



جامعة المستقبل
كلية التقنيات الصحية والطبية
قسم تقنيات البصريات



Fourth Stage 2024-2025

X-ray and Ultrasound of The Eye

Lecture Title

**Foreign Body Localization by Plain
X-Ray Film**

Lecture Number: 5

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OPTOMETRIST

Foreign Body Localization by Plain X-Ray Film

Foreign bodies (FB) in the orbit represent a significant ocular emergency that requires precise localization for successful management. Plain radiography remains a valuable initial imaging modality due to its accessibility, low cost, and ability to detect radio-opaque foreign bodies.



Figure. Foreign body localization using a frontal and lateral projection. A. Caldwell projection of a patient with a gunshot injury to the left orbit. B. Lateral projection with a large metal fragment (arrow) in the orbital apex.

Types of Foreign Bodies

1. Radio-opaque (easily visible on X-ray):

- Metallic objects
- Glass
- Stone
- Concrete particles

2. Radiolucent (poorly visible or invisible on X-ray):

- Wood
- Plastic
- Organic materials
- Pure graphite

**❖ Radiographic Signs and Interpretation**

- Density of foreign body
- Size and shape
- Number of fragments
- Location relative to:
 - ✓ Orbital walls
 - ✓ Globe
 - ✓ Optic nerve

❖ Limitations of Plain Radiography

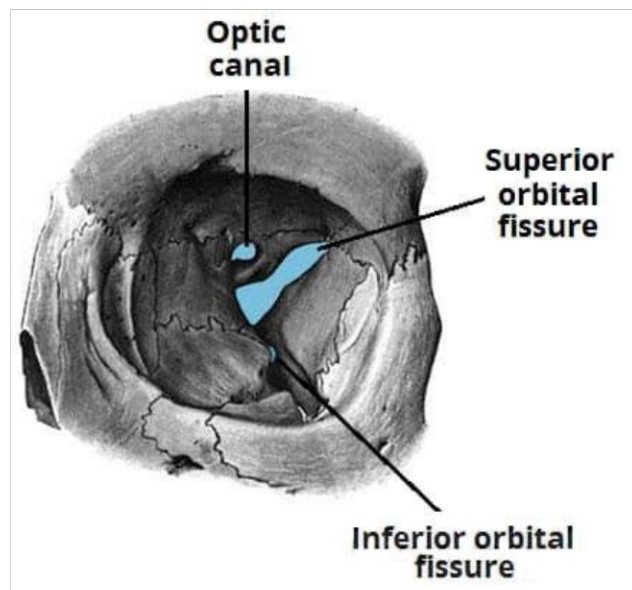
- ✓ Limited soft tissue detail
- ✓ Overlapping structures
- ✓ Poor visualization
- ✓ May require additional imaging:
 - CT scan
 - MRI
 - Ultrasound

❖ Orbital Bones

- ✓ Superior (frontal bone)
- ✓ Lateral (zygoma and sphenoid)
- ✓ Medial (ethmoid and lacrimal)
- ✓ Inferior (maxilla)

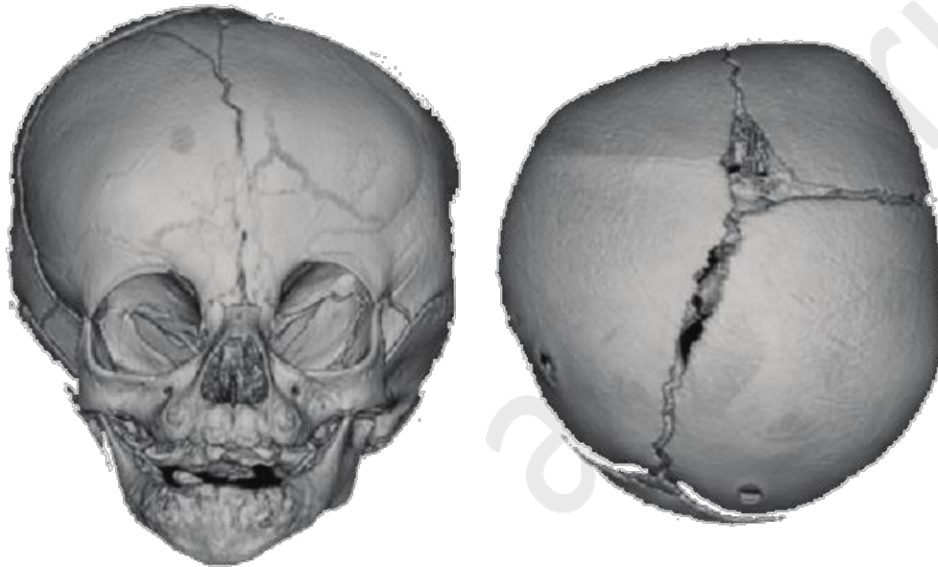
❖ Key Features:

- ✓ Orbital rim
- ✓ Greater and lesser wings of sphenoid
- ✓ Superior and inferior orbital fissures
- ✓ Optic canal

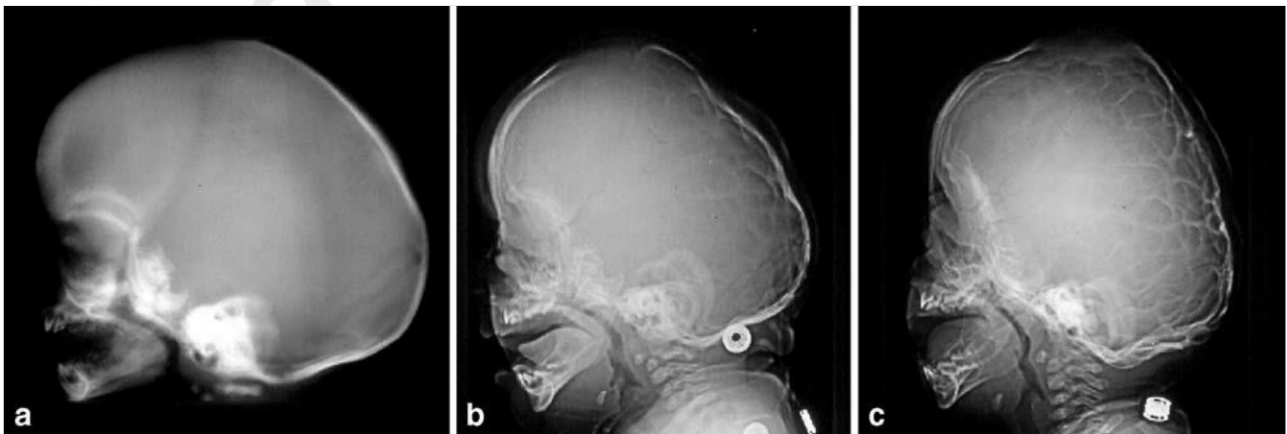


❖ **Pathological Changes****1. Congenital Abnormalities**✓ **Craniosynostosis:**

- Altered orbital shape
- Asymmetric orbital rims
- Changes in orbital volume

✓ **Craniofacial Dysostosis:**

- Shallow orbits
- Abnormal orbital angles
- Associated skull deformities



2. Inflammatory Conditions

✓ Orbital Cellulitis

- Soft tissue swelling
- Loss of orbital fat lines
- Possible air-fluid levels in sinuses
- Periosteal reaction in chronic cases

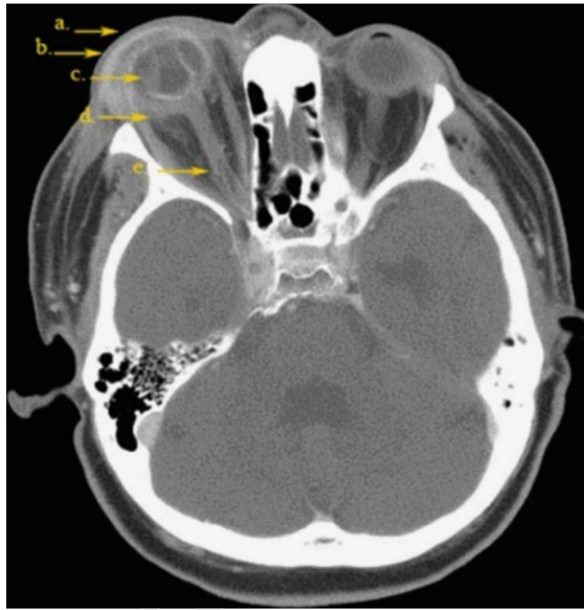
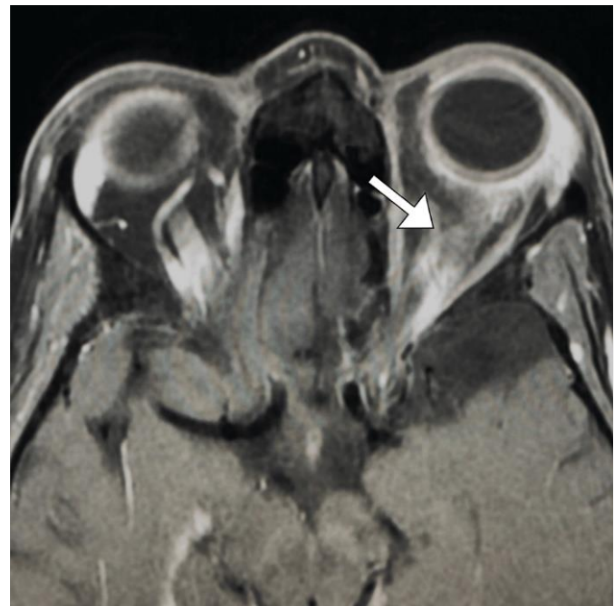


