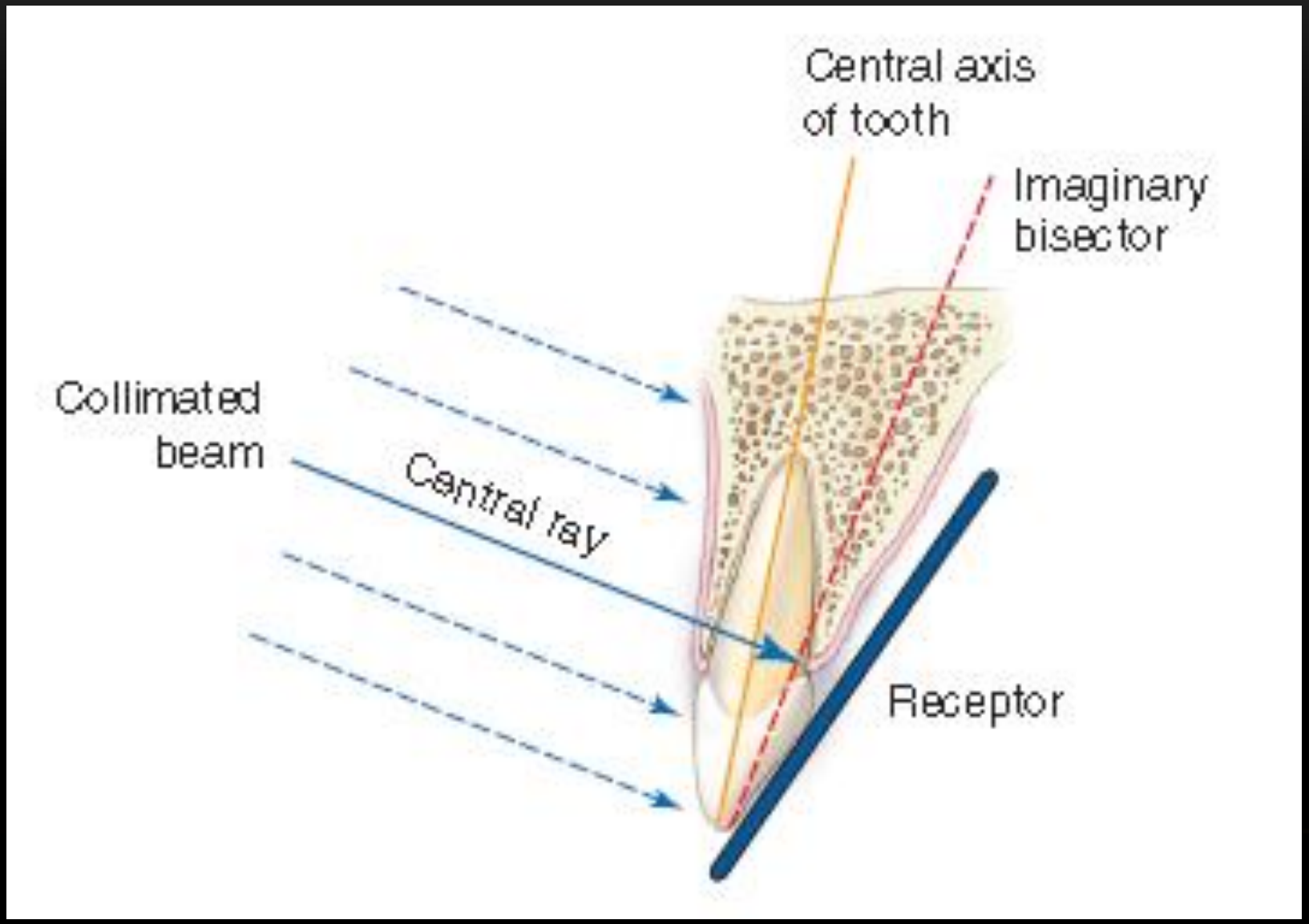
INTRAORAL AND EXTRAORAL PROJECTIONS

Dr. E. Bahrampour

PERIAPICAL IMAGING

1. The bisecting angle technique
2. The paralleling technique

THE BISECTING ANGLE TECHNIQUE



STEPS

- Positioning of the Patient
  - For maxilla: Sagittal plane vertical and the occlusal plane horizontal
  - For mandible: the head is tilted back slightly
- Receptor Placement
- Angulation of the Tube Head
  - Horizontal Angulation → 0 →direct the central ray **through the contacts**
  - Vertical Angulation → varies with the anatomy

TABLE 7-1 Angulation Guidelines for Bisecting-Angle Projections*

Projection	Maxilla	Mandible
Incisors	+40 degrees	−15 degrees
Canines	+45 degrees	−20 degrees
Premolars	+30 degrees	−10 degrees
Molars	+20 degrees	−5 degrees

Note: With a positive (+) angulation, the aiming tube is pointed downward, and with a negative (−) angulation, it is pointed upward.
*When the occlusal plane is oriented parallel with the floor.

