

المؤتمر السنوي الدولي للجمعية المصرية
INTERNATIONAL CONGRESS OF THE
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Mechanisms of Damage and
Consequences of Orbital
Trauma

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A colorful illustration of the head of Nefertiti, wearing her iconic blue and gold headdress and a multi-colored necklace. A large green eye icon is overlaid on the background behind her.

Types of Orbital Trauma

1. Blunt trauma
2. Penetrating trauma
3. Intraorbital foreign bodies



Causes of Orbital Trauma

1. Motor car accidents
2. Occupational trauma
3. Violence
4. Fall from height
5. Fall on hard objects
6. Thrown stone
7. Animal kick
8. Firearm injuries
9. War injuries
10. Iatrogenic trauma



Tissue damage

👁️ Boney orbit

👁️ Orbital contents, adnexa and adjacent structures

👁️ Mixed



Boney orbit

👁️ Fractures involving the orbital rim

👁️ Isolated orbital wall Fractures



Fractures involving the orbital rim

👁️ Direct impact of trauma

👁️ Usually severe trauma



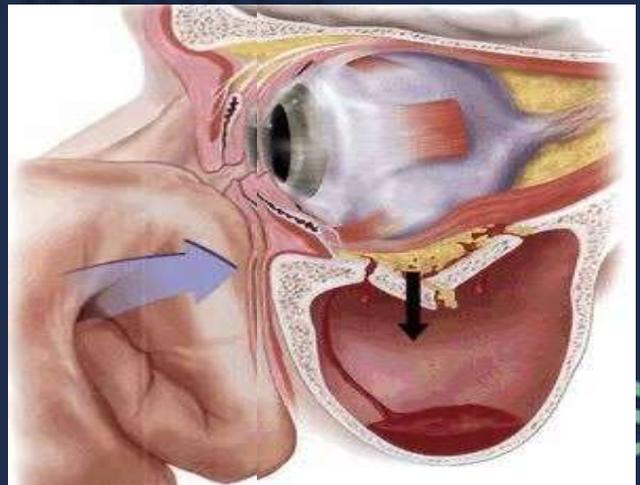
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Isolated orbital walls Fractures **blow-out fractures**

Mechanism

👁️ The Buckling Theory

transmission of the kinetic energy through the rigid orbital rim to the weak floor.

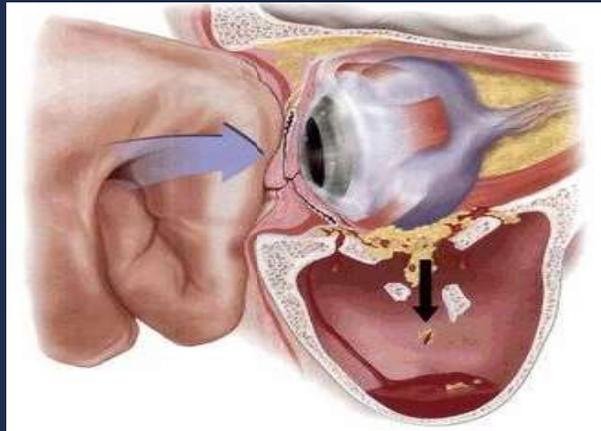


Isolated orbital walls Fractures blow-out fractures

Mechanism

👁️ The Hydraulic Theory

An increase in orbital pressure from a globe-directed trauma results in fracturing the thin orbital bones.



