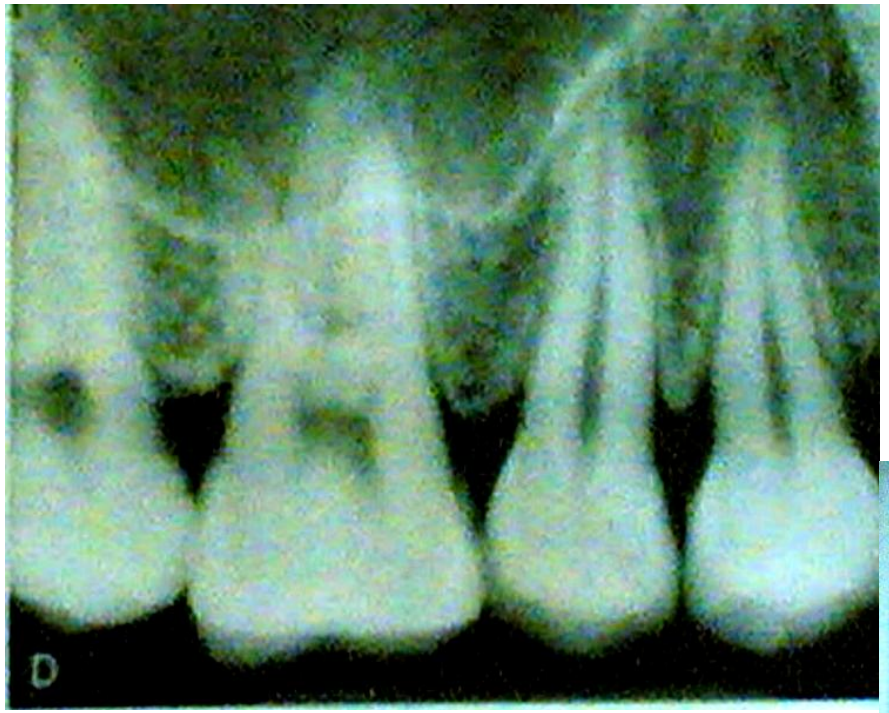
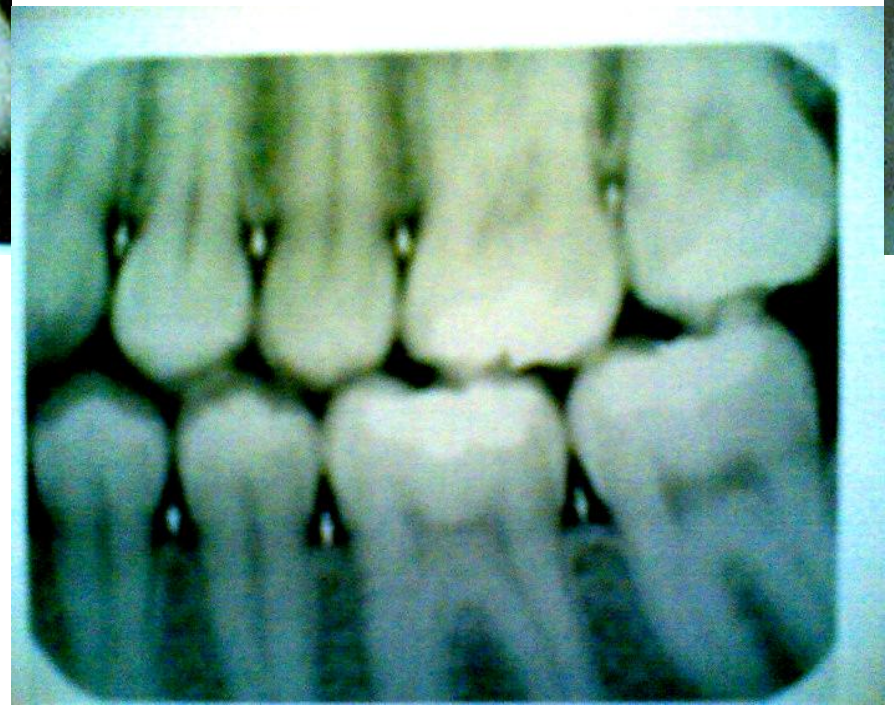
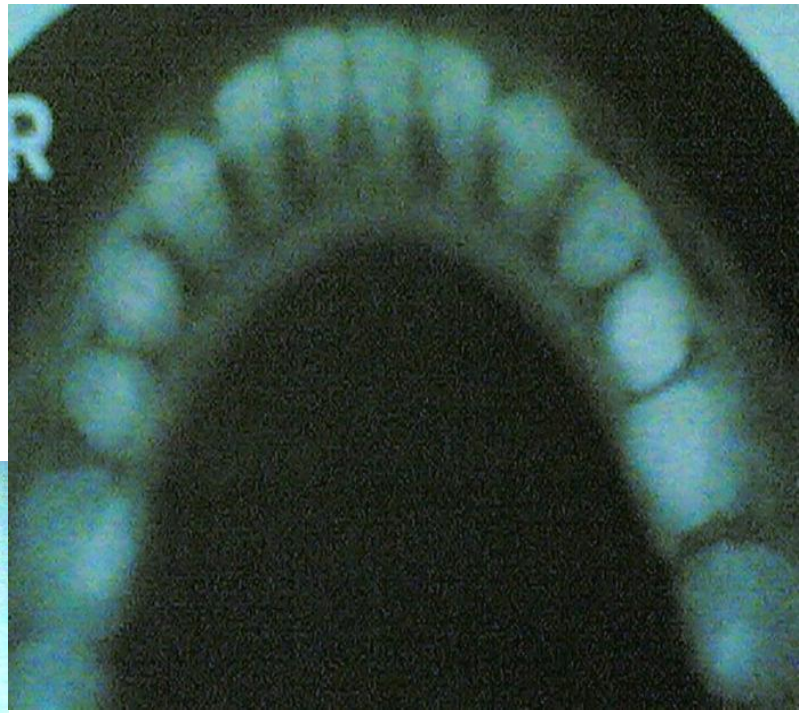
Intraoral projection 8





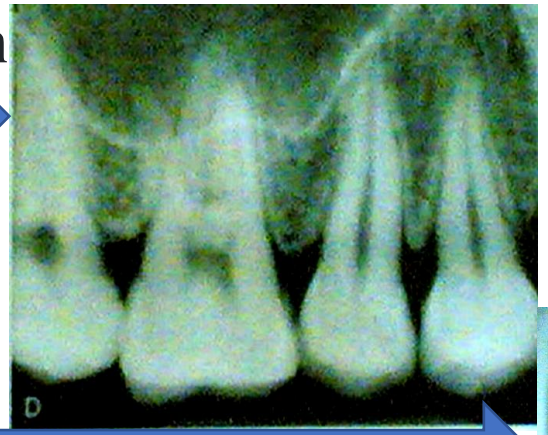


Prof. Abbas A Y Taher

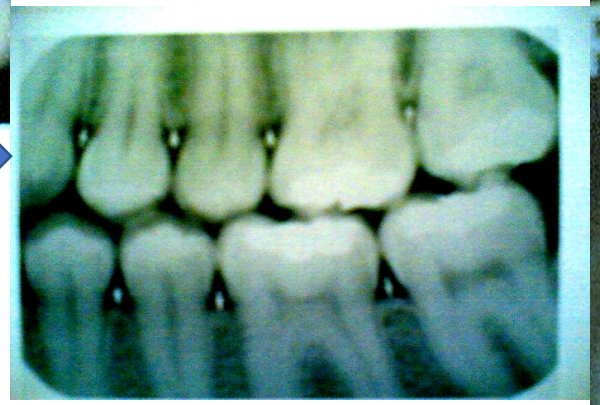
What is intraoral radiography (IOR)?

• **IOR:** a group name for different types of **dental exposures**, in which the image receptor is placed in the **patient's mouth**

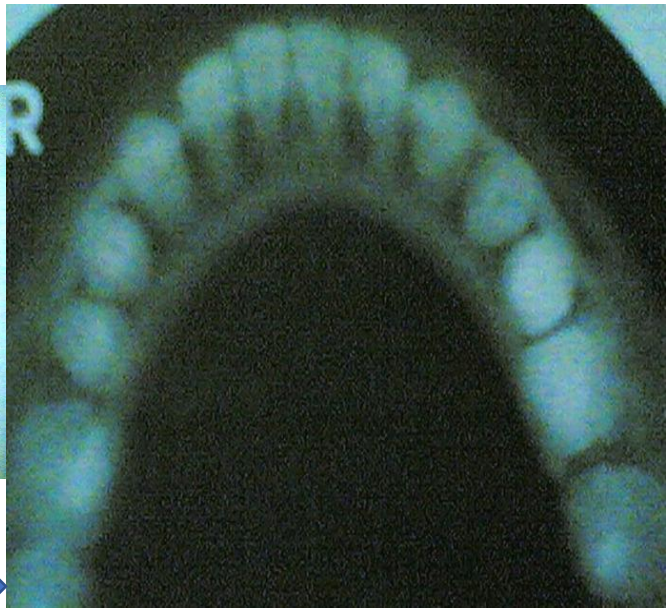
• Periapical radiography



• Bitewing radiography

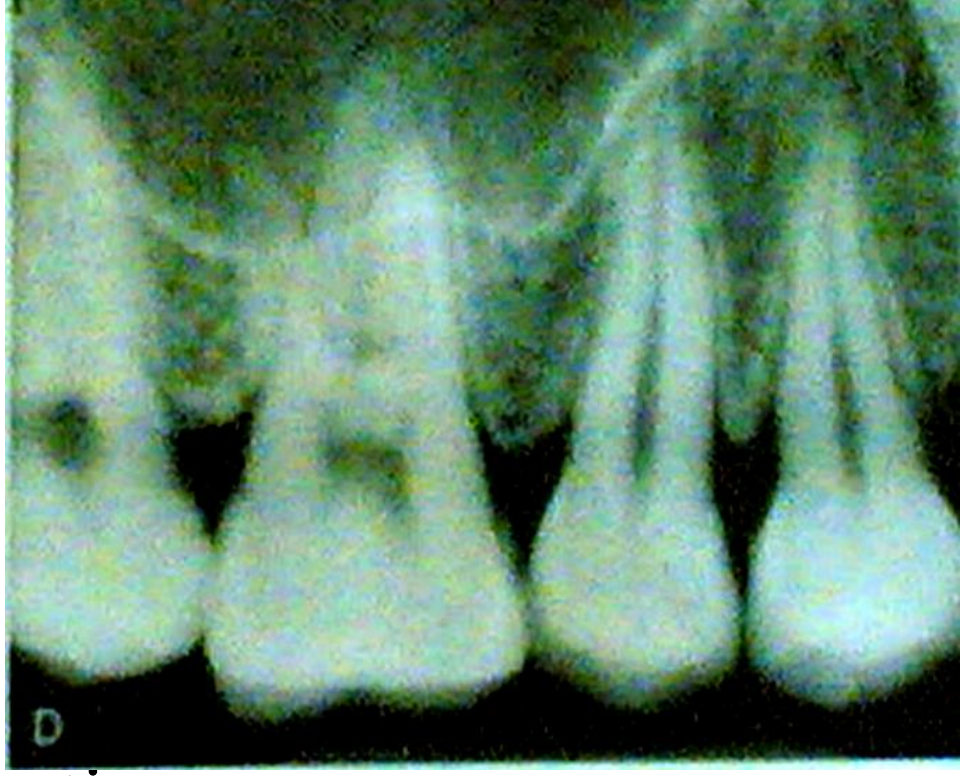


• Occlusal radiography



• All IOR make use of the same X-ray tube, with different receptor sizes and positioning devices being used depending on the type of IOR

Periapical Radiography:



Indication of this technique :

1-Detection of apical disease

2-Truma to the teeth and alveolar bone

3-During endodontics treatment

4-Presence or absence of unerrupted teeth

5-Assessment of root morphology during extraction

6-Evaluation of apical cyst and other lesions within the alveolar bone

7-Evaluation of implant

8-Assessment of periodontal status

The common Periapical Radiographic Technique:

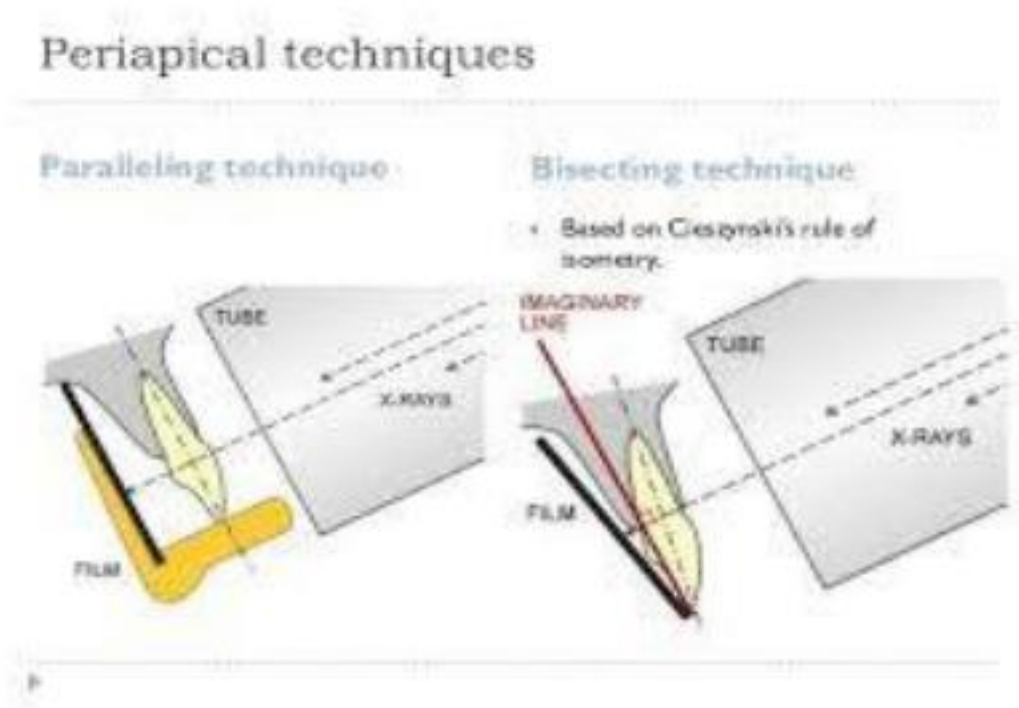
1-Parallel Technique: or Right angle or Long cone Technique

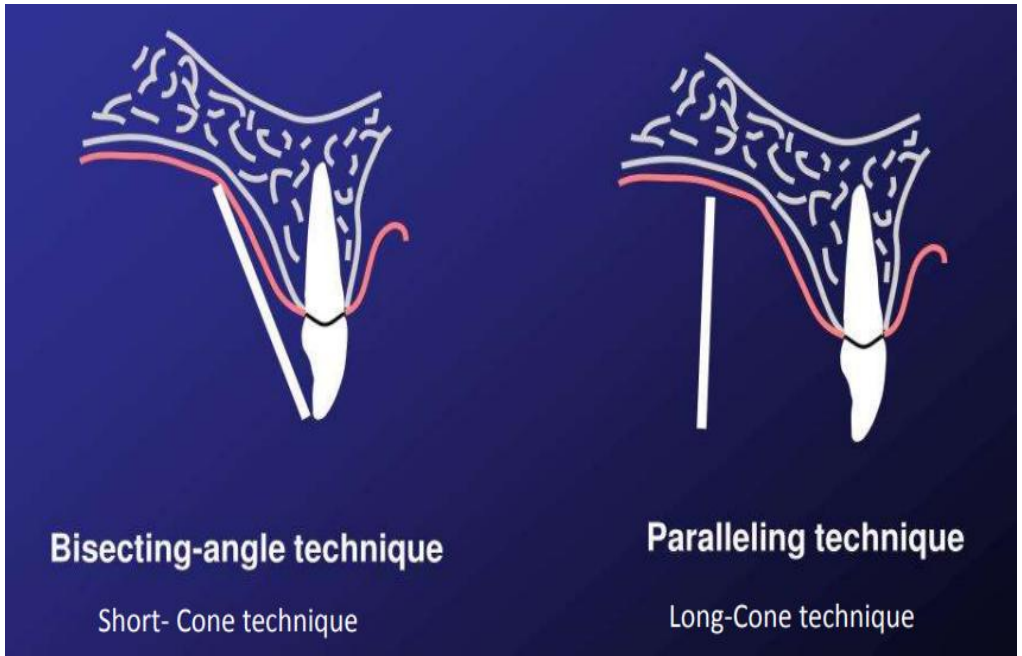
2-Bisecting Technique

Paralleling Technique:

The Basic Principles of the Paralleling Technique:

1. The film is placed in the mouth parallel to the long axis of the tooth being radiographed
2. The central ray of the X-ray beam is directed perpendicular (at right angle) to the film and long axis of the tooth
3. A film holder must be used to keep the film parallel with the long axis of the tooth
4. Long cone should be used to make the target – object distance as long as possible





Preparing a Patient for the Paralleling Technique

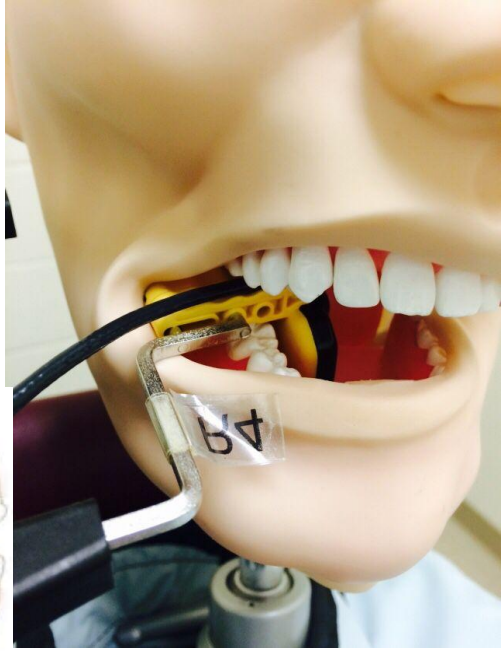
With this technique, the film is placed parallel to the long axis of a tooth, allowing the X-ray to be focused perpendicular to the long axis of the tooth. The patient is seated upright in the dental chair and should remove any removable dental appliances, glasses or jewelry that could interfere with the X-ray beam.
Ensure they are seated high enough so it is easy to see the occlusal surfaces of the teeth and check for any aphthous ulcers or sores that could interfere with the images. If any are present, it may be necessary to consider a different technique as touching them with the film could exacerbate them.

