Dental Radiology Study Guide

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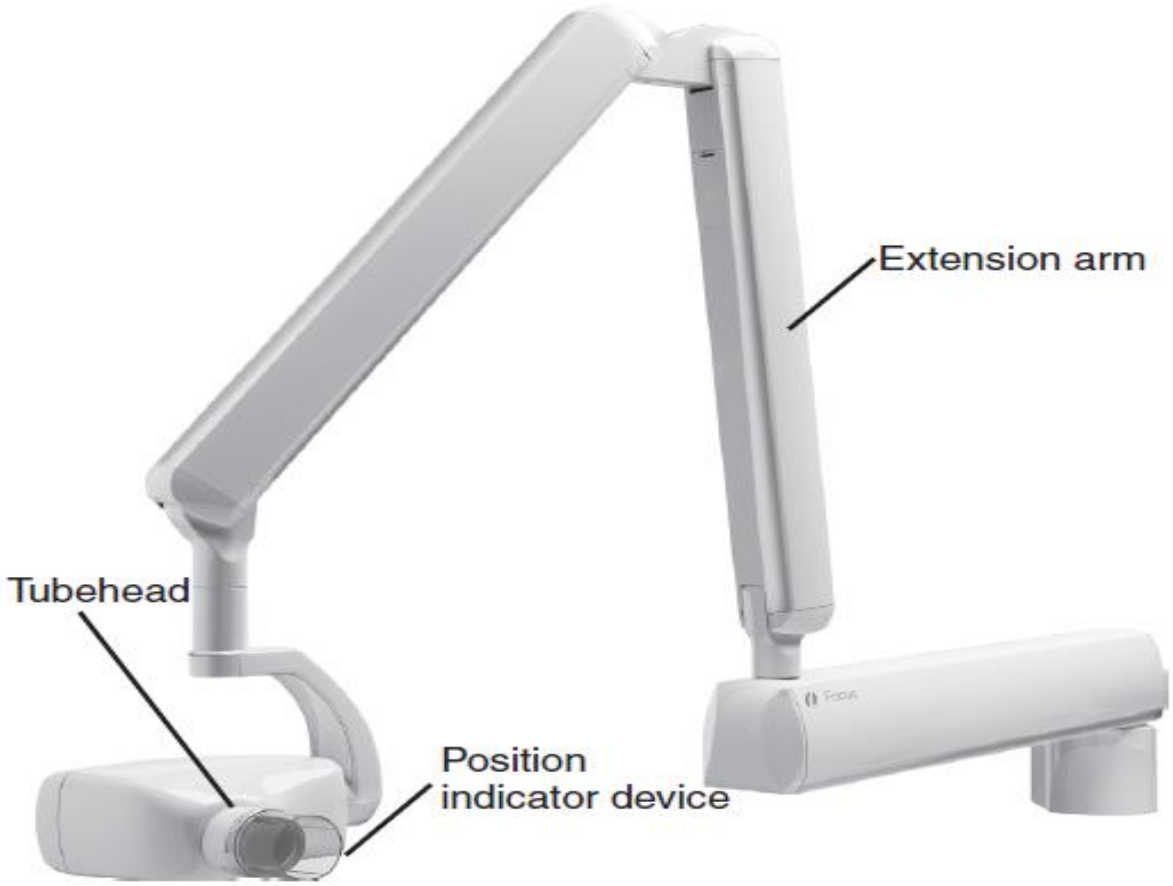
DENTAL X-RAY MACHINE



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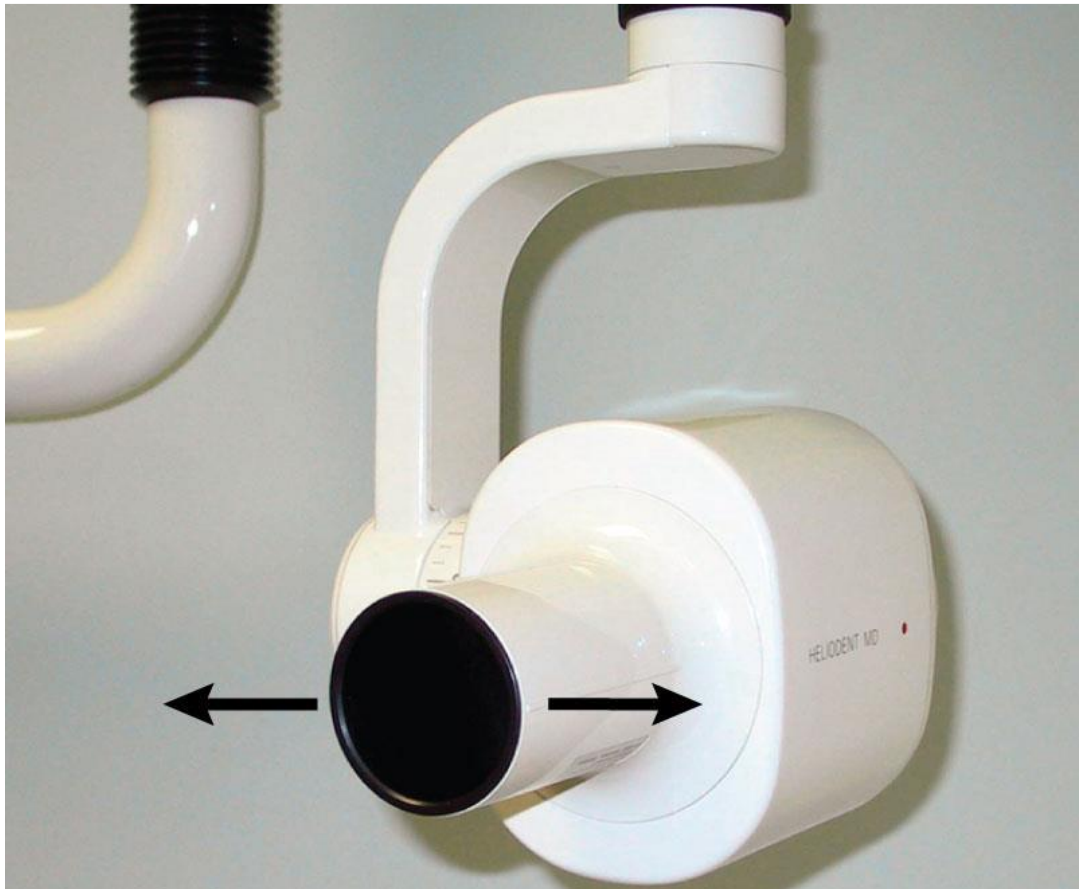
X-RAY TUBEHEAD

The x-ray tubehead is tightly sealed; heavy metal housing contains the x-ray tube that produces dental x-rays.



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COMPONENTS OF THE TUBEHEAD

- The metal body of the tubehead that houses the x-ray tube is called the *metal housing*, which is filled with insulating oil.

- The tubehead seal is made of leaded glass or aluminum, keeps the oil in the tubehead, and acts as a filter for the x-ray beam.

- The X-ray tube is where X-rays are produced.

- The transformer alters the voltage of the incoming electrical current

- The aluminum filter is an aluminum sheet 0.5 mm thick.

- The lead collimator is a metal disc with a small opening in the center to control the size and shape of the x-ray beam as it leaves the tubehead.

- The PID is the open-ended, lead-lined cylinder that extends from the opening of the metal housing of the tubehead and is used to aim the x-ray beam.

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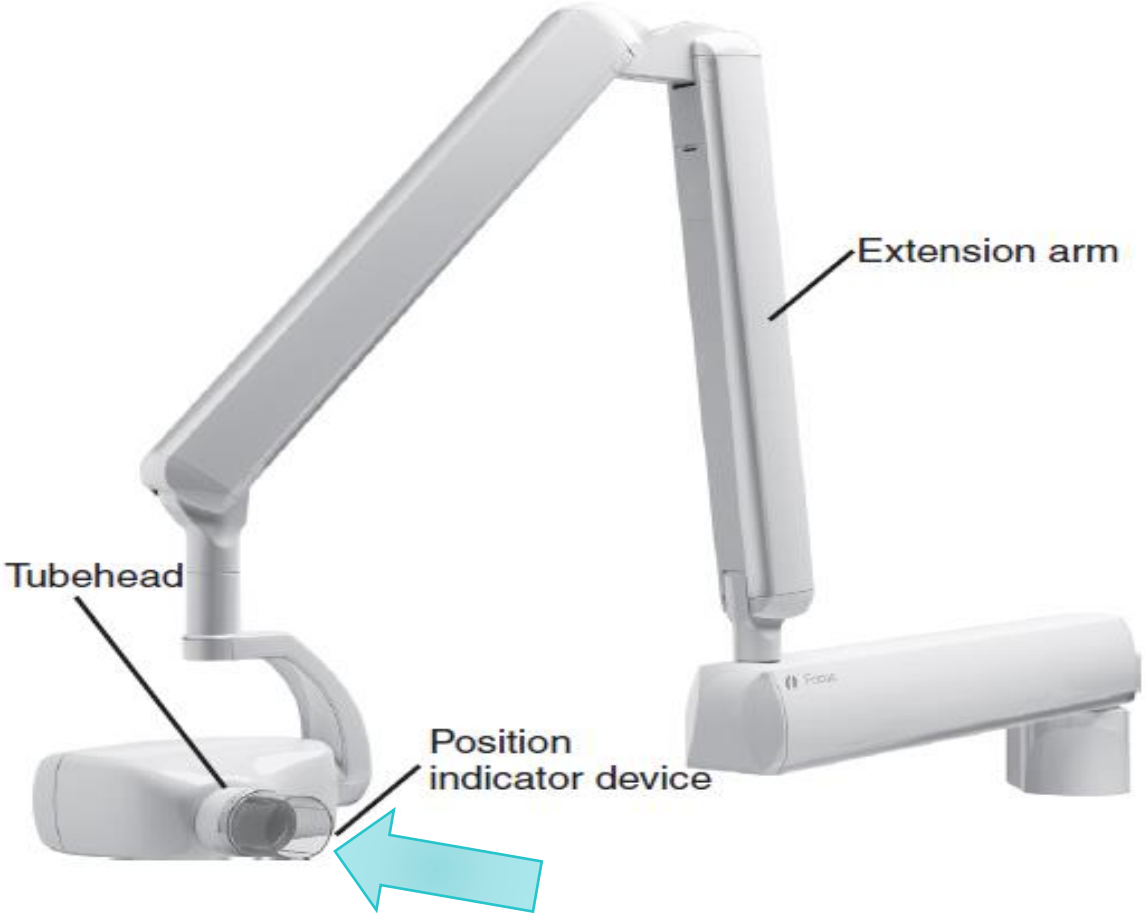
POSITION INDICATOR DEVICE (PID)

- The lead-lined PID is used to aim the x-ray beam at the film in the patient's mouth.
- The open end of the PID is placed against the patient's face during film exposure.
- The PID may be cylindrical or rectangular.



