Extraoral radiographic techniques:

Extra oral radiographs include all views made for the orofacial region with the film positioned extra orally. These views are used to examine areas not fully covered with intraoral film or to visualize skull and facial structures.

Skull projections

1. postero-anterior of the skull (PA skull)

It shows the skull vault , jaw bones

Indications:

1. fracture of the skull vault.

2. intracranial calcifications and lesions.

3. orbits. 4. nasal fossae.

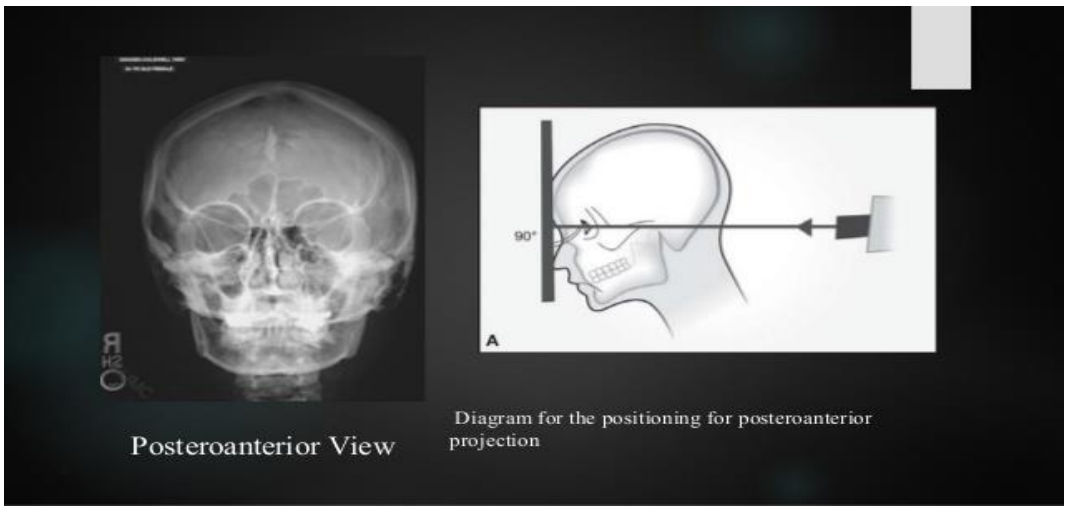
5. frontal and ethmoidal sinuses.

Technique and positioning:

1. the patient is positioned with the head tipped forward so that **the forehead and the tip of the nose touch the film (forehead – nose) position.**

2. the radiographic base line (line extends from the outer canthus of the eye to the external auditory meatus) is horizontal.

3. the x ray beam passes through the occiput at 0 degree.



2. Submentovertex (SMV)

It shows the base of the skull, sphenoid sinus and facial skeleton from below. .

This technique is **contraindicated for patient with **suspected neck injury**

Indications:

1. lesions affecting palate and base of skull.

2. investigations of the sphenoid sinus.

3. fractures of the zygomatic arch (taken with low exposure).

Technique and positioning:

1. the patient is positioned facing away from the film, the head is tipped backwards as far as possible so the vertex of the skull touch the film. In this position the radiographic base line is vertical and parallel to the film.

2. the x ray beam is centered at 5 degree to the horizontal from below the chin. (4 cm inferior to the chin tip)

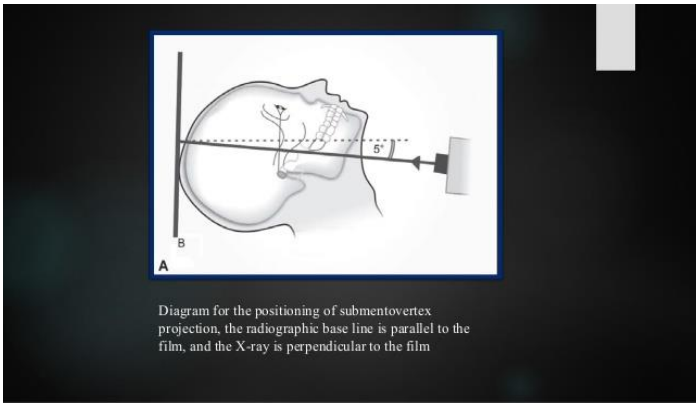
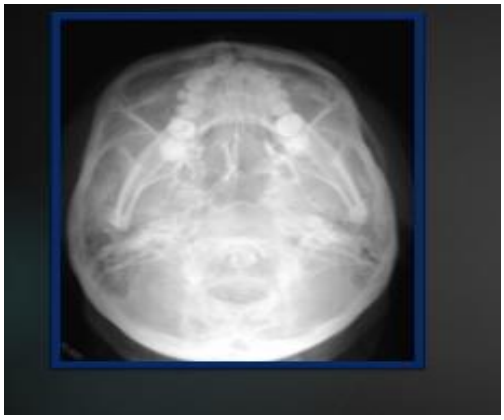


