OCULAR EMERGENCIES

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ACUTE CONDITIONS

- Emergency
  - Retinal Artery Occlusion
  - Chemical burns (alkali)
  - Orbital compartment syndrome

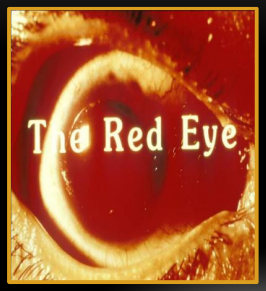
ACUTE CONDITIONS

- Very Urgent
  - Perforation
  - Rupture
  - Acute glaucoma

ACUTE CONDITIONS

- Urgent
  - Orbital cellulitis
  - Hyphema
  - Orbital injury
  - Intraocular foreign body
  - Corneal ulcer
  - Retinal detachment
  - Corneal abrasion
  - Macular edema syndrome

NON TRAUMATIC RED EYE - POSSIBLE CAUSES



- Conjunctivitis
- Iritis (Uveitis)
- Corneal Inflammation/Infection
- Acute glaucoma

NON TRAUMATIC RED EYE - POSSIBLE CAUSES

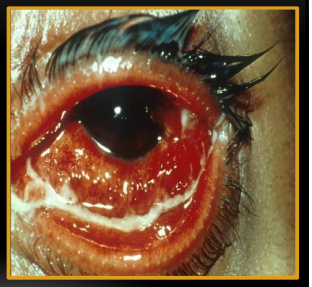
- Conjunctivitis

Discharge type	**Etiology**
Purulent	Bacterial
Serous or clear	Viral
Stringy, white	Allergic

Preauricular lymph node enlargement: typically viral

NON TRAUMATIC RED EYE - POSSIBLE CAUSES

- Bacterial Conjunctivitis
  - Bilateral or unilateral
  - Mucopurulent
  - Visual acuity good
  - Drops/ointment
  - Warm compresses

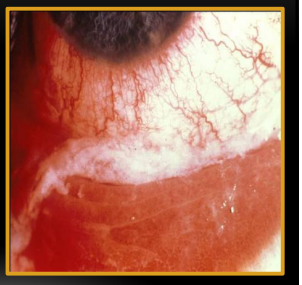


NON TRAUMATIC RED EYE - POSSIBLE CAUSES

- Gonococcal Conjunctivitis
  - Purulent conjunctivitis
  - Pre-auricular adenopathy
  - Neonates: bilateral, 3-5 days post vaginal delivery
  - Adults: Usually unilateral
  - Treatment: **IV** PCN G 10 million units/day (*topical antibiotics are inadequate*)

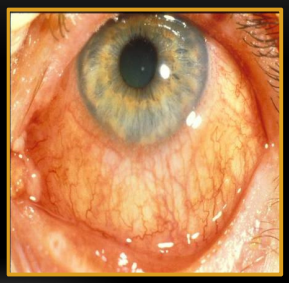
NON TRAUMATIC RED EYE - POSSIBLE CAUSES

- *Chlamydia* Infection
  - Trachoma: Leading cause of preventable blindness
  - Conjunctivitis of newborn 5-14 days of delivery
  - Characterized by lymphoid follicles in the conjunctiva
  - Adult: Systemic tetracycline and topical erythromycin
  - Neonatal: Systemic and topical erythromycin



NON TRAUMATIC RED EYE - POSSIBLE CAUSES

- Viral Conjunctivitis
  - Difficult to distinguish from bacterial
  - More frequently bilateral
  - Preauricular adenopathy
  - Treatment: Topical antibiotics



EPIDEMIC KERATOCONJUNCTIVITIS (EKC)

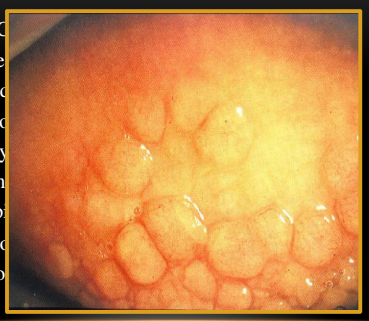
- 31 year old woman
  - Red, painful eye
  - Moderate mucoserous discharge x 5 days
  - Began in the left eye, spread to right eye
  - Initially intense FB sensation
  - Mild photophobia and blurred vision

EPIDEMIC KERATOCONJUNCTIVITIS (EKC)

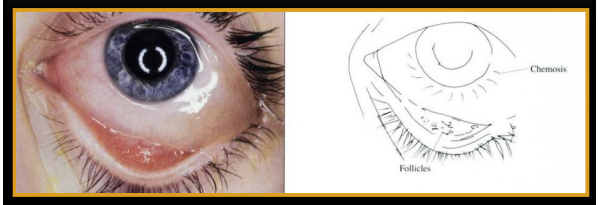
- Adenovirus 8 (preauricular nodes common)
- Highly contagious
  - Families, sex contacts, swimming pools
  - Epidemics are frequent
- Avoid Schiötz Tonometry
- Treatment:
  - Ophtho referral
  - Topical antibiotics
  - Steroids in severe cases

NON TRAUMATIC RED EYE POSSIBLE CAUSES

- Allergic C
  - Cobble
  - Marke
  - Sympt
  - Usuall
  - Treatm
    - Top
    - Vas
    - Coo



ALLERGIC CONJUNCTIVITIS



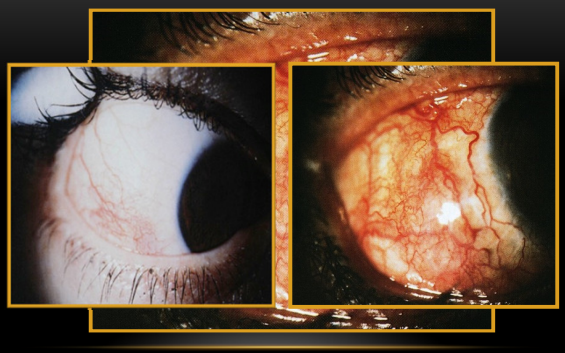
EPISCLERITIS

- Minimally painful red eye (but *acute* onset)
- No visual symptoms
- Simple & nodular
- Usually self limiting
- Reassurance, NSAIDs (topical) may be helpful

EPISCLERITIS

SCLERITIS

- Anterior & posterior
- Moderate to severe pain
- Bilateral > 50%
- *Gradual* onset (days)



SCLERITIS

- Infective – syphilis, TB, zoster, leprosy
- Autoimmune – RA, WG, SLE, PN, Goodpastures, Crohns, sarcoid
- Metabolic - gout

SCLERITIS

- < 1/3 necrotizing, 2/3 non-necrotizing
- Untreated – thinning, scleral defects, anterior uveitis, keratitis, cataract, glaucoma
- Posterior scleritis– proptosis, visual loss