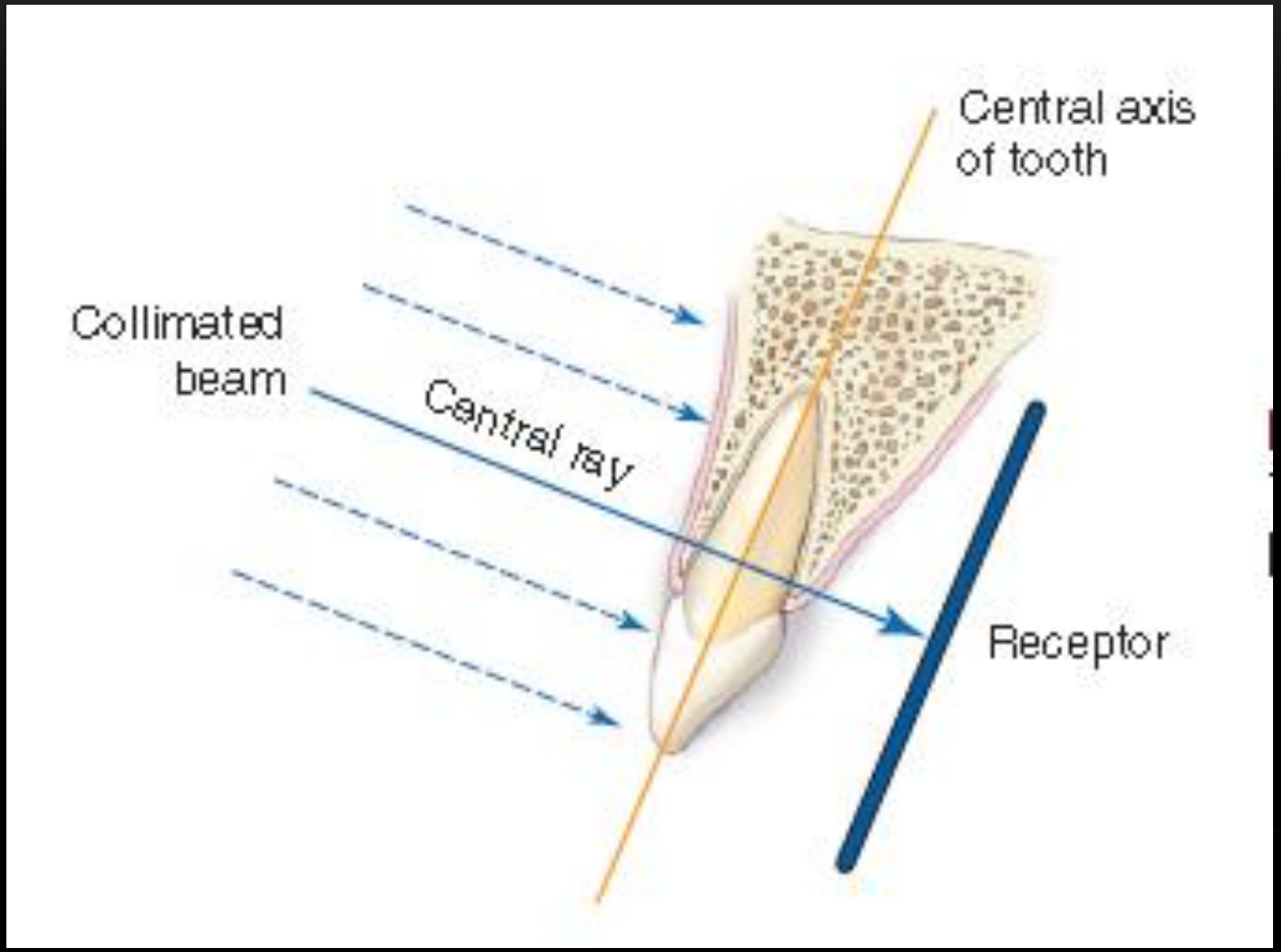
DISADVANTAGES

1. In multirooted tooth
2. Alveolar ridge often projects more coronally than its true position

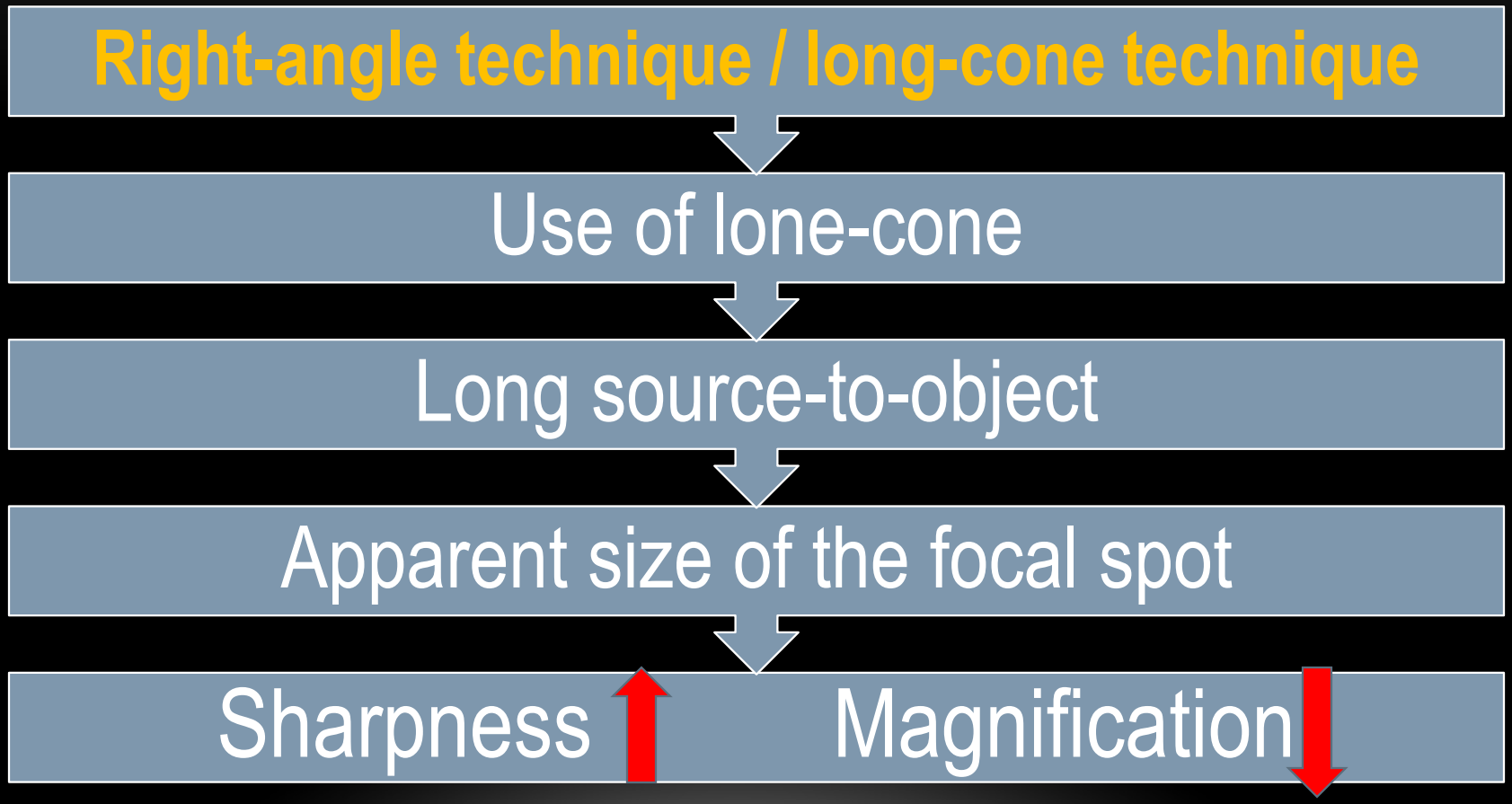
Distortion

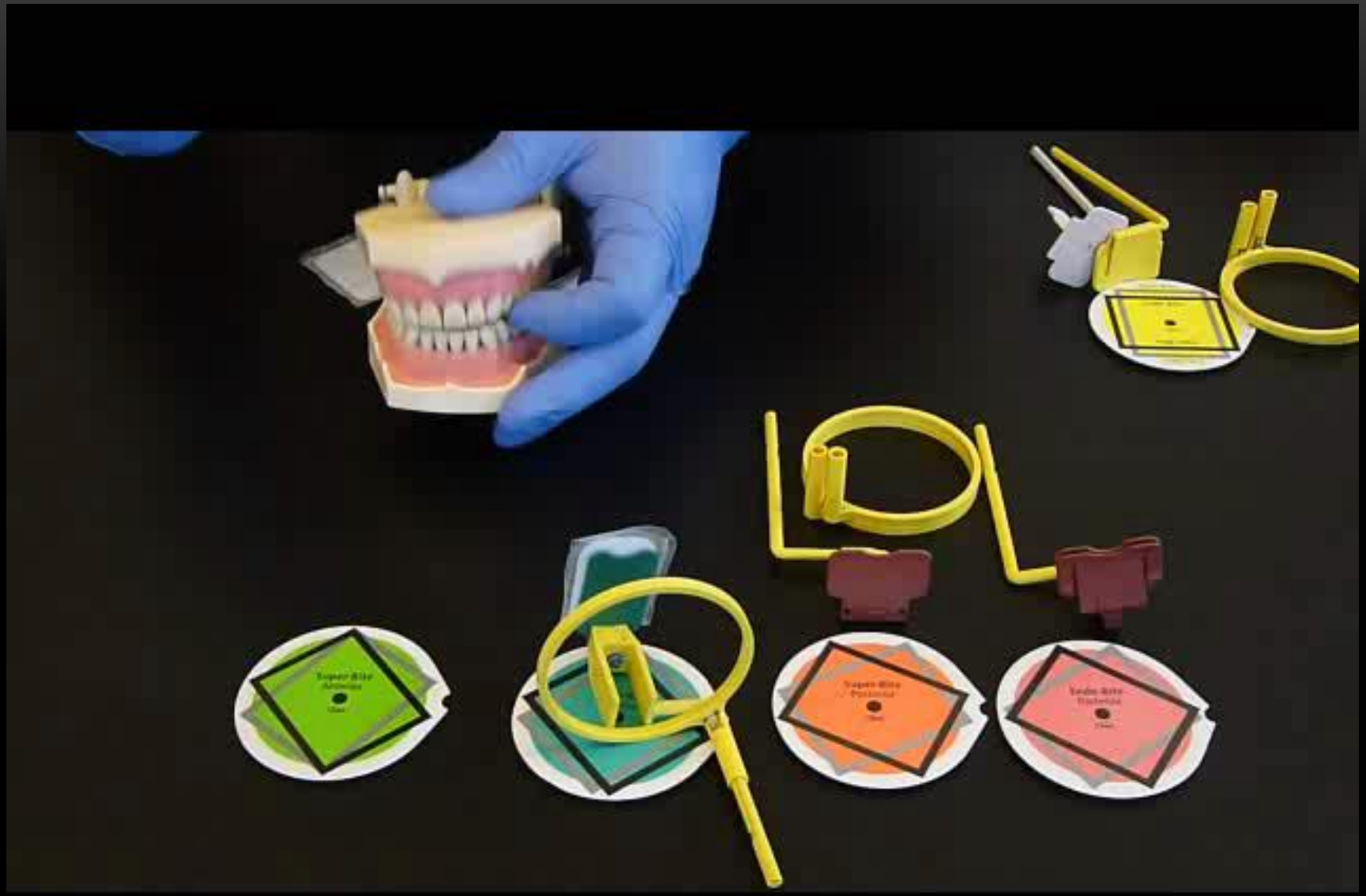
Back

THE PARALLELING TECHNIQUE



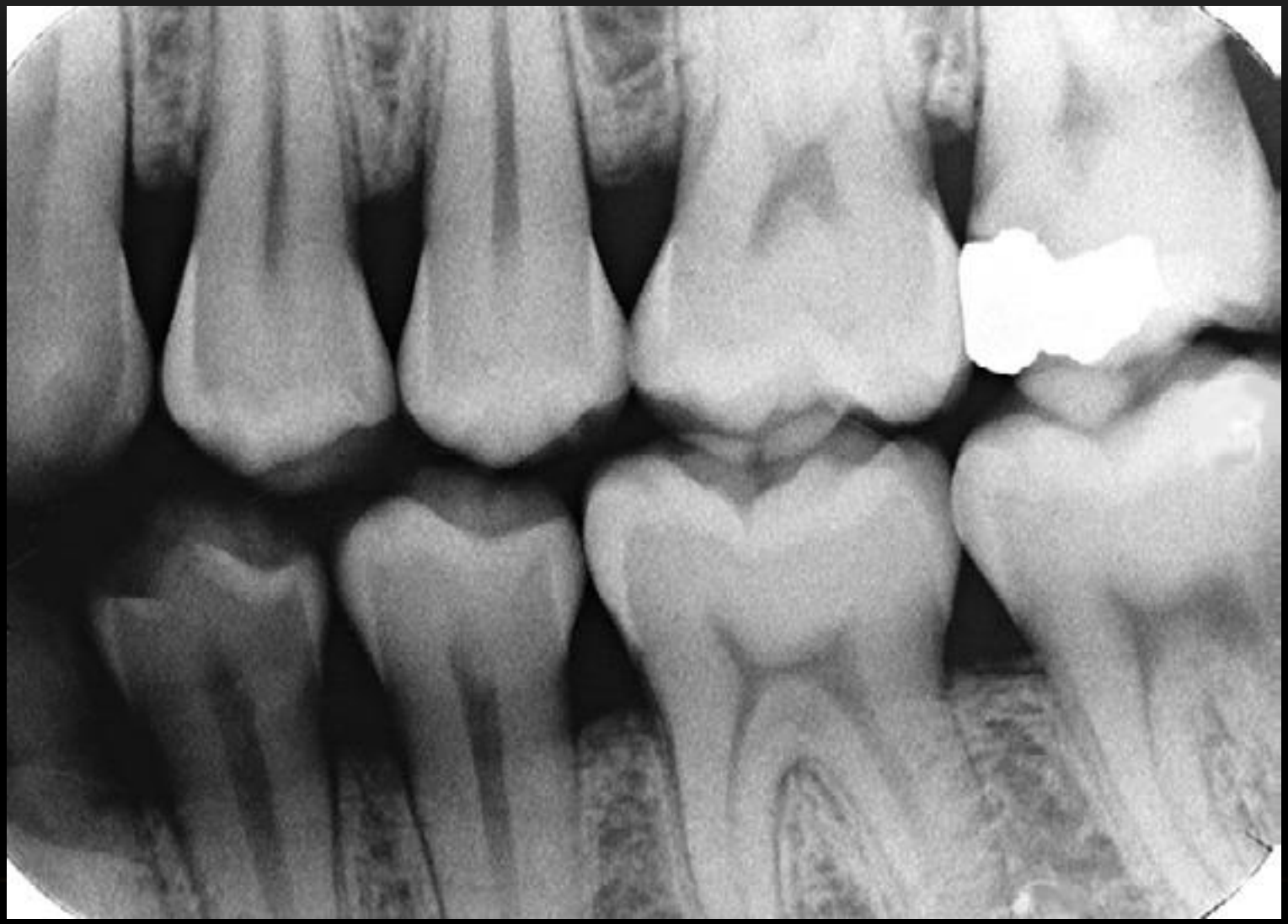
THE PARALLELING TECHNIQUE





BITEWING EXAMINATIONS

- Also called interproximal
- Include the crowns of the maxillary and mandibular teeth and the alveolar crest on the same receptor



BITEWING EXAMINATIONS

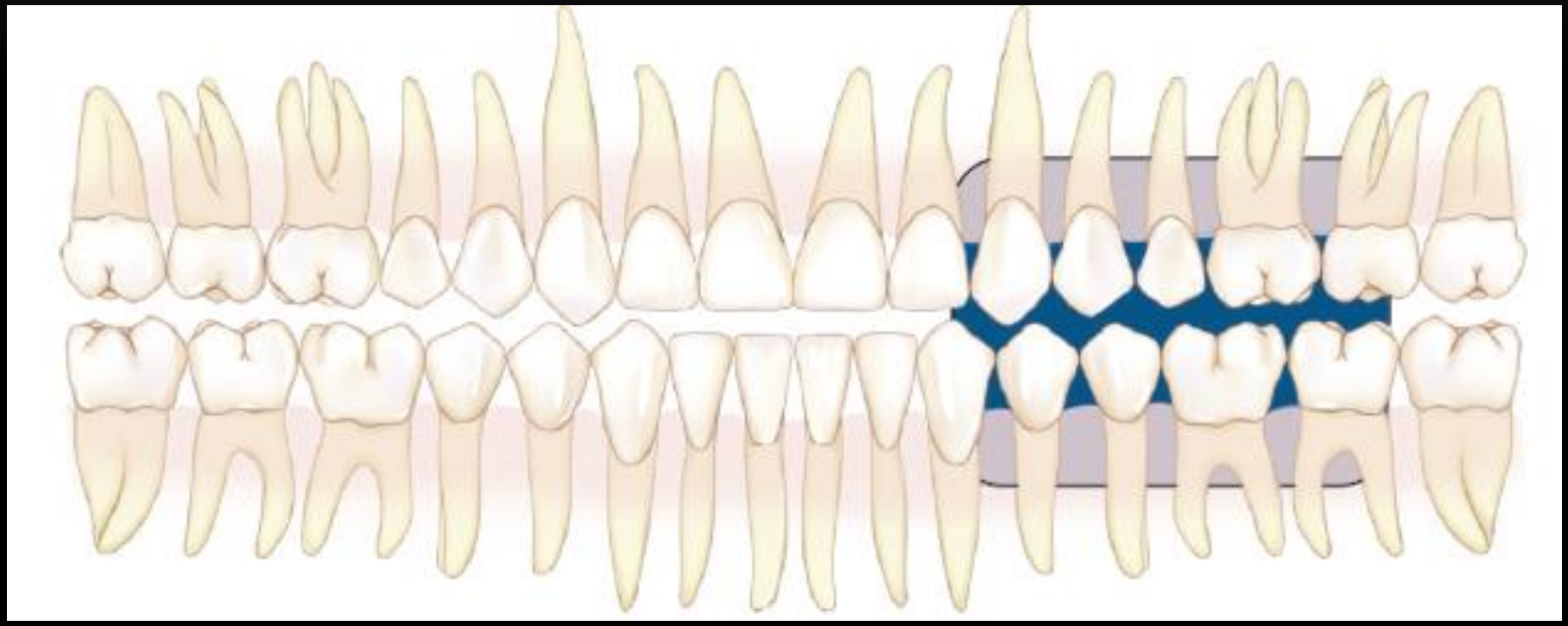
1. Detecting interproximal caries in the early stages of development
2. Secondary caries below restorations that may escape recognition in the periapical views
3. Alveolar bone crest, and changes in bone height
4. Useful for detecting calculus deposits in interproximal areas(reduced exposure)

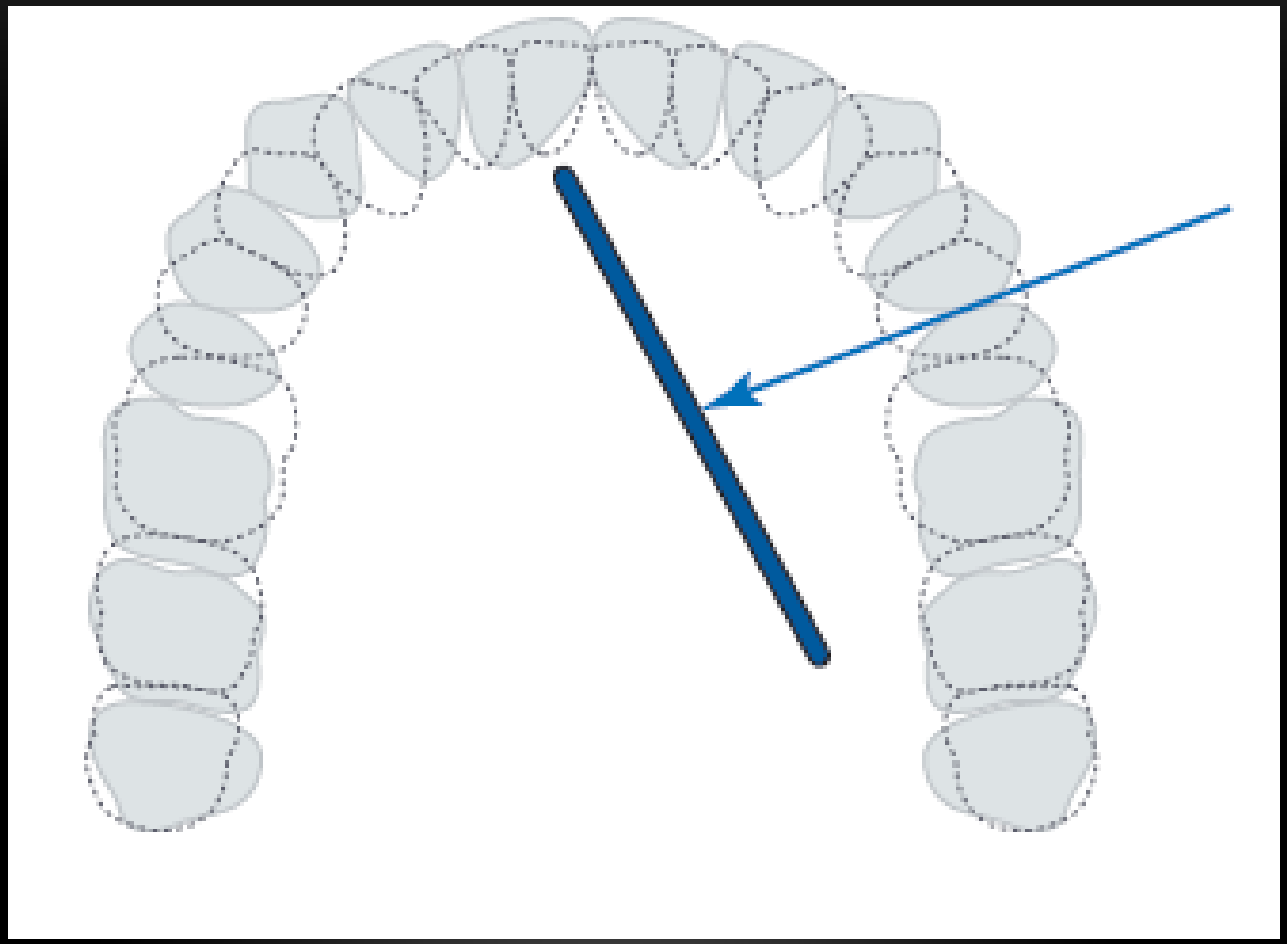
BITEWING EXAMINATIONS

1. ***Horizontal Bitewing Receptors***
   - ***Premolar BW***
   - ***Molar BW***
2. ***Vertical Bitewing Receptors***

HORIZONTAL BITEWING RECEPTORS

- ***Premolar BW***
  - Should include the **distal half of the canines** and the crowns of the premolars
  - **Mandibular canine** is used as the guide for placement of the receptor
  - When the x-ray beam is accurately directed through the **mandibular premolar contacts**, overlapping is minimal or absent in the maxillary premolar segment
  - **+5 degrees** → To compensate for the slight inclination of the receptor against the palatal mucosa
  - central ray will enter the line of occlusion at the point of contact between the **second premolar and the first molar**.