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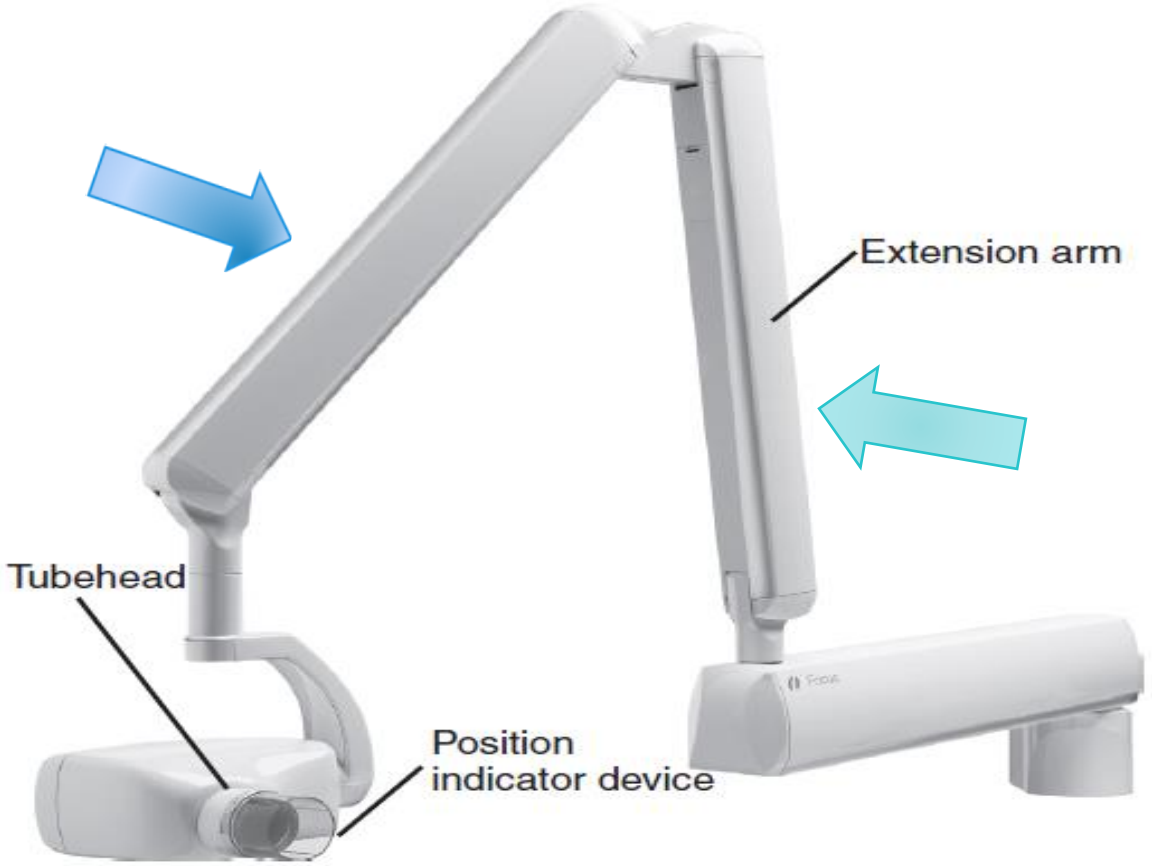
EXTENSION ARM

- Encloses the wire between the tubehead and the control panel.
- Has an important function in positioning the tubehead.
- The extension arm folds up and can be swiveled from side to side.
- The dental assistant or the patient must never hold the tubehead to keep it in place during exposure.



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CONTROL PANEL

The control panel of an X-ray unit contains:

- Master switch
- Indicator light
- Selector buttons
- Exposure button
  - Control devices (time, milliamperage [mA] selector, and kilovoltage [kVp] selector)

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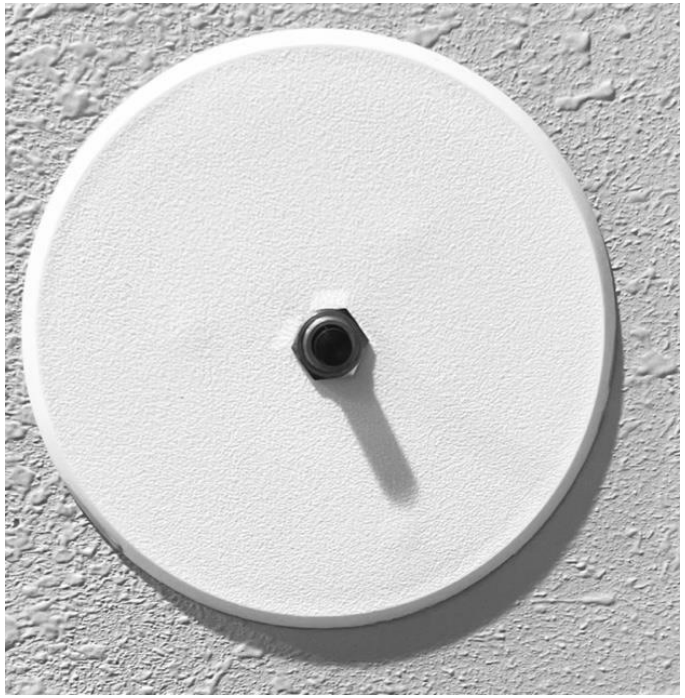
EXPOSURE BUTTON

- The Exposure button can be found on the Control Panel with a cord to walk outside the room and press to expose the X-ray sensor.
- Or mounted on a wall outside the x-ray room to walk outside the x-ray room to press to expose the x-ray sensor.
- The image of the tooth will not show if the Exposure Button is not pressed for the correct amount of time (Until the beeping sound stops).



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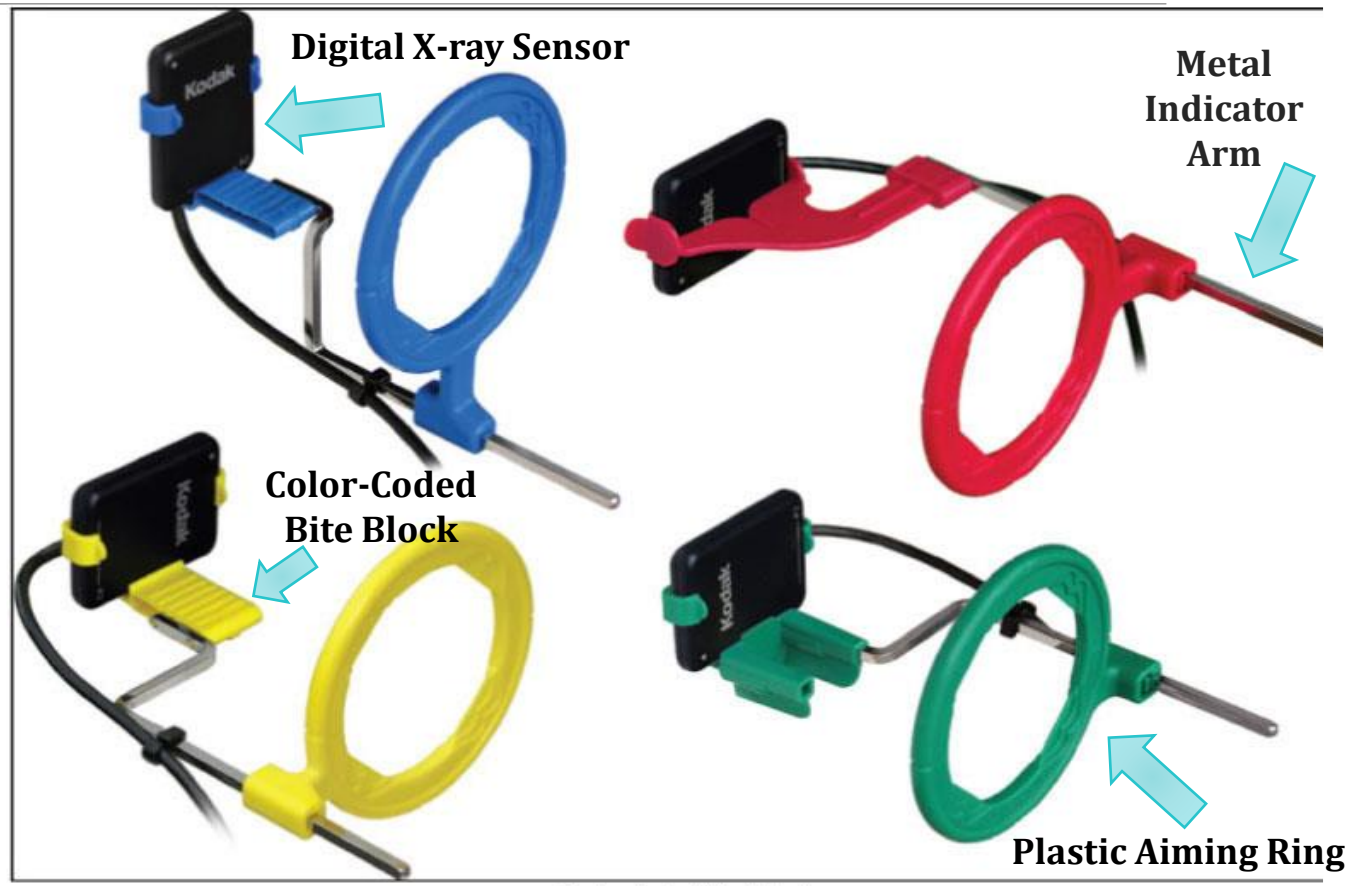
DENTAL X-RAY RINNS
X-RAY BEAM ALIGNMENT DEVICES

- Blue- Anterior Rinn
- Yellow- Posterior Rinn
- Red – Bitewing Rinn
- Green – Endodontic Rinn

- The beam alignment device assists in the positioning of the PID in relation to the tooth and sensor
- Rinn XCP instruments use color-coded plastic bite-blocks, plastic aiming rings, and metal indicator arms for film-based techniques
- Rinn XCP-DS are for holding digital sensors



Courtesy Dentsply Rinn, Elgin, IL.

Unn Fig. 41-3. Extension-cone paralleling (XCP-DS) instruments for digital sensors.

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How to Assemble the X-ray Rinns Video

Click Link Below for Tutorial: https://www.youtube.com/watch?v=Xb9BpOEFK-Y&list=PLbFPoLfHyYCvYj7XocqSDZ7CiRFCC0fzT&index=1

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Bitewing X-ray (BWX) Rinn Set Up

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Anterior Rinn Set Up

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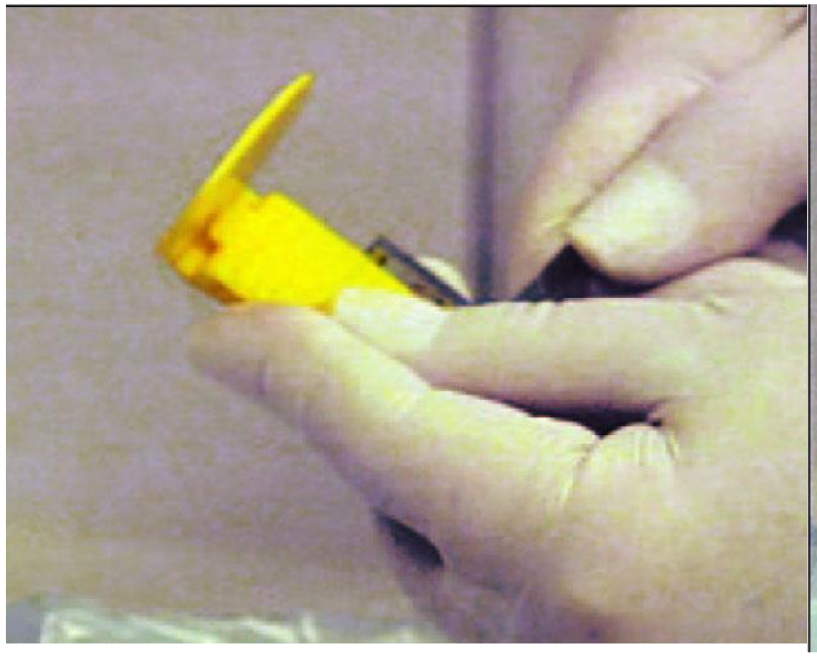
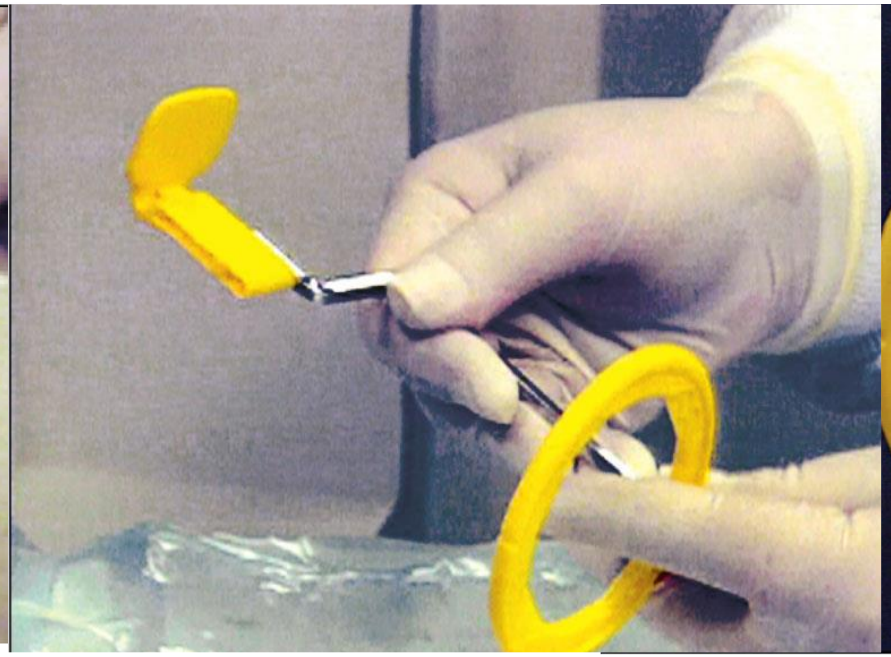
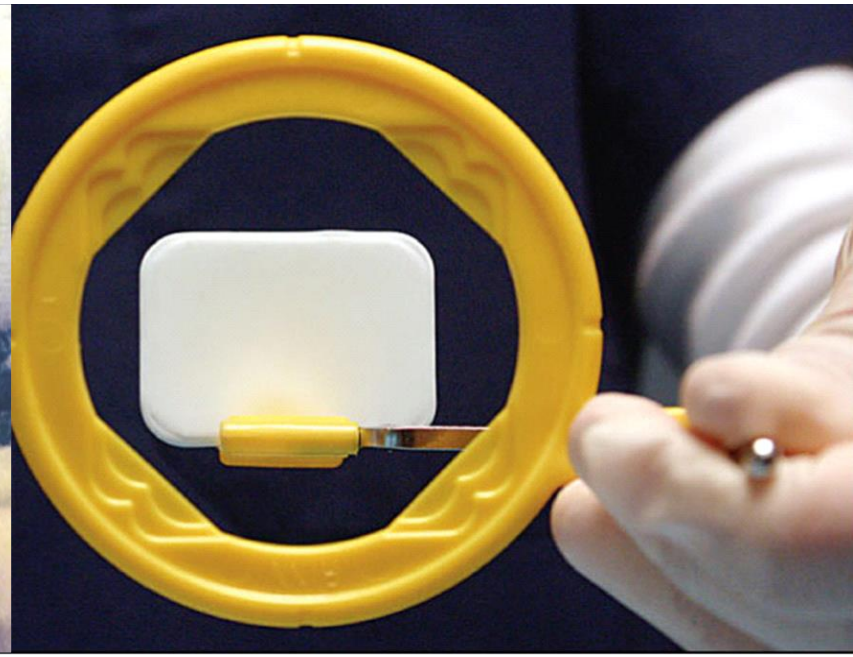
Posterior Rinn Set Up