SCLERITIS

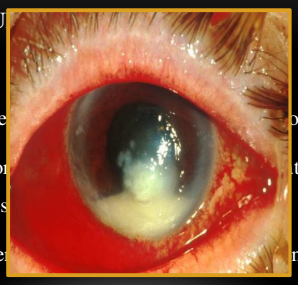
- Treatment:
  - High dose systemic steroids (especially necrotizing form)
  - Systemic NSAID
  - Topical cyclosporine
  - Methotrexate
  - Scleral grafting

SCLERITIS VS EPISCLERITIS

- Episcleritis – painless, benign course, acute onset
- Scleritis – painful, worse course, gradual onset
- Phenylephrine may blanch episcleral vessels, not scleritis

NON TRAUMATIC RED EYE POSSIBLE CAUSES

- Corneal U
  - Painful
  - Localize ornea
  - Look fo tory exudates
  - Treatme nsult



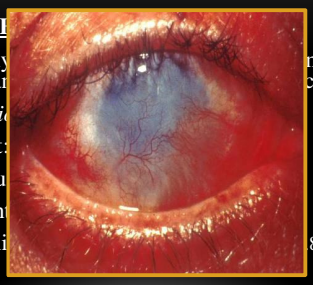
NON TRAUMATIC RED EYE POSSIBLE CAUSES

- Conjunctivitis Following Recent Eye Surgery
  - Purulent discharge on lash margins should be viewed as potential endophthalmitis
  - Decreased vision, floaters, redness & pain
  - Treatment: Ophthalmology consult, consider immediate hospitalization

A 32 uction
wor when
a ly shed
He arrives at the ED 15 minutes after the injury.

ALKALI BURNS

- **ABSOLUTE E**
  - Sodium hy ment, drain clear crackers)
  - *Liquefacti*
  - Treatment:
  - Continuou
  - STAT opht
  - Irrigate Ri 8 – 7.4



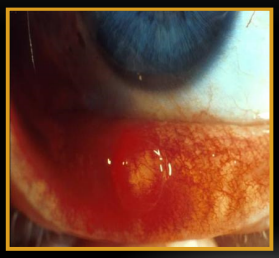
ACID BURNS

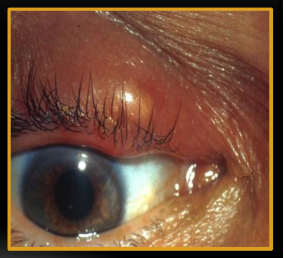
- Coagulation necrosis
  - Invasion limited by coagulum
  - Not as severe as alkali burns
- Treatment: Ringer's lactate

OCULAR SOFT TISSUES

- Ultraviolet K ow blindness)
  - Intense pa
  - Fluoroscei y
  - Snug doub
  - Topical an cornea

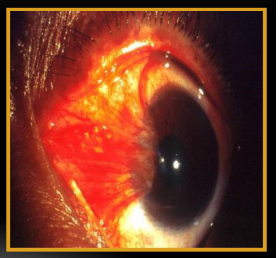
DISORDERS OF THE LIDS





Internal and external hordeolum

DISORDERS OF THE LIDS



Chalazion Pterygium

PTERYGIUM

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- mon
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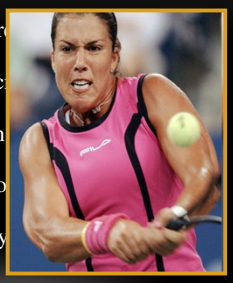
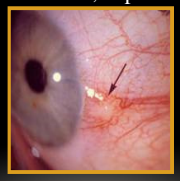
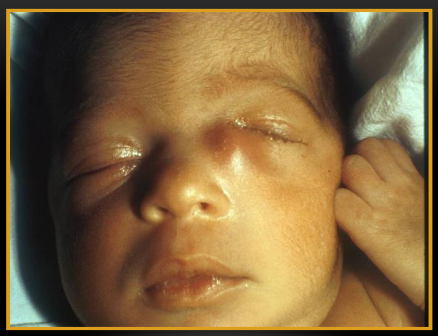


PINGUECULUM

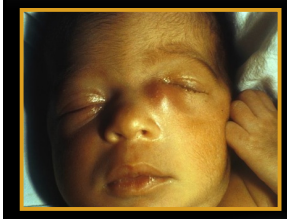
- Raised conjunctival nodular degeneration
- Does not extend to cornea
- Treatment: reassurance, topical lubricants





DACROCYSTITIS AND ADENITIS

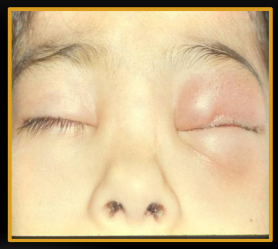
- Dacryocystitis
- Dacryoadenitis



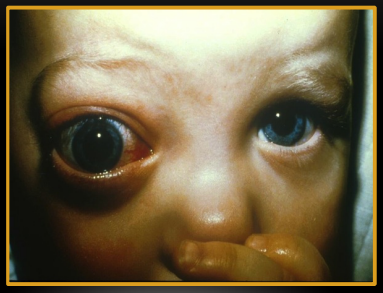
antibiotics

CELLULITIS

- Preseptal cellulitis
  - CT scan?
  - Warm compresses
  - Systemic antibiotics



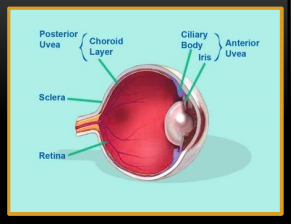
ORBITAL CELLULITIS



ORBITAL CELLULITIS

- Eye urgency
  - Unilateral proptosis with swelling/erythema of lids
  - Causes: Sinusitis (Ethmoid) & dental infections
  - Meningitis / cavernous sinus thrombosis
  - Urgent imaging - CT scan
  - IV antibiotics
  - Surgical drainage may be indicated

UVEITIS

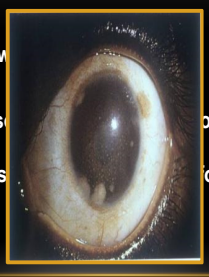


- Uvea – (Latin for grape)
  - Iritis (anterior uveitis)
  - Cyclitis (Intermediate)
  - Choroiditis (posterior uveitis)

UVEITIS HAS MANY CAUSES

- **35-year-old w**
- **Multiple epis ophobia,**

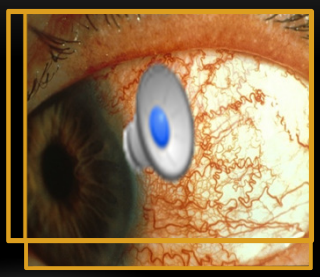
  deceased vis ort

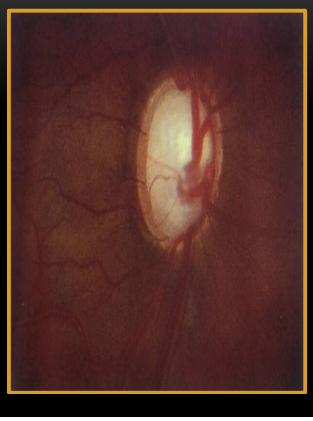


"Mutton-fat" precipitates of sarcoidosis

IRITIS

- Pain with accomodation
- "*Cells and Flare*"
- Mydriatics and topical steroid
- Cycloplegics (reduction of ciliary spasm and pain)
- Complications: synechiae with subsequent secondary glaucoma

