Facial & Nasal Bone

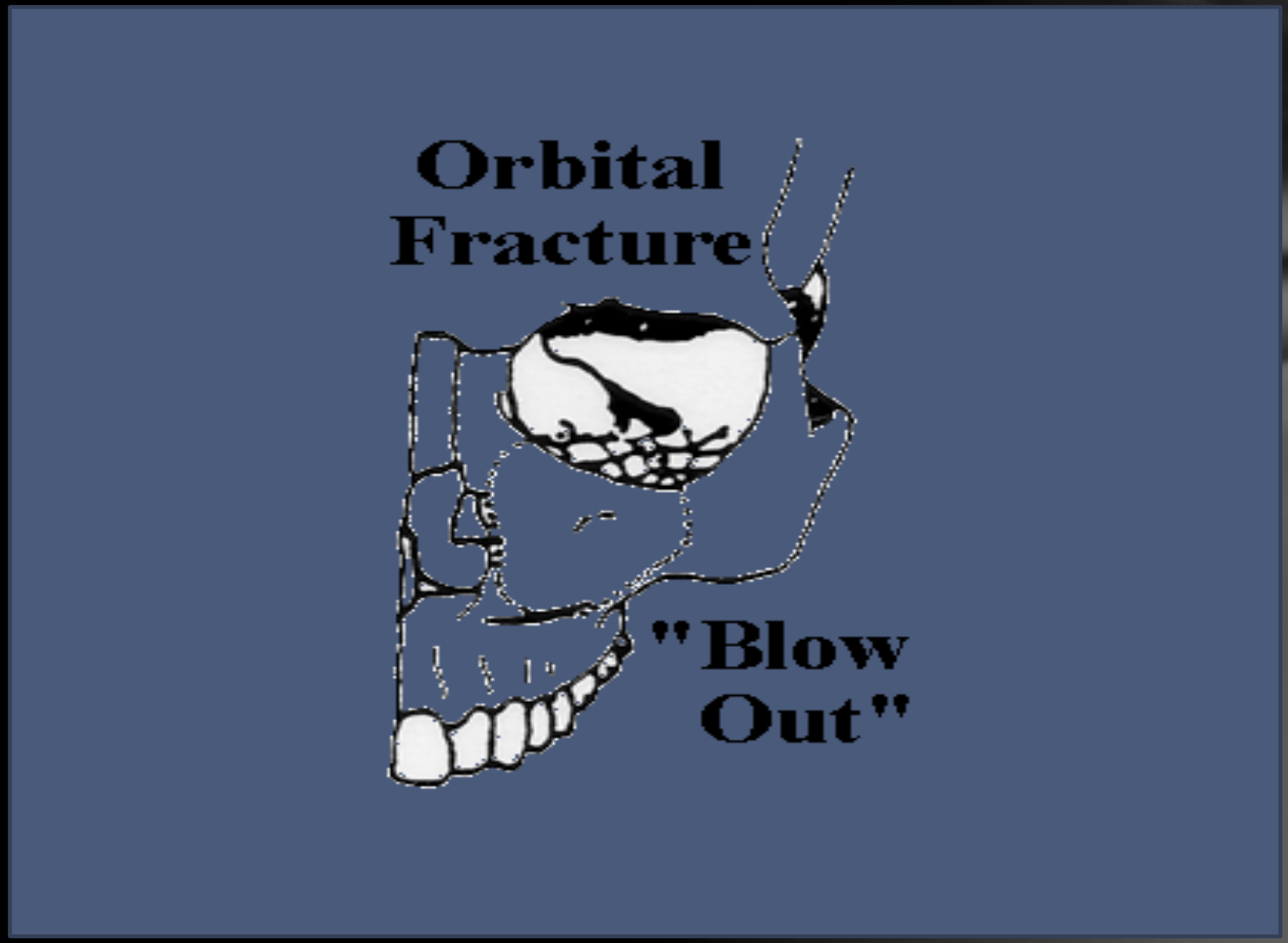
Pathology and Critique

Pathology

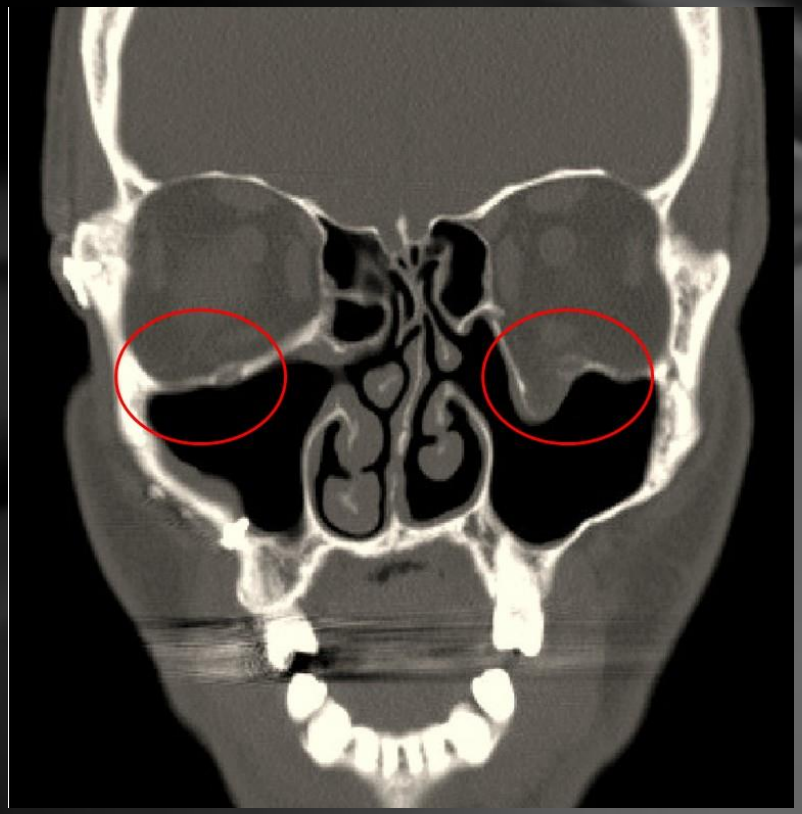
Blowout Fracture

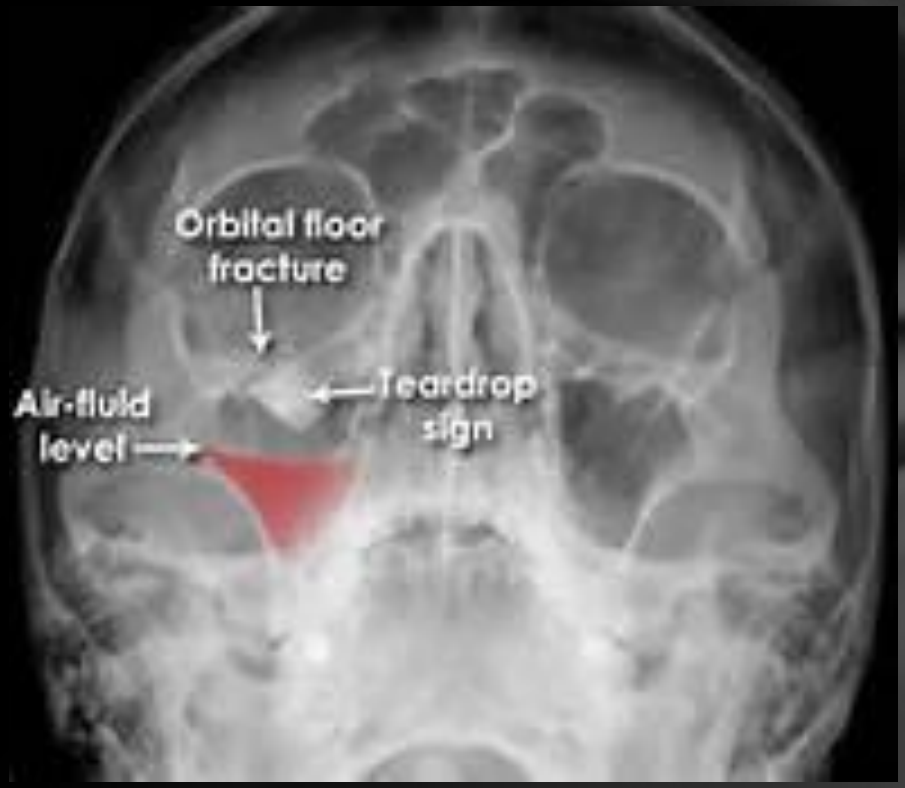
- A blowout fracture is a result of a forceful blow to the orbit (ex. fist or baseball). It causes one or more of the orbital walls to fracture, but the orbital rim stays intact
- **Cause**- traumatic in nature- direct blow to the orbit, usually sports related
  - Most common in young males
- **Complications**- Can cause damage to the globe (eyeball) and optic nerve. It can also cause diplopia (double vision). Non- union of fracture site.
- **Radiographic appearance-** plain film radiographs are not the modality of choice for facial trauma.
  - Fluid in the maxillary sinus and ethmoidal air cells
  - "Tear drop" sign- herniation of the orbital fat inferiorly
  - Orbital emphysema- air enters the orbit via the sinus due to fracture
  - CT is the modality of choice
- **Technical considerations-** none
- **Prognosis-** Surgery is indicated in order to repair the fractured orbit. Might be done after swelling goes down.

