



Technique Guide

Orbital Floor Fractures

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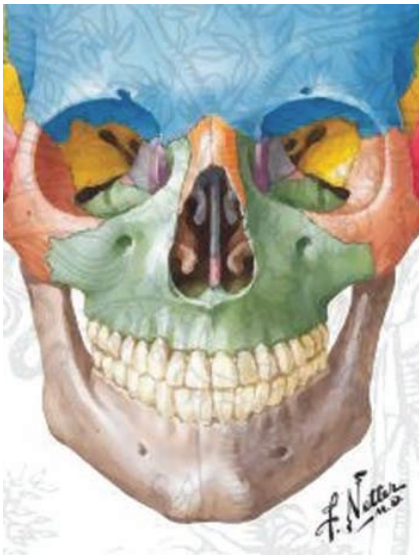
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Section I:

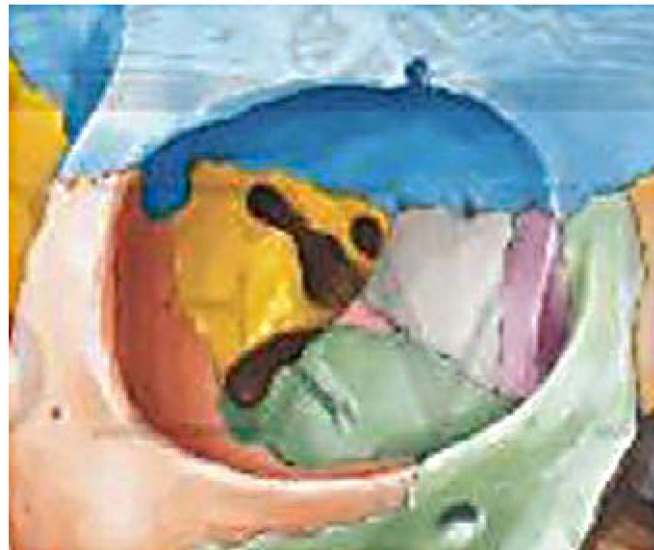
Orbital Anatomy

Orbital Anatomy

Bony anatomy



Orbital floor anatomy



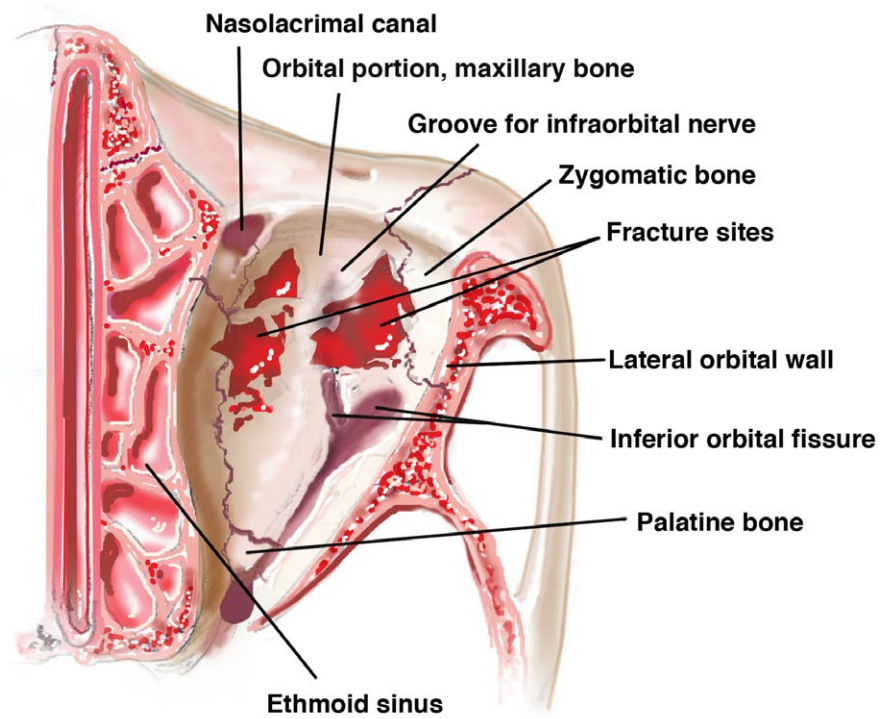
Orbital Anatomy: Floor

Bones

- Zygoma
- Maxillary
- Palatine

Landmarks

- Infraorbital groove and canal
- Infraorbital artery, V2
 - Does not end at apex, ends at pterygopalatine fossa
 - Shortest of orbital walls



Section II:

Clinical Presentation/Orbital Examination

Orbital Floor Fractures

Most common type of orbital fracture

- Thin maxillary bone medial to infraorbital neurovascular bundle
- Bone is 0.5mm thick

Orbital rim is often spared

