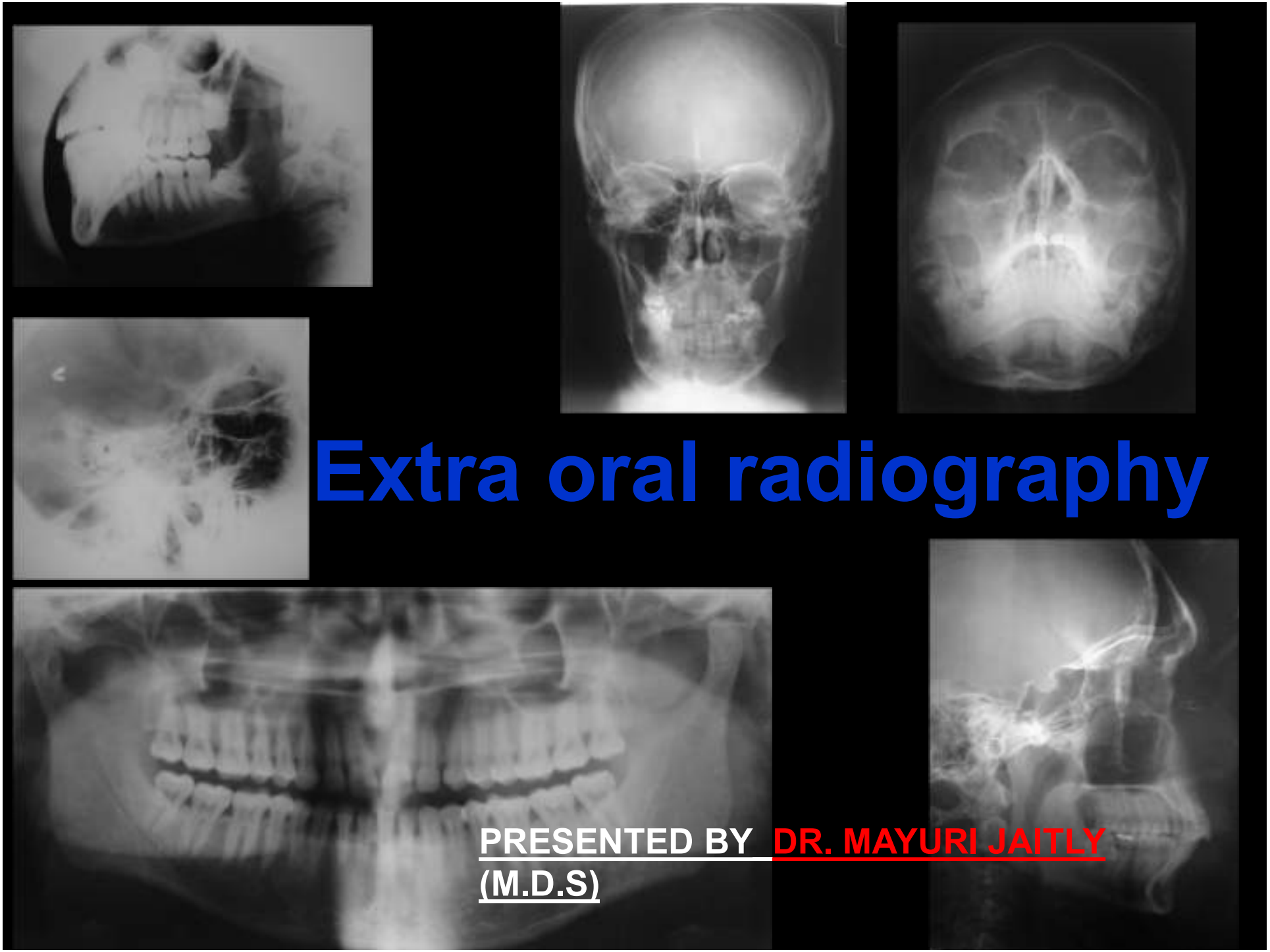
Sri Aurobindo College of Dentistry

Indore, Madhya Pradesh

INDIA

MODULE PLAN

- TOPIC :Extra oral radiography
- SUBJECT:OMDR
- TARGET GROUP: UNDERGRADUATE DENTISTRY
- MODE: POWERPOINT – WEBINAR
- PLATFORM: INSTITUTIONAL LMS
- PRESENTER: DR. MAYURI JAITLY



Extra oral radiography

PRESENTED BY DR. MAYURI JAITLY
(M.D.S)

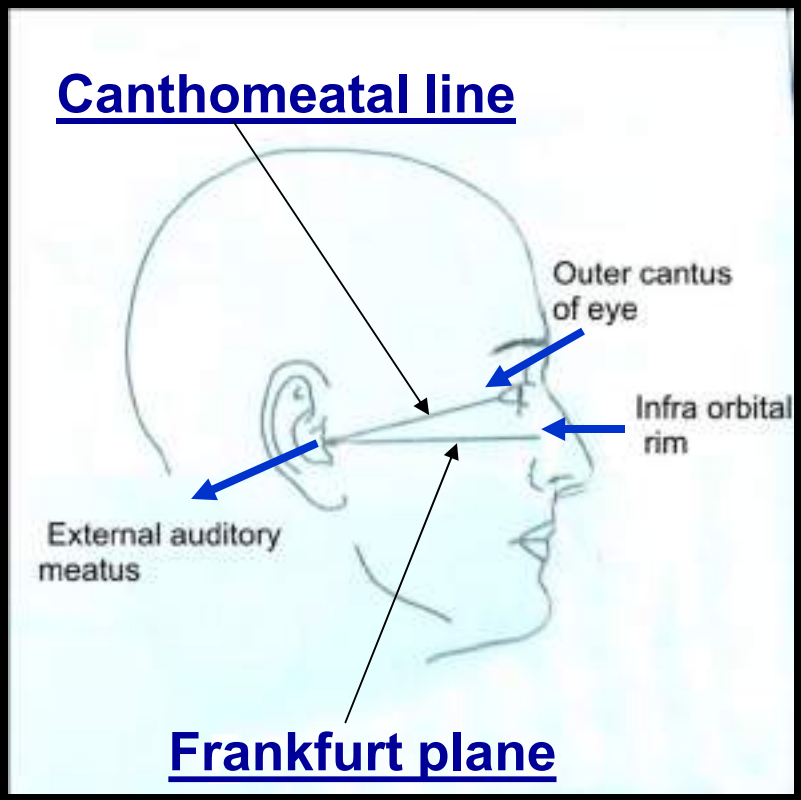
Indication

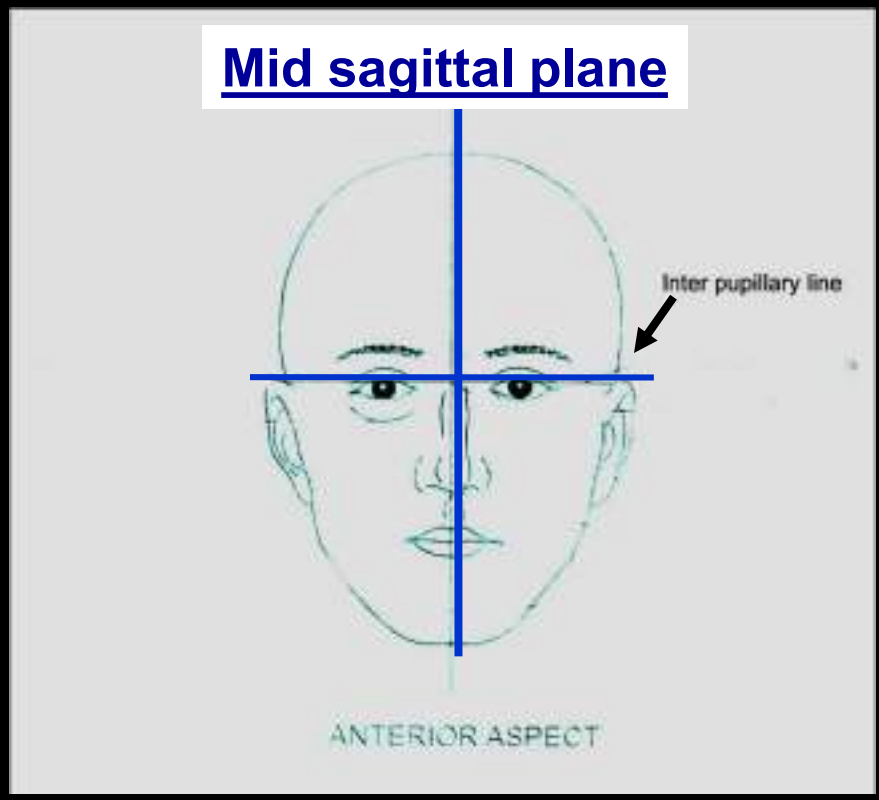
1. Trismus.
2. Large lesions.
3. When jaws and other facial bones have to be examined for evidence of disease lesions and other pathological conditions.

Indication

4. To evaluate skeletal growth and development.
5. To evaluate status of impacted teeth.
6. To evaluate TMJ area.
7. To evaluate trauma.

Landmarks in extraoral radiography





Requirement of equipment

X ray unit

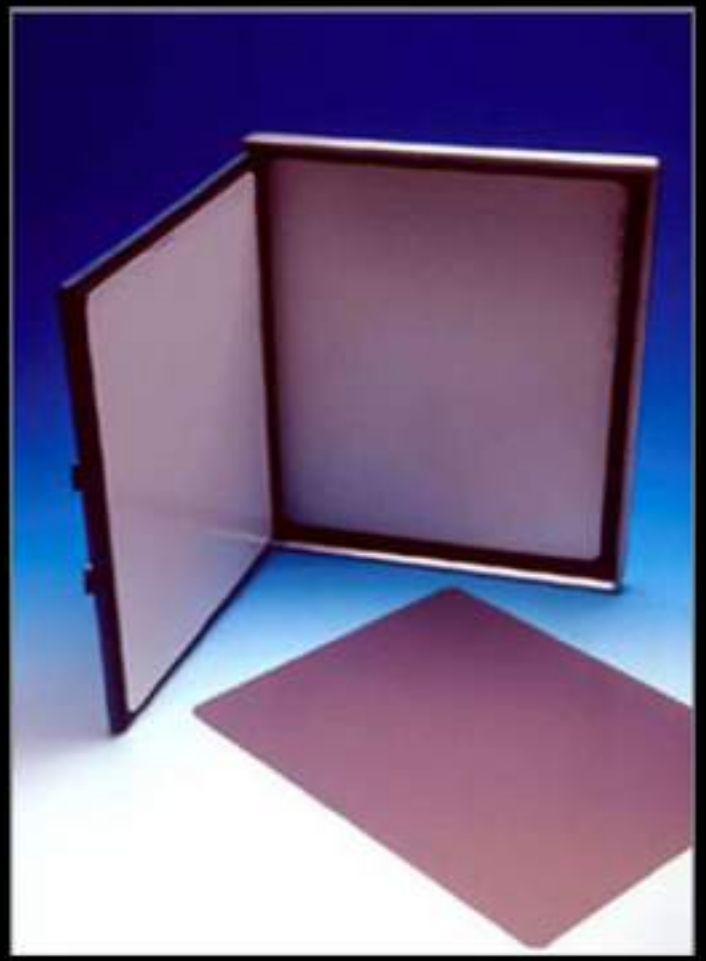
Intra oral X ray machine

Panaromic X ray unit.

Extra oral X ray machine

➢ Films:-

- Extraoral non screen films
- Extraoral screen films:
  I. Sensitive to blue light
  II. Sensitive to green light
- OPG films.



➢ Intensifying screen:-

I. Blue light
II. Green light

➢ Film cassettes:-

➢ Grids

Various extra oral radiograph

Radiograph for maxillary sinus:

1. Standard occiputomental projection 0 degree
2. 30 degree occiputomental projection.
3. PA waters

Radiography for mandible:-

1. PA mandible.
2. Rotated PA mandible.
3. Lateral oblique:-
    (i) Anterior body of mandible.
    (ii) Posterior body of mandible.
    (iii) Ramus of mandible.

- **Radiography of base of skull.**

  (i) Submentovertex projection.
- **Radiography for zygomatic arch:-**

  (i) Jug handle view
- **Radiography of Temperomandibular joint**:-

(i) Transcranial projection.

(ii) Transpharyngeal projection.

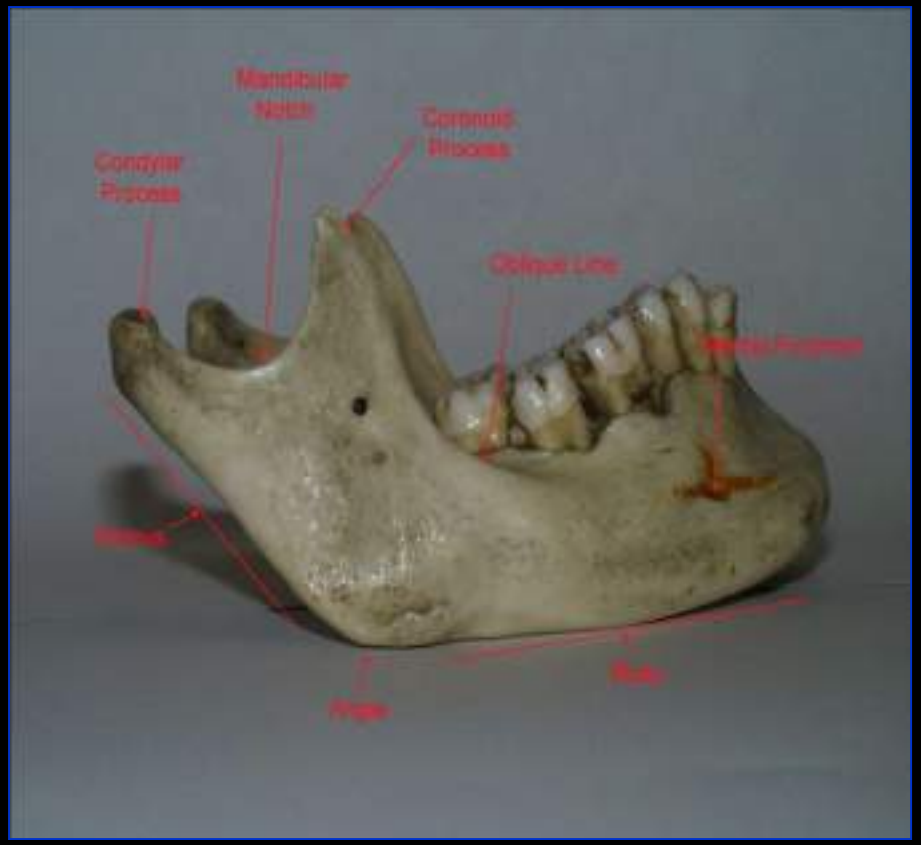
(iii) Transorbital projection.