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Utilizing an X-ray RINN will line up the X-ray sensor to get the idle image

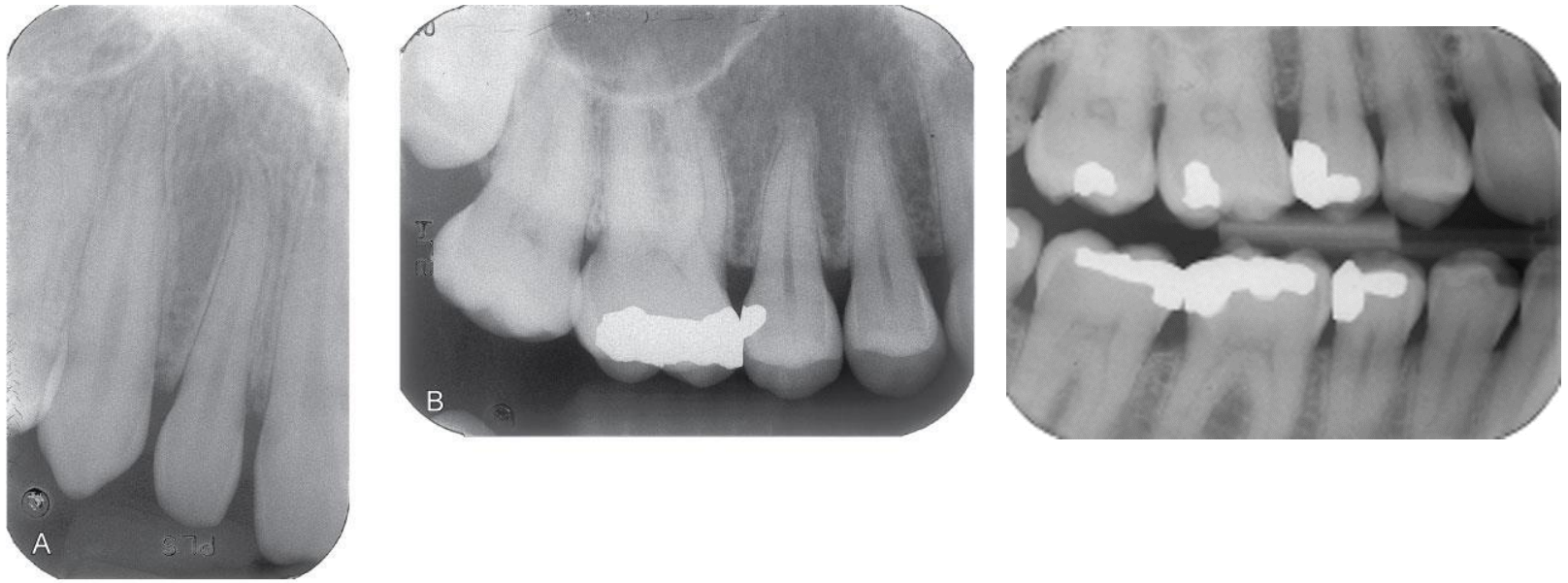

Fig. 41-3. **A,** Anterior periapical. **B,** Posterior periapical. Note that the entire tooth and surrounding bone are visible on the radiograph.

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Angulation of the Tubehead

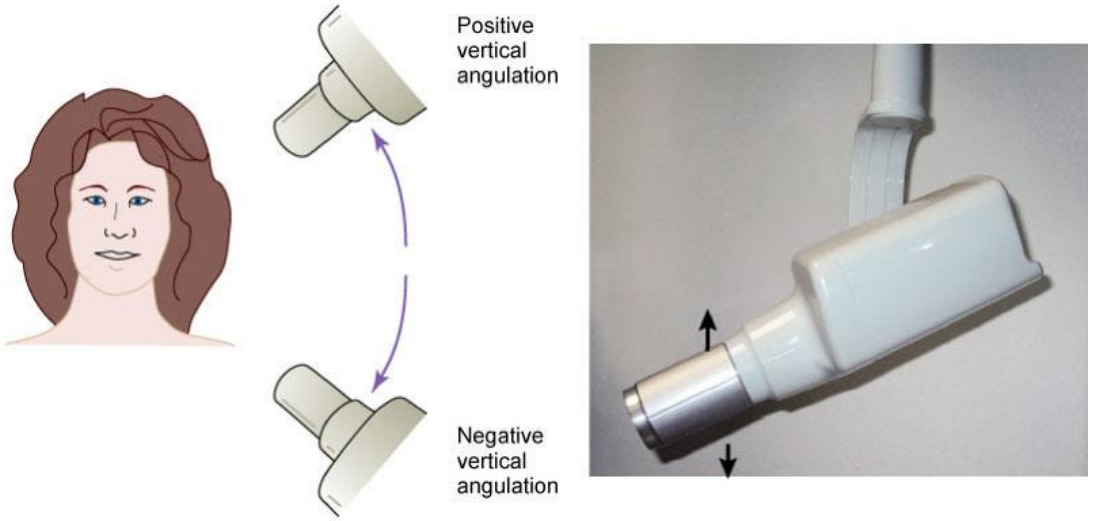

Fig. 41-19. Vertical angulation of the position indicator device (PID) refers to PID placement in an up-and-down (head-to-toe) direction.

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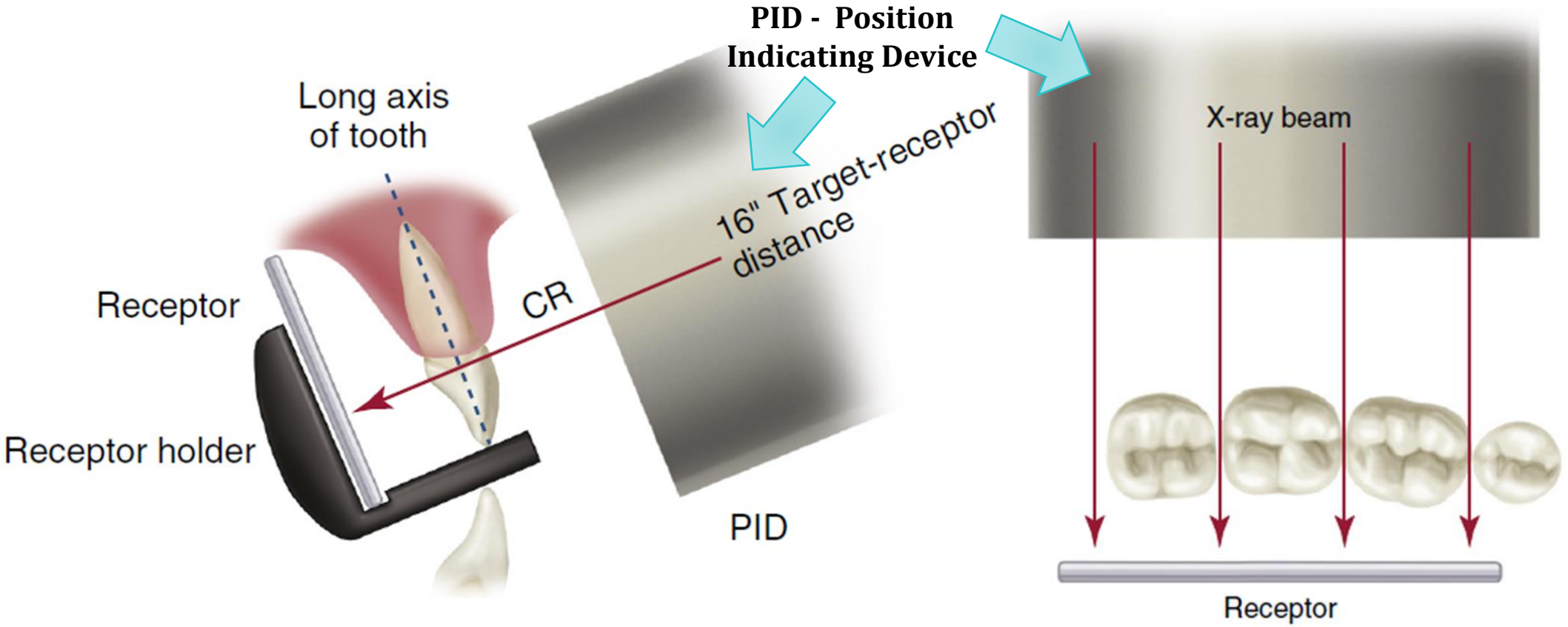
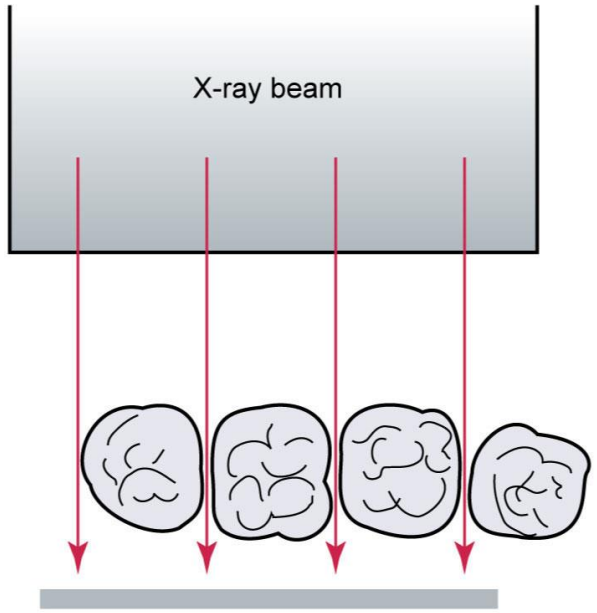
ALIGNING THE TUBEHEAD

With correct horizontal angulation, the central ray is directed perpendicular to the curvature of the arch and through the contact areas of the teeth

