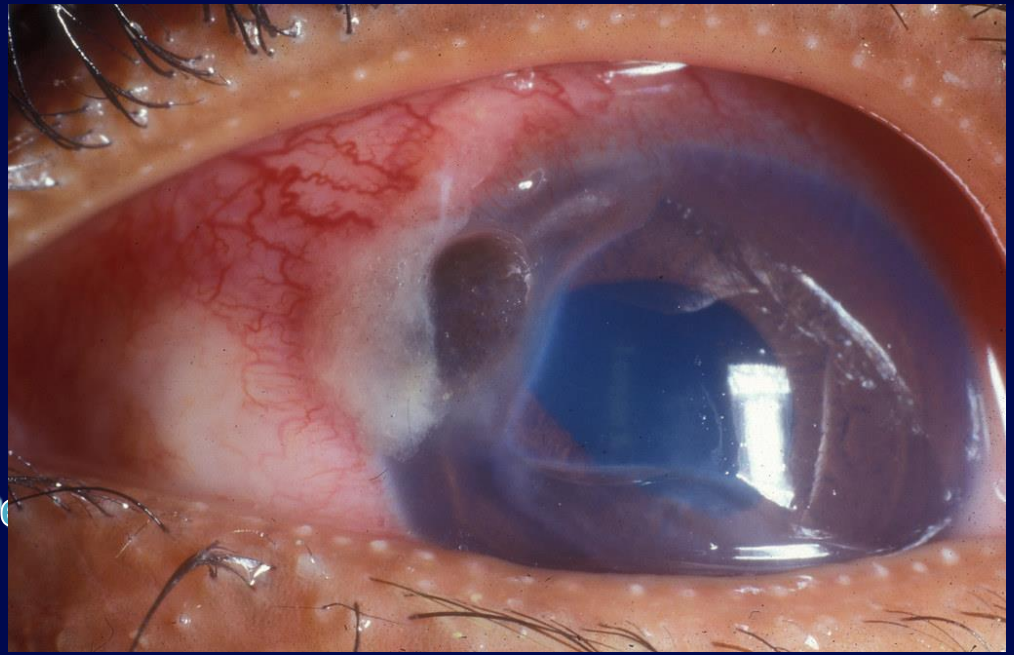
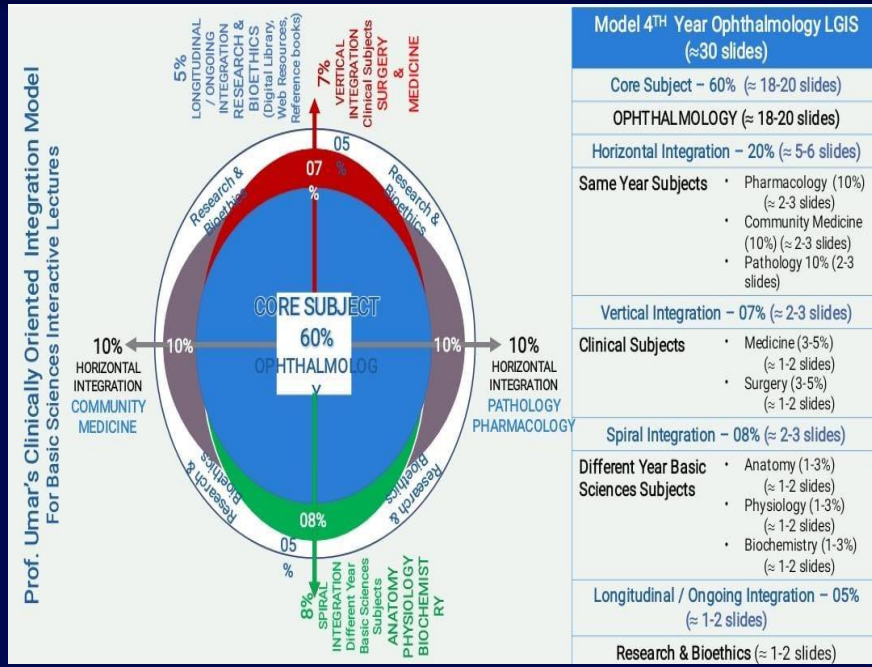
PENETRATING TRAUMA

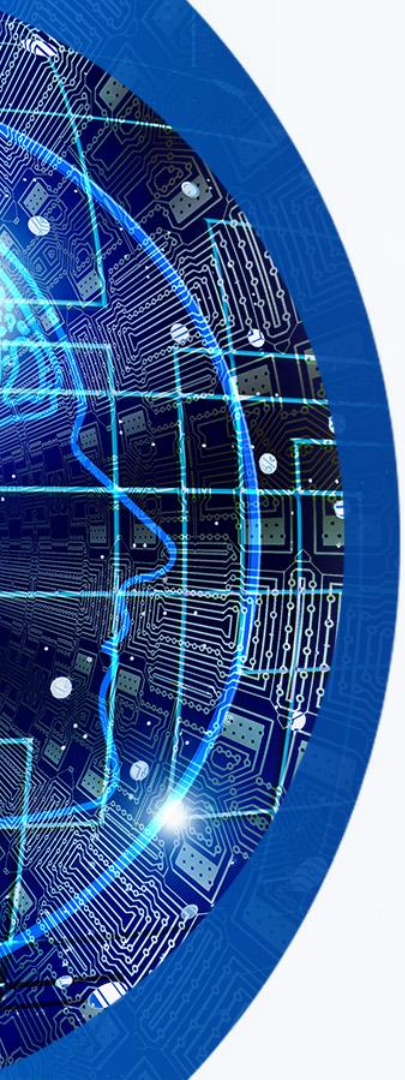


P

CONTENTS:

- LEARNING OBJECTIVES
- VERTICAL INTEGRATION
- HORIZONTAL INTEGRATION
- CORE SUBJECT
- END OF LECTURE ASSESSMENT
- DIGITAL LIBRARY REFERENCES (RESEARCH, BIOETHICS, ARTIFICIAL INTELLIGENCE)