Diagram for the positioning of submentovertex projection, the radiographic base line is parallel to the film, and the X-ray is perpendicular to the film



3.True lateral skull:

It show the skull vault and facial skeleton from lateral aspect.

Indications:

1. fracture of the cranium and the cranial base.

2.middle third fracture.

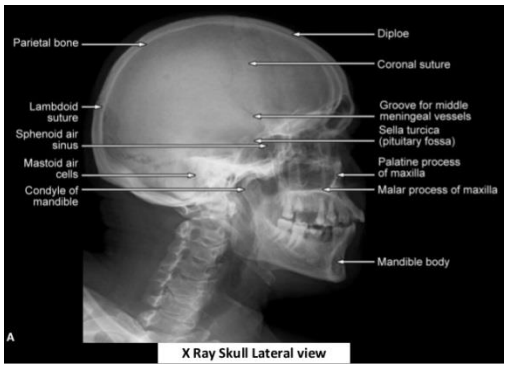
3. investigations of the frontal, sphenoidal and maxillary sinuses.

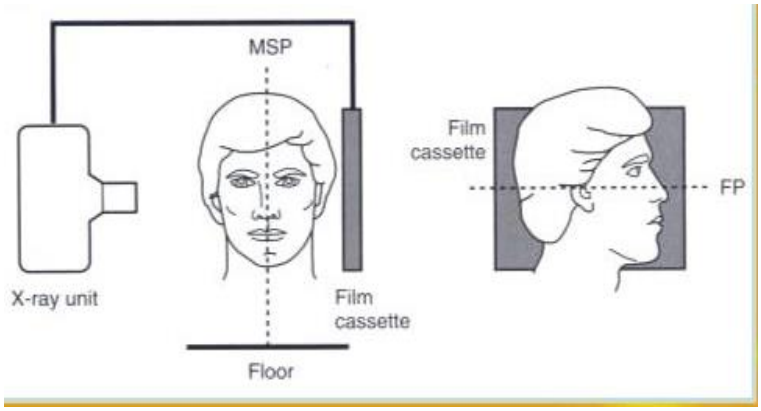
Technique and positioning:

1. the patient is positioned with the head turned through 90 degree so the side of the face touches the film. In this position sagittal plane of the head is parallel to the film.

2. the x ray beam passes horizontally (0 degree) through the center of the external auditory meatus where it will be perpendicular to the sagittal plane and film.

3. x ray to mid sagittal plane distance is 150 cm.





4.Water's view (occipito – mental) view:

It shows the facial skeletons and paranasal sinuses (maxillary, frontal and ethmoidal).

It avoids superimposition of the dense bone of the base of the skull.

Indications:

1. investigation of the paranasal sinuses.

2. detection of middle face fracture.

3. zygomatic complex.

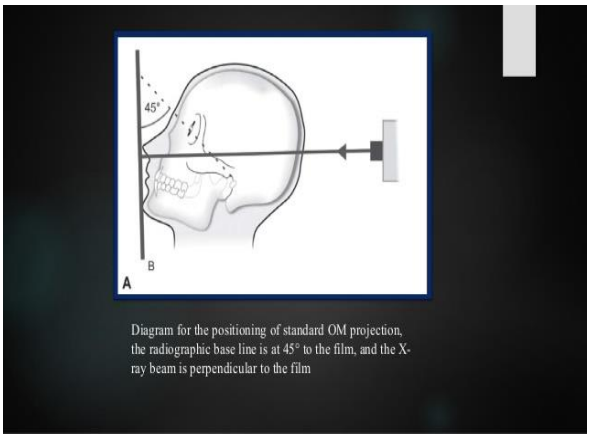
4. orbital blow out fracture.