(iv) Reverse Townes projection

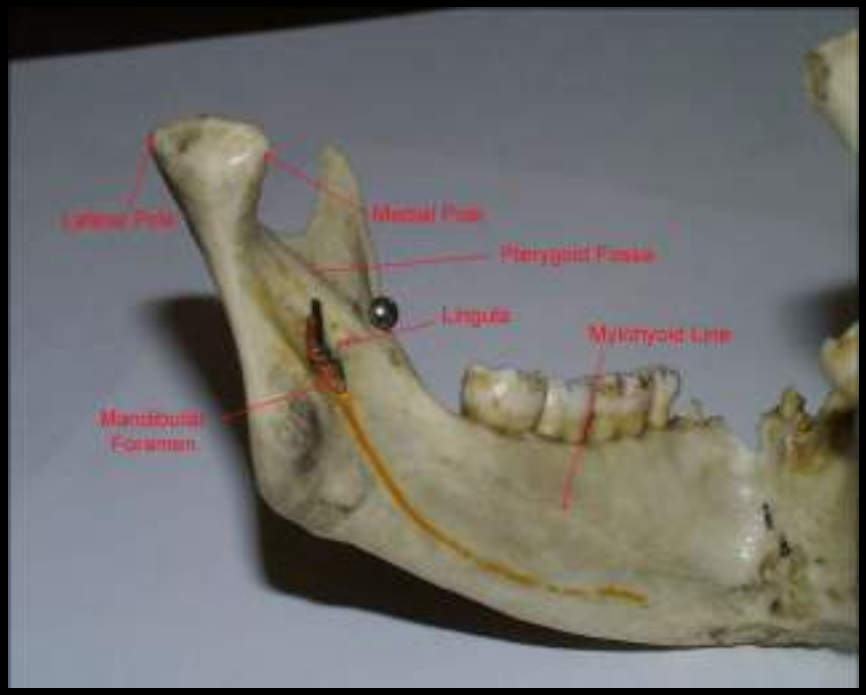
Lateral oblique projections of mandible

Lateral oblique projections of mandible

1. Lateral oblique body of mandible
2. Lateral oblique ramus of mandible.



Lateral oblique body of mandible



Lateral oblique body of mandible

- **Head position:** The head is tilted toward the side to be examined with mandible protruded
- **Film placement** :the cassette is placed against the patients cheek and centered over the first molar. The lower border of cassette should be parallel to the inferior border of mandible and extend at least 2 cms below it . The cassette is held in place by patient.

- **Projection of central ray**:

The central ray is directed towards the first molar region of the mandibular body to be examined from a point 2 cms below the angle of mandible on tube side. The central rays are kept as close perpendicular to the cassette.

Lateral oblique body of mandible

Maxillary sinus

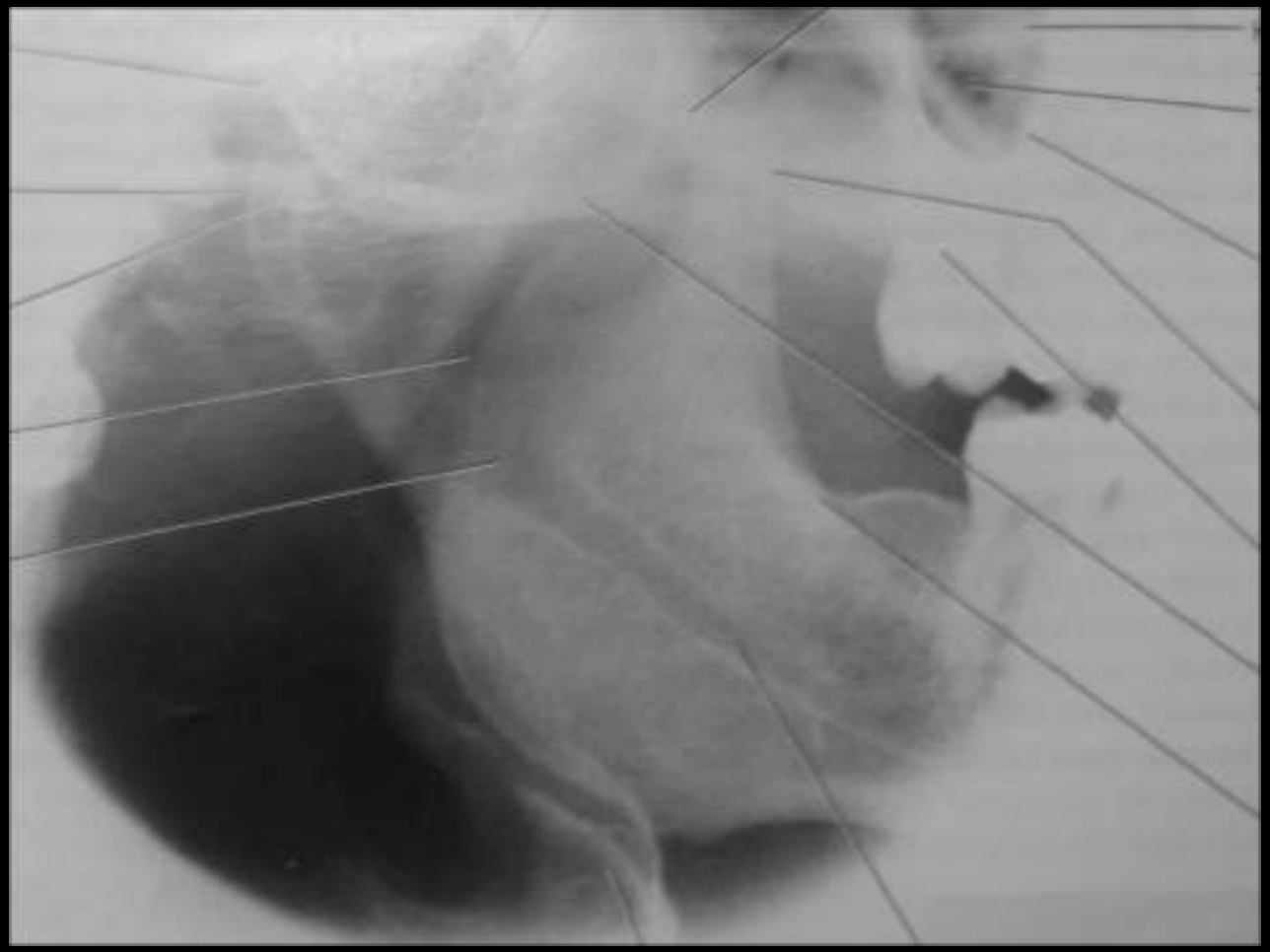
Inferior alveolar canal

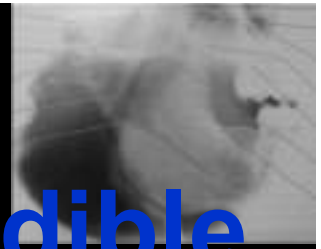
inferior border of mandible

Vertebrae

Mental foramen

Lateral oblique ramus of mandible.



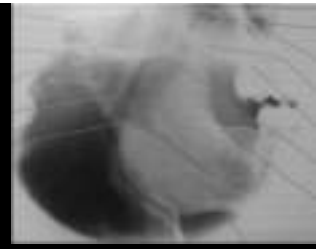


Lateral oblique ramus of mandible.

- **Head position**:

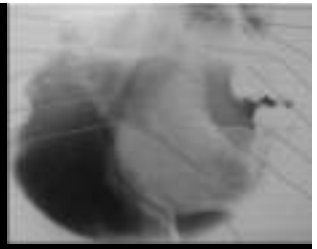
➢ The head is tilted toward the side of the mandible to be examined until a line between the angle of mandible next to the tube and the condyle on the side away from the tube is parallel to the floor.

➢ The mandible is protruded to prevent the cervical spine from superimposed over the ramus.

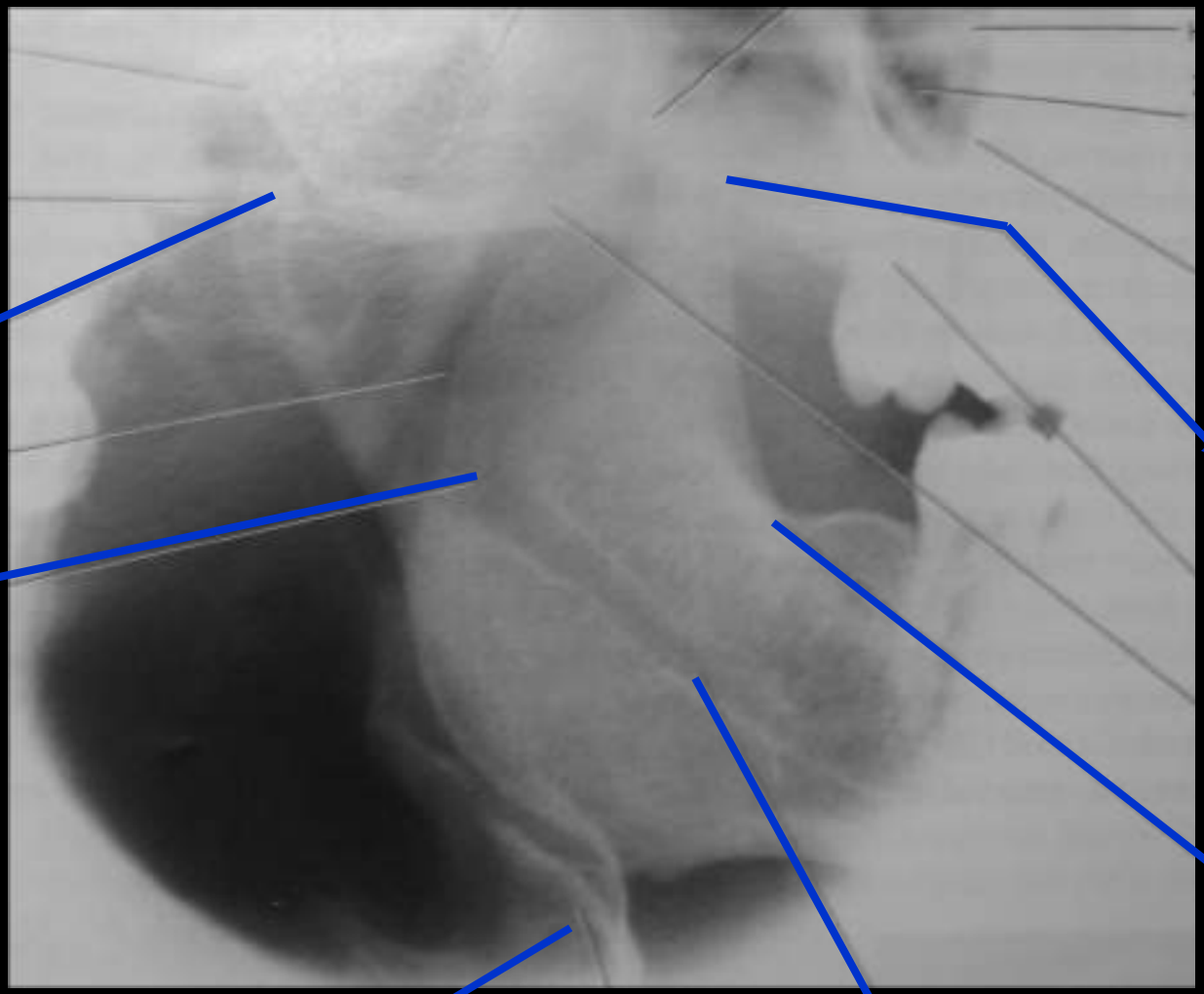


Film placement :the cassette is placed over the ramus of the mandible and far enough posterior to include the condyle. The lower border of cassette should be parallel to inferior border of mandible and extend 2 cms below the inferior border of mandible.

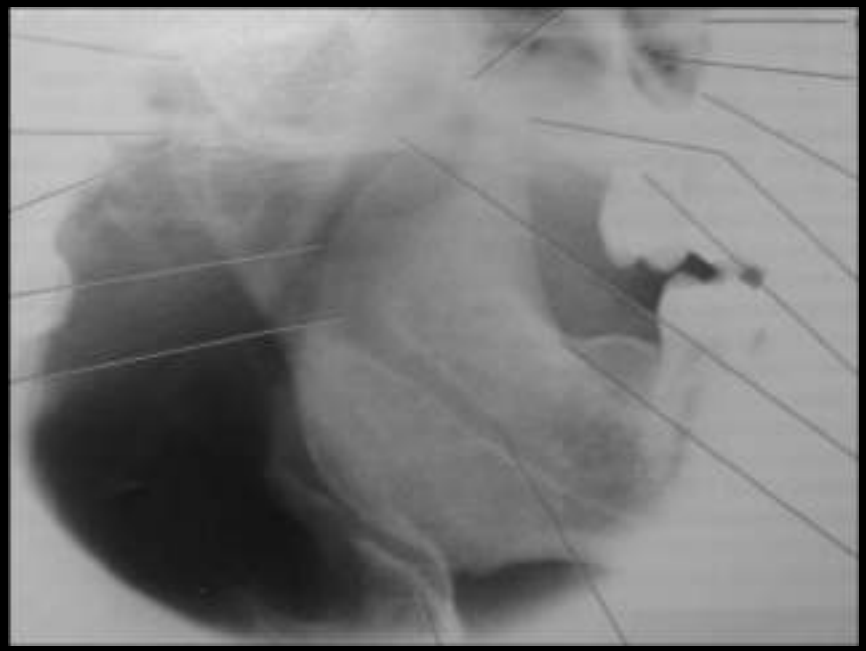
Projection of central ray: the central ray is directed posterior towards the center of ramus on the side of interest from a point 2 cms below the inferior border of first molar region of mandible on the tube side.