SPECIFIC LEARNING OBJECTIVES

By the end of the lecture students will be able to

- Classify different types of trauma
- Know the clinical features of Penetrating trauma
- Know different treatment modalitis of trauma
- Describe ocular signs, complications and treatment of chemical injuries

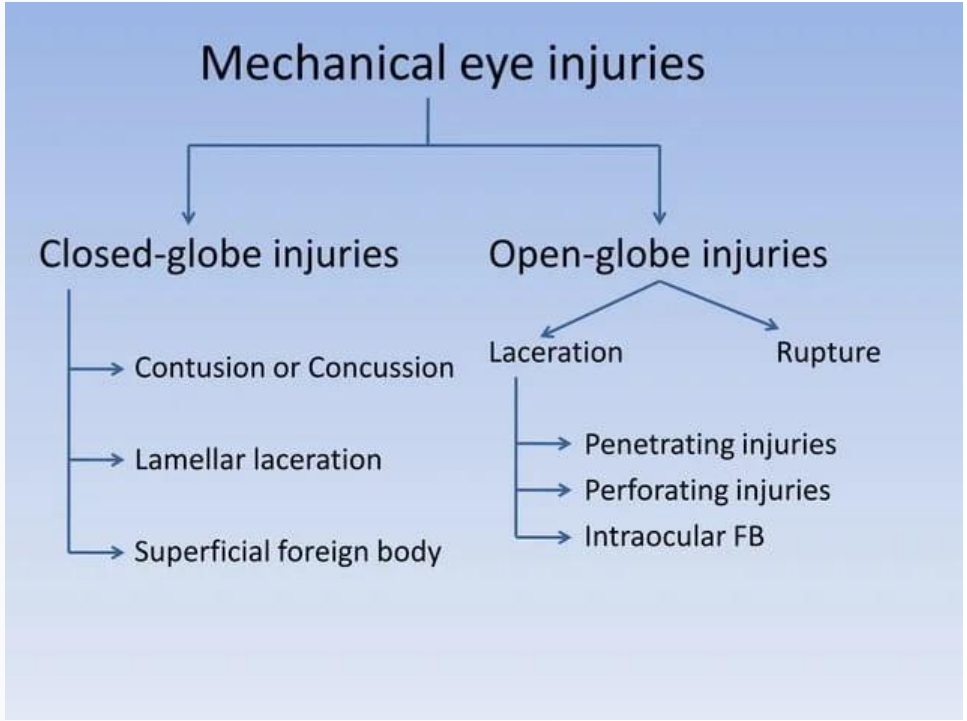
Integration with Pathophysiology:

- The eye is protected from direct injury by lids, eyelashes and the projecting margins of the orbit. Neverthless , it can be injured in a variety of ways by chemicals, heat, radiation and mechanical trauma.

Classification according to nature

- Mechincal trauma
  - a. Close globe injury
  - b. Open globe injury
- Chemical trauma
  - a. Acid
  - b. Alkali
  - c. Dye(salt of acid or alkali)

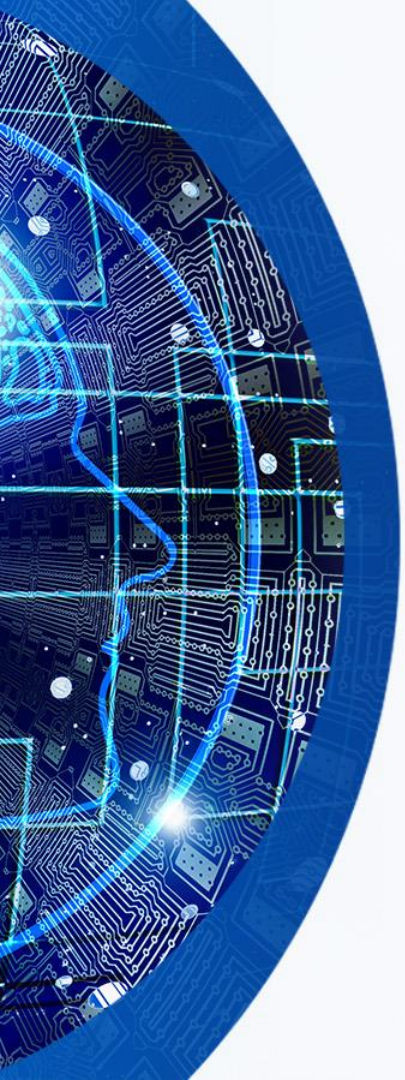
Mechanical Trauma



Core subject

Evaluation of trauma patient

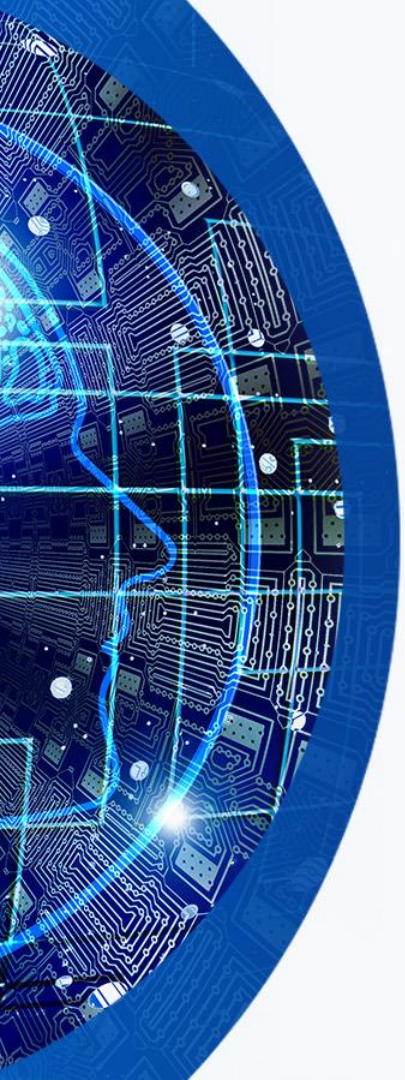
- Evaluate general status
- Evaluate eye problem
- Periocular evaluation