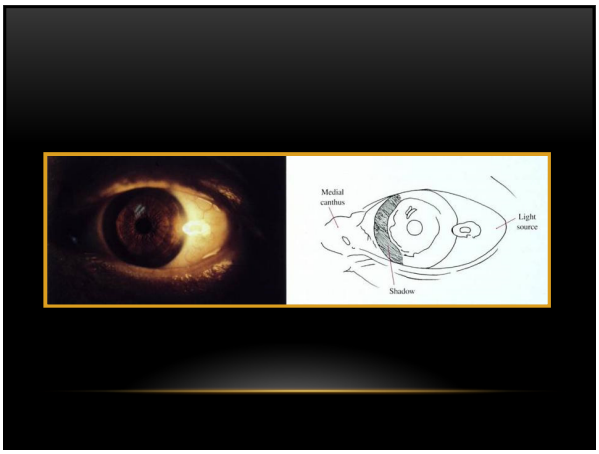




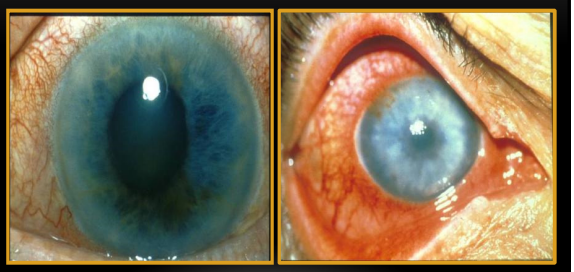
A 55-year-old man comes in for a routine physical examination. Your funduscopic examination reveals the findings illustrated in the photograph in both optic discs.

ACUTE ANGLE CLOSURE GLAUCOMA

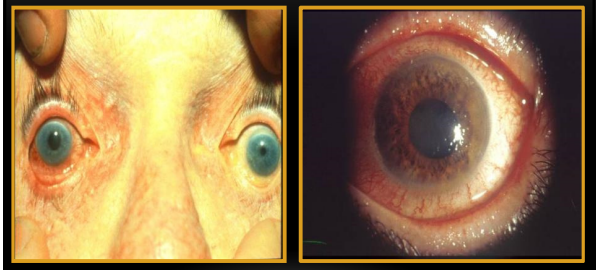
- Often precipitated by administration of mydriatics or moving from daylight to darkened environment
- Distress
  - Severe ocular pain
  - Haloes
  - Nausea/Vomiting
  - Headache



ACUTE ANGLE CLOSURE GLAUCOMA



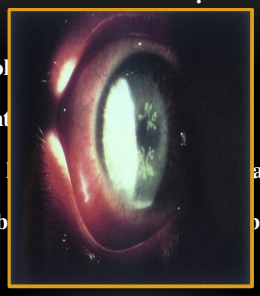
ACUTE ANGLE CLOSURE GLAUCOMA

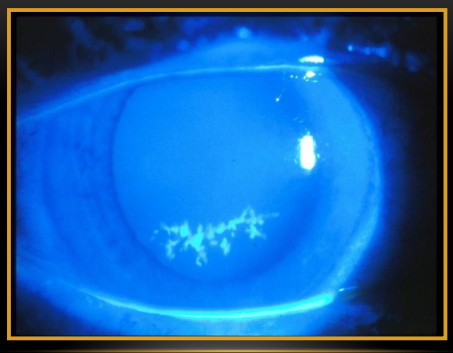


ACUTE ANGLE CLOSURE GLAUCOMA

- Treatment
  - Pilocarpine 1-2% every 15 min until pupillary constriction occurs
  - Topical Timolol 0.25-0.50% solution one drop every 12 hours (Betaxalol can be used)
  - Acetazolamide (carbonic anhydrase inhibitor) 500mg IV
  - IV Mannitol 2-7ml/kg & Glycerol (orally 50% solution of 1.5-4ml/kg if not nauseated
  - Alpha$_2$–agonist (brimonidine)
  - Peripheral Iridotomy

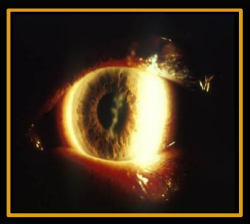
- **33-year-ol**
- **Recurrent** **his left eye**
- **Episodes** **ays**
- **Foreign b** **ia, & tearing**



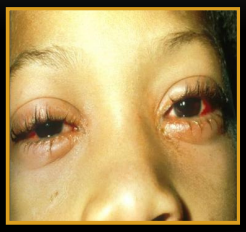


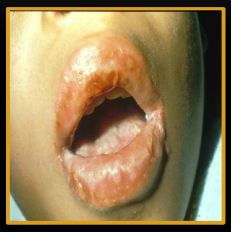
HERPES SIMPLEX KERATITIS

- Localized pain/foreign body sensation
- Fluorescein : dendrites
- Treatment: Antiviral agents



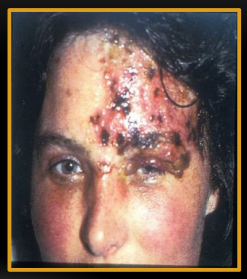
HERPES SIMPLEX KERATITIS



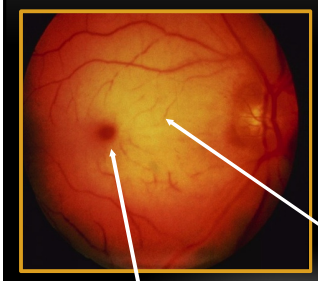


HERPES ZOSTER CONJUNCTIVITIS

- Almost always uniocular
- Hutchinson's Sign
- Corneal dendrite is classic
- Ophthalmology referral
- Avoid steroids
- Antiviral agents



CENTRAL RETINAL ARTERY OCCLUSION

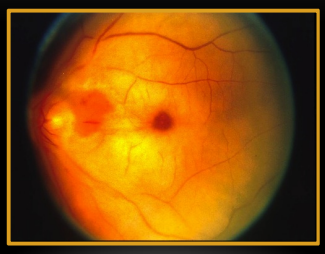


- **70-year-old man suffered a sudden and total loss of vision in one eye**
- **No pain or other symptoms.**

Pale retina

"Cherry-red" spot

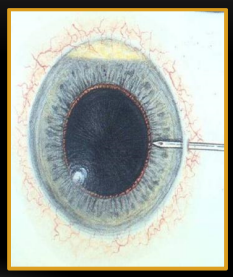
CRAO – EYE EMERGENCY #2!



