

Ocular Trauma

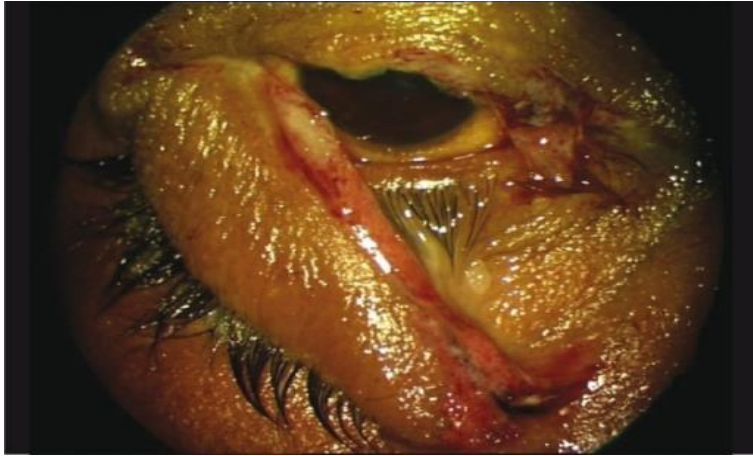
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- Prevention is better than cure!
- History is v important
- Can range from a superficial FB to an IOFB!
- Causes
 - Work related injuries
 - Sport and recreational injuries
 - Assault
 - Self inflicted



Types

- Chemical injuries (needs a separate talk!!)
- Mechanical injuries
 - Closed Globe injury (injury without Full thickness corneoscleral defect)
 - Contusion
 - Lamellar laceration
 - Superficial FB
 - Open globe injury (Full thickness defects corneoscleral defects)
 - Laceration (outside to inside break)
 - Penetrating (object traverses the coat only once)
 - Perforating (entry and exit wound)
 - Intraocular FB
 - Rupture (inside to outside break)
- Orbital Trauma (technically NOT an ocular injury)

Chemical Injuries (Briefly)

- Alkalis
 - Lipophilic
 - Saponify fatty acids in cell membrane
 - Destroy collagen and proteoglycans in the stroma
 - Penetrate the surfaces easily and cause necrosis of surface epithelium in SECONDS
 - Also cause occlusion of vasculature leading to anterior segment ischemia
 - Lime, Ammonia and sodium hydroxide are particularly nasty
 - In our country 'CHUNA' or lime is the usual culprit

- Acids
 - Hydrochloric and sulphuric acid
 - Denature and precipitate proteins
 - Coagulate the surface layers to form a coagulum
 - therefore have less penetration into the eye
 - Can also produce gimbals schema
 - Immediate Copious irrigation is necessary

Treatment of Chemical injuries (In brief)

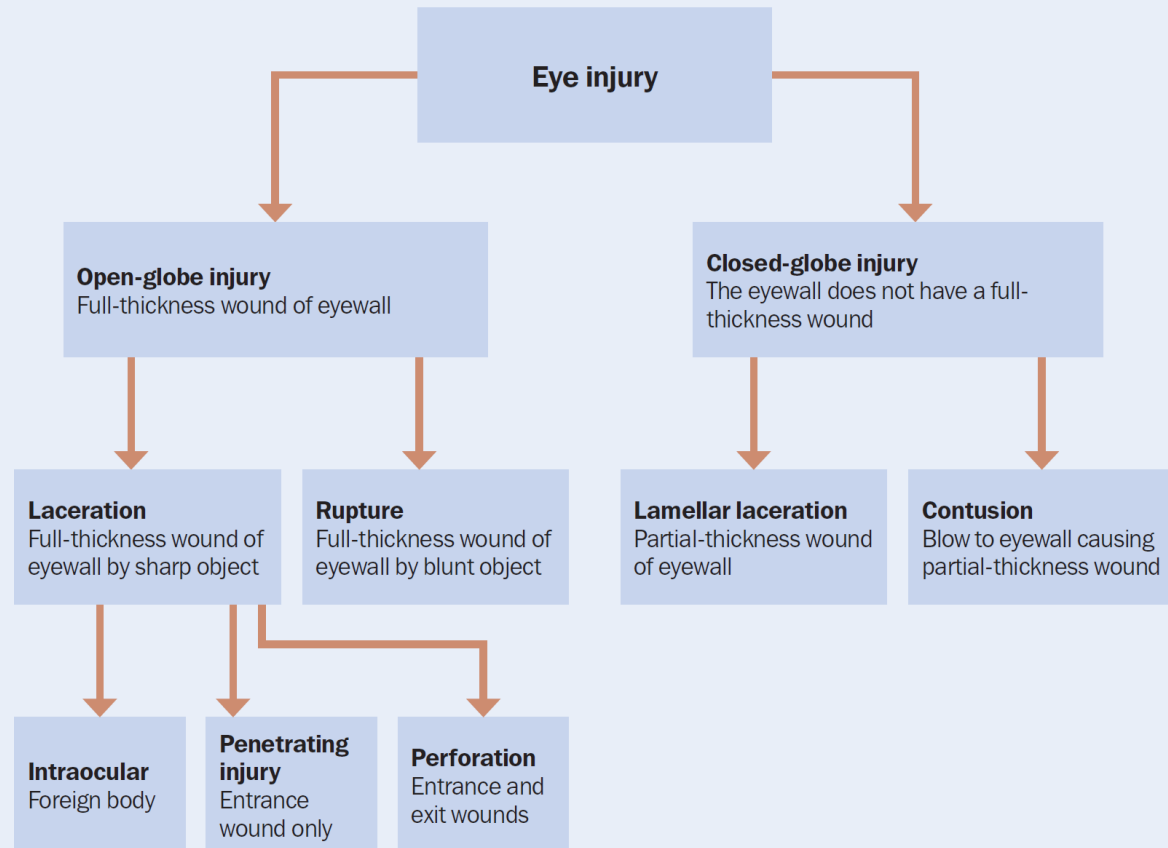
- Copious irrigation of the ocular surface and fornices!! Use a minimum of 2 liters of Ringer lactate/ Basis Salt Solution / Normal Saline / Water
- Do not waste time if the best irrigating solution is not available - even tap water is better than no irrigation or delay in the same
- Take a history while you are irrigating the eye.
- Irrigate the eye till the pH is normal or for a period of minimum 30 mins.
- Best method is using a IV tubing on full flow
- Irrigate the fornices and remove any particulate matter