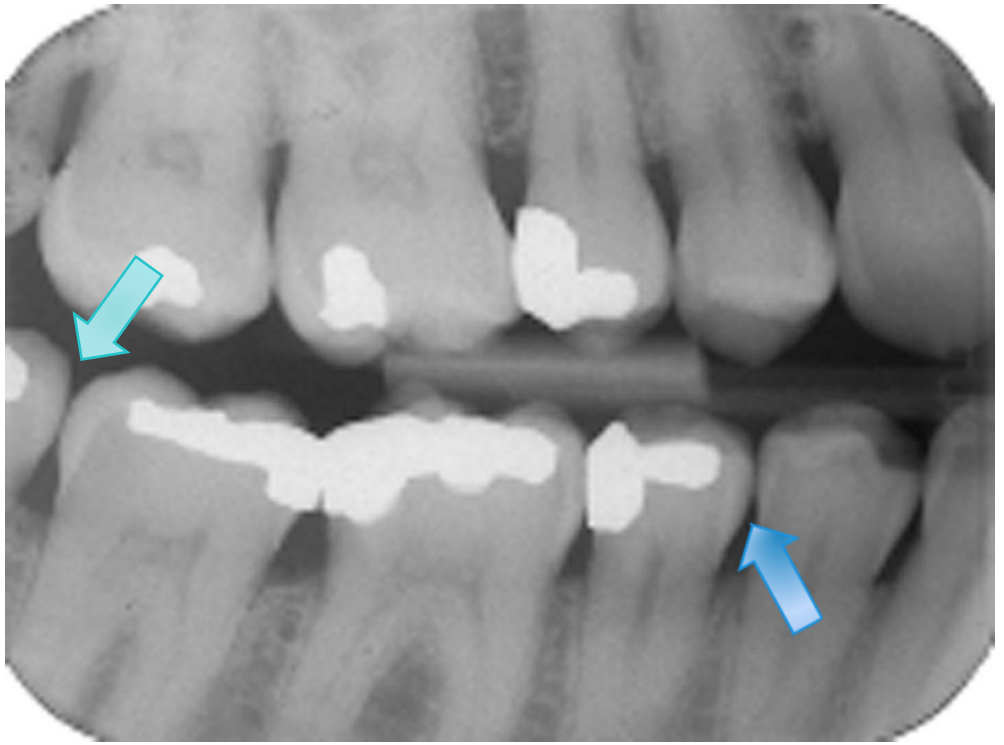


CORRECT HORIZONTAL ANGULATION= OPEN CONTACTS



From Iannucci J, Jansen Howerton L: Dental radiography: principles and techniques, ed 4, St Louis, 2012, Saunders.

Fig. 41-16. Correct horizontal angulation.



Open Contact Areas between the teeth so Dr can see between teeth to check for cavities.

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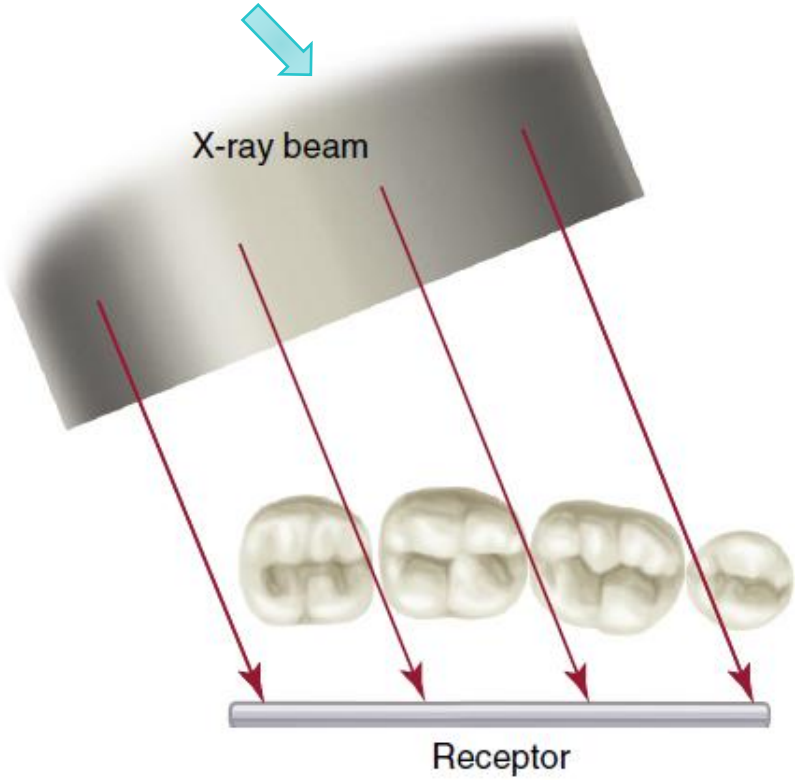
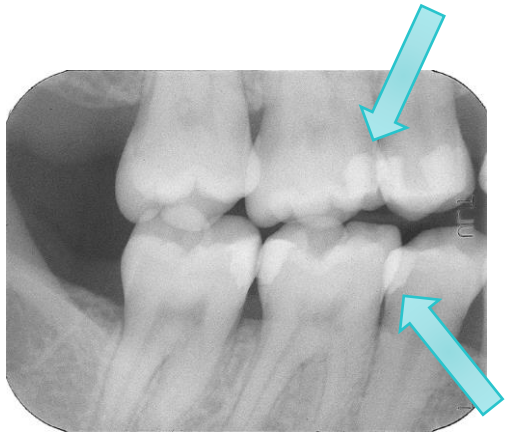
INCORRECT ANGULATION OF THE PID/TUBEHEAD

If angled incorrectly, the x-ray will show overlapped contact areas, which cannot be used to examine the interproximal areas of the teeth.

PID - Position Indicating Device





Overlapping of the teeth due to incorrect angulation of the PID/Tubehead – Dr won't be able to see if there is a cavity between the teeth

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BITEWING X-RAYS & ALIGNMENT OF TUBEHEAD

- A bitewing view shows the crowns and interproximal areas of the maxillary and mandibular teeth
- Bitewing views are used to detect interproximal caries (tooth decay

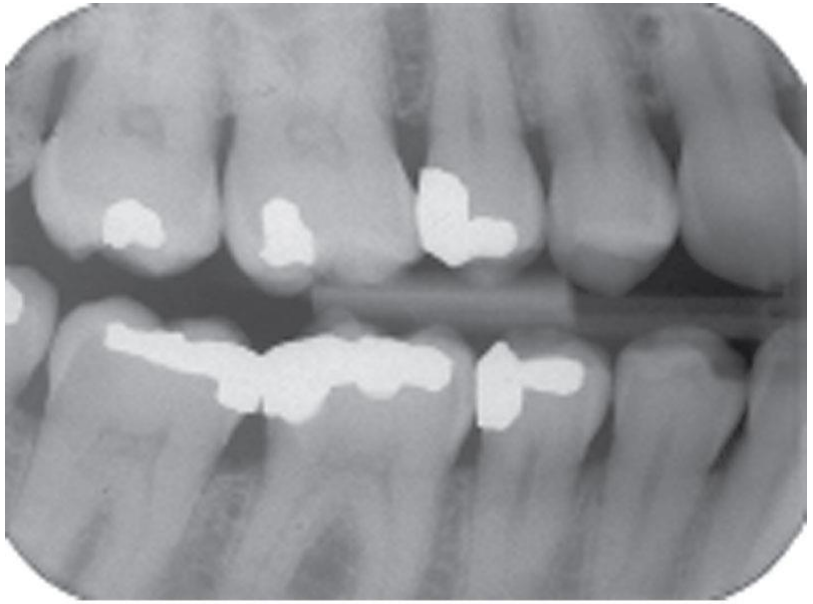
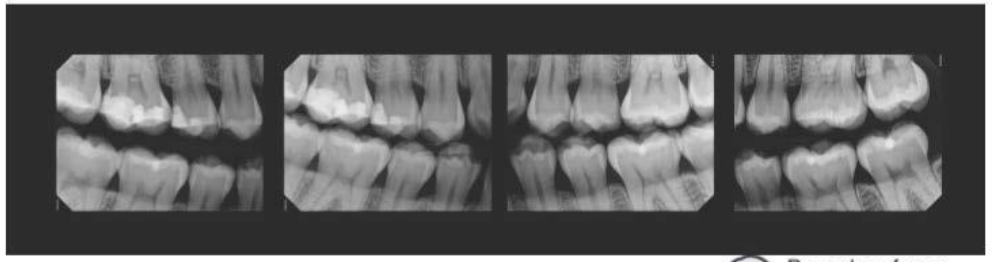


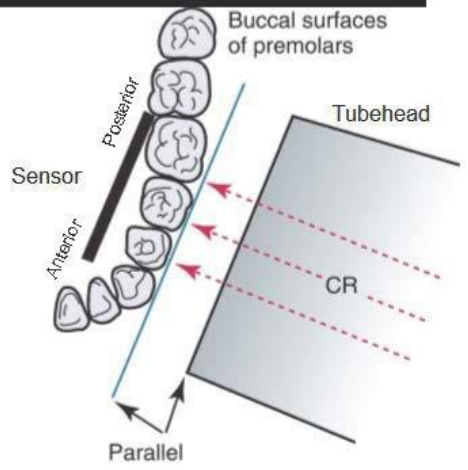
Fig. 41-2. Bitewing radiograph. Note that only the crowns and the alveolar ridge are visible, but not the entire root.

BITEWING X-RAYS



When placing the bite block into mouth "open the anterior portion of bite block" in the patient's mouth to avoid overlapping.

TIP: DO NOT place bite block up against teeth, place/rest the bite block on the patients tongue for patient comfort.



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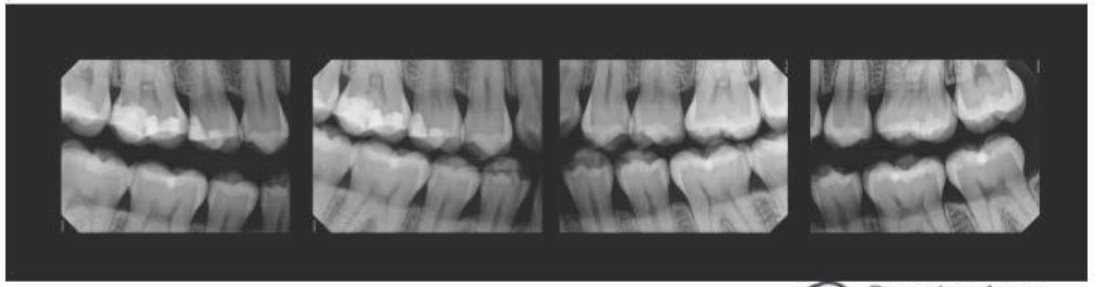
BITEWING X-RAYS



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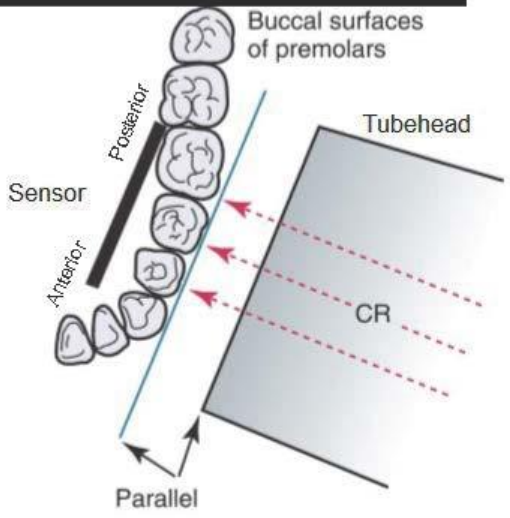