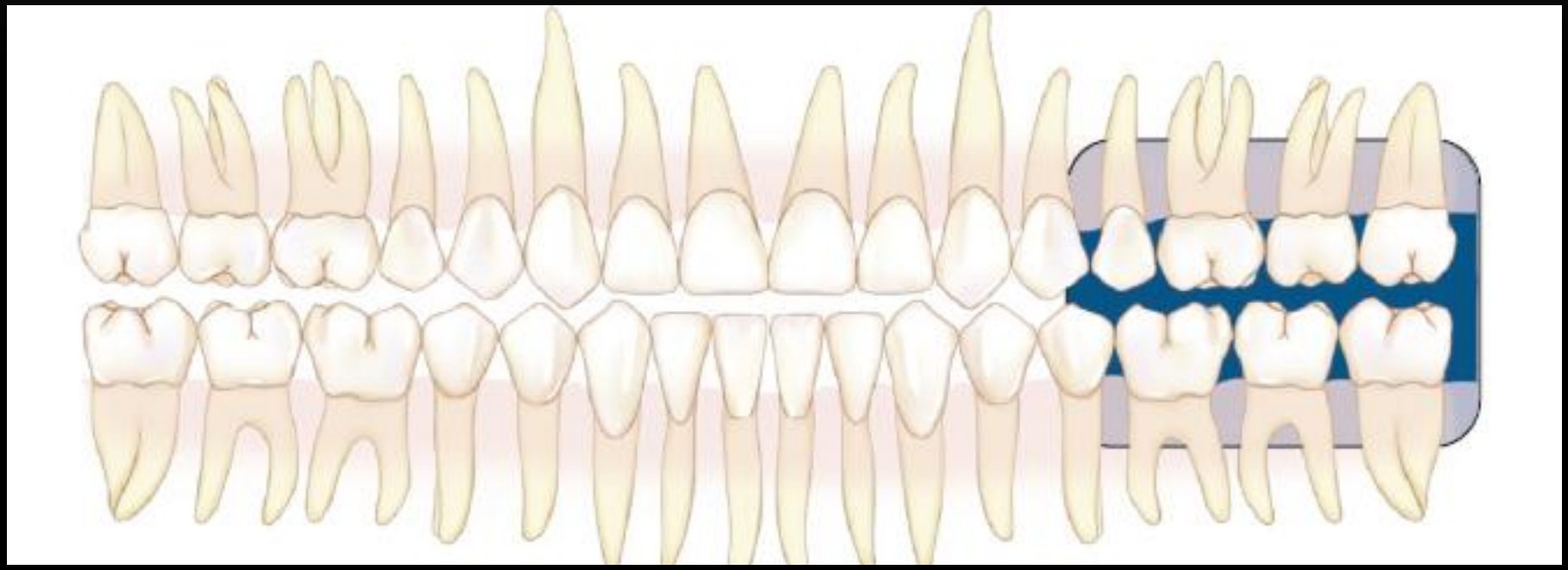


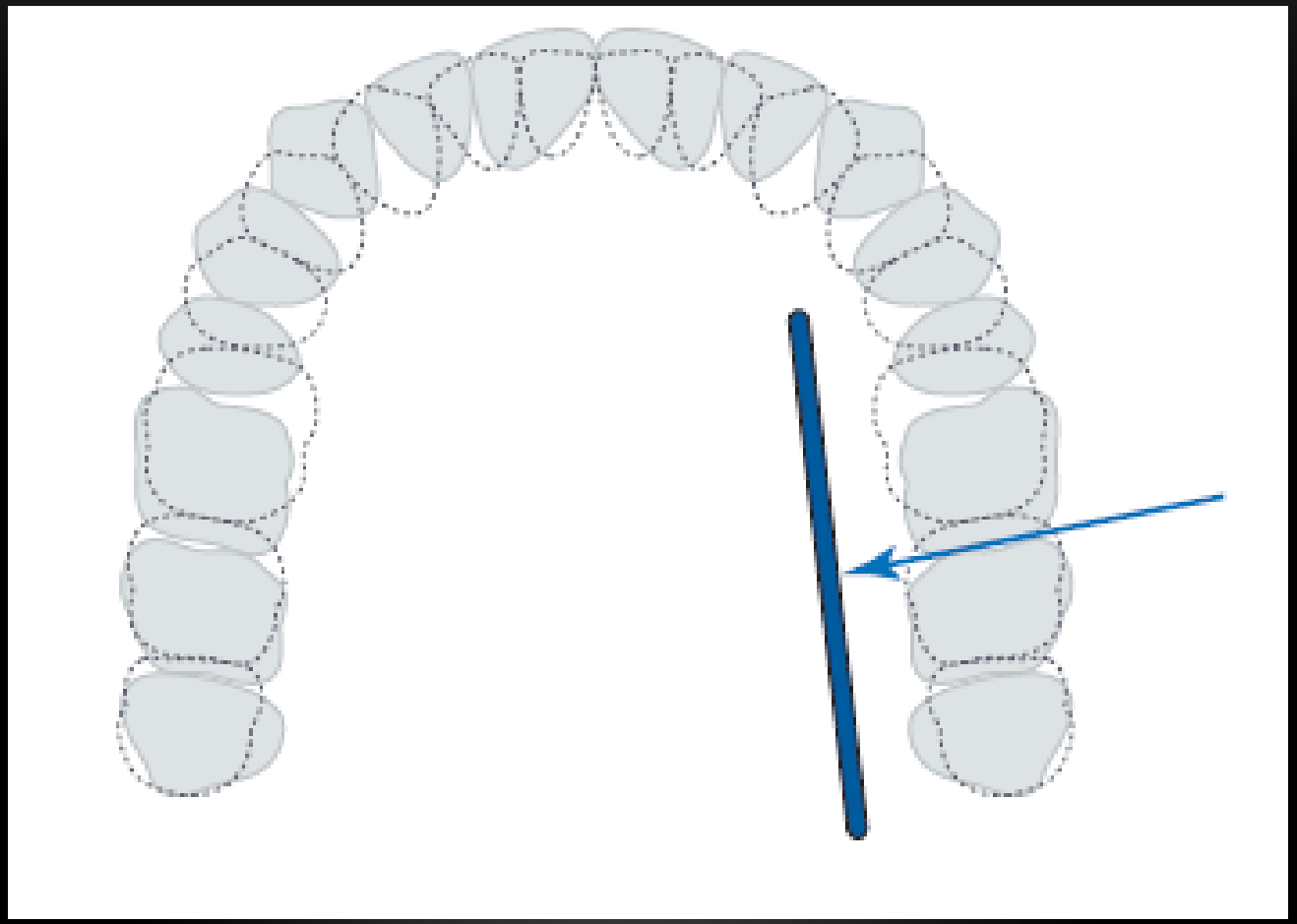


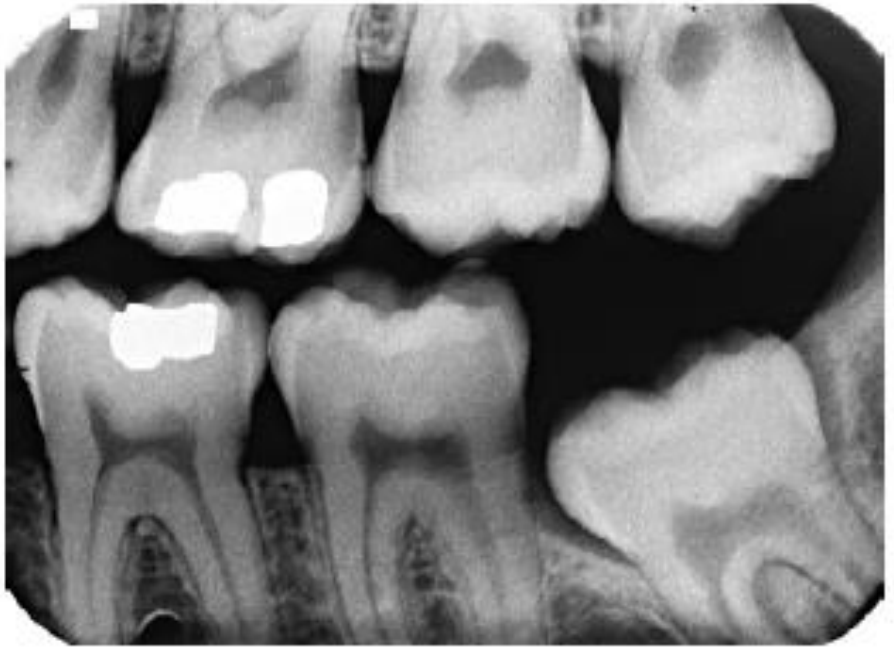
BACK

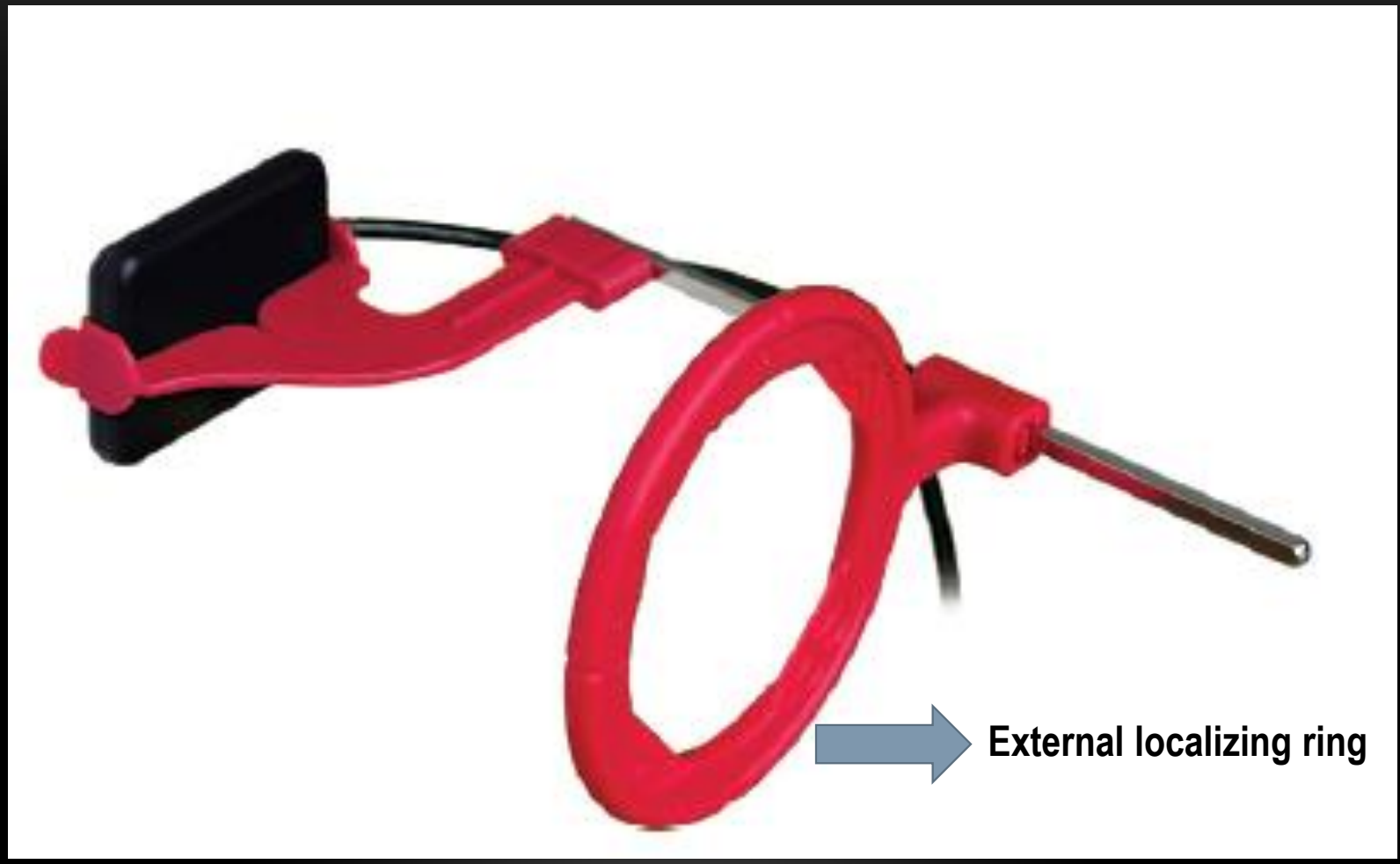
HORIZONTAL BITEWING RECEPTORS

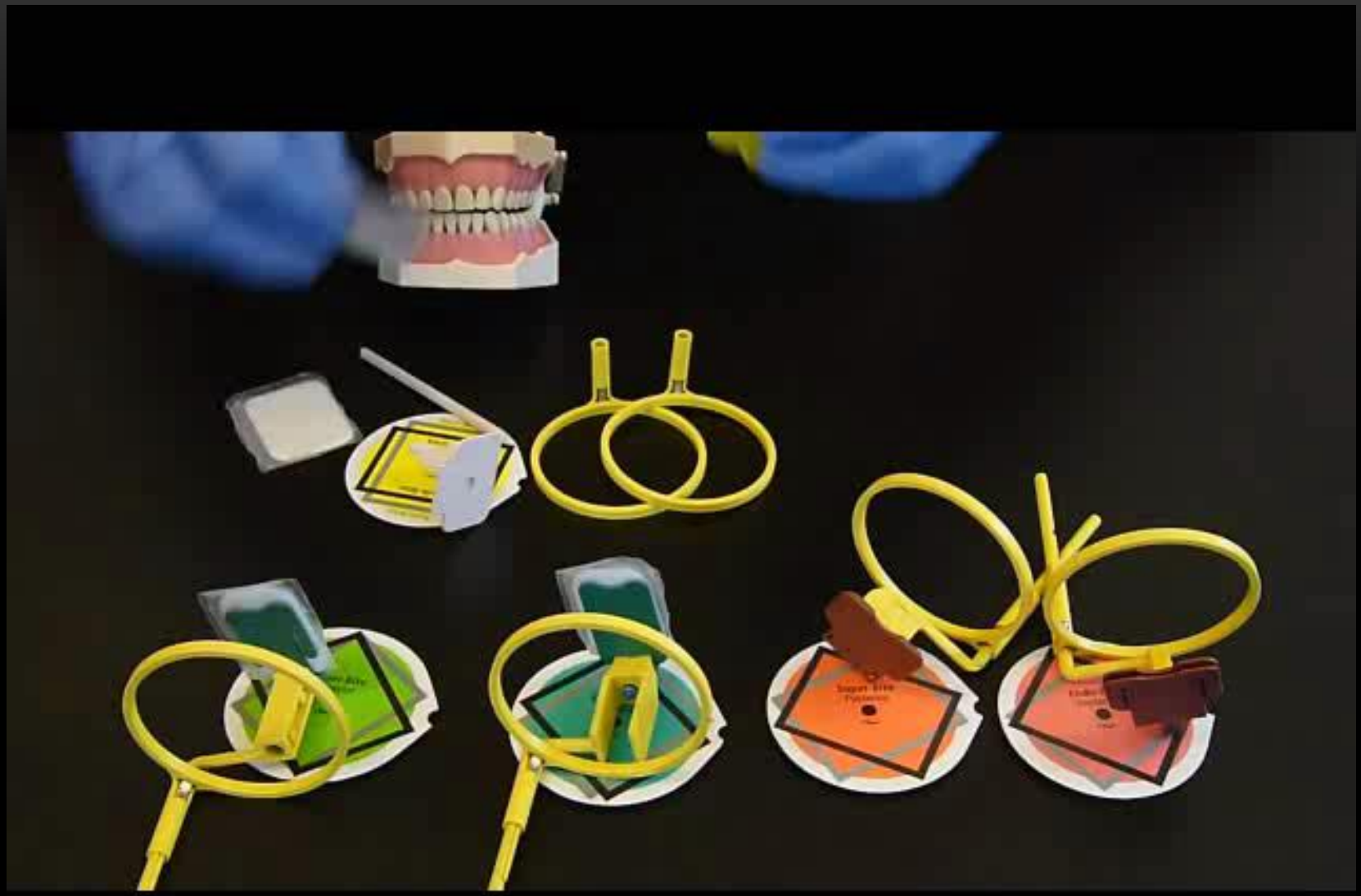
- ***Molar BW***
  - **1 or 2 mm beyond the most distally erupted molar** (maxillary or mandibular).
  - **+10 degrees** → minimizes overlapping of the opposing cusps → improves the probability of detecting early occlusal lesions at the DEJ
  - Because the maxillary and mandibular molar contact areas may not be open from the same horizontal angulation, they may not be visible on one receptor. In this case, **it may be desirable to open the maxillary molar contacts** because the mandibular molar contacts usually are open on the periapical receptors.
  - The central ray should enter **the cheek below the lateral canthus of the eye** at the level of the occlusal plane.