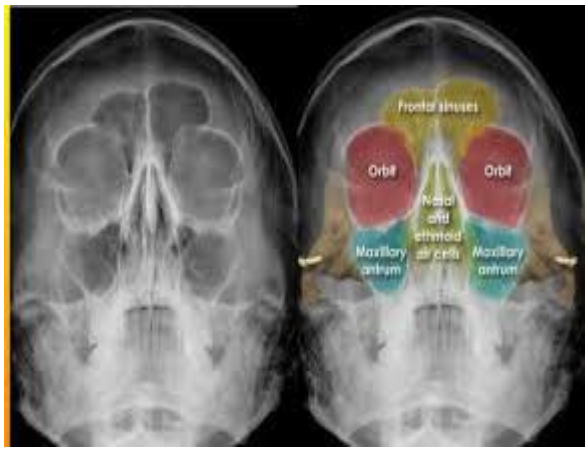
5. coronoid process fracture.

Technique and positioning:

1. the patient is positioned facing the film with **the head tipped back (naso-chin position).**

2. the x ray beam passes in the center of the occipital bone at 0 degree and perpendicular to the film.





5.Reverse Towne:

It shows condylar head and neck and the occipital region.

Indications:

1. high fracture of the condylar neck.

2- fracture of the TMJ area.

3. investigation of the TMJ.

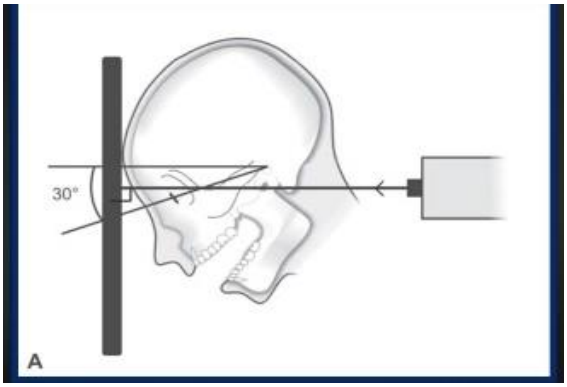
4. condylar head deformities (hypoplasia or hyperplasia).

Technique and positioning:

1.the patient head is tilted downward so that the radiographic base forms a 25-30 degree angle with the image receptor**. In this technique the mouth is opened.**

2. **opening the mouth taking the condylar heads out of the glenoid fossae so they can be demonstrated radiographically.**

3. the x ray beam passes through the center of the condyles from below the occiput and at 0 degree.



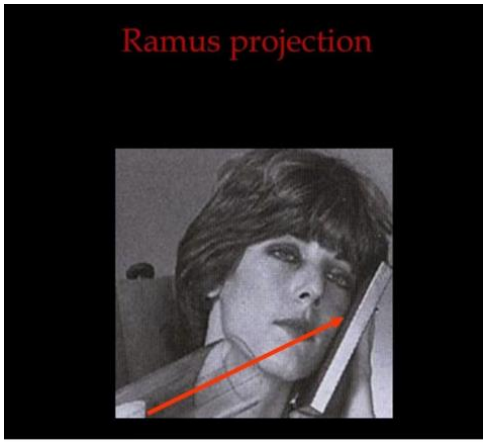
Lateral Oblique Projection:

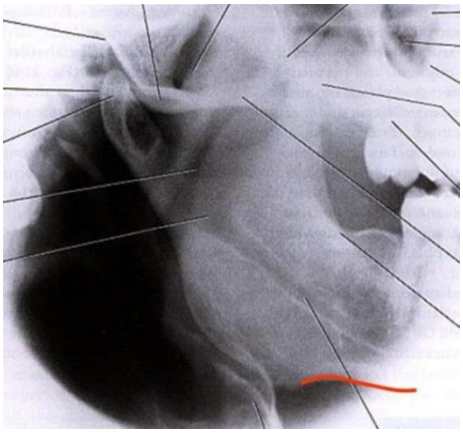
An extraoral view of the jaw used to assess presence of unerupted teeth, fractures of the mandible, and evaluation of jaw lesions, it is of 3 types:

Mandibular ramus projection it gives a view of the ramus from the angle of the mandible to the condyle. It often is very useful for examining the third molar regions of the maxilla and mandible -