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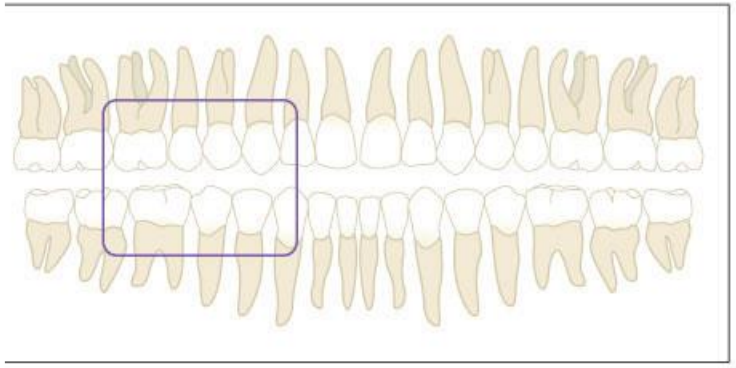
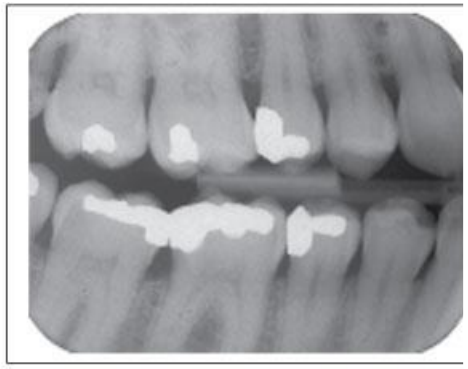
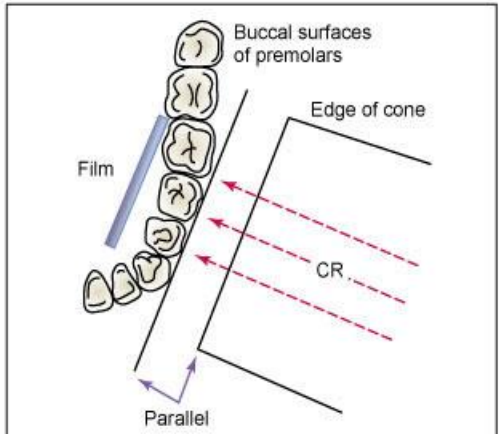
BITEWING ANGULATION OF THE XCP RINN - PREMOLAR X-RAY







PLACE THE XRAY RINN to open the contacts

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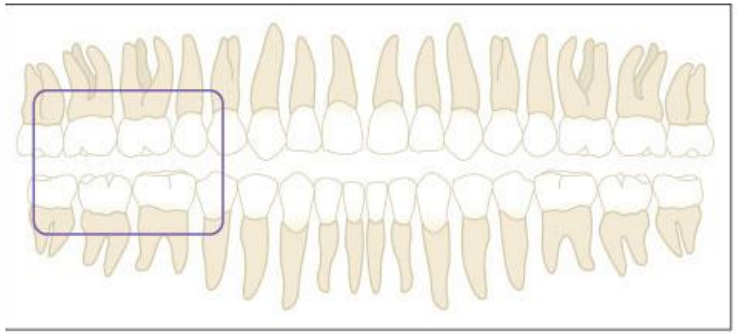
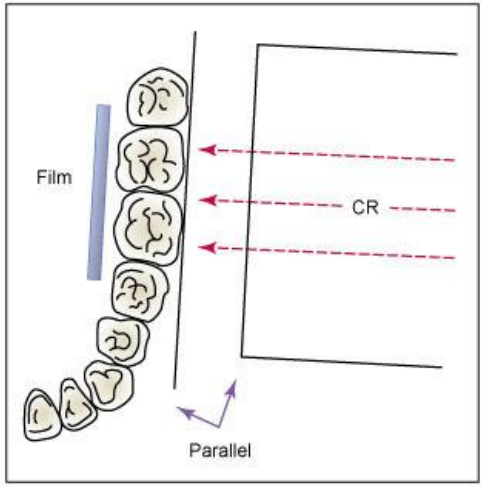
BITEWING ANGULATION OF THE XCP RINN - MOLAR SHOT

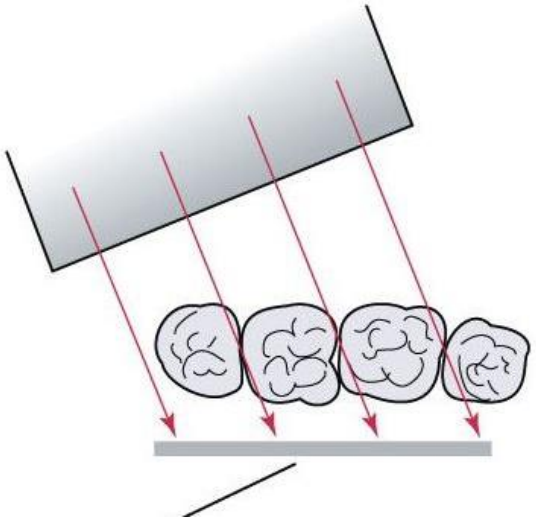




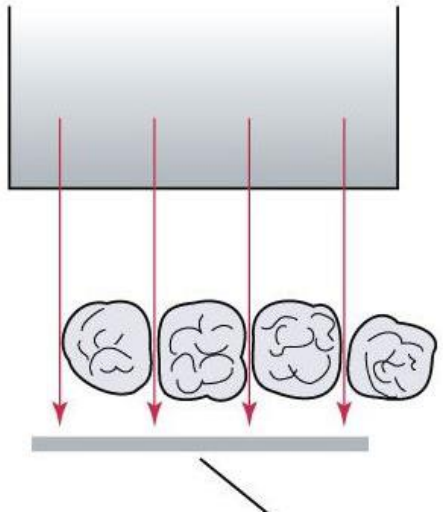
PLACE THE XRAY RINN to open the contacts

ERROR- OVERLAPPED X-RAY

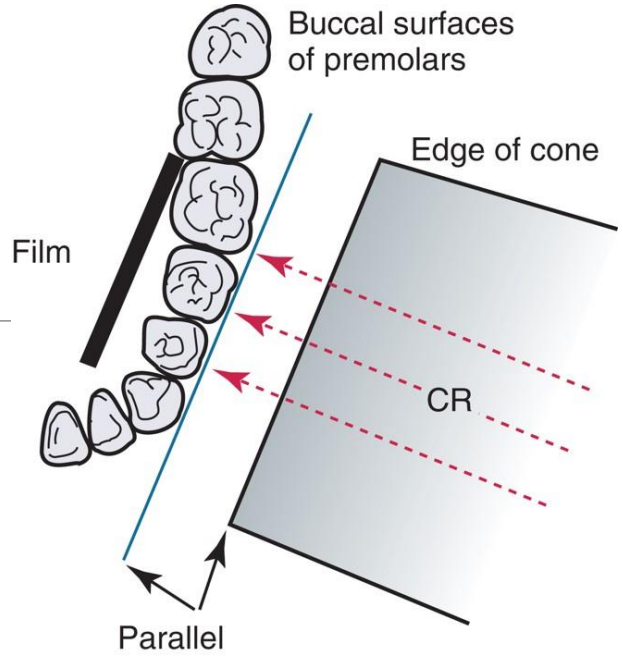
THE TEETH ARE OVERLAPPING AND CAN'T SEE THE CONTACT AREAS (IN BETWEEN TEETH) TO LOOK FOR DECAY

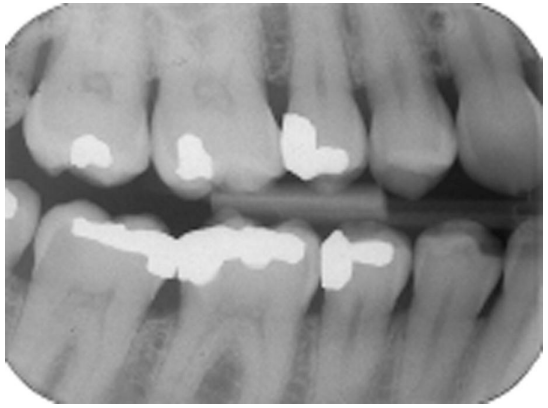


Incorrect Angulation of Tubehead = Overlapping of Teeth



Correct Angulation of Tubehead = Open Contacts (can see between the teeth for cavities)





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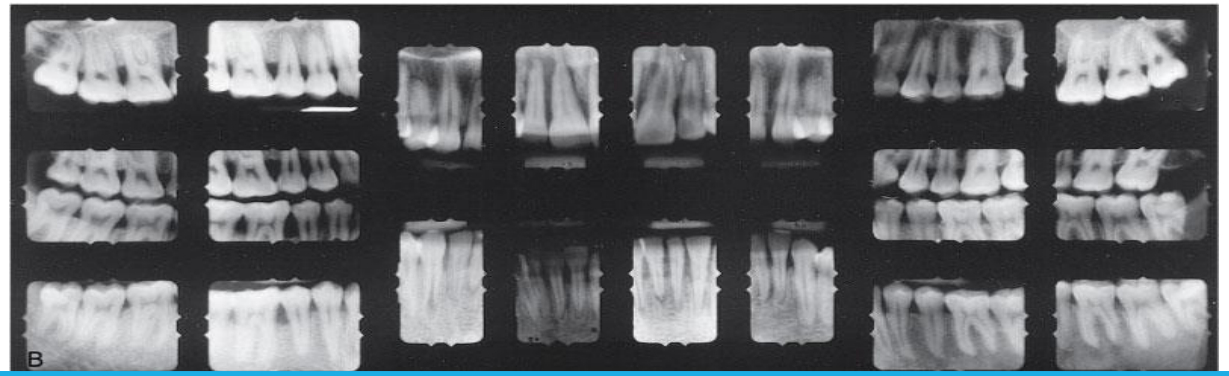
DIGITAL FULL MOUTH X-RAYS (FMX)

FMX- Full Mouth X-rays Can be made up of 18 or 20 films

18 Film FMX
- 8 Posterior PA's (Molars and Premolars)
- 6 Anterior PA's (Canines and Incisors)
- 4 Bitewings (2 Molars, 2 Premolars)



20 Film FMX
8 Posterior PA's (Molars & Premolars)
8 Anterior PA's (Canines & Incisors)
4 Bitewings (2 Molars, 2 Premolars)

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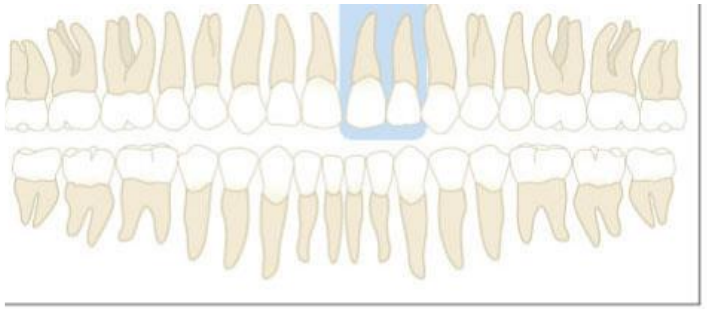
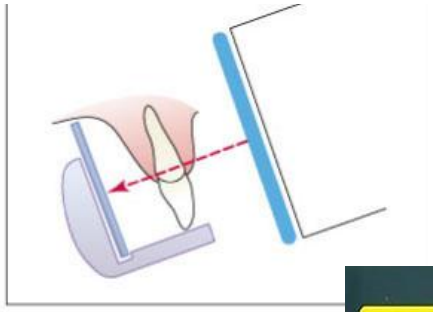
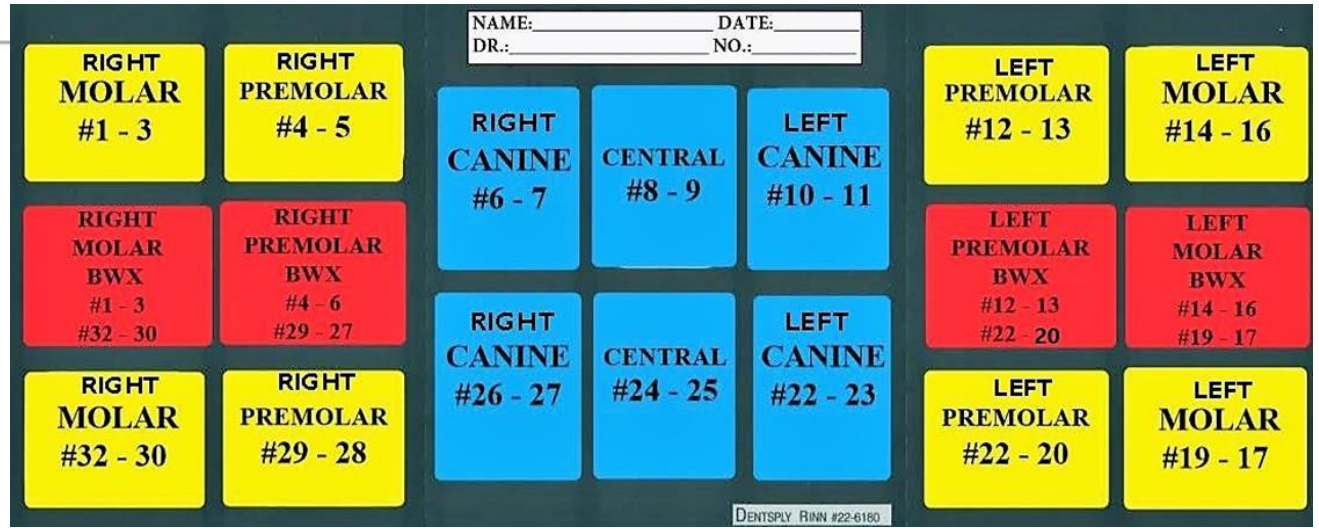
Anterior Rinn Placement for the Maxillary Central