Blow-out fracture/Indirect fracture

- Orbital floor fracture with intact rim
 - Hydraulic pressure from globe compression
 - Buckling of bone



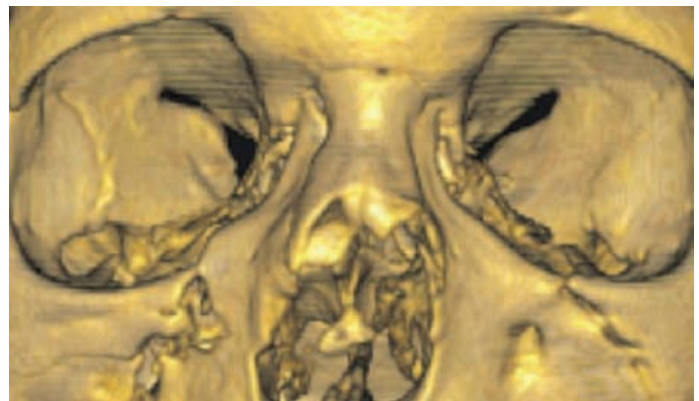
Initial Examination of Orbital Trauma

Advanced trauma life support guidelines

- Primary Assessment
 - Airway
 - Breathing
 - Circulation
 - Neurologic Status

Secondary assessment

- Cranium
- Face and Facial Nerve
- Eye and Orbit
- Nose
- Oral Cavity
- Ear
- Neck



History

- Chief complaint
- Estimation of visual acuity before and after trauma
- Visual aberrations including distortion, flashing/flickering of light, floaters, double vision
- Past ocular history
- Past medical history

The basic eye exam

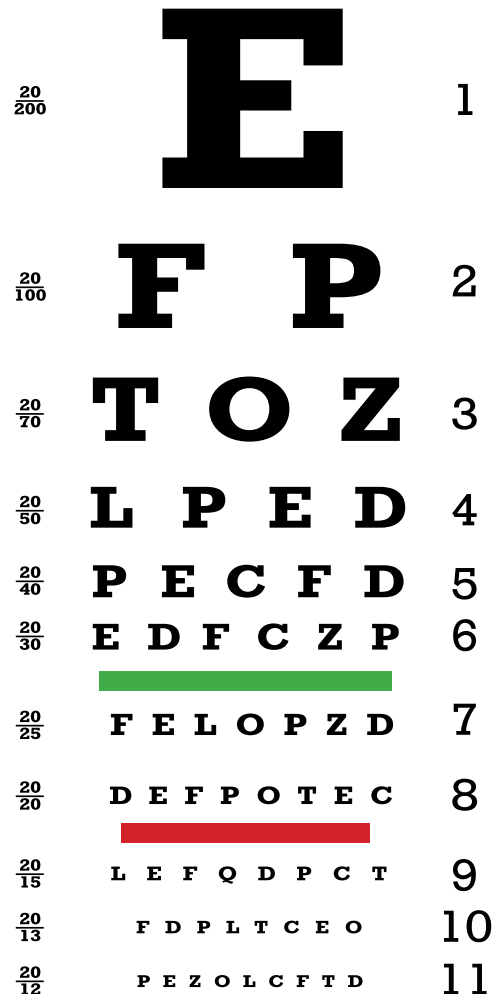
- Best corrected visual acuity
- Pupil exam
- Alignment and motility