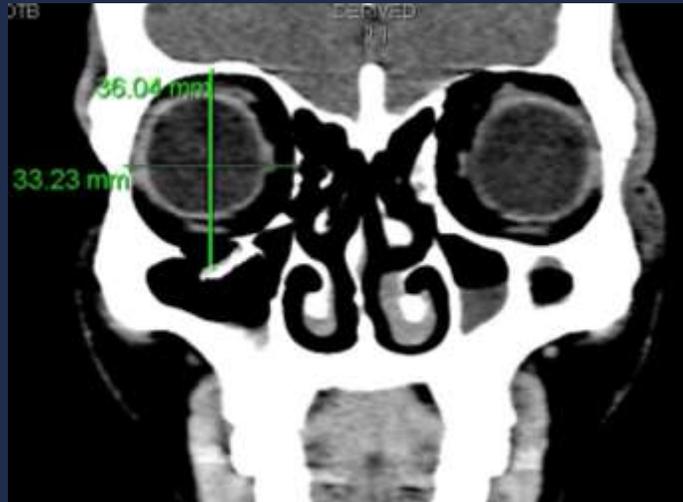
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Blow-out fractures

- 👁️ The orbital floor, although is thicker than the medial wall (0.5-1mm versus 0.2-0.4mm), it is more often involved in orbital blow out fractures
- 👁️ This is probably because it lacks the buttress-like supports of the ethmoid air cells and the protection of the nose with the hollow maxillary sinus below it.

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Floor fracture



Floor fracture

Consequences:

Enophthalmos

Restrictive strabismus & diplopia (muscle entrapment or trauma of the muscle or its nerve or blood supply)

Infraorbital n. hypo or paresthesia

Oculo-cardiac reflex

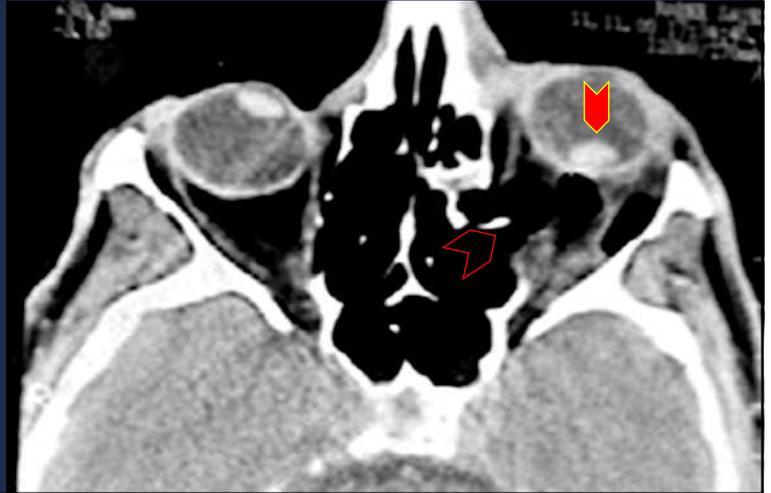


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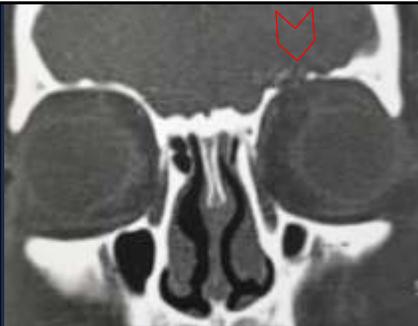
Medial wall fracture