Assessment

- History
  - should be in detail
  - time and nature of injury
  - past ocular history
- Visual acuity,lid function
- Rule out life threatening injuries
- Rule out globe threatening injuries
- Examine both eyes
- Documentation
- Plan for repair

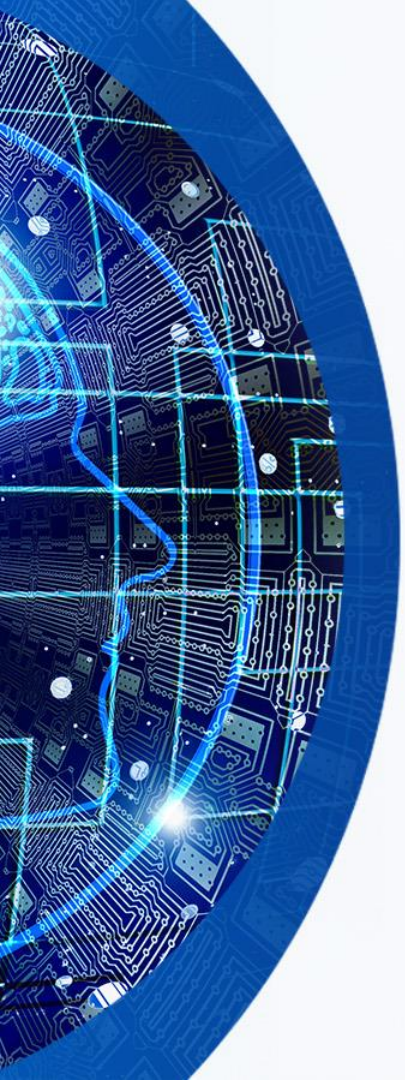
Eyelid Trauma



Laceration

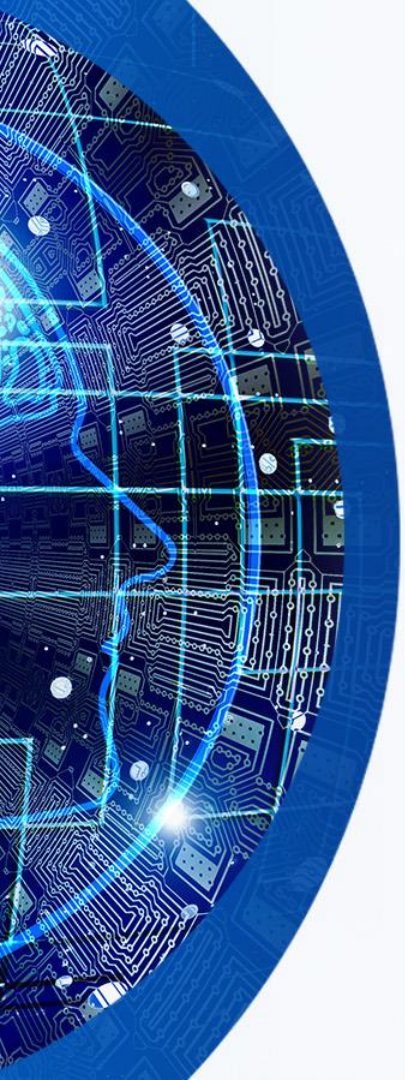
- Superficial lacerations
- Lid margin lacerations
- Lacerations with mild tissue loss
- Lacerations with extensive tissue loss
- Cannalicular lacerations

Eyelid tear



General principles of repair

1-Clean the wound
2-Remove foreign body
3-Careful handling of tissue
4-Careful alignment of anatomy
5-Close in layers
6-Timing - repair within 12 to 24 hours
7-Anaesthesia
    GA/LA



Tear repair

1. **Superficial lacerations** without gaping can be sutured with 5-0/6-0 black silk,removed after 5 days
2. **Lid margin laceration**

   Carefully align to prevent notching

   a-Align with 5-0 silk suture

   b-Close tarsal plate with fine absorbable suture(5-0 vicryl)

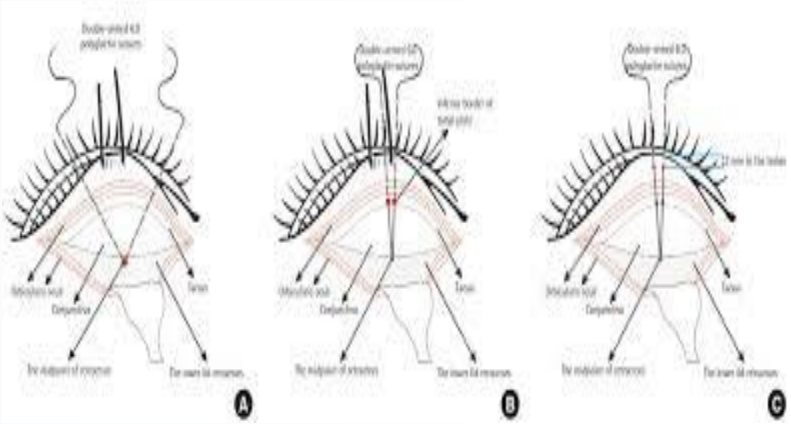
   c-Place additional marginal silk suture

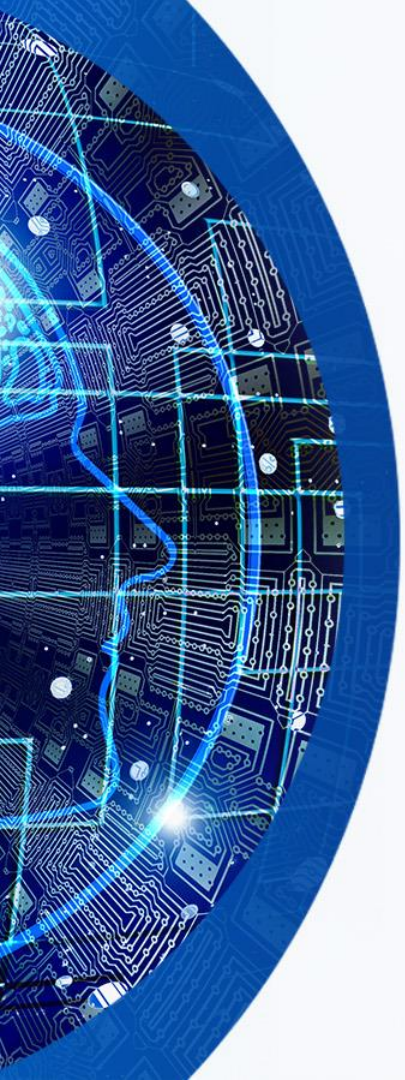
   d-Close skin with multiple interrupted suture
3. **Laceration with tissue loss**