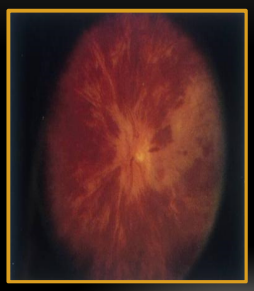
RELATIVE AFFERENT PUPILLARY DEFECT

CRAO - TREATMENT

- Digital massage
- Sublingual nitroglycerin
- Timolol
- Carbogen (95% O_2 / 5% CO_2)
- Anterior chamber paracentesis
- Ophthalmology consult



CENTRAL RETINAL VEIN OCCLUSION



- **65-year-old woman**
- **Sudden, marked, painless loss of vision in one eye**
- **"Hand motion" visual acuity**
- **No systemic symptoms**

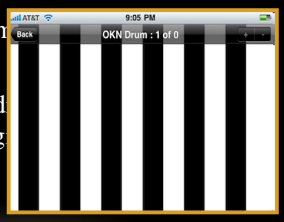
"Blood and Thunder"

ACUTE VISUAL LOSS

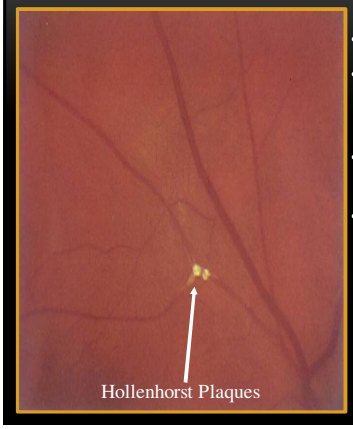
- Retrobulbar Neuritis
  - Loss of central vision
  - Peripheral vision is preserved
  - Multiple sclerosis is associated in 25% of cases
- Eclipse Burn (Sungazer's Retinopathy)
  - Photocoagulation of macula
  - Loss of central vision
  - Visual acuity 20/200 or worse
  - "Gun Barrel" central visual field defect

ACUTE VISUAL LOSS

- Hysterical Blindness



"Eye Handbook" iPhone app

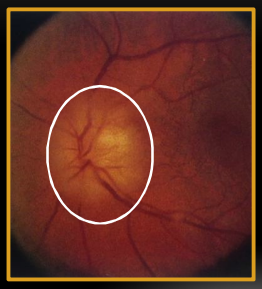


- **65-year-old man**
- **Several episodes of momentary blindness in one eye**
- **Last seconds to minutes**
- **The photograph shows fundus detail of the involved eye**

ACUTE VISUAL LOSS

- Amaurosis Fugax
  - Fleeting uniocular visual loss
  - Vasospasm secondary to atherosclerosis

GIANT CELL ARTERITIS



- **70-year-old woman**
- **Sudden but painless loss of vision in one eye**
- **Headaches and shoulder pain during the past several months**

GIANT CELL ARTERITIS

- Headache, visual complaints, malaise, jaw claudication
  - Diagnostic Features:
    - Tenderness of affected artery
    - Markedly elevated ESR > 100
    - Elevated CRP
    - Swelling of optic nerve head
  - Treatment: IV Methylprednisolone
  - Consultations

DIABETIC EYE DISEASE

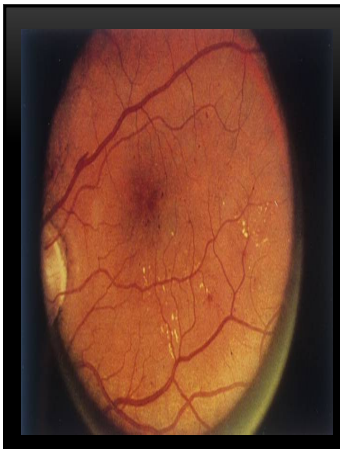
- 2% of population
- 50 million patients world wide
- 30% background signs, 13% threatened vision
- ~ 6 million require laser now

DIABETIC RETINOPATHY

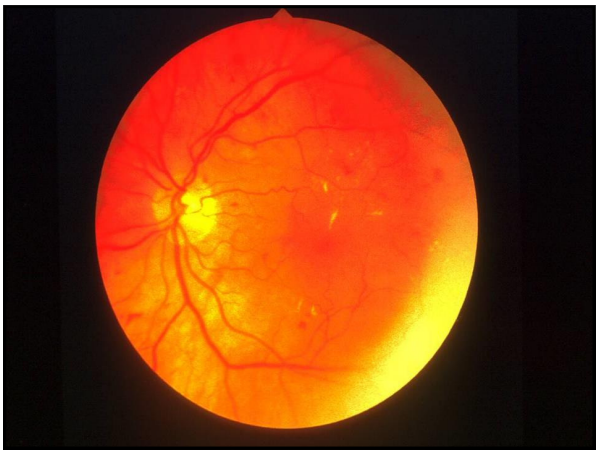
- Non proliferative
  - Mild
  - Moderate
  - Severe
- Proliferative retinopathy
  - Low risk
  - High risk

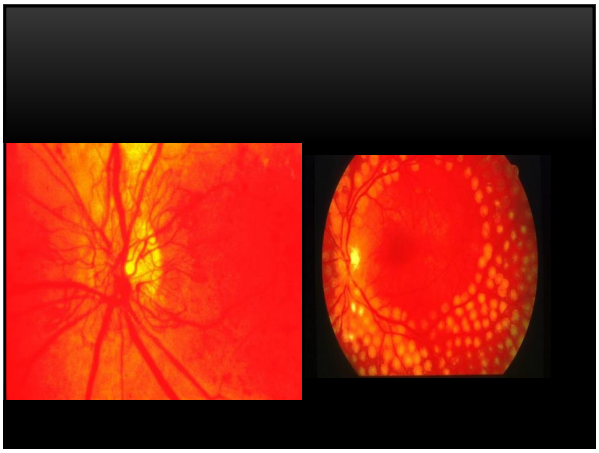
DIABETIC RETINOPATHY

- Microaneurysms
- Cotton wool spots
- Hemorrhage (dot-blot, flame)
- Intraretinal microvascular anomaly
- New vessels

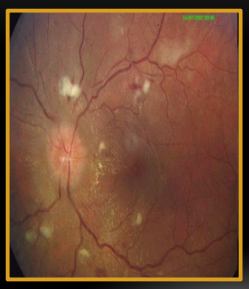


A 60-year-old obese woman complains of general malaise and has no ocular complaints. The fundus photograph illustrates the ophthalmoscopic findings in both eyes.