Lateral oblique ramus of mand



Difference in projection



Posterior anterior of skull (PA skull)

Posterio- anterior of skull (PA skull)

Posterior anterior of skull (PA skull)

Main indications

1. Fracture of skull vault.
2. Investigation of frontal sinus .
3. Condition affecting the cranium, particularly

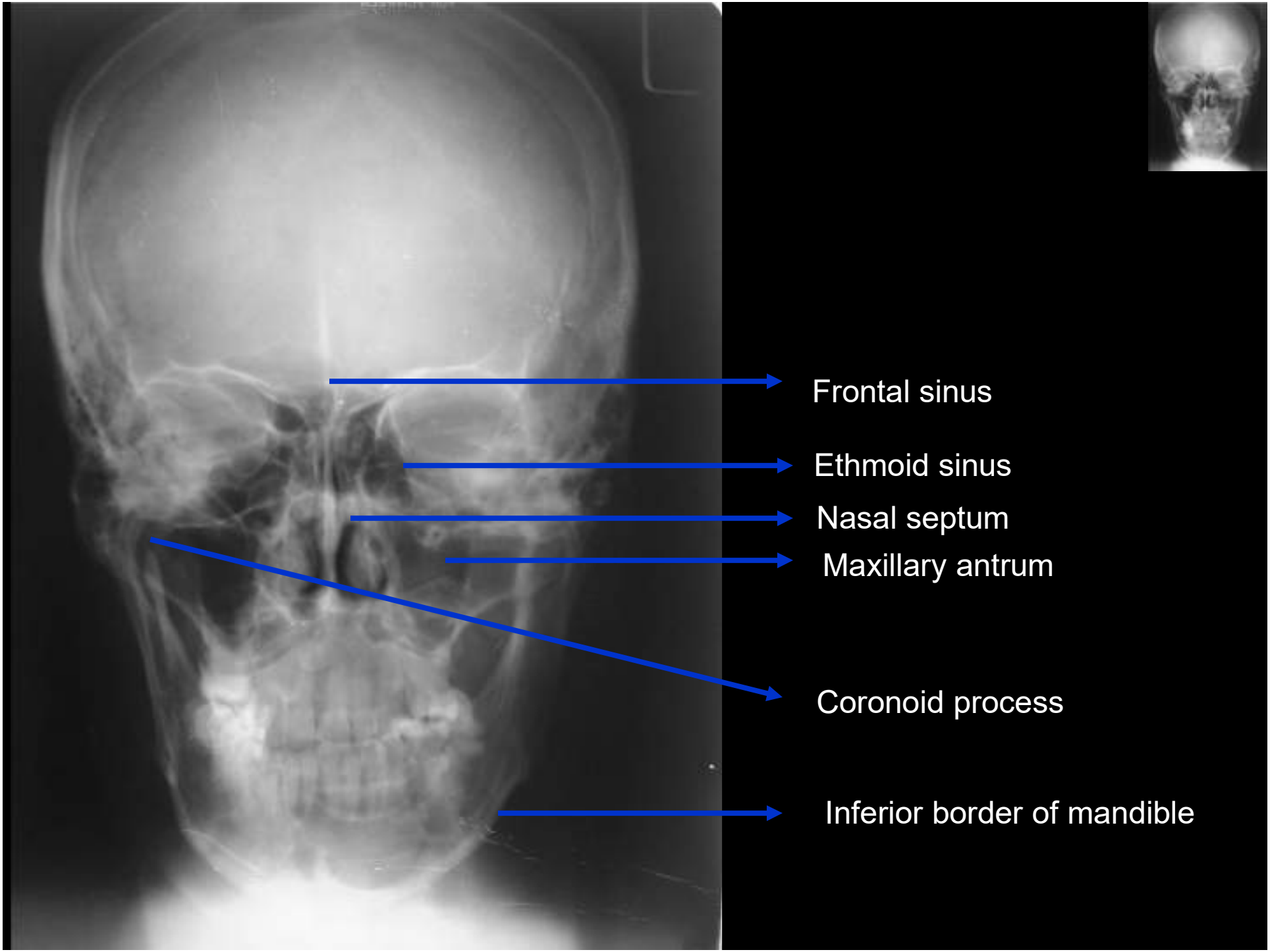
- Pagets's disease
- Multiple myeloma
- Hyperparathyroidism

4. Intracranial calcification

Technique and positioning

- The patient is positioned facing the film with the head tipped forwards so that the forehead and tip of nose touch the film. The so called forehead nose position.
- This positioning of the base of the skull allows the vault to be seen without superimposition.

- The x ray tube head is positioned with the central rays horizontal (0^0) centered through the occiput


Frontal sinus
Ethmoid sinus
Nasal septum
Maxillary antrum
Coronoid process
Inferior border of mandible

Postero anterior of jaws
(PA jaws/ PA mandible)

Postero anterior of jaws (PA jaws/ PA mandible)

Main indications

1. Fracture of the mandible involving the following sites

- Posterior third of the body
- Angles
- Rami
- Low condylar necks

2. Lesions such as cyst or tumor in the posterior third of the body or rami to note any medio lateral expansion
3. Mandibular hypoplasia and hyperplasia.
4. Maxillofacial deformities.

Technique and positioning

The patient is positioned facing the film with the head tipped forwards so that the forehead and tip of nose touch the film. The so called forehead nose position.

The x ray tube head is again horizontal , but now the central ray is centered through the cervical spine at level of the rami of the mandible.


B

Waters projection
Occiputomental projection

Waters projection

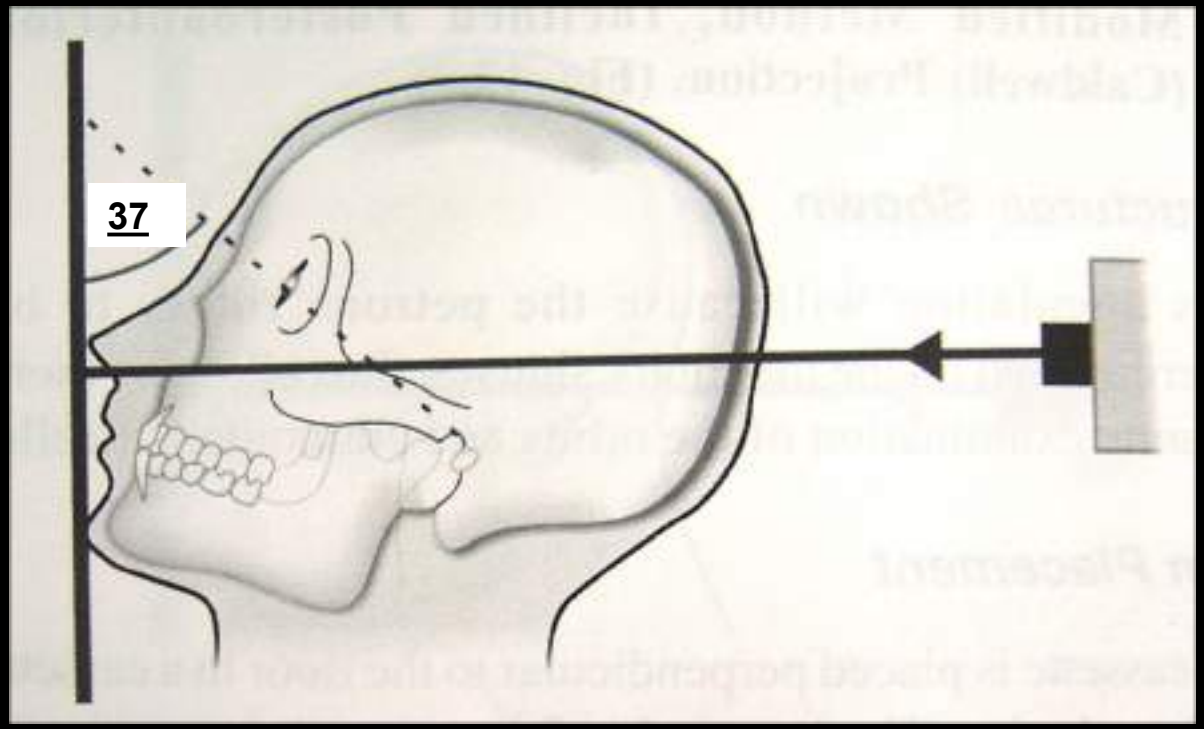
Waters projection
Occiputomental projection

Main indications

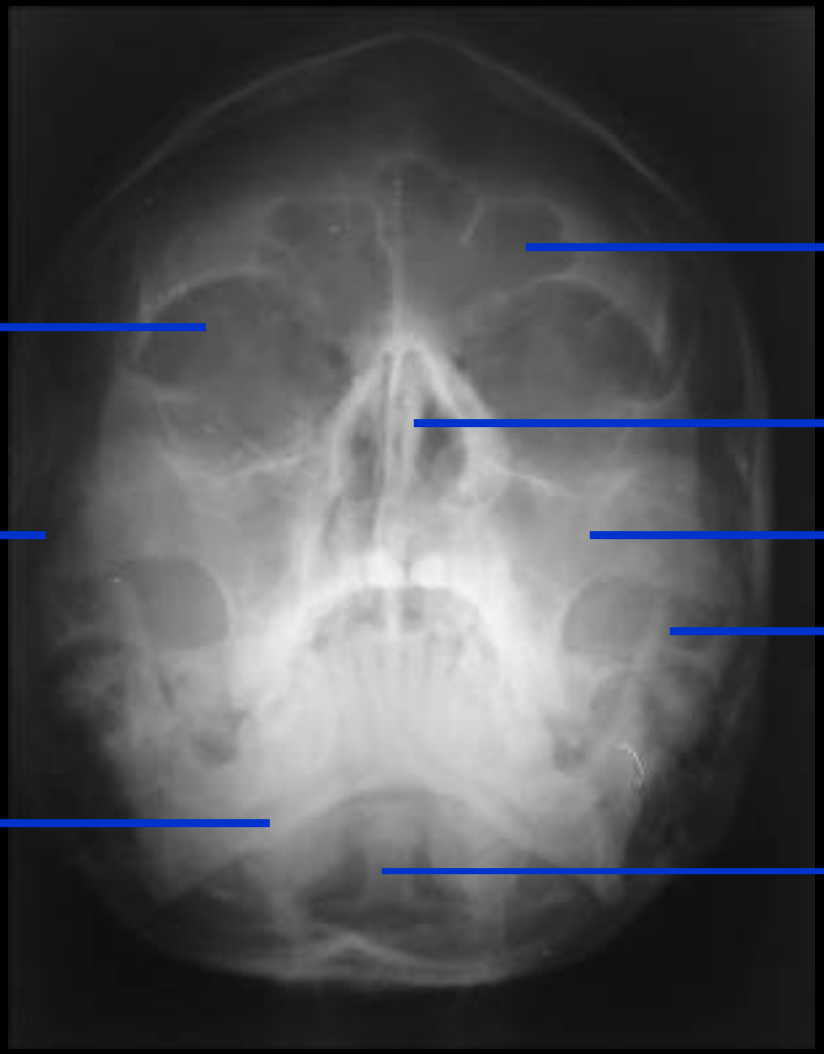
- Particularly useful in evaluating maxillary sinuses.
- In addition it demonstrates frontal and ethmoidal sinus, the orbit, ,the frontozygomatic suture and nasal cavity.

- **Head position:-** the head is placed with sagittal plane perpendicular to the plane of the film. The chin is raised high so that canthmeatal line is elevated 37 degree above the horizontal.
- **Projection of central rays:-** the central rays are projected perpendicular to the film, through the mid sagittal plane and at the level of sinus.
- **Exposure parameter:-** kvp 75-80

Waters projection



Waters projection



Frontal sinus

Orbit

Nasal septum

Zygomatic arch

Maxillary sinus

Coronoid

Lower border of mandible

Odontoid process

Submentovertex
‘Full axial projection’

Submentovertex
‘Full axial projection’

Main indications

- To demonstrate base of skull
- To reveal position and orientation of condyles.
- The sphenoid sinus , the curvature of mandible.
- The lateral wall of maxillary sinus.
- Displacement of fractured zygomatic arch.
- Medial and lateral pterygoid plates fractures

Submentovertex projection

Film placement

- The film cassette is placed vertically in a holding device. A grid should be used.

Head position:

The patients head and neck is hyper extended backward as far as possible and the vertex of the skull is placed on the center of cassette. The mid saggital plane is kept perpendicular to the floor. The canthomeatal line should extend 10 degree past vertical so that the Frankfurt line is oriented vertically and parallel to the film.

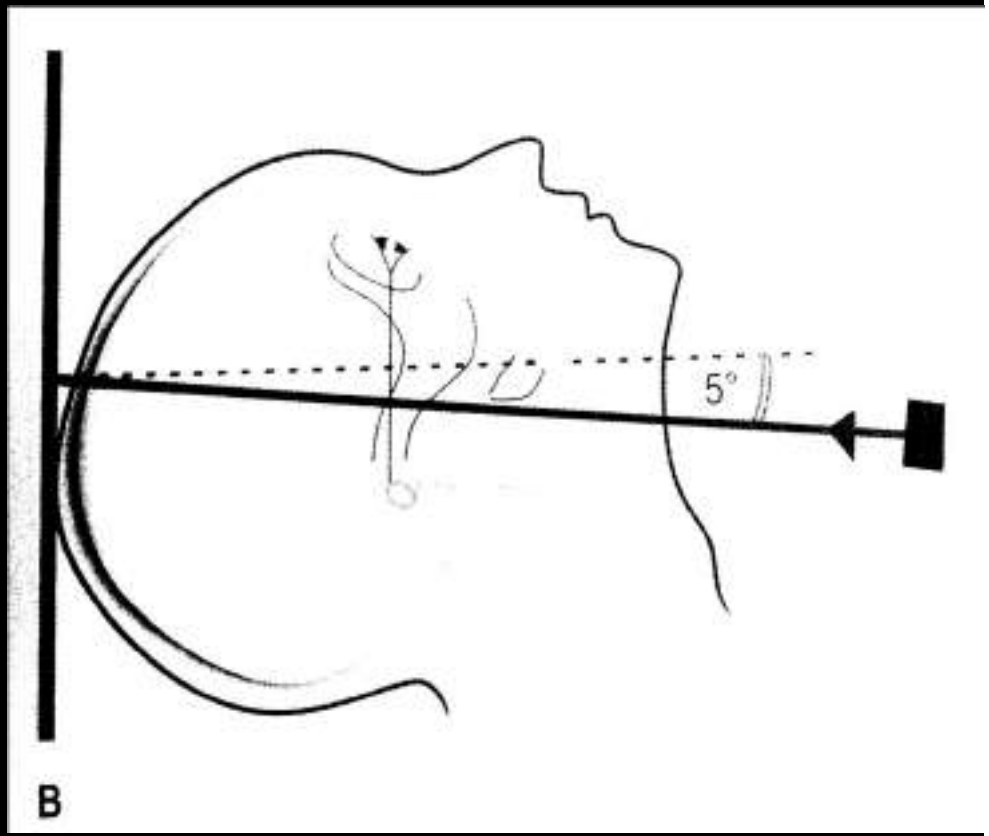
Projection of central rays

- The central rays are directed from below the mandible upward toward the vertex of the skull.
- It is positioned far enough anterior to pass about 2 cms in front of line connecting the right and left condyloid process.