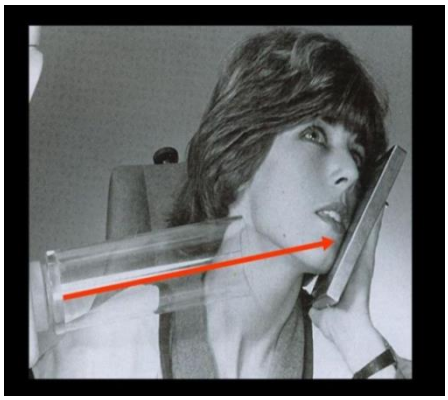
Mandibular body projection it demonstrates the premolar-molar region and the inferior border of the mandible. It provides much broader coverage than is possible with periapical projections -

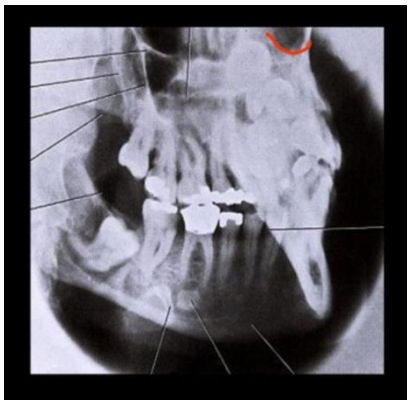
Bimolar view: In this view, both the right and left sides of mandible are taken in one film. -



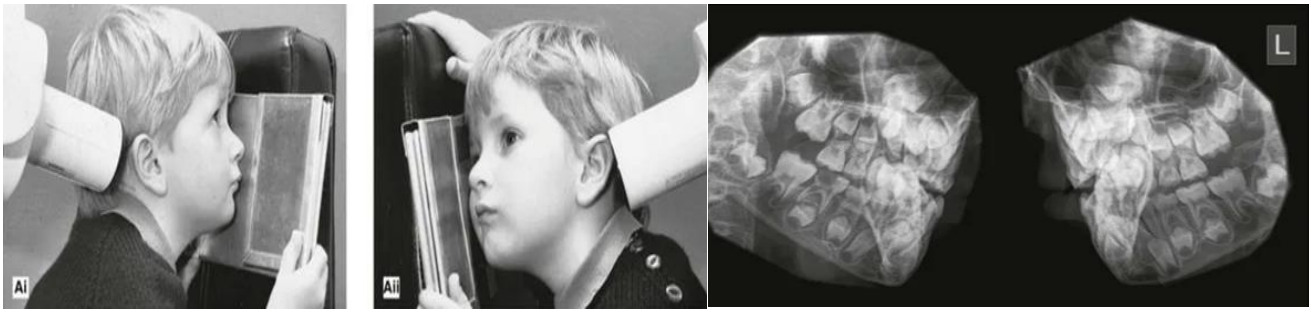


lateral oblique view of mandibular ramus





Lateral oblique view of mandibular body



Bimolar view

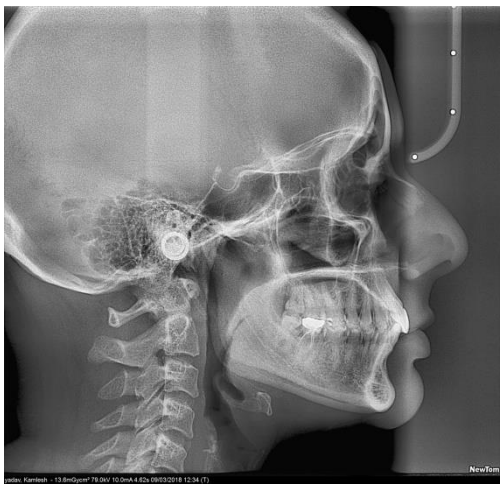
Cephalometric projections

This radiography is commonly used in dentistry . The cephalometric radiography are taken with a **cephalostat** that helps maintain a constant relationship among the skull, film and the x ray beam

Skeletal, dental and soft tissue anatomic landmarks are delineated. Planes, angles and distances are used to generate measurements and to classify patient's craniofacial morphology

At the beginning of treatment , these measurements are often compared with an established standard; while during the treatment , the measurements are usually compared with the measurements from previous cephalometric radiograph of the same patient to monitor growth , development as well as treatment progress.

The main difference between the true lateral skull and the lateral cephalometric projection taken on the cephalostat is that the true lateral skull is not standardized or reproducible. The true lateral used when a single lateral view of the skull is required but not in orthodontics or growth study.



Indications of Cephalogram:

1. In orthodontic diagnosis and treatment planning.

2. In classification of skeletal and dental abnormalities and in establishing facial type.

3.The radiographic technique of choice in orthognathic surgery.