   Primary closure and may also need a lateral cantholysis
4. **Canalicular laceration**

   Either through silicone tubing or monocanalicular stent

Repairing lid margin laceration



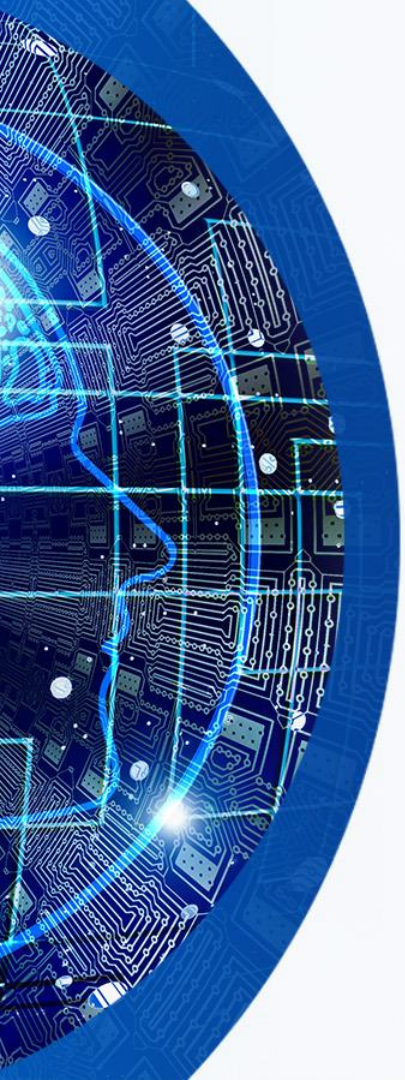


Corneal tear

- Peaking of pupil
- Shallow anterior chamber
- May involve iris and lens
- Primary repair should be done without delay

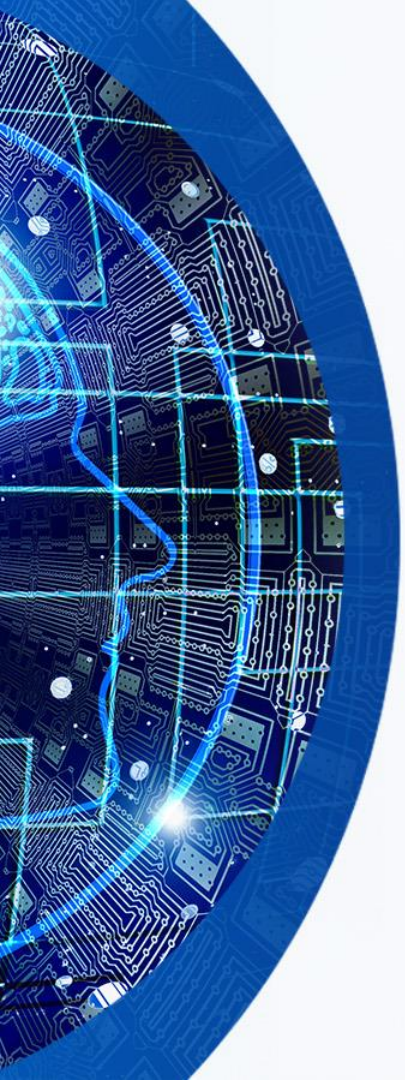
Corneal tear

Scleral tear



Scleral Tear

- Anterior scleral lacerations have a better prognosis. May be associated with iridociliary prolapse and vitreous incarceration
- Posterior scleral lacerations is associated with retinal damage. Primary repair to restore globe integrity is initial priority

