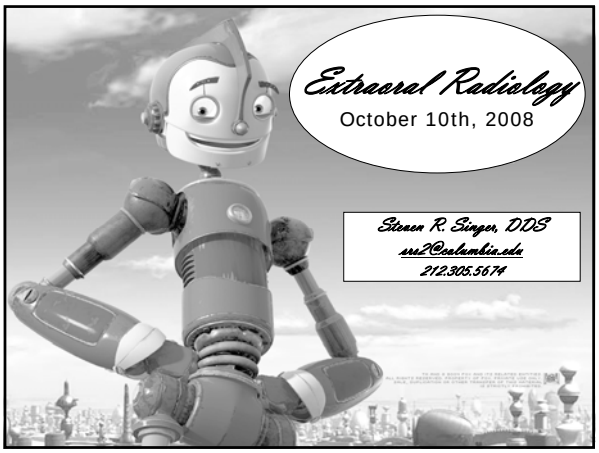

Extraoral Radiology

October 10th, 2008

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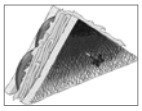
November 8th, 1895

Extraoral Projections

- Images can be produced in the dental office
- X-ray source can be
  - Intraoral X-ray machine
  - Combination Pan/Ceph
  - Medical
  - Dedicated Cephalometric machine

Film-Screen Combinations



- Used for extraoral radiographs to reduce both patient dose and time of exposure.
- Image quality is slightly reduced over direct film, such as intraoral projections
- Based on the ability of X-ray photons to cause fluorescence
- Screen film is sensitive to both x-ray photons and blue or green light. Dyes are included in film emulsions, making the emulsion sensitive to light emitted by the screens at a specific wavelength/color.

Film-Screen Combinations

- **Fluorescence**
  Certain materials fluoresce, that is, they absorb radiation and immediately emit light. The intensity of the light emitted depends on the intensity of the incident radiation. The photographic effect on the film, is the sum of the effects of the x-rays and of the light emitted by the screens. Light emission stops immediately when the exciting radiation stops. Fluorescence, as used in radiology, is thus the ability of phosphors to emit light when excited by x-rays.

Film-Screen Combinations

- Most of the image is produced by the visible light photons
- Faster screens reduce dose at the expense of image quality
- Size and shape of phosphor crystals in screens affect image quality

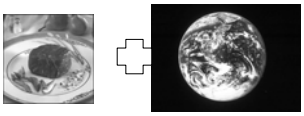
Film-Screen Combinations

- Screens and film must be matched
- Screens are used in pairs, as film is double-sided
- Three types of screens:

1. Standard — blue light-emitting calcium tungstate
2. Rare Earth — green light-emitting gadolinium or lanthanum
3. Combination

Rare Earth Screens

Rare-earth compounds in these screens convert x-ray energy into image-creating light more efficiently than conventional blue-light-emitting screens, reducing radiation exposure to patients by as much as 50 percent.



Screen Selection and Application Guide

Speed Classification:
System Basics

Speed class	50	100	200	400	800
Required mAs change to produce similar densities (fixed kV + ffd)	200mAs	100mAs	50mAs	25mAs	12.5mAs
Exposure alteration compared to class 100	x 2	1	1/2	1/4	1/8

Digital Image Receptors

Storage Phosphors

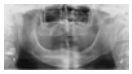
CCD/CMOS

Size of Image Receptors

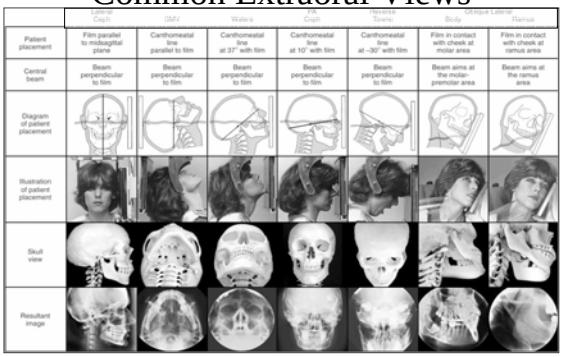
Cephalometric and Skull views:
20x25 cm (8x10 inches)

Lateral Oblique views
13x18 cm (5x7 inches)