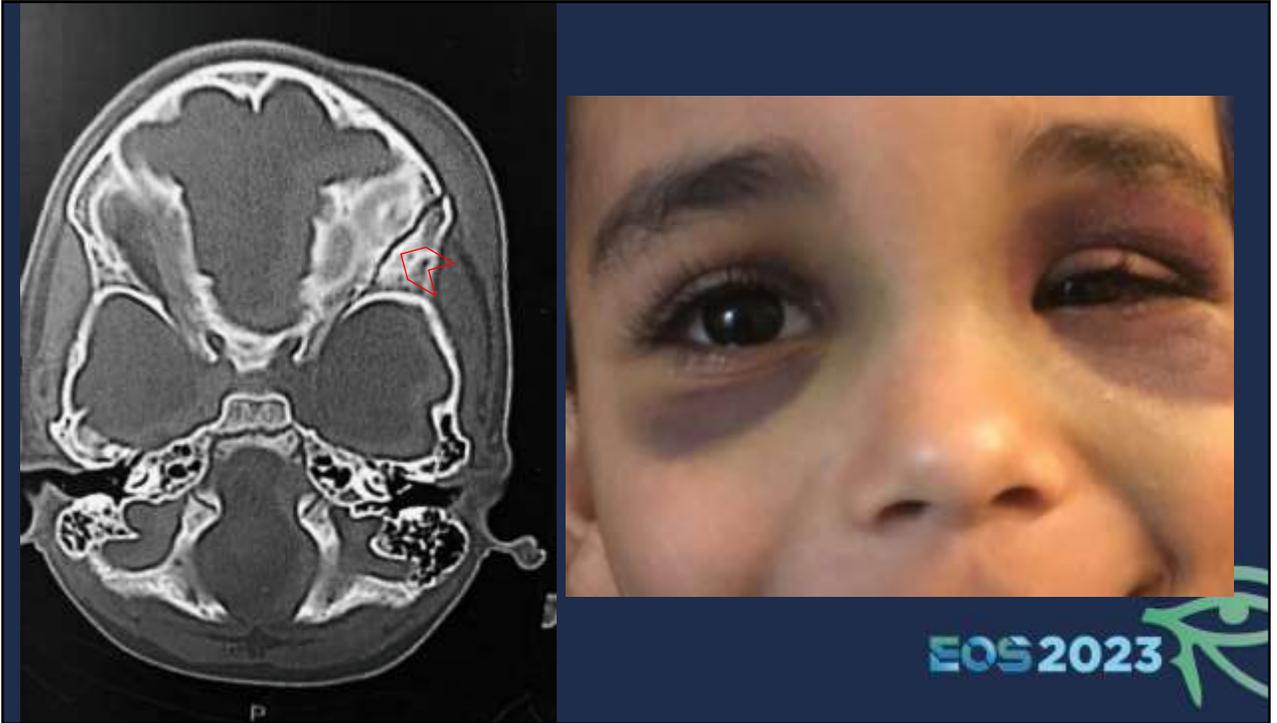
Consequences:

- 👁️ Restrictive strabismus & diplopia
- 👁️ Surgical emphysema
- 👁️ Orbital cellulitis



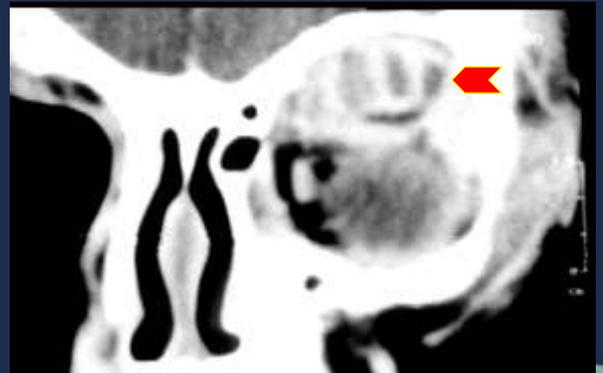
Roof fracture





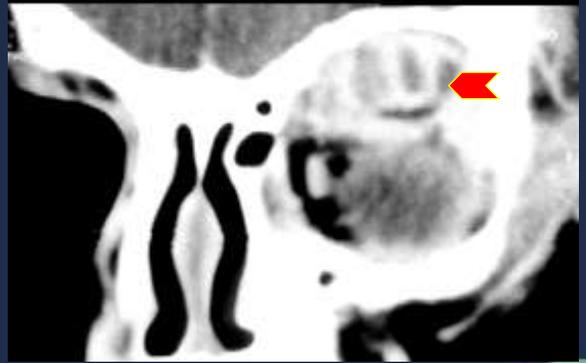
Orbital hemorrhage

👁️ Most orbital hematomas due to blunt injuries are present in the potential subperiosteal space → subperiosteal hematoma



Orbital hemorrhage

👁️ The lack of adjacent sinus opacification and the absence of systemic manifestations, normal leucocytic count and CRP could differentiate it from subperiosteal abscess.



