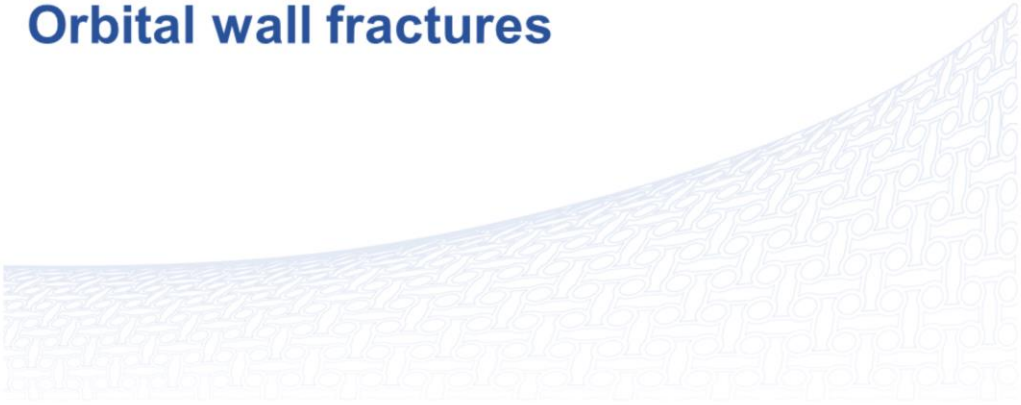


Orbital wall fractures



Version 2 (December 12, 2018)

Faculty can add a clinical or imaging picture of Orbital wall fractures

Learning objectives

- Describe the mechanism of injury for different types of orbital wall fractures
- Recognize signs and symptoms of orbital wall fractures
- Select appropriate imaging modalities and interpret the findings
- Formulate principles of management

Clinical findings

- Periorbital bruising
- Conjunctival hemorrhage
- Enophthalmos
- Visual acuity changes
- Extraocular motility restriction
- Diplopia
- Infraorbital paresthesia
- Pain on eye motion



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Pain on eye motion is a more unusual finding and may imply entrapment

Functional

Structural

Diagnostic evaluation

- CT scan
- Ophthalmology consultation
- Forced duction test



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Ophthalmology consultation:

- Preoperative and postoperative
- Up to 40% of patients have associated injury
- Visual acuity, eye movements, orthoptic assessment and forced duction test

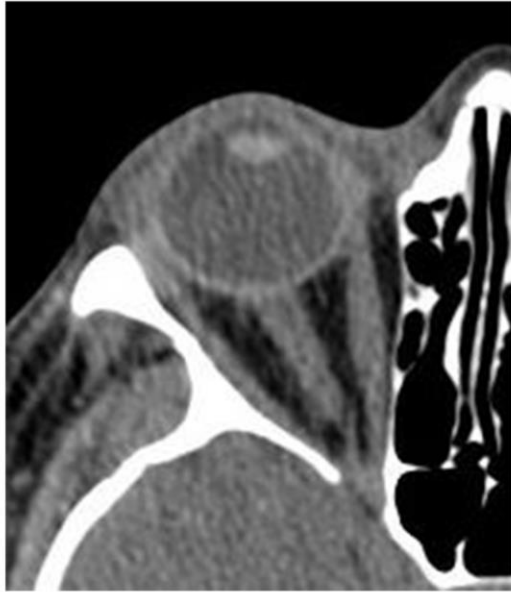
Forced duction test:

- To assess preoperative entrapment and post-reconstruction mobility

Diagnostic imaging—CT scan

Axial cuts identify:

- Lateral and medial wall fractures
- Medial and lateral rectus shape



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Diagnostic imaging—CT scan

Coronal cuts:

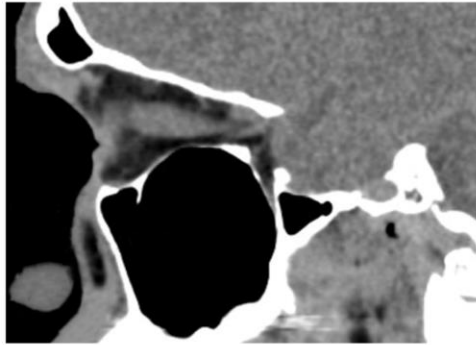
- Floor and medial wall fractures
- Measure floor fracture size
- Inferior and medial rectus shape



Diagnostic imaging—CT scan

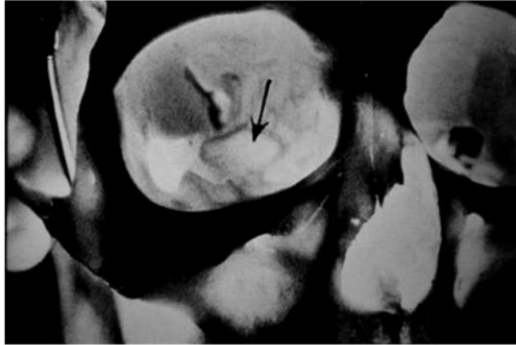
Sagittal cuts:

- Floor shape
- Fracture extent
- Fracture position
- Inferior and superior rectus shape



Orbital floor fractures

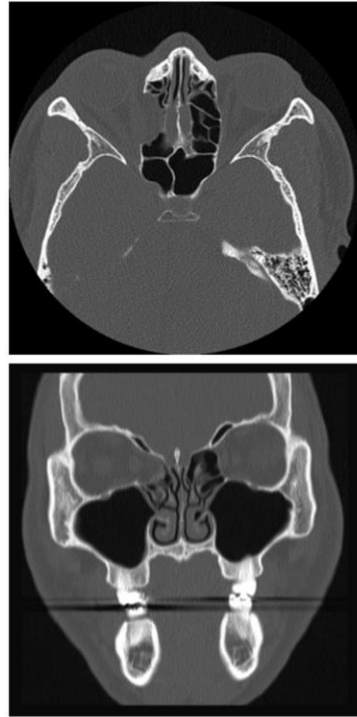
- Isolated or associated with other midfacial fractures
- Often medial to infraorbital nerve
- Beware of “trap door” fractures
- Posteromedial fractures associated with enophthalmos