- Medication
 - Lots of topical lubrication, hourly
 - Antibiotics if secondary infection
 - Cycloplegia to reduce pain
 - Topical steroids for the initial 7-10 days ONLY. DO NOT CONTINUE BEYOND 10 DAYS
 - Oral Ascorbic acid and Oral tetracyclines to reduce breakdown of collagen
 - Daily sweeping with glass rod for symblepharon prevention

TABLE 24.1 Hughes-Roper-Hall Classification of Ocular Chemical Burns

Grade	Epithelial Damage	Stroma	Perilimbal Ischaemia	Prognosis
I	Present	Minimal haze (can see details of iris)	None	Good
II	Present	Moderate haze (blurred iris)	<1/3	Good
III	Present	Hazy (barely visible pupil)	1/3–1/2	Guarded
IV	Present	Opaque cornea	>1/2	Poor

Figure 1. BETTS eye injury classification



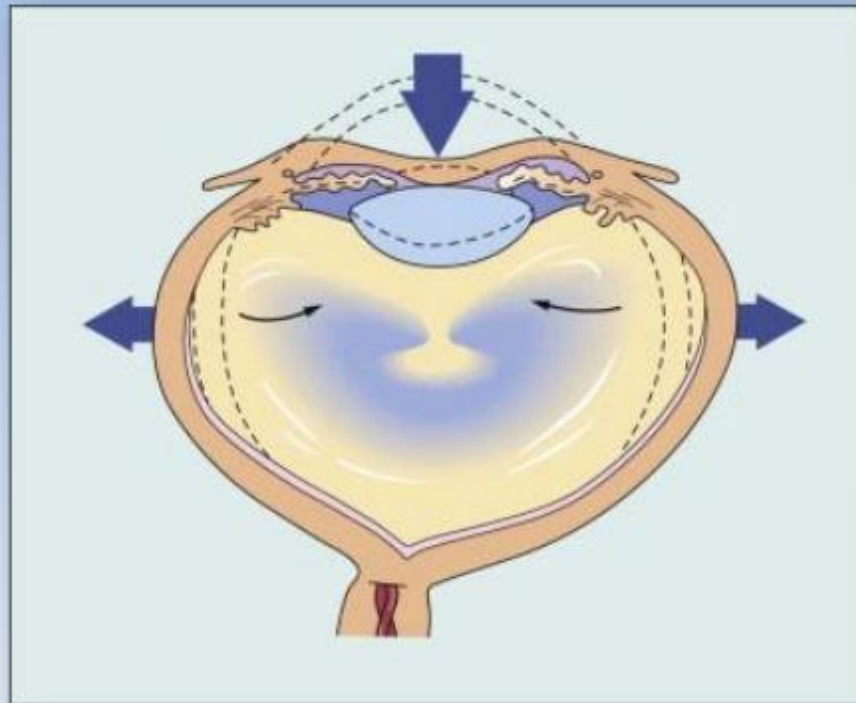
This figure was published in *Ophthalmology Clinics of North America*, Volume 15, Kuhn F, Morris R and Witherspoon CD. Birmingham eye trauma terminology (BETT): terminology and classification of mechanical eye injuries, pages 139–143, copyright Elsevier, 2002.

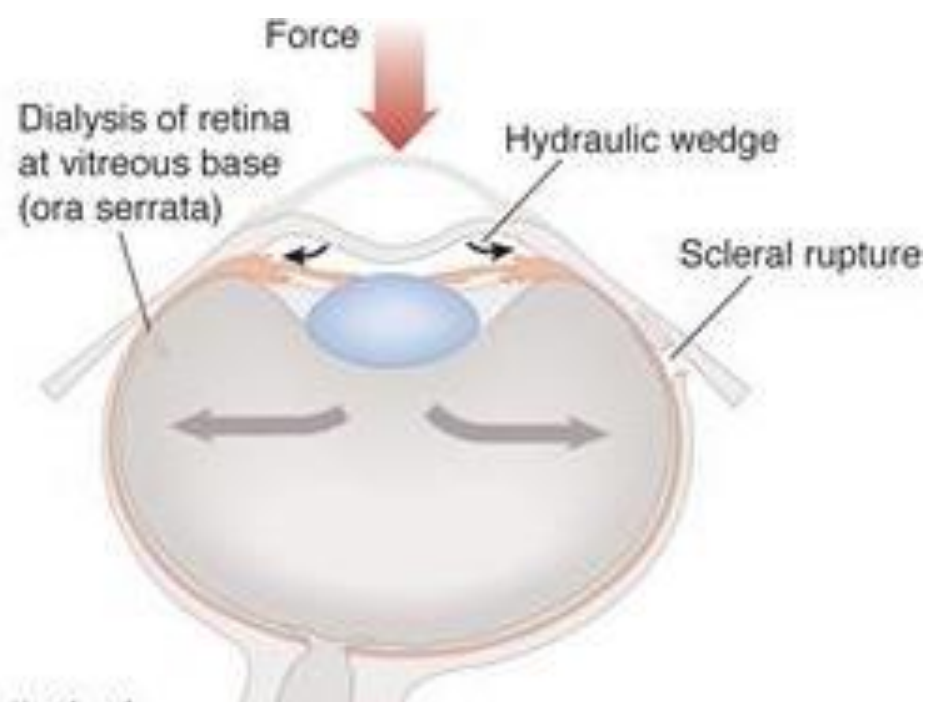
Closed globe/contusion/concussion injuries