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Orbital hemorrhage

👁️ The hemorrhage may be also be iatrogenic, resulting from orbital injection, orbital surgery or surgery on adjacent structures (blepharoplasty, sinus surgery)

👁️ **Orbital hemorrhage could be sight threatening → CRAO**

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Orbital Emphysema

- 👁️ Air may enter the orbit from a paranasal sinus following a fracture with valve like mechanism
- 👁️ A large volume of air may result in proptosis and crepitus



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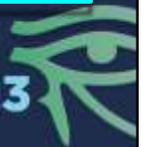


Carotid-Cavernous Fistula



Head trauma: Pulsating proptosis, characteristic tortuous epibulbar vessels, bruit that is audible to the examiner and/or the patient, enlarged EOM, 2ry glaucoma

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Optic Nerve Trauma

1- Transmitted shock from an orbital impact to the intracanalicular portion of optic nerve

- 👁️ May be normal imaging
- 👁️ RAPD and profound visual loss
- 👁️ Early normal disc



Optic Nerve Trauma

2- Penetrating injury ,FB or bony fragments

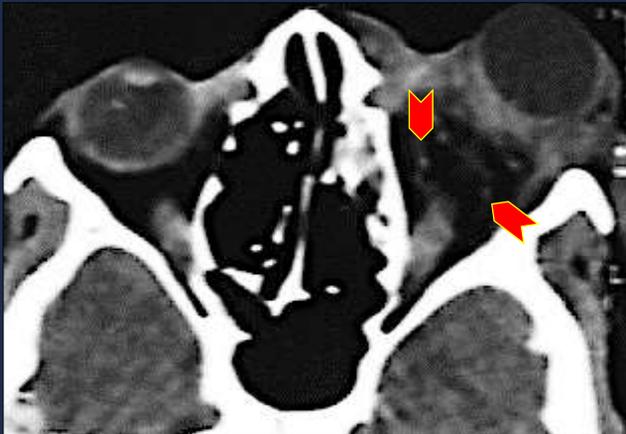
3- Optic nerve Avulsion

4- Orbital hemorrhage and ON sheath hematoma

5- Iatrogenic lesion in endoscopic sinus surgery



Optic nerve shearing or avulsion

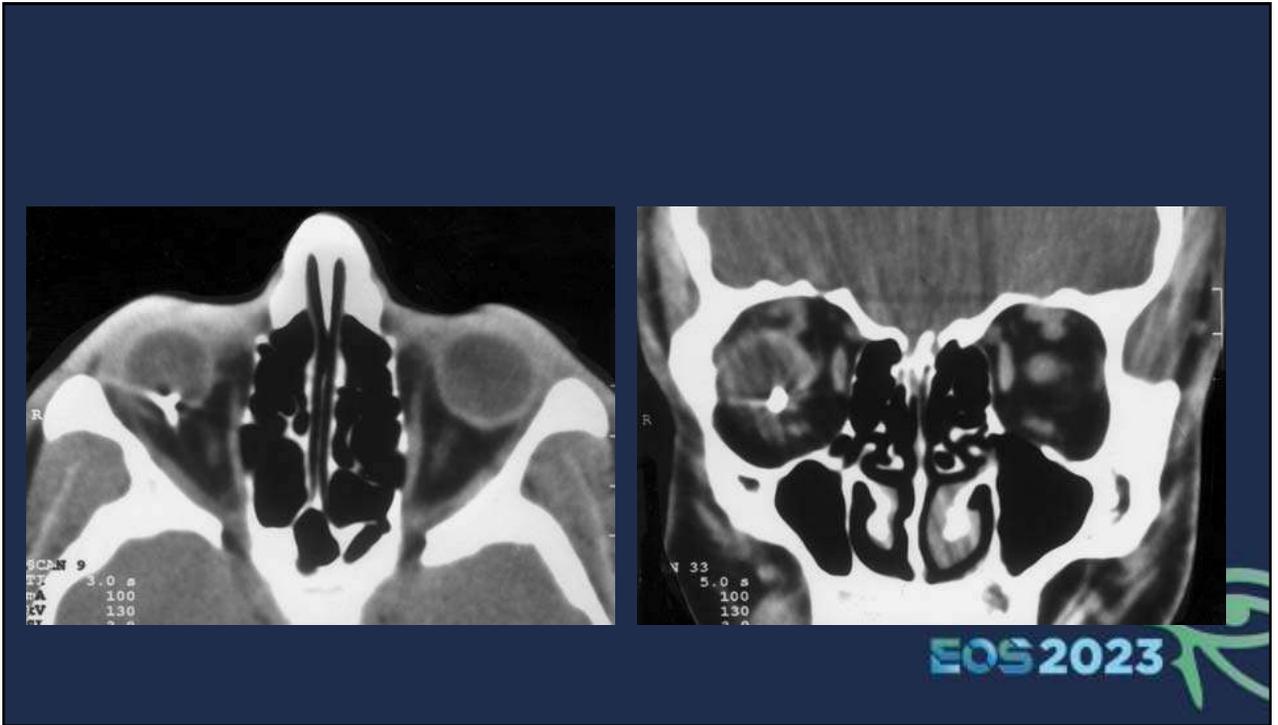


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Optic nerve shearing or avulsion



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Lid Trauma

- 👁️ Hematoma
- 👁️ Mechanical ptosis
- 👁️ Aponeurotic ptosis
- 👁️ Neurogenic ptosis
- 👁️ Canalicular lesions
- 👁️ Lid avulsion



Hematoma



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Lid avulsion



Intraorbital Foreign body

- 👁️ Direct effect of F.B on orbital structures
- 👁️ Orbital inflammation & infection