Panoramic views
12.7x30.5 cm (5x12 inches)
-or-
15x30 cm (6x12 inches)



Common Extraoral Views



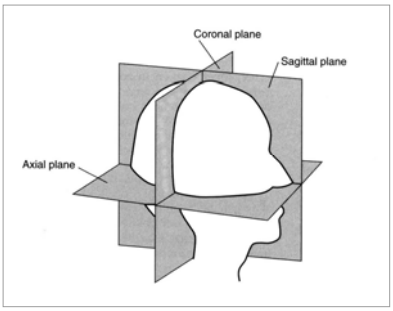
From: White and Pharoah 5th edition

Projection of the Central Ray

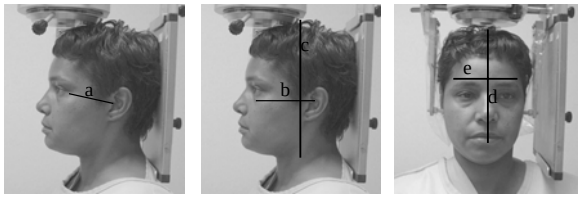
The central ray is directed perpendicular to the plane of the film in the horizontal and vertical dimensions from a source 91 to 102 cm (36 to 40 inches) away. The source should be coincident with the midsagittal plane of the head at the level of the bridge of the nose.

For cephalometric applications the distance should be 152.4 cm (60 inches) between the x-ray source and the midcoronal plane. This increased distance provides an resultant image with a broader gray scale. of the patient.

Reference Planes



Reference Planes



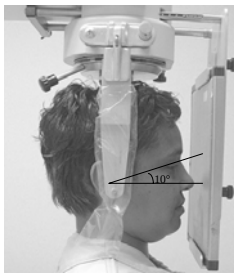
a=canthomeatal plane
b=Frankfort Horizontal plane
c=coronal plane
d=sagittal plane
e=axial plane

Posteroanterior View

- Indications:
  - Disease
  - Trauma
  - Developmental abnormalities
  - Growth and development

PA Ceph Projection

- The image receptor is placed in front of the patient, perpendicular to the midsagittal plane and parallel to the coronal plane
- The patient is placed so that the canthomeatal line forms a 10-degree angle with the horizontal plane and the Frankfurt plane is perpendicular to the image receptor. In the PA skull projection, the C-M line is perpendicular to the image receptor.



PA Ceph Projection

PA Projection

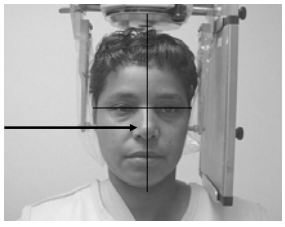
PA Landmarks

Lateral Skull View

- Indications
  - Trauma
  - Disease
  - Developmental abnormalities

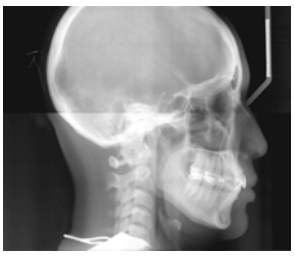
Lateral Cephalometric Projection

- The image receptor is positioned parallel to the patient's midsagittal plane. The side of interest is placed toward the image receptor to minimize distortion.
- In cephalometric radiography, the patient is placed with the left side toward the image receptor, and a wedge filter at the tube head is positioned over the anterior aspect of the beam to absorb some of the radiation and allow visualization of soft tissues of the face.

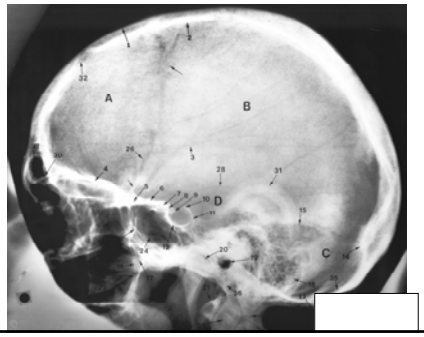


Lateral Cephalometric Projection

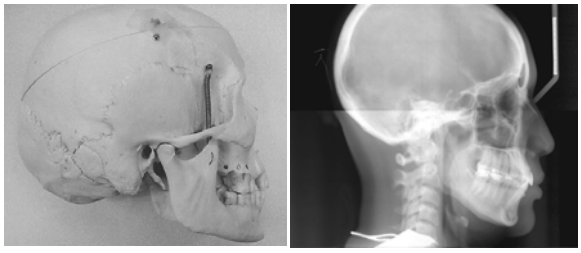
- Uneven magnification of left and right sides
- Structures close to the midsagittal plane (e.g., the clinoid processes and inferior turbinates) should be nearly superimposed.