Contusion/ Concussion injury

- Coup and counter coup
- MOA
- Damage caused depends on force endured!
- Can affect virtually any structure within the eye
- Always Always Always give a very guarded visual prognosis as delayed manifestations are known

Pathogenesis of ocular damage by blunt trauma





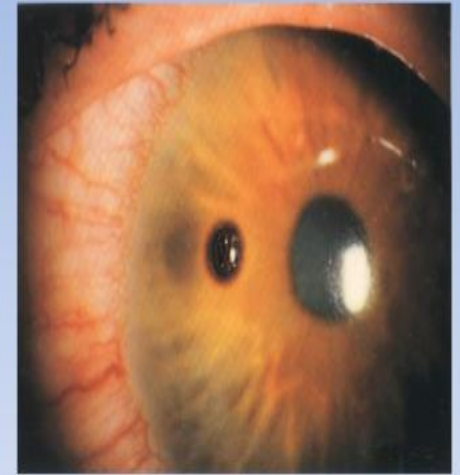
Best form of ocular trauma to have!

- Superficial FB
 - Conjunctival, corneal, subtarsal
 - Needs removal with a sterile 26 G needle
 - Post procedure
 - Preventive measures

Superficial foreign body



Subtarsal foreign body



Corneal foreign body with surrounding cellular infiltration

Cornea

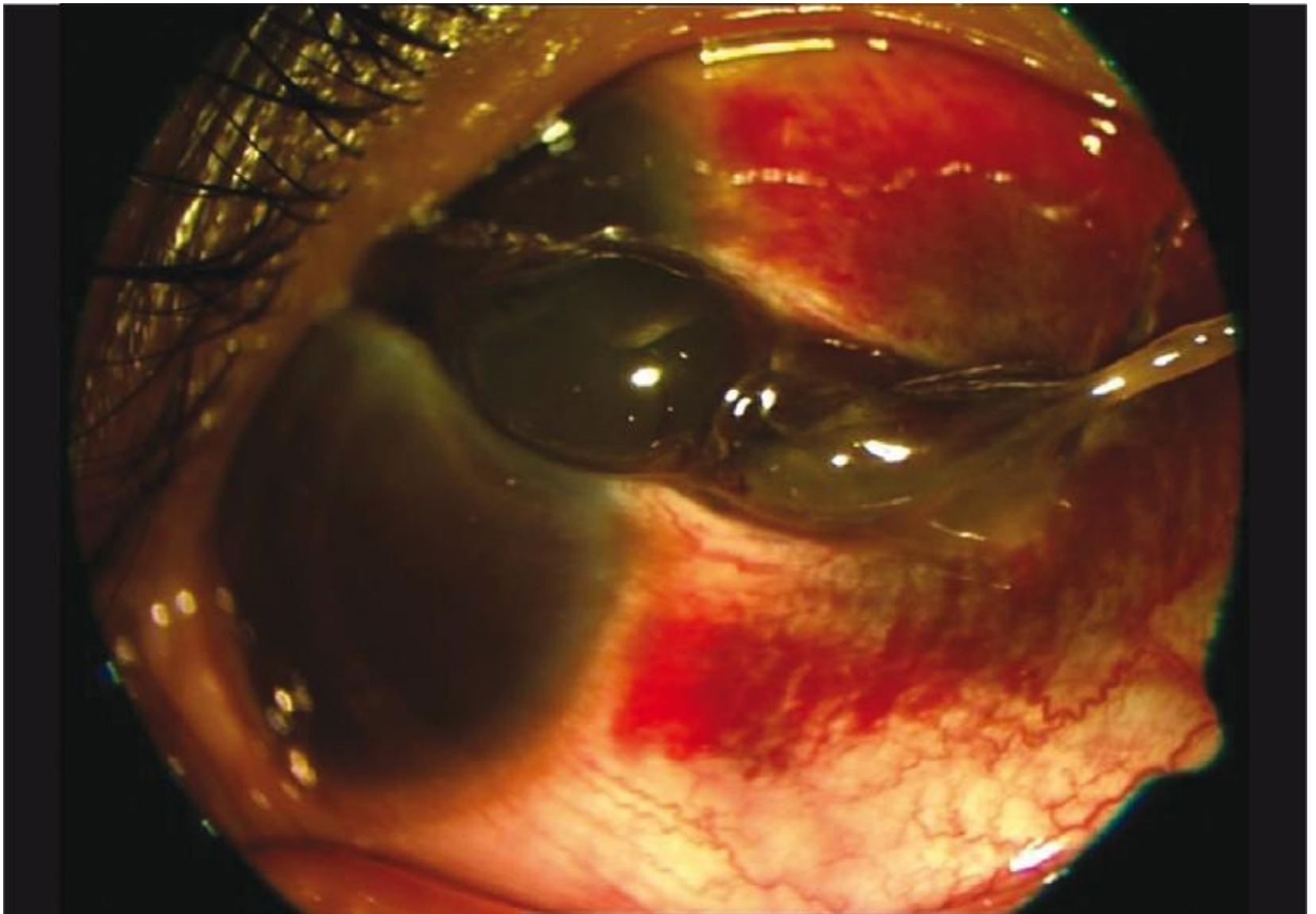
- Simple abrasion
- Recurrent erosion
- DM trauma/DM rupture (forceps delivery)
- Laceration

