

# 2.3 Ocular trauma

## Plan

Categories of ocular injuries

Ocular trauma strategy: Avoid-Treat-Prevent

Evaluation

General

Ocular

Investigations

Common open globe injuries

Subconjunctival hemorrhage

Foreign body

Abrasion

Rupture/Laceration

Intra-ocular foreign body

Common close globe injuries

Black eye

Hyphema

Concussion

Macular edema

Blowout fracture

Common chemical injuries

Alkali

Acid

Thermal, Electrical & Radiation injury

**All types of trauma cause decrease vision by**

- Hemorrhage
- Edema
- Damage
- Scarring

## Categories

### CATEGORIES OF OCULAR INJURIES

#### Mechanical injury

##### Open-globe injury

Laceration = Full-thickness wound of the eye wall, caused by a sharp object

Lamellar laceration = Partial thickness wound of the eye wall

Abrasion/superficial Laceration = Superficial partial wound of the eye wall

Rupture = Full-thickness wound of the eye wall, caused by a blunt object

Penetrating injury = Only entrance wound is present

Perforating injury = Both an entrance and exit wound are present

##### Close globe injury

Ocular contusion= Anterior segment blunt: damage at or at distance

Ocular concussion = Injury with blunt object

Frenkel syndrome = absolute term for traumatic iridoplegia

Blow out fracture = Orbit wall fracture with blunt trauma

##### Chemical injury (Alkali/Acid)

##### Thermal injury

##### Electrical injury

##### Radiation injury

## Strategy to deal with trauma

### Ocular trauma: Avoid-Treat-Prevent

Avoid  
Trauma

- Protective glasses
- Protective face shield
- Protective cloths/gloves
- Take care of children

Treat  
Trauma

- Treat immediately
- Treat IOP
- Microbial superinfection
- Keratoplasmy
- Multidisciplinary approach

Prevent  
Complications

- Microbial superinfection
- Treat IOP
- Adhesions
- Scarring (Entropion, Ectropion & Symblepharon)
- Keratoplasty

## **EVALUATION: General**

- **History**
  - Penetrating VS blunt VS Chemical injury
  - Record Initial Visual acuity if possible
- **Orbital Structures**
  - Palpate Orbital margins
  - Check extra ocular movements ----- blowout fracture.
- **Adnexa**
  - Eyelids ----- Subcutaneous Emphysema
  - Lacrimal structures

## **EVALUATION: Ocular**

### **Anterior Segment**

- Conjunctiva ----- Subconjunctival hemorrhage
- Cornea ----- Clarity
- Anterior Chamber ----- Hyphema
- Iris ----- Distortion
- Lens ----- Cataract, subluxation, dislocation.

### **Posterior Segment**

- Vitreous hemorrhage
- Retina ----- Detachment
- Optic Nerve ----- Neuropathy, avulsion.

## **Evaluation: Investigation**

- **Investigations for general anesthesia**
  - Most need general anesthesia
- **Radiology**
  - X-ray, CT, MRI
- **Ocular**
  - B-scan
  - OCT if needed & possible

# Common open globe injuries & management

## CATEGORIES OF OCULAR INJURIES

Mechanical injury

### Open-globe injury

Laceration  
Lamellar laceration  
Abrasion/ superficial  
Rupture  
Penetrating injury  
Perforating injury

### Close globe injury

Ocular contusion  
Ocular concussion  
Frenkel syndrome  
Blow out fracture

Chemical injury  
Thermal injury  
Electrical injury  
Radiation injury

#### Common OGIs

#### Subconjunctival Hge

Foreign body

Abrasion

Rupture/Laceration

Intra ocular FB

### Sub-conjunctival hemorrhage

- Noticed by someone else or wakeup in morning with red eye
- Cause: straining, trauma
- No pain
- Resolve in 3-4 weeks
- Prophylactic topical antibiotics



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Ocular contusion  
Ocular concussion  
Frenkel syndrome  
Blow out fracture

Chemical injury  
Thermal injury  
Electrical injury  
Radiation injury

#### Common OGIs

Subconjunctival Hge

#### Foreign body

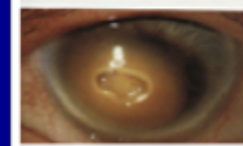
Abrasion

Rupture/Laceration

Intra ocular FB

### Foreign body

- Anesthetize cornea
- Remove FB
- Prophylactic antibiotic
- Follow-up for rust



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### Close globe injury

Ocular contusion  
Ocular concussion  
Frenkel syndrome  
Blow out fracture

Chemical injury  
Thermal injury  
Electrical injury  
Radiation injury

#### Common OGIs

Subconjunctival Hge

Foreign body

Abrasion

Rupture/Laceration

Intra ocular FB

### Abrasion

- Heals in 48 hours
- Patch eye
- Better put bandage contact lens
- Prophylactic topical antibiotics