Note: a trapdoor fracture is an emergency situation

Medial wall fractures

- Isolated fractures—easy to miss
- Can result in diplopia and/or enophthalmos
- Approaches—varied and none is easy
- Optic nerve enters orbit medially



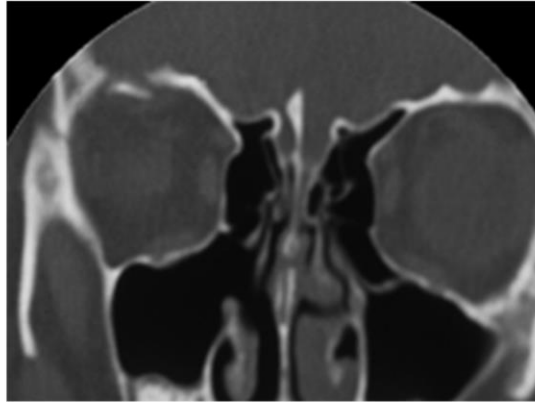
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Relative indications:

- Multiple wall fractures
- Distortion of medial rectus on CT scan
- Entrapment, decreased range of motion
- Late enophthalmos

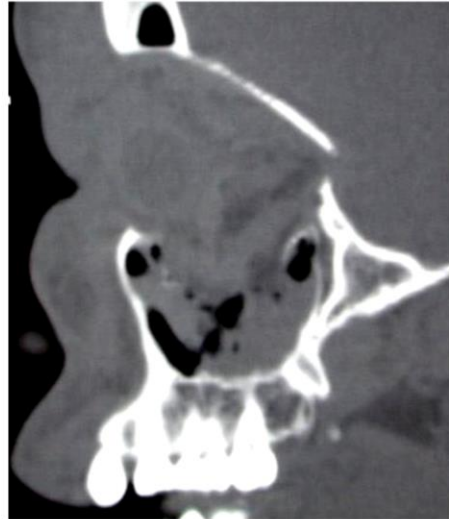
Orbital roof fractures

- Rare/blow-in type fractures
- Vertical dystopia
- Proptosis, pulsating
- Diplopia
- Globe pressure—decompression



Indications for surgery

- Evidence of entrapment
- Vertical globe malposition
- Enophthalmos
- Size and location of fracture
- Treatment of other associated fractures
- Diplopia?



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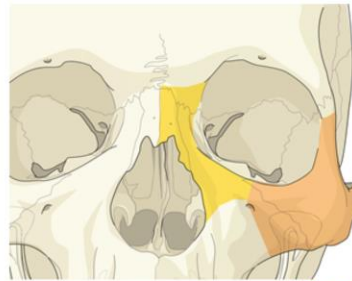
Diplopia itself is not necessarily an indication for surgery.

The decision to operate is multifactorial ... patient's symptoms, patient's wishes, ability to monitor.

Best evidence suggests that both a large floor defect and periorbital fat herniation is required to develop significant enophthalmos.

Principles of orbital fracture correction

- Reduce and fix rim fractures first
- Expose all edges of orbital wall defects
- Place appropriate implant
- Fixate implant if required



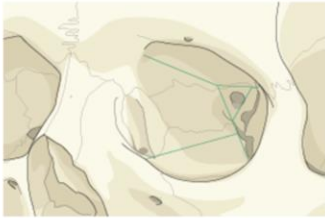
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Note: Orbital wall fractures are usually medial to infraorbital nerve

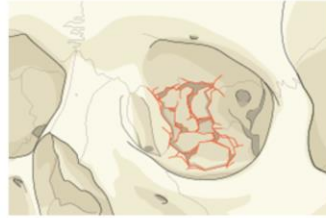
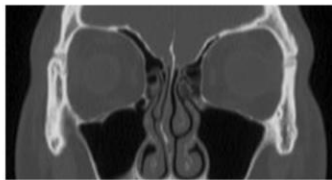
Note: Emphasize Hammer's critical zone in posteromedial orbital floor

Critical zones (Hammer, 1994)

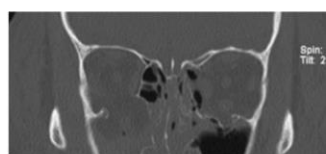
- Transition between orbital floor and medial orbital wall
- Repair of crucial importance



Normal orbit



Fracture in critical zone



Orbital implants

- Autograft
 - Bone
 - Cartilage
 - Fascia
- Alloplastic
 - Porous polyethylene
 - Bioresorbable
 - Titanium mesh
 - Patient-specific implants



Emphasize the need for an intraoperative or postoperative CT to assess reduction and fixation.

Complications

- Persistent diplopia
- Enophthalmos:
 - Must get to posterior ledge in floor fractures
- Vertical dystopia
- Scar/lid deformities
- Mydriasis/blurry vision—CN III injury
- Blindness
- Paresthesia V



Key message for faculty: Emphasize that the two most common complications are related to failure to correct the original deformity.

Take-home messages

- Accurate diagnosis and planning
- Reconstruct orbital rims before orbital walls
- Implant appropriate to fracture
- Accurate positioning of implant
- Intraoperative or postoperative CT