Sclera

(discuss in the open globe section)

- Rupture
 - Open globe injury
 - Injury occurring from inside out
 - Due to being suddenly and violently forced against a fixed orbital wall
 - Commonly the inferotemp aspect of the globe is hit
 - Scleral gives way at its weakest point
 - Generally concentric or oblique injury
 - Associated uveal prolapse/ iridodialysis
 - Lens may be extruded from the eye
 - Hyphaema, VH, RD Suprachoroidal haemorrhage

- Treatment – aim is to establish normal anatomy
 - Repair the wound
 - 8-0 nylon
 - Mx of uveal prolapse
 - Suture landmarks first
 - Visual prognosis always guarded and generally poor
 - Further surgery after 14 days
 - If very severe injury enucleate
 - Topical antibiotics and steroids post repair





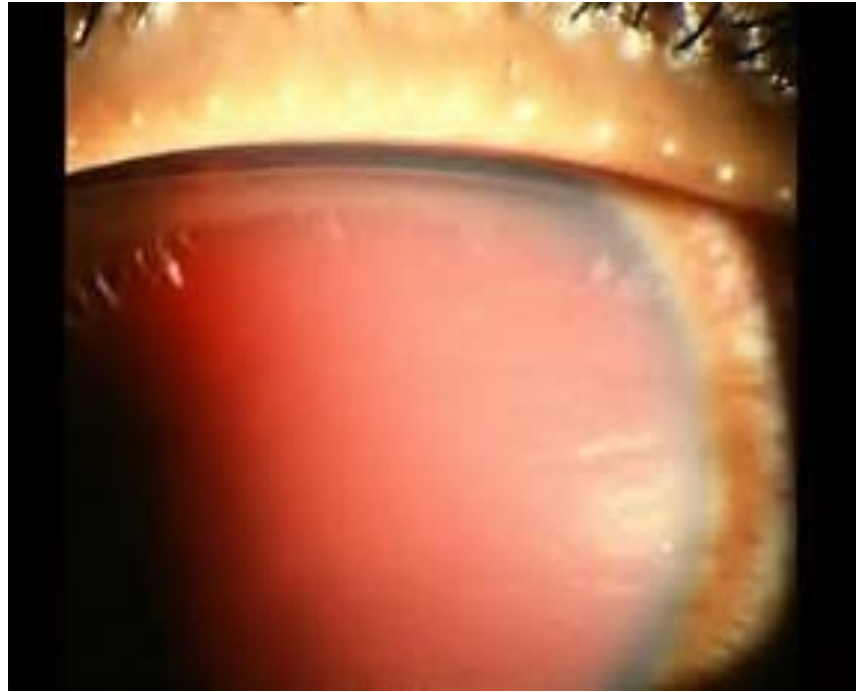
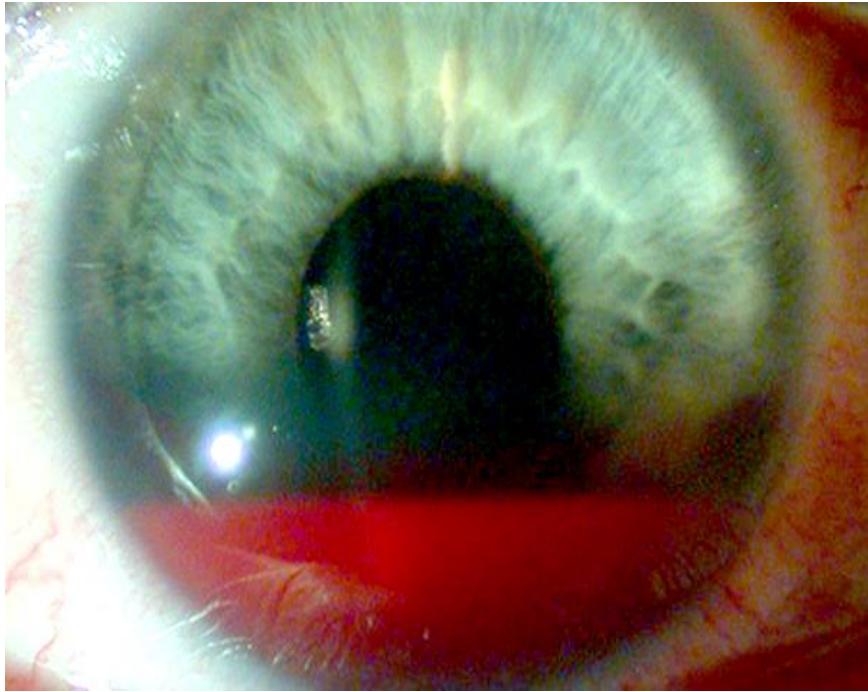


Iris and Ciliary body

- Functional loss
- Traumatic mydriasis
- Tears in the pupillary margin
- Iridodialysis
 - Black biconvex area in the periphery
 - Pupil is D shaped
 - May get uniocular diplopia
 - Treatment?
- CB tear/rupture/detachment
 - Angle recession
 - Treatment?
- Hyphaema (minimal /severe)
 - Mx
 - Depending on extent
 - Supportive mx
 - Surgical mx

Iridodialysis





Lens

- Vossius ring
- Cataract
 - Rosette Cataract
 - Mechanical trauma to the fibers
 - Micro tears in the capsule which allow aqueous to enter the lens
 - Can remain static or progress
 - Sometimes you can see the IOFB tract in the lens