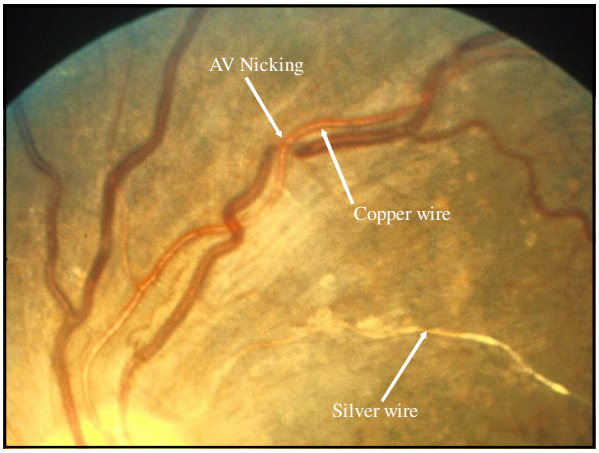
HYPERTENSIVE RETINOPATHY



- 55-year-old man
- Headaches for several months
- Fundus similar in both eyes

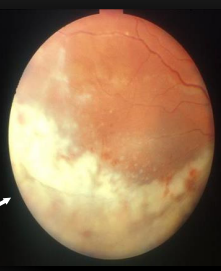
HYPERTENSIVE RETINOPATHY

- A-V nicking
- Retinal arterial narrowing
- Flame hemorrhages
- Cotton wool spots
- Papilledema



RETINOPATHIES

- 30 year old presents with 6 month history of fever, weight loss, cough, and rash.



CMV Retinitis ("pizza pie")

NEURO-OPHTHALMOLOGY

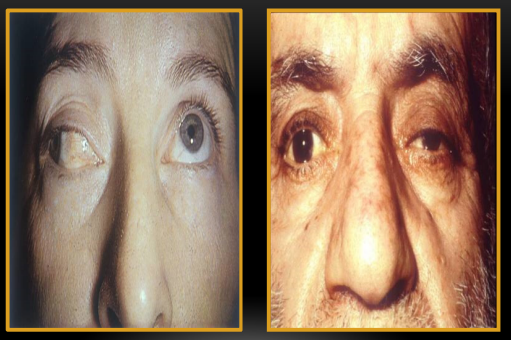
- Anisocoria
  - Adie's Tonic Pupil – responds to .05-0.1% Pilocarpine
  - Third Nerve Palsy – responds to 1% Pilocarpine
  - Atropinic Mydriasis - **No** response to 1% Pilocarpine

NEURO-OPHTHALMOLOGY

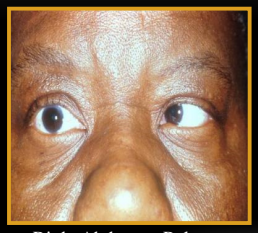
- Third Nerve Palsy
  - Levator palpebrae (upper eyelids), the superior, medial, inferior rectus and inferior oblique muscles; carries paraysmpathetic fibers to the sphincter of the iris
  - Signs: dilated pupil
  - Ptosis
  - Deviation of the eye: "down and out"

3RD NERVE PALSY

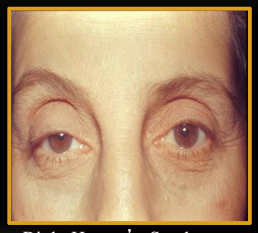
- Pupil-sparing
  - Diabetic 3rd nerve palsy
  - NOT an emergency
- Pupil involved
  - Posterior communicating artery aneurysm
  - Emergency!



NEURO-OPHTHALMOLOGY



Right Abducens Palsy



Right Horner's Syndrome

NEURO-OPHTHALMOLOGY

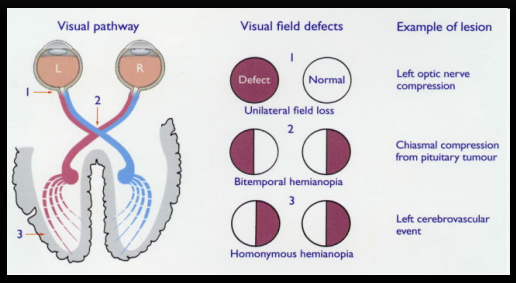
- Sixth Cranial Nerve
  - Abducens: Innervates lateral rectus
  - Signs: Loss of abduction
  - Cause: Intracranial tumors ~ 30%
- Horner's Syndrome
  - Pancoast tumor, carotid dissection, aortic aneurysm

NEURO-OPHTHALMOLOGY

- Myasthenia Gravis
  - Signs: Diplopia
  - Ptosis
  - Spares pupil
  - Diagnosis: Edrophonium chloride (tensilon test)
- Additional causes of extra ocular muscles palsies:

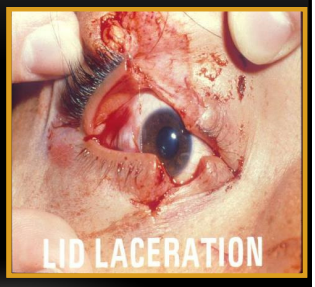
  Cavernous sinus thrombosis and carotid cavernous fistula

VISUAL LOSS



TRAUMA

- Lid Lacerations
  - Skin only: close with 6-0 or 7-0 nylon
  - Five anatomical areas where expertise is needed:
    - Lacrimal canaliculi
    - Levator
    - Orbital septum
    - Canthal tendons
    - Lid margins

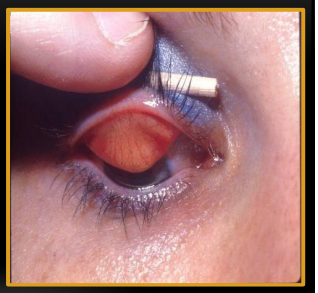


TRAUMA

- Conjunctival Lacerations
  - Usually minor
  - Positive fluorescein dye
  - Repair if > 1cm
  - Suspect:
    - Retained foreign body
    - Orbital fracture
    - Scleral rupture
    - Carotid cavernous fistula

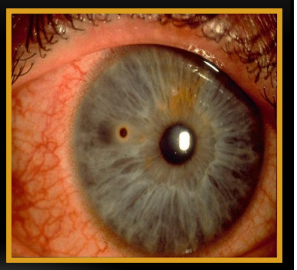
TRAUMA

- Corneal Abrasions
  - Positive fluorescein stain
  - "Ice Rink Sign" - Tarsal foreign body
  - Contacts
  - Treatment:
    - Topical cycloplegic
    - Topical antibiotic



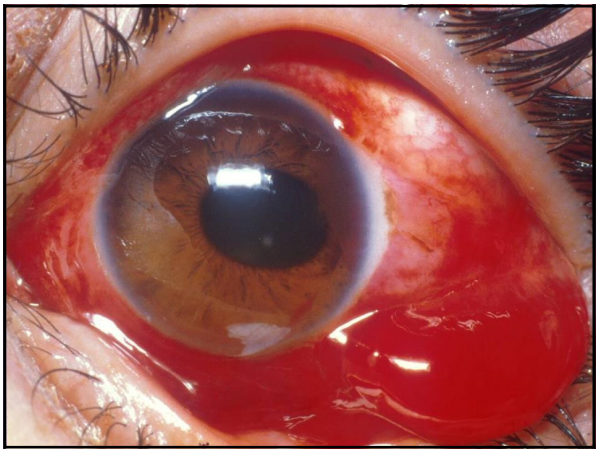
TRAUMA

- Foreign Bodies
  - Special situations:
    - Rust Ring: From metallic foreign body
      - Remove OR Refer
    - Wooden Splinters:
      - Must be removed by slit lamp
      - Watch for fungal infection.