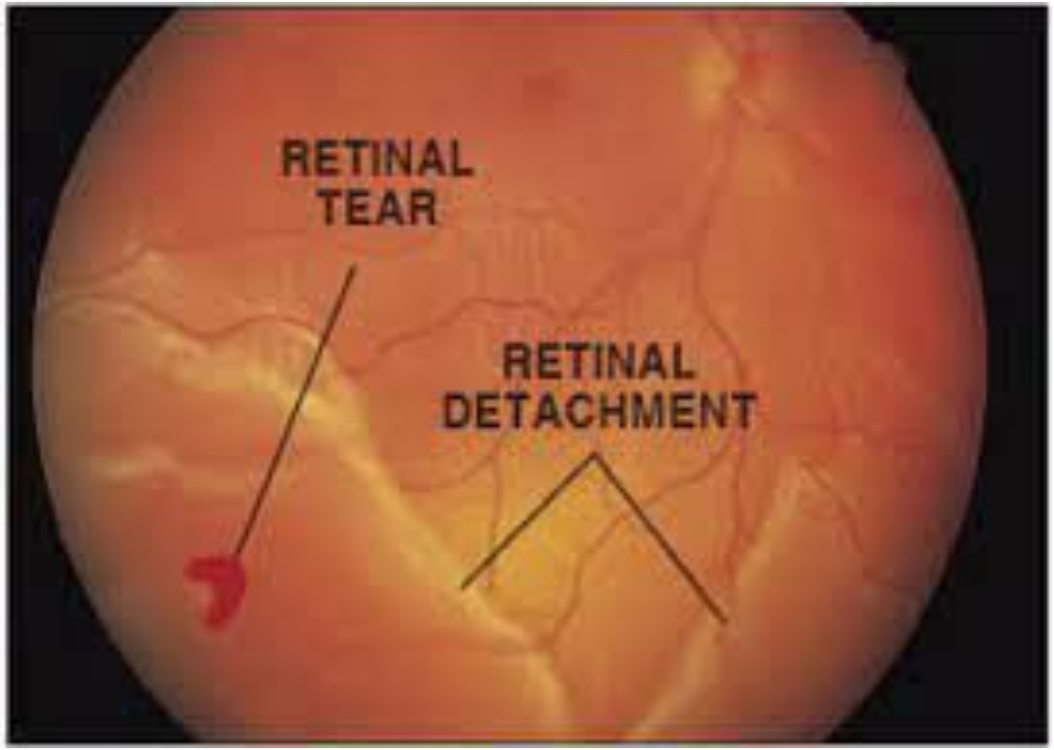


Retinal detachment

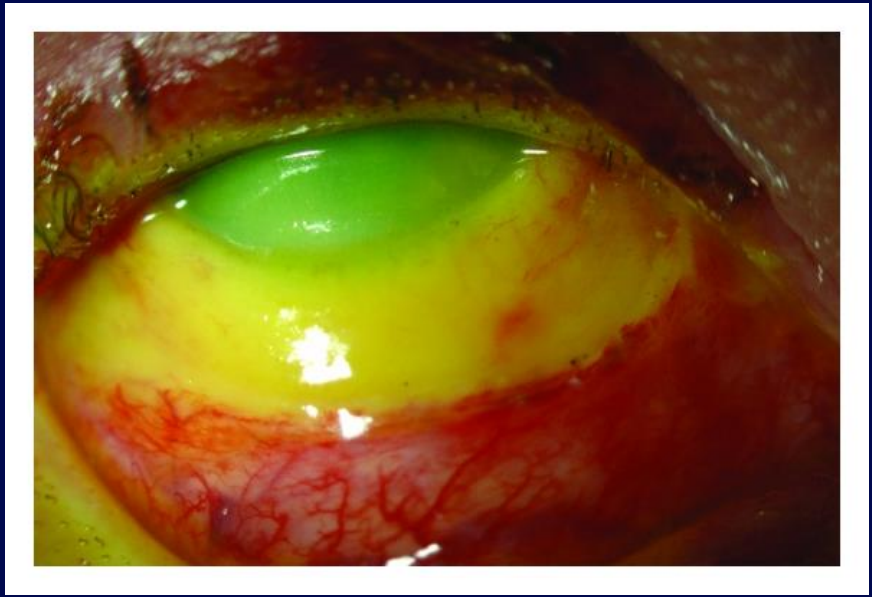
- Traumatic RD following penetrating trauma results from vitreous incarceration in wound
- Retinal break may develop several weeks later, leading to a more rapidly progressing RD

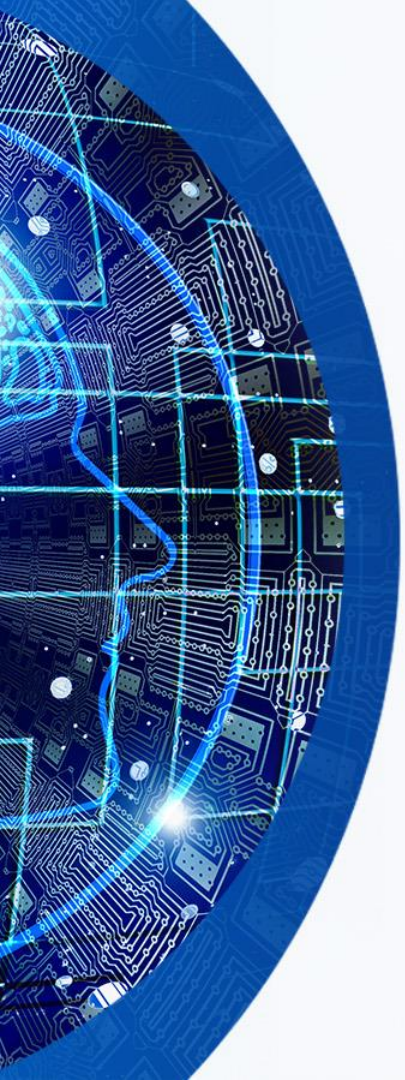
Tractional retinal detachment

Retinal breaks and detachment



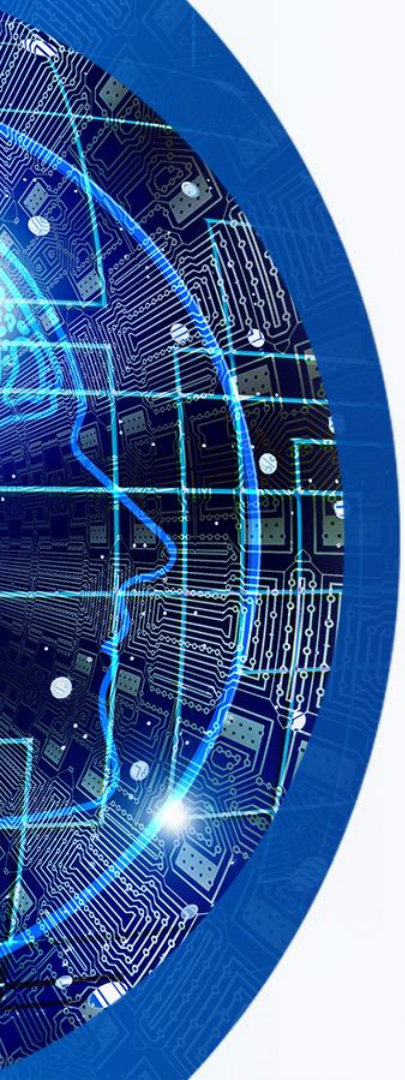
Chemical Injury





Integration with Pathophysiology:

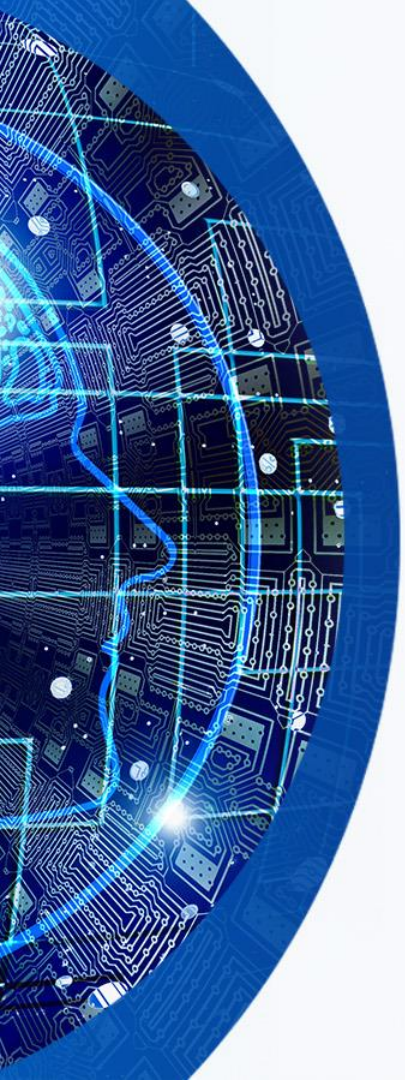
- **Acids** cause coagulation of surface proteins and thus set up physical barrier against deeper tissue presentation
- **Alkalis** cause necrosis of conjuctival and corneal epithelium with destruction and occlusion of limbal vasculature. Resulting in corneal vasculization. Deeper penetration causing damage to iris, lens and trabecular meshwork. Ciliary epithelial damage results into hypotony and phythisis bulbi



Ocular Signs

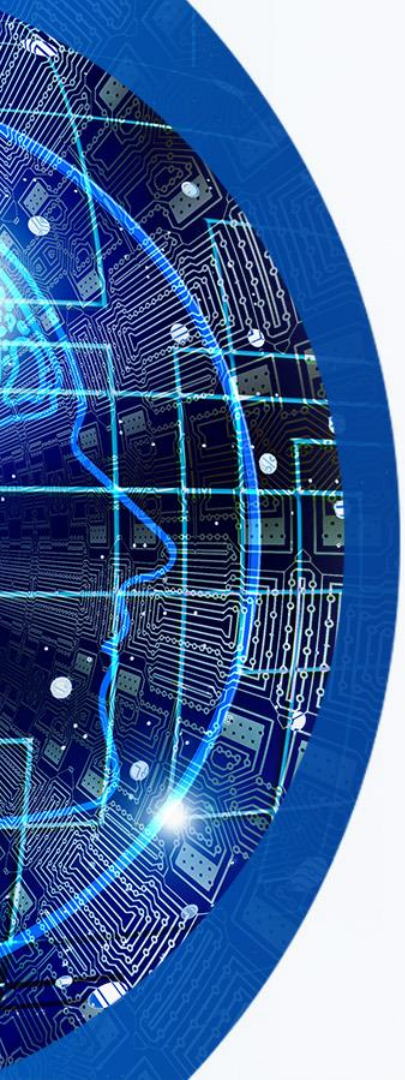
❑ Acid injury

- Conjuctiva and cornea shows necrosis followed by slouging
- Corneal surface tissue becomes opaque and swollen



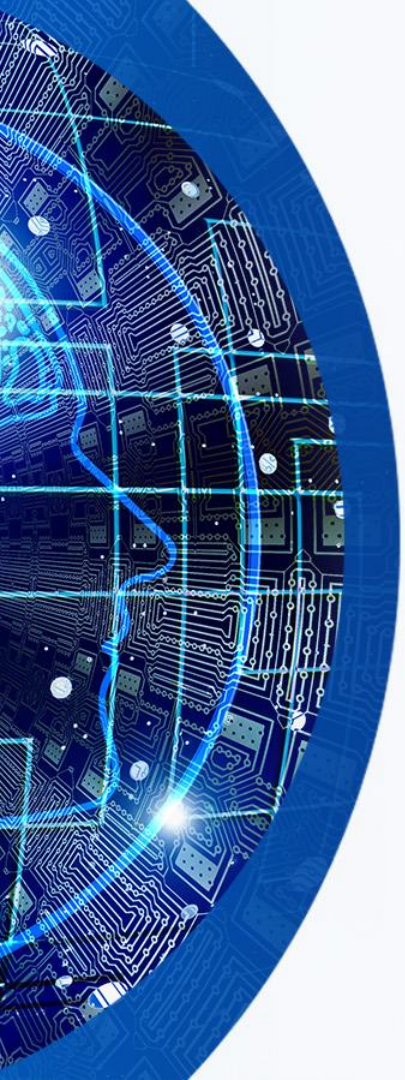
❑ Alkali injury

- Conjuctiva and limbus becomes white due to destruction and occlusion of vasculature
- Cornea is dull opaque and epithelium may become sloughed out



Management

- Emergency treatment
- Medical treatment
- Surgical treatment



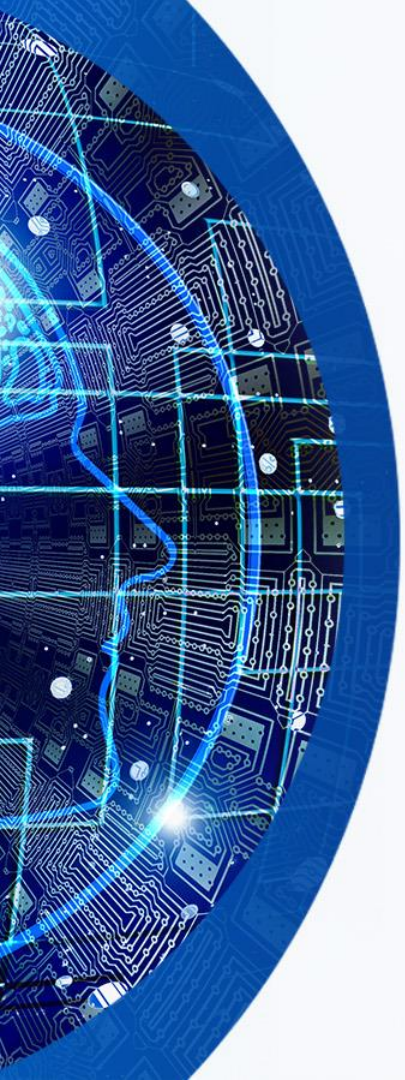
Emergency treatment

- Irrigate the eye with cupious amount of normal saline for 15 to 20 minutes.
- Neutralization of chemical