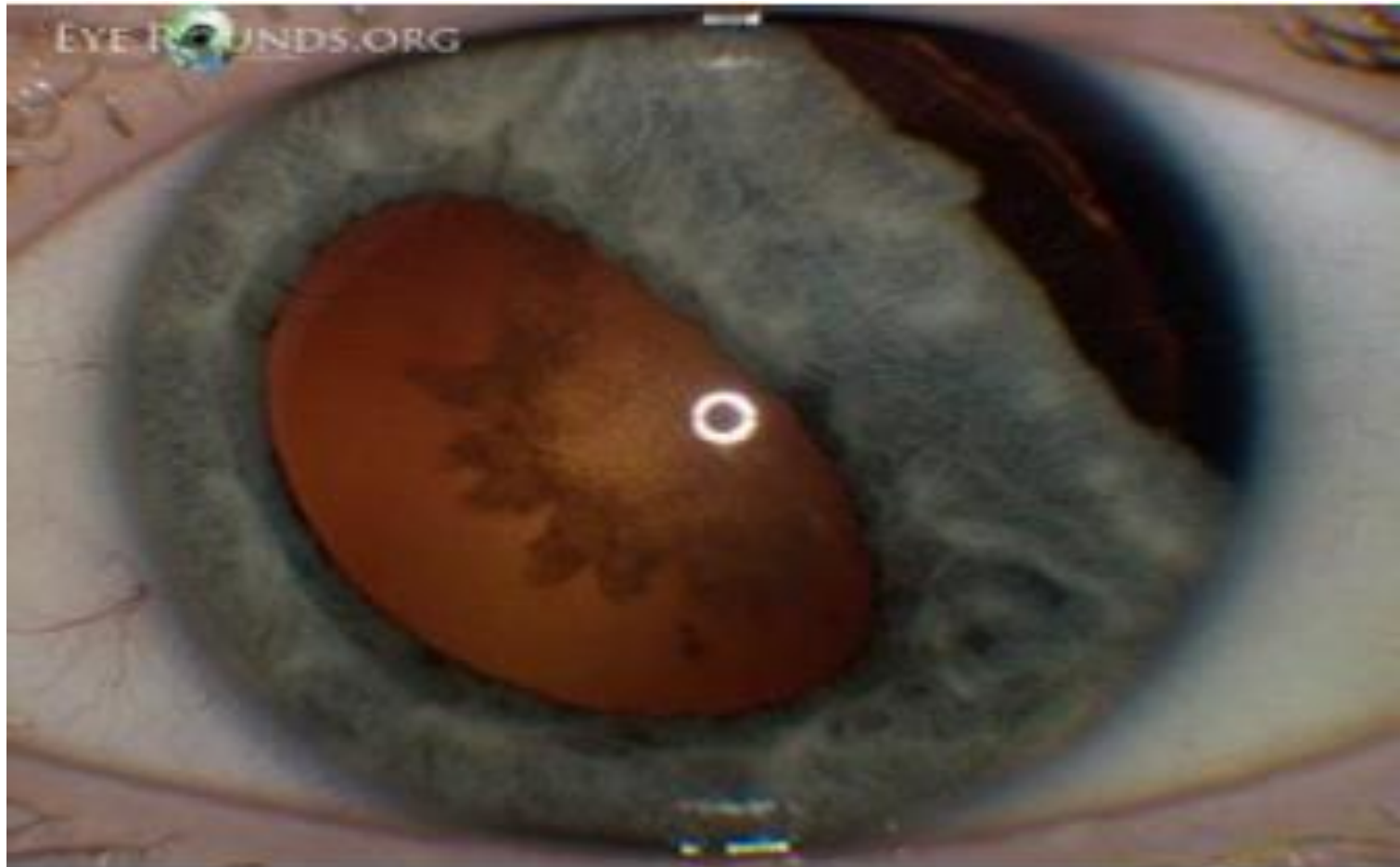
- Dislocation
 - Complete break in zonules
 - Lens dislocated from the lenticular fossa
 - Anterior or posterior
 - Lens in AC /lens in vitreous
 - If post dislocation, Iridodonesis
 - Treatment is surgical removal.
 - Timing of surgery?

- Subluxation
 - Partial tear in the zonules
 - Laterally displaced with slight ant rotation/tilt
 - If significant, Grey convex margin after pupil dilation or a black rim on fundoscopy
 - Patient may get diplopia if significant subluxation
 - Some iridodonesis and unequal AC depth