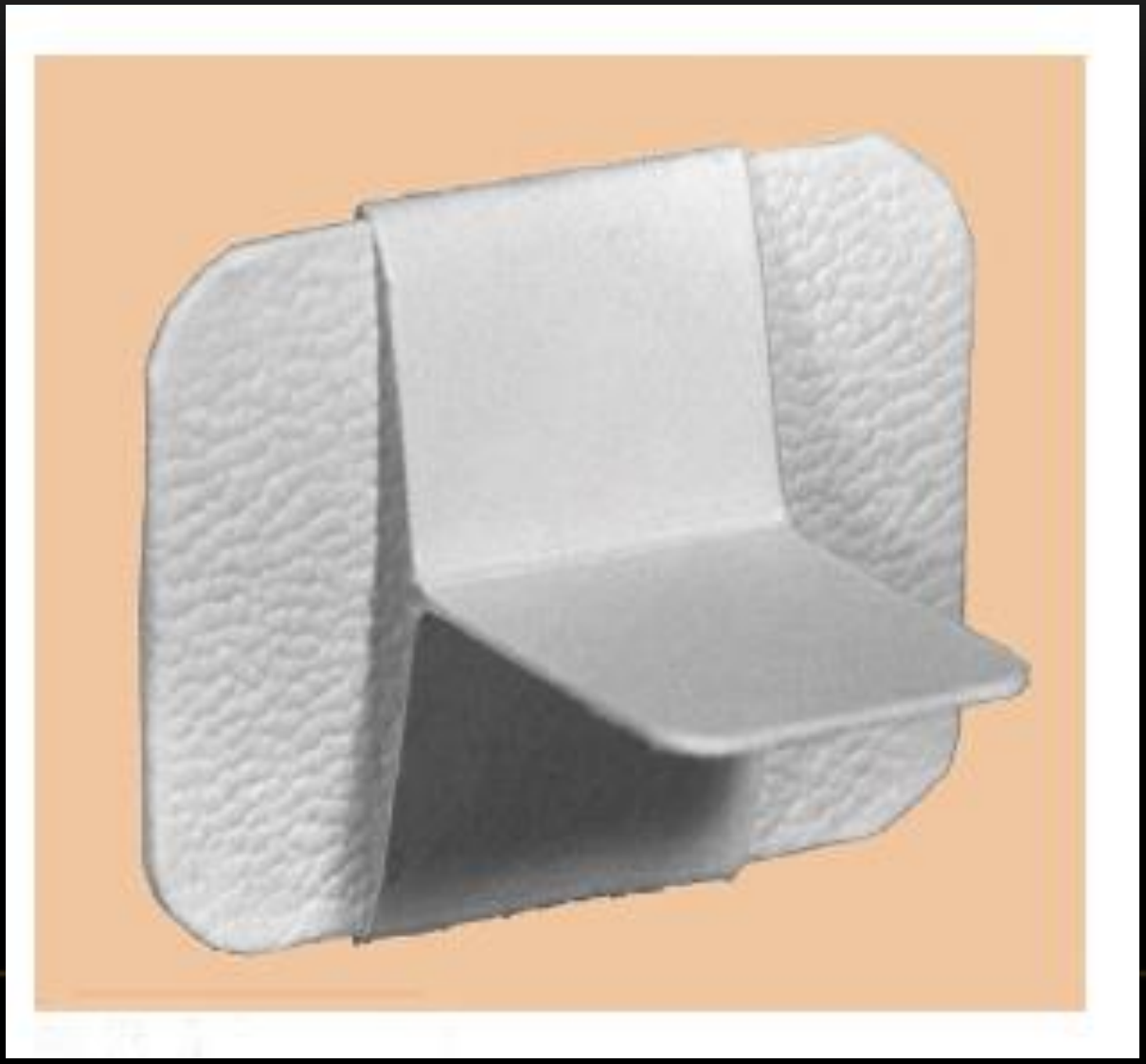





External localizing ring

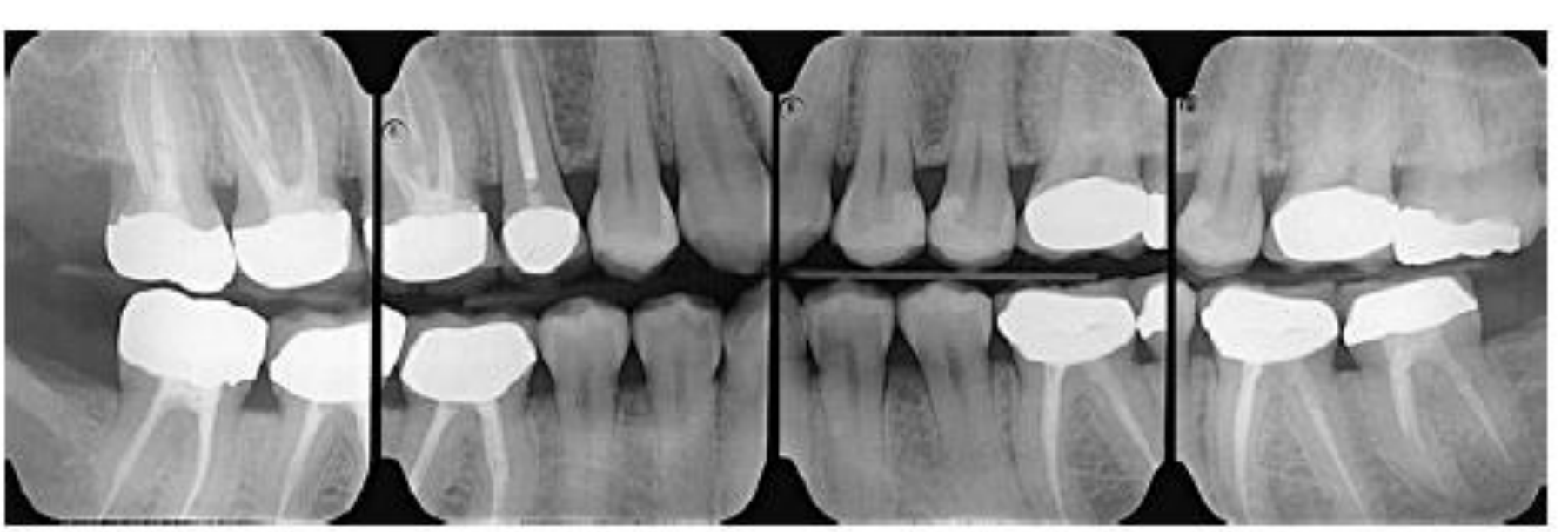


Back



VERTICAL BITEWING RECEPTORS

- Moderate to extensive alveolar bone loss



OCCLUSAL IMAGING

- Large receptor (7.7 cm × 5.8 cm [3 inches × 2.3 inches]) is inserted between the occlusal surfaces of the teeth

OCCLUSAL IMAGING

1. To locate precisely roots and supernumerary, unerupted, and impacted teeth (this technique is especially useful for impacted canines and third molars)
2. To localize foreign bodies in the jaws and stones in the ducts of sublingual and submandibular glands
3. To demonstrate and evaluate the integrity of the anterior, medial, and lateral outlines of the maxillary sinus

OCCLUSAL IMAGING

4. To aid in the examination of patients with trismus, who can open their mouths only a few millimeters
5. To obtain information about the location, nature, extent, and displacement of fractures of the mandible and maxilla
6. To determine the medial and lateral extent of disease (e.g., cysts, osteomyelitis, malignancies) and to detect disease in the palate or floor of the mouth

OCCLUSAL IMAGING

- **Maxilla:**

1. ANTERIOR MAXILLARY OCCLUSAL PROJECTION
2. TOPOGRAPHICAL MAXILLARY OCCLUSAL PROJECTION
3. LATERAL MAXILLARY OCCLUSAL PROJECTION

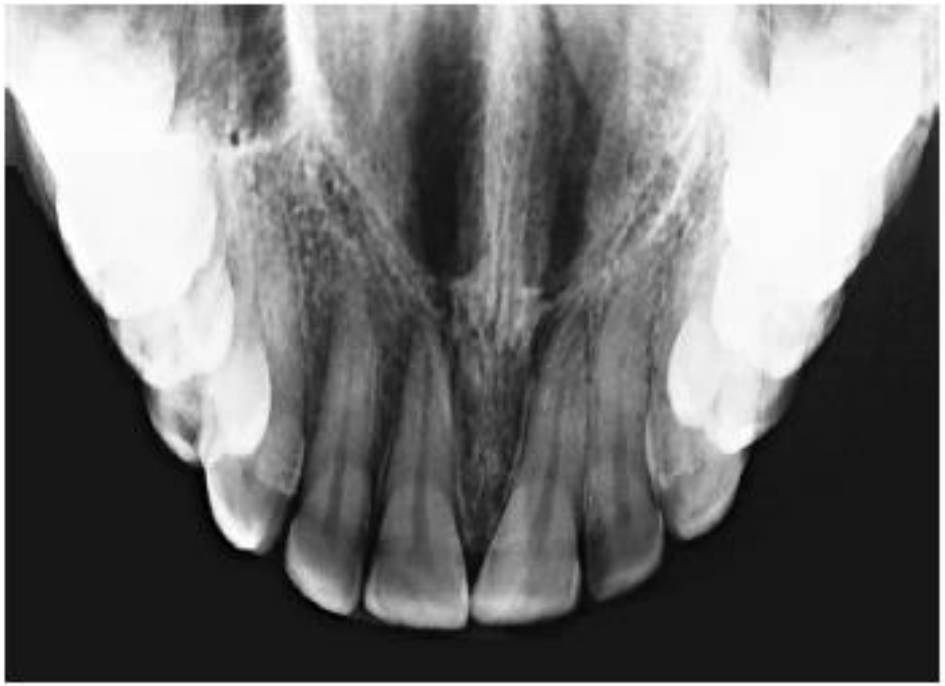
- **Mandible:**

1. ANTERIOR MANDIBULAR OCCLUSAL PROJECTION
2. TOPOGRAPHICAL MANDIBULAR OCCLUSAL PROJECTION
3. LATERAL MANDIBULAR OCCLUSAL PROJECTION

ANTERIOR MAXILLARY OCCLUSAL PROJECTION

- The primary field of this projection includes the anterior maxilla and its dentition and the anterior floor of the nasal fossa and teeth from canine to canine.

BACK



Receptor Placement. Adjust the patient's head so that the sagittal plane is perpendicular and the occlusal plane is horizontal to the floor. Place the receptor in the mouth with the exposure side toward the maxilla, the posterior border touching the rami, and the long dimension of the receptor perpendicular to the sagittal plane. The patient stabilizes the receptor by gently closing the mouth or using gentle bilateral thumb pressure.

Projection of Central Ray. Orient the central ray through the tip of the nose toward the middle of the receptor with approximately +45 degrees vertical angulation and 0 degrees horizontal angulation.

Point of Entry. The central ray enters the patient's face approximately through the tip of the nose.

TOPOGRAPHICAL MAXILLARY OCCLUSAL PROJECTION

- This projection shows the palate, zygomatic processes of the maxilla, anteroinferior aspects of each antrum, nasolacrimal canals, teeth from second molar to second molar, and nasal septum.

BACK

Receptor Placement. Seat the patient upright with the sagittal plane perpendicular to the floor and the occlusal plane horizontal. Place the receptor, with its long dimension perpendicular to the sagittal plane, crosswise in the mouth. Gently push the receptor in backward until it contacts the anterior border of the mandibular rami. The patient stabilizes the receptor by gently closing the mouth.

Projection of Central Ray. Direct the central ray at a vertical angulation of +65 degrees and a horizontal angulation of 0 degrees to the bridge of the nose just below the nasion, toward the middle of the receptor.

Point of Entry. Generally, the central ray enters the patient's face through the bridge of the nose.

LATERAL MAXILLARY OCCLUSAL PROJECTION

- This projection shows a quadrant of the alveolar ridge of the maxilla, inferolateral aspect of the antrum, tuberosity, and teeth from the lateral incisor to the contralateral third molar. In addition, the zygomatic process of the maxilla superimposes over the roots of the molar teeth.

BACK

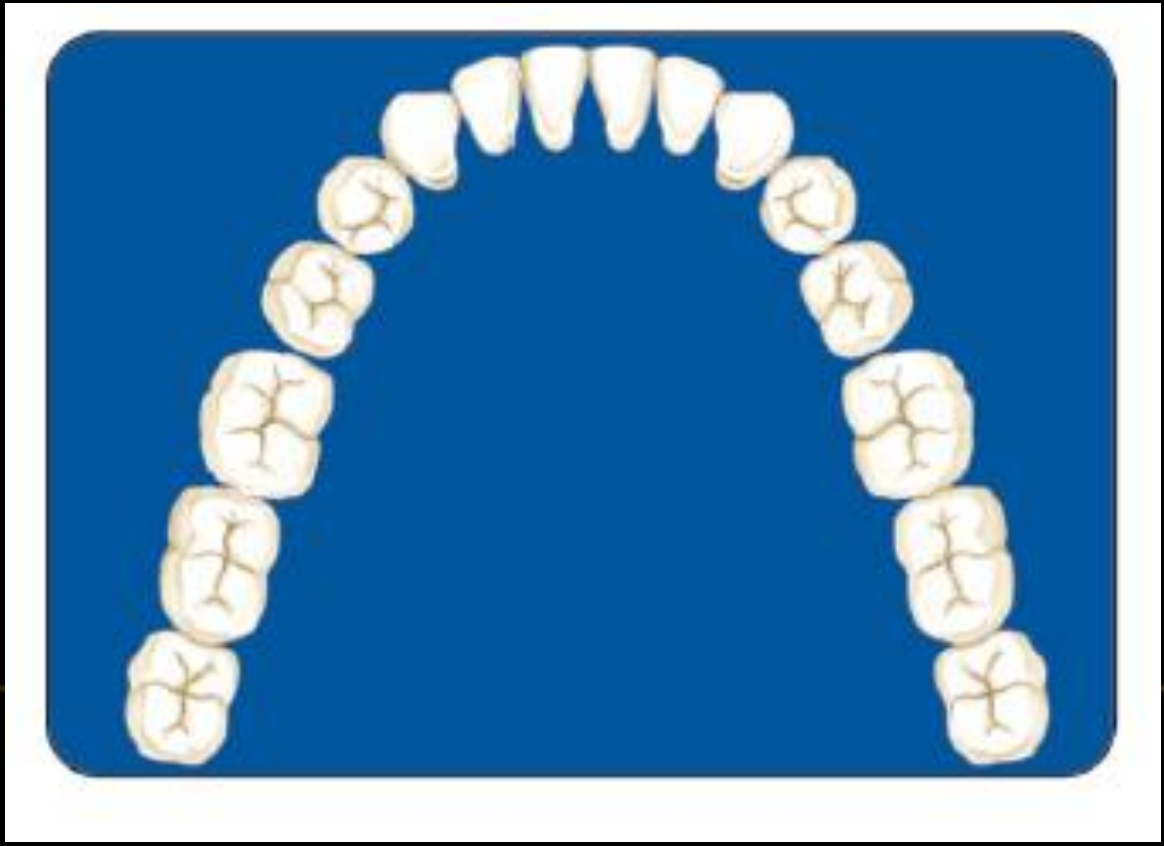
Receptor Placement. Place the receptor with its long axis parallel to the sagittal plane and on the side of interest, with the tube side toward the side of the maxilla in question. Push the receptor posteriorly until it touches the ramus. Position the lateral border parallel with the buccal surfaces of the posterior teeth, extending laterally approximately 1 cm past the buccal cusps. Ask the patient to close gently to hold the receptor in position.

Projection of Central Ray. Orient the central ray with a vertical angulation of +60 degrees, to a point 2 cm below the lateral canthus of the eye, directed toward the center of the receptor.

Point of Entry. The central ray enters at a point approximately 2 cm below the lateral canthus of the eye.

ANTERIOR MANDIBULAR OCCLUSAL PROJECTION

- This projection includes the anterior portion of the mandible, the dentition from canine to canine, and the inferior cortical border of the mandible.



BACK

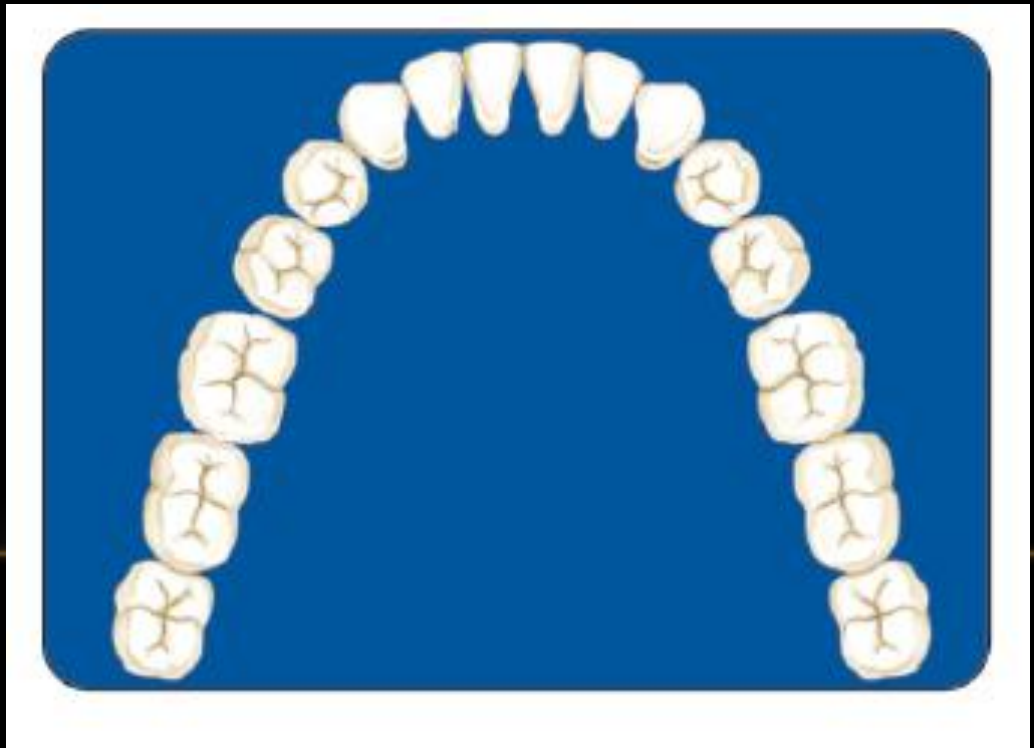
Receptor Placement. Seat the patient tilted back so that the occlusal plane is 45 degrees above horizontal. Place the receptor in the mouth with the long axis perpendicular to the sagittal plane and push it posteriorly until it touches the rami. Center the receptor with the pebbled side (tube side) down, and ask the patient to bite lightly to hold the receptor in position.

Projection of Central Ray. Orient the central ray with –10 degrees angulation through the point of the chin toward the middle of the receptor; this gives the ray –55 degrees of angulation to the plane of the receptor.

Point of Entry. The point of entry of the central ray is in the midline and through the tip of the chin.