Testing Poor Vision

- 20/200 letter moved closer
- Counting fingers
- Hand motion
- Light perception
- No light perception

External examination of ocular adnexa including:

- Lacrimal system
- Position of eyelids
- Position of globe
- General facial formation
- Sensory exam

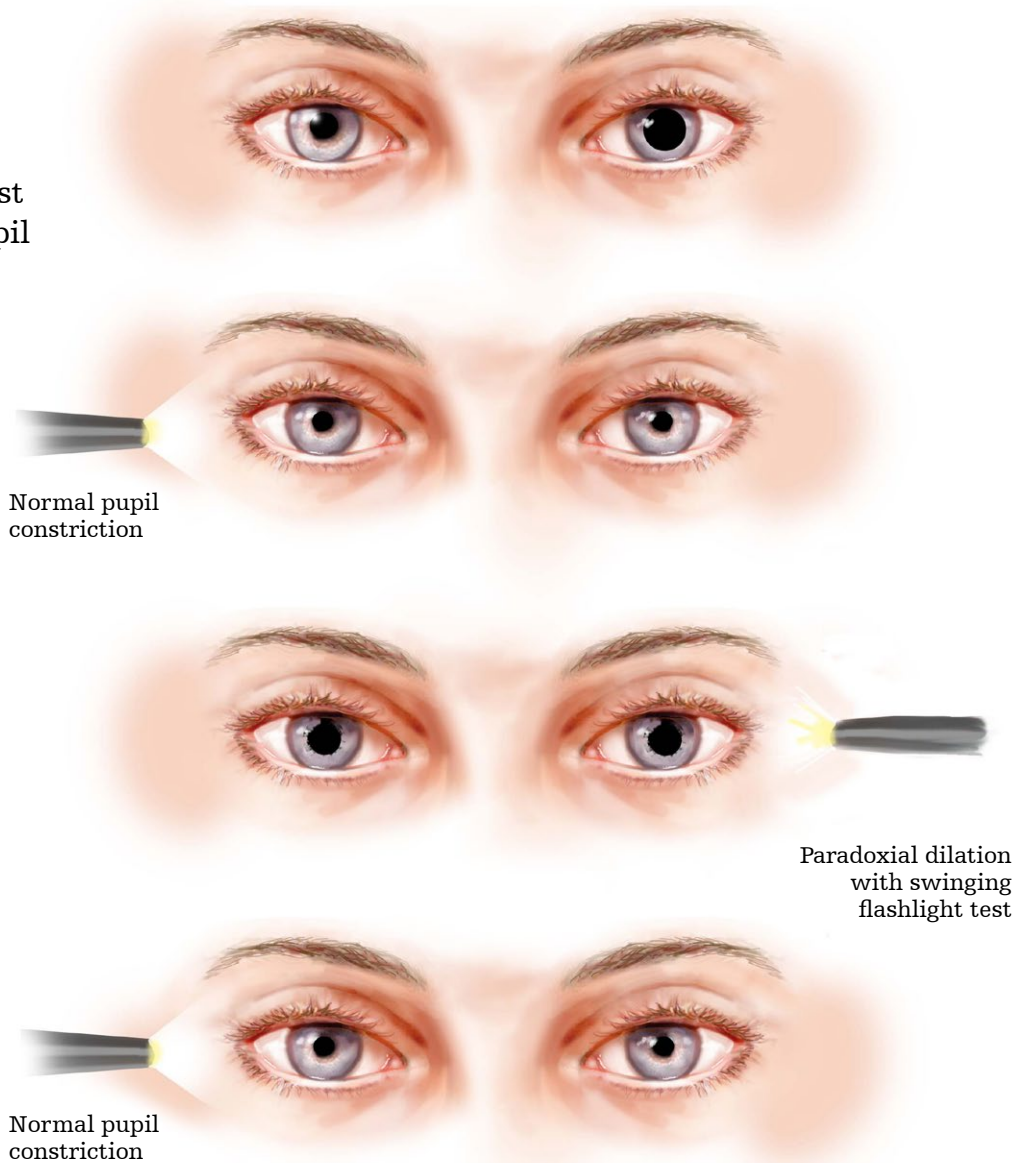


Pupil exam