Exposure parameter

- **kVp 75-80.**

Submentovertex



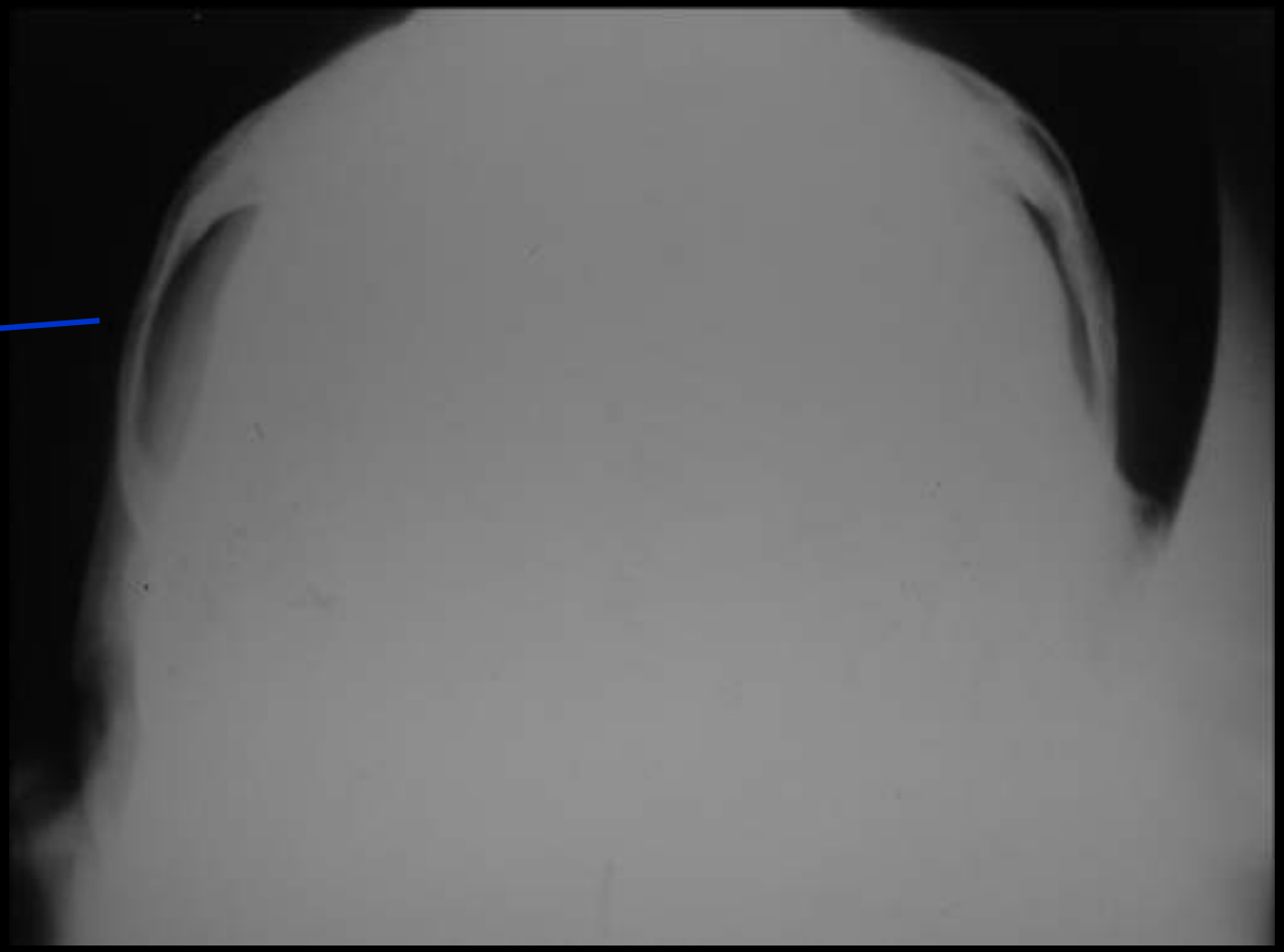
Submentovertex

Zygomatic arch

Sphenoid sinus

Condyle

Jug handle view
Submentovertex



Reverse Towne's

Reverse Towne's

Main indications

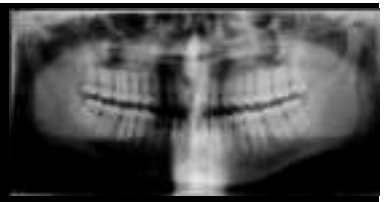
1. fracture of condylar necks.
2. Intracapsular fractures of TMJ.
3. Investigation of the quality of the articular surfaces of the condylar heads in TMJ disorder.
4. Condylar hypoplasia and hyperplasia

Technique and positioning

- The patient is in PA position
- The mouth is kept open. This opening of mouth takes the condyle head out of the glenoid fossa so they are seen.
- The x ray tube head is aimed upwards from below the occipit, with the central ray at 30 ^{0} to the horizontal, centered through the condyles.

Panoromic radiograph

Panoromic radiograph



Panoromic radiograph

Main indications

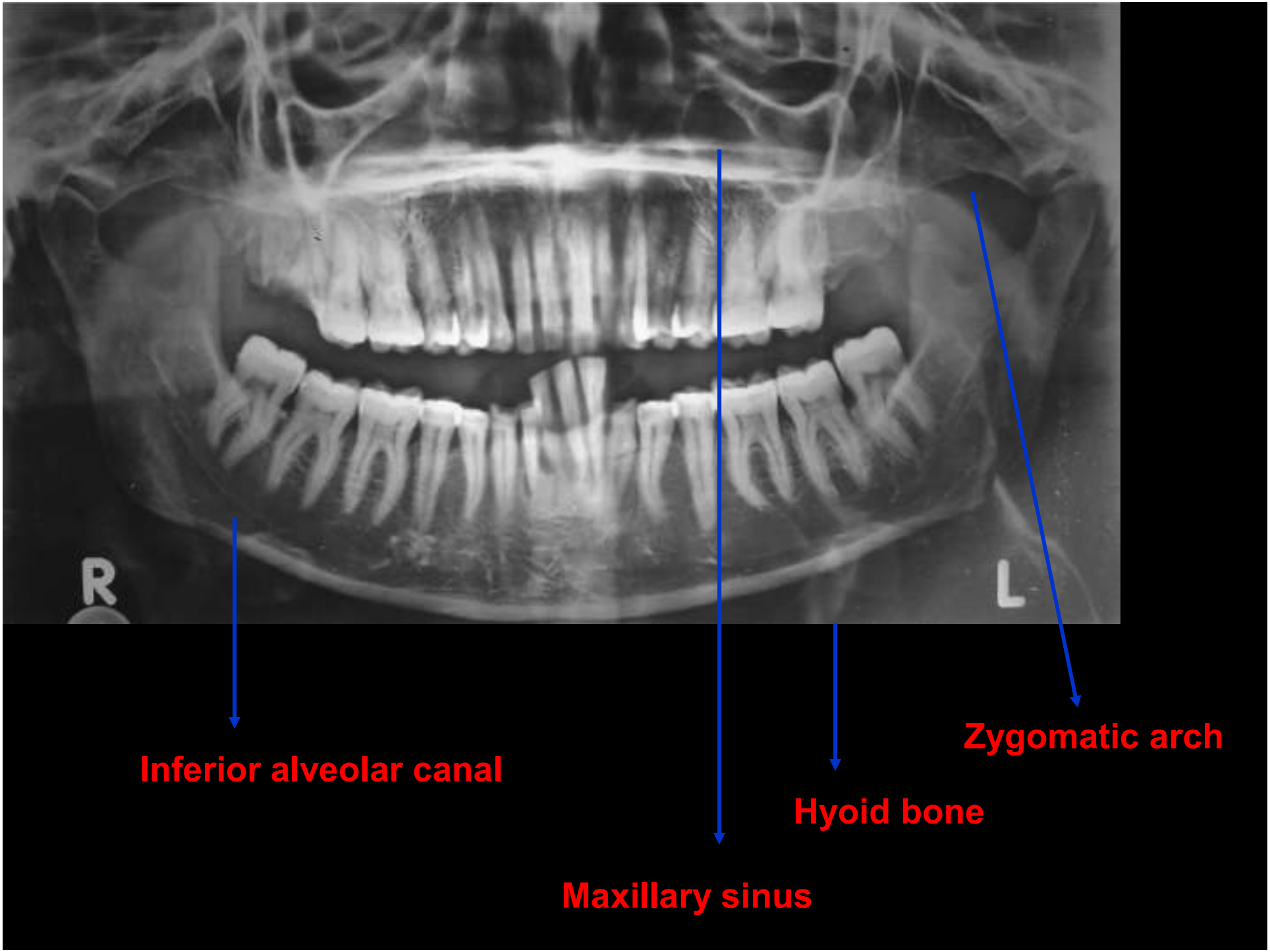
- The evaluation of trauma , third molars, extensive and unique prosthesis and their surgical procedure.
- The evaluation of tooth development, especially mixed dentition analysis.
- The evaluation of developmental anomalies.

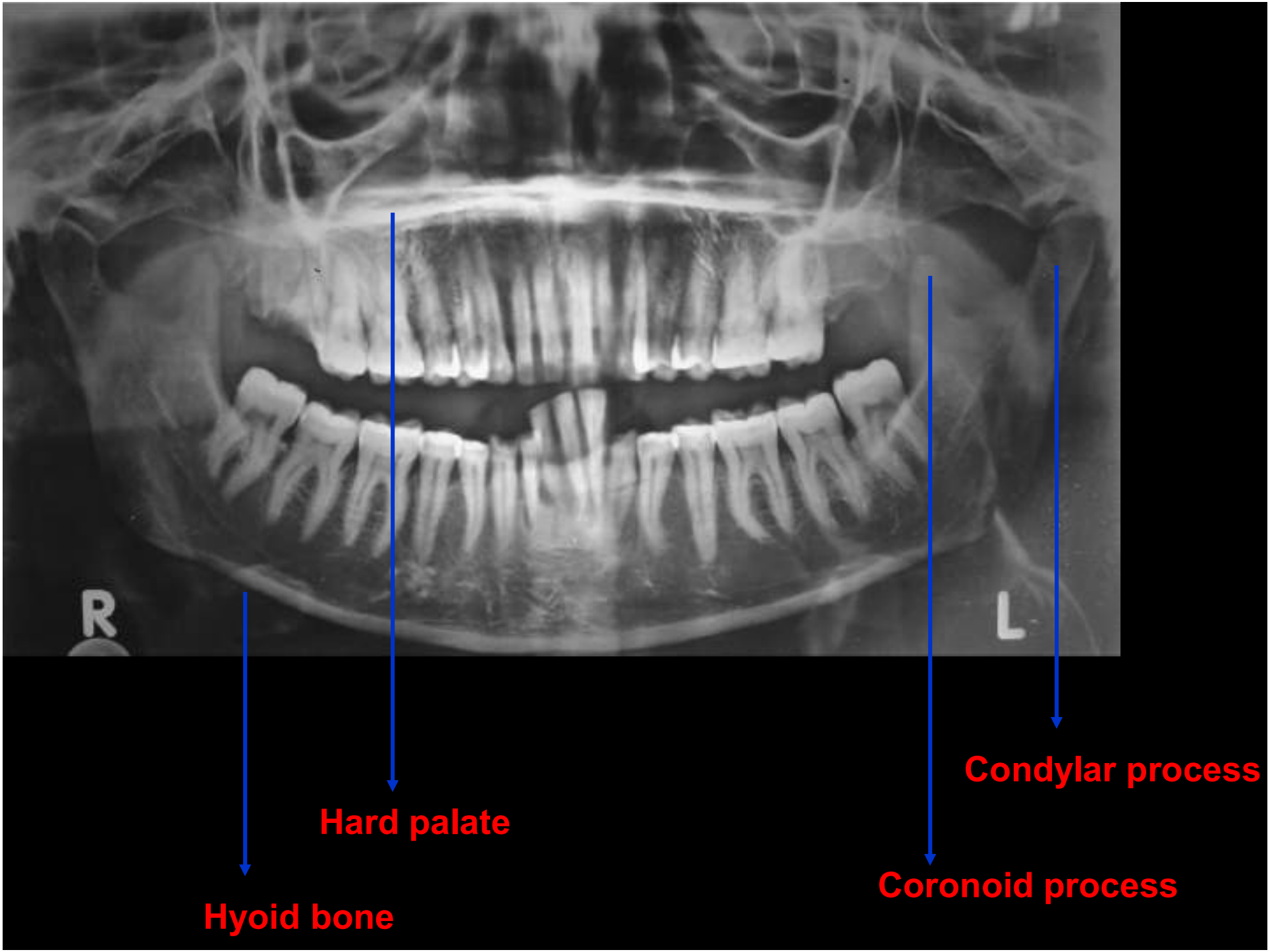
Advantages

- The broad anatomic region viewed
- The relative low patient radiation dose.
- The relative convenience , ease and speed with which the procedure may be performed.
- The fact that the procedure may be performed on patients who are unable to open their mouth.

Disadvantages

- The resultant image does not resolve the fine anatomic details that may be seen in IOPA.
- Other problems associated with panoromic radiography are magnification, geometric distortion and over lapped images teeth, especially in the premolar region.
- The cost.