TOPOGRAPHICAL MANDIBULAR OCCLUSAL PROJECTION

- This projection includes the soft tissue of the floor of the mouth and reveals the lingual and buccal plates of the mandible from second molar to second molar. When this view is made to examine the floor of the mouth (e.g., for sialoliths), the exposure time should be reduced to half the time used to create an image of the mandible.



BACK

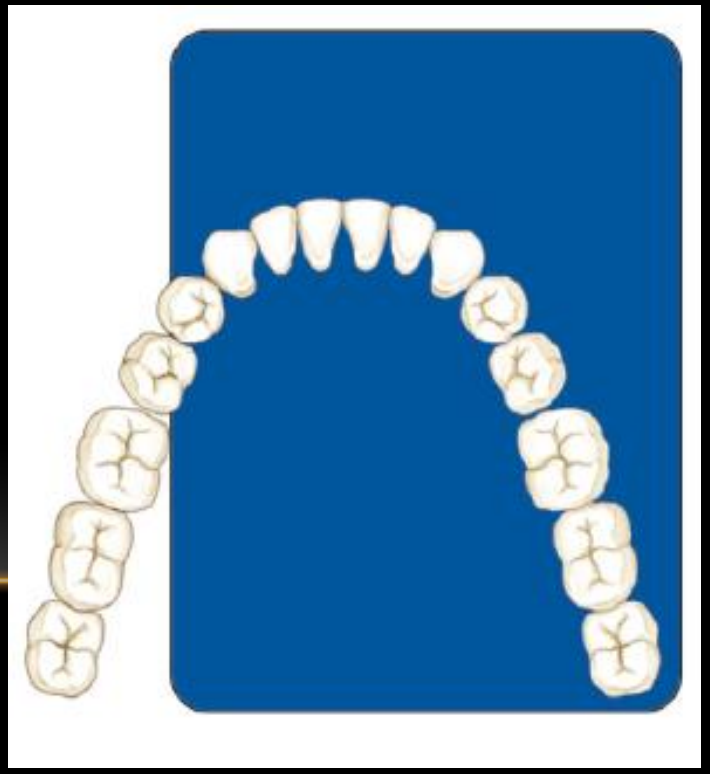
Receptor Placement. Seat the patient in a semireclining position with the head tilted back so that the ala-tragus line is almost perpendicular to the floor. Place the receptor in the mouth with its long axis perpendicular to the sagittal plane and with the tube side toward the mandible. The anterior border of the receptor should be approximately 1 cm beyond the mandibular central incisors. Ask the patient to bite gently on the receptor to hold it in position.

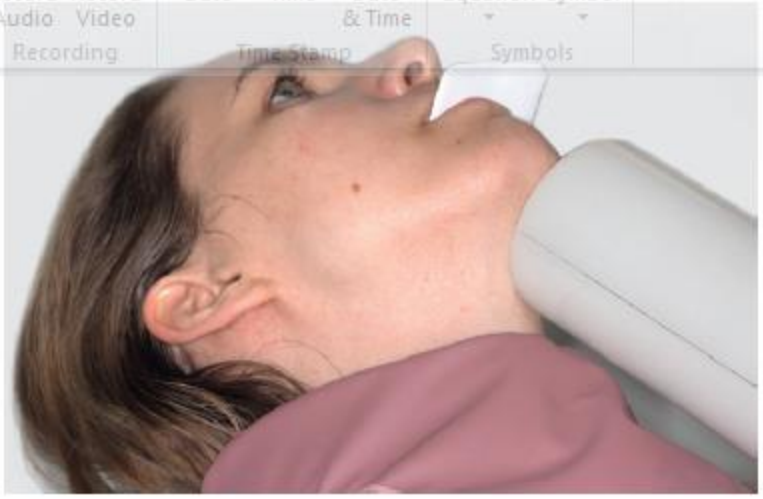
Projection of Central Ray. Direct the central ray at the midline through the floor of the mouth approximately 3 cm below the chin, at right angles to the center of the receptor.

Point of Entry. The point of entry of the central ray is in the midline through the floor of the mouth approximately 3 cm below the chin.

LATERAL MANDIBULAR OCCLUSAL PROJECTION

- This projection covers the soft tissue of half the floor of the mouth, the buccal and lingual cortical plates of half of the mandible, and the teeth from the lateral incisor to the contralateral third molar. When this view is used to provide an image of the floor of the mouth, the exposure time should be reduced to half that used to provide an image of the mandible.





Receptor Placement. Seat the patient in a semireclining position with the head tilted back so that the ala-tragus line is almost perpendicular to the floor. Place the receptor in the mouth with its long axis initially parallel with the sagittal plane and with the pebbled side down toward the mandible. Place the receptor as far posterior as possible, then shift the long axis buccally (right or left) so that the lateral border of the receptor is parallel with the buccal surfaces of the posterior teeth and extends laterally approximately 1 cm.

Projection of Central Ray. Direct the central ray perpendicular to the center of the receptor through a point beneath the chin, approximately 3 cm posterior to the point of the chin and 3 cm lateral to the midline.

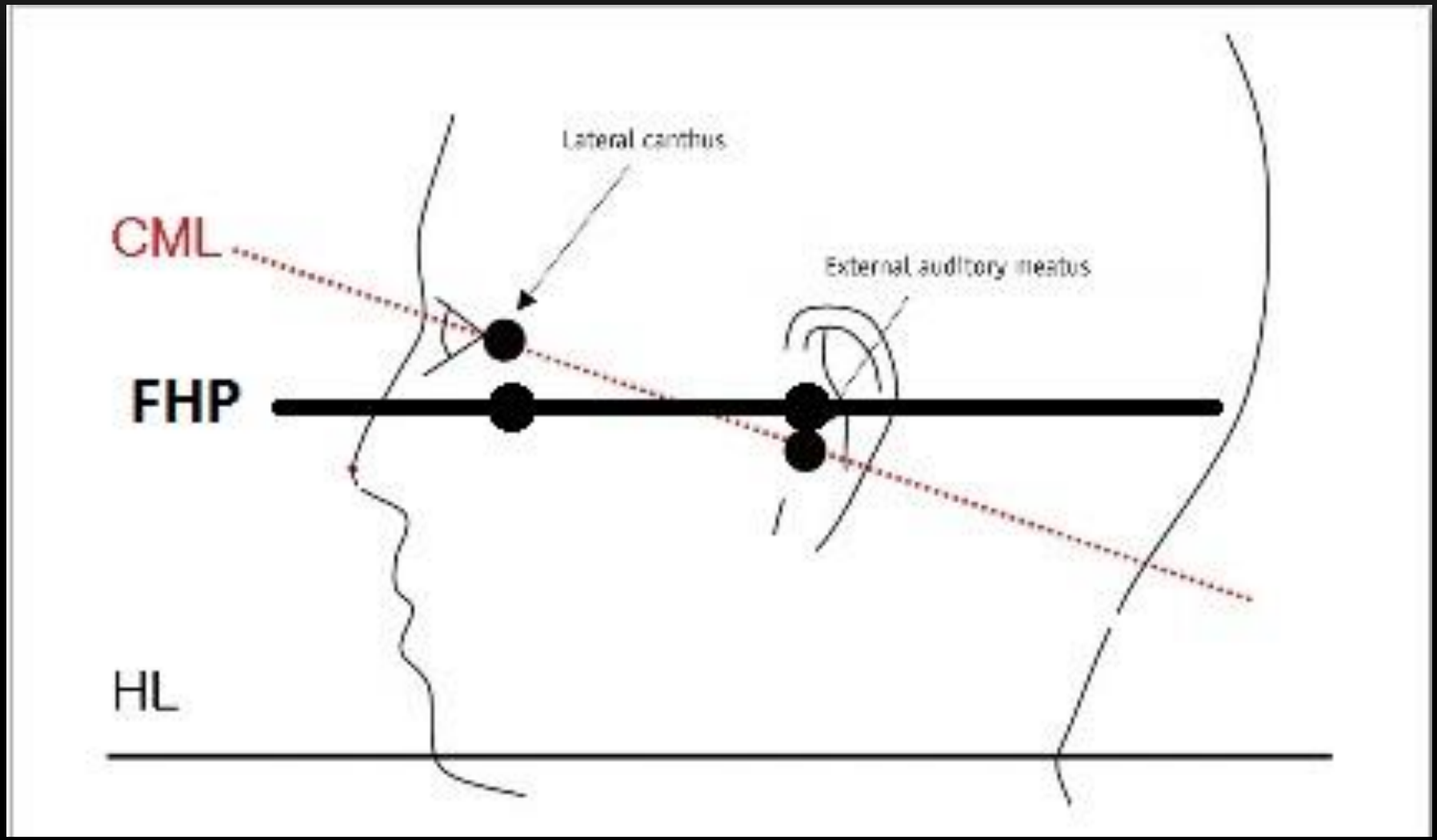
Point of Entry. The point of entry of the central ray is beneath the chin, approximately 3 cm posterior to the chin and approximately 3 cm lateral to the midline.

Extraoral Projections

T

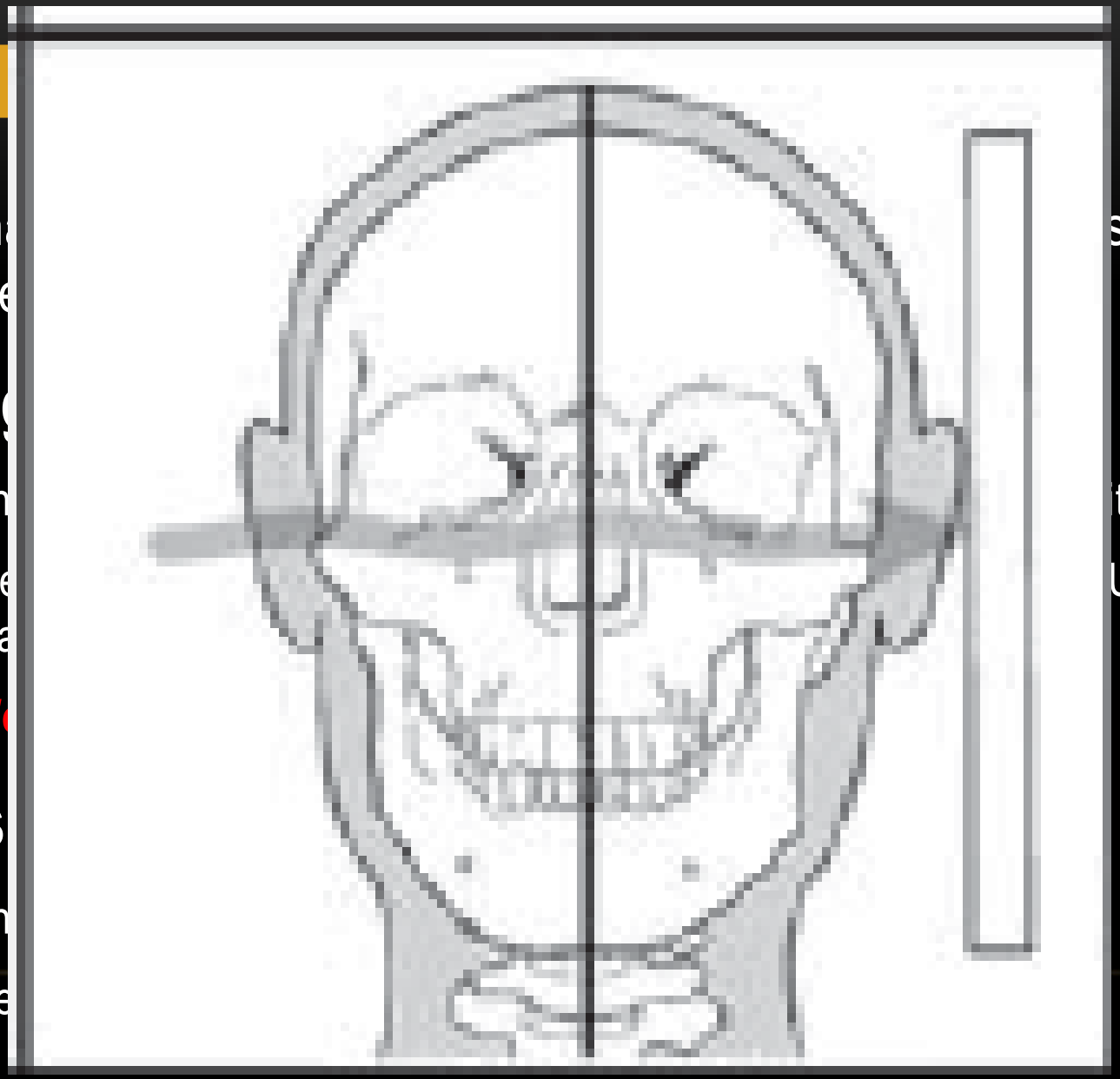
1. LA
   CE
2. SU
3. W
4. PO
   (P
5. RE
6. MA
   -
   -