Blowout Fracture



“Tear Drop” Sign on X-ray & CT

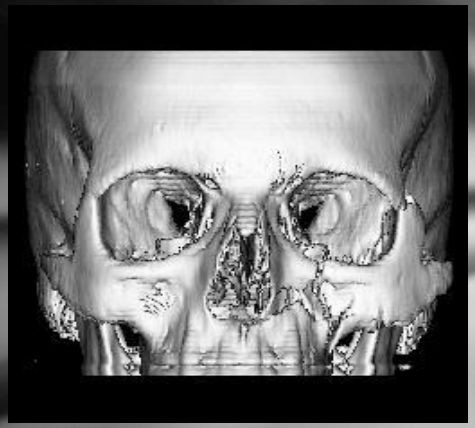


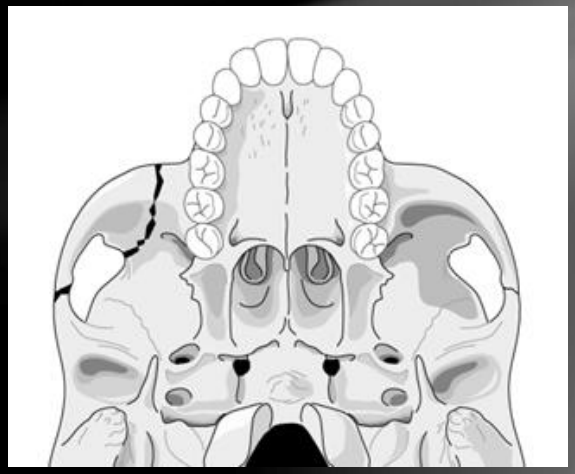

Orbital floor fracture
Teardrop sign
Air-fluid level

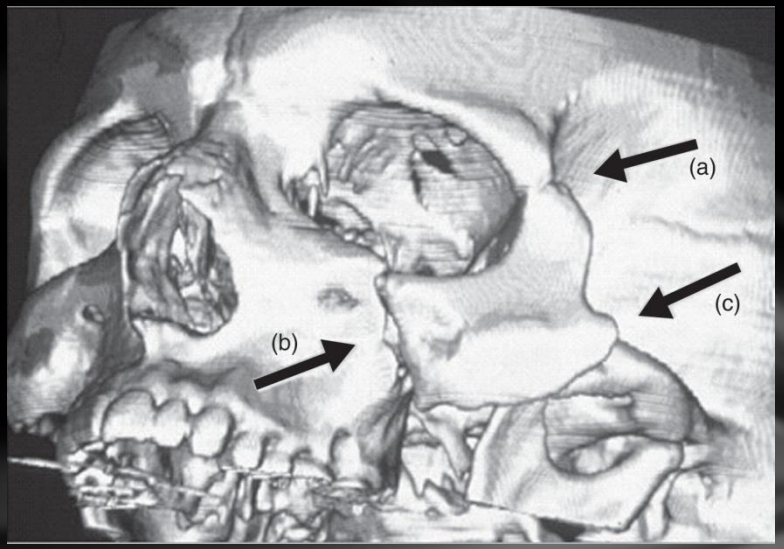
Tripod Fracture

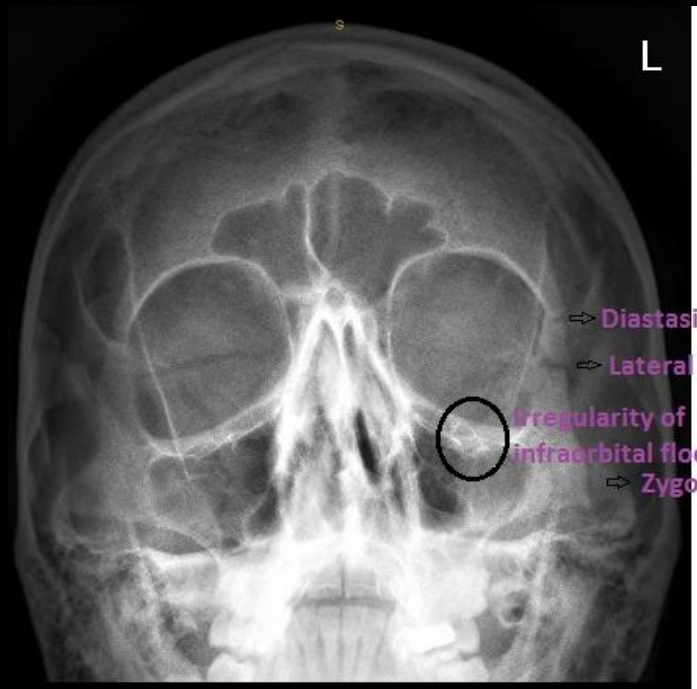
- A tripod fracture is a fracture of three parts of the facial bones- the zygomatic arch, the zygomatic process of the frontal bone and the zygomatic process of the maxillary. Also called a zygomaticomaxillary complex fracture. 40% of facial fractures.
- **Cause**- traumatic in nature- direct blow to the "cheek"
- **Complications**- non- union of fracture sites
- **Radiographic appearance-** plain film radiographs done along with a CT
  - Fractures of the:
    - zygomatic arch
    - inferior orbital rim and anterior and posterior maxillary sinus walls
    - lateral orbital rim
  - Fracture may appear as a "free floating" bone
- **Technical considerations-** none
- **Prognosis-** Closed or open reduction surgery is performed to preserve normal facial structure and function

Tripod Fracture









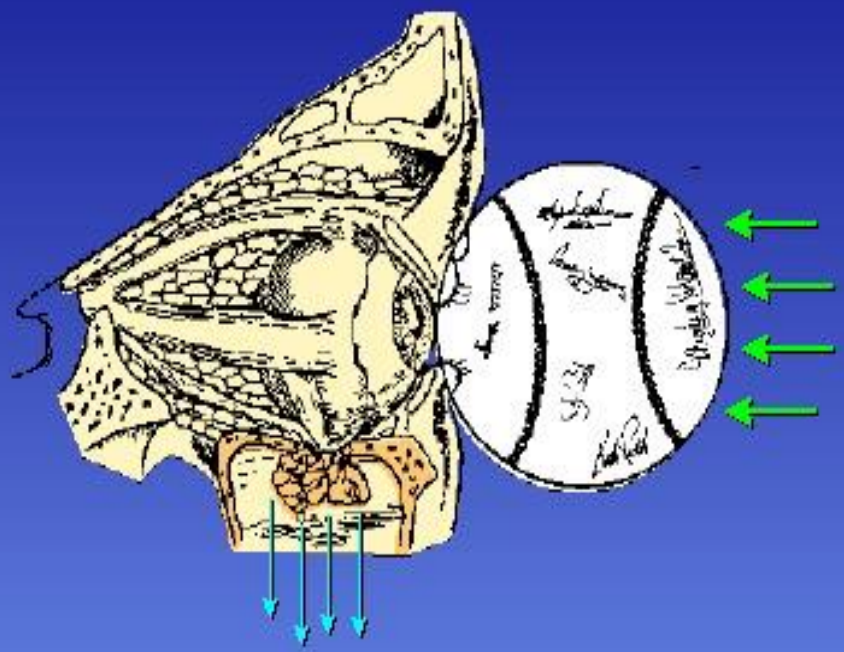
⇨ Diastasis of the frontozygomatic suture