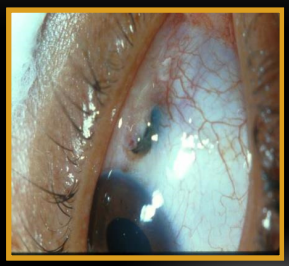


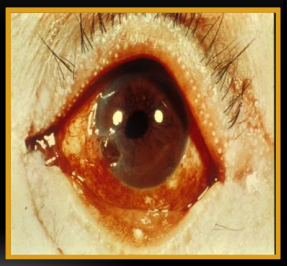
TRAUMA

- Glob
  - Su
  - Vi
  - Sc f
    flu
  - Tr



TRAUMA

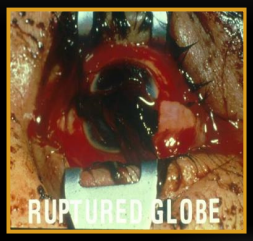


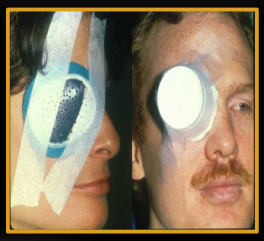


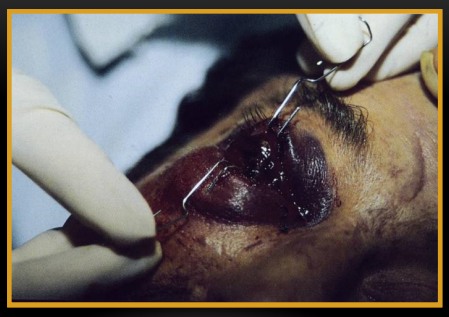
TRAUMA

- Globe Perforation
  - Systemic antibiotics
  - Tetanus prophylaxis
  - NPO
  - Protect the eye!!!

TRAUMA

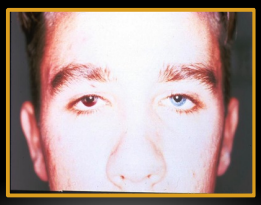




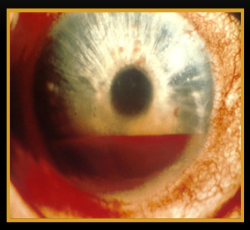


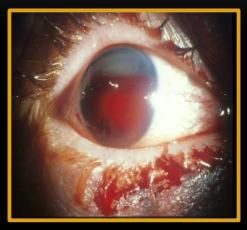
HYPHEMA

- **25-year-old struck in eye with racquetball**
- **Not wearing protective eye gear**



HYPHEMA





HYPHEMA

- Hemorrhage in anterior chamber
- Blunt trauma
- Recurrence of bleeding over first 5 days which may be worse than initial bleed
  - 2% blue eyes, 40% African-Americans
- Complication: extension into vitreous cavity and intractable glaucoma
- Consider sickle cell anemia

HYPHEMA

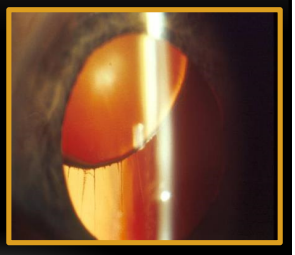
- With total hyphema, 20-25% will have visual acuity of 20/40 or less
- Treatment: Hospitalization, sedation, bed rest
- Management of hyphema
  - Assume globe is ruptured
  - Shield eye and refer to ophthalmology
  - 25% of patients have other ocular injuries

TRAUMA

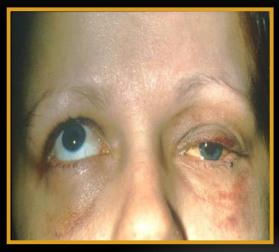
- Hyphema – additional potential treatment
  - Dilation if seen in first few hours prevents iris movement
  - Topical steroid helps clot dissolution
  - Alpha aminocaproic acid – not in children

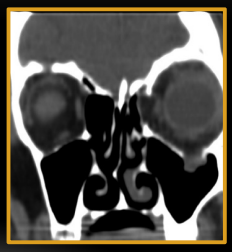
TRAUMA

- Traumatic Dislocated Lens
  - Blunt trauma: rupture of zonules fibers
  - Marfan's syndrome
  - Iridodonesis: trembling of lens with shaking of head
  - Treatment: can be delayed for several weeks
  - Complication: secondary glaucoma



TRAUMA





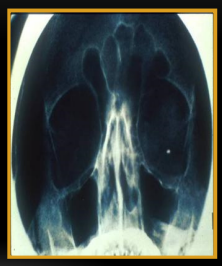
BLOW-OUT FRACTURE OF ORBIT

- Floor /medial wall easily subject to fracture
- Inferior rectus muscle and orbital fat may prolapse
- Infraorbital nerve usually involved
- Pain and diplopia in upward gaze
- Hypesthesia in distribution of orbital nerve

BLOW-OUT FRACTURE OF ORBIT

- Treatment: Ophthalmology referral/consult
- Management
  - Antibiotics, nose-blowing precautions
  - Surgery indicated only for persistent diplopia or poor cosmesis
  - Surgery can be delayed since diplopia may be transient

TRAUMA



No children were harmed during the making of this slide!