Acids with dilute alkali (sodium bicarbonate solution)

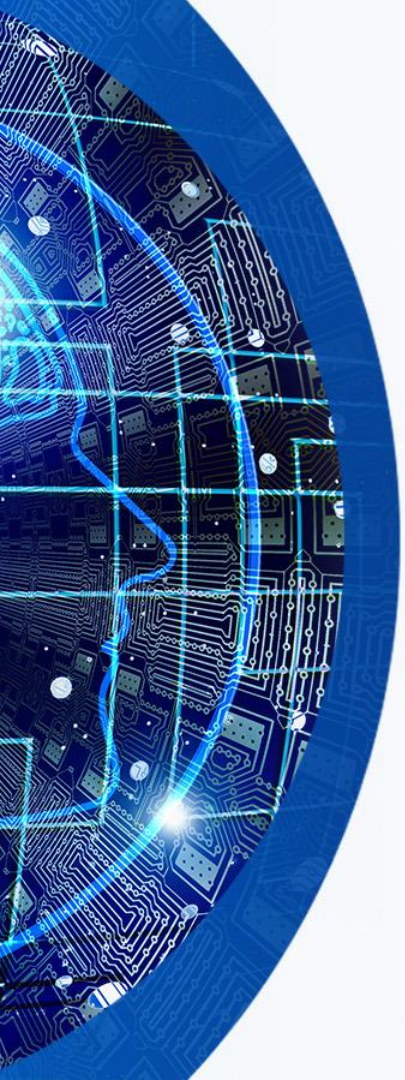
Alkali with weak acid (boric acid solution)

- Removal of chemical matter with cotton swab or forceps
- Remove the devitalised tissue

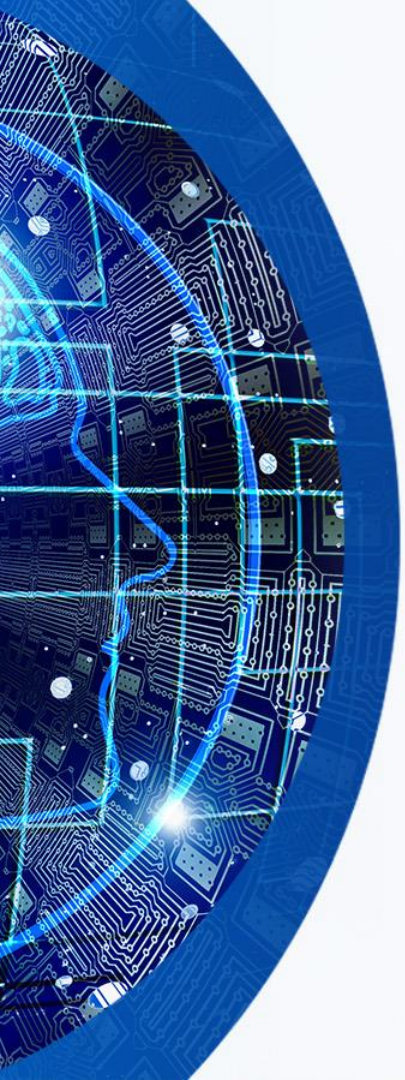


Medical Treatment

- ❑ Topical
- Antibiotics drops to prevent secondary infection
- Cyclopegic drops to relieve pain and avoid posterior synechiae formation
- Steroids are used for the first 7 days after which NSAID are used
- Topical sodium ascorbate 10% to reduce inflammation
- Tetracycline eye ointment acts as collagenase inhibitor



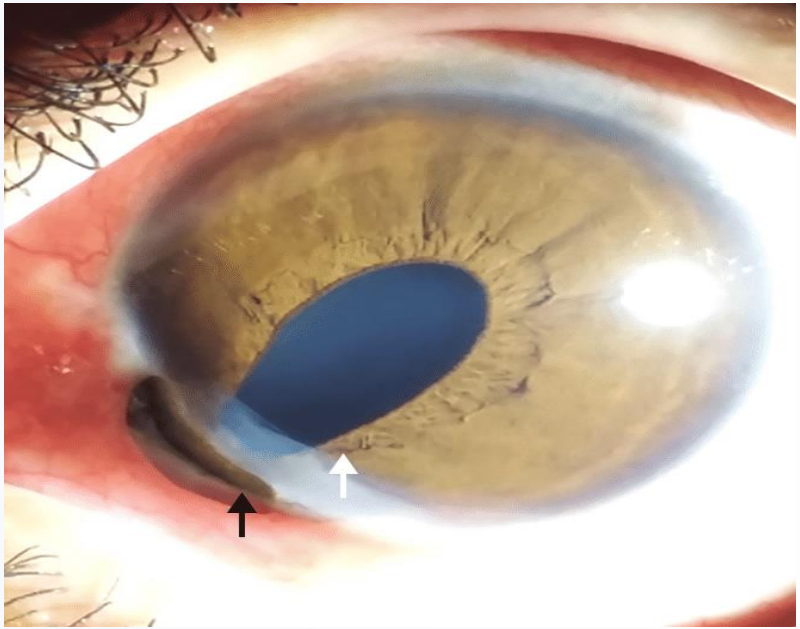
- Oral
  - Analgesic for pain relief
  - Antibiotic tetracycline to prevent secondary infection
  - Vitamin C to reduce inflammation and promote healing