R
L
Inferior alveolar canal
Maxillary sinus
Hyoid bone
Zygomatic arch


R
L
Hyoid bone
Hard palate
Coronoid process
Condylar process

Cephalometric Radiography

Cephalometric Radiography

Cephalometric Radiography

Main indications

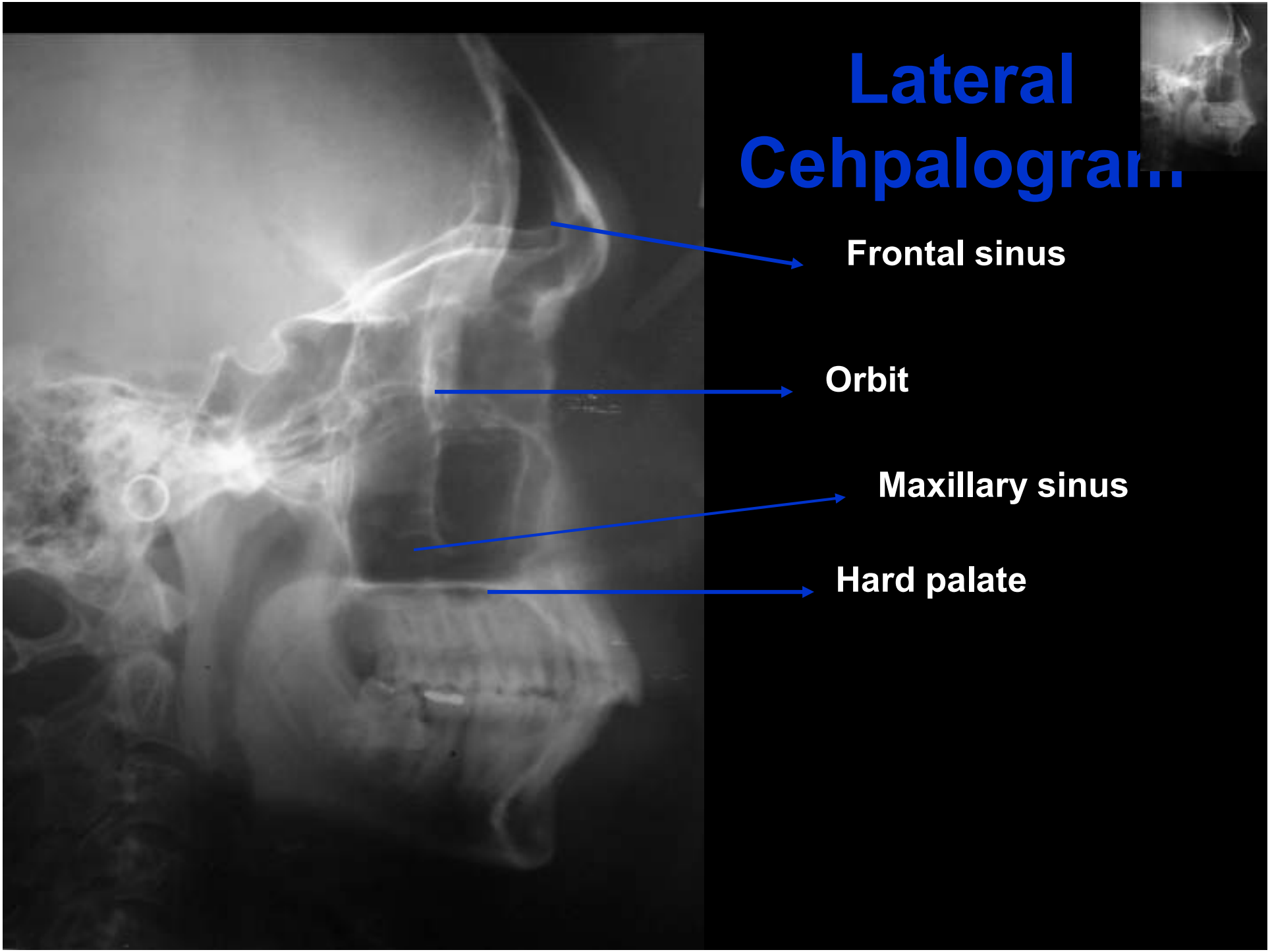
- **Initial diagnosis**: confirmation of the underlying skeletal and/or soft tissue abnormalities.
- Treatment planning.
- Monitoring treatment progress.
- Appraisal of treatment result.

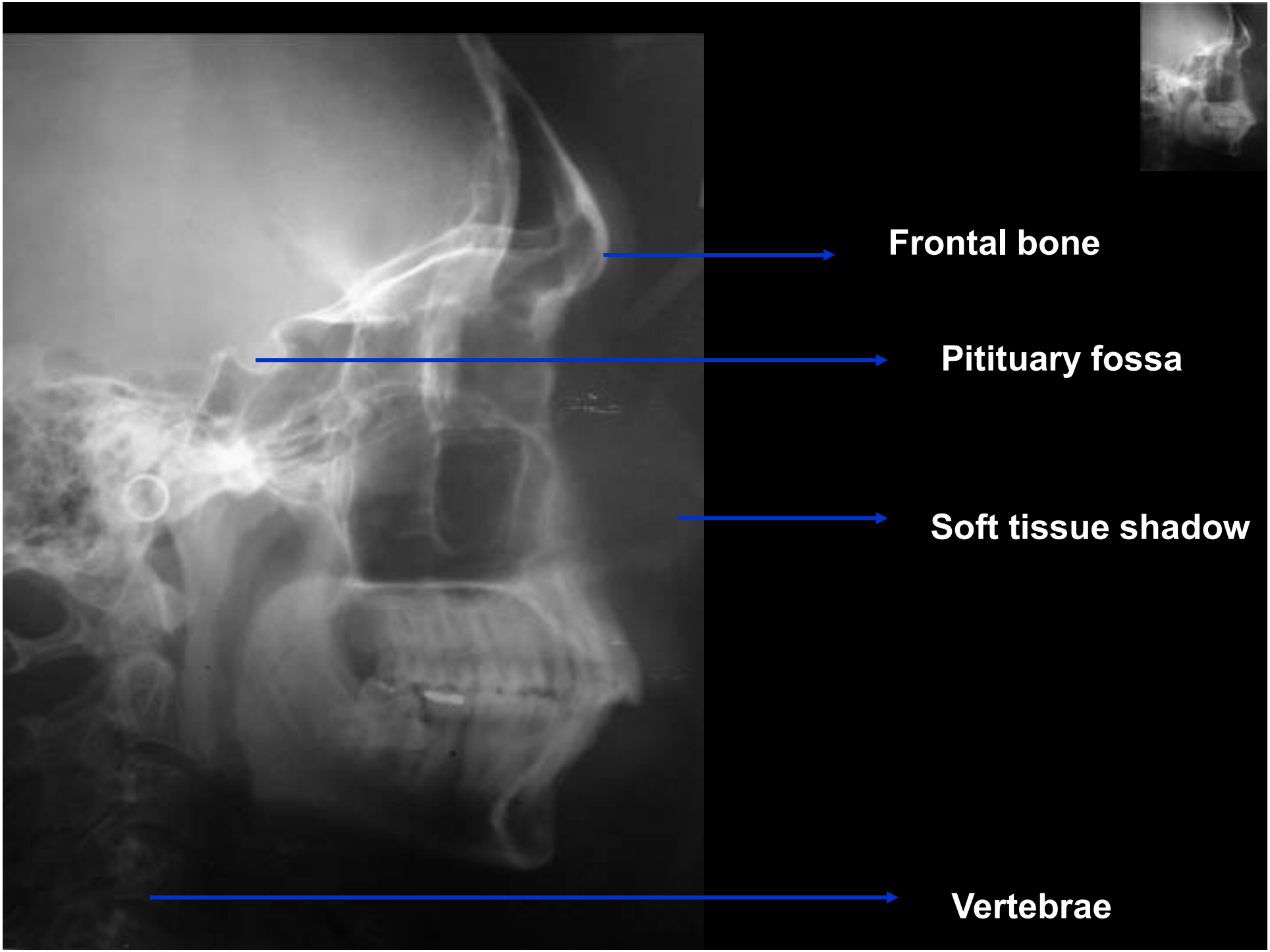
Technique and positioning

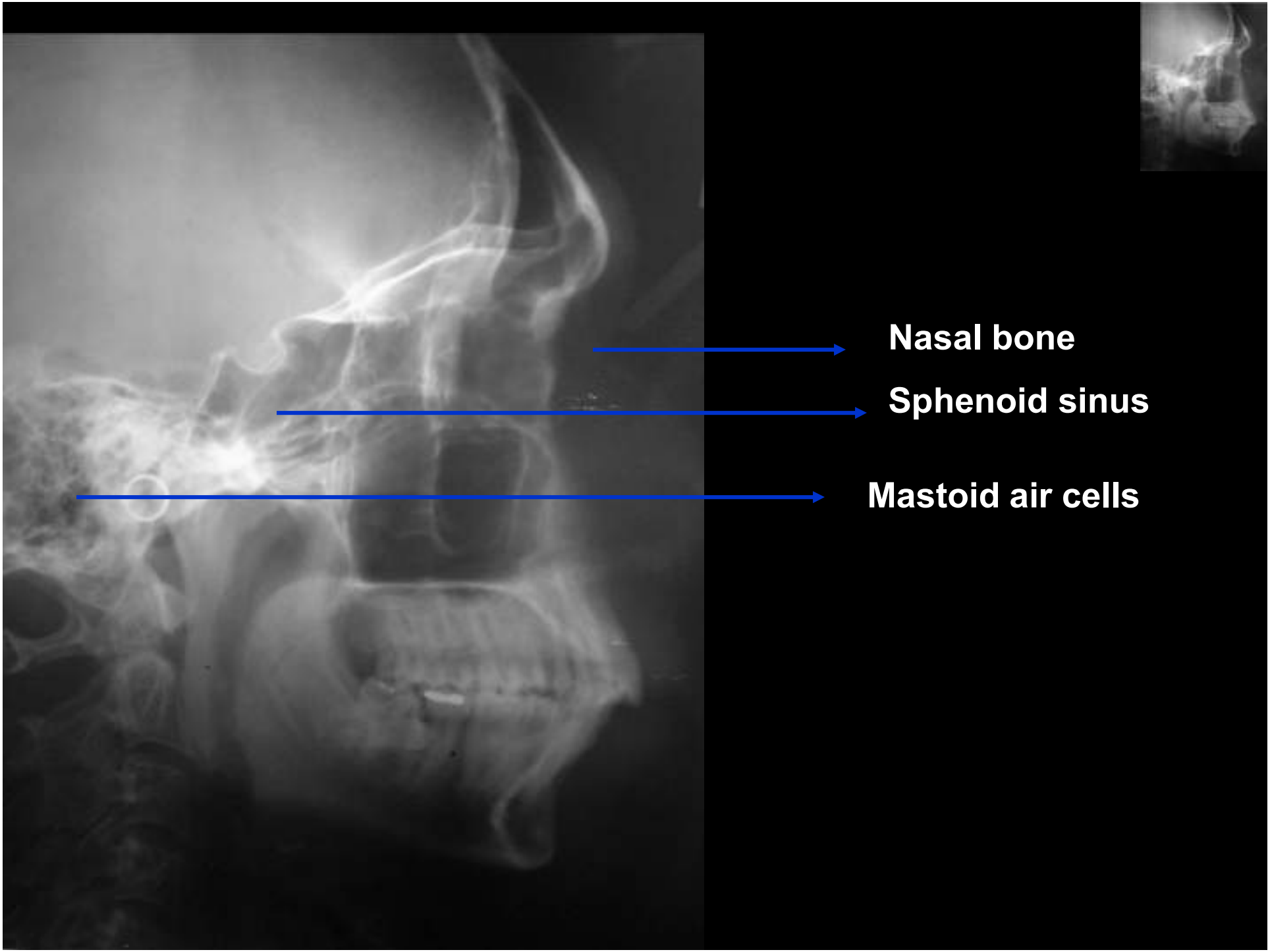
- The patient is positioned within the cephalostat, with the sagital plane of the head vertical and parallel to the film and with the Frankfort plane horizontal.
- The teeth should be in maximum intercuspation.
- The head is immobililzed carefully within the appratus with the plastic ear rods being inserted gradually into the external auditory meatus.

- The distance between X ray source and the midsaggital plane is 60 inches. The central rays is directed towards the external auditory meatus and perpendicular to the plane of the film and the midsaggital plane
- Exposure parameters: kVp 75-80