⇨ Lateral orbital wall fracture

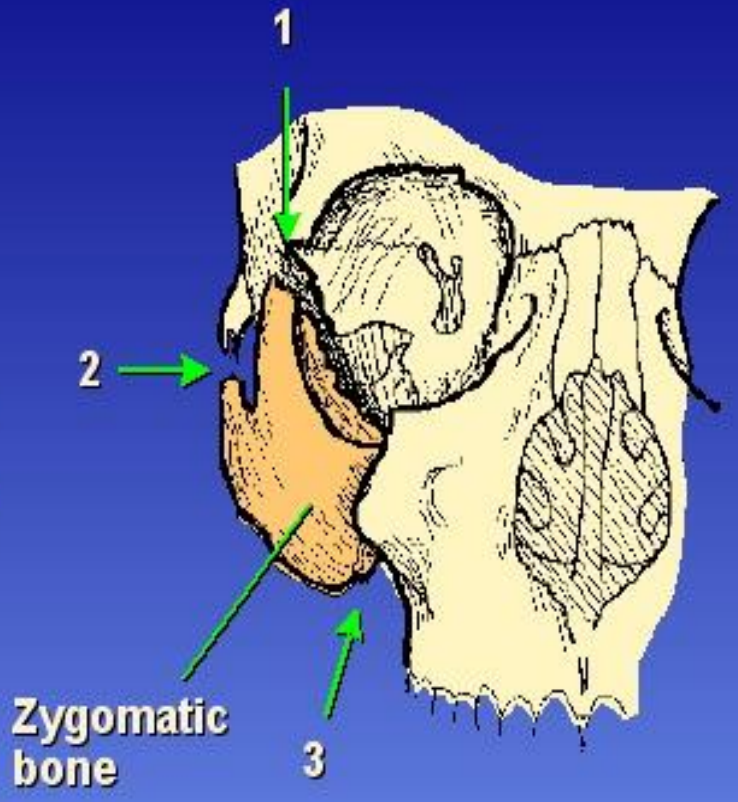
Irregularity of infraorbital floor

⇨ Zygomatic arch fracture

Orbital Fractures

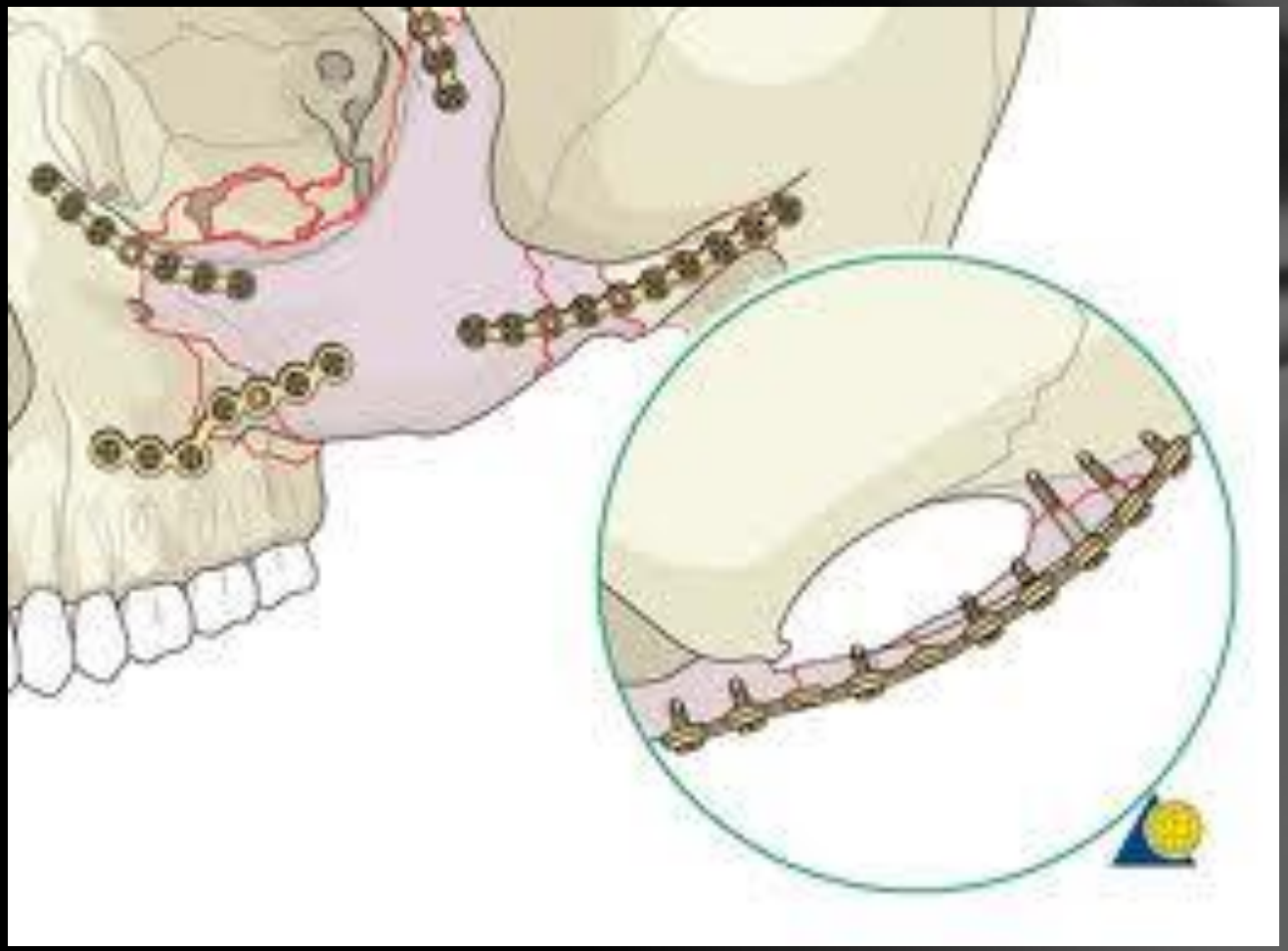


Blow-out fracture



Tripod fracture

Surgical Repair



Facial Fracture Surgical Fixation

Zygomatic Arch Fracture

- A zygomatic arch fracture is a fracture of the arch that is formed by the zygomatic process of the temporal bone and the zygomatic bone
- **Cause**- traumatic in nature- usually from a MVC, assault, sports, or falls
- **Complications**- non- union of fractures
- **Radiographic appearance-** the arch of interest may be depressed, if so the axial oblique (tangential) may be needed in order to visualize the fracture
- **Technical considerations-** none
- **Prognosis-** Surgery is indicated in cases of deformity, or a fracture that is displaced or comminuted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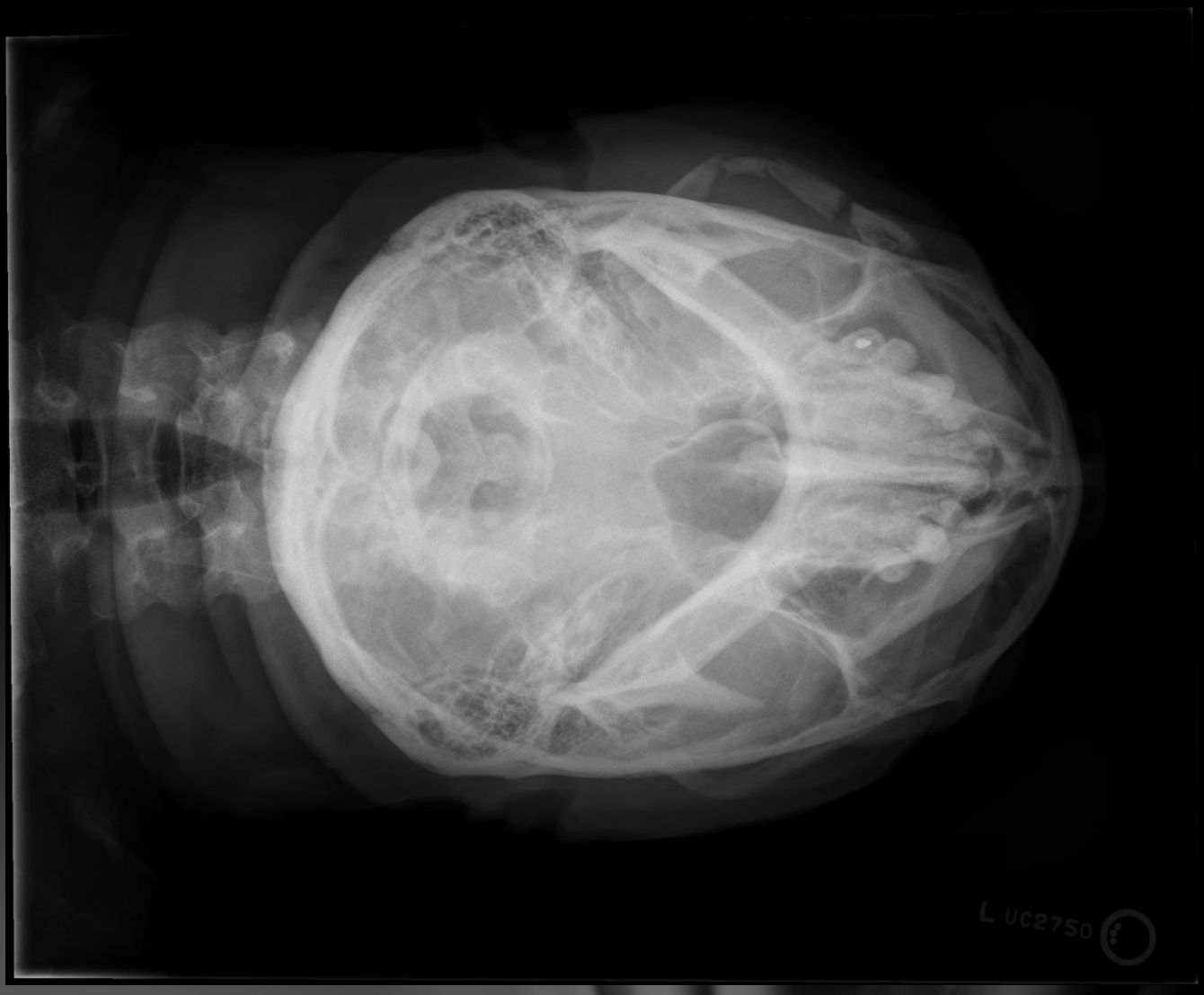
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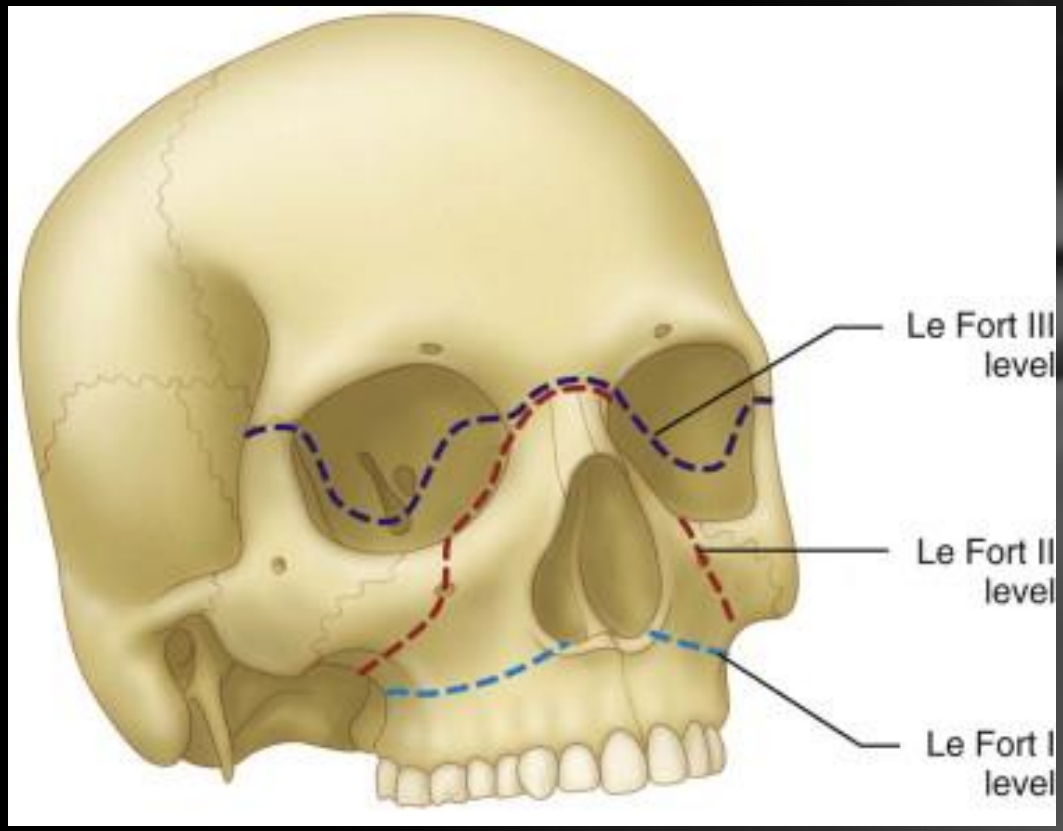
Le Fort Fracture

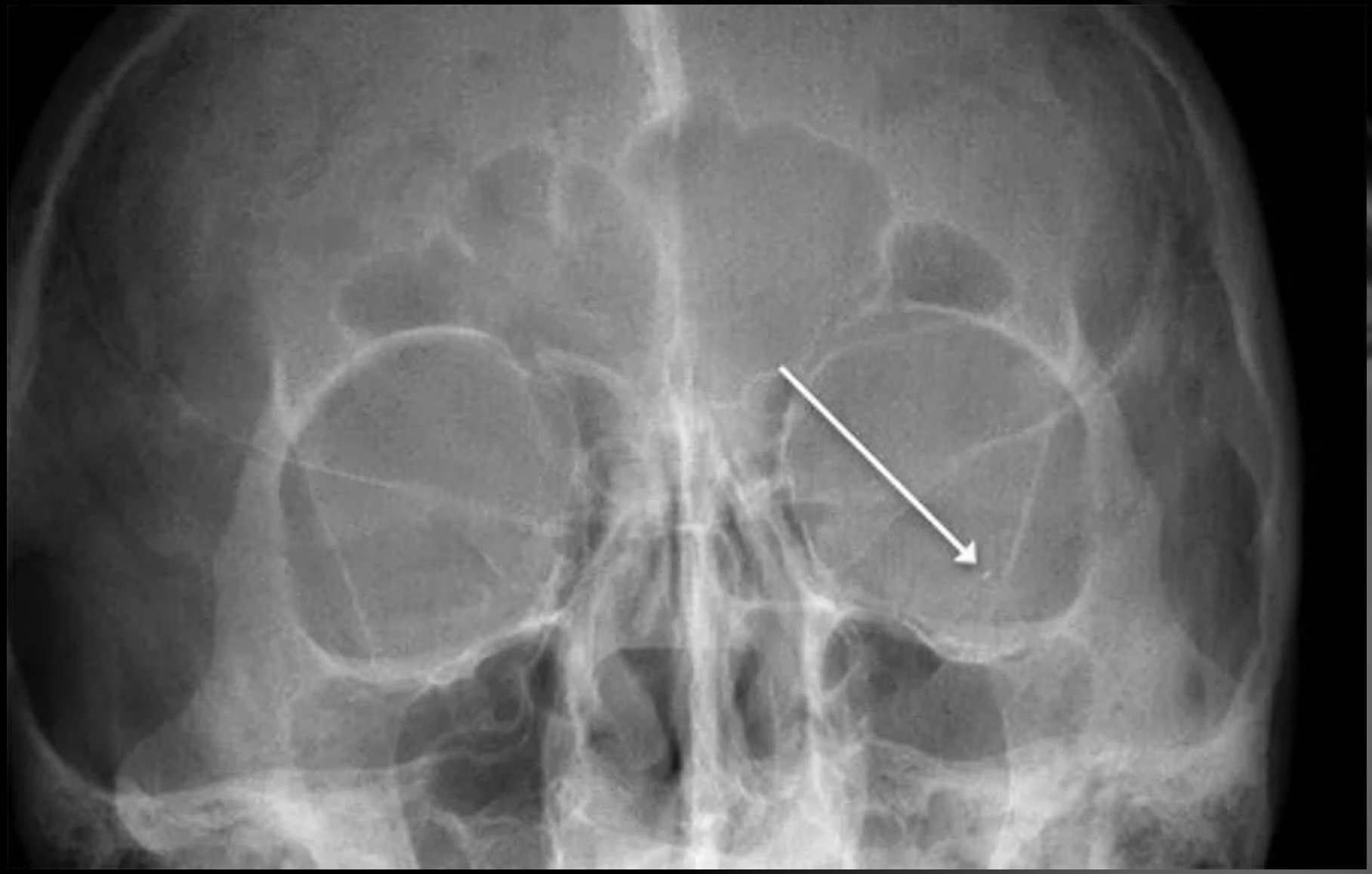
- Bilateral horizontal fracture of the maxillae that causes instability
- **Cause**- traumatic in nature
- **Complications**- extra-ocular muscle injury, hemorrhage, and nerve impingement
- **Radiographic appearance-** unstable detached fragments of the maxilla
- CT is also useful
- **Technical considerations-** none
- **Prognosis-** Surgery is indicated to stabilize the fracture and restore facial features