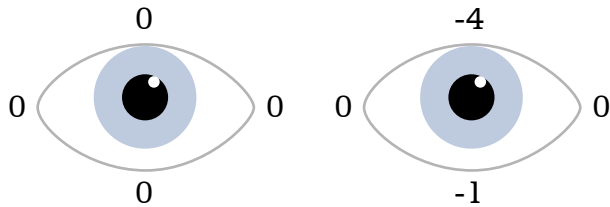
- Size
- Shape
- Reactivity to light
- Direct
- Consensual
- Swinging penlight test for Marcus Gunn Pupil

Normal

Affected



Ocular Alignment & Motility



Right Eye:

Elevation	0
Depression	0
Abduction	0
Adduction	0

Left Eye:

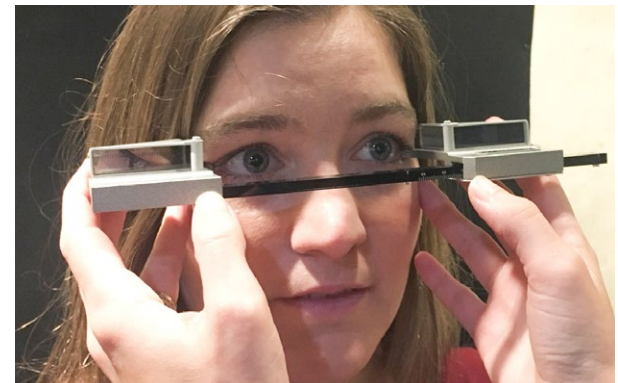
Elevation	-4
Depression	-1
Abduction	0
Adduction	0