Lateral Skull Landmarks



Lateral Cephalometric Projection

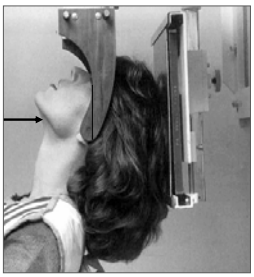


Submentovertex View

- Indications
  - View base of skull, position of condyles, sphenoid sinuses
  - Fractures of the zygomatic arch (Jughandle View)

Submentovertex Projection

- AKA Base projection

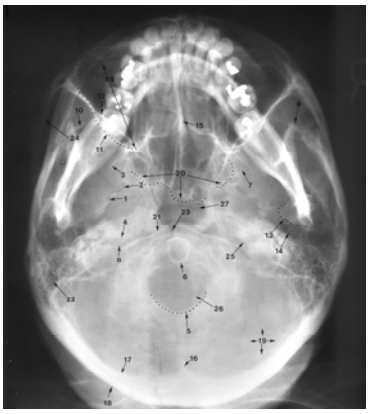


Submento-vertex Projection

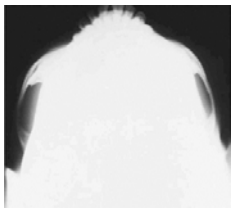
- Check to see the symmetry
- Buccal and lingual cortical plates of the mandible projected as uniform opaque lines

Submento-vertex Projection

Submento-vertex Landmarks

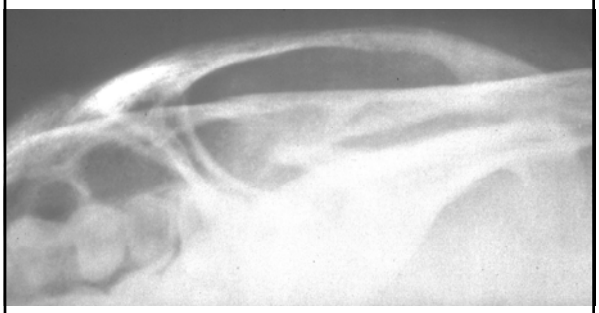


Submentovertex Projection



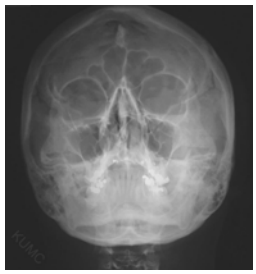
Jug handle view

Submentovertex Jughandle View



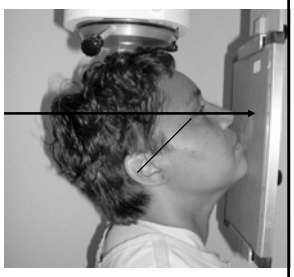
Occipeto-Menton Projection aka Waters View

- Indications
  - Evaluation of the maxillary sinus
  - Evaluation of the frontal sinus
  - View of orbit and nasal fossa



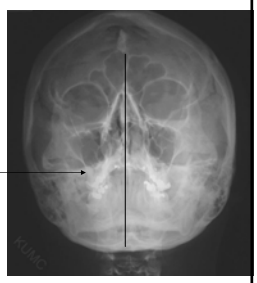
Occipeto-Menton Projection

- AKA Waters projection
- C-M plane forms ~37° angle with the image receptor



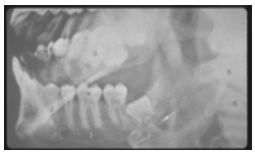
Occipeto-Menton Projection

Petrous ridge



Lateral Oblique Views

- Largely replaced by panoramic views
- Indications:
  - Position of impacted third molars
  - Fractures of the ramus, condyle, or body of the mandible (but not symphysis)