Vossius Ring



Iridodialysis

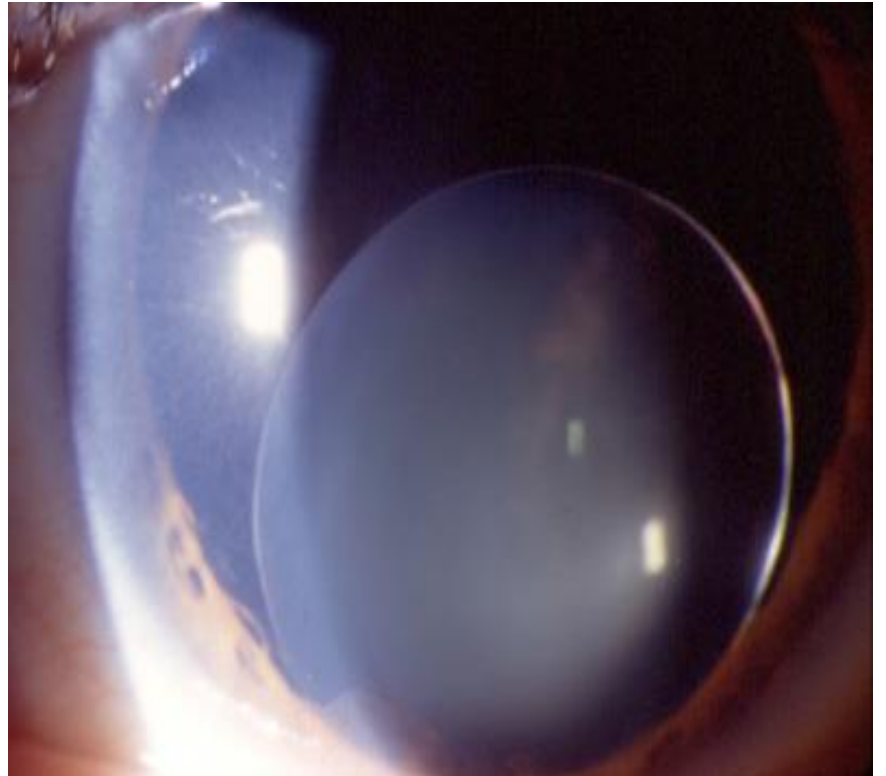


Subluxated lens



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Dislocated lens

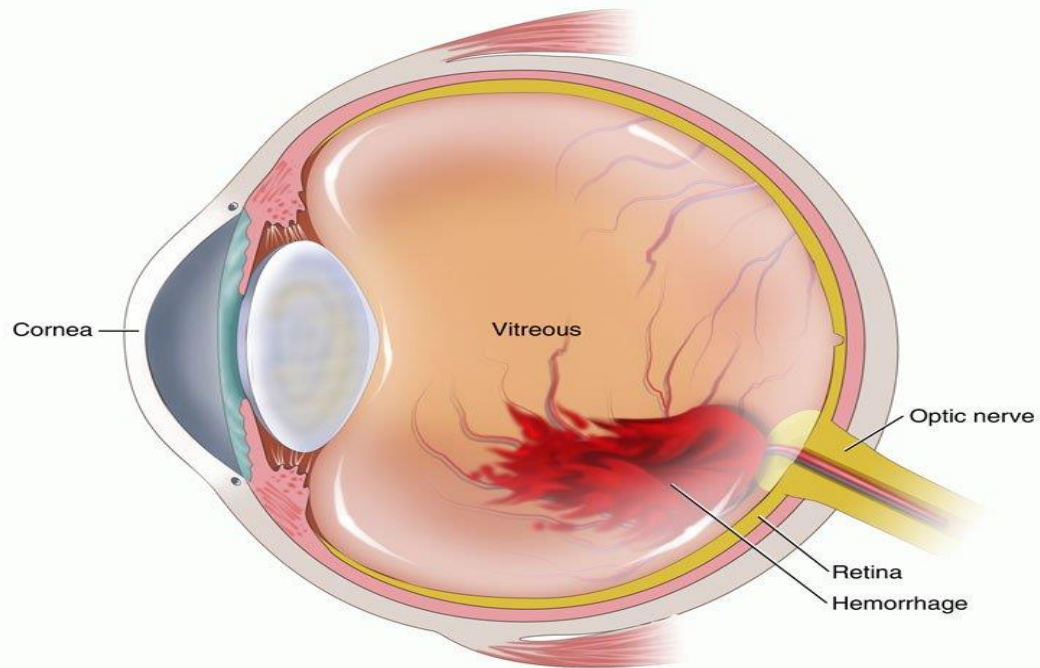


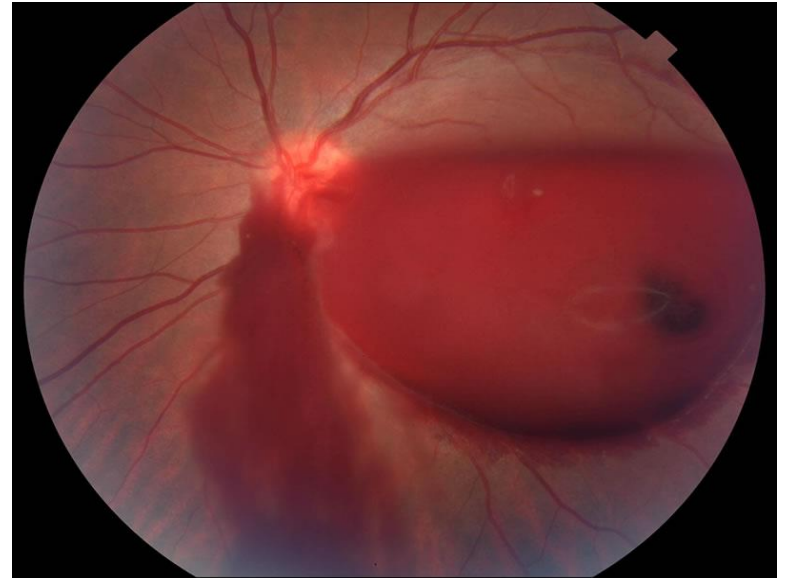
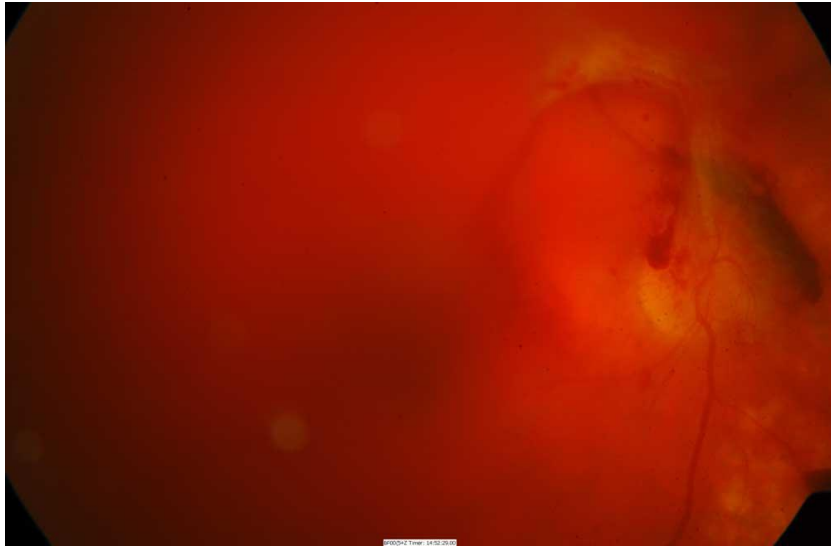