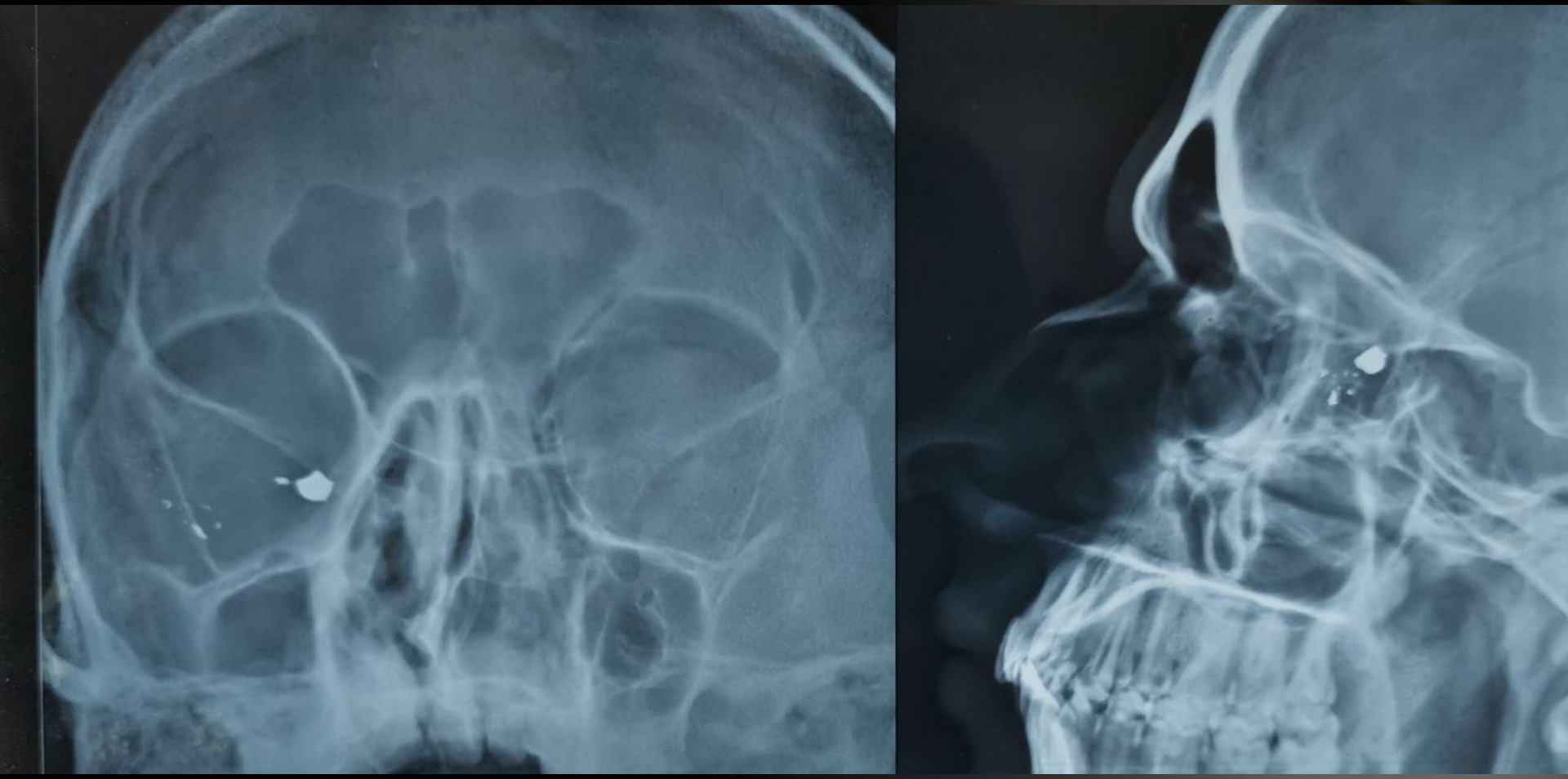

Le Fort III
level
Le Fort II
level
Le Fort I
level

Waters' view: Le Fort I fracture

Foreign body of the eye

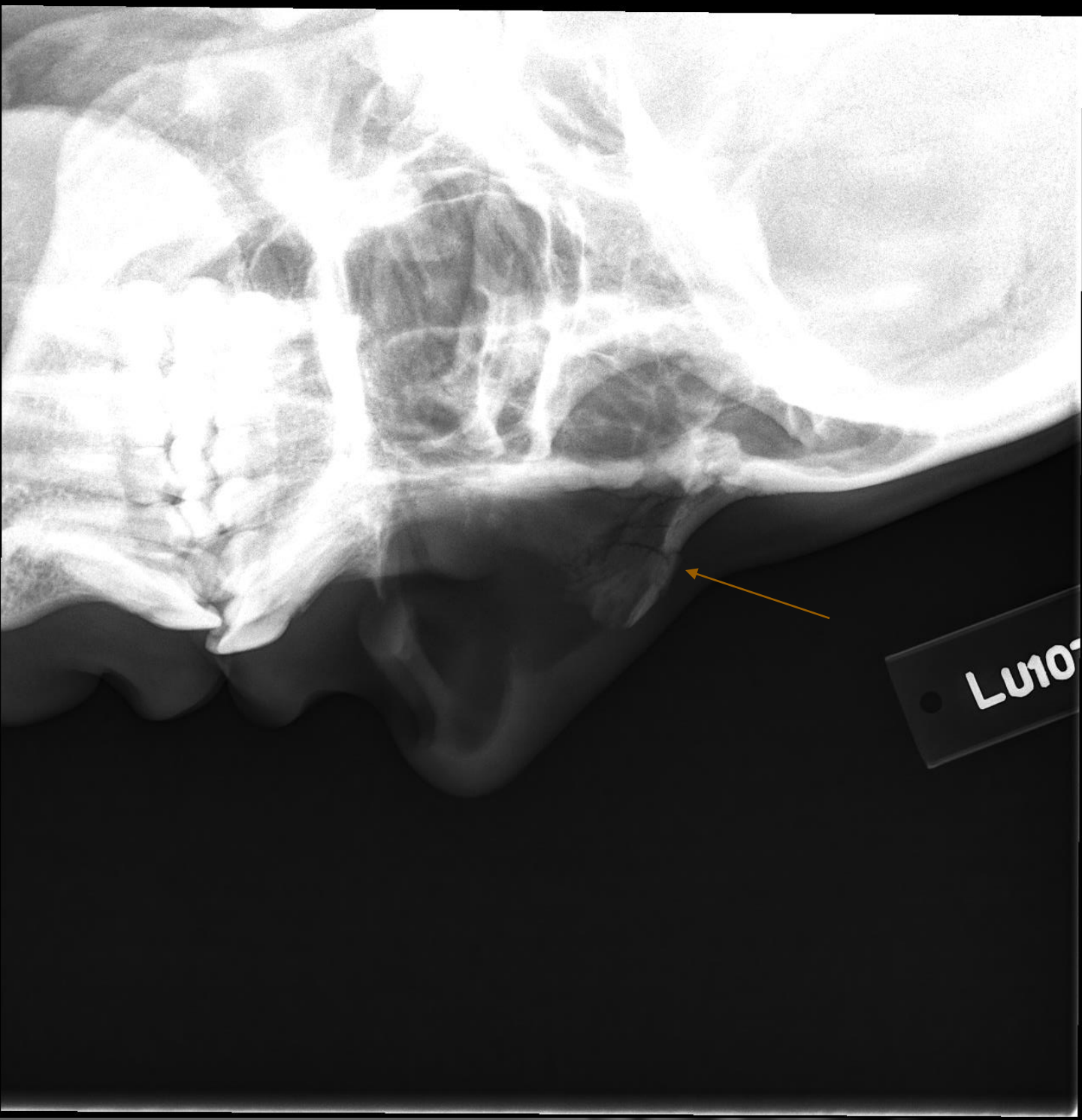
- Metal or other types of fragments in the eye
- **Cause**- common with machinery and industry mishaps, traumatic in nature, eye surgeries
- **Complications**- none or could cause optic nerve issues or blindness depending where the fragment is
- **Radiographic appearance-** bright metallic piece in orbit
- *Need images prior to MRI as the magnet can shift metal*
- **Technical considerations-** none; could increase density if metallic foreign body is large
- **Prognosis-** good, may need surgical removal if possible and necessary





Nasal Bone Fracture

- Fracture to the nasal bone
- **Cause**- trauma/injury
- **Complications**- pain, sometimes doesn't heal properly and can cause breathing issues or unfavorable cosmetic appearance
- **Radiographic appearance-** often a transverse fx, best detected on lateral views
- **Technical considerations-** none
- **Prognosis-** good