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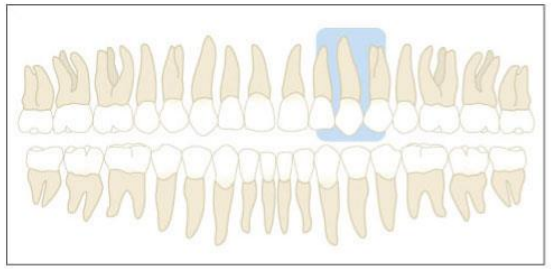
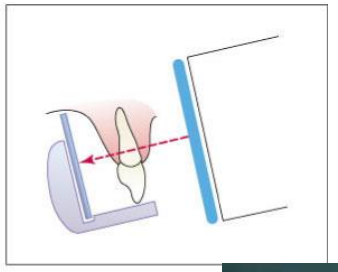
Anterior Rinn Placement for the Maxillary Canine





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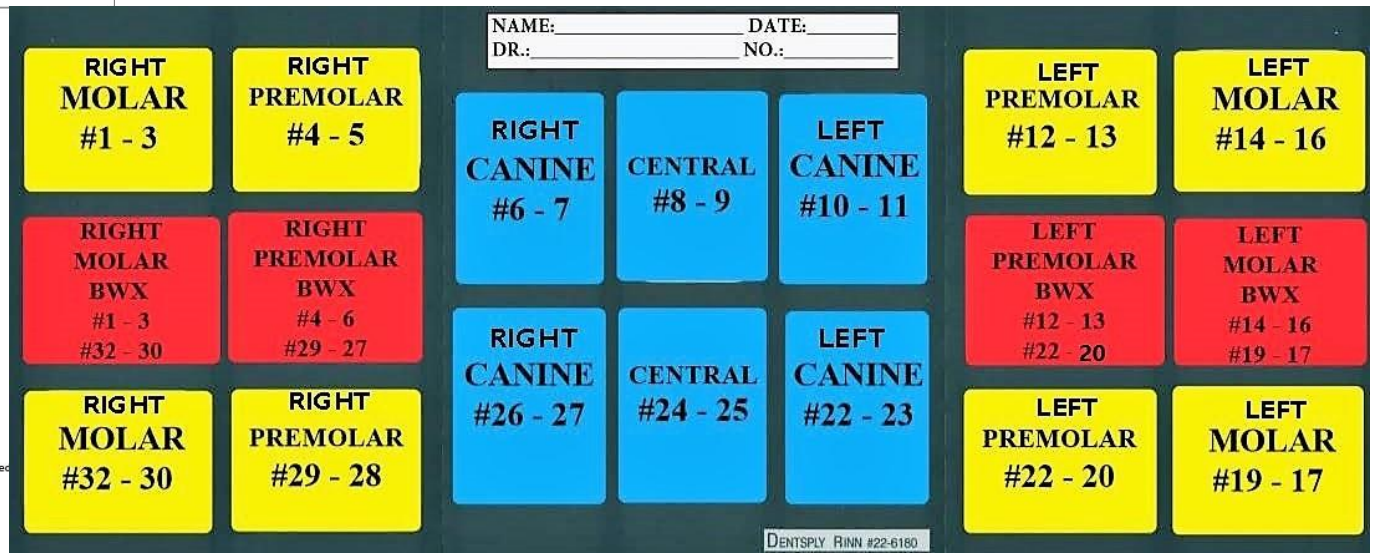
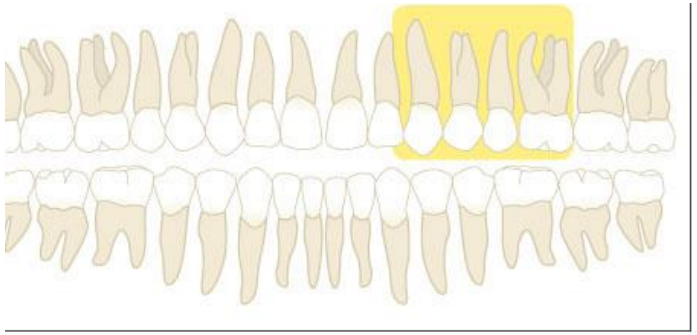
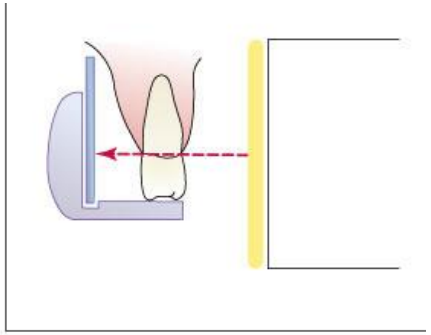
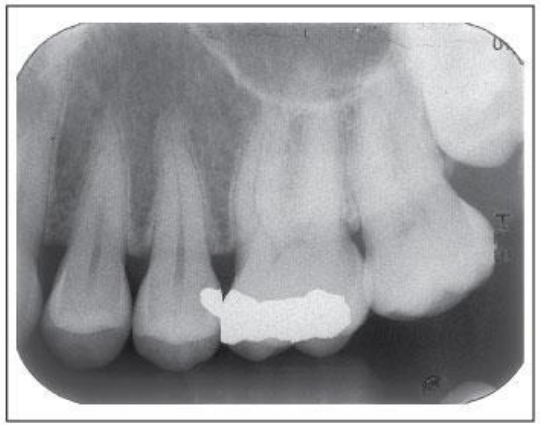
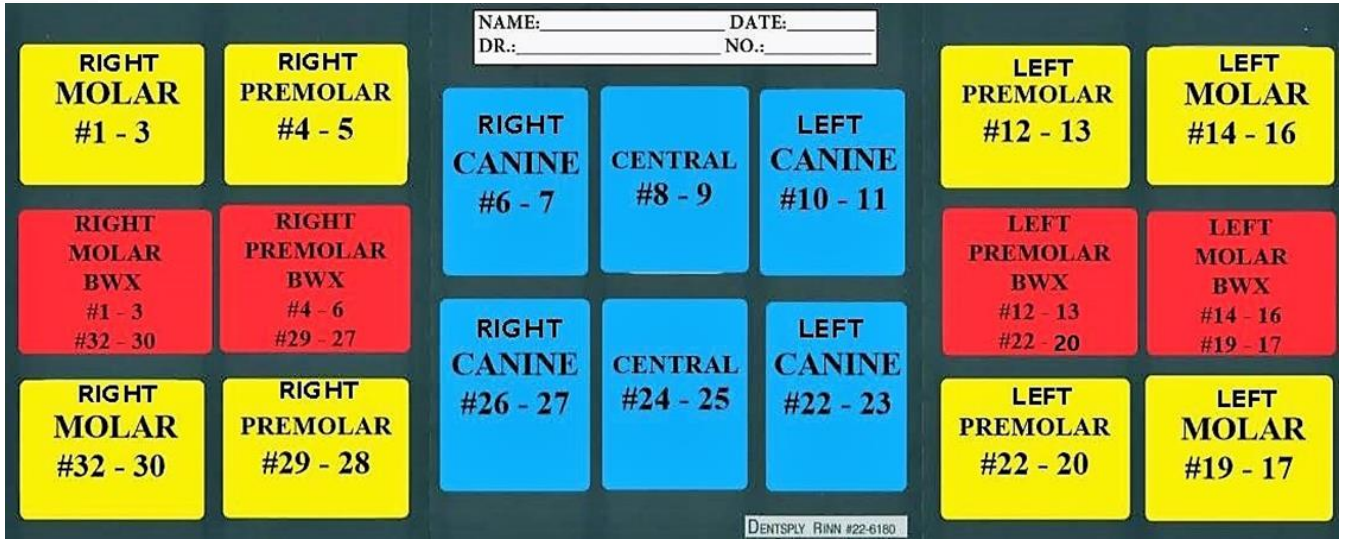


Posterior Rinn Placement for the Maxillary Premolars









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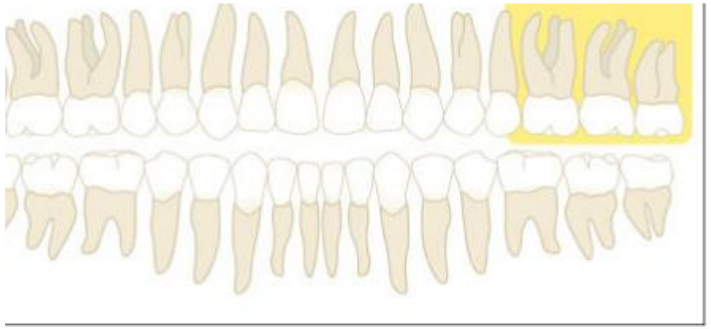
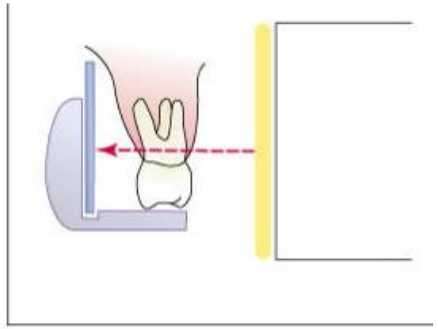
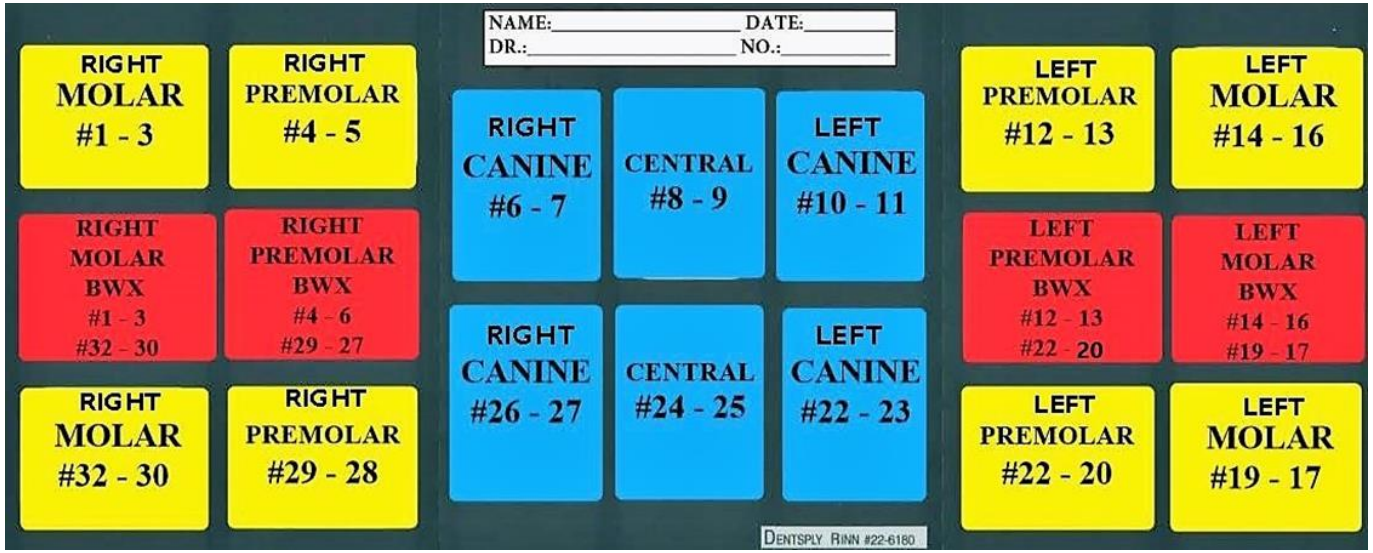
Posterior Rinn Placement for the Maxillary Molars