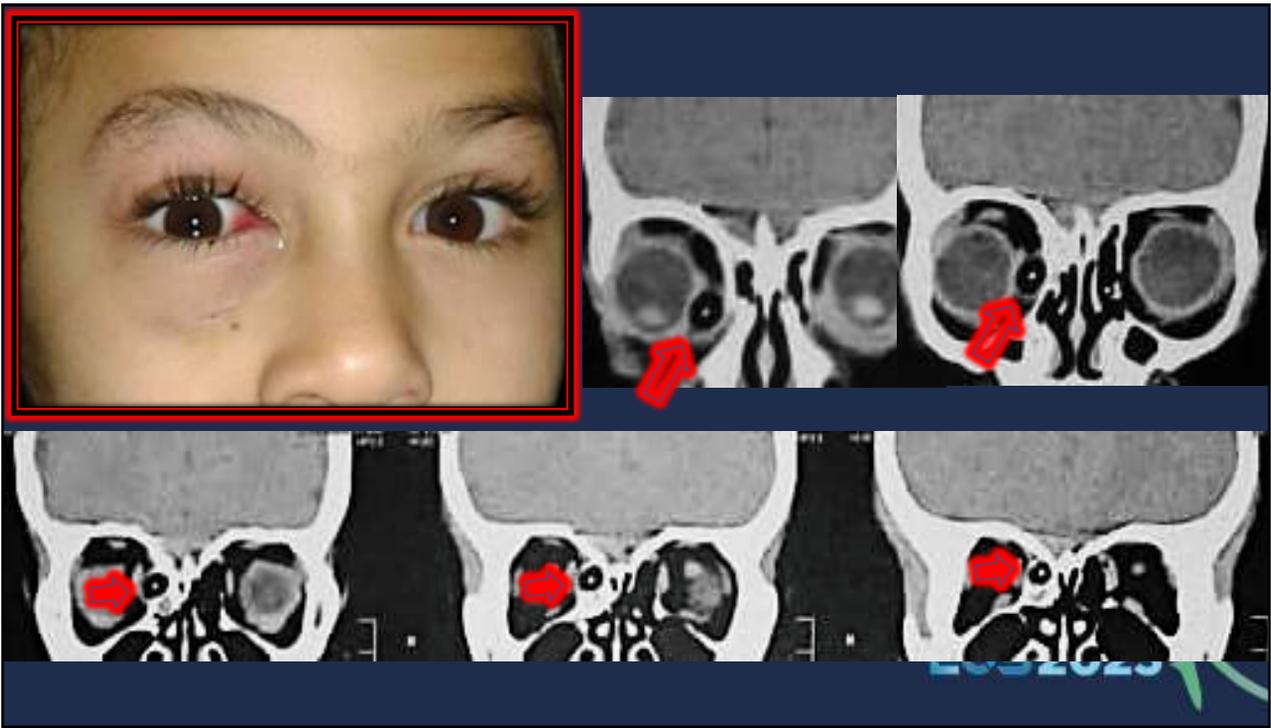


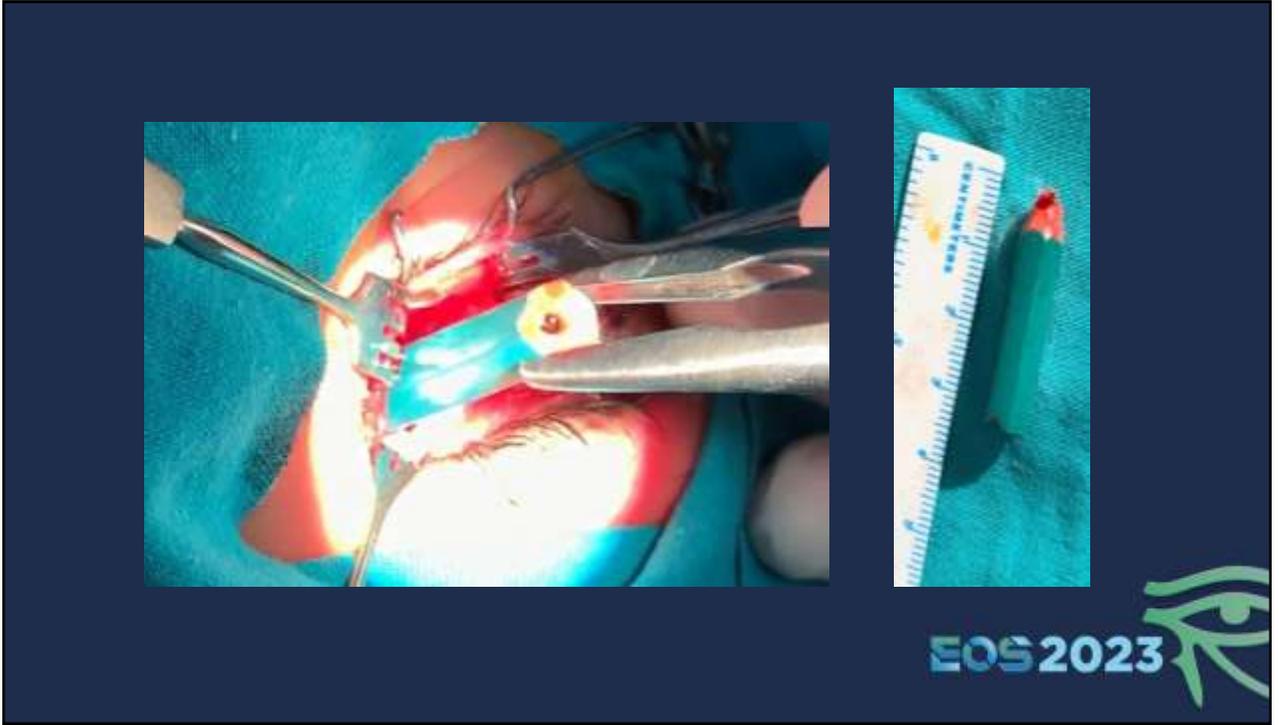
Intraorbital Foreign body