The patient is protected with a lead apron and thyroid collar.

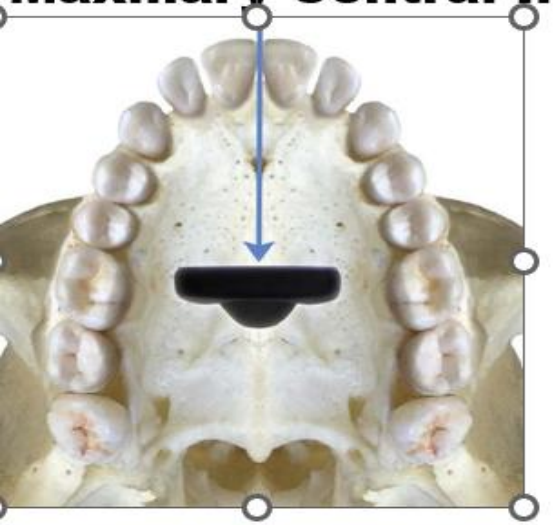
Mandibular periapical X-rays tend to be more difficult to take due to the position of the floor of the mouth and the tongue. The patient needs to be instructed to relax their mouth and tongue so the film can be placed between the mylohyoid ridge and the tongue. Guide the film into place with an index finger before asking the patient to slowly close their mouth. It is very important that the teeth are fully closed onto the bite surface as this will ensure the film is correctly positioned so the apical area is completely covered. Patients often find this type of X-ray quite uncomfortable but reminding them to relax their musculature can help improve comfort levels.

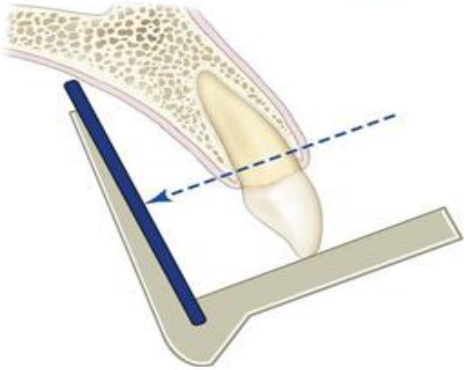
Reducing the Risk of Errors

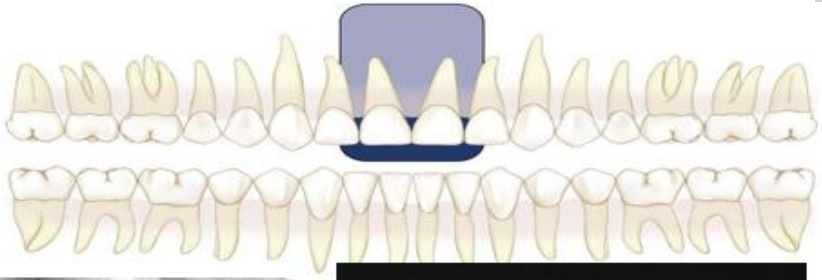
Common errors that can affect the quality of the image include failing to remove glasses or jewelry which may mean these objects obscure anatomical structures. Using the incorrect size of film or the incorrect orientation for the area being examined can result in incomplete coverage. Incorrectly focusing the X-ray on the film may result in important anatomical structures being obscured. Additionally, if the patient fails to bite down properly, the Rinn instrument may become incorrectly angled.

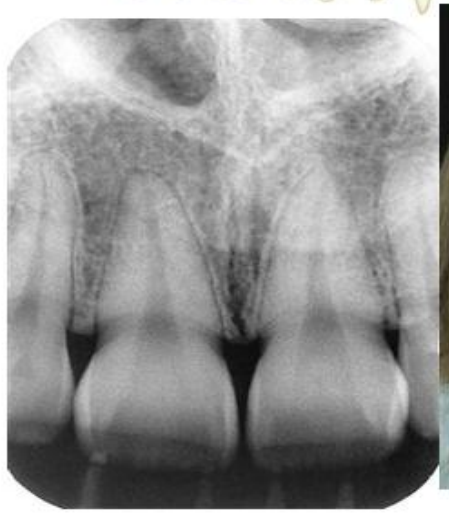


Paralleling Technique •
Maxillary Central Incisor Projection*









The field of view on these radiographs *(shaded area)* should include both central incisors and their periapical areas.

Place a No. 1 receptor at about the level of the second premolars or first molars to take advantage of the maximal palatal height so that the entire length of the teeth can be projected on it. Have the receptor resting on the palate with its midline centered with the midline of the arch. Position the packet's long axis parallel to the long axis of the maxillary central incisors

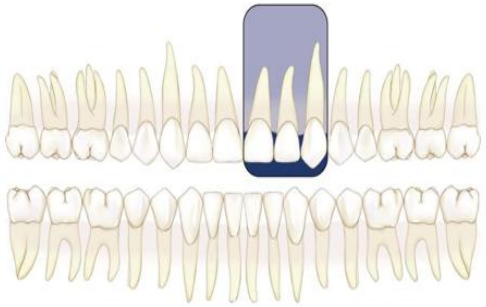
Once mastered, this technique is faster and more accurate than using the Rinn, since you do not need to change the apparatus between shots. It always produces the least distorted shadow possible when the angle of the sensor and teeth can be compensated for by the beam angle.

This technique is essential with occlusal x-rays on a child. Place sensor in the child's mouth perpendicularly to the long axes of both the upper and lower incisors. Aim the beam perpendicularly to the film surface and angle midway between perpendicular to the sensor and perpendicular to the teeth.

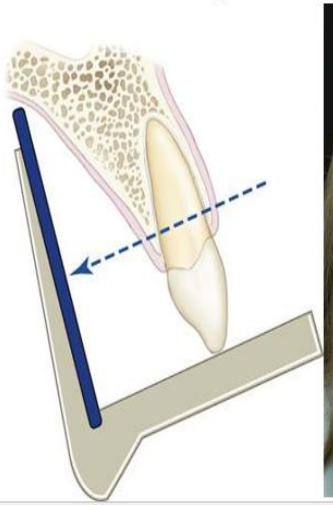
Rinn's XCP system sensor holders help keep film perpendicular to the x-ray beam which eliminates one source of distortion, but they cannot eliminate the distortion produced when the sensor is not parallel to the teeth. With practice, developing a technique that utilizes angle bisecting does produce less distorted intraoral images and saves quite a lot of time.

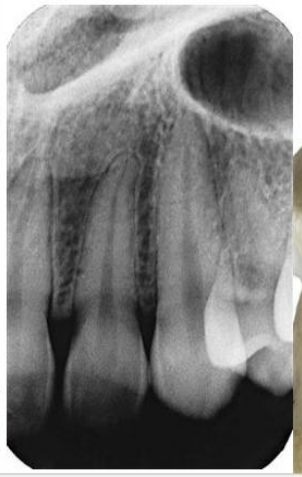
Maxillary Lateral Projection

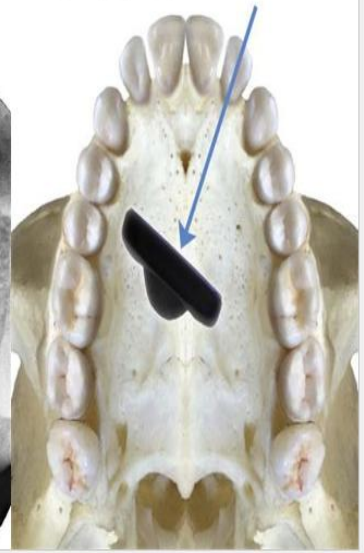
This projection should show the lateral incisor and its periapical field centered on the radiograph. Include the mesial interproximal area with the distal aspect of the central incisor on the radiograph so that no overlap is evident



Receptor deep in the oral cavity parallel with the long axis and the mesiodistal plane of the maxillary lateral incisor.

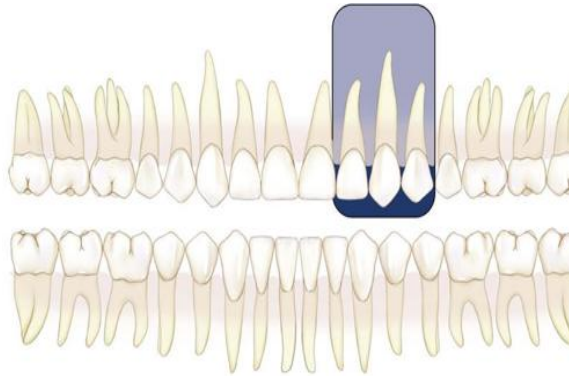






Maxillary Canine Projection

This projection should demonstrate the entire canine, with its periapical area, in the midline of the radiograph. Open the mesial contact area. Ignore the distal contact because it will be visualized on other projection

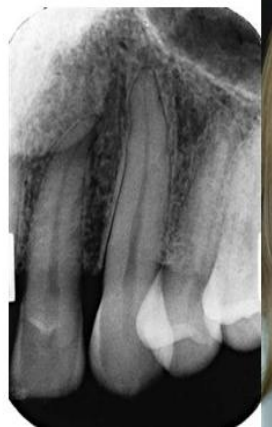


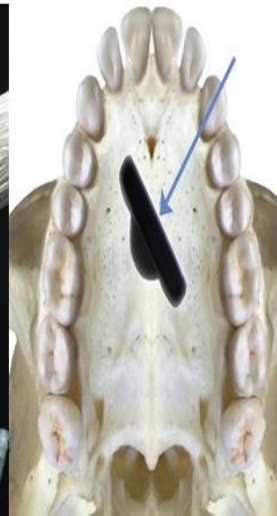
No. 1 receptor against the palate, well away from the palatal surface of the teeth. Orient the receptor packet with its anterior edge at about the middle of the lateral incisor and its long axis parallel with the long axis of the canine.

Position the holding instrument so that it directs the beam through the mesial contact of the canine. Do not attempt to open the distal contact.

Point of Entry.

Direct the central ray through the canine eminence. The point of entry is at about the intersection of the distal and inferior borders of the ala of the nose.

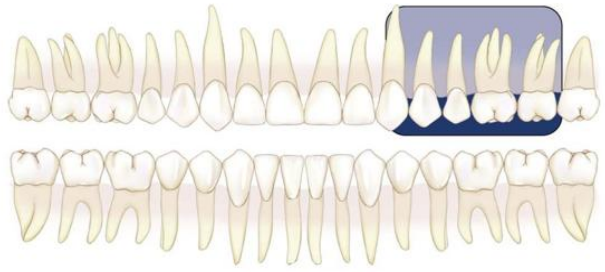


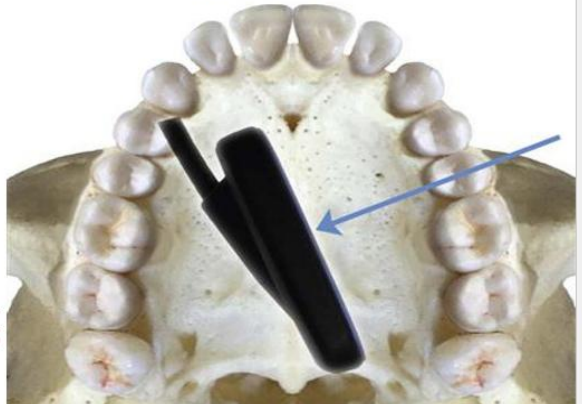


Maxillary Premolar Projection

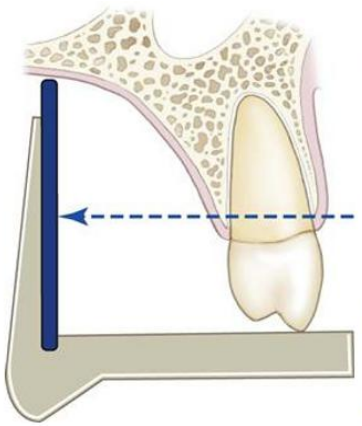
Receptor Placement.

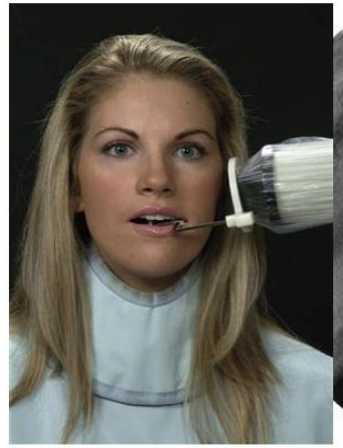
Place a No. 2 receptor in the mouth with the long dimension parallel with the occlusal plane and in the midline and near the palatal midline. The packet should extend far enough forward to cover the distal half of the canine. It should also include the premolars and the first molar and maybe the mesial portion of the second molar. The plane of the receptor should be nearly vertical to correspond with the long axis of the premolar teeth. Position the receptor-holding device so that the long axis of the receptor is parallel with the mean buccal plane of the premolars. This establishes the proper horizontal angulation

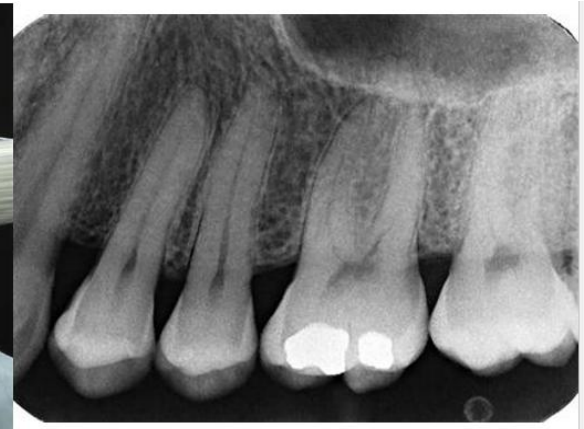




The radiograph of this region should include the images of the distal half of the canine and the premolars, with room for at least the first molar.







Direct the central ray perpendicular to the receptor. The horizontal angulation of the holding instrument should be adjusted to permit the beam to pass through the interproximal area between the first and second premolars.

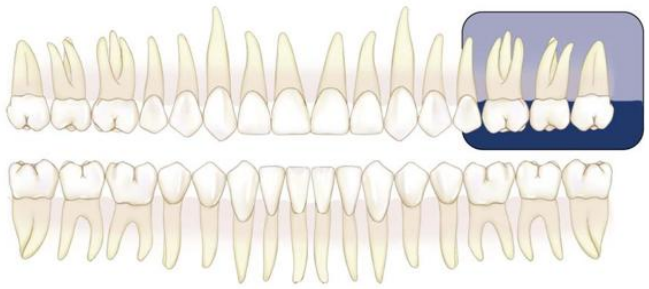
Point of Entry.