Lateral Cehpalogram

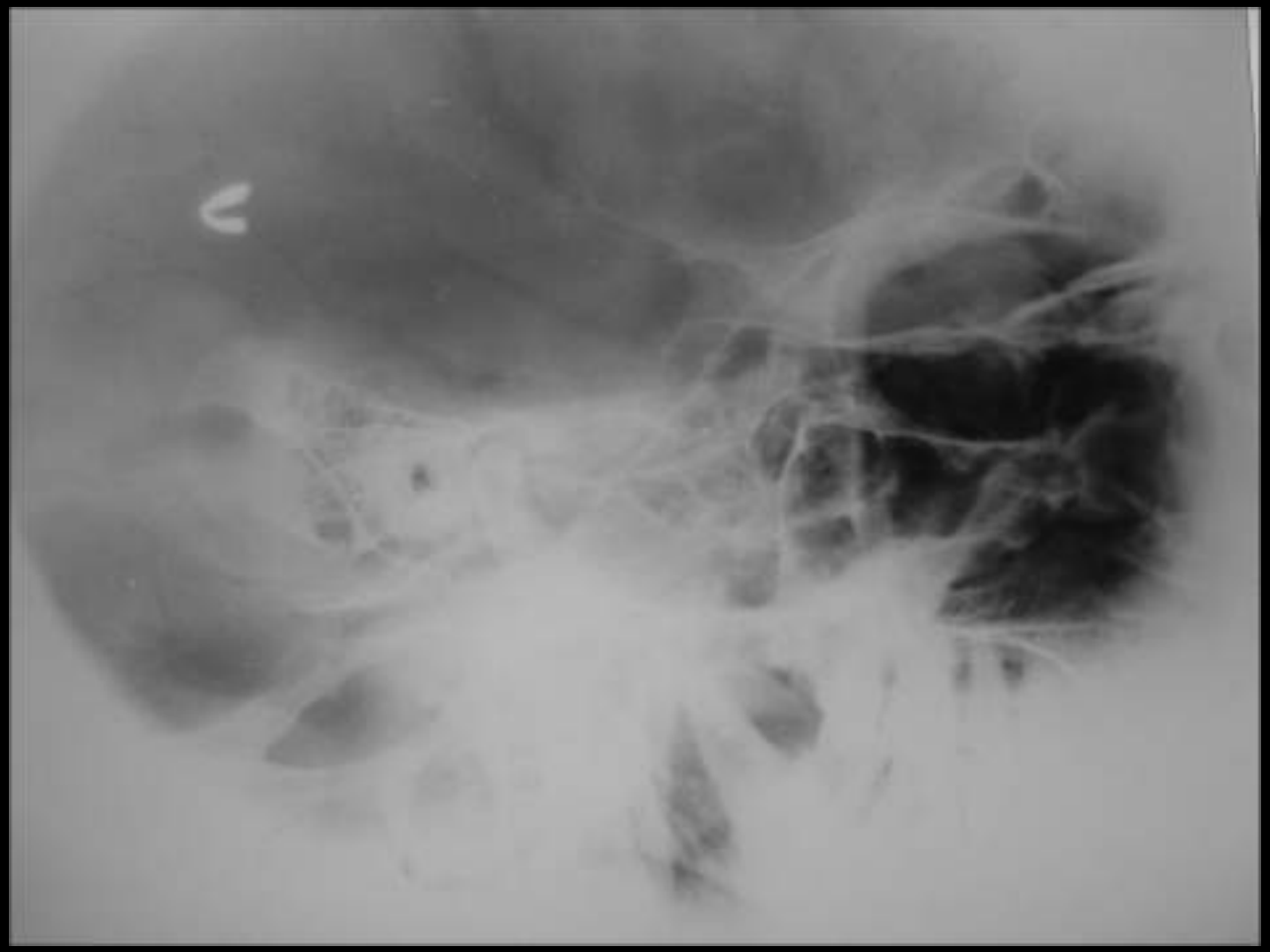



Frontal bone
Pitituary fossa
Soft tissue shadow
Vertebrae


Nasal bone
Sphenoid sinus
Mastoid air cells

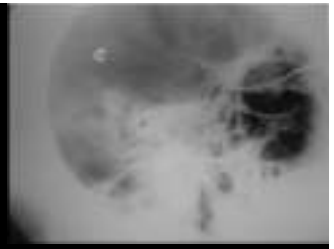
Temperomandibular joint radiograph

Trans caranial projectio



Main indications

- TMJ pain dysfunction syndrome and internal derrangements of joint producing pain clicking and limitation of opening.
- To investigate the size and position of the disc-
- To investigate range of movement.

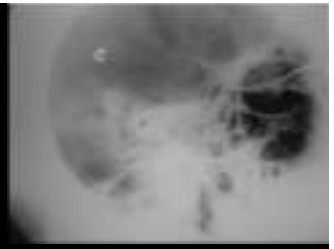


Technique and positioning

- The x ray film cassette is positioned against the facial skin surface on the side of interest, parallel to the sagital plane.
- The x rays are directed from contralateral side projected downwards 25 degree and anteriorly 20 degree and is centered on TMJ.

➢ Closed position

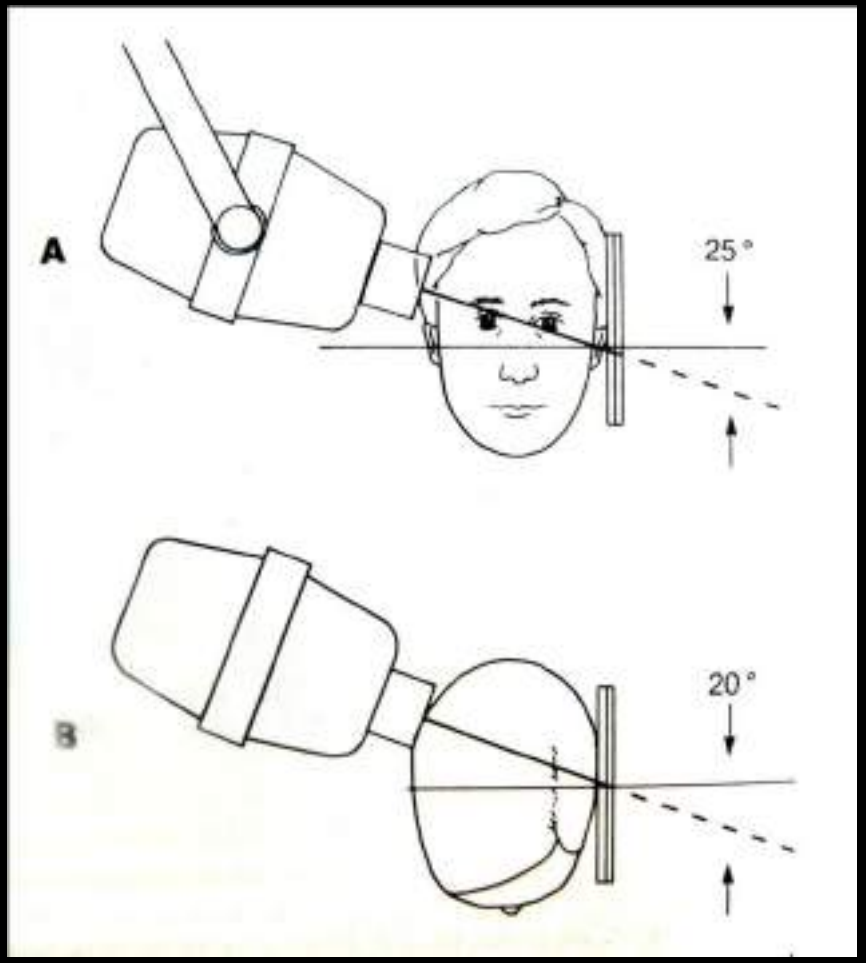
➢ Open mouth position



Advantage

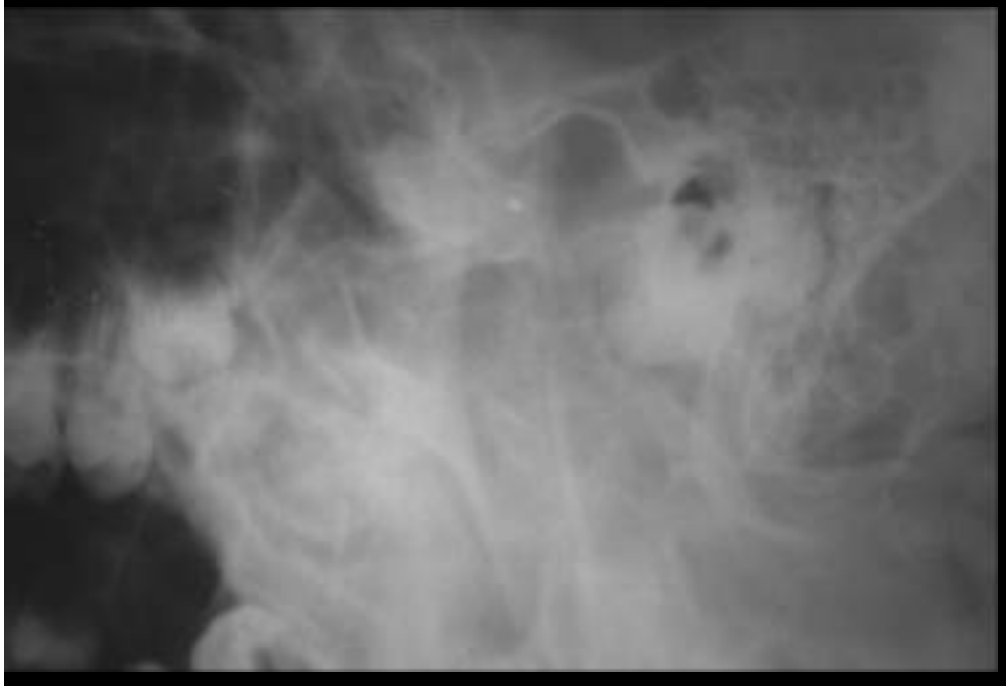
- Helpful in detecting changes in the lateral aspect of the articulating surfaces such as those produced by various forms of arthritis.
- Closed mouth position provide approximate position of condyle in glenoid fossa.

Trans caranial projectio



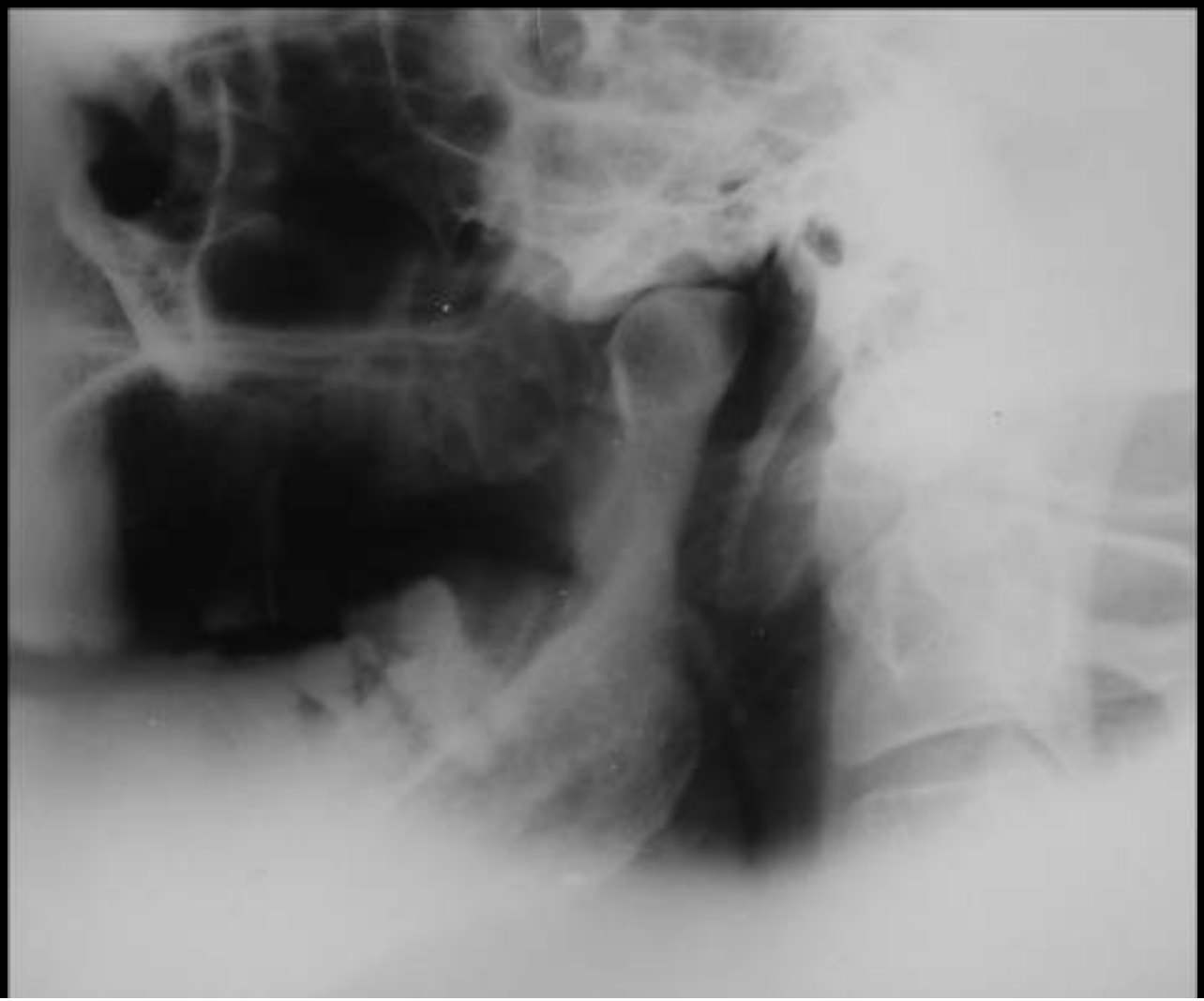
Trans caranial projection

Closed mouth



Open mouth

Trans pharyngeal projection
Parma , Mcqueen projection



Trans pharyngeal projection

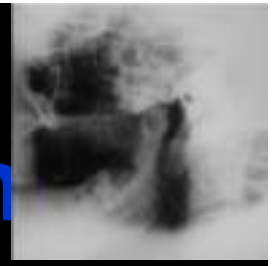
Main indications

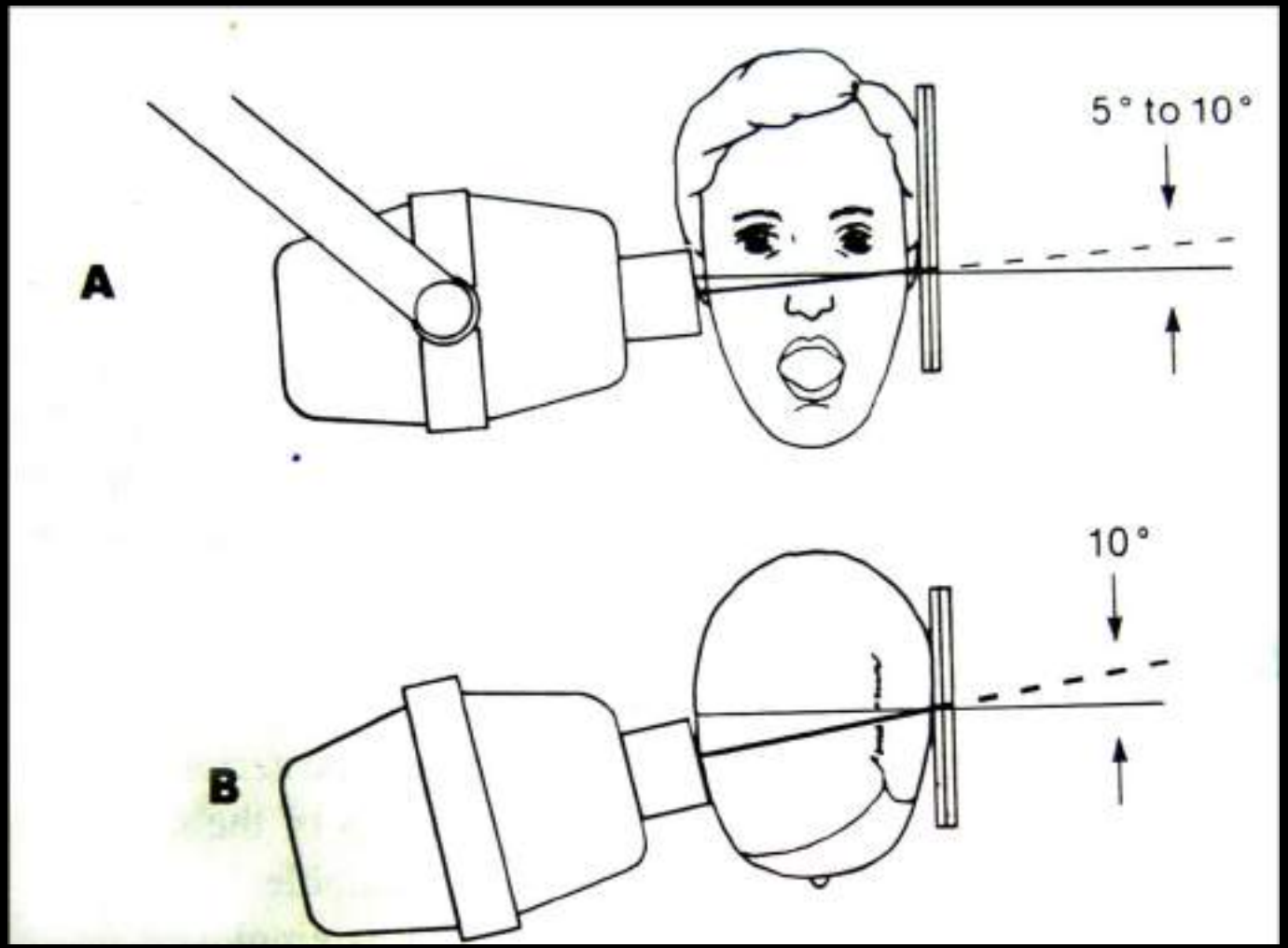
- TMJ pain syndrome.
- To investigate the presence of joint disease particularly osteoarthritis and rheumatoid arthritis.
- To investigate pathological conditions affecting the condylar head including cyst and tumor.
- Fracture of neck and head of condyle