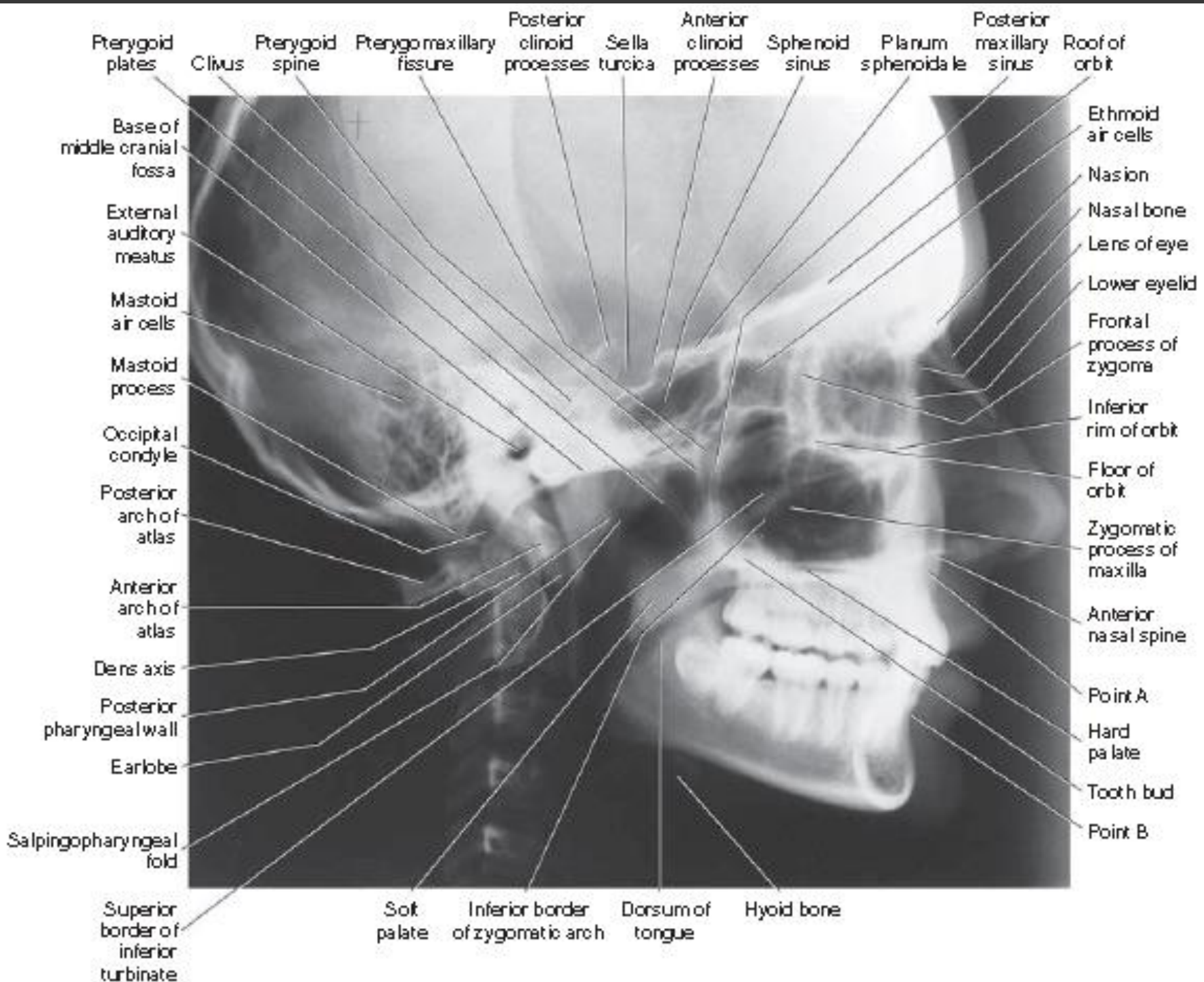
TERMINOLOGY

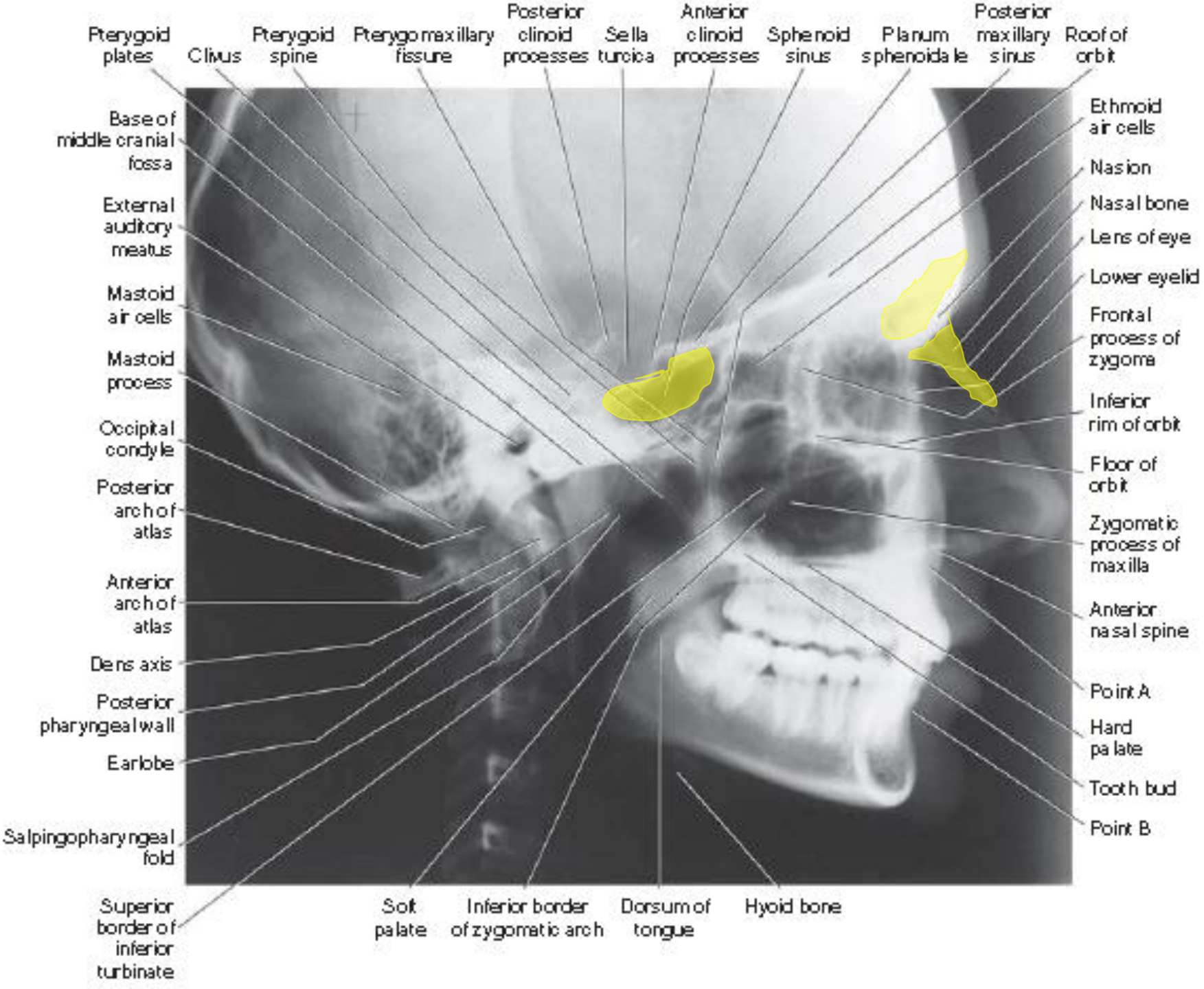


LATI

- Ceph s of the he
- **Imag**
  - Th ttal
  - the U.S. sta
  - W
- **Pos**
  - Th
  - Ce




Pterygoid plates
Clivus
Pterygoid spine
Pterygomaxillary fissure
Posterior clinoid processes
Sella turcica
Anterior clinoid processes
Sphenoid sinus
Planum sphenoidale
Posterior maxillary sinus
Roof of orbit
Base of middle cranial fossa
External auditory meatus
Mastoid air cells
Mastoid process
Occipital condyle
Posterior arch of atlas
Anterior arch of atlas
Dens axis
Posterior pharyngeal wall
Earlobe
Salpingopharyngeal fold
Superior border of inferior turbinate
Soft palate
Inferior border of zygomatic arch
Dorsum of tongue
Hyoid bone
Ethmoid air cells
Nasion
Nasal bone
Lens of eye
Lower eyelid
Frontal process of zygoma
Inferior rim of orbit
Floor of orbit
Zygomatic process of maxilla
Anterior nasal spine
Point A
Hard palate
Tooth bud
Point B


Pterygoid plates
Clivus
Pterygoid spine
Pterygomaxillary fissure
Posterior clinoid processes
Sella turcica
Anterior clinoid processes
Sphenoid sinus
Planum sphenoidale
Posterior maxillary sinus
Roof of orbit
Base of middle cranial fossa
External auditory meatus
Mastoid air cells
Mastoid process
Occipital condyle
Posterior arch of atlas
Anterior arch of atlas
Dens axis
Posterior pharyngeal wall
Earlobe
Salpingopharyngeal fold
Superior border of inferior turbinate
Soft palate
Inferior border of zygomatic arch
Dorsum of tongue
Hyoid bone
Ethmoid air cells
Nasion
Nasal bone
Lens of eye
Lower eyelid
Frontal process of zygoma
Inferior rim of orbit
Floor of orbit
Zygomatic process of maxilla
Anterior nasal spine
Point A
Hard palate
Tooth bud
Point B

