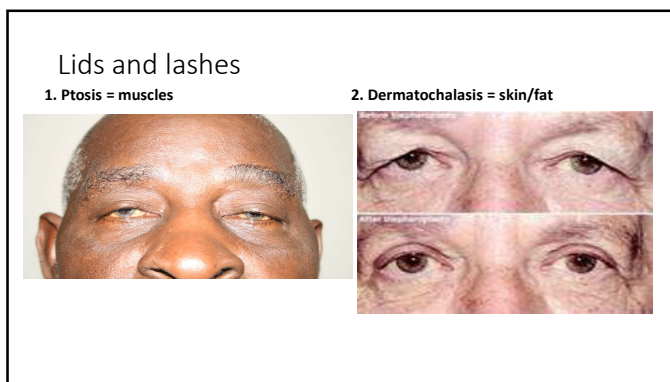
Ptosis (toe-sis)

Ptosis is a drooping or falling of the upper eyelid. The drooping may be worse after being awake longer when the individual's muscles are tired. This condition is sometimes called "lazy eye", but that term normally refers to the condition amblyopia. If severe enough and left untreated, the drooping eyelid can cause other conditions, such as amblyopia or astigmatism. This is why it is especially important for this disorder to be treated in children at a young age, before it can interfere with vision development.

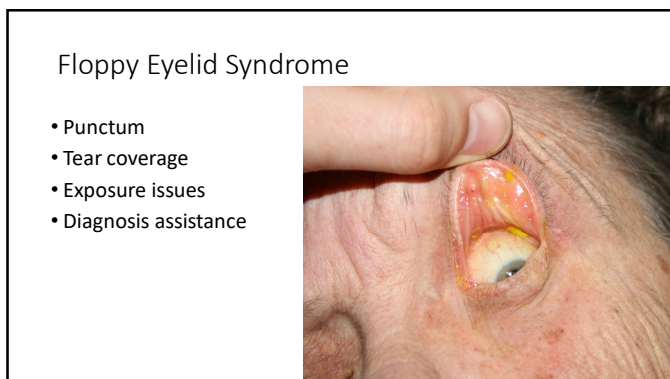
69



70



71



72

Other Lid Defects



73

Droopy or Floppy Eyelids

- Can be caused by nerve or muscle defects
- Can be excess skin (Dermatochalasis)
- Poor eyelid muscle tension (lid ptosis)
- Brow ptosis

- Corrected by:
- Blepharoplasty
 - Brow lift
 - Face lift



74


Common Lid Conditions



75

Presbyopia

- Reduction in the ability to accommodate
- Occurs normally with age
 - Reduction in lens elasticity
 - Reduction in strength of the ciliary muscle




Using the Worth 4-Dot test, if only two or three lights are seen _____ is indicated?

76

The Retina


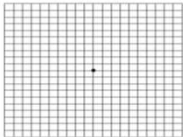
- AMD
- Retinitis Pigmentosa
- ERM
- Diabetic Retinopathy
- Glaucoma
- The ultimate receiver



77

Age Macular Degeneration

- Wet – more aggressive
- Dry – can turn more aggressive without warning

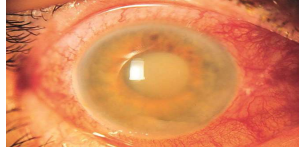



30 Vision

78

Acute Angle Glaucoma

- Steamy cornea
- Elevated pain
- Elevated IOP
- Decreased vision
- Irregular shaped pupil



79

Reinoblastoma

- A white color (leukocoria) in the center circle of the eye (pupil) when light is shone in the eye, such as when taking a flash photograph
- Eyes that appear to be looking in different directions
- Eye redness
- Eye swelling
- a mutation on [chromosome 13](#), called the [RB1](#) gene



80

Diabetes

- Fluctuations with vision
- Bleeding in retina is called retinopathy
- Dried blood leaves yellowish clumps in the retina called, Exudates



The white spot in this photo come from _____ deposits?