INTRAOCULAR METALLIC FOREIGN BODY

- Pounding metal
- May be present one or two days after injury
- Non localizing pain
- Diagnosis: X-ray or ultrasound
- Treatment: Surgical removal

INTRAOCULAR FOREIGN BODY

- NPO
- Tetanus
- Eye shield
- Antibiotics

INTRAOCULAR FOREIGN BODY

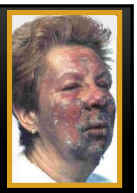
- Wood, vegetable matter, iron, copper & steel – intense inflammation
- BBs & pellets (lead & iron) poorly tolerated – chorioretinitis
- Inert – Glass, lead, plaster, rubber, silver & stone may not be removed if asymptomatic

TRAUMATIC IRITIS

- Blunt
- Photo
- Ciliar
- Diagn
- Intrao
- Treatr
- Steroi

ected eye

AIR BAG INJURIES



- Sodium azide releases sodium hydroxide
- Screen for alkali burn: pH measurement
- Periorbital abrasions, chemical keratitis, corneal abrasions
- Lens subluxation, cataracts, hyphemas, & globe rupture

CYANOACRYLATE GLUE

- Household superglues – chemical keratitis
- Medical superglues – lower tissue toxicity, traumatic keratopathy

CYANOACRYLATE GLUES
EYELID MARGIN ADHESION

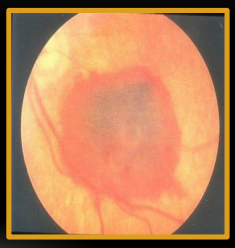
- Anecdotal treatment

Eyelid
In the event that eyelids are stuck together or bonded to the eyeball, wash thoroughly with warm water and apply a gauze patch. The eye will open without further action within 1-4 days. To our knowledge there has never been a documented case of adhesive in the eye causing permanent damage. Do not try to force eyes open.

Eyeball
The adhesive will attach itself to the eye protein and will disassociate from it over time, usually within several hours. Periods of weeping and double vision may be experienced until clearance is achieved. Use of water to wash eyes repeatedly may assist in aiding more rapid removal of the adhesive.
WE SUGGEST THAT ALL INCIDENTS OF EYE EXPOSURE TO CYANOACRYLATE ADHESIVE (SUPER GLUE) BE DISCUSSED WITH A PHYSICIAN.

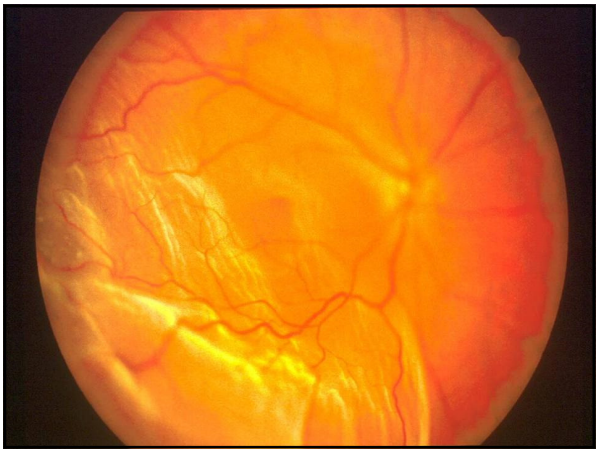
TRAUMA

- Vitreous and Retinal Hemorrhage
  - Blunt trauma
  - Loss of red reflex
  - Retinal detail obscured
  - Torn retinal or uveal blood vessel

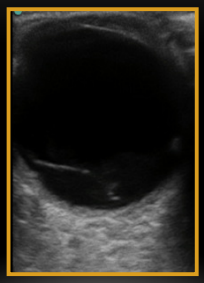


TRAUMA

- Retinal Detachment
  - Painless
  - Lowering or raising of curtain
  - Flashing lights in peripheral vision
  - "Dunes on a beach"



RETINAL DETACHMENT



ORBITAL COMPARTMENT SYNDROME (OCS)

- Usually after blunt trauma
- Acute elevation of intraorbital pressure
- Ocular dysfunction
- Retrobulbar hemorrhages most likely scenario
- Irreversible optic nerve damage and retinal ischemia within *90 minutes*

OCS – EYE EMERGENCY #3!

- Globe may accommodate pressure & prolapse forward
- Intraorbital pressure increases – orbit reaches maximal distention

OCS

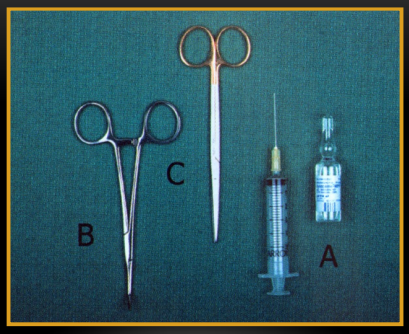
Diagnosis

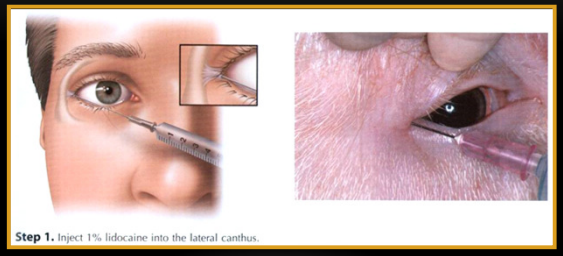
- Ocular pain, proptosis, afferent pupillary defect, diminished vision
- Chemosis, increased IOP, mydriasis, diminished retropulsion of globe, ophthalmoplegia

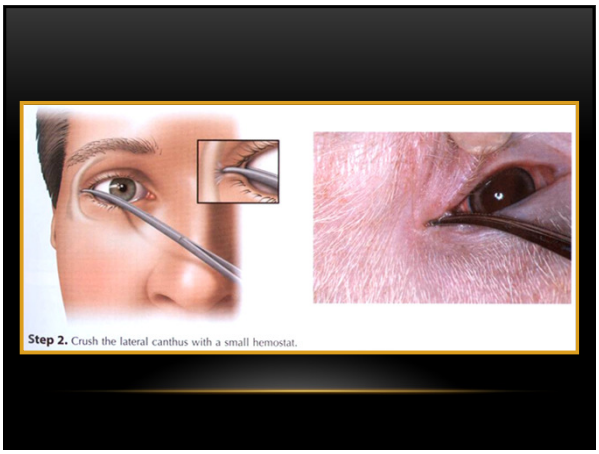
OCS

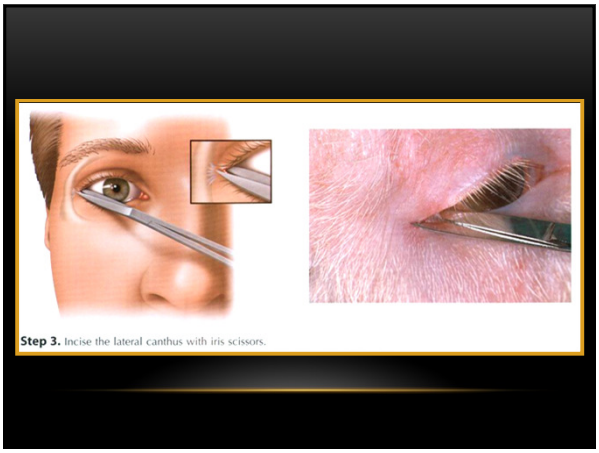
Treatment

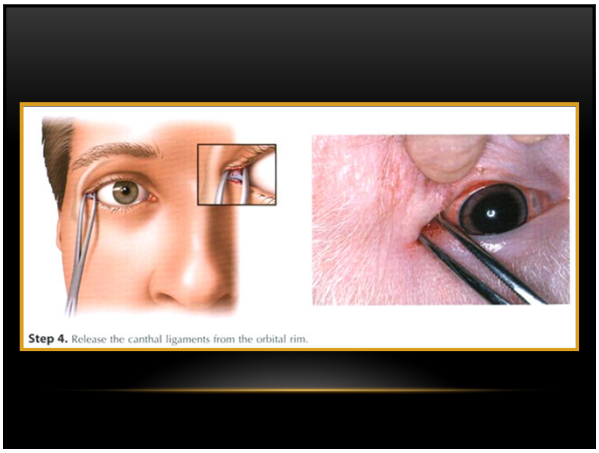
- Surgical intervention (primary)
- Immediate lateral canthotomy & cantholysis
- Within one hour of injury & ocular dysfunction
- Medical therapy is adjunctive






Step 2. Crush the lateral canthus with a small hemostat.