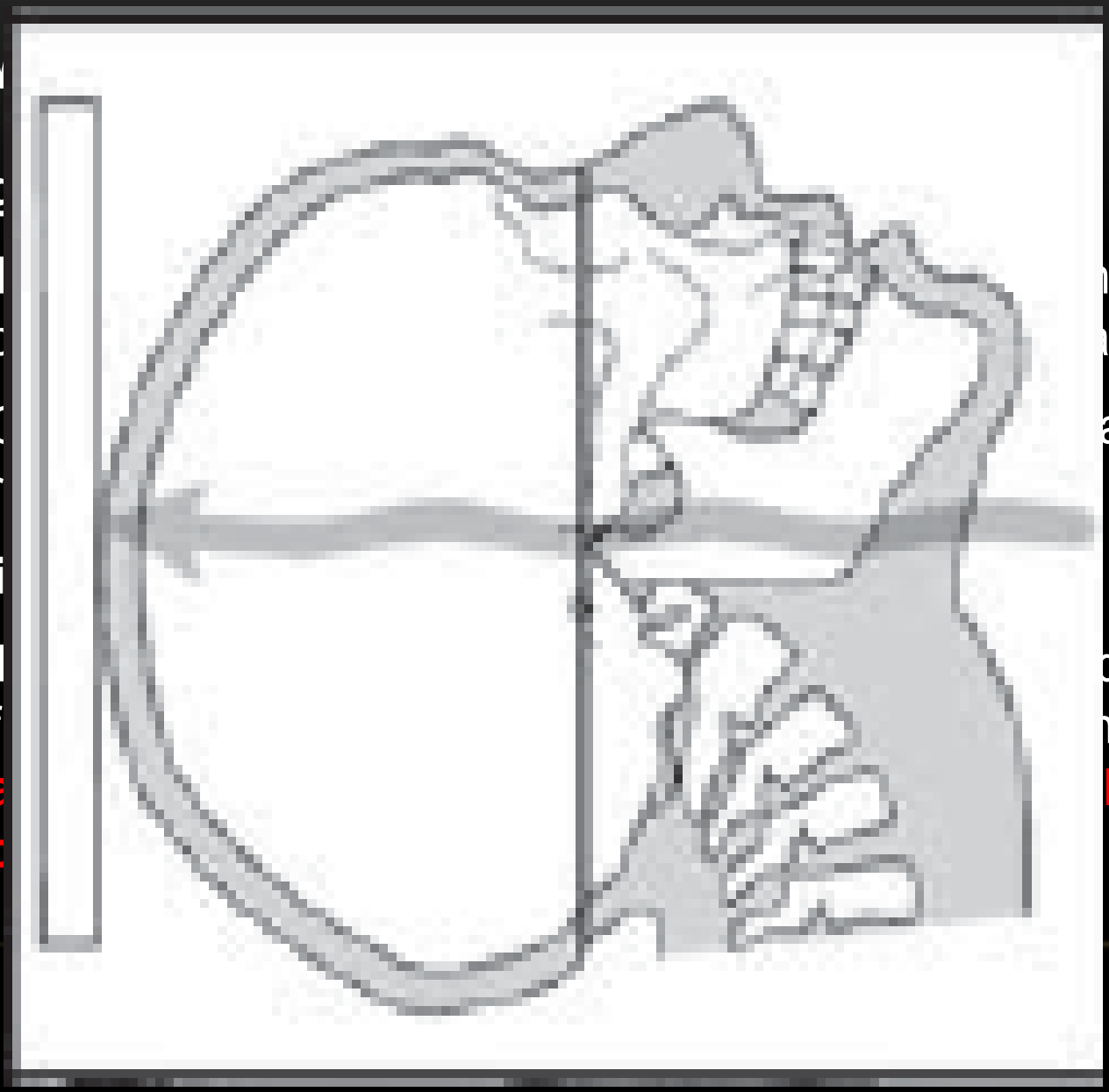
LATERAL CEPHALOMETRY

- Nasal bone
- Frontal sinus
- Sphenoidal sinus

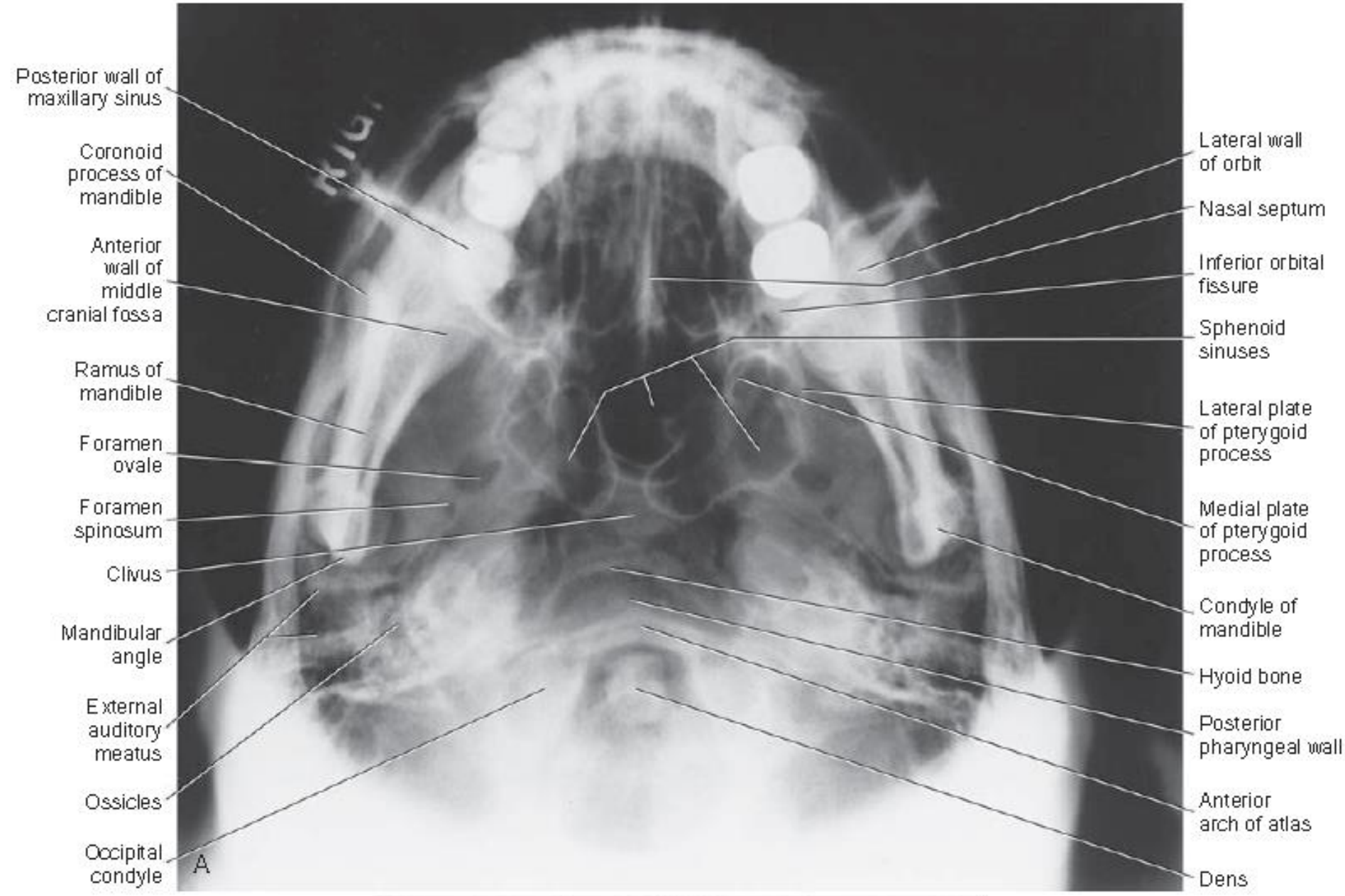
Back to the types

SUBM

- **Imag**
  - T
    p
  - C
    r
- **Posi**
  - T
    f
    a
    c



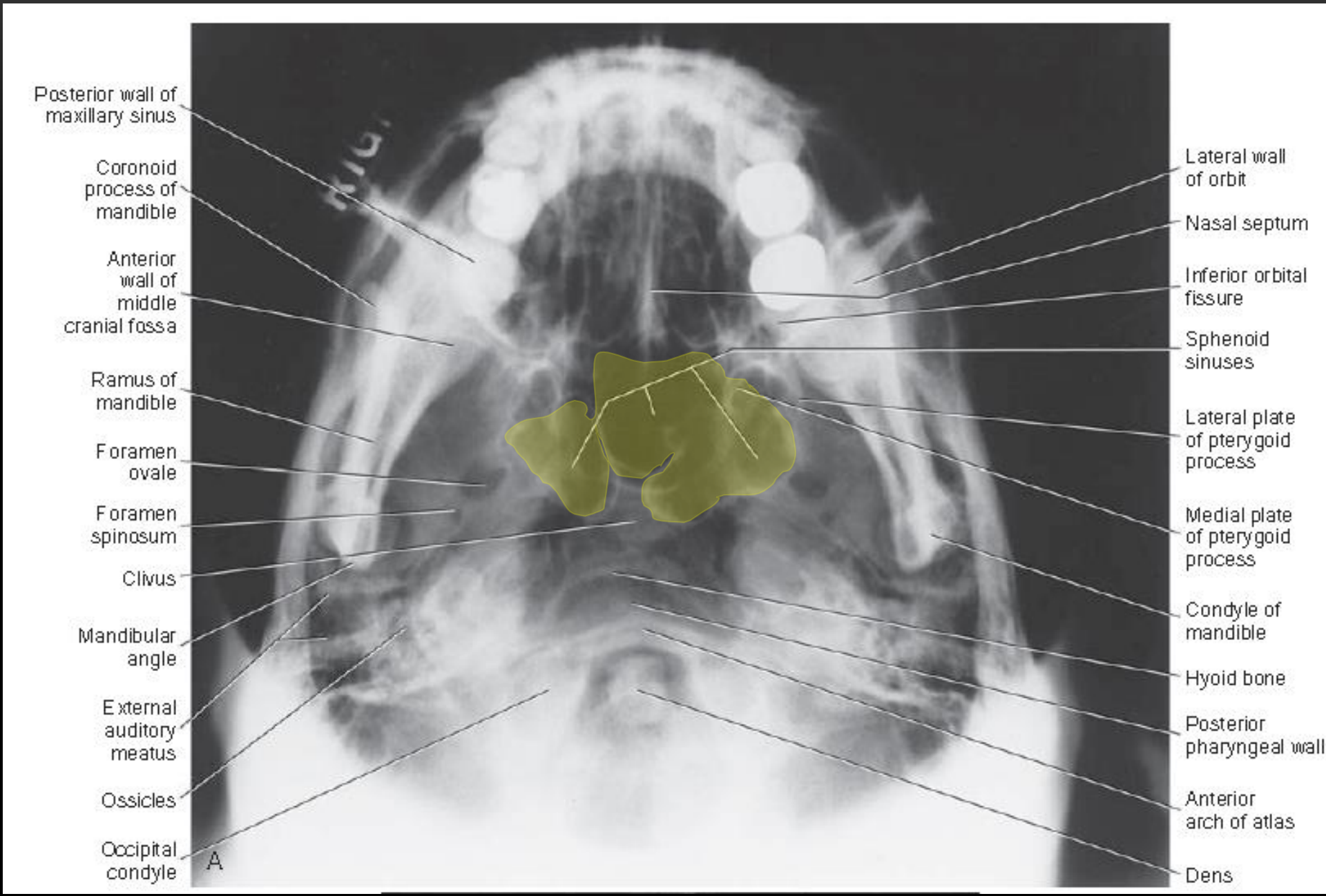
nsverse
nes
age
directed
ntered
left


Posterior wall of maxillary sinus
Coronoid process of mandible
Anterior wall of middle cranial fossa
Ramus of mandible
Foramen ovale
Foramen spinosum
Clivus
Mandibular angle
External auditory meatus
Ossicles
Occipital condyle
A
Lateral wall of orbit
Nasal septum
Inferior orbital fissure
Sphenoid sinuses
Lateral plate of pterygoid process
Medial plate of pterygoid process
Condyle of mandible
Hyoid bone
Posterior pharyngeal wall
Anterior arch of atlas
Dens

Radiographic Positioning

Skull

Submentovertex (SMV)


Posterior wall of maxillary sinus
Coronoid process of mandible
Anterior wall of middle cranial fossa
Ramus of mandible
Foramen ovale
Foramen spinosum
Clivus
Mandibular angle
External auditory meatus
Ossicles
Occipital condyle
A
Lateral wall of orbit
Nasal septum
Inferior orbital fissure
Sphenoid sinuses
Lateral plate of pterygoid process
Medial plate of pterygoid process
Condyle of mandible
Hyoid bone
Posterior pharyngeal wall
Anterior arch of atlas
Dens

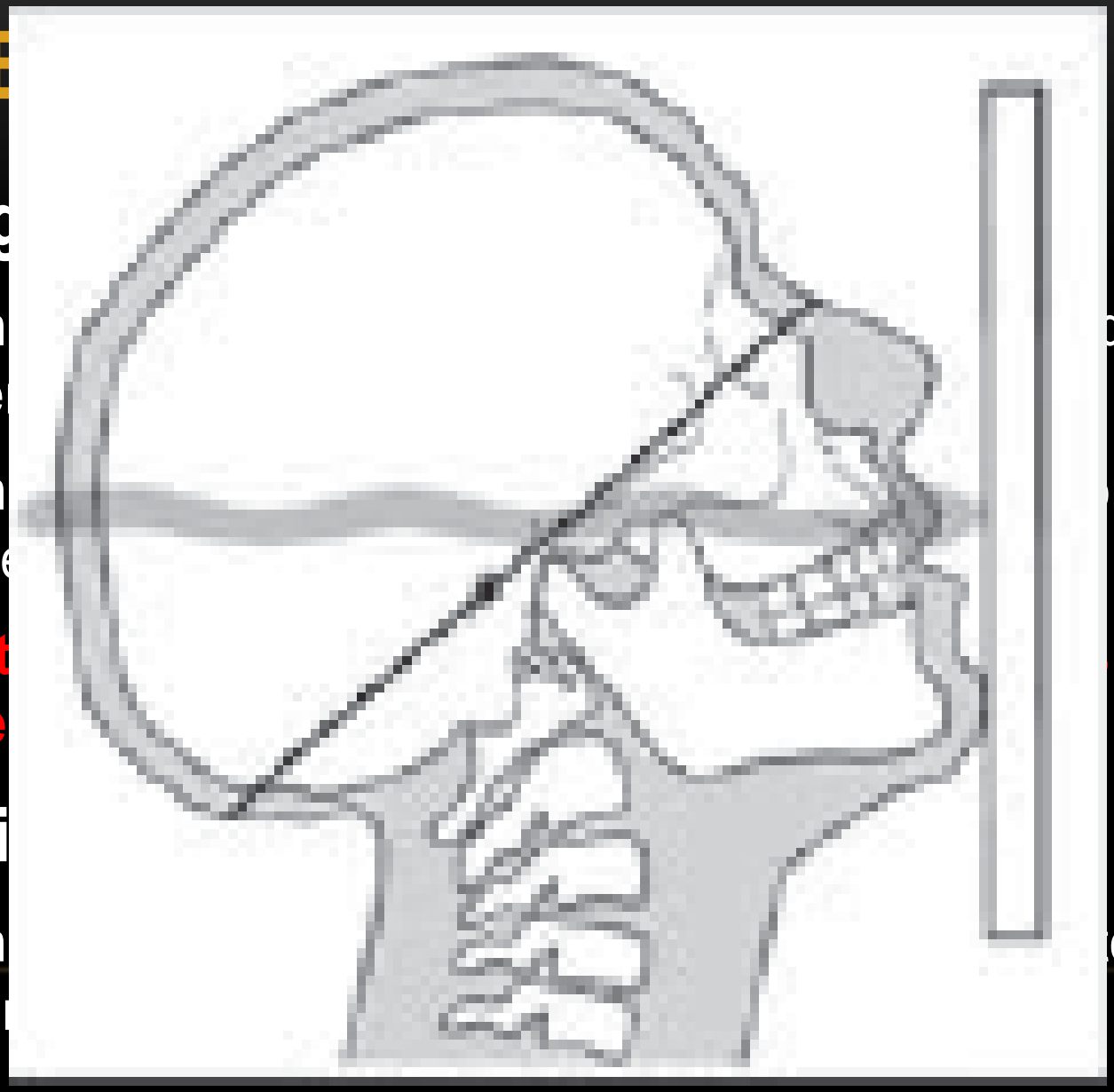
SUBMENTOVERTEX (BASE) PROJECTION

- Zygomatic arch
- Sphenoid sinus

Back to the types

WATE

- **Imag**
  - Th d
pe
  - Th meatal
line
  - **If t will**
be
- **Posi**
  - Th or and
ce



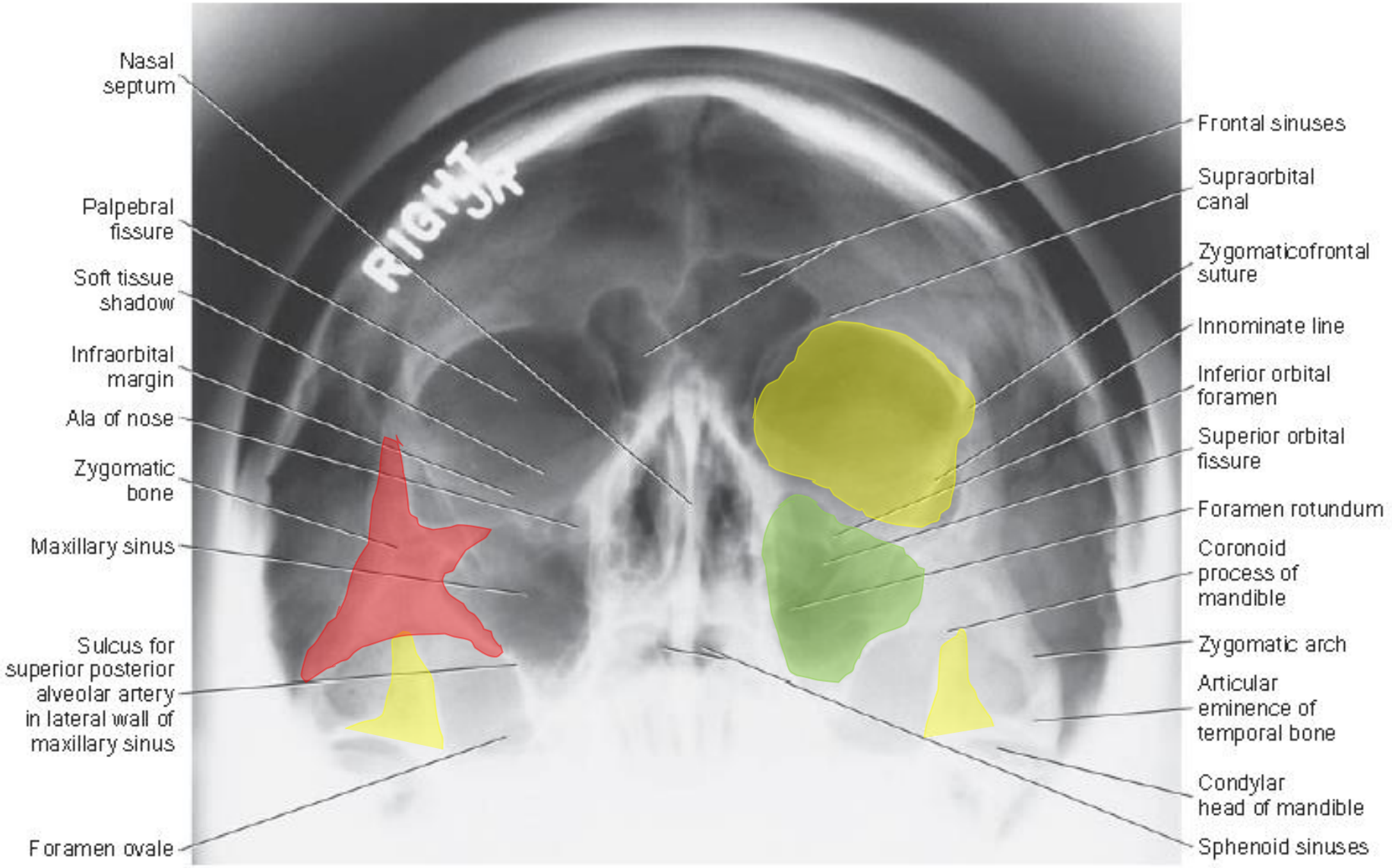


FIG. **12-4** Anatomic landmarks identified in the Waters projection.