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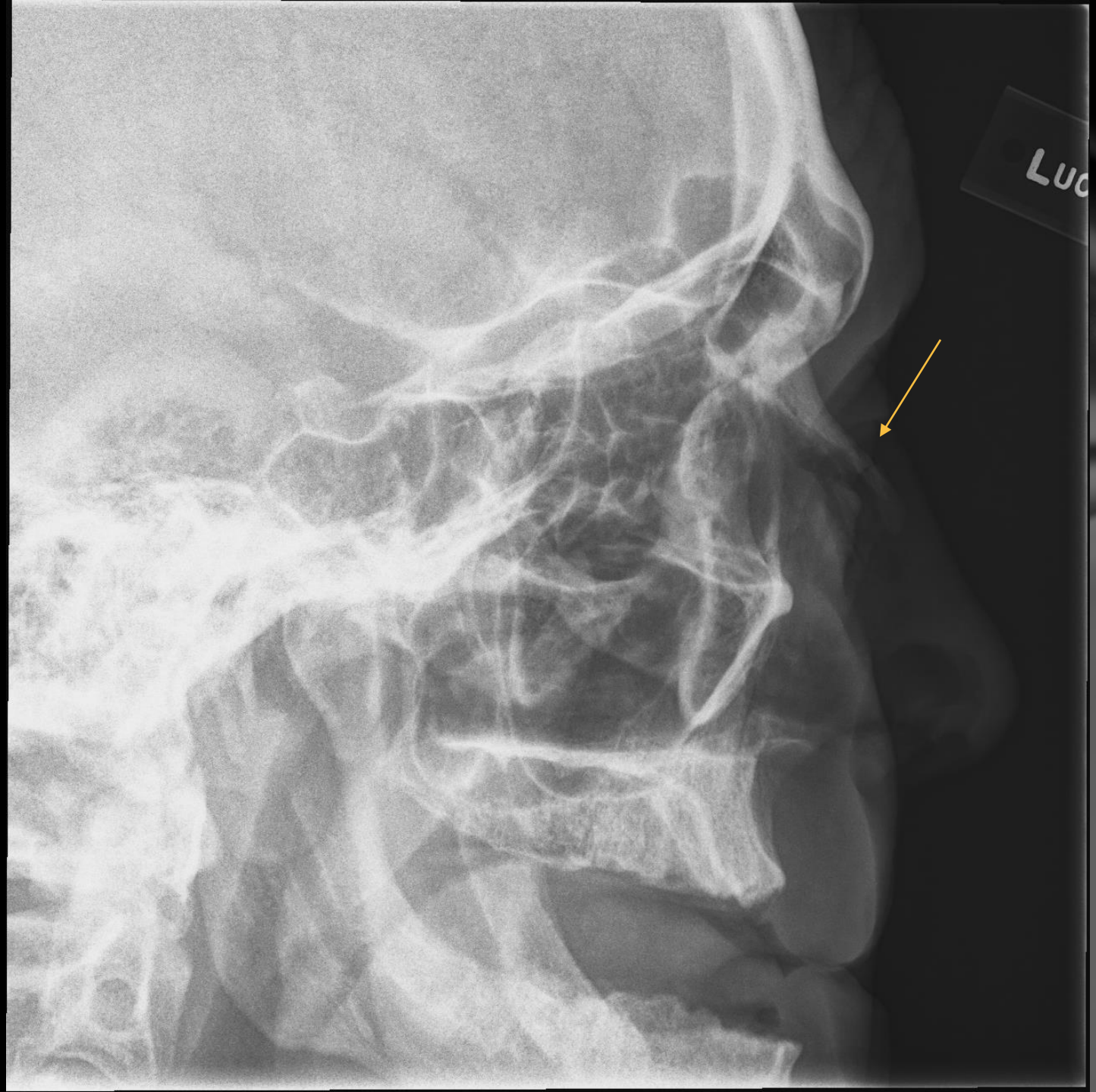
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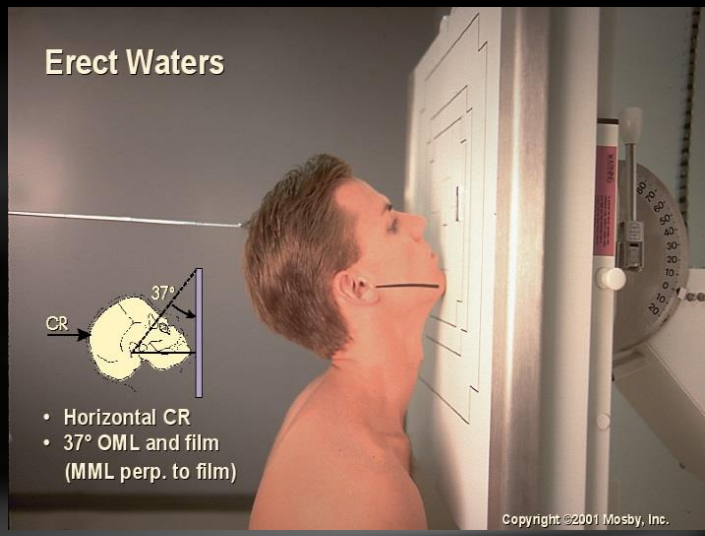
Image Critique

FACIAL BONES

EI Values
Ideal 400 - 600
Acceptable 200 - 800

Parietoacanthial Waters

Parietoacanthial Waters Evaluation Criteria



Evidence of proper collimation & presence of side marker place clear of anatomy of interest

Entire orbits and facial bones

No rotation or tilt, demonstrated by:

- Distance between the lateral border of the skull and the orbits should be equal on both sides
- MSP of head aligned with long axis of collimated field

Petrous ridges should be **projected immediately below the maxillary sinuses**

Brightness and contrast demonstrate soft tissue and bony trabecular detail

EI 320

EI 350

EI 200

EI 250

EI 180

Left Lateral

Left Lateral

Evidence of proper collimation & presence of side marker placed clear of anatomy of interest

All facial bones in their entirety, with the zygomatic bone in the center

No rotation or tilt of the facial bones, demonstrated by:

- Almost perfectly superimposed mandibular rami
- Superimposed orbital roofs
- Sella turcica in profile

Soft tissue and bony trabecular detail

EI 290

EI 200

EI 100

EI 190

EI 270

PA Axial Exaggerated Caldwell

PA Axial Exaggerated Caldwell

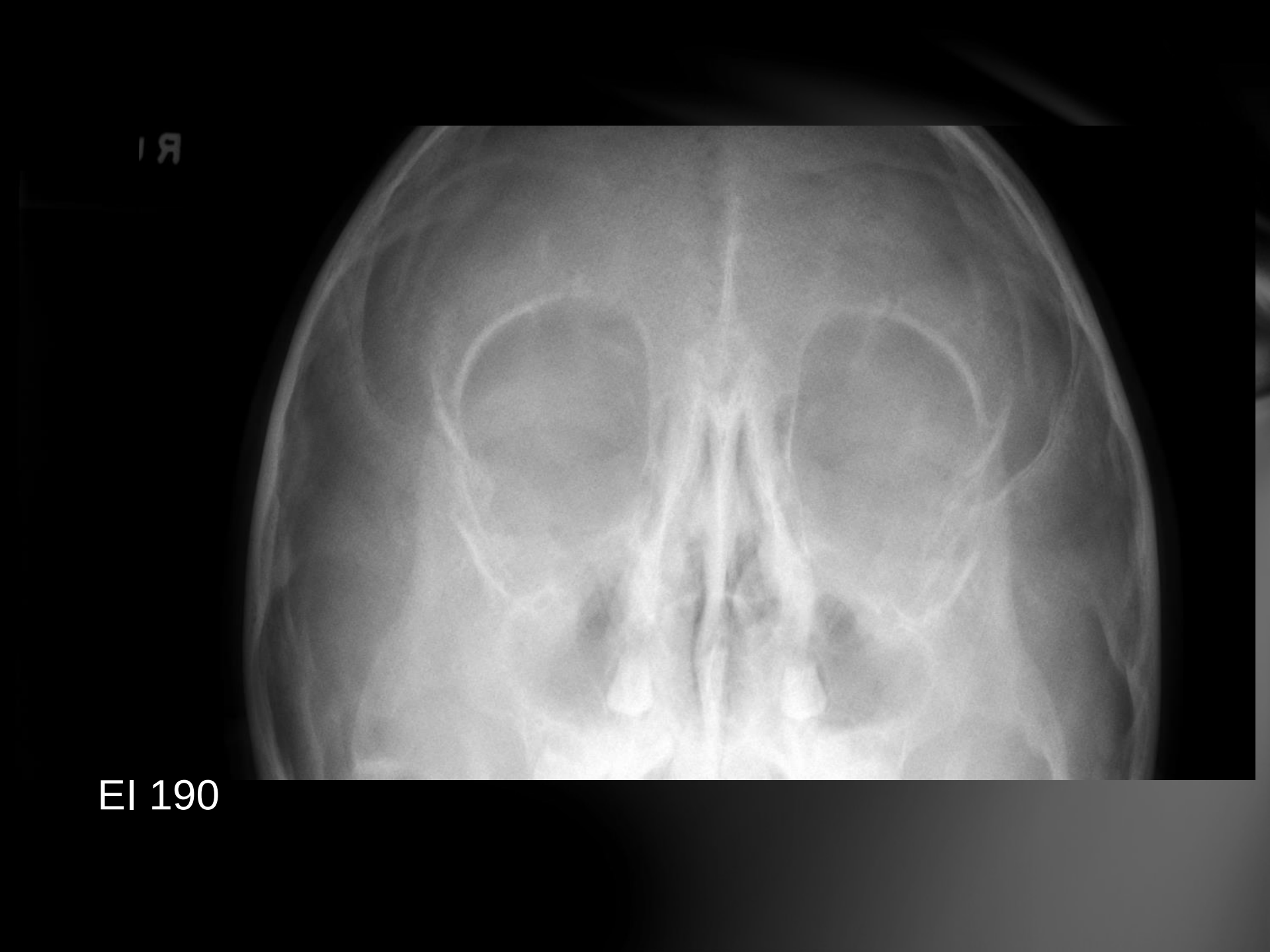
- Evidence of proper collimation & presence of side marker placed clear of anatomy of interest
- No rotation or tilt, demonstrated by:
- Equal distances from the lateral border of the skull to lateral border of orbits on both sides.
- MSP of head aligned with long axis of the collimated field
- Petrous ridges should be projected on the maxillary sinuses, below the infraorbital margin.
- Bony detail and surrounding soft tissues


EI 280

EI 240

EI 300

EI 150



EI 190

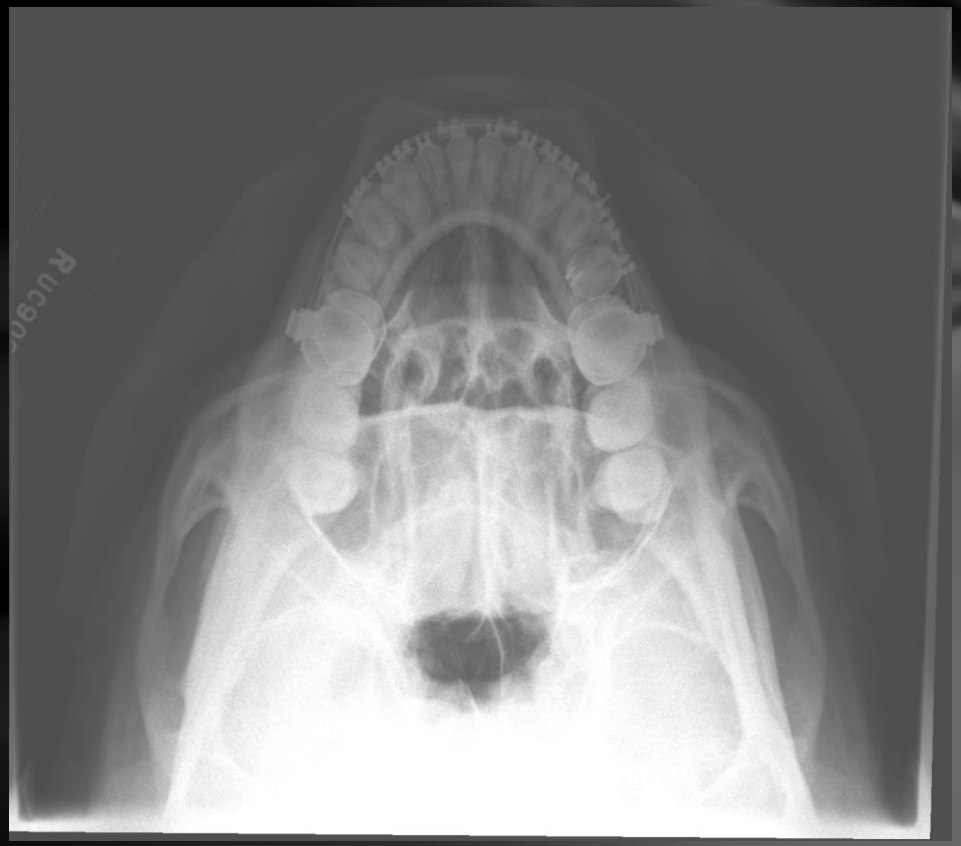
What was done wrong?