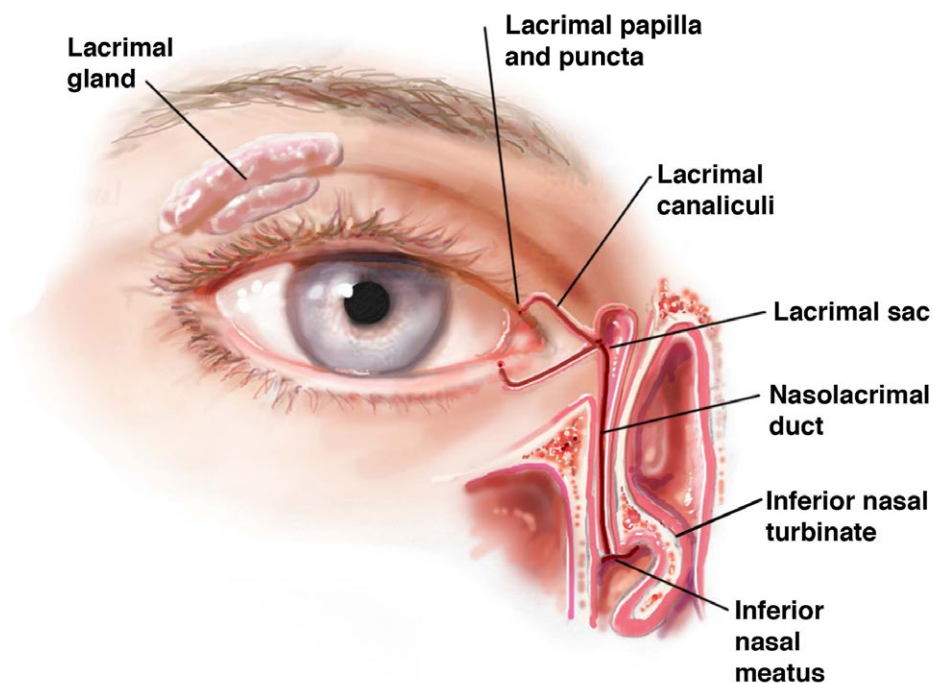
Initial Examination of Orbital Trauma

Exophthalmometry

- Measurement of anterior-posterior position
- Lateral rim to anterior corneal surface
- > 2 mm difference suggest exophthalmos or enophthalmos



Inspection of lacrimal system



Clinical presentation of the orbital trauma

- External
 - Ecchymosis
 - Ephysema
 - Subconjunctival hemorrhage
 - Enophthalmos
- Ocular Injury
- Motility Defects
- Pupil Abnormality
- Infraorbital Hypesthesia
- Oculocardiac Response



Section III:

Indications for Surgical Repair

Indications for Surgical Repair

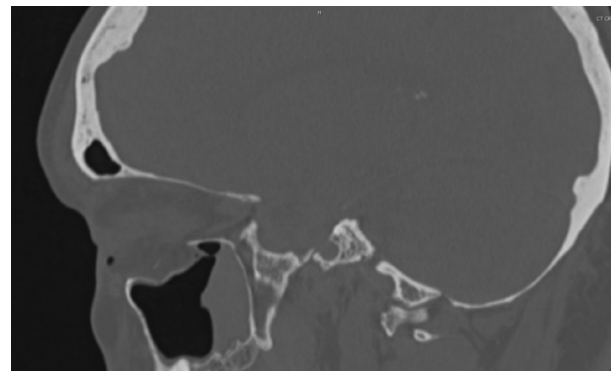
Immediate

- Muscle entrapment
- Oculocardiac reflex



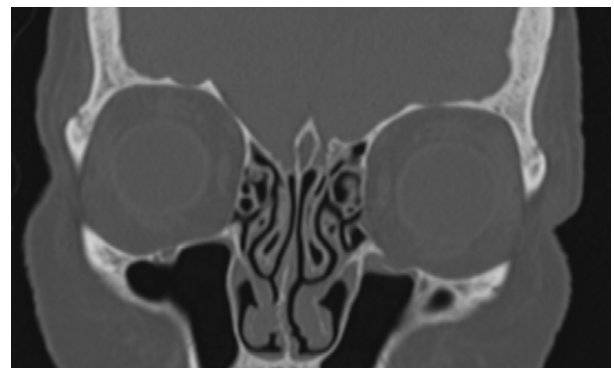
Early repair - 5 to 10 days

- Symptomatic diplopia
 - CT documentation - inferior rectus muscle/perimuscular soft tissue
 - Minimal improvement
- Hypoglobus
- Large fracture - greater than 50%
- Enophthalmos greater than 2mm



Observation

- Clinically insignificant diplopia
- Intact ocular motility
- Enophthalmos less than 2mm
- No evidence of hypoglobus



Section IV:

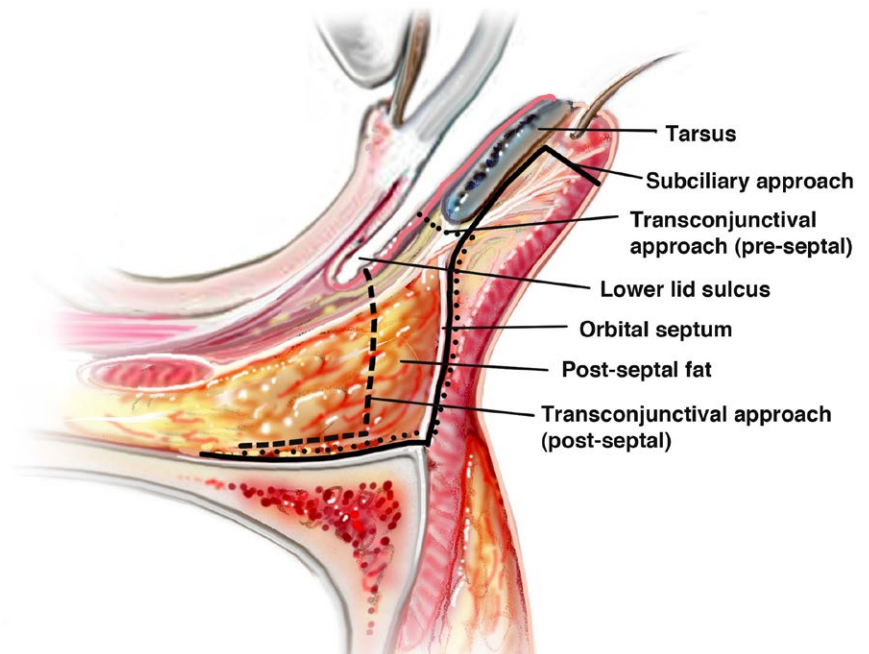
Surgical Technique

Surgical Technique

Surgical approaches to the orbital floor

- Subciliary approach
- Preseptal incision (Author's preferred approach)
 - Transconjunctival approach
- Postseptal incision
 - Transconjunctival approach

Lid-crease extended incision can be utilized for increased exposure of the orbital floor



Perioperative preparation

- Surgical repair performed under general endotracheal tube anesthesia
- Local anesthetic (2% lidocaine with 1:100,000 epinephrine) injected into inferior fornix
- Forced duction to determine amount of restriction



Preseptal transconjunctival approach

- 5-0 silk traction suture through lower eyelid margin
- Lateral canthotomy and inferior cantholysis if needed for increased exposure
- Eversion of eyelid over Desmarres retractor
- Transconjunctival incision 4mm inferior to the inferior border of the tarsus with a 15 blade
- Preseptal dissection to the level of the orbital rim using cautery
- Wide exposure of the inferior orbital rim



Subperiosteal dissection and exposure of fracture

- Incision of periosteum with Colorado Needle
- Enter orbit in subperiosteal plane
- Using elevator, elevate periosteum to anterior aspect of the floor fracture
- Using a hand-over-hand technique with malleable retractors, reposition prolapsed orbital contents back into the orbit
- Expose 360 degrees of fracture
- Repeat forced ductions after orbital contents repositioned into orbit



Placement of orbital implant

- Size and shape orbital implant of choice to accommodate defect and 3-Dimensional configuration of orbit
- Pre-soak in antibiotic of choice if desired
- Appropriately place orbital implant to cover defect and ensure no orbital contents are prolapsed into the maxillary sinus
- Repeat forced duction testing
- If necessary, implant can be secured using titanium micro screws



Closure

- Periosteum is closed with 5-0 polyglactin 910 suture if hardware is present on the orbital rim
- Conjunctiva is closed with one 7-0 polyglactin 910 suture
- Repair lateral canthus if necessary



Section V:

Orbital Implants

Orbital Implants

Autogenous grafts

- Bone
- Cartilage

Human donor grafts

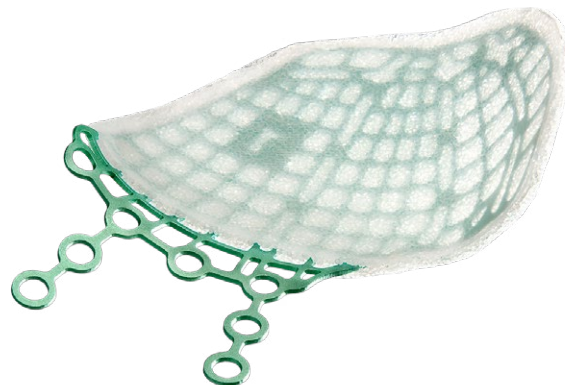
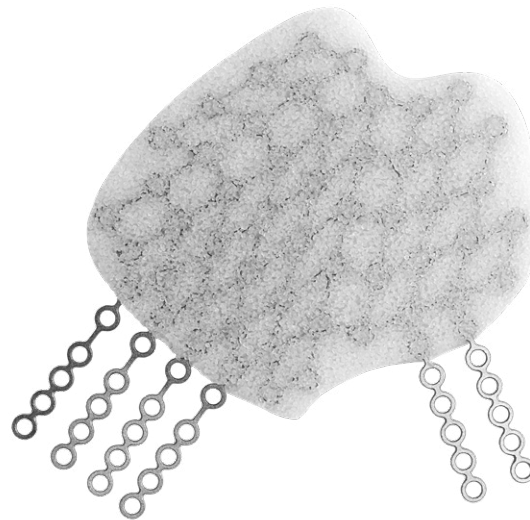
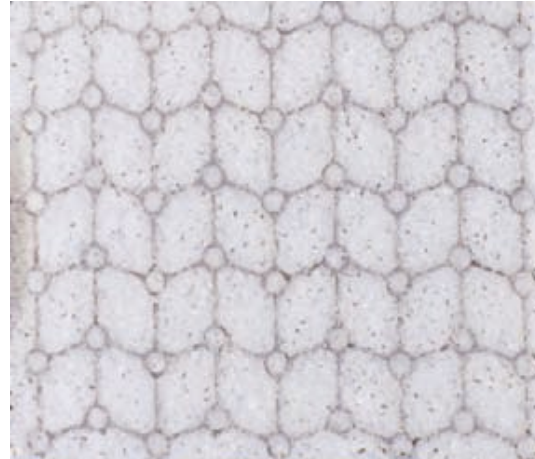
Xenografts

Alloplastic implants

- Porous polyethylene
- Porous polyethylene/titanium
- Titanium mesh
- Polyamide mesh

Benefits of alloplastic implants

- Sizeable to accommodate defect in a 2-Dimensional plane
- Shapeable to accommodate the 3-Dimensional configuration of the orbit
- Durable
- Inert
- Single stage reconstruction



Section VI:

Post Operative Care

Post Operative Care

- Visual acuity and pupil exam should be performed in the immediate post-operative period
- Ice packs are recommended for 20 minutes an hour while awake for 48 hours total
- Broad spectrum antibiotics are prescribed for 7-10 days
- Patient should be instructed to contact the surgeon with any decreased vision or increased pain

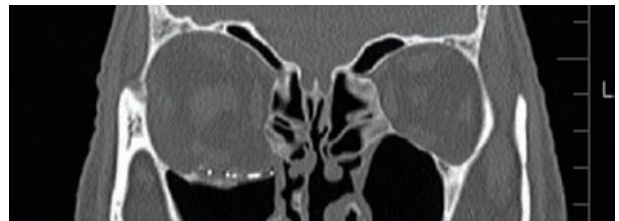
Section VII:

Complications

Complications

Surgical complications

- Vision loss
- Eyelid retraction
- Enophthalmos
- Worsening diplopia
- Infection or migration of orbital implant
- Postoperative retrobulbar hemorrhage
- Inappropriate placement of orbital implant



Right enophthalmos secondary to incorrect placement of orbital implant

- Lower Eyelid Retraction
 - Middle and Posterior lamellar scarring



Left lower eyelid retraction extenuated in upgaze

- Retrobulbar Hemorrhage
- Clinical Manifestations
 - Decreased vision
 - Afferent pupillary defect
 - Proptosis
 - Pain
 - Subconjunctival heme
 - External ophthalmoplegia



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Cranio-maxillofacial

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