Vitreous and Choroid

- PVD with or without a retinal tear
- Choroidal rupture
 - Caused by severe contusion by a blunt object striking the front of the eye
 - VA is affected depending on location
 - Initially view is obscured by a massive extravastation od blood
 - Curved white streak concentric to the disc, usually temporal
 - Treatment is supportive
 - Complication - CNVM

Vitreous Hemorrhage



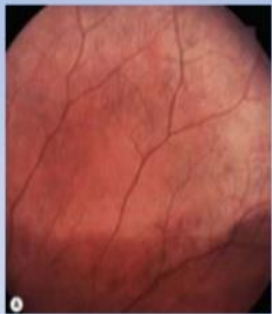




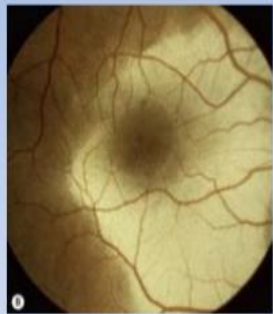
Retina

- Commotio retinae (Berlins Odema)
 - Milky white cludiness appears over the retina
 - Odema
 - Mostly resolves
 - Presence of intraretinal haemorrhage is not a good sign
 - Late decrease in vision may be secondary to pigmentary deposits
- Retinal tear and Giant retinal tear
- Retinal Dialysis
- RD
- Traumatic Macular degeneration

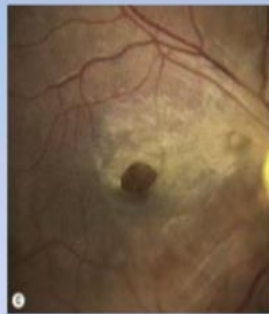
Comotio retinae



(A) Peripheral



(B) central



(C) macular hole following resolution







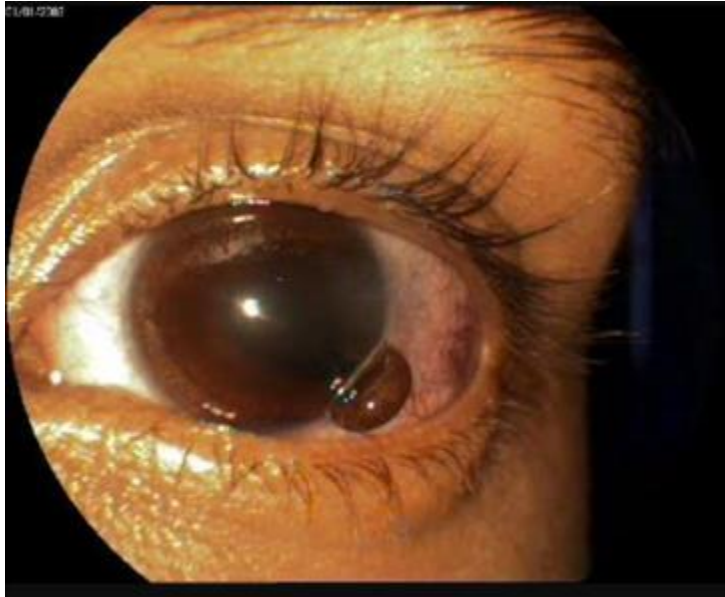
Optic Nerve and IOP

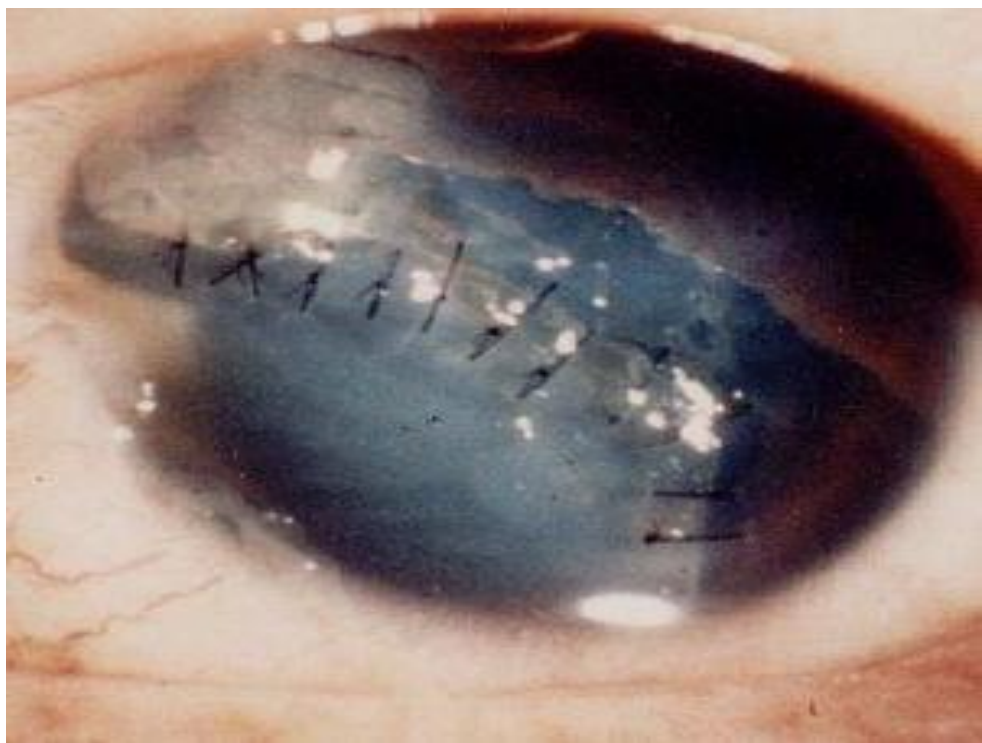
- Optic nerve
 - Injury in case of base of skull fractures
 - Avulsion in case gunshot injuries of the orbit
- IOP
 - Hypotony
 - Increased IOP
 - Angle recession glaucoma
 - Ghost cell glaucoma