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Mechanical injury

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#### Common OGIs

Subconjunctival Hge

Foreign body

Abrasion

Rupture / Laceration

### Rupture / Laceration

- Examine laceration
- Primary repair
  - Close wound
  - Reposit iris or other contents
  - Lens wash if ruptured
- Secondary repair



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**Chemical injury**  
**Thermal injury**  
**Electrical injury**  
**Radiation injury**

### Common OGIs

Subconjunctival Hge

Foreign body

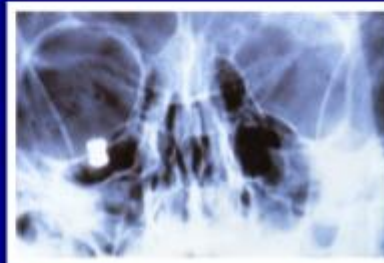
Abrasion

Rupture/Laceration

### Intra ocular FB

## IOFB

- Refer to hospital
- Primary repair
- Followed by secondary foreign body removal



# Common close globe injuries: General

Pathogenesis:

Blunt trauma or close globe injury results in anterior posterior compression of globe with expansion at equator associated with increase intraocular pressure

## CATEGORIES OF OCULAR INJURIES

**Mechanical injury**

- Open-globe injury**
  - Laceration
  - Lamellar laceration
  - Abrasion/superficial laceration
  - Rupture
  - Penetrating injury
  - Perforating injury
- Close globe injury**
  - Ocular contusion
  - Ocular concussion
  - Frenkel syndrome
  - Blow out fracture
- Chemical injury**
- Thermal injury**
- Electrical injury**
- Radiation injury**

Common CGIs
Black eye
Hyphema
concussion
Macular edema
Blow out fracture

**General: Pathogenesis**

- Blunt trauma results in anterior posterior compression with simultaneous expansion at equatorial plane associated with increase in intra ocular pressure




The diagram illustrates the pathogenesis of a blunt trauma injury to the eye. It shows a cross-section of the eye with a downward arrow indicating compression at the anterior pole. Simultaneously, outward arrows at the equator indicate expansion. This expansion is associated with an increase in intraocular pressure, which can lead to various complications like those listed in the table.



# Common open globe injuries & management

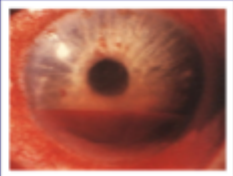
## CATEGORIES OF OCULAR INJURIES

<b>Mechanical injury</b>	<b>Open-globe injury</b>	<table border="1"> <thead> <tr> <th>Common CGIs</th> </tr> </thead> <tbody> <tr><td>Black eye</td></tr> <tr><td>Hyphema</td></tr> <tr><td>concussion</td></tr> <tr><td>Macular edema</td></tr> <tr><td>Blow out fracture</td></tr> </tbody> </table>	Common CGIs	Black eye	Hyphema	concussion	Macular edema	Blow out fracture	<p><b>Black eye</b></p> <ul style="list-style-type: none"> <li>Make sure not medico legal</li> <li>Look for other injuries</li> <li>Resolves with cold compresses</li> <li>Prophylactic treatment</li> </ul>
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Blow out fracture

### Concussion

- Can cause damage to ant part of eye
- Conservative treatment to stabilize condition
- Treatment according to pathology

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### Macular edema (Comotio retina)

- OCT to document and see progression
- NSAIDs for 6 weeks



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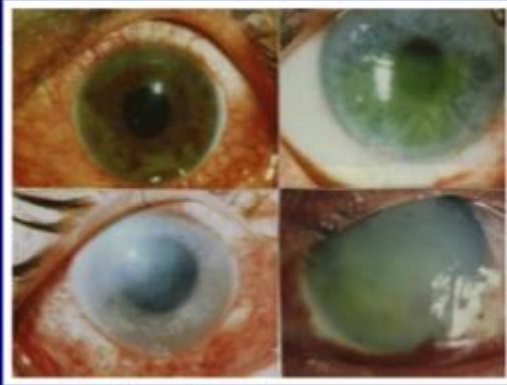
#### Blow out fracture

- Look for double vision
- Hess chart if needed
- Surgery if inferior oblique muscle trapped in fracture and causing double vision



# Common chemical injuries & management

## CATEGORIES OF OCULAR INJURIES



Blow out fracture

**Chemical injury**  
**Thermal injury**  
**Electrical injury**  
**Radiation injury**

Common
Alkali injury
Acid injury

### Alkali

- Wash wash & wash
- Remove solid particals
- Continuous damage by absorbed alkali in tissue
- Actual damage more than initially visible damage
- Topical steroids & antibiotics
- Vitamin C drops & tablets
- Serum drops

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**Thermal injury**  
**Electrical injury**  
**Radiation injury**

Common
Alkali injury
Acid injury

### Acid

- Wash wash wash
- Topical antibiotics & steroids
- Amniotic membrane graft
- Secondary corneal graft