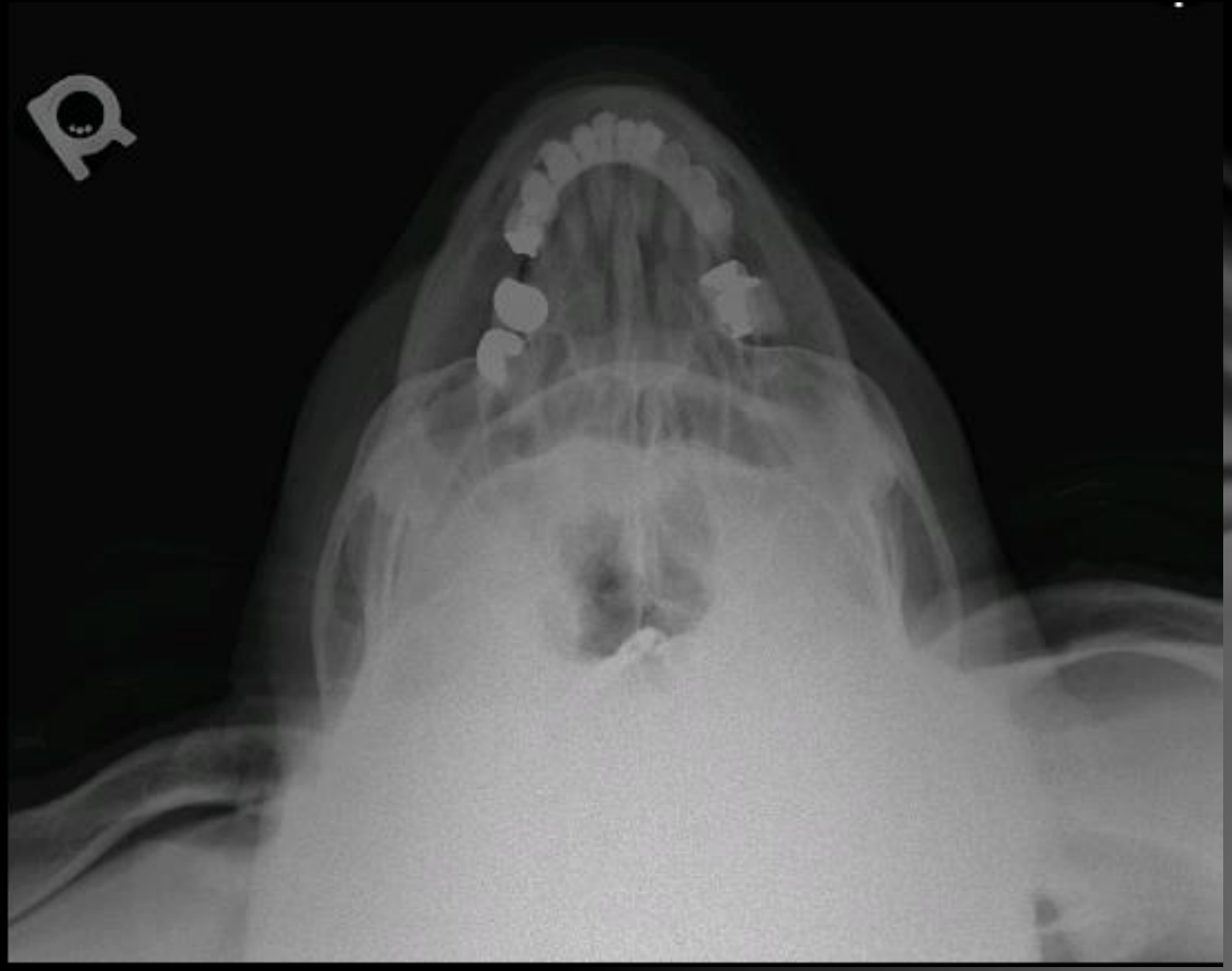
EI 500

SMV

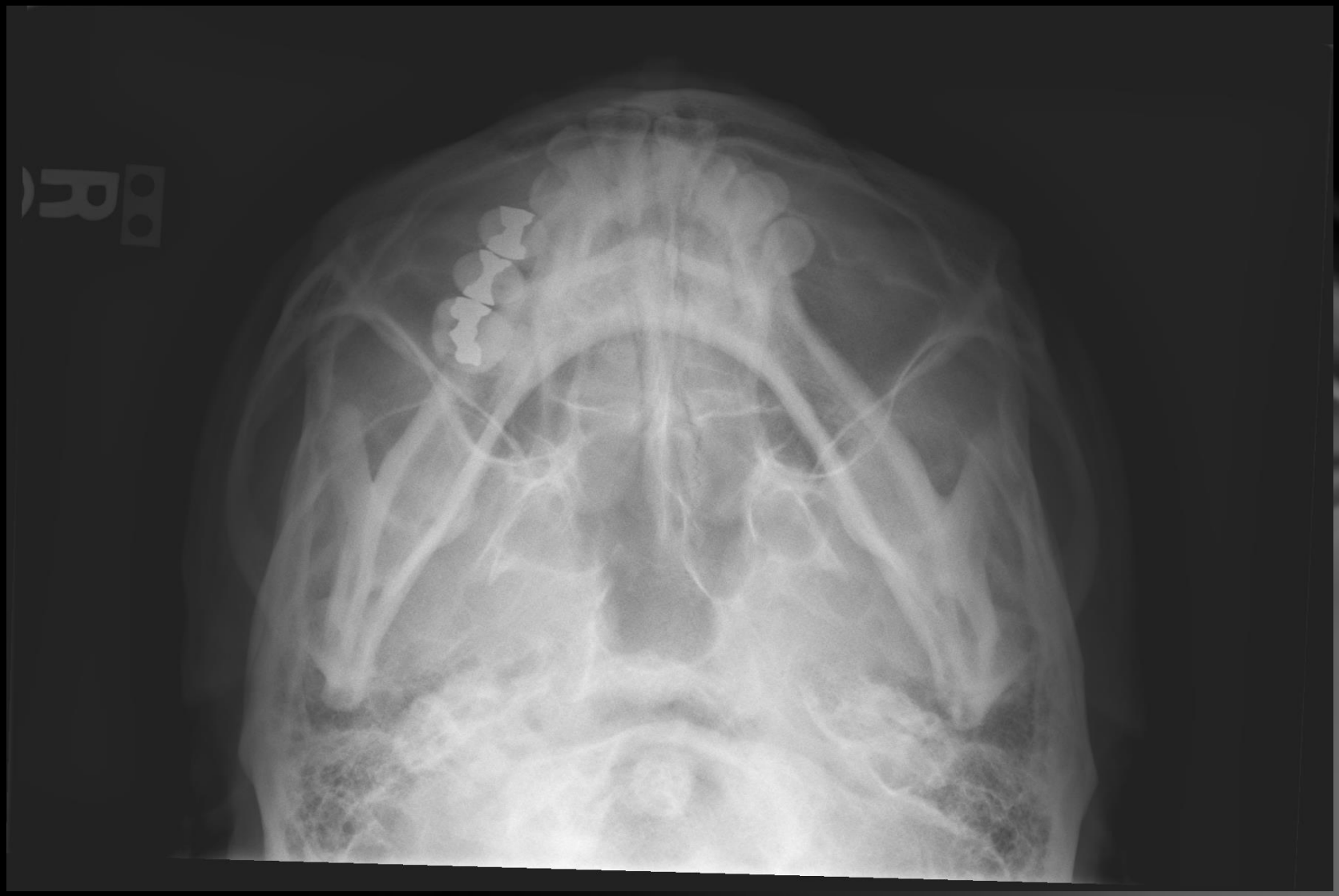
SMV

- Evidence of proper collimation & presence of side marker placed clear of anatomy of interest
- Zygomatic arches are free from overlying structures.
- No rotation or tilt, demonstrated by:
- Zygomatic arches are symmetric and without foreshortening.
- Soft tissue and bony trabecular detail.





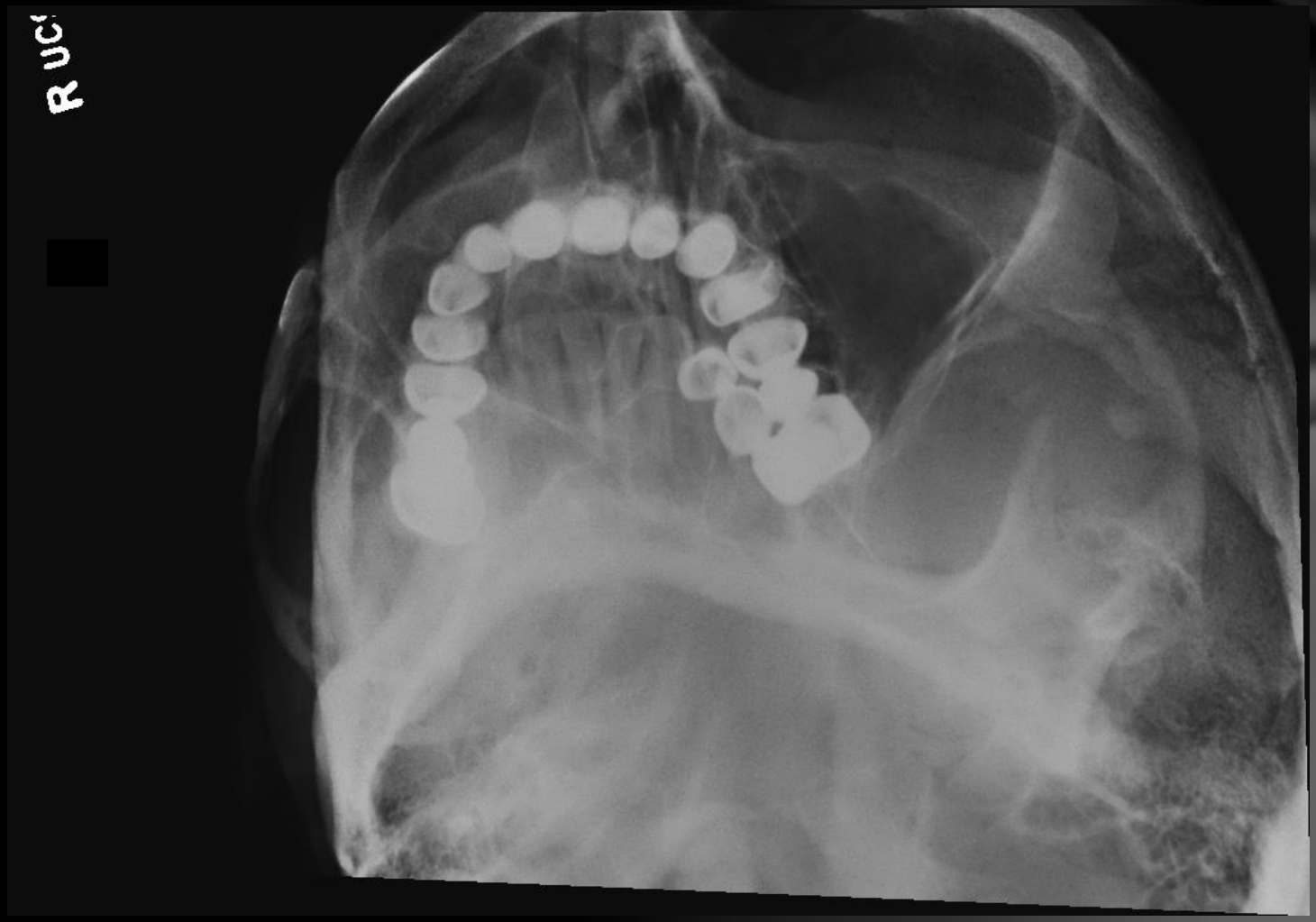
EI 100



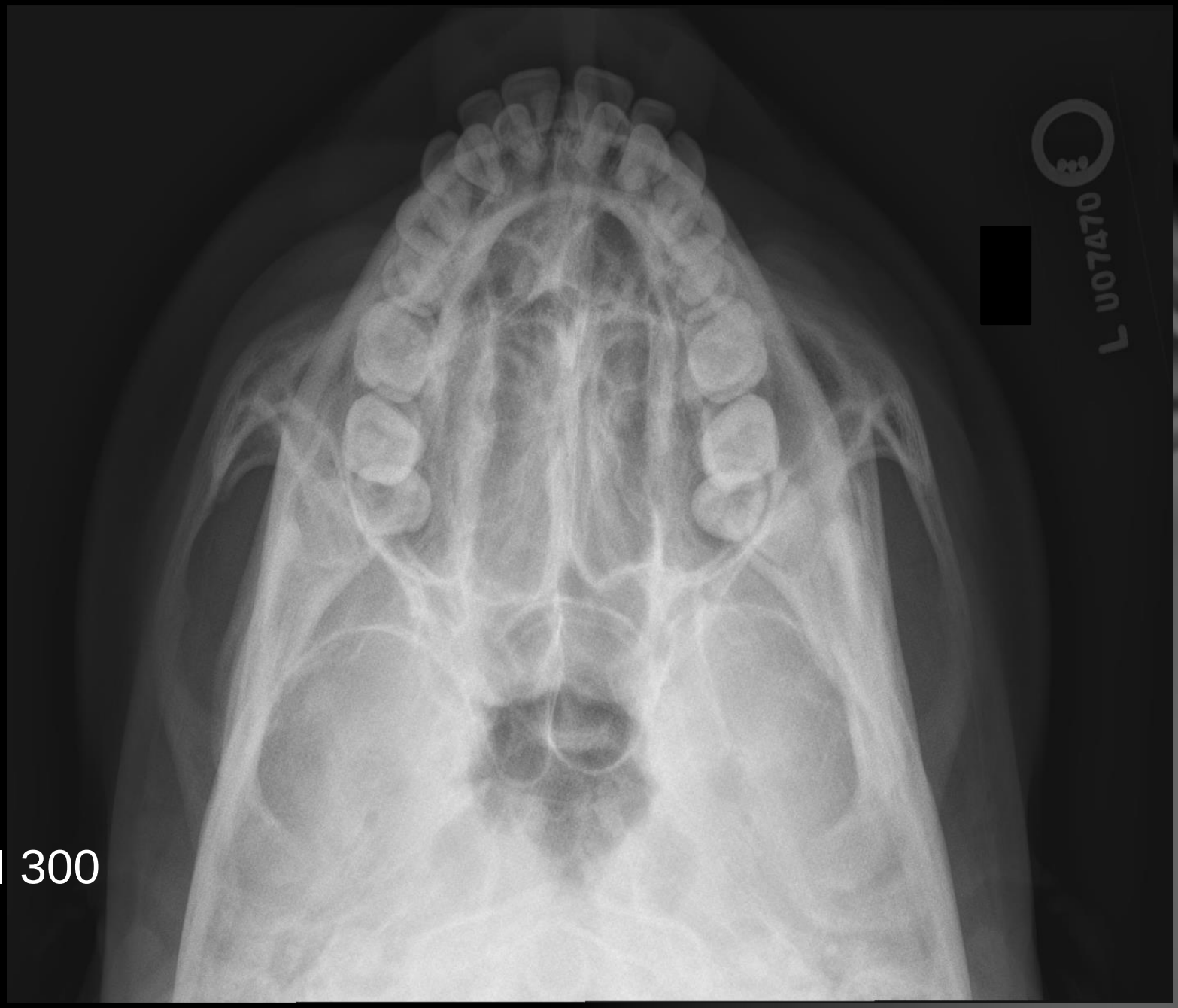
EI 300

EI 250


R
EI 280

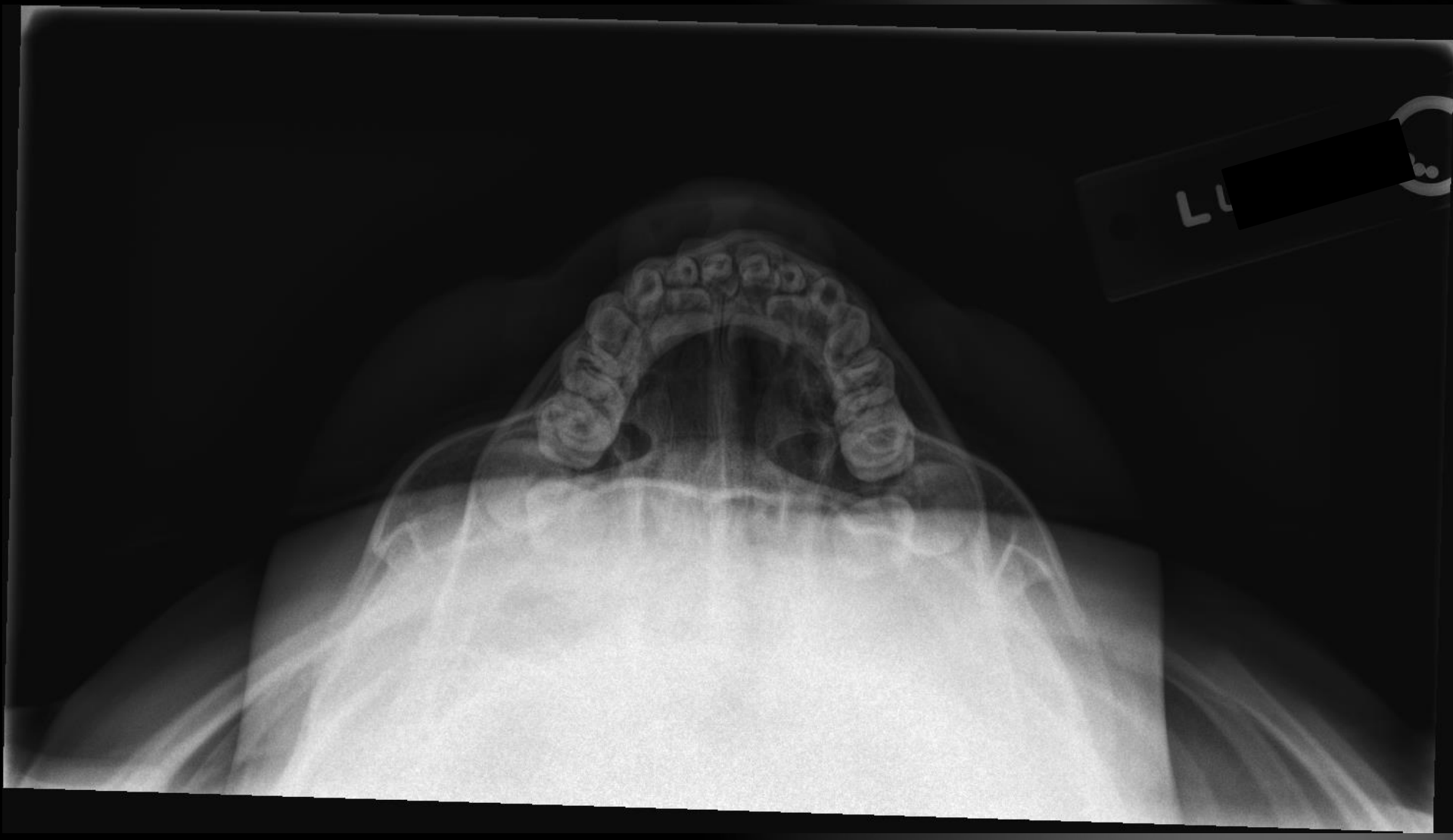


EI 290



EI 300

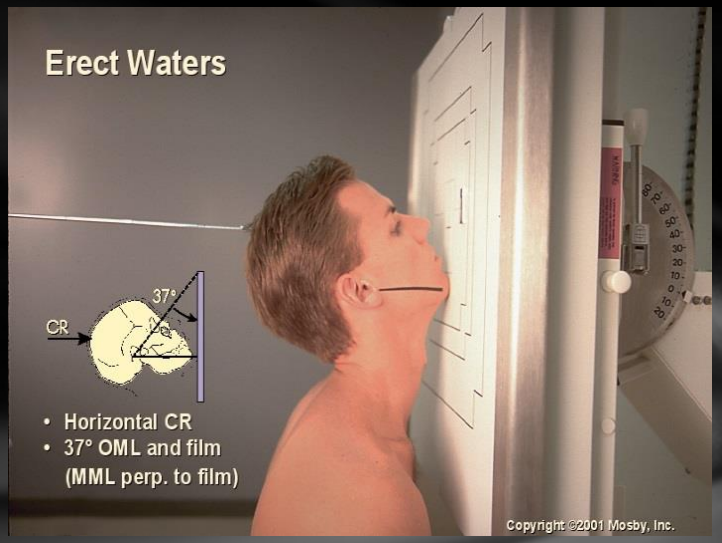
EI 310



NASAL BONES

Parietoacanthial Waters

Parietoacanthial Waters



Evidence of proper collimation & presence of side marker placed clear of anatomy of interest

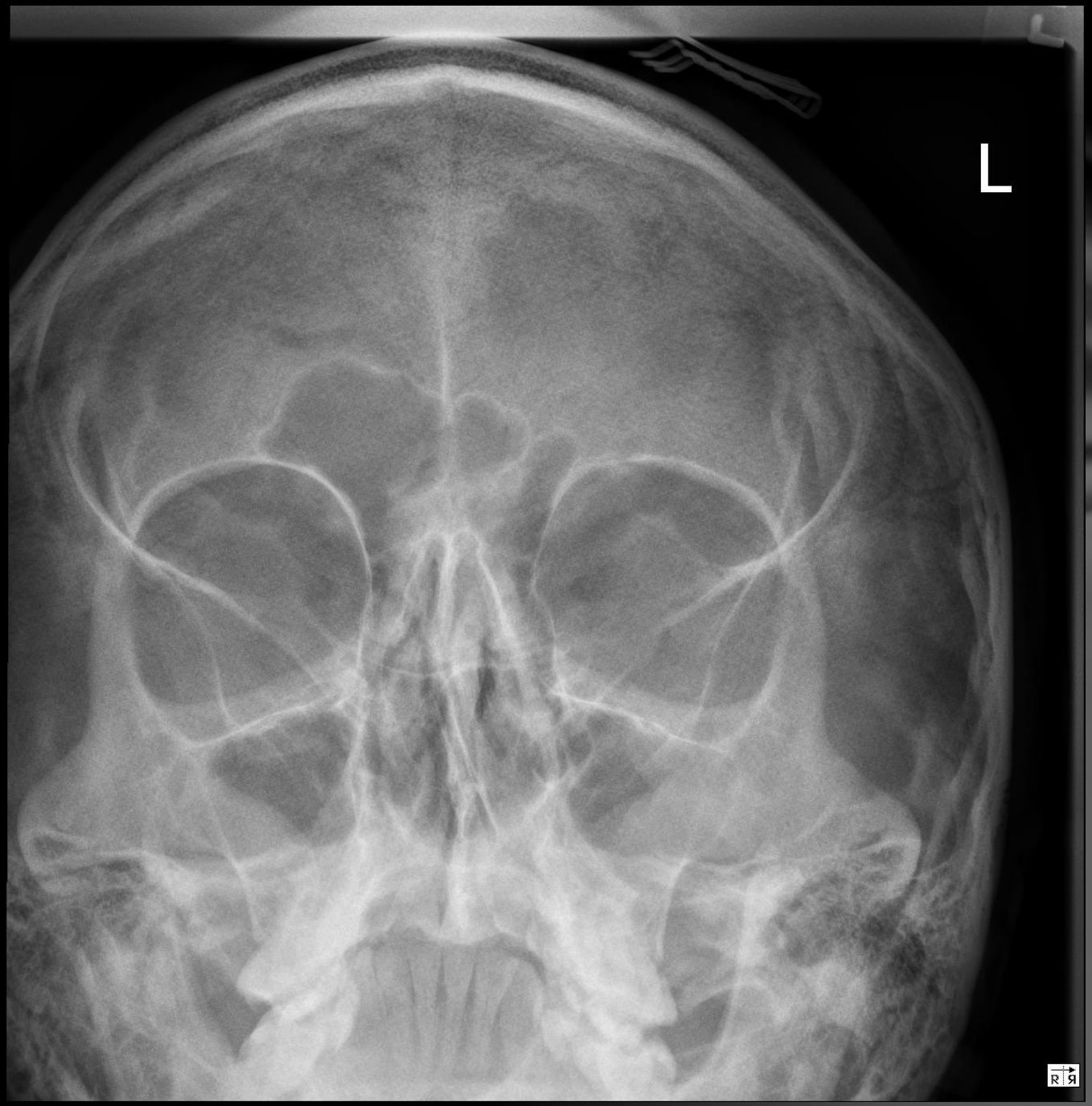
Most of orbits and facial bones included: nasal septum is of main concern

No rotation or tilt, demonstrated by:

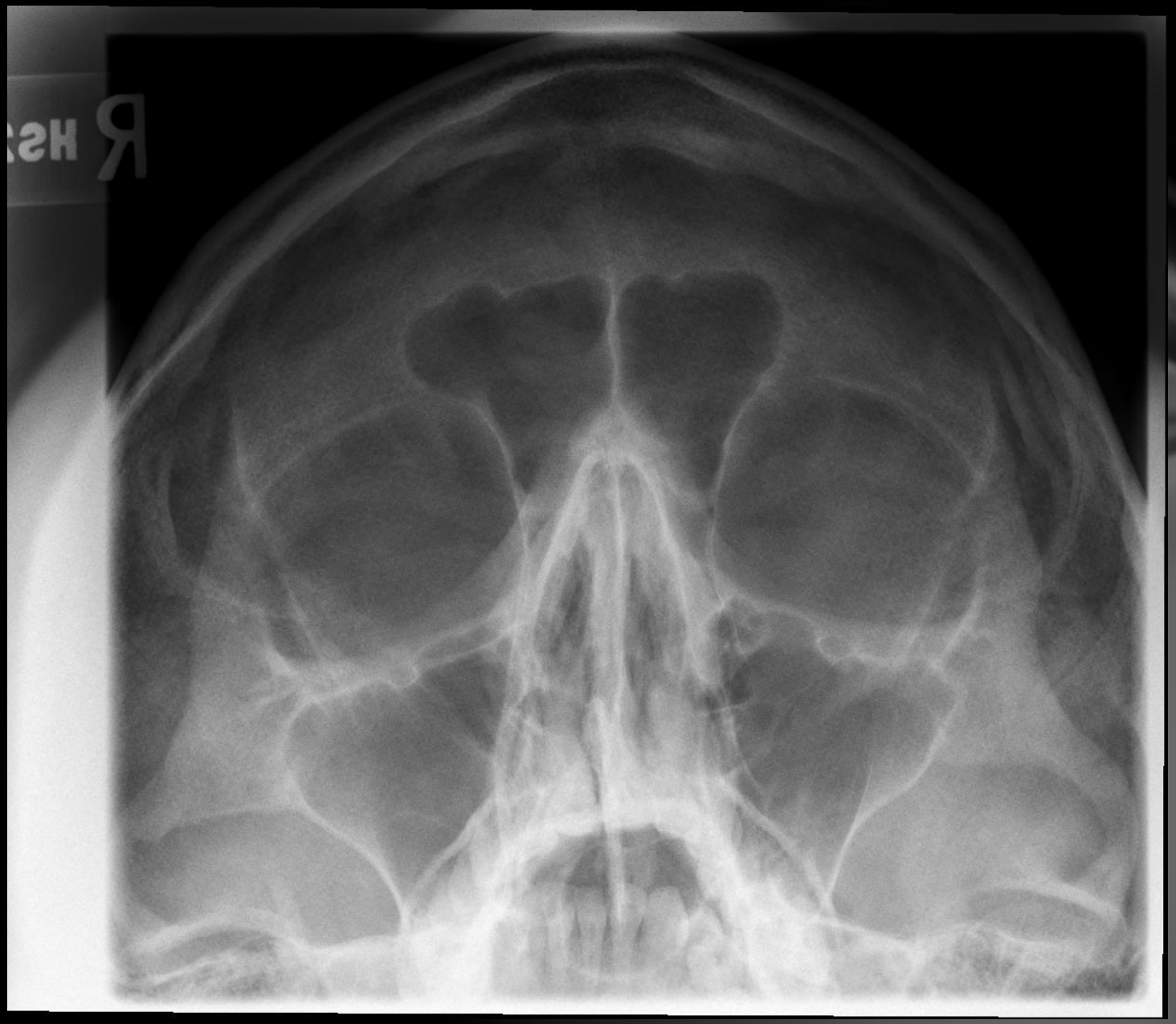
- Distance between the lateral border of the skull and the orbits should be equal on both sides
- MSP of head aligned with long axis of collimated field

Petrous ridges should be projected immediately below the maxillary sinuses

Soft tissue and bony trabecular detail

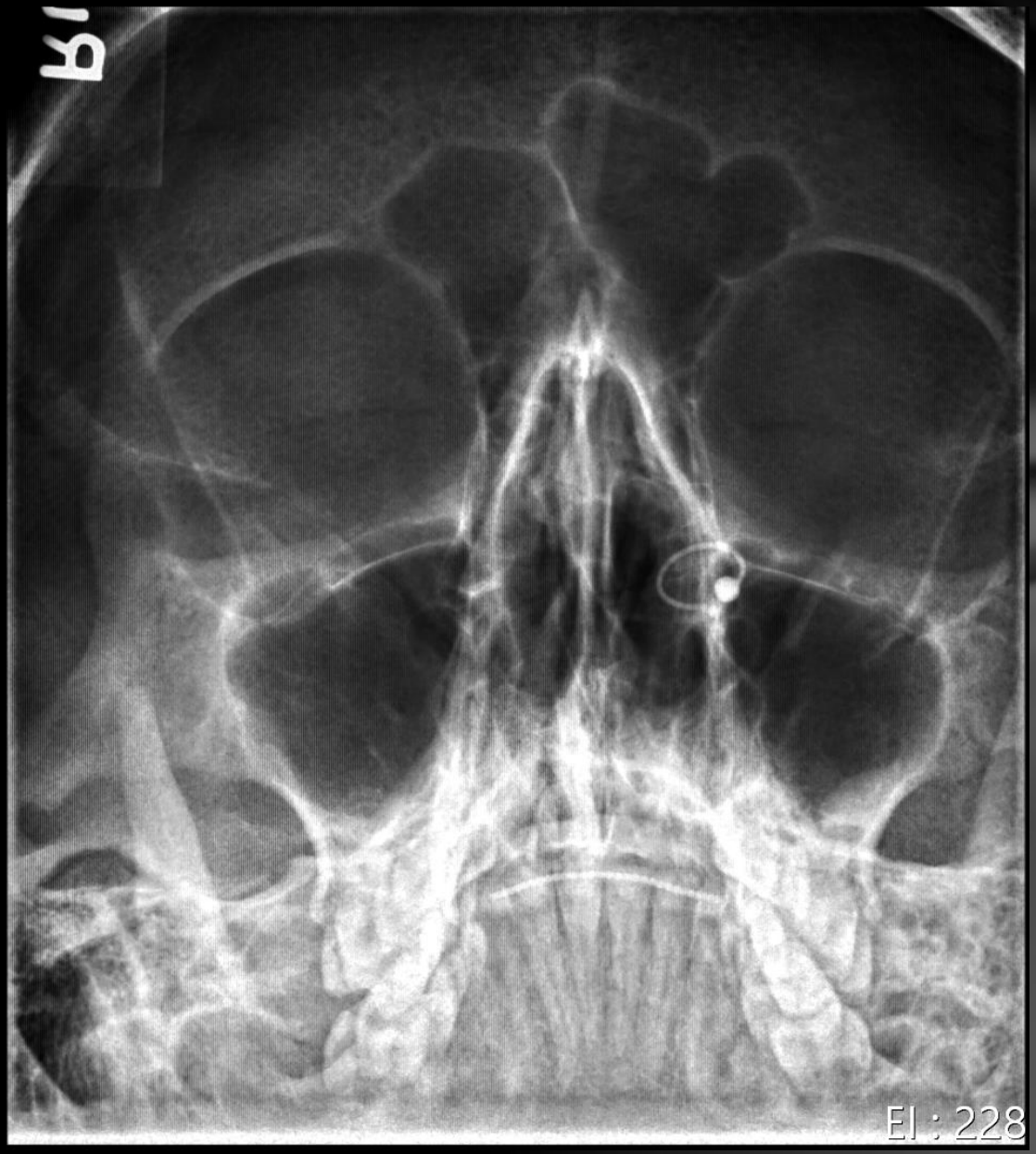


EI 250



EI 210

EI 200



EI 150

Right and Left Laterals

Laterals- right and left

- Evidence of proper collimation & presence of side marker placed clear of anatomy of interest
- Nasal bones, anterior nasal spine and frontonasal suture
- No rotation of nasal bones and soft tissue
- Soft tissue and bony trabecular detail

EI 290

EI 260

EI 130

Lug
EI : 113

EI 100

EI 450


R