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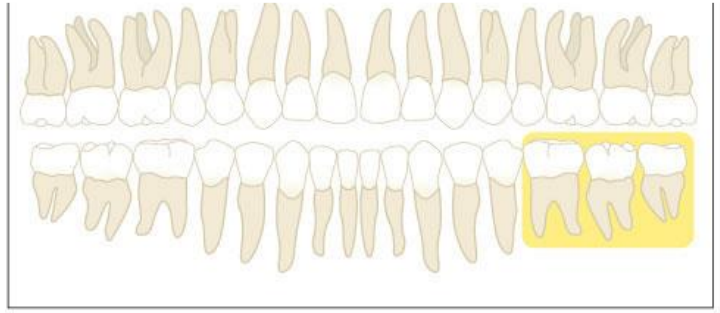
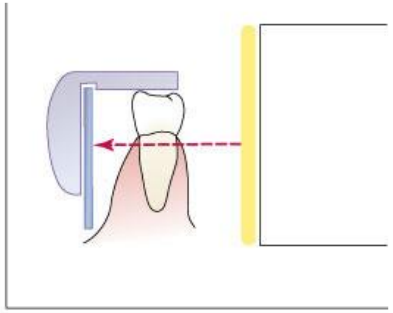
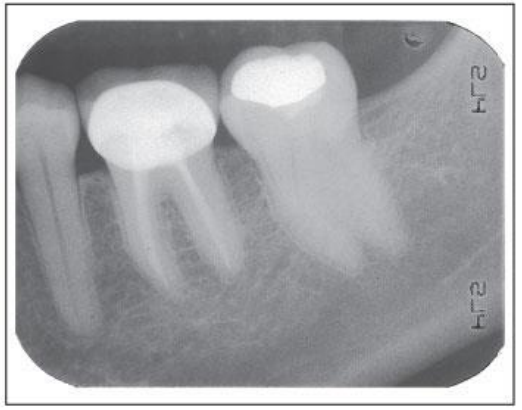
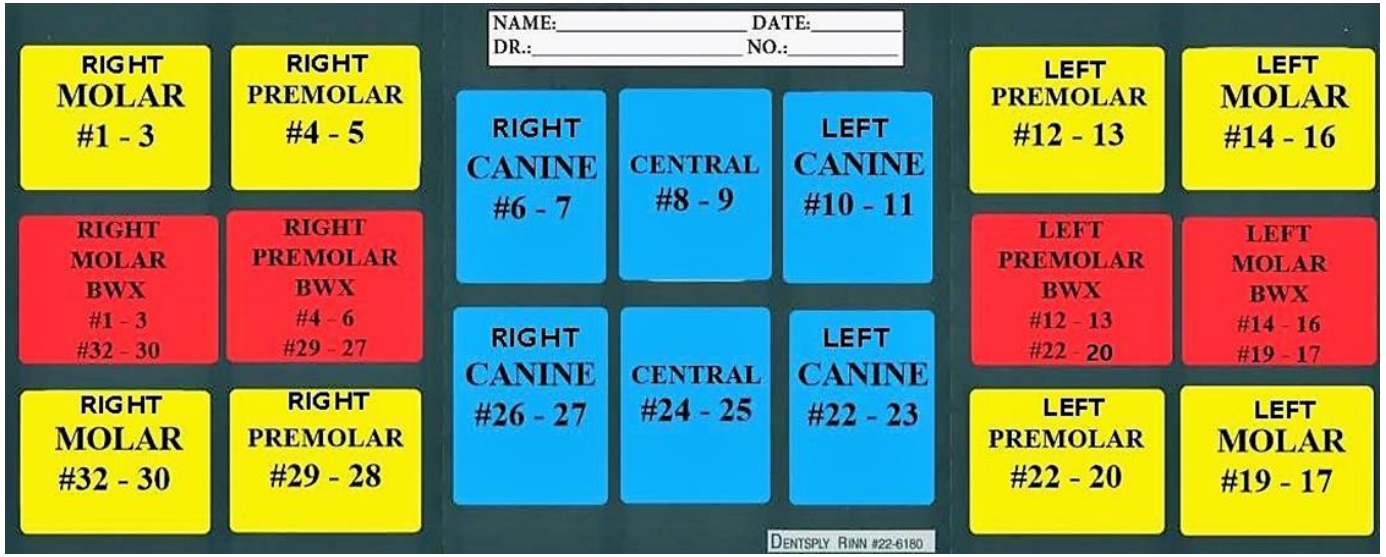
Posterior Rinn Placement for the Mandibular Molars

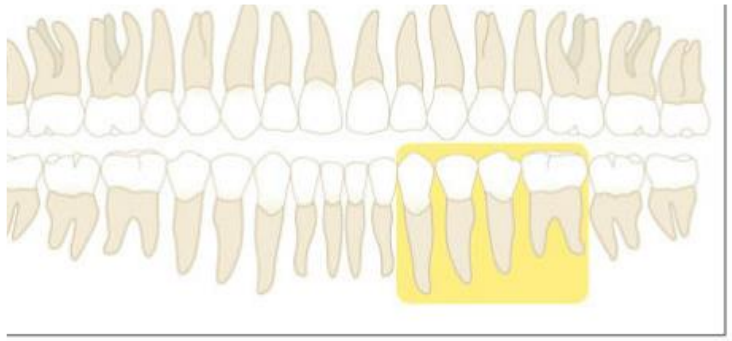


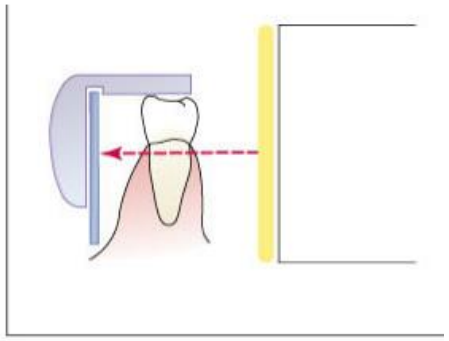


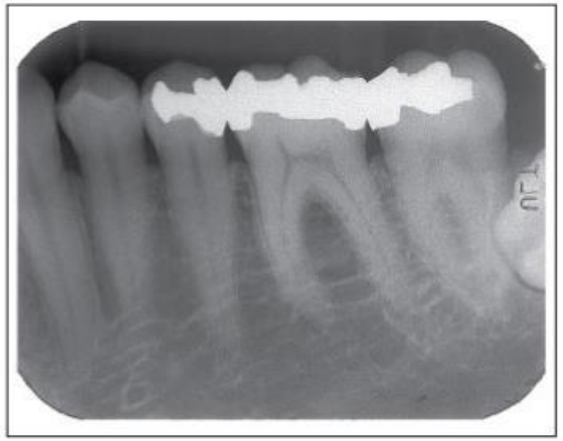


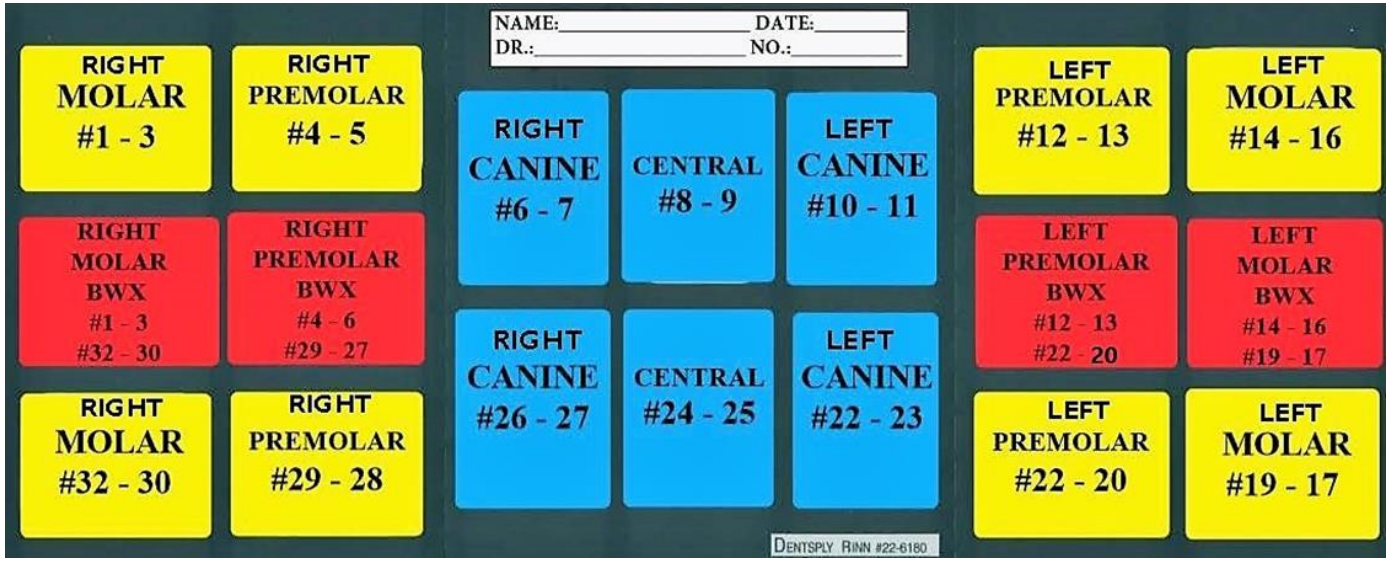


Posterior Rinn Placement for the Mandibular Premolars









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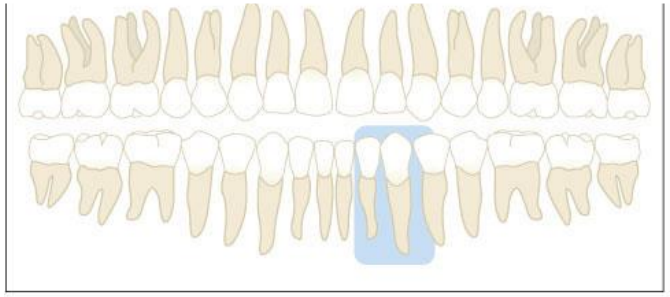
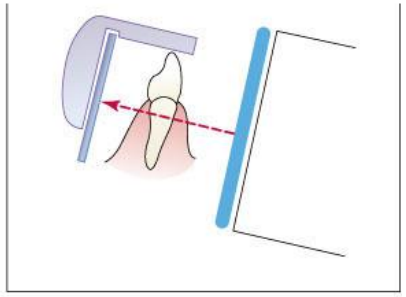
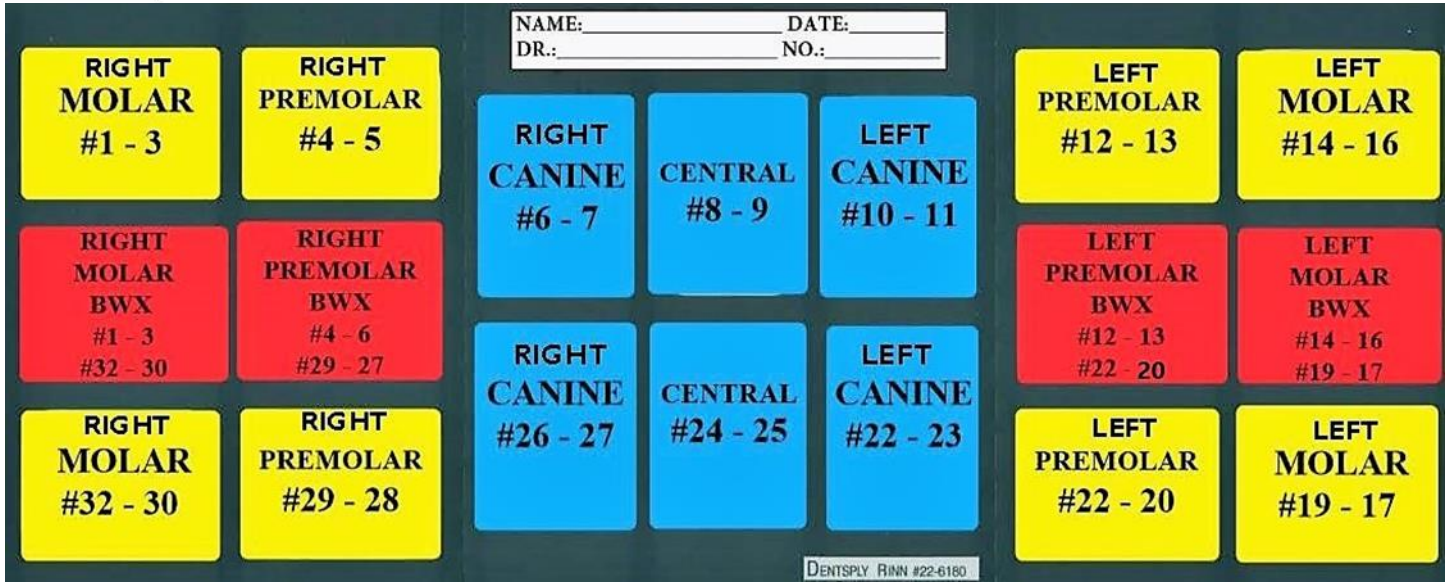
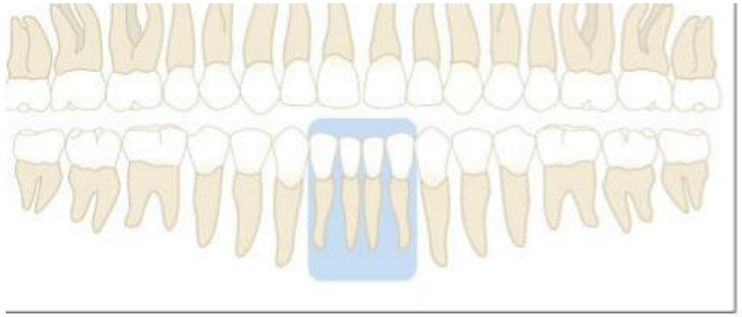
Anterior Rinn Placement for the Mandibular Canine