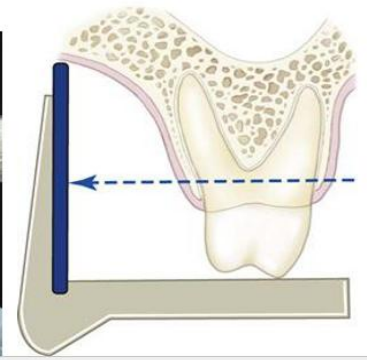
Place the holding instrument so that the central ray passes through the center of the second premolar root. This point usually is below the pupil of the eye.

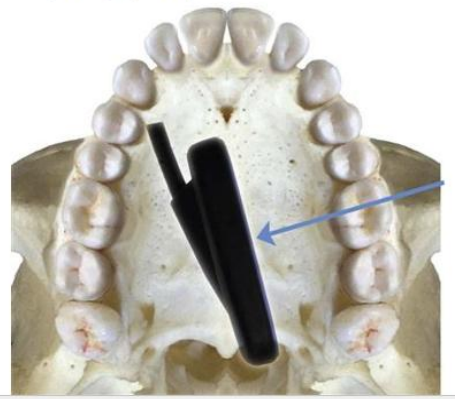
Maxillary Molar Projection

Image Field.

The radiograph of this region should show the images of the distal half of the second premolar, the three maxillary permanent molars, and some of the tuberosity. Include the same area on the receptor even if some or all molars are missing. If the third molar is impacted in an area other than the region of the tuberosity, a distal oblique or extraoral projection (e.g., panoramic or oblique lateral jaw view) may be require







Maxillary Molar Projection

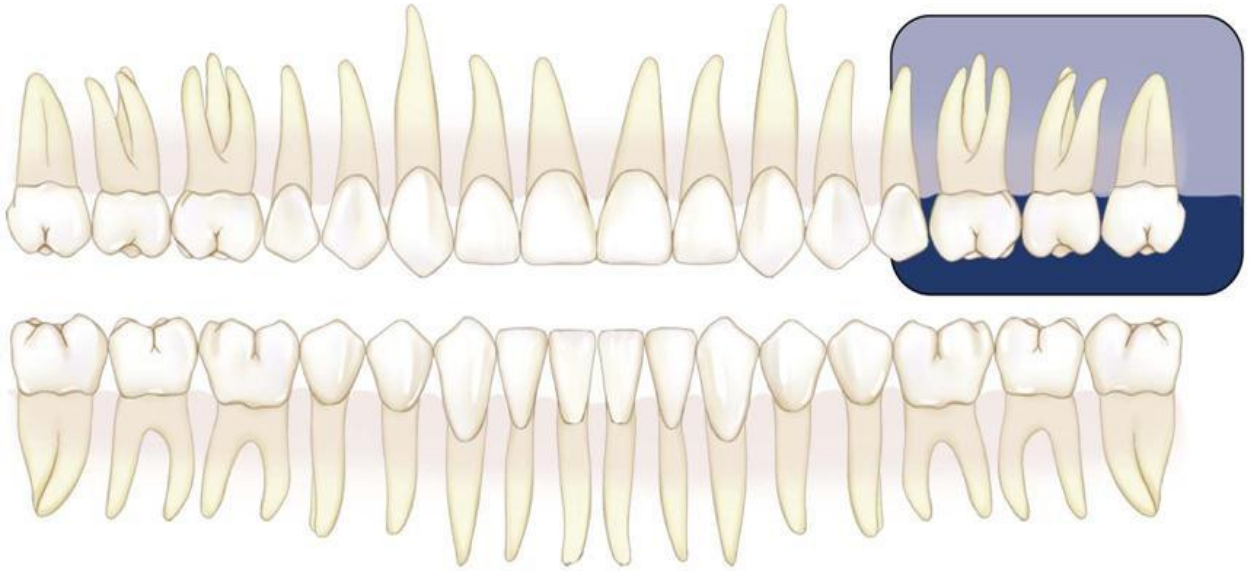
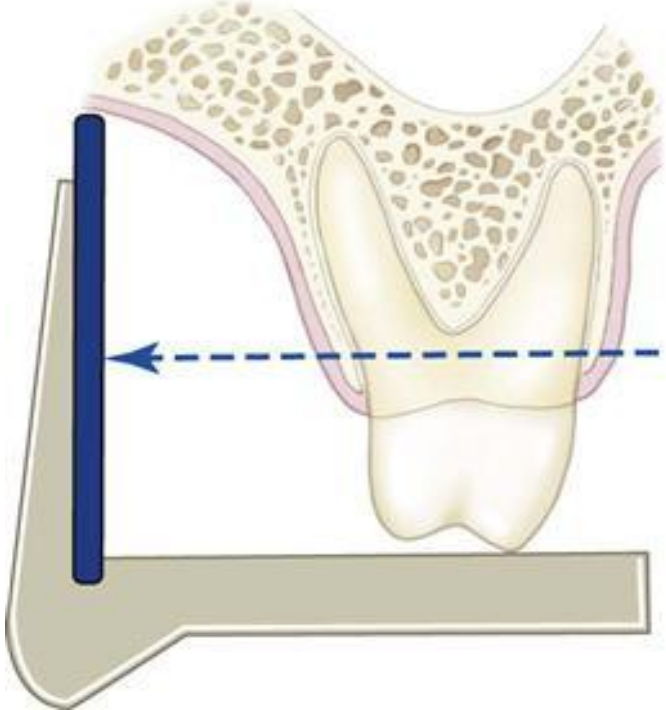
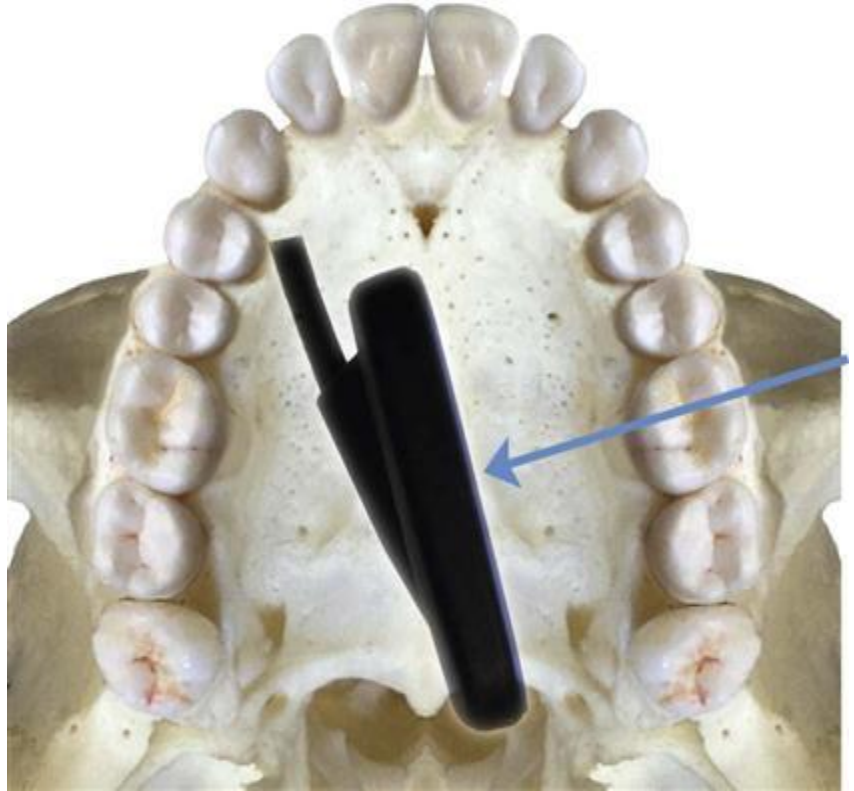


Image Field.

The radiograph of this region should show the images of the distal half of the second premolar, the three maxillary permanent molars, and some of the tuberosity. Include the same area on the receptor even if some or all molars are missing. If the third molar is impacted in an area other than the region of the tuberosity, a distal oblique or extraoral projection (e.g., panoramic or oblique lateral jaw view) may be require





Mandibular Centrolateral Projection

Image Field.

Center the image of the mandibular central and lateral incisors and their periapical areas on the receptor. Because the space in this area frequently is restricted, use two of the narrower anterior periapical receptors for the incisors to provide good coverage with minimal discomfort. In addition, the incisor contact areas are better visualized on two narrower anterior receptors because the angulation of the central ray can be adjusted for the contact area on each side.

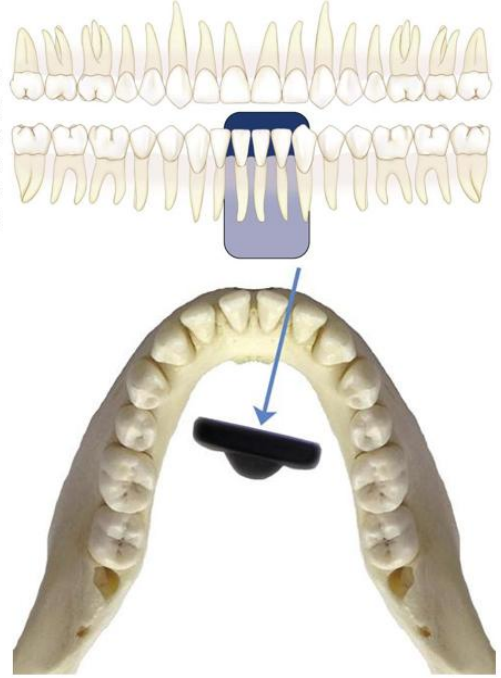


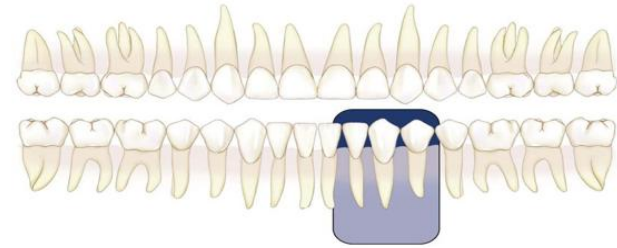
Image Field.

Center the image of the mandibular central and lateral incisors and their periapical areas on the receptor. Because the space in this area frequently is restricted, use two of the narrower anterior periapical receptors for the incisors to provide good coverage with minimal discomfort. In addition, the incisor contact areas are better visualized on two narrower anterior receptors because the angulation of the central ray can be adjusted for the contact area on each side

Mandibular Canine Projection

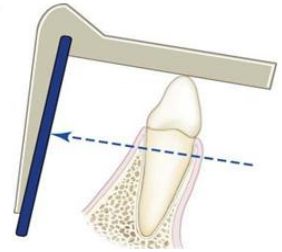
Image field:

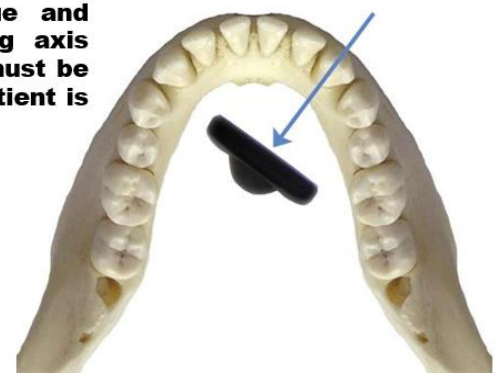
This image should show the entire mandibular canine and its periapical area. Open its mesial contact area. The distal contact is included on other projections.



Receptor Placement.

Place a No. 1 receptor packet in the mouth with its long dimension vertical and the canine in the midline of the receptor. Position it as far lingual as the tongue and contralateral alveolar process permit, with its long axis parallel and in line with the canine. The instrument must be tipped with the bite-block on the canine before the patient is asked to close.

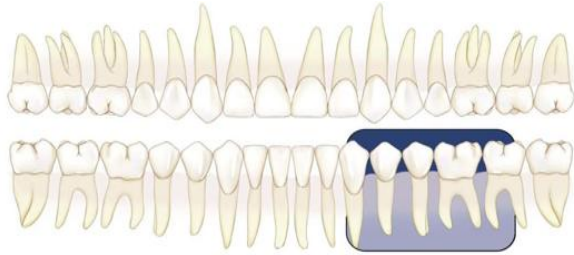




Mandibular Premolar Projection

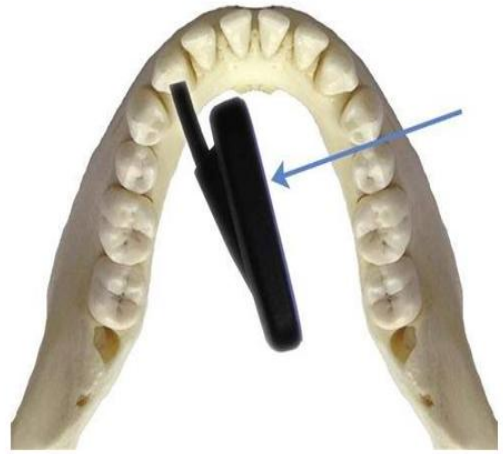
Image Field.

The radiograph of this area should show the distal half of the canine, the two premolars, and the first molar.



Receptor Placement.

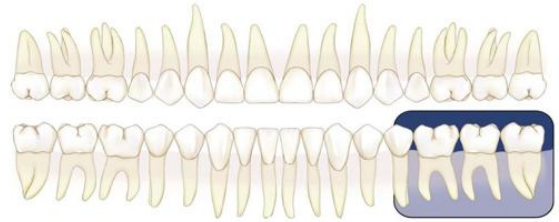
Bring the No. 2 receptor into the mouth with its plane nearly horizontal. Rotate the lead edge to the floor of the mouth between the tongue and the teeth with the anterior border near the midline of the canine. Place the receptor away from the teeth to position it in the deeper portion of the mouth. Placing the receptor toward the midline also provides more room for the anterior border of the receptor in the curvature of the jaw as it sweeps anteriorly. Prevent the anterior border from contacting the very sensitive attached gingiva on the lingual surface of the mandible.



Mandibular Molar Projection

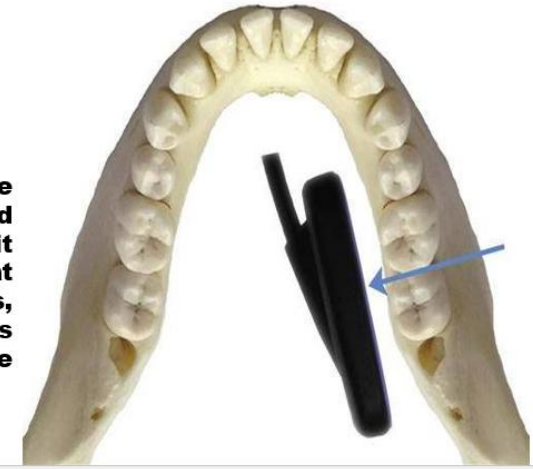
Image Field.

The radiograph of this region should include the distal half of the second premolar and the three mandibular permanent molars. In the case of an impacted third molar or a pathologic condition distal to the third molar, a distal oblique molar projection or even additional extraoral projections (panoramic or lateral ramus) may be required to demonstrate the area adequately. If the molar area is edentulous, place the receptor far enough posterior to include the retromolar area in the examination.



Receptor Placement.

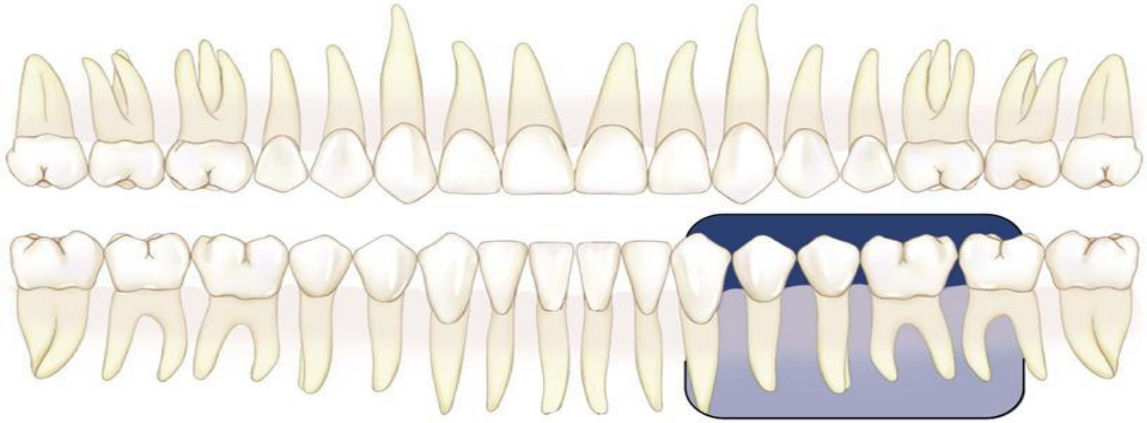
Place the No. 2 receptor in the mouth with its plane nearly horizontal. Rotate the inferior edge downward beneath the lateral border of the tongue, displacing it medially. The anterior edge of the receptor should be at about the middle of the second premolar. In most cases, the tongue forces the receptor near the alveolar process and molars, aligning it parallel with the long axis of the teeth and the line of occlusion



Mandibular Premolar Projection

Image Field.