4. In evaluation of the treatment results.

5. Valuable aid in research work involving the craniodentofacial region

Tracing technique:

After obtaining a radiographic image, the film is then traced and various standard landmarks, lines and angles are measured and recorded. This allow comparison with normal values of population to evaluate abnormalities and also help to distinguish treatment progress

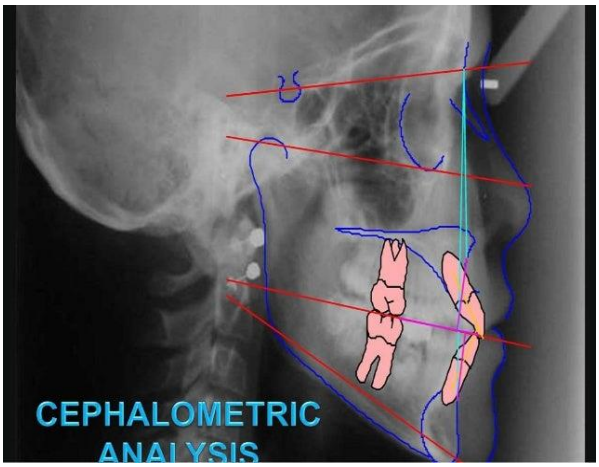
Tracing may be digital by using specific software program in case of using digital system or it may manual and in this situation we need a sharp HB pencil and a good quality tracing paper securely taped to the radiograph.

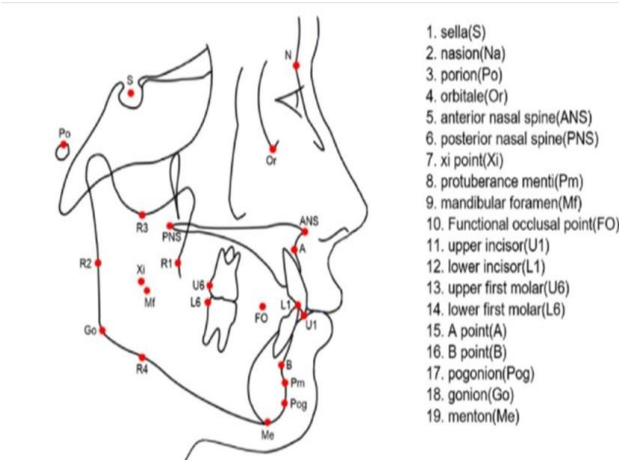
First we outline the following:

1. soft tissue profile of face (forehead to chin). 2. Sella turcica. 3. Frontal bone and nasal bone. 4. Orbital floor. 5. External auditory meatus. 6. Mandible and maxilla.

7. upper and lower first molars and central incisors.

Next mark the other cephalometric points; connecting these points together give a specific lines, planes and angles.





Skeletal Landmarks	Soft Tissue Landmarks
1. Porion (P): Most superior point of the external auditory canal 2. Sella (S): Center of the hypophyseal fossa 3. Nasion (N): Frontonasal suture 4. Orbitale (O): Most inferior point of the infraorbital rim 5. PNS: Tip of the posterior nasal spine 6. ANS: Tip of the anterior nasal spine 7. A point (A): Deepest point of the anterior border of the maxillary alveolar ridge concavity 8. B point (B): Deepest point in the concavity of anterior border of the mandible 9. Pogonion (Po): Most anterior point of the symphysis 10. Gnathion: Midpoint of the symphysis outline between pogonion and menton 11. Menton (M): Most inferior point of the symphysis 12. Gonion: Most convex point along the inferior border of the mandibular ramus	1. Soft tissue glabella: Most anterior point of the soft tissue coveringthe frontal bone 2. Soft tissue nasion: Most concave point of soft tissue outline at thebridge of the nose 3. Tip of nose: Most anterior point of the nose 4. Subnasale: Soft tissue point where the curvature of the upper lipconnects to the floor of the nose 5. Soft tissue A point: Most concave point of the upper lip between thesubnasale and the upper lip point 6. Upper lip: Most anterior point of the upper lip 7. Lower lip: Most anterior point of the lower lip 8. Soft tissue B point: Most concave point of the lower lip between thechin and lower lip point 9. Soft tissue pogonion: Most anterior point of the soft tissue of thechin 10. Soft tissue gnathion: Midpoint of the chin soft tissue outlinebetween the soft tissue pogonion and soft tissue menton 11. Soft tissue menton: Most inferior point of the soft tissue of the Chin