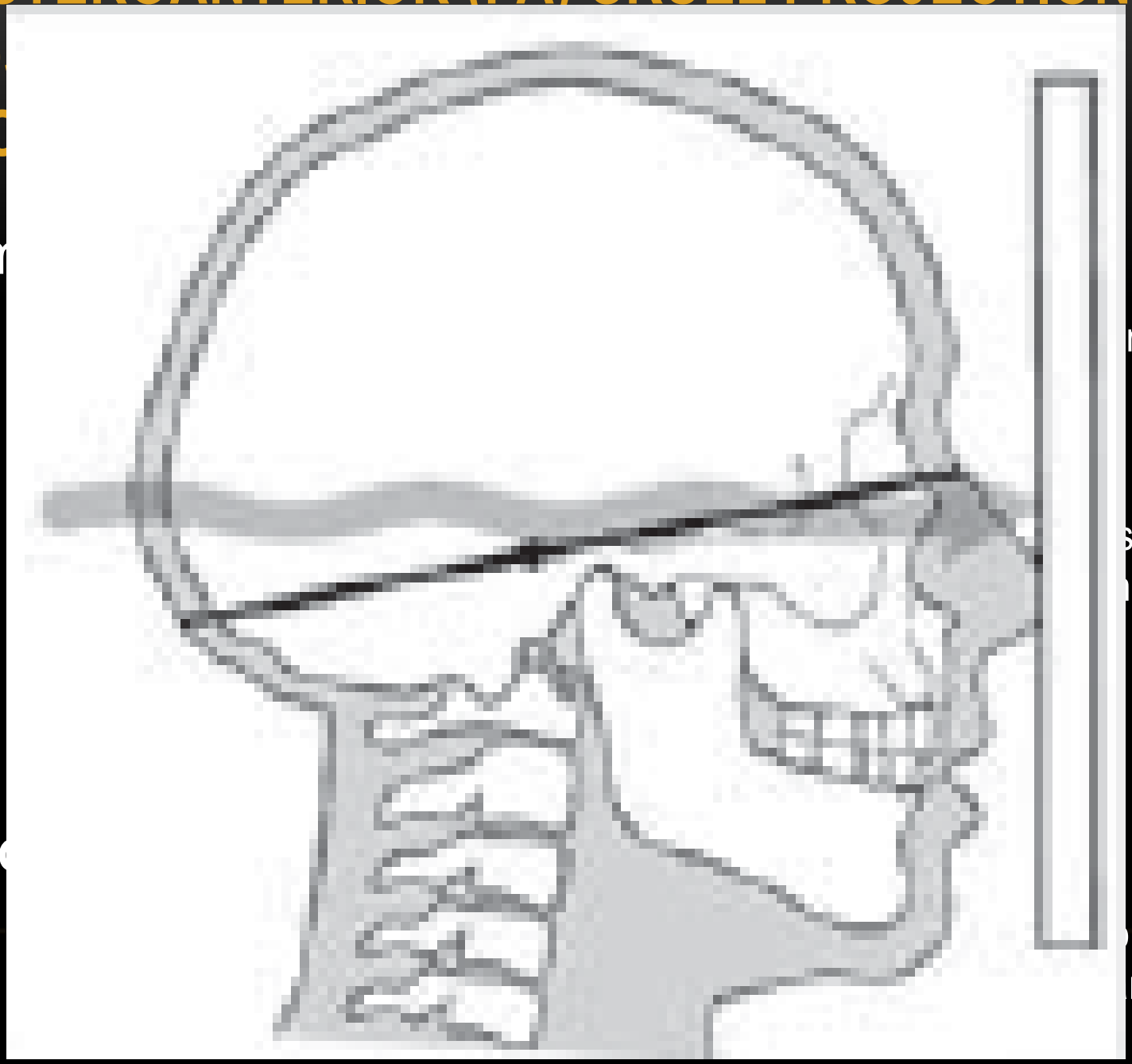
WATERS PROJECTION

- Coronoid process
- Orbit
- Zygoma
- Maxillary sinus

Back to the types

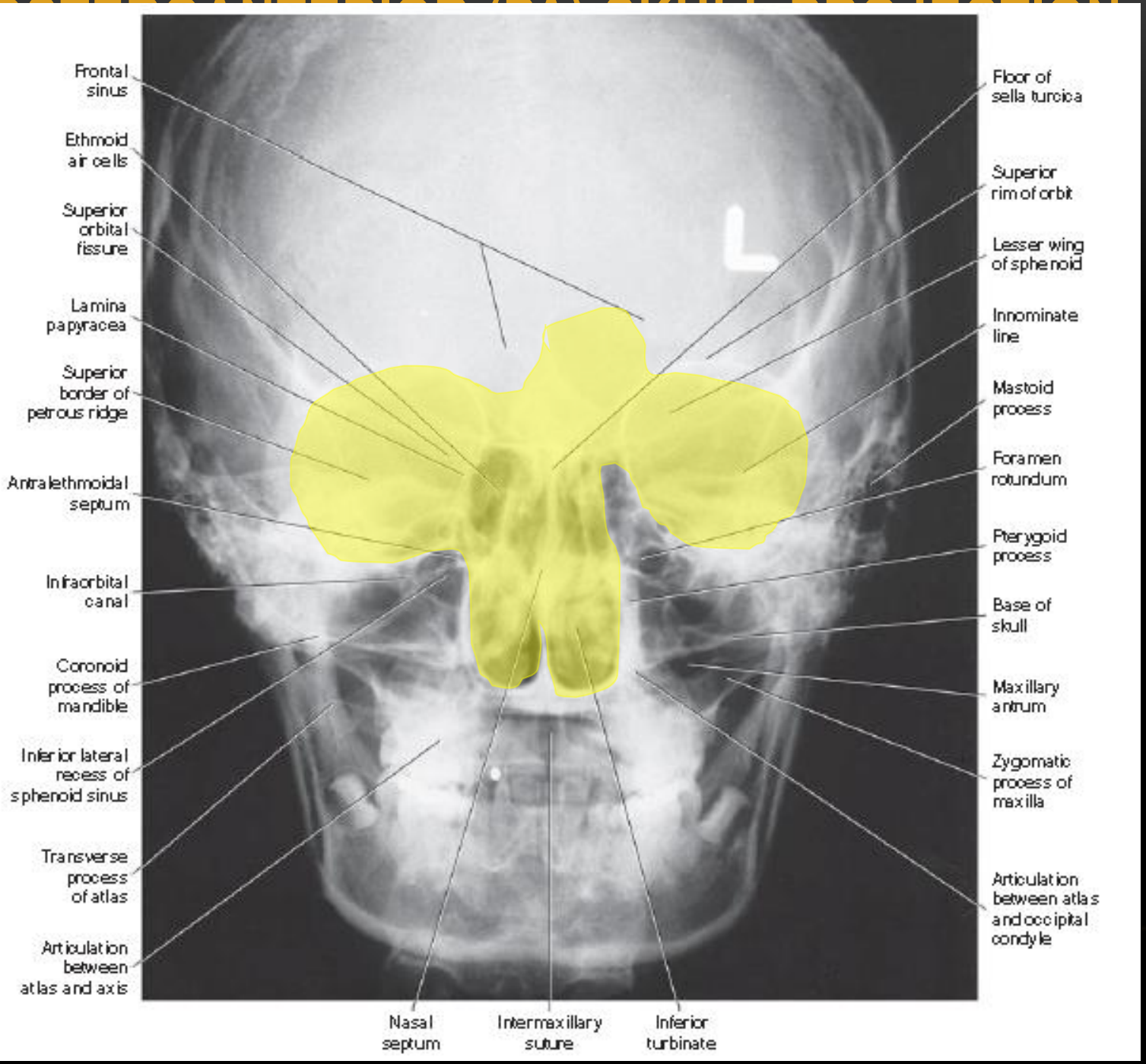
POSTEROANTERIOR (PA) SKULL PROJECTION (PO… PRO…

- Im…
  - …r to
  - …s a …e is
- Po…
  - …om …nd



P
(
P

-


Frontal sinus
Ethmoid air cells
Superior orbital fissure
Lamina papyracea
Superior border of petrous ridge
Anterior ethmoidal septum
Infraorbital canal
Coronoid process of mandible
Inferior lateral recess of sphenoid sinus
Transverse process of atlas
Articulation between atlas and axis
Floor of sella turcica
Superior rim of orbit
Lesser wing of sphenoid
Innominate line
Mastoid process
Foramen rotundum
Pterygoid process
Base of skull
Maxillary antrum
Zygomatic process of maxilla
Articulation between atlas and occipital condyle
Nasal septum
Intermaxillary suture
Inferior turbinate

POSTEROANTERIOR CEPHALOMETRIC PROJECTION

- Orbit
- Nasal cavity
- Frontal sinus

Back to the types

REVERSE-TOWNE PROJECTION (OPE

- **Imag**
  - The
    per
  - The
    line
  - the
    loc
    rev
- **Posit**
  - Th
    pa
    the

RE
(OF

- Re
  - two
  - e,
    to

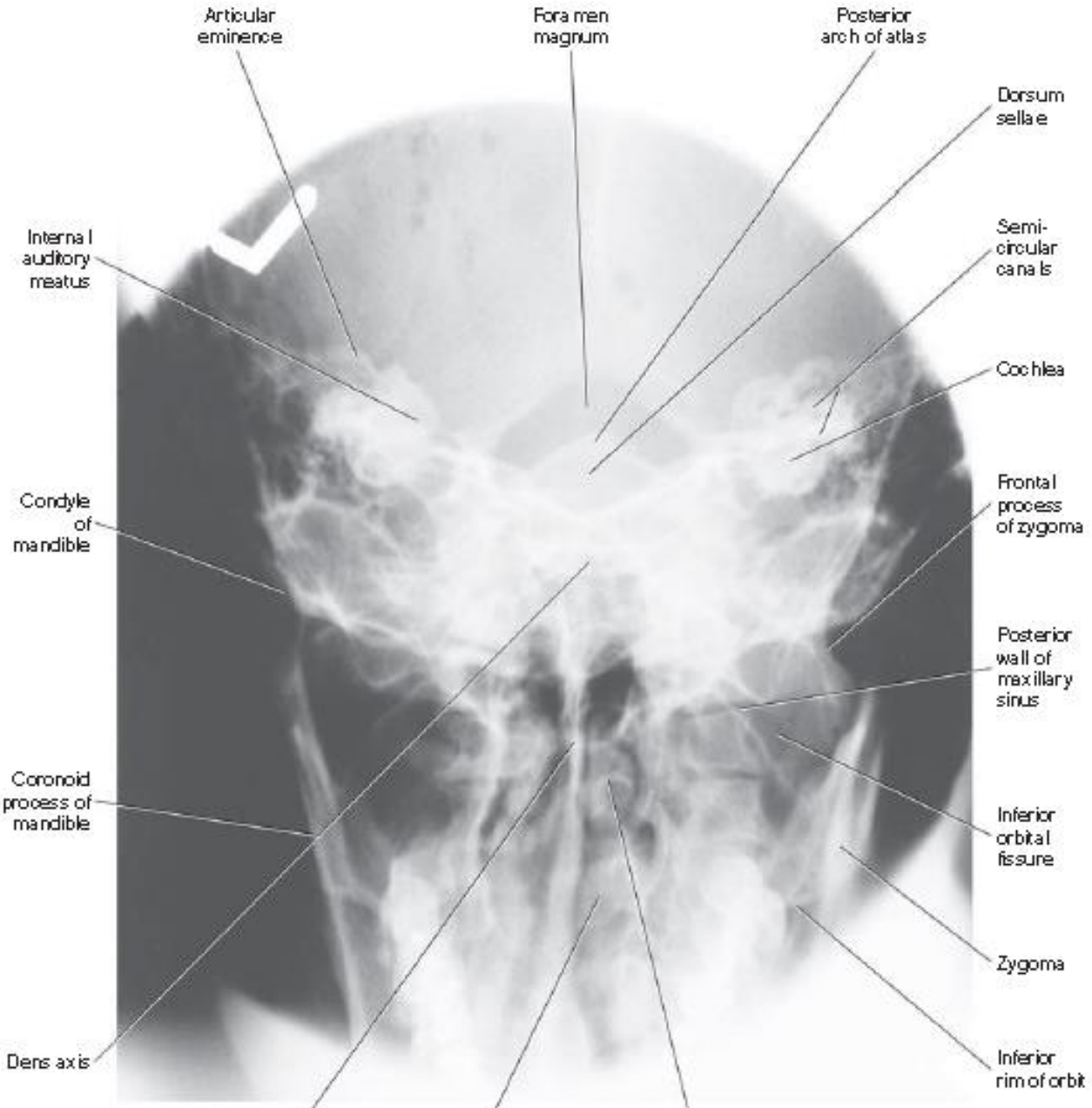


FIG. 12-6 Anatomic landmarks identified in the open-mouth reverse-Towne projection.

REVERSE-TOWNE PROJECTION (OPEN-MOUTH)

- Condylar head
- Condylar neck

Back to the types

MANDIBULAR OBLIQUE BODY PROJECTION

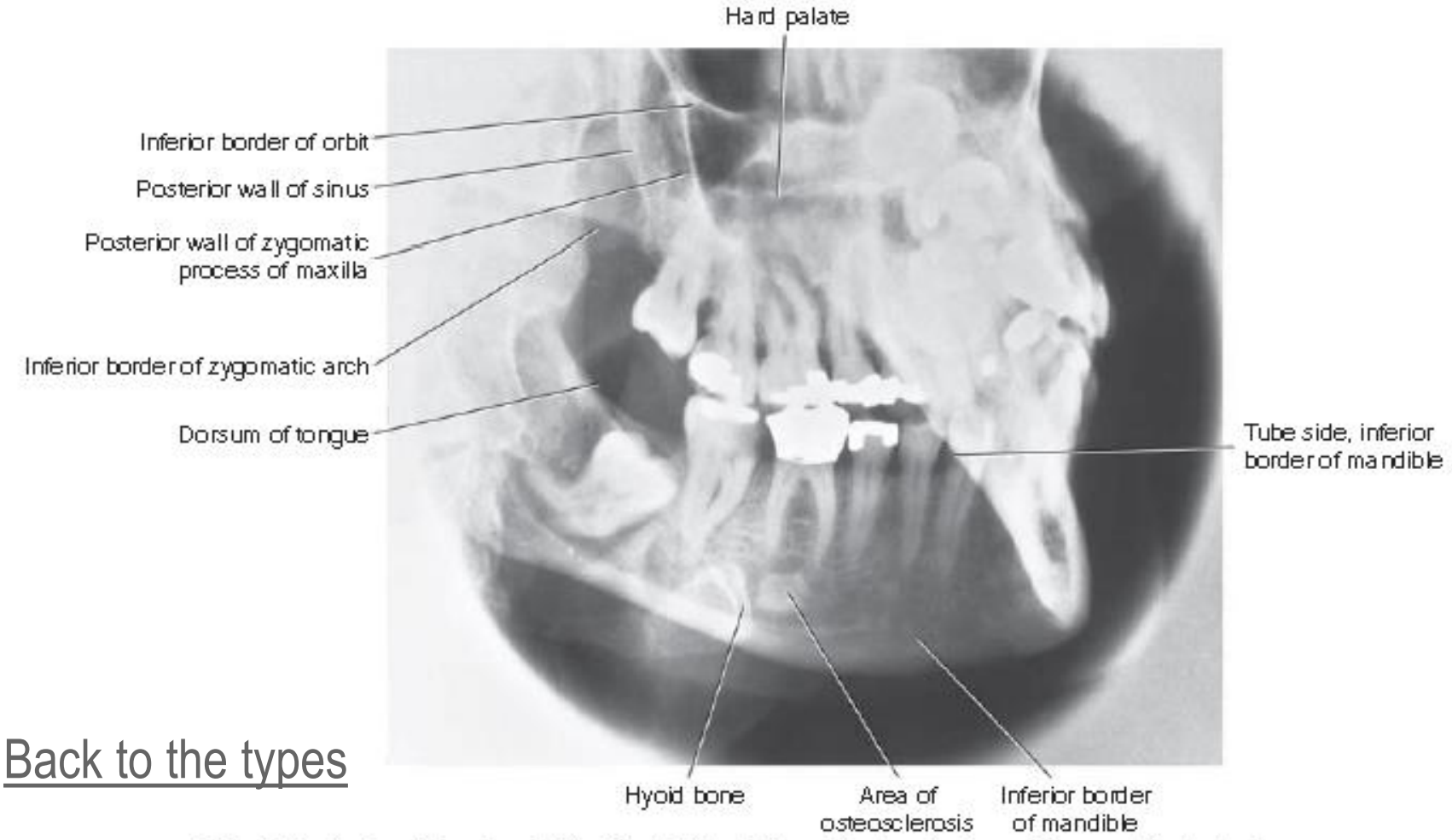


FIG. **12-7** Anatomic landmarks identified in the oblique lateral projection of the mandibular body.

Back to the types

MANDIBULAR OBLIQUE RAMUS PROJECTION

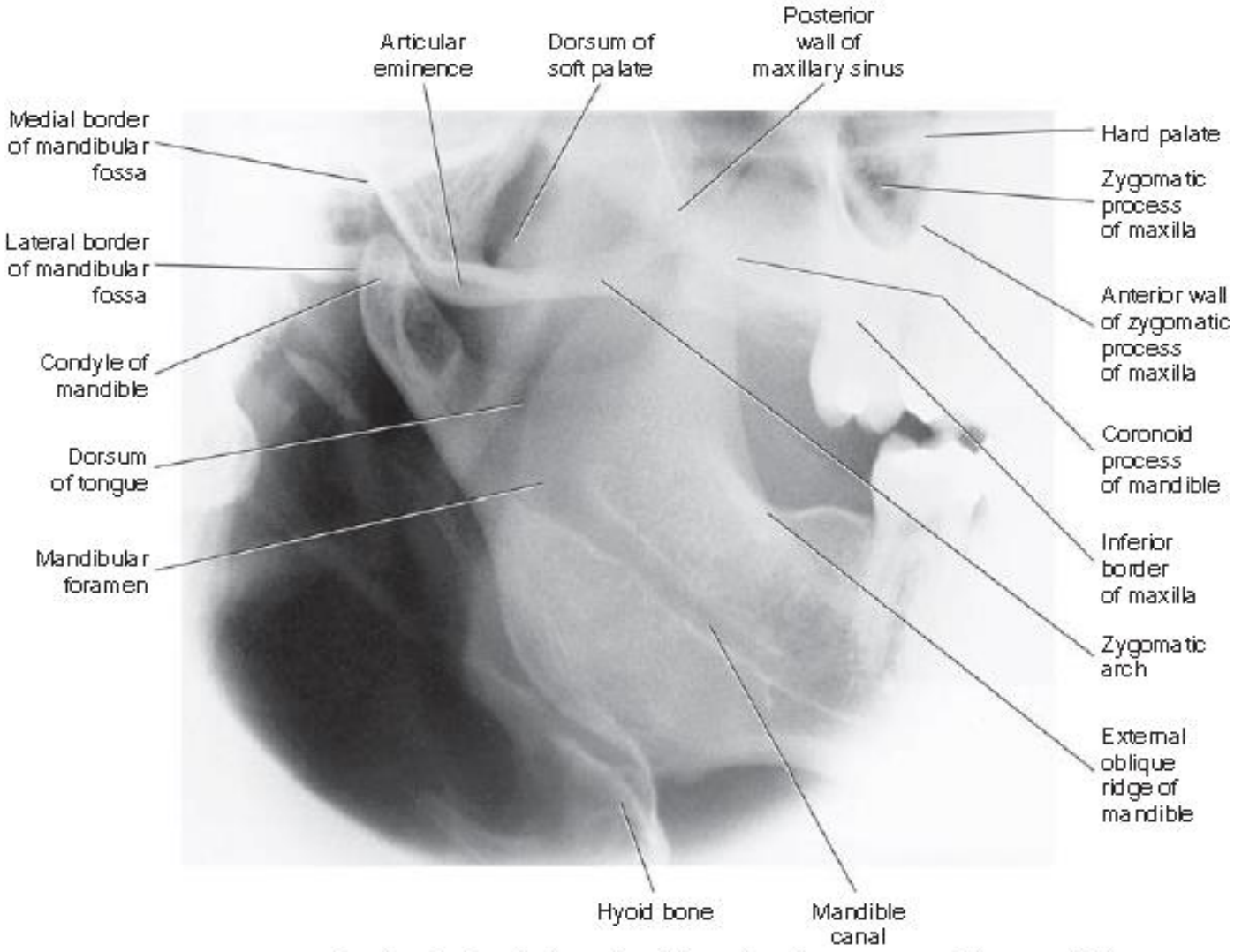


FIG. **12-8** Anatomic landmarks identified in the oblique lateral projection of the mandibular

MANDIBULAR OBLIQUE RAMUS PROJECTION

- Ramus
- Coronoid process
- Condylar neck

THANK YOU FOR YOUR ATTENTION!

ANY QUESTIONS?