The radiograph of this area should show the distal half of the canine, the two premolars, and the first molar.



Receptor Placement.

Bring the No. 2 receptor into the mouth with its plane nearly horizontal. Rotate the lead edge to the floor of the mouth between the tongue and the teeth with the anterior border near the midline of the canine. Place the receptor away from the teeth to position it in the deeper portion of the mouth. Placing the receptor toward the midline also provides more room for the anterior border of the receptor in the curvature of the jaw as it sweeps anteriorly. Prevent the anterior border from contacting the very sensitive attached gingiva on the lingual surface of the mandible.

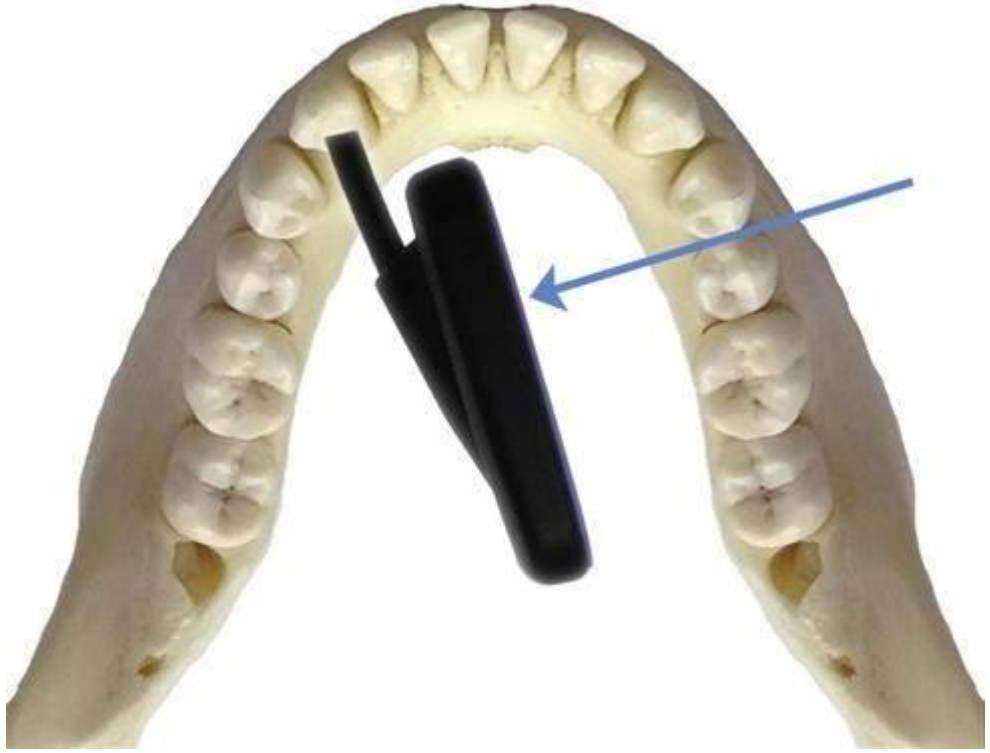


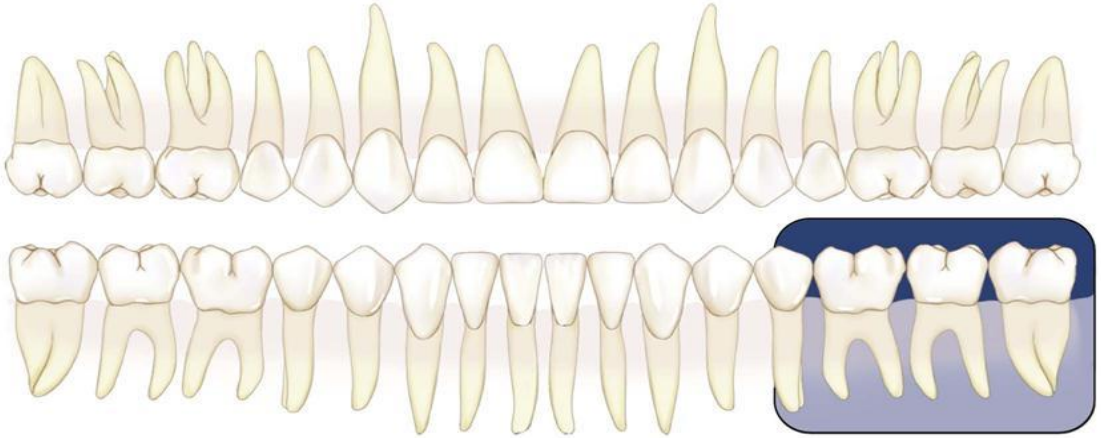
Image Field.

The radiograph of this area should show the distal half of the canine, the two premolars, and the first molar.

Mandibular Molar Projection

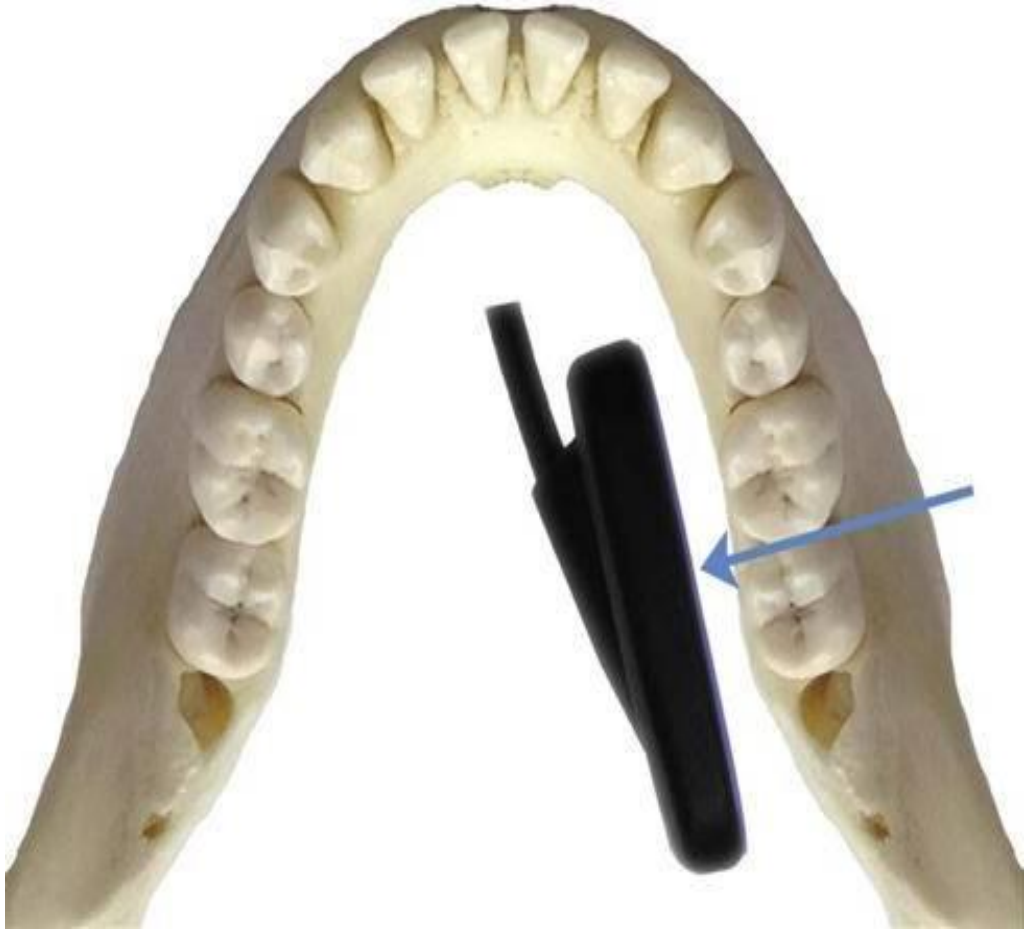
Image Field.

The radiograph of this region should include the distal half of the second premolar and the three mandibular permanent molars. In the case of an impacted third molar or a pathologic condition distal to the third molar, a distal oblique molar projection or even additional extraoral projections (panoramic or lateral ramus) may be required to demonstrate the area adequately. If the molar area is edentulous, place the receptor far enough posterior to include the retromolar area in the examination.



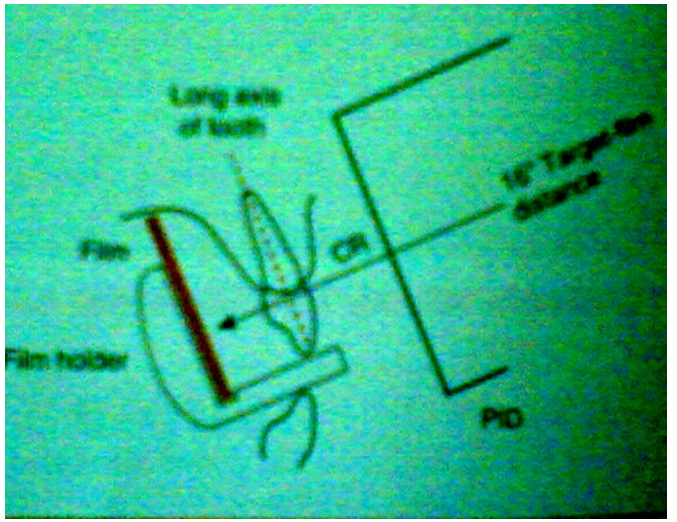
Receptor Placement.

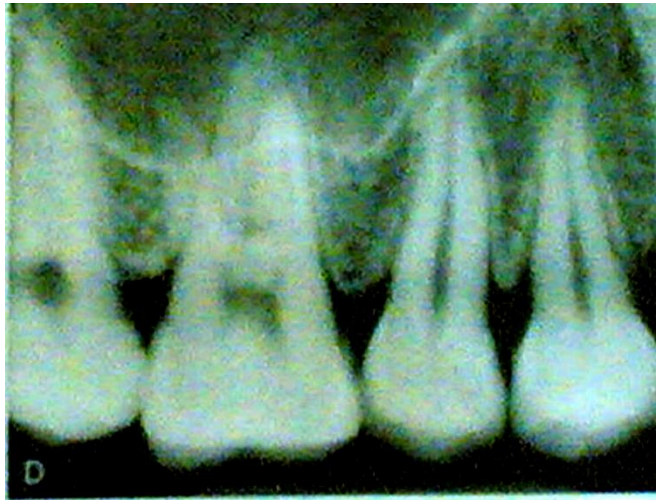
Place the No. 2 receptor in the mouth with its plane nearly horizontal. Rotate the inferior edge downward beneath the lateral border of the tongue, displacing it medially. The anterior edge of the receptor should be at about the middle of the second premolar. In most cases, the tongue forces the receptor near the alveolar process and molars, aligning it parallel with the long axis of the teeth and the line of occlusion



To achieve **parallelism between the film and the tooth** ,the film must be placed away from the **tooth** and **toward the middle of the oral cavity** .

The object – film distance must be **increased to keep the film parallel** with the long axis of the tooth .





Because the film is placed away from tooth , image magnification and loss of definition result , so to compensate for image magnification, the target –film distance must be increased to ensure that only the most parallel rays will be directed at the **tooth and film** ,as a result ,a long target – film distance must be used with the paralleling technique ,so this technique sometime is known as **long – cone technique** .

Film Holder

The paralleling technique requires the use of **film holding instrument** to position the film parallel to the long axis of the tooth .

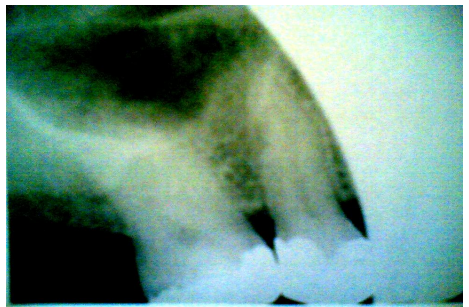
A film holder : is a device that is used to position an **intraoral film** in the mouth and retain the film in position during exposure .

Example of commercially available intraoral film holder is **Rinn XCP** instruments

X=extension , C=cone , P=paralleling

Purpose of using film holder is :

- to eliminate patient's hand exposure
- when the patient has a broken arm
- avoid cone cut the film
- assist in identifying horizontal and vertical angulations



Advantage of paralleling technique:

1.Accuracy: produce a radiographic image without dimensional distortion .

2.Simplicity : the paralleling technique is simple and is easy to learn and use . The use of a film holder with a beam alignment device eliminates

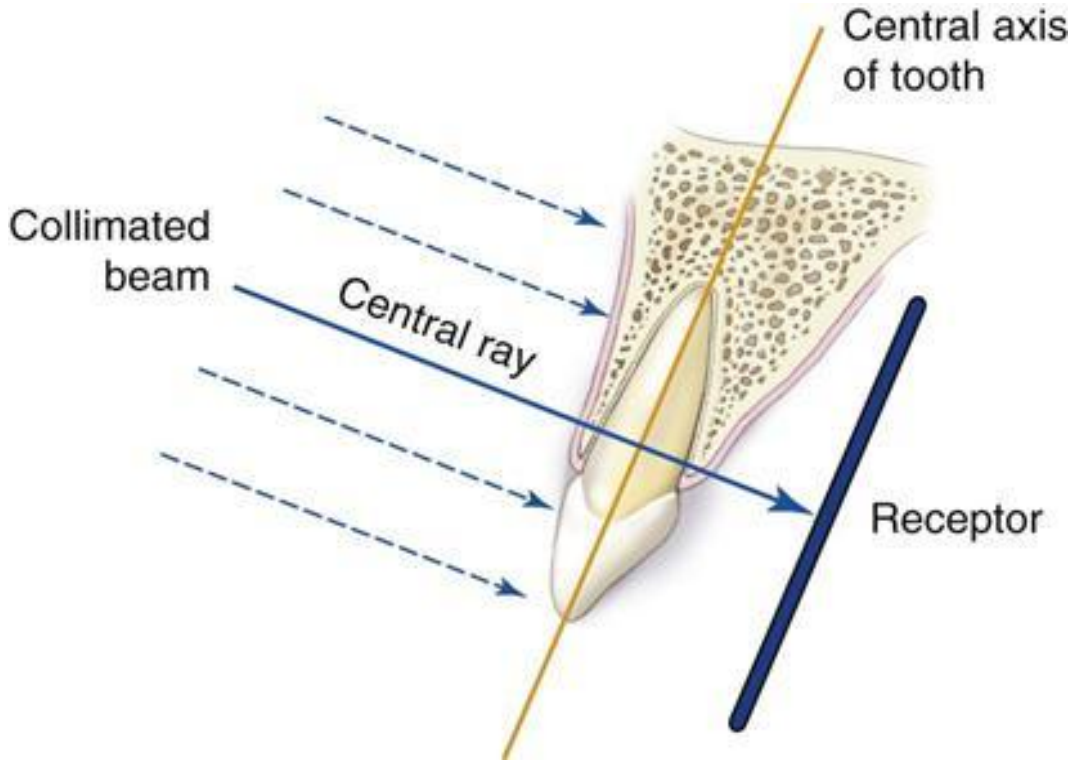
the need for the dental radiographer to determine horizontal and vertical angulation and eliminate the chances of dimensional .

3.Duplication : the paralleling technique is easy to standarized and can be duplicated , or repeated when serial radiographs are indicated .

Disadvantage :

1.Film placement :because of the film –holding device , the film placement may be difficult for the dental radiographer .

2.Discomfort : the film – holding device use , may be impinge on the oral tissue and cause discomfort for the patient .

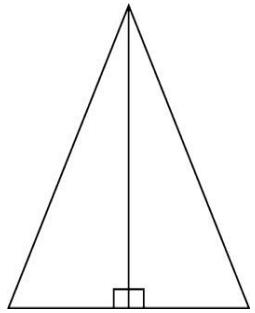


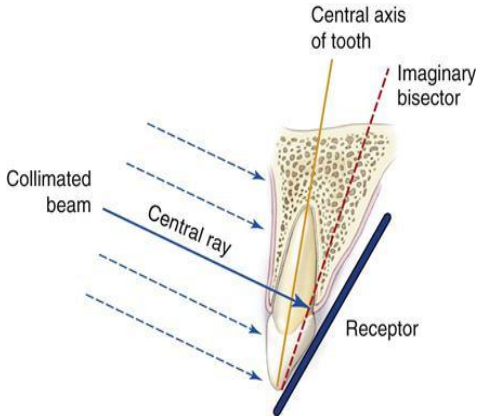
The Bisecting Angle Technique

The bisecting angle technique outlines a method to produce an image of an object, minimizing its magnification and distortion, while optimizing its image clarity.

The principles of the technique are based on simple geometry.

The rule of isometry states that two triangles are equal if they have two equal angles and share a common side





To apply this principle to intraoral imaging, the receptor (film or sensor) is positioned on the lingual or palatal surface of the mouth, resting against the tooth.

The long axis of the receptor meets the long axis of the tooth at point A (tip of the triangle).

An imaginary line bisects or divides the triangle into two equal parts (the bisector). The central ray of the X-ray tube must be aligned so that it will strike the bisector at 90 degrees (a right angle). As a result, the rule of isometry can be applied; the two newly produced triangles share a common side and have equal angles, so that the hypotenuse (the side of a right-angled triangle opposite the right angle) AC is equal in length to the hypotenuse of the other triangle AB producing an image of the object that is accurate in length

A triangle with equal angles is bisected equally, producing two equal triangles that share a common side.

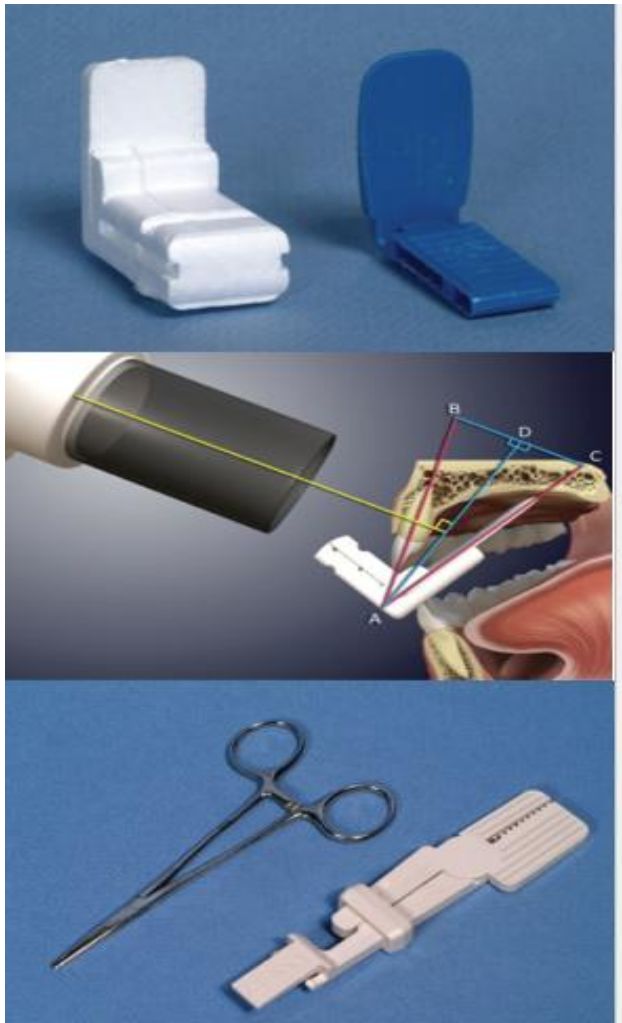
The Principles of Bisecting Technique :

An imaginary bisector of the angle formed by the long axis of the tooth and the x-ray film ,the angle is formed where the film contacts the tooth crown . The operator need to direct the central ray of beam through the apex of the tooth in such a manner that it strikes the bisector at right angle , such angulation , if properly employed , result in a tooth image that is exactly the length of the object .

Receptor Holders Used for the Bisecting Angle Technique

Styrofoam and rigid plastic stabilizers are composed of different materials, with a similar design. The occlusal or incisal portion of the receptor rests in a groove located in the horizontal base of the stabilizer. The groove provides alignment and retains the receptor in position. The vertical component of the stabilizer supports the vertical component of the receptor, preventing any bending (more commonly a problem when using film type receptors). When positioned lingual or palatal in the mouth, the horizontal base of the stabilizer projects between the occlusal surfaces of the teeth where the patient bites firmly onto it as they close their teeth together, providing stabilization.

•***Hemostat and the Snap-A-Ray®*** *holders* (for-merly known as the Eezee-Grip® film holder) are used in a similar fashion. The open end of each instrument grasps the occlusal portion of the receptor in a horizontal orientation (parallel to the edge), so that when the receptor is positioned palatal or lingual to the teeth, the handle of the devise protrudes out of the mouth. The Snap-A-Ray® has the unique feature of extending a horizontal plate over the occlusal surfaces of the teeth, allowing further stabilization as the patient is instructed to close their teeth together



Positioning of the patient :

When **either the parallel** or **bisecting technique** is used

1.The patient should be seated on the **dental chair** in a comfortable position .

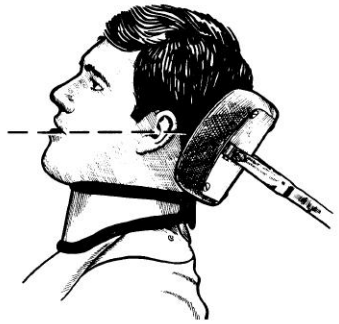
The patient should be **placed in an upright position** ,some operators feels that a procedure of tipping the patient's back on the chair gives them greater opportunity to observe film placement in relation to the long axis of the teeth .

Recently ,many dentists have equipped their dental clinic with **contour chair** and have learned to do most operation with the patient in a supine position .

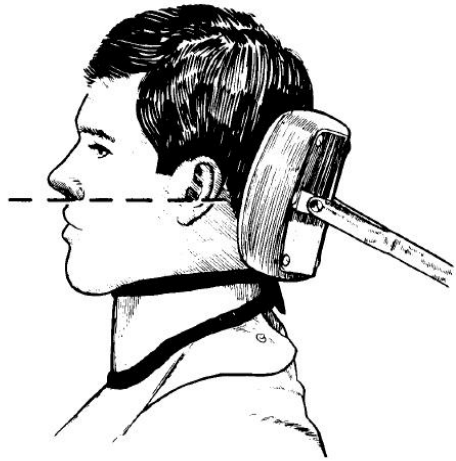
2.Occlusal plane of the jaw being examined should be **parallel with the floor**

3.Chair height should be higher when the lower arch is being examined .

4-For images of the maxillary arch, the patient's head should be positioned upright with the sagittal plane vertical and the occlusal plane horizontal.

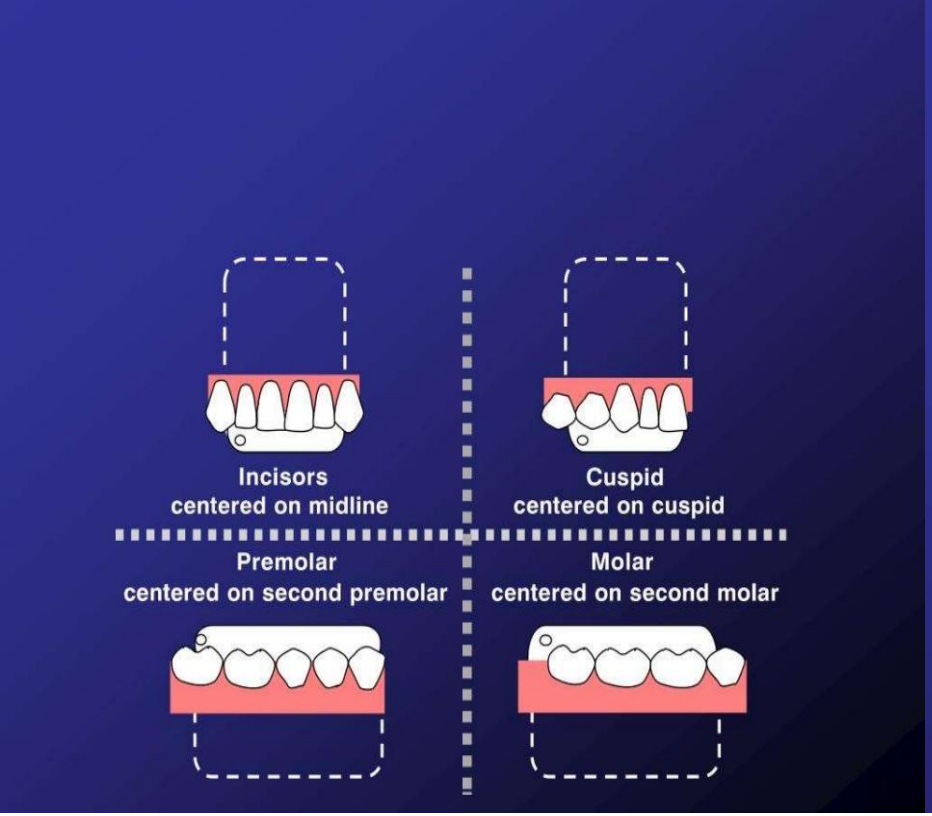


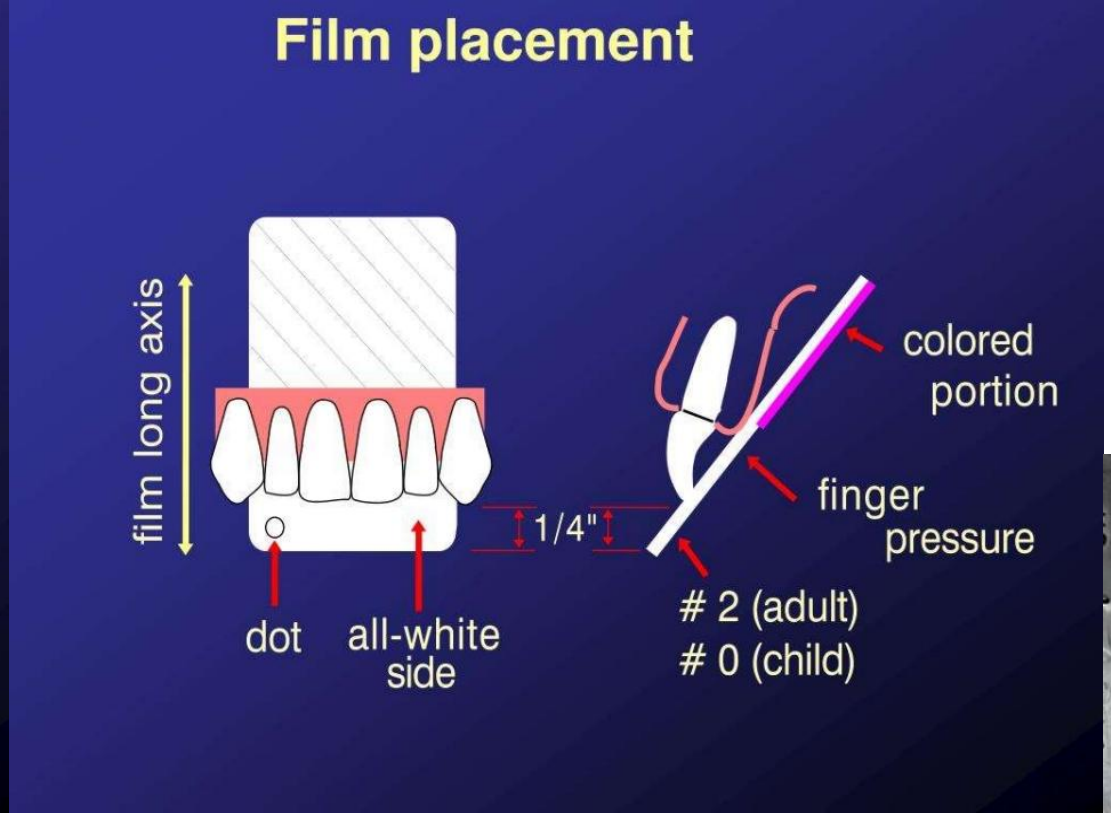
Head position for making mandibular periapical radiographs.

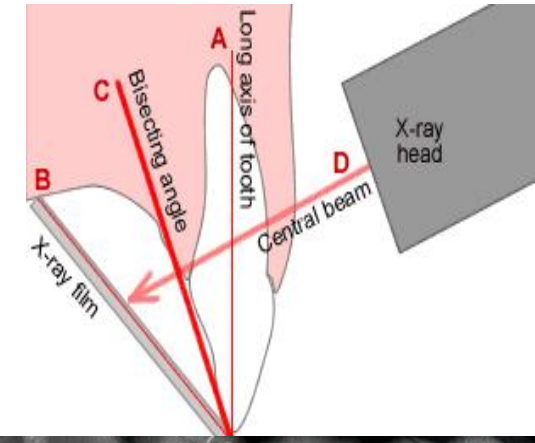


Head position for making maxillary periapical radiographs

When the mandibular teeth are to be radiographed, the head is tilted back slightly to compensate for the changed occlusal plane when the mouth is opened.





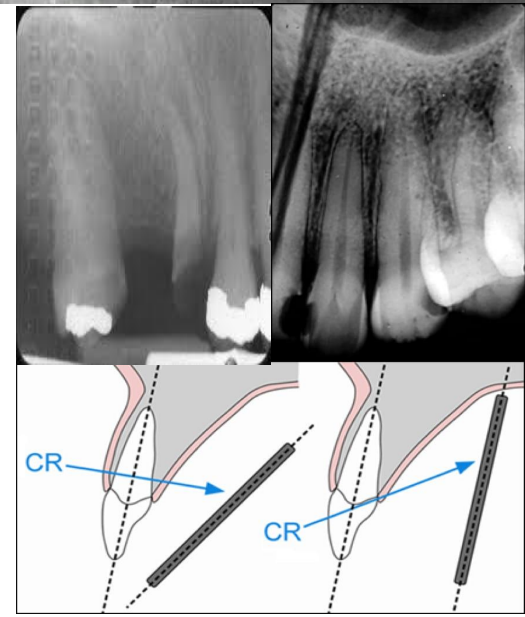


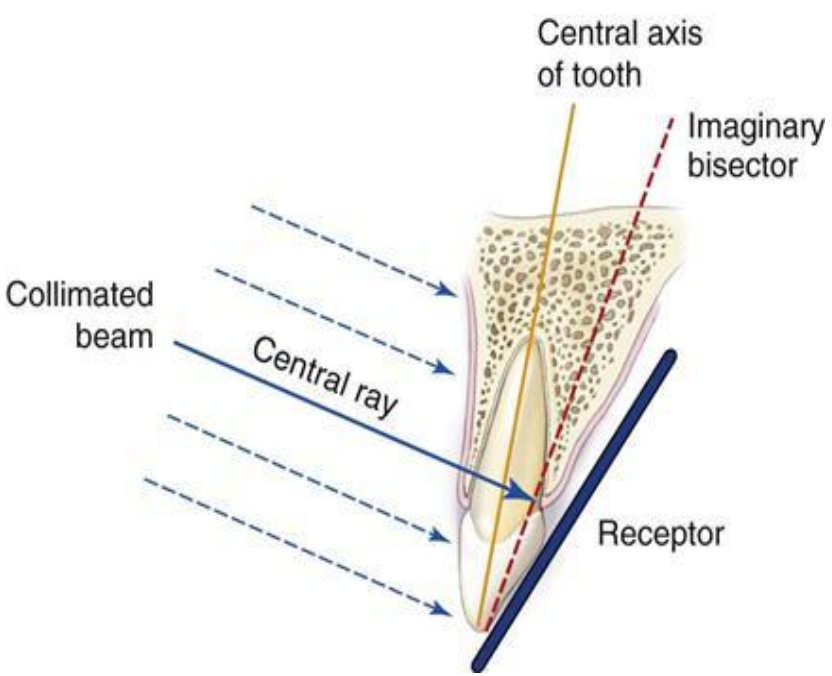
Receptor Placement:

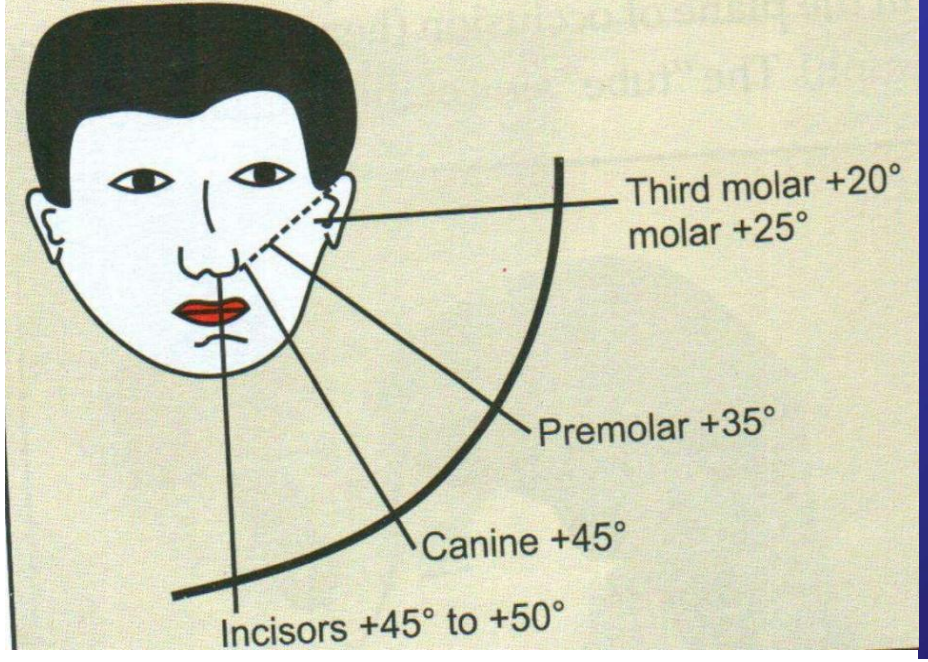
The projections described for the paralleling technique may also be used for the bisecting-angle technique. The receptor is positioned behind the area of interest, with the apical end against the mucosa on the lingual or palatal surface.

The occlusal or incisal edge is oriented against the teeth with an edge of the receptor extending just beyond the teeth. If necessary for the patient's comfort, the anterior corner of a film can be softened by bending it before it is placed against the mucosa. Care must be taken not to bend the film excessively because this may result in considerable image distortion and pressure defects in the emulsion that are apparent on the processed film.

Such bending is impossible with CCD or CMOS sensors or storage phosphor plates.

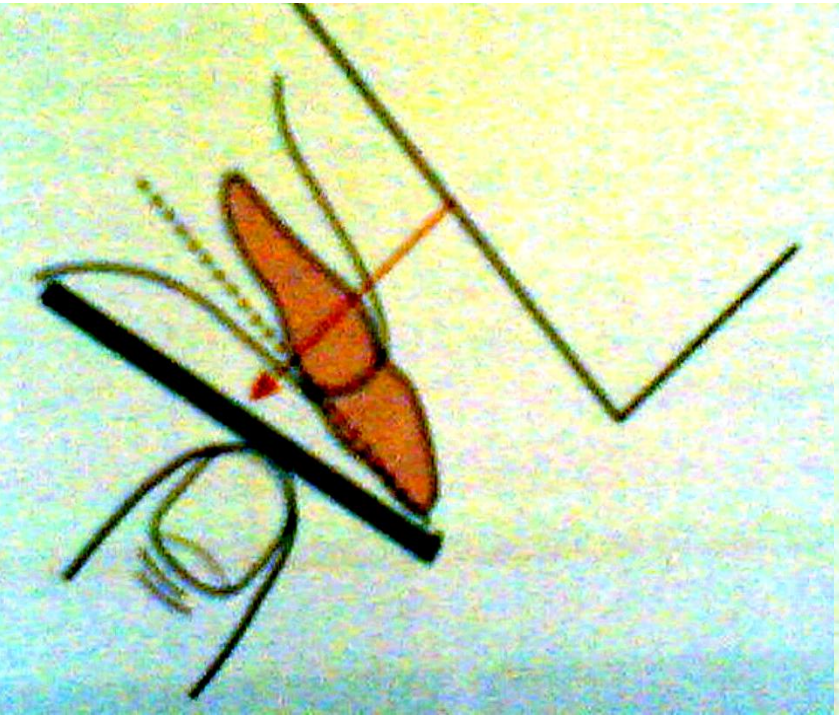


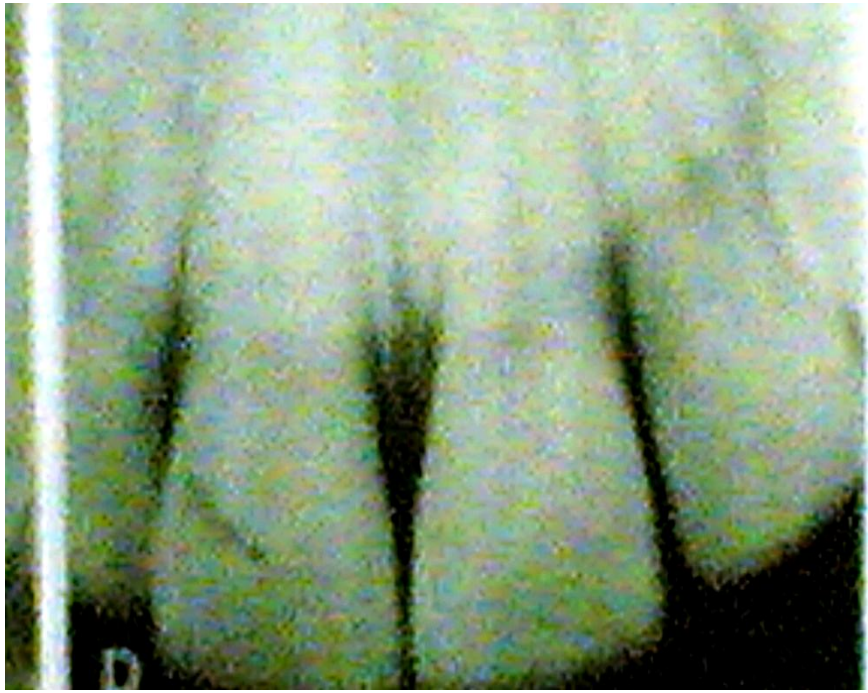




vertical angulation

Film	maxillary	mandibular
Molar	+25 to 30	0
Premolar	+35 to 40	-5 to -10
canine	+ 45 to 50	-15 to -30
incisor	+ 55 to 65	-15 to -30





Bisecting Angle Technique (Advantages)

When comparing the two periapical techniques, the advantages of the bisecting angle technique are:

1. **More comfortable**: because the film is placed in the mouth at an angle to the long axis of the teeth, the film doesn't impinge on the tissues as much.
2. A **film holder**, although available, is **not needed**. Patients can hold the film in position using a finger.
3. **No anatomical restrictions**: the film can be angled to accommodate different anatomical situations using this technique

Bisecting Angle Technique (Disadvantages)

When comparing the two periapical techniques, the disadvantages of the bisecting angle technique are:

1. **More distortion**: because the film and teeth are at an angle to each other (not parallel) the images will be distorted (see next slide).
2. **Harder to position x-ray beam**: as mentioned previously, because a film holder is often not used it is difficult to visualize where the x-ray beam should be directed.
3. **Film less stable**: using finger retention, the film has more chance of moving during placement

Comparison between parallel and bisecting technique :

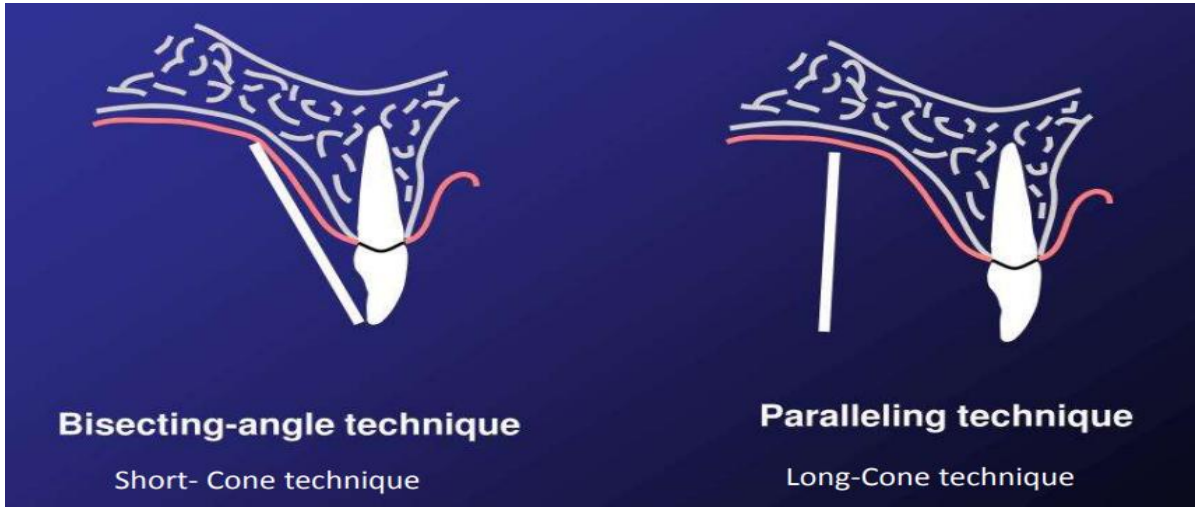
1-both procedures utilize the same **source of radiation**

2-the use of **short cone** in parallel technique is contra-indicated since the short target –object distance produce a high degree of image un-sharpness .

The bisecting technique can be used with **either short or extended distances**

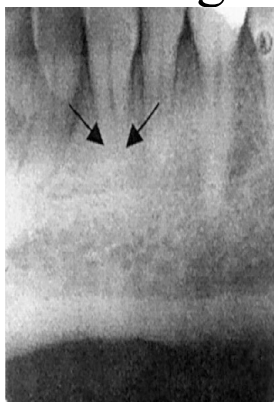
3-tooth – film distance in **parallel technique is greater** .This separation of tooth and film is due to anatomic **limitation such as palatal curvature and muscle attachment**

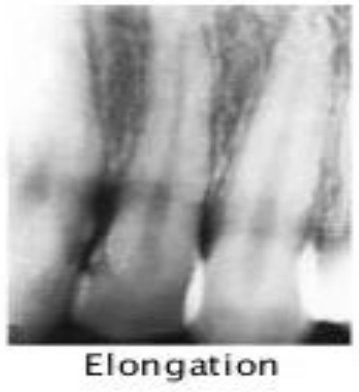
4-the parallel technique is more likely to portray an accurate anatomic representation of what actually exist .

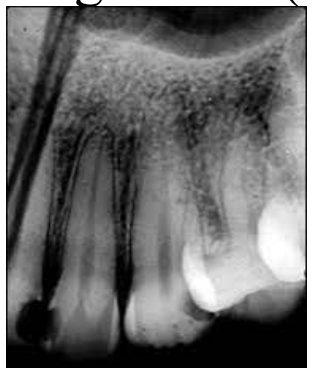


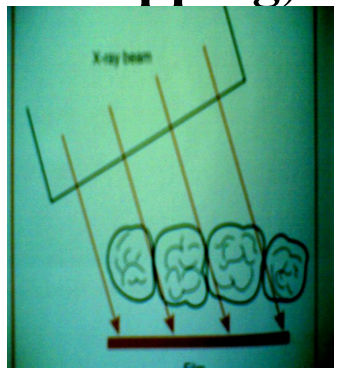
Horizontal and Vertical Angulations

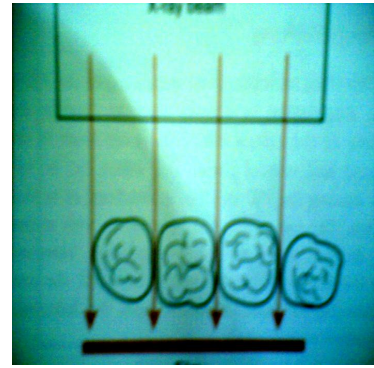
Horizontal angulation :refers to the X- ray beam direction in a horizontal plan . X- ray beam should pass through the interproximal spaces to prevent faulty horizontal angulation (**overlapping**)







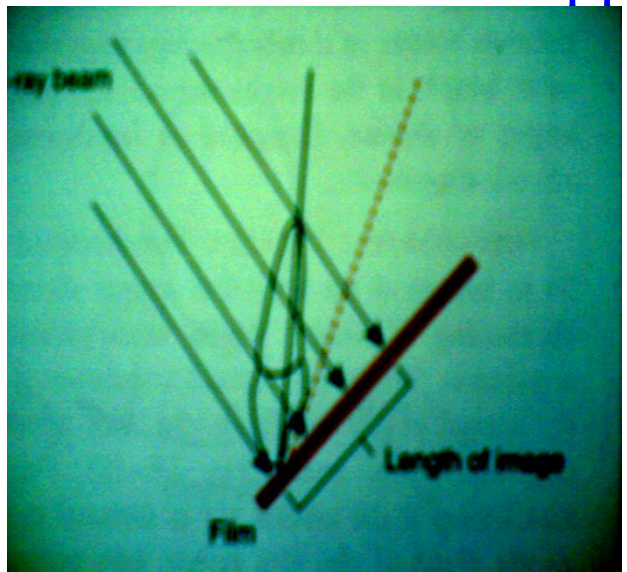


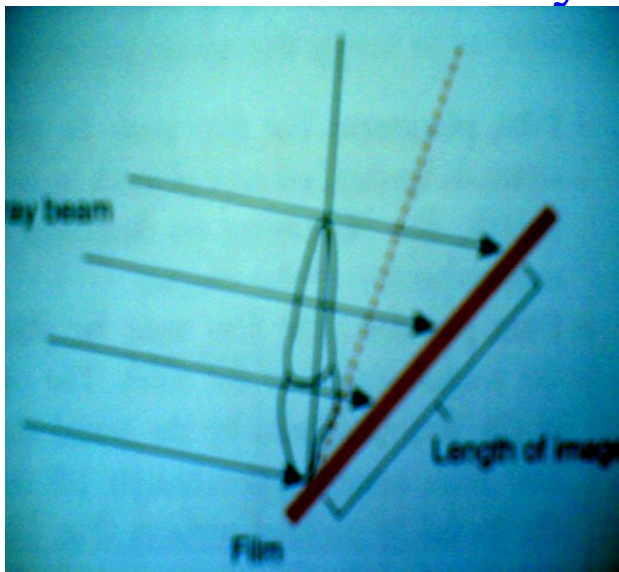


Vertical angulation :it is the angle of the X- ray beam in a vertical plan .we have two type of **vertical angulation :**

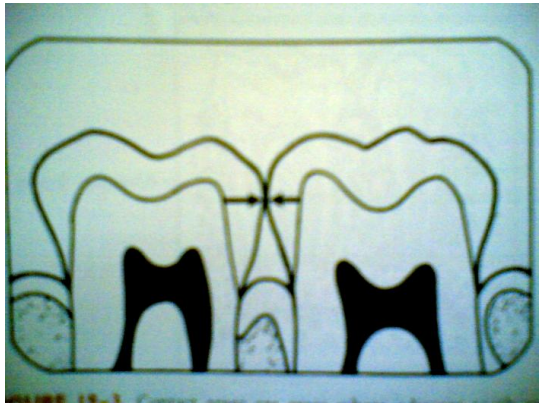
1.Plus (+):mean the beam is tipped toward the floor .

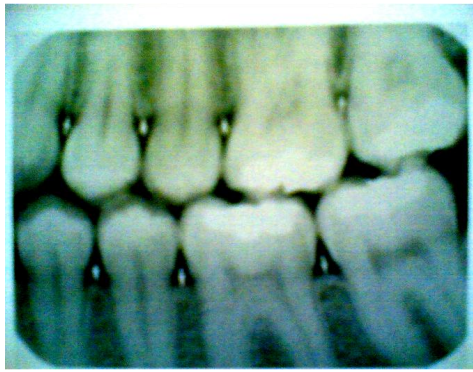
2.Minus (-):mean the beam is tipped upward . The stated angulation is the amount away from zero.





Bite Wing Radiography :



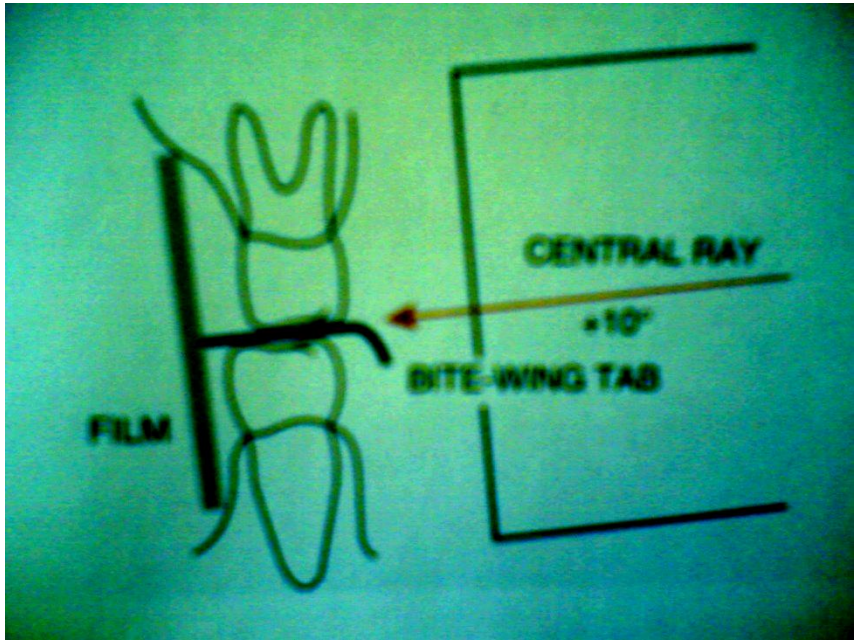


Indications of the technique :

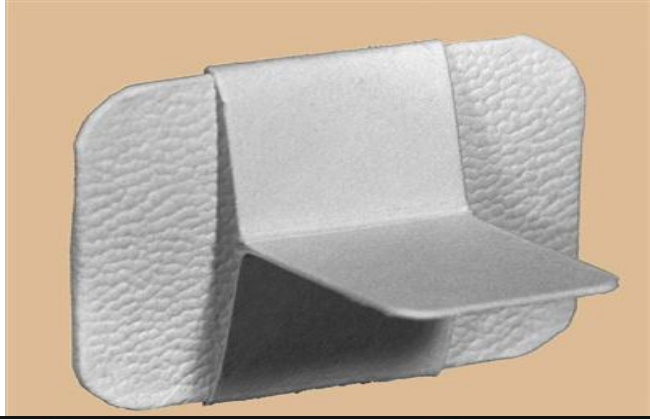
1.To demonstrate interproximal carious teeth

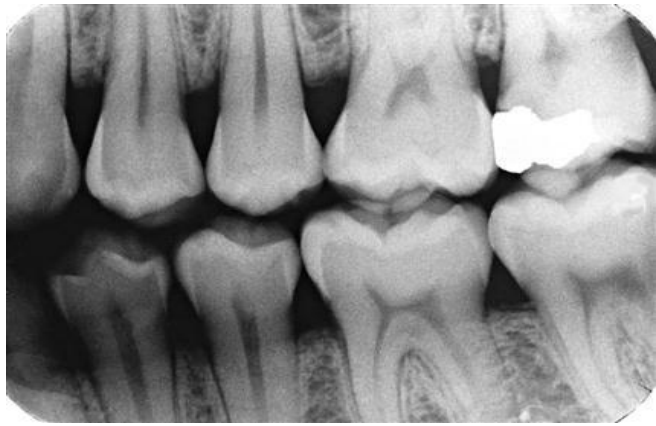
2.To demonstrate the over hanged filling

3.To demonstrate the underlying periodontal condition (interseptal bone level)



Bitewing Examinations:





Bitewing (also called **interproximal**) images include the crowns of the maxillary and mandibular teeth and the alveolar crest on the same receptor.
Bitewing receptors are particularly valuable for detecting interproximal caries in the early stages of development before it becomes clinically apparent. Because of the horizontal angle of the x-ray beam, these radiographs also may reveal secondary caries below restorations that may escape recognition in the periapical views.

Bitewing projections are also useful for evaluating the periodontal condition. They provide a good perspective of the alveolar bone crest, and changes in bone height can be assessed accurately through comparison with the adjacent teeth. In addition, because of the angle of projection directly through the interproximal spaces, the bitewing receptor is especially effective and useful for detecting calculus deposits in interproximal areas. (Because of its relatively low radiodensity, calculus is better visualized on images made with reduced exposure.)

The long axis of bitewing receptors usually is oriented horizontally but may be oriented vertically.

Indications of the technique :

1. To demonstrate interproximal carious teeth
2. To demonstrate the over hanged filling
3. To demonstrate the underlying periodontal condition (interseptal bone level)

Horizontal Bitewing Receptors:

To obtain the desirable characteristics of the bitewing examination described, the beam is carefully aligned between the teeth and parallel with the occlusal plane. As the receptor or receptor-holding instrument is placed in the mouth, the portion of the mandibular quadrant that is being radiographed is in view. The position of the teeth in this segment of the mandibular quadrant is evaluated, and the beam is directed through the contacts. Some difference may exist in the curvature of the mandibular and maxillary arches. However, when the x-ray beam is accurately directed through the mandibular premolar contacts, overlapping is minimal or absent in the maxillary premolar segment.

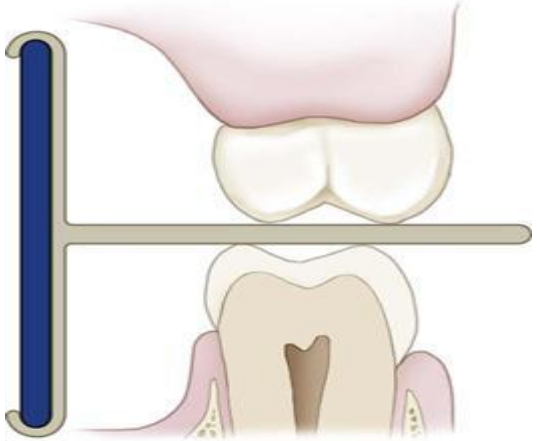
A few degrees of tolerance are available in the horizontal angulation before overlapping becomes critical. The contact between the maxillary first and second molars often is angled a few degrees more anteriorly than between the mandibular first and second molars. The aiming cylinder is positioned about +10 degrees to project the beam parallel with the occlusal plane (occlusal dentinoenamel junction). This orientation minimizes overlapping of the opposing cusps onto the occlusal surface and thus improves the probability of detecting early occlusal lesions at the dentinoenamel junction.
The XCP (Dentsply Rinn, Elgin, IL) bitewing instrument has an external guide ring for positioning the tube head. This guide ring reduces the possibility of cone cutting the receptor To position the XCP instrument properly, the guide bar is placed parallel with the direction of the beam that opens the contacts of the dentition being examined.

Receptor-holding device for bitewing images. Note the external localizing ring, which is used to position the aiming tube of the x-ray machine to ensure that the entire receptor is in the x-ray beam. Disposable barrier has been removed to show detector and wire.

A receptor fitted with a bitewing tab or loop may be used instead of a holding device . The receptor is placed in a comfortable position lingual to the teeth to be examined. The aiming cylinder is oriented in the predetermined direction that passes the x-ray beam through the interproximal spaces. To help prevent cone cutting, the central ray is directed toward the center of the bitewing tab, which protrudes to the buccal side. The beam is angulated +7 to +10 degrees vertically to preclude overlap of the cusps onto the occlusal surface.

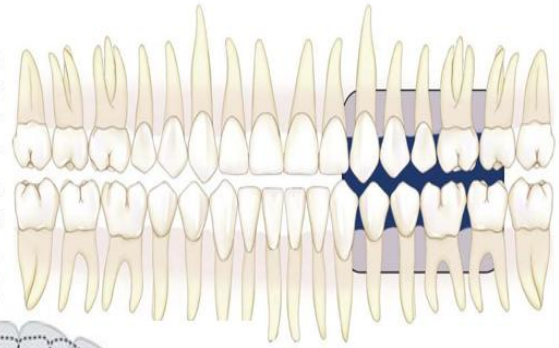
Two posterior bitewing views, a premolar and a molar, are recommended for each quadrant. However, for children 12 years or younger, one bitewing receptor (No. 2 receptor) usually suffices.

The premolar projection should include the distal half of the canines and the crowns of the premolars. Because the mandibular canines usually are more mesial than the maxillary canines, the mandibular canine is used as the guide for placement of the premolar bitewing receptor. The molar bitewing receptor is placed 1 or 2 mm beyond the most distally erupted molar (maxillary or mandibular).

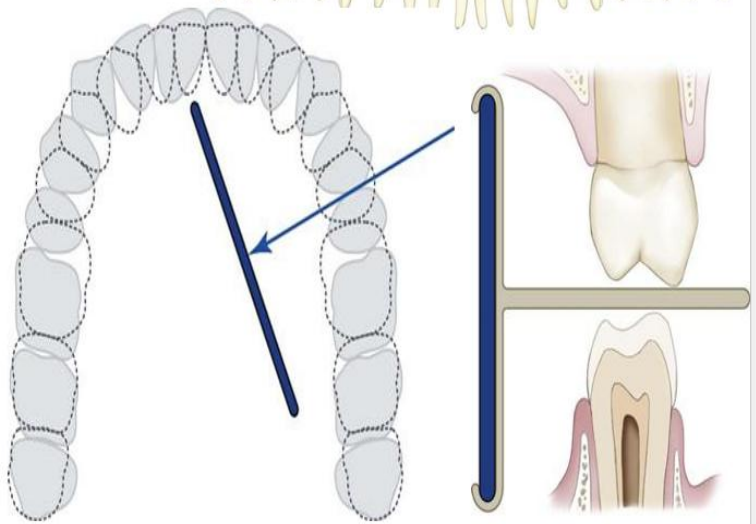


Vertical Bitewing Receptors

Vertical bitewing receptors usually are used when the patient has moderate to extensive alveolar bone loss. Orienting the length of the receptor vertically increases the likelihood that the residual alveolar crests in the maxilla and the mandible will be recorded on the radiograph .The principles for positioning the receptor and orienting the x-ray beam are otherwise the same as for horizontal bitewing projections.



Premolar Bitewing Projection

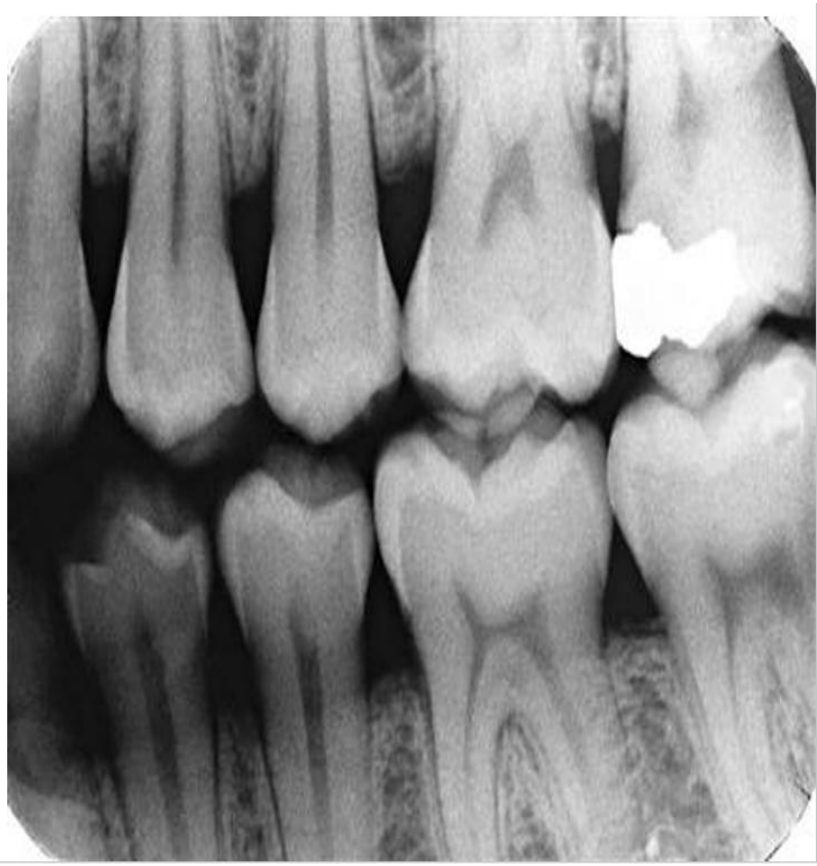


Projection of Central Ray.

Adjust the horizontal angulation of the cone to project the central ray to the center of the receptor through the premolar contact areas. To compensate for the slight inclination of the receptor against the palatal mucosa, the vertical angulation should be about +5 degrees. (In the drawing, the mandibular teeth are shown in *dashed lines*.)

Point of Entry.

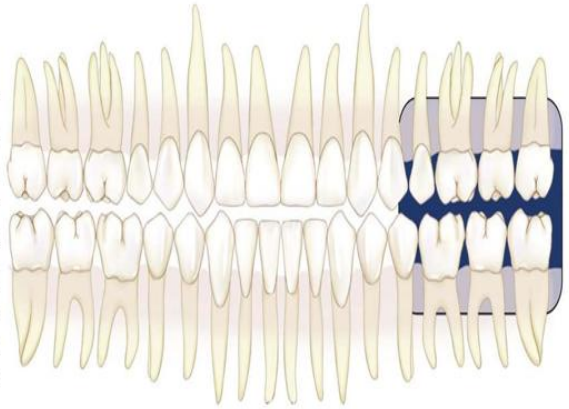
Identify the point of entry by retracting the cheek and determining that the central ray will enter the line of occlusion at the point of contact between the second premolar and the first molar.



Molar Bitewing Projection

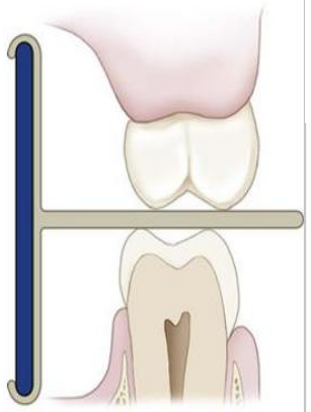
Image Field.

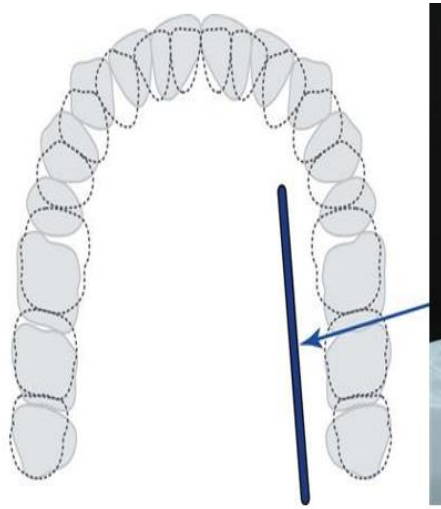
This projection should show the distal surface of the most posterior erupted molar and equally the crowns of the maxillary and mandibular molars. Because the maxillary and mandibular molar contact areas may not be open from the same horizontal angulation, they may not be visible on one receptor. In this case, it may be desirable to open the maxillary molar contacts because the mandibular molar contacts usually are open on the periapical receptors.

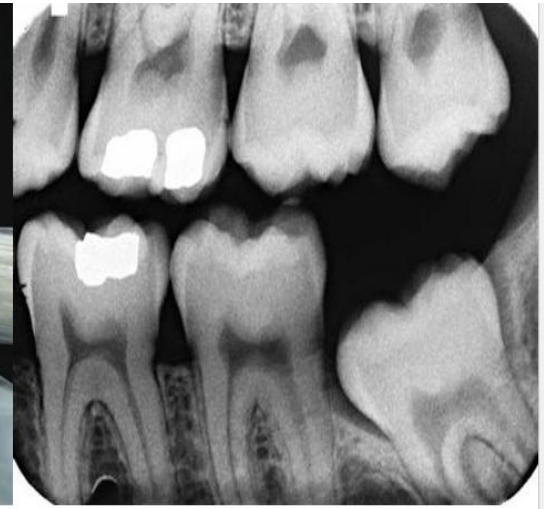


Receptor Placement.

Place the receptor between the tongue and teeth as far lingual as practical to avoid contacting the sensitive attached gingiva. The distal margin of the receptor should extend 1 to 2 mm beyond the most posterior erupted molar. When using the XCP, adjust the horizontal angulation by placing the guide bar parallel with the direction of the central ray to open the contact area between the first and second molars







Projection of Central Ray.

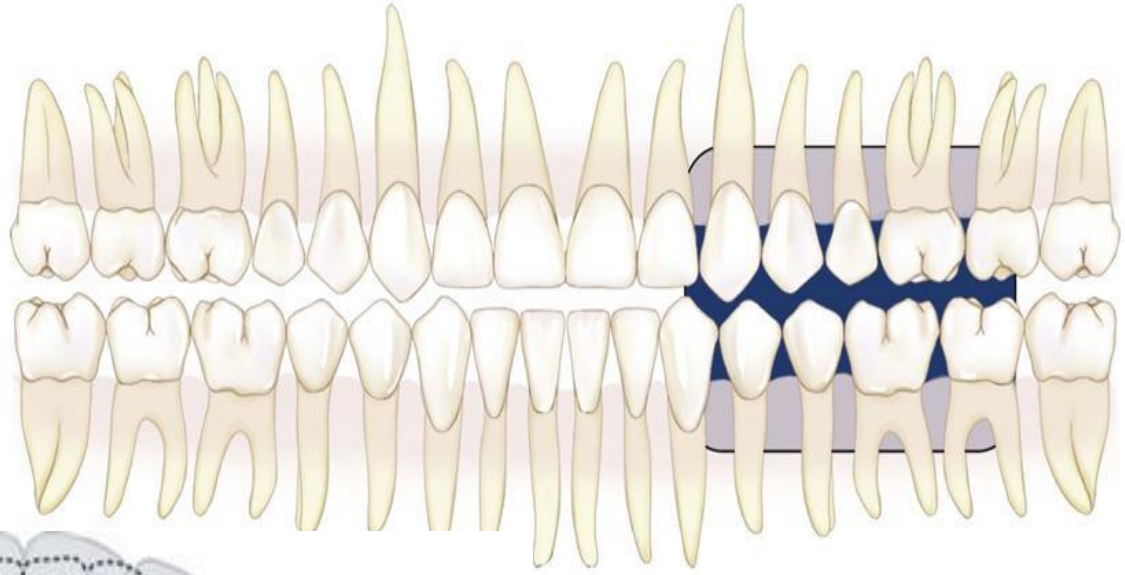
Project the central ray to the center of the receptor and through the contact of the first and second maxillary molars. Angle the central ray slightly from the anterior because the molar contacts usually are not oriented at right angles to the buccal surfaces of these teeth. A vertical angulation of +10 degrees is recommended. (In the drawing, the mandibular teeth are shown in *dashed lines.*)

Point of Entry.

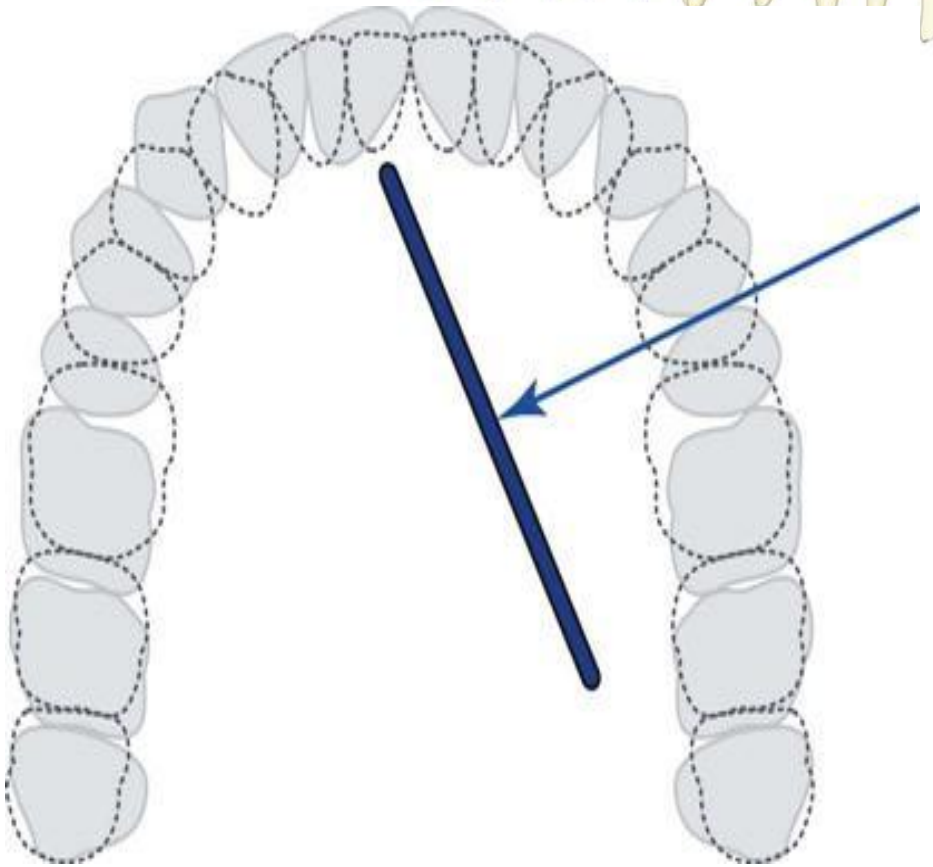
The central ray should enter the cheek below the lateral canthus of the eye at the level of the occlusal plane.

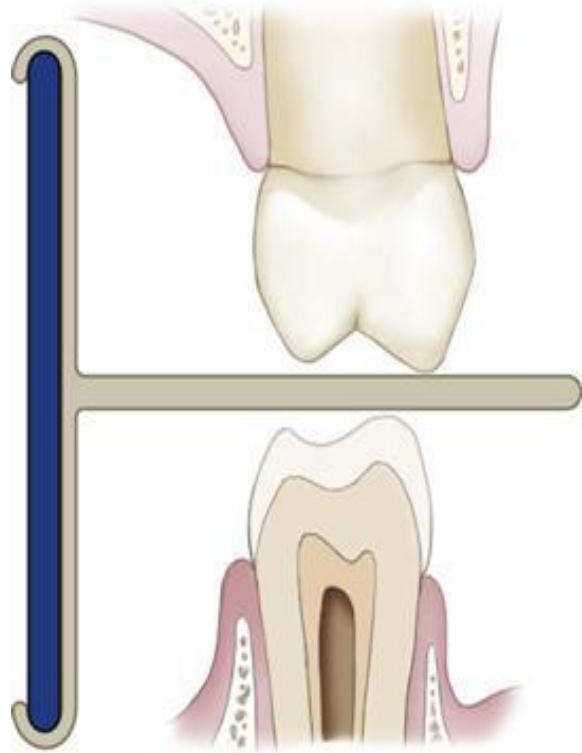
Vertical Bitewing Receptors

Vertical bitewing receptors usually are used when the patient has moderate to extensive alveolar bone loss. Orienting the length of the receptor vertically increases the likelihood that the residual alveolar crests in the maxilla and the mandible will be recorded on the radiograph .The principles for positioning the receptor and orienting the x-ray beam are otherwise the same as for horizontal bitewing projections.



Premolar Bitewing Projection





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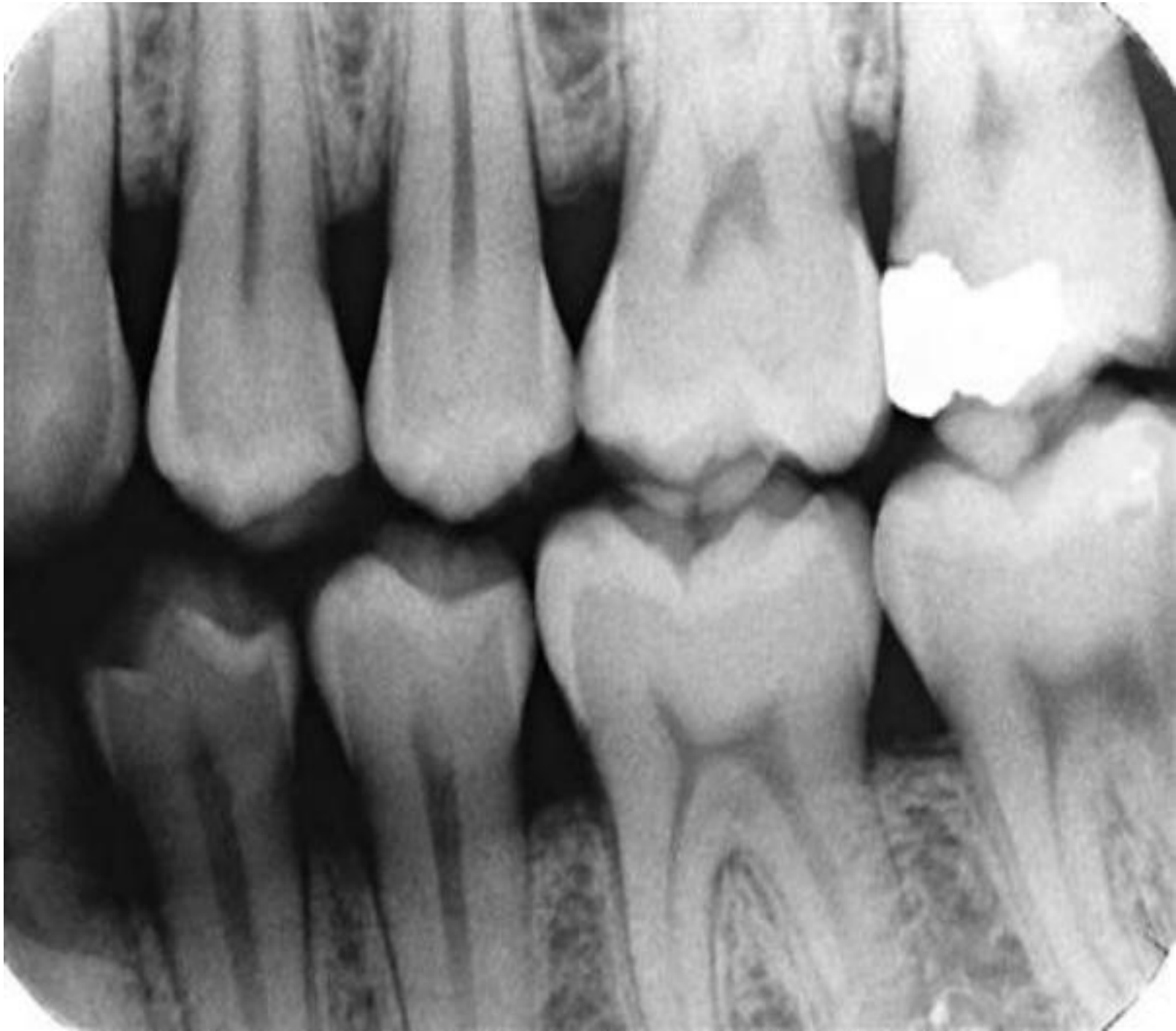

Molar Bitewing Projection

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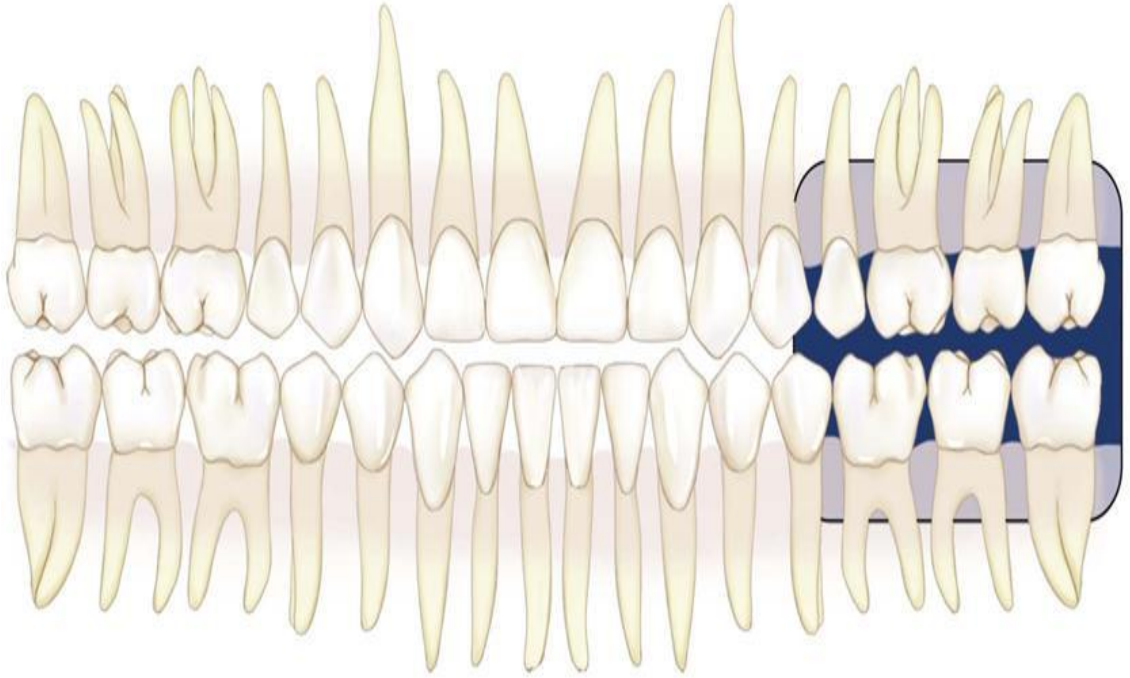

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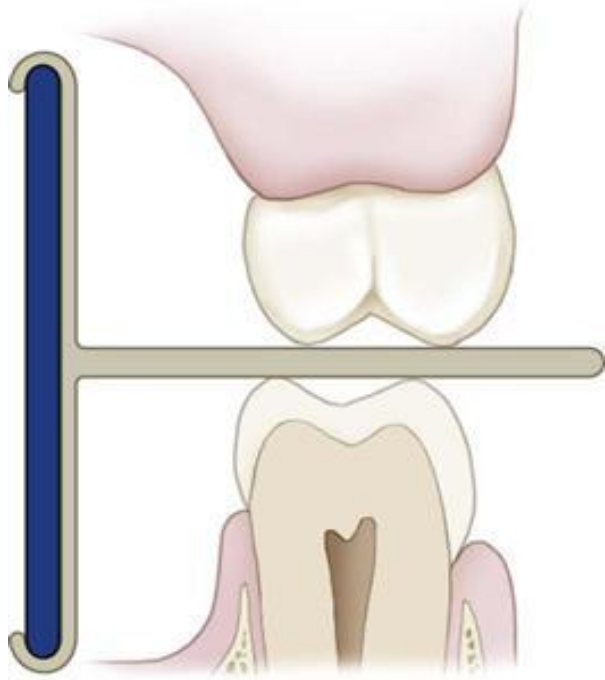

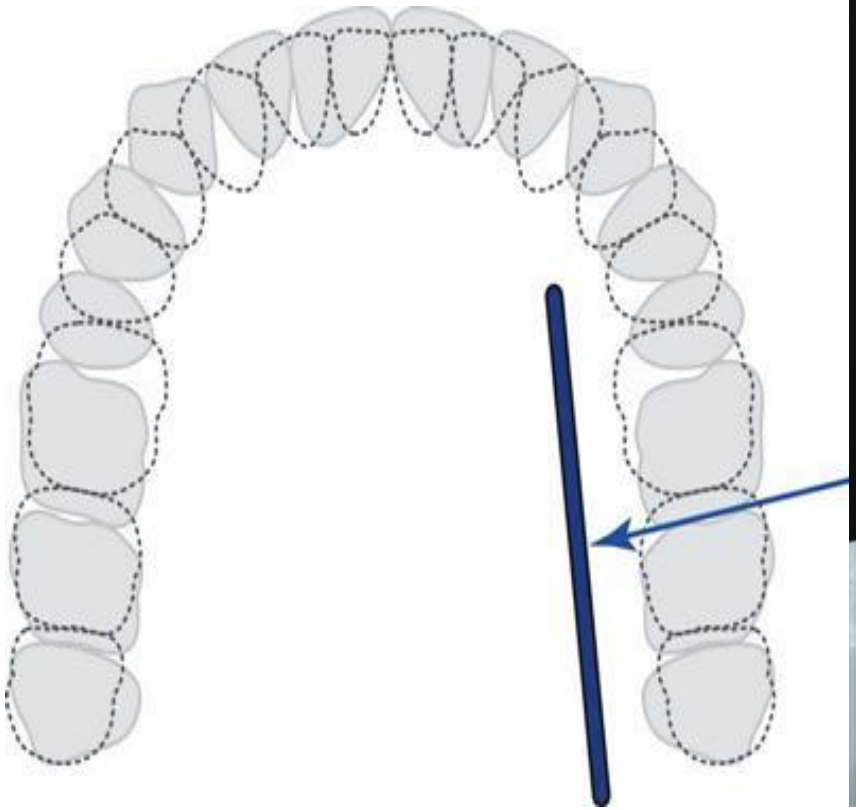