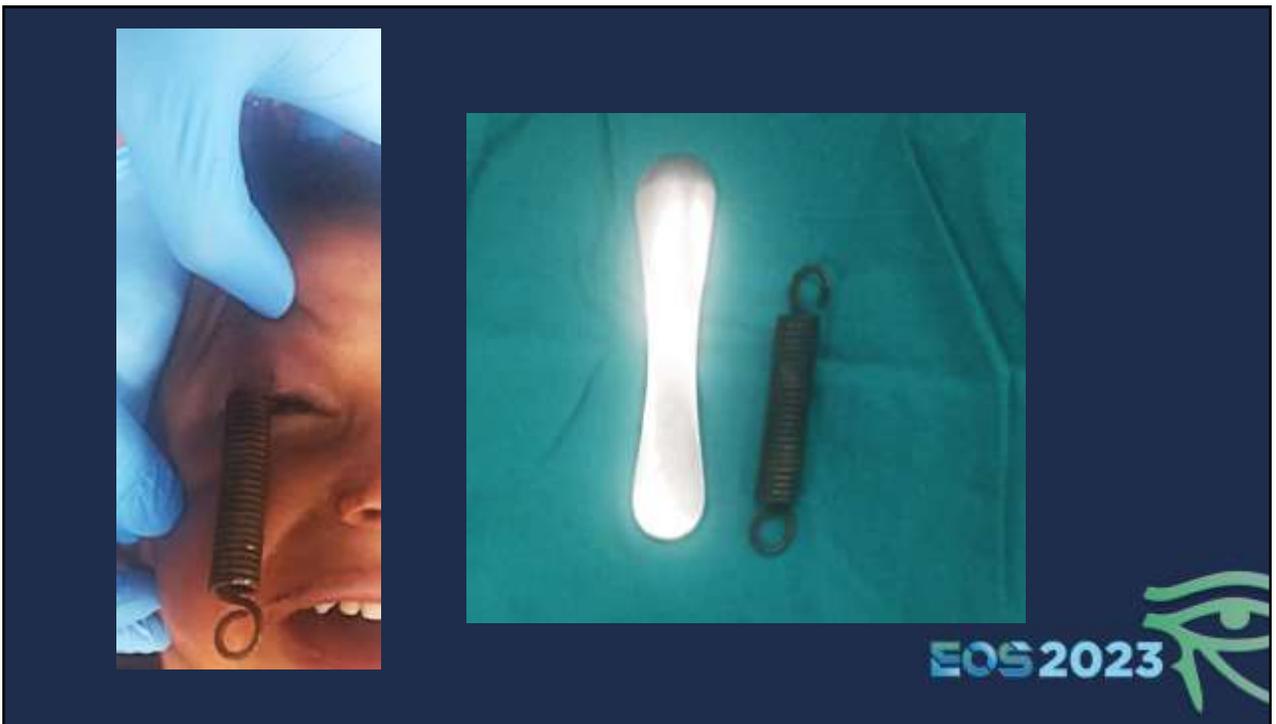
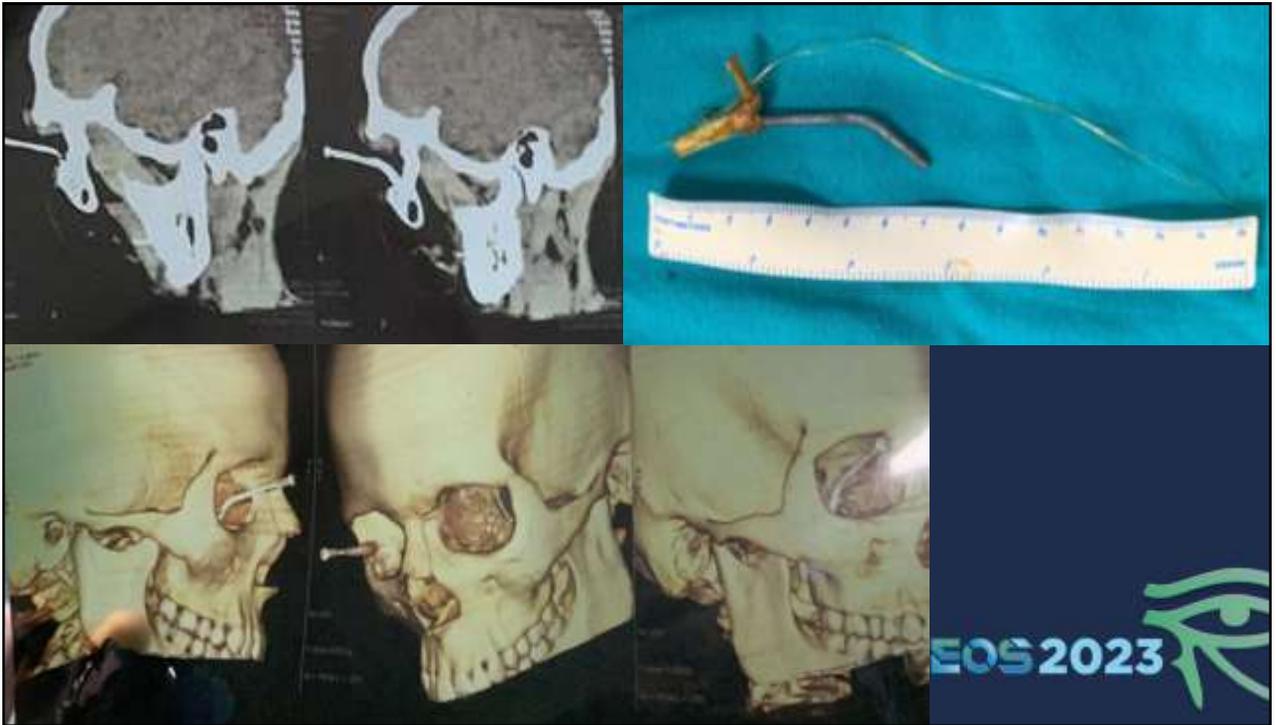
- 👁️ Metallic FB high momentum F.Bs as firearm may be hot enough to be sterile and cause damage by direct effect
- 👁️ Orbital inflammation and infection is more common with organic FBs.