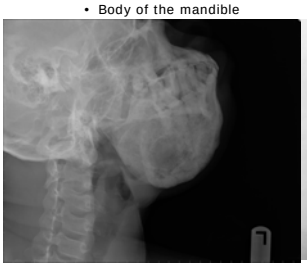
Lateral Oblique Projection

- The image receptor is placed against the patient's cheek on the side of interest and centered in the molar-premolar area. The lower border of the cassette is parallel and at least 2 cm below the inferior border of the mandible. The head is tilted towards the side being examined, and the mandible is protruded.
- The central ray is directed toward the premolar-molar region from a point 2 cm below the opposite angle of the mandible.

Lateral Oblique Projection

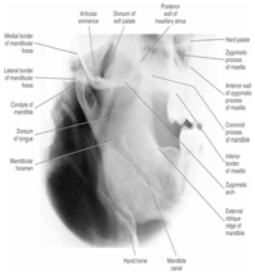
Lateral Oblique Projection-Body

- Body of the mandible



Lateral Oblique Projection-Ramus

- Ramus
- Also known as Lateral ramus view



Reverse Towne View

- Indications:
  - Suspected fracture of the condylar neck
  - Shows posterolateral wall of maxillary sinus

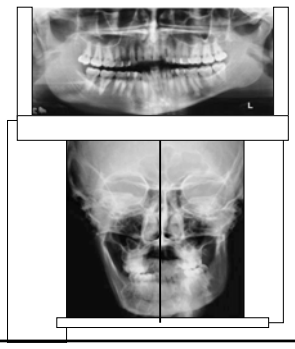
Reverse Towne projection


Reverse Towne projection

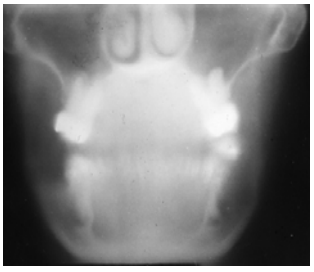

Townes Landmarks

Panoramic View

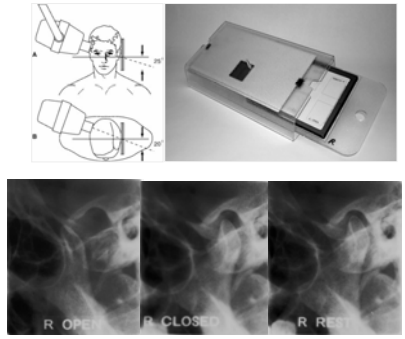
Comparative views



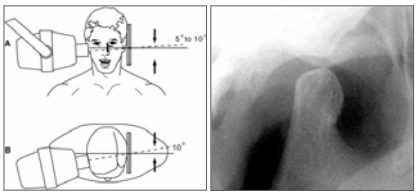
Linear Tomography



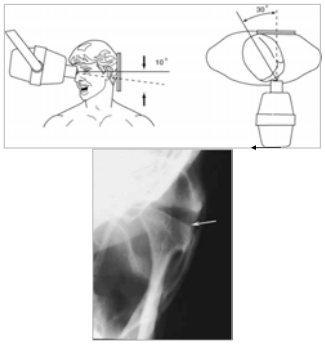
Trans-cranial views



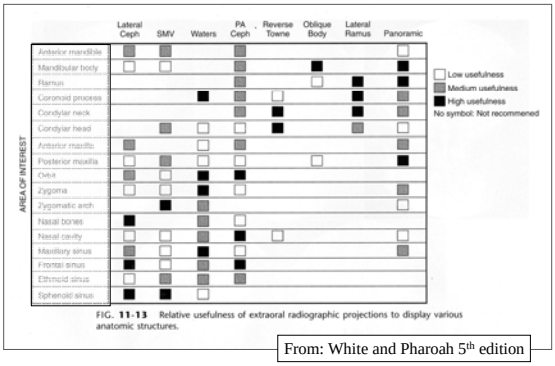
Trans-pharyngeal



Trans-orbital



Selection Criteria



From: White and Pharoah 5th edition

Selection Criteria

Thank you!

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