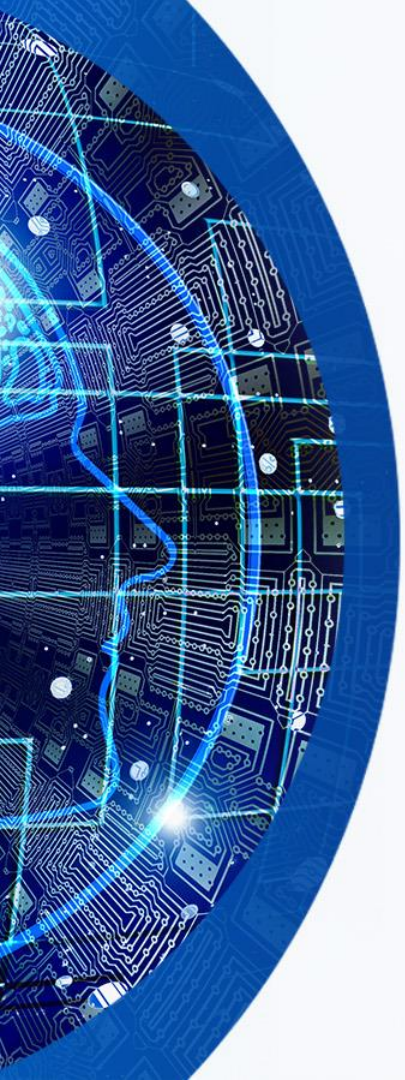
Surgical treatment

- Advancement of tenon's capsule and suturing to limbus
- Limbal stem cell transplantation to restore normal corneal epithelium
- Amniotic membrane graft to assist epithelial healing
- Conjuctival or mucus membrane graft
- Keratoplasty
- Keratoprosthesis

EOLA(END OF LECTURE ASSESSMENT)



a) What is the probable diagnosis?
b) Label the arrows shown in the figure.
c) Treatment options.



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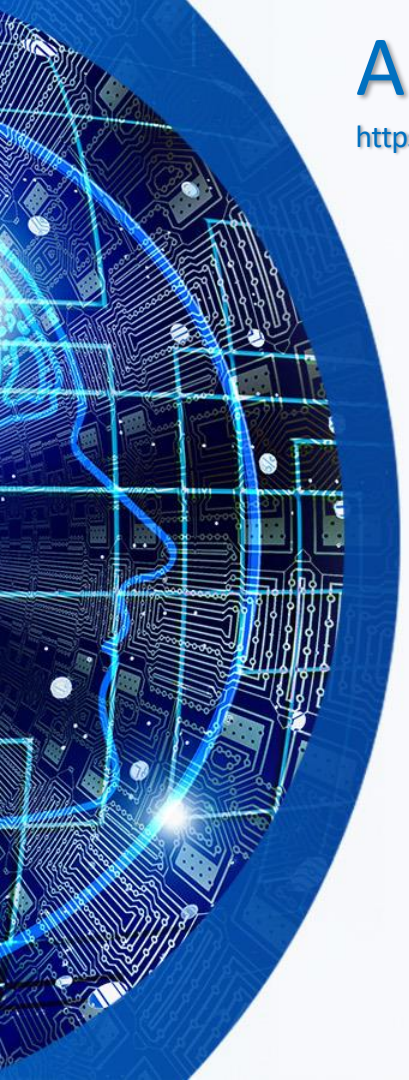
- Basic ophthalmology by Renu Jogi



Artificial Intelligence

https://www.mdpi.com/2079-9284/10/2/52

Open Access Case Report

Computer-Assisted Reconstruction of an Orbital Trauma Case Treated with a Patient-Specific Titanium Prosthesis

by Mhd Ayham Darwich [1], Khaldoun Darwich [2], Khalil Yousof [2], Szabolcs Szávai [3], Hasan Mhd Nazha [4,*] and Daniel Juhre [4]

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Abstract

Virtual planning is ideally suited for maxillofacial operations as it allows the surgeon to assess the bony and critical neurovascular structures and enables him to plan osteotomies and fracture reductions. This study aims to propose the use of titanium-based patient-specific implants (PSI), along with virtual surgical planning to assess the advantages and the complications in a case of orbital reconstruction. A three-dimensional model of the skull was generated using computed tomography (CT) data of a female patient using Mimics software (version 19, Materialize, Leuven, Belgium). Numerical PSI models were designed using 3-Matic software (version 13, Materialize, Leuven, Belgium) and the non-affected orbit as a template. Surgical virtual planning showed the suitability of the use of the numerical models in traumatic surgical rehabilitation. Moreover, the digital printing process enabled the trial of the designed PSIs on the patient's face before the surgery. Reconstruction Biomechanical studies are an essential part of understanding the limits of maxillofacial traumas. The surgical results confirmed the virtual predictions, and the orbital reconstruction seems to be more enhanced and facilitated.

Keywords: orbital reconstruction; virtual planning; titanium maxillofacial prosthesis

Research and Ethics

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3729297/

Saudi J Ophthalmol

Imaging in orbital trauma

Ken Y. Lin,* Philip Ngai, Julio C. Echegoyen, and Jeremiah P. Tao

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Abstract

Go to:

Orbital trauma is one of the most common reasons for ophthalmology specialty consultation in the emergency department setting. We survey the literature from 1990 to present to describe the role of computed tomography (CT), magnetic resonance imaging (MRI) and their associated angiography in some of the most commonly encountered orbital trauma conditions. CT orbit can often detect certain types of foreign bodies, lens dislocation, ruptured globe, choroidal or retinal detachments, or cavernous sinus thrombosis and thus complement a bedside ophthalmic exam that can sometimes be limited in the setting of trauma. CT remains the workhorse for acute orbital trauma owing to its rapidity and ability to delineate bony abnormalities; however MRI remains an important modality in special circumstances such as soft tissue assessment or with organic foreign bodies.

Keywords: Orbital wall fracture, Orbital trauma, Orbital hemorrhage, Orbital foreign body

Introduction

Go to:

Despite developments and improvements in automobile safety and injury prevention, motor vehicle accidents and sports-related injuries still remain


Thank
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