Step 3. Incise the lateral canthus with iris scissors.


Step 4. Release the canthal ligaments from the orbital rim.

OPHTHALMIC MEDICATIONS

- Anesthetics
  - Proparacaine: most popular
    - Onset within 20 seconds
    - Duration: 10-15 minutes
  - Tetracaine
    - Onset of action more delayed (4 minutes)
    - Duration greater: 30-40 minutes
    - Depth of anesthesia is greater

OPHTHALMIC MEDICATIONS

- Mydriatic/Cycloplegics: Dilate and paralyze the ciliary body
  - Tropicamide (Mydriacyl)
    - Complete recovery within 6 hours
  - Cyclopentolate (Cyclogyl)
    - Duration less than 24 hours
  - Homatropine
    - Duration 2-3 days
  - Atropine
    - Duration up to two weeks

OPHTHALMOLOGY MEDICATION

Recent fluoroquinolones

- Vigamox – moxifloxacin HCL (Alcon)
- Zymar – Gatifloxacin (Allergan)

Less recent flouroquinolones

- Ciloxan – Ciprofloxacin
- Ocuflox – Ofloxacin
- Quixin - Levofloxacin

OPHTHALMOLOGY MEDICATIONS

Selected anti-inflammatory/allergy/decongestants

- Acular – NSAID
- Alocril – mast cell stabilizer
- Elestat – H_1 antagonist
- Naphcon-A – H_1 antagonist/alpha-agonist
- Optivar – H_1, antagonist
- Patanol – H_1, antagonist & mast cell stabilizer
- Voltaren – NSAID
- Zaditor – H_1, antagonist & mast cell stabilizer

MISCELLANEOUS

- Fluorescein solution may cause *pseudomonas* infection
  - Always use fluorescein coated strips

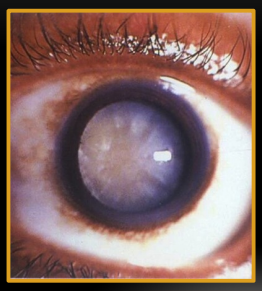
SIDE EFFECTS OF TOPICAL STEROIDS

- Enhance corneal penetration of herpes virus
- Steroid induced glaucoma
- Cataract formation
- Potentiates fungal corneal ulcers

COLOR CODES FOR OPHTHALMIC MEDICATIONS

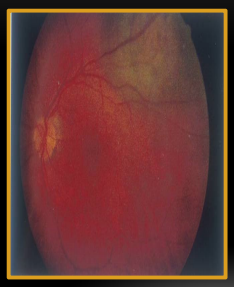
Top	Drug Action	Example
Red	Dilation	Mydriacyl
Green	Constriction	Pilocarpine
Yellow	Caution	Timolol
Clear / white	Anesthetic	Proparacaine
Blue	Irrigant / Lubricant	Artificial Tears

CATARACT



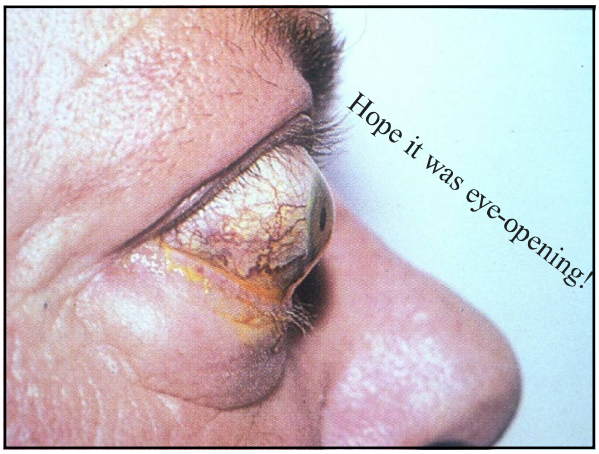
- **75-year-old man**
- **Bilateral asymmetric decrease in vision**

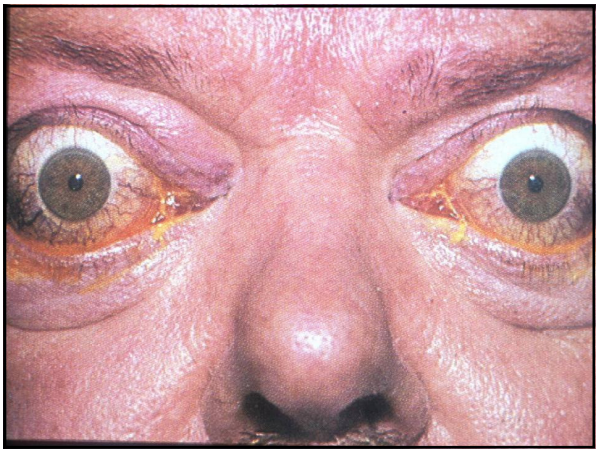
MELANOMA

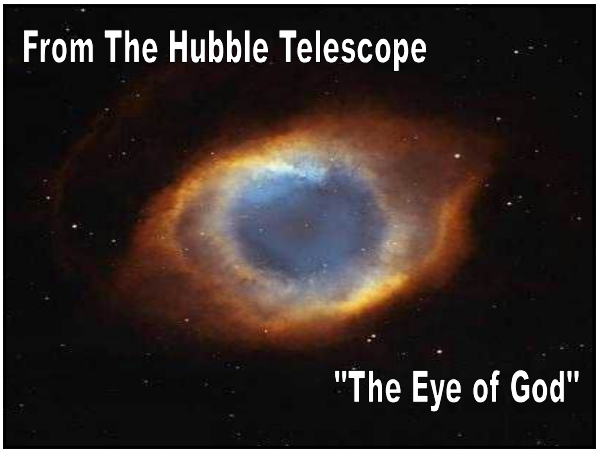


- **55-year-old man comes to your office with complaints of painless but progressive inferior visual field loss in one eye**
- **Funduscopic shows?**

"The eyes are the windows to the soul."


Hope it was eye-opening!




From The Hubble Telescope
"The Eye of God"