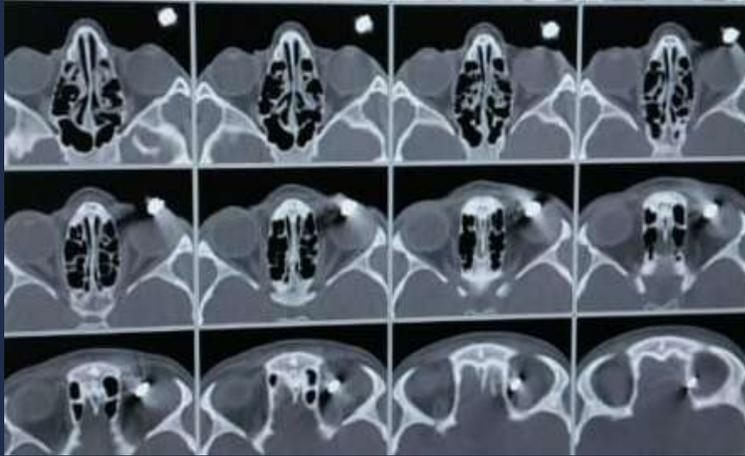


Intraorbital FB









Metallic FB penetrating the orbital roof



Organic FB penetrating the orbital roof with pneumocephaly