81

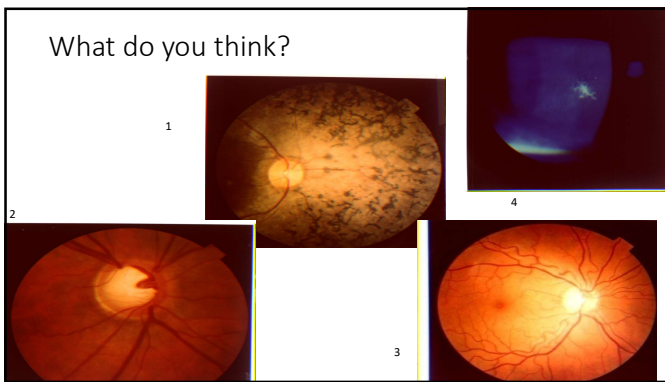
CRVO

- Since the central retinal artery and vein are the sole source of blood supply and drainage for the retina, such occlusion can lead to severe damage to the retina and blindness, due to [ischemia](#) (restriction in blood supply) and [edema](#) (swelling).^[2]
- It can also cause [glaucoma](#).



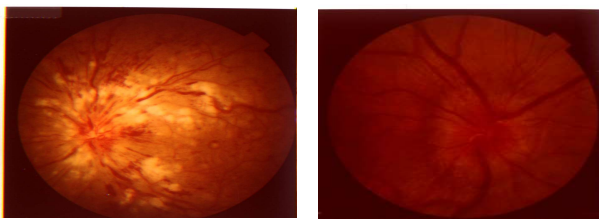
82

What do you think?



83

What is wrong in these photos?

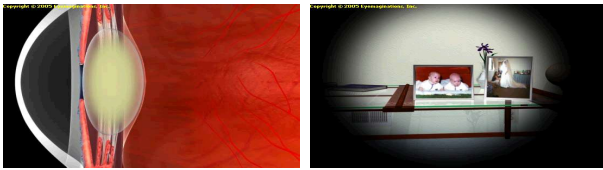


Extreme Blood Pressure/ retinal bleeding

Papilledma

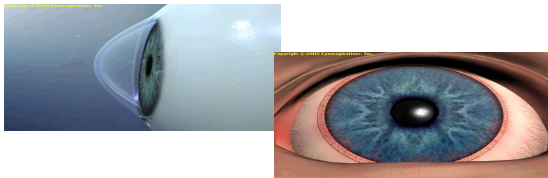
84

Call it



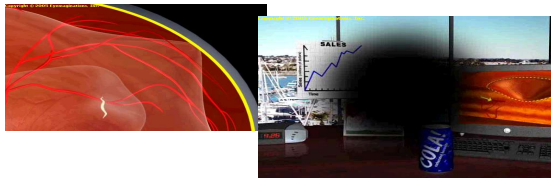
85

Call it



86

Call it



87

Call it



88

Call It



89

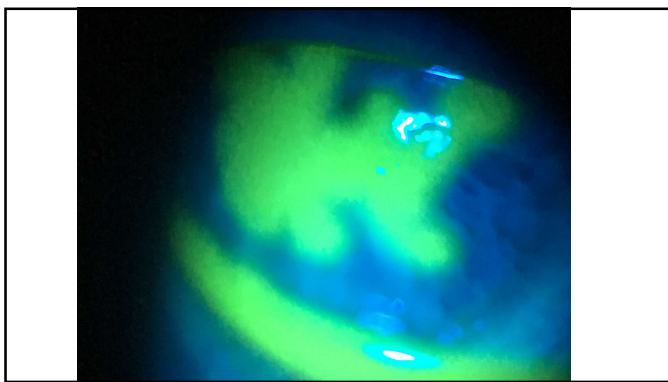
Call it



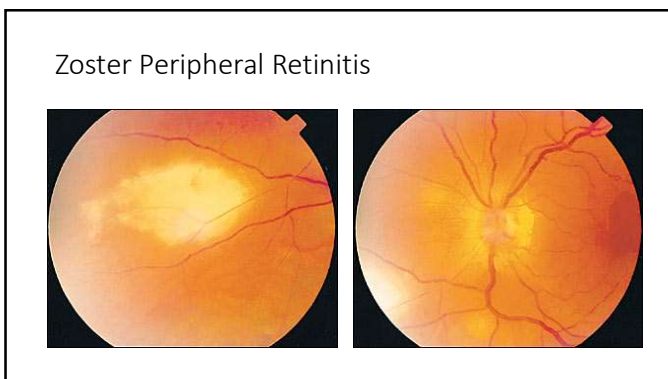
90



91



92



93



94