Figure. (a) proptosis, (b) soft tissue inflammation, (c) choroidal detachment, (d) retrobulbar inflammation, and (e) optic nerve sheath enhancement

✓ Orbital Pseudotumor

- Soft tissue mass effect
- Normal bony margins



3. Traumatic Changes in Orbital Fractures

✓ Blow-out Fractures:

- Tear-drop sign
- Herniation of orbital contents
- Air in maxillary sinus

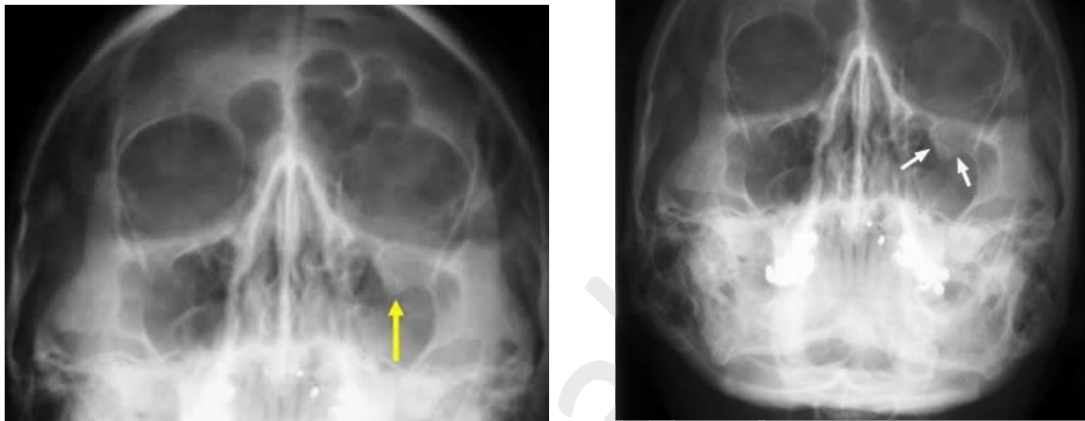


Figure. Blowout fracture (a traumatic deformity of the orbital floor or medial wall). Muscles/fats herniate down into the maxillary sinus. Results in a 'teardrop' of soft tissue in the roof of the maxillary sinus

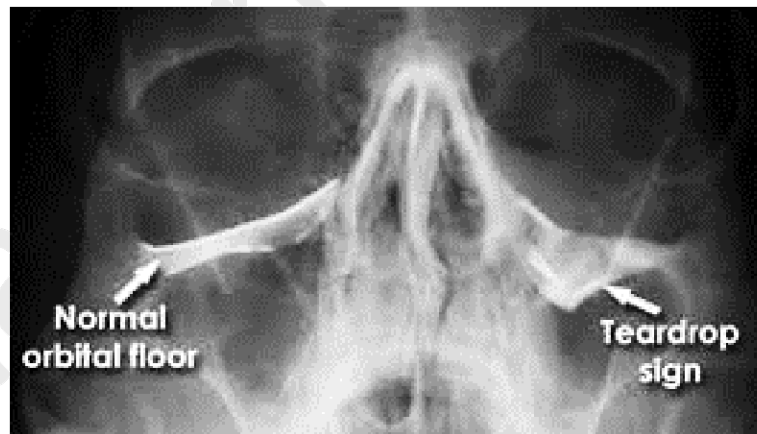


Figure. Blowout fracture on the left side compared to normal orbital floor with Waters view (occipitomeatal (OM))

✓ **Orbital Rim Fractures:**

- Disrupted orbital margin
- Displacement of fragments
- Associated soft tissue swelling

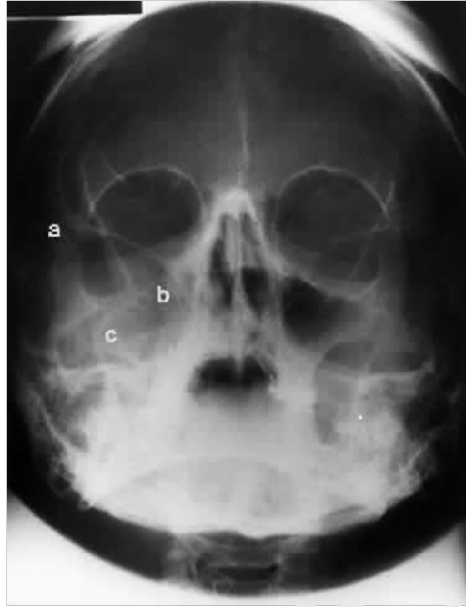


Figure. A tripod fracture (zygomatico- maxillary complex fracture). Right zygoma is inferiorly displaced. a: zygomatic-frontal suture separation b: orbital rim disruption c: opacification of maxillary sinus

4. Age-Related Changes

- ✓ Pneumatization of sinuses
- ✓ Bone density changes
- ✓ Orbital volume alterations
- ✓ Rim configuration changes