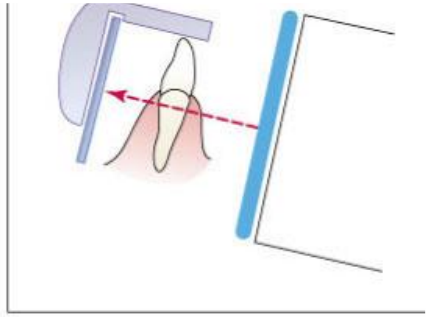


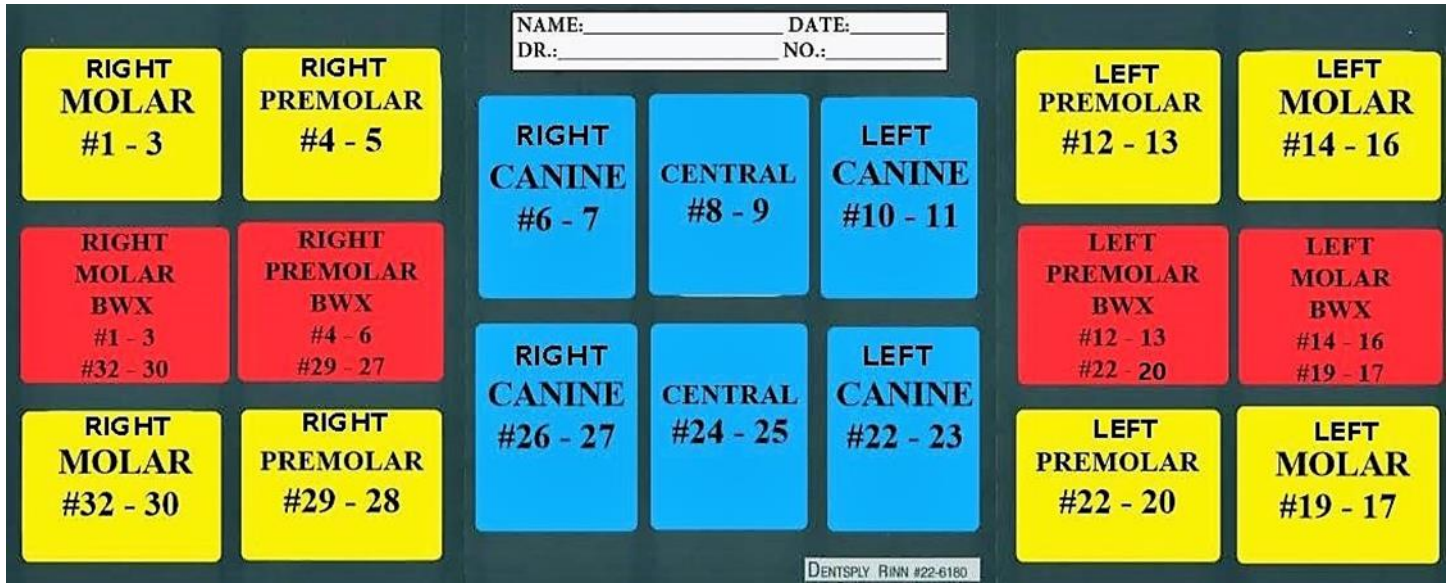




Anterior Rinn Placement for the Mandibular Centrals







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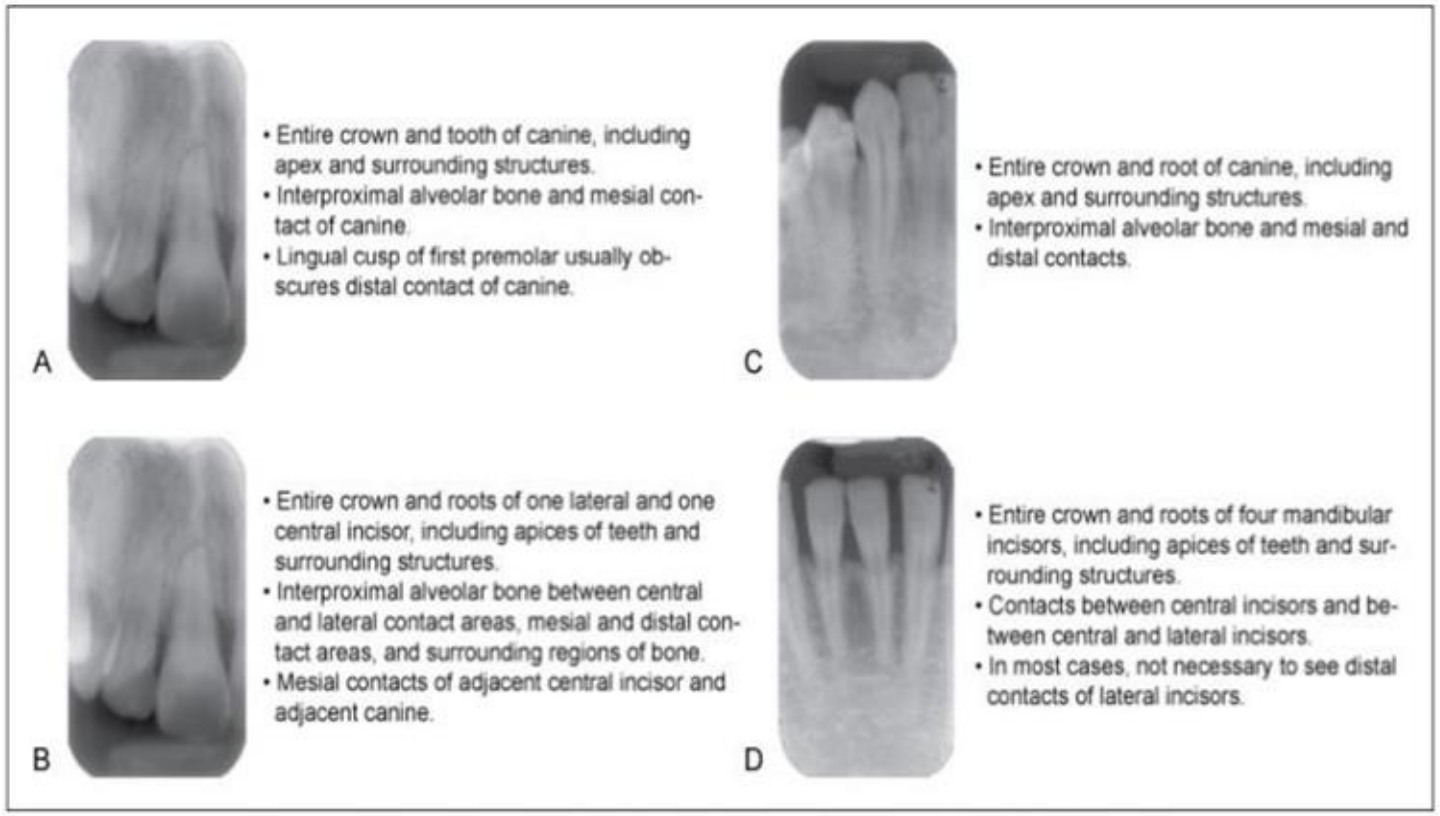
What You Want to See on an Anterior Film



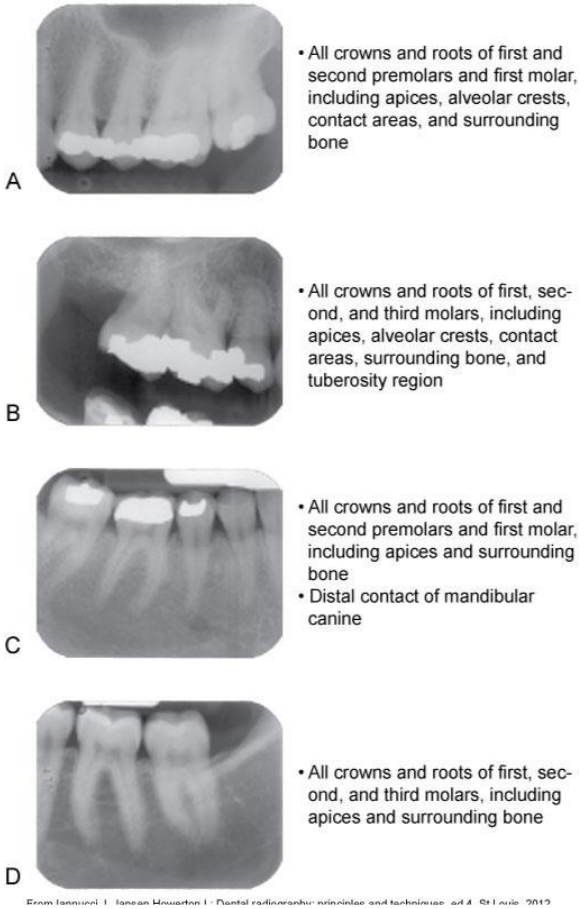
From Iannucci J, Jansen Howerton L: Dental radiography: principles and techniques, ed 4, St Louis, 2012, Saunders.

Fig. 41-11. Anterior periapical film placement shows structures visible on the radiograph. **A,** Maxillary canine exposure. **B,** Maxillary incisor exposure. **C,** Mandibular canine exposure. **D,** Mandibular incisor exposure.

What You Want to See on a Posterior Film

Crown, Root, and Sinus Cavity (Sinus only on Maxillary)

Crown, Root, Apex, and Surrounding Bone



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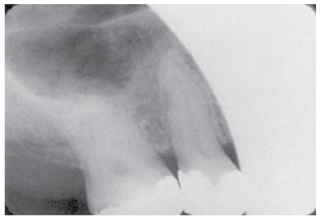
COMMON ERRORS WHEN TAKING AN X-RAY

Cause: Underexposed
Correction: Check exposure settings & increase as needed

Cause: Overexposed
Correction: Check exposure settings & decrease as needed

Cause: Movement
Correction: Stabilize patient/x-ray tubehead before exposure



Cause: Cone-Cut
Correction: Align tubehead to be positioned with the XCP Target

Cause: Overlapping – Incorrect angulation
Correction: Align tubehead to be aligned w/ contact of the teeth

Cause: Occlusal Plane Misaligned
Correction: Reposition the XCP for the patient to be able to bite properly

Cause: Foreshortened – angle too steep
Correction: Ensure the X-ray beam is perpendicular (90 degrees) to the long axis of the teeth

Cause: Elongated – angle too shallow
Correction: Avoid directing the beam at an angle that is too shallow.