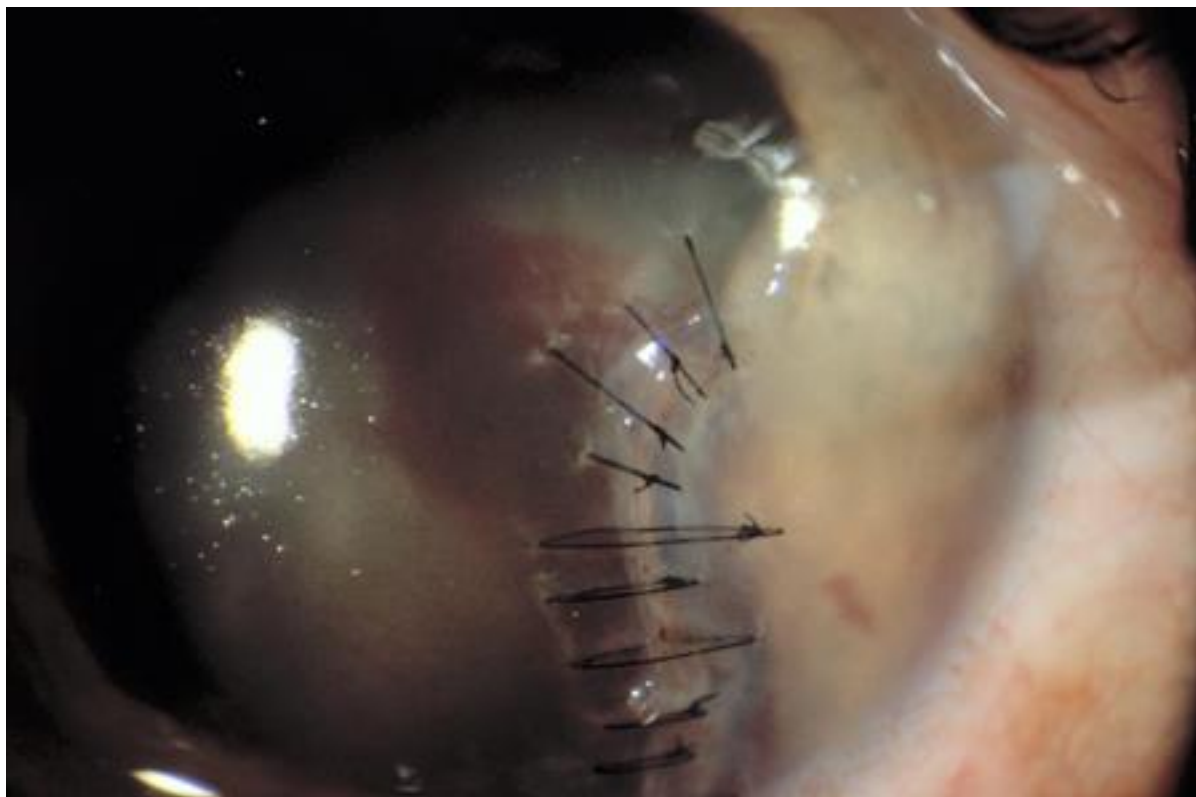
Open Globe

Penetrating injuries

- Serious ocular emergencies
- As a CMO/intern
 - Put an eye shield
 - Give pain killers, start a systemic broad spectrum antibiotic
 - Make sure patient is systemically stable
 - Do not put any drops/ointment in the eye
 - keep the patient NBM
- As an ophthalmologist
 - Thorough examination under anaesthesia
 - Primary repair







- Wounds of the conjunctiva
 - Generally self healing but can be sutured with 8-0 vicryl
- Wounds of the cornea and sclera
 - Primary repair
 - Prolapsed iris should be replaced
 - If iris is non viable then absice it
 - Landmarks sutured first
 - Scleral wounds 3-4 mm posterior to limbus need further exploration
 - In case of vegetative/organic trauma look out for endophthalmitis/panophthalmitis

- Lens wounds
 - Ruptured ant capsule and release of lens matter in AC causes severe iridocyclitis
 - Removal of the lens during primary repair if AC ruptured

Open globe penetrating injuries with IOFB

- Damage due to a IOFB
 - Mechanical
 - Causes degenerative changes and loss of some or all function
 - Introduction of infection
 - Wood/organic matter has higher risk
 - Poor prognosis
 - Chemical reaction
 - Glass, plastic, porcelain, gold, platinum and titanium are inert
 - Iron and copper not so inert!
 - Siderosis (more damage can be caused by the deposition of Iron than the actual injury)
 - Chalcosis (sunflower cataract)
 - Lead and aluminium cause little local reaction

- Diagnosis (not so easy!)
 - *History is very important!*
 - X ray
 - CT
 - MRI (contraindicated in metallic IOFB!!!!)
 - B scan

Treatment

- Needs removal unless,
 - Inert
 - Removal will cause irreparable damage

Mx

- Life threatening injuries are dealt with first
- Assess severity and extent
- TT
- Exclude IOFB
- Treatment if IOFB present
- Look for an infection
- Restore globe integrity
- Assess secondary injuries and complications

Thank you

Any question please email me
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