Technique and positioning

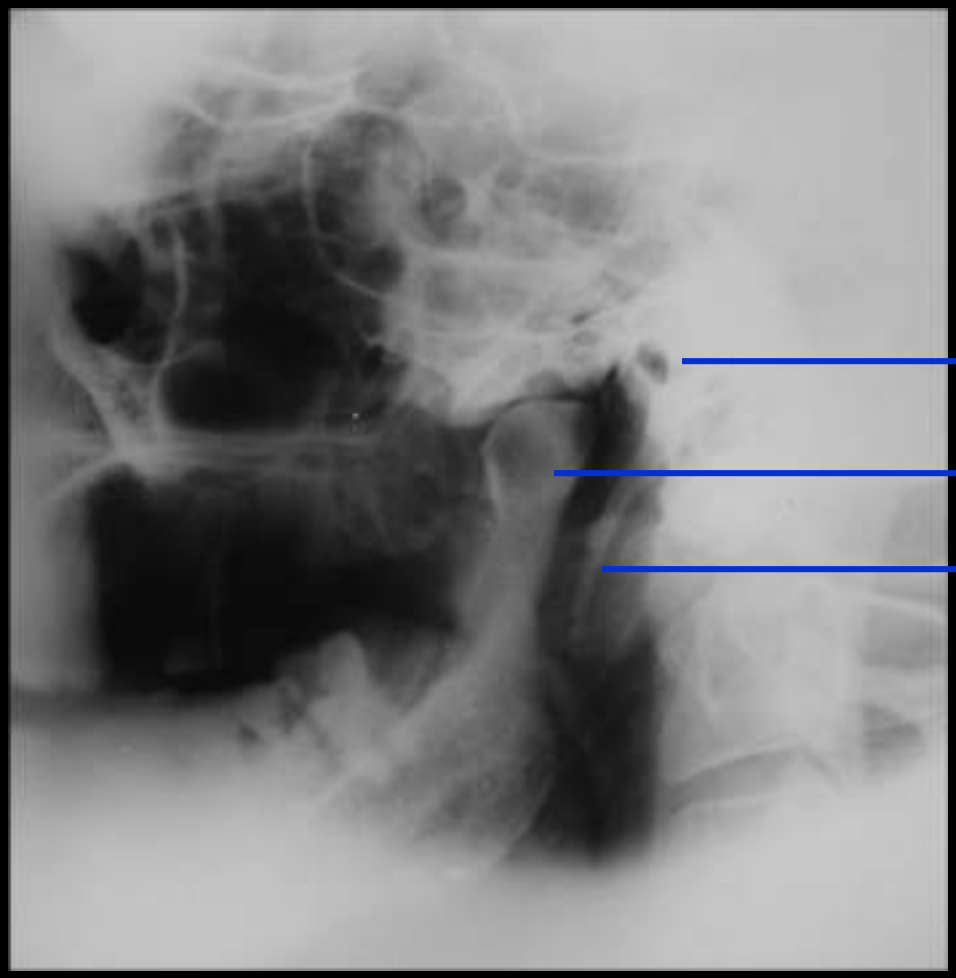
- The patient holds the cassette against the side of the face over TMJ of interest. The film is parallel to sagittal plane.
- The patients mouth is open.
- The X ray tube head is positioned in front of opposite condyle and beneath the zygomatic arch. It is aimed through the sigmoid notch, slightly posteriorly across the pharynx at the condyle under investigation.

Trans pharyngeal projection





Trans pharyngeal projection

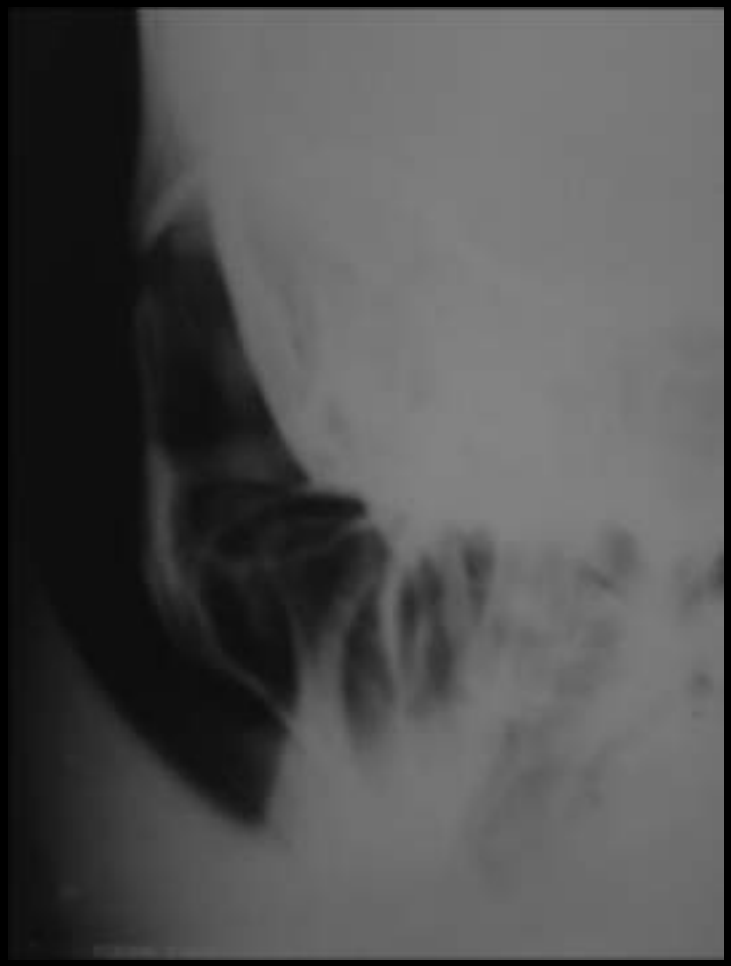


External auditory meatus

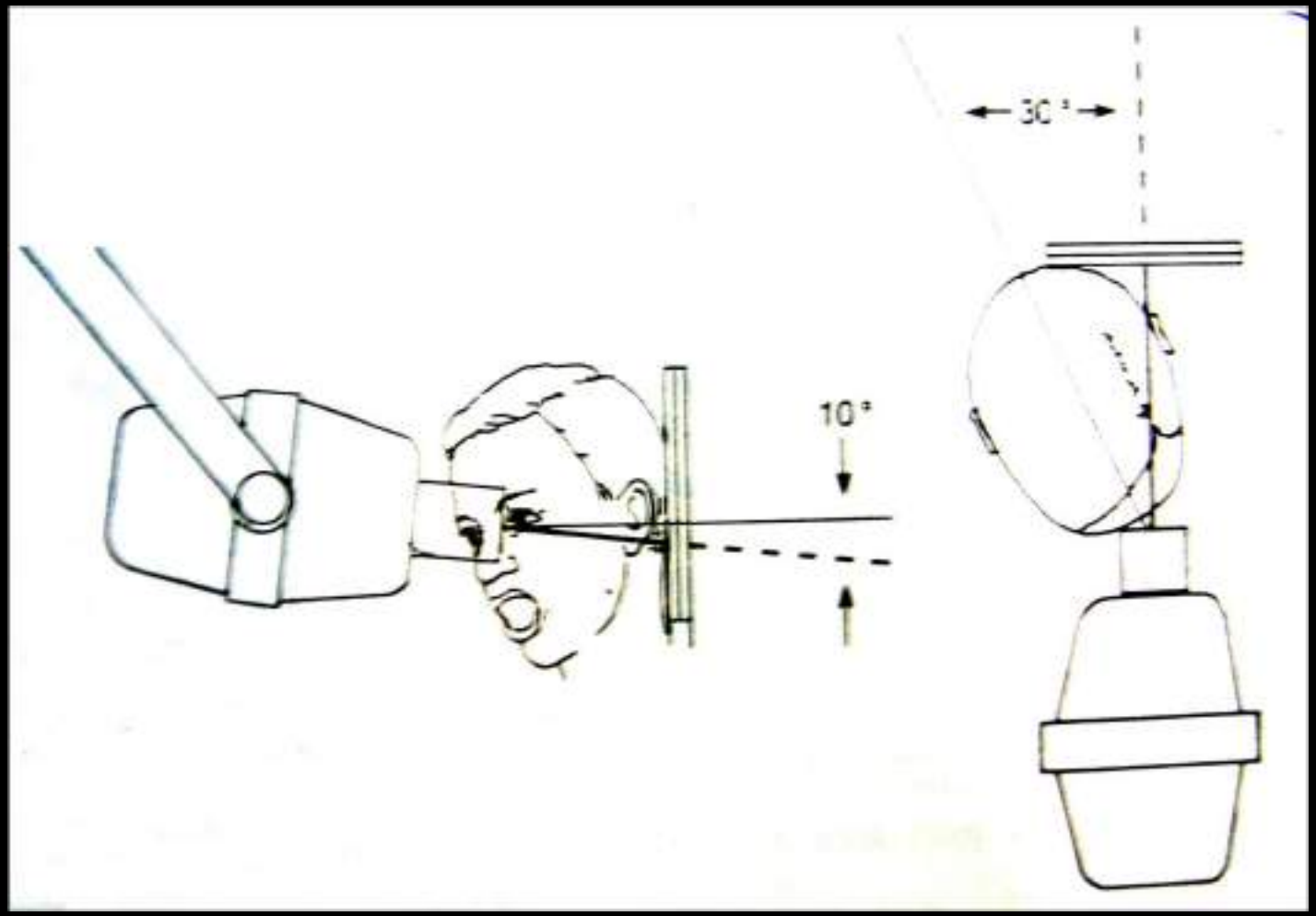
Condylar process

Styloid process

Transorbital projection



Transorbital projection



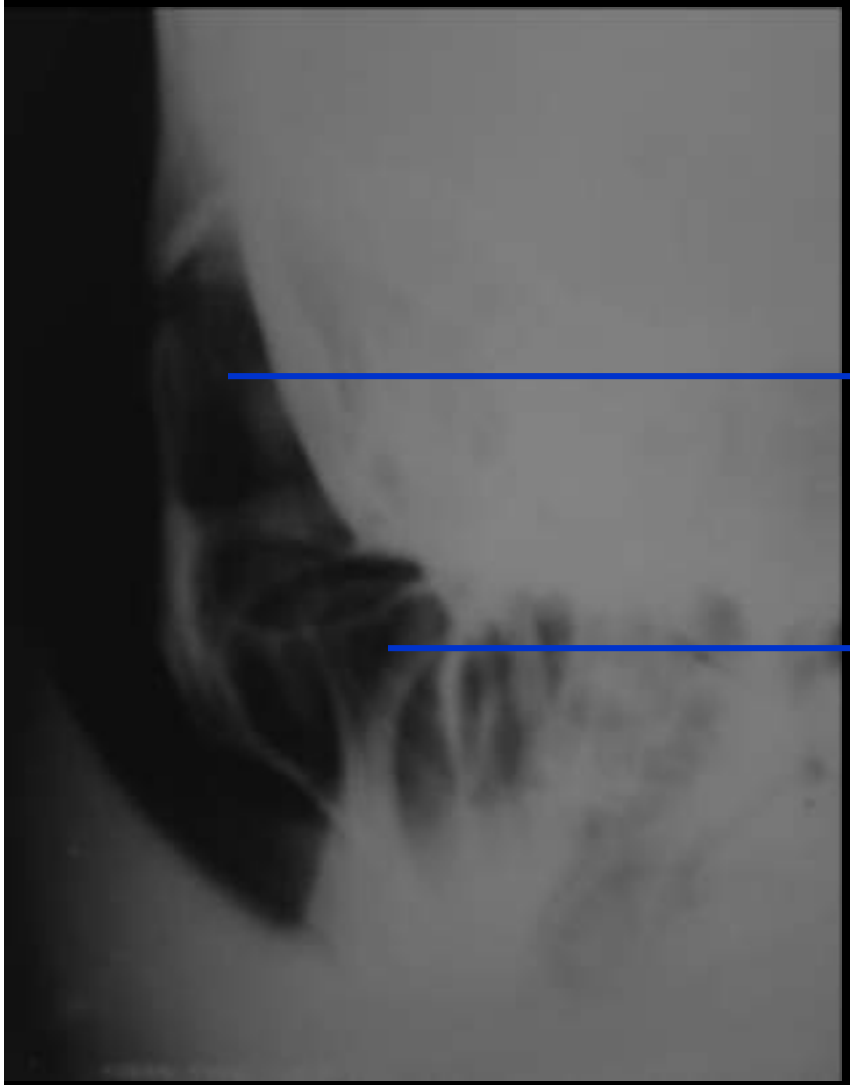
Transorbital projection
Zimmer projection

- The patient is upright and tip the head downwards about 10 degree, so canthomeatal line is horizontal. Place the tube head in front of the patient and direct the central rays through ipsilateral orbit and through TMJ of interest, existing from the skull behind mastoid process.
- The x ray film is placed behind patients head so the central ray is projected to its center and perpendicular to it.
- Patient is asked to open mouth as wide as possible.

Advantage

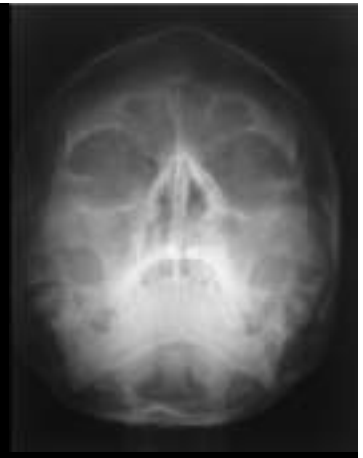
- It demonstrate the convex articulating surface of the condyle and slight convcave or flat, broad ridge of the articular eminnence.
- It can show mesio distal displacement of fractured condyle.

Transorbital projection



Standard occipitomental (0^0 OM)

Standard occipitomental (0^0 OM)

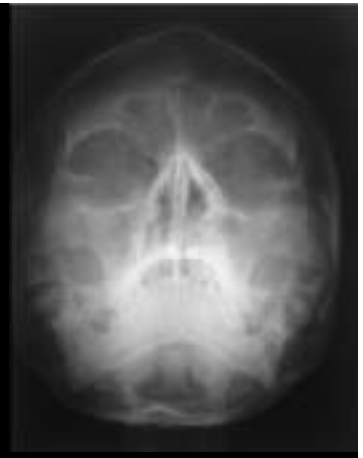


Main indications

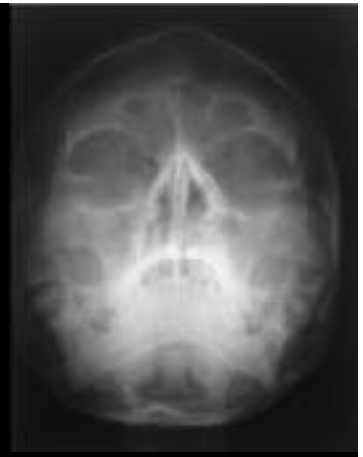
1. Investigation of maxillary antrum.
2. Detecting the following middle third facial fracture

- Le Fort I
- Le Fort II
- Le Fort III

3. Zygomatic complex



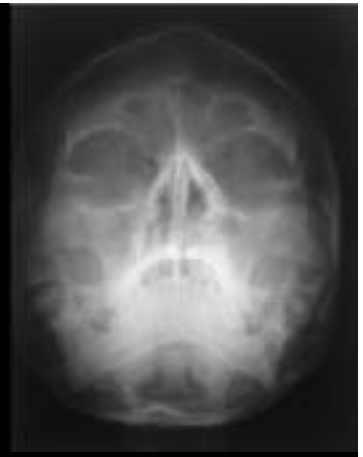
4. Nasoethmoidal fracture
5. Orbital blow out .
6. Coronoid process fracture.
7. Investigation of frontal and ethmoidal sinuses.
8. Investigation of spehnoidal sinus (Projection need to be taken mouth open)



Technique and positioning

Patient facing the film with head tipped back so the radiographic baseline is at 45^0 to the film.(nose chin position).

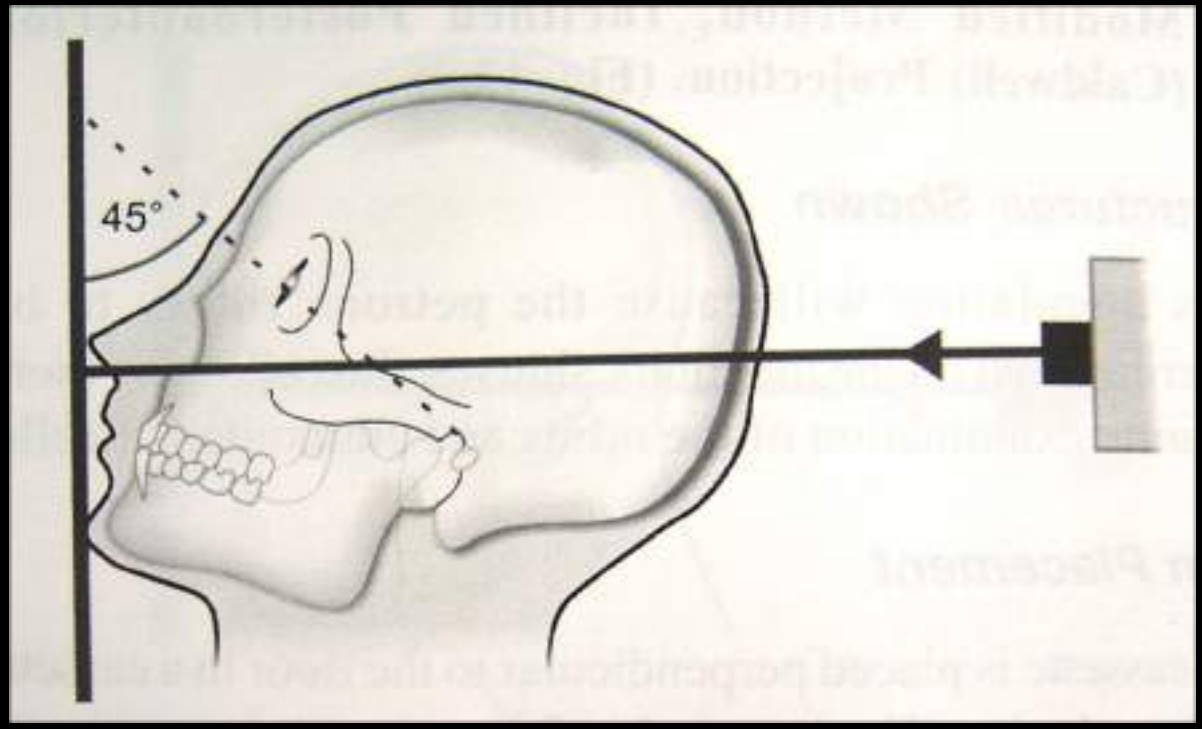
This positioning drops the dense bones of the base of skull downwards and raise the facial bones so they can be seen



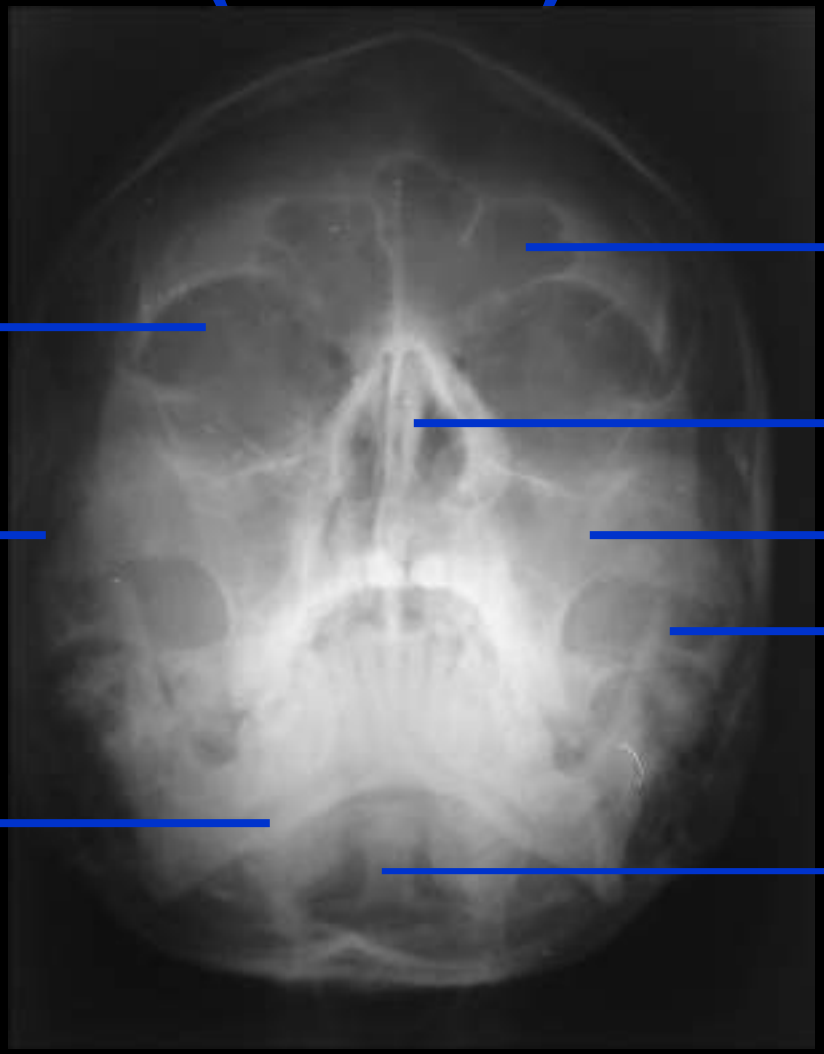
- The X ray tube is positioned with the central ray horizontal center through the occipit.

Exposure parameter:

kVp :- 75 – 80
mA :- 10
Seconds :- 2-3


45°

Standard Occipitomental (0^0 OM)



30^0 ocipitomental (30^0 OM)

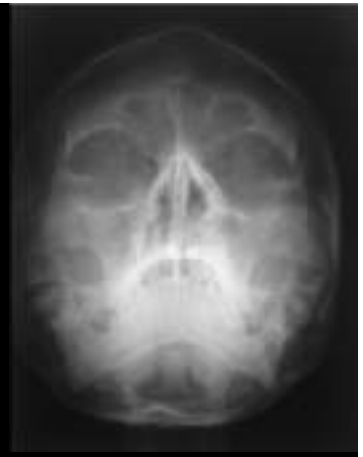
30^0 ocipitomental (30^0 OM)

Main Indications

1. Detecting following middle third facial fracture

- Le Fort I
- Le Fort II
- Le Fort III

2. Coronoid process fracture



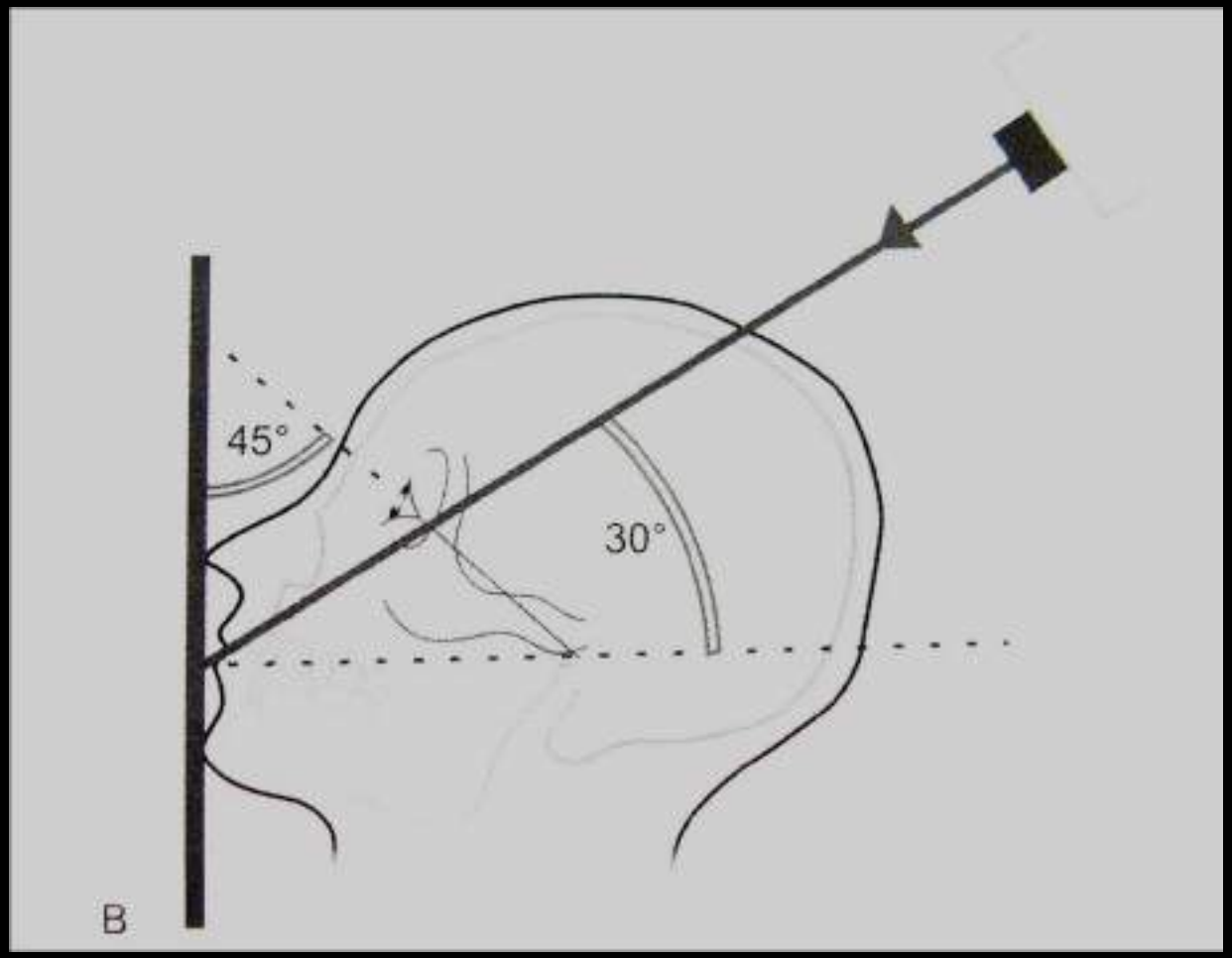
Technique and positioning

- The patient is in same position as for 0^0 OM i.e. nose chin position
- The x ray tube is aimed downwards from above the head with the central rays at 30^0 to the horizontal, centered through the lower border of orbit.

Exposure parameter:

kVp :- 65
mA :- 10
Seconds :- 2-3

30^0 ocipitomental (30^0 OM)



30^0 ocipitomental (30^0 OM)

Frontal sinus

Orbit

Zygomatic bone

Maxillary sinus

Coronoid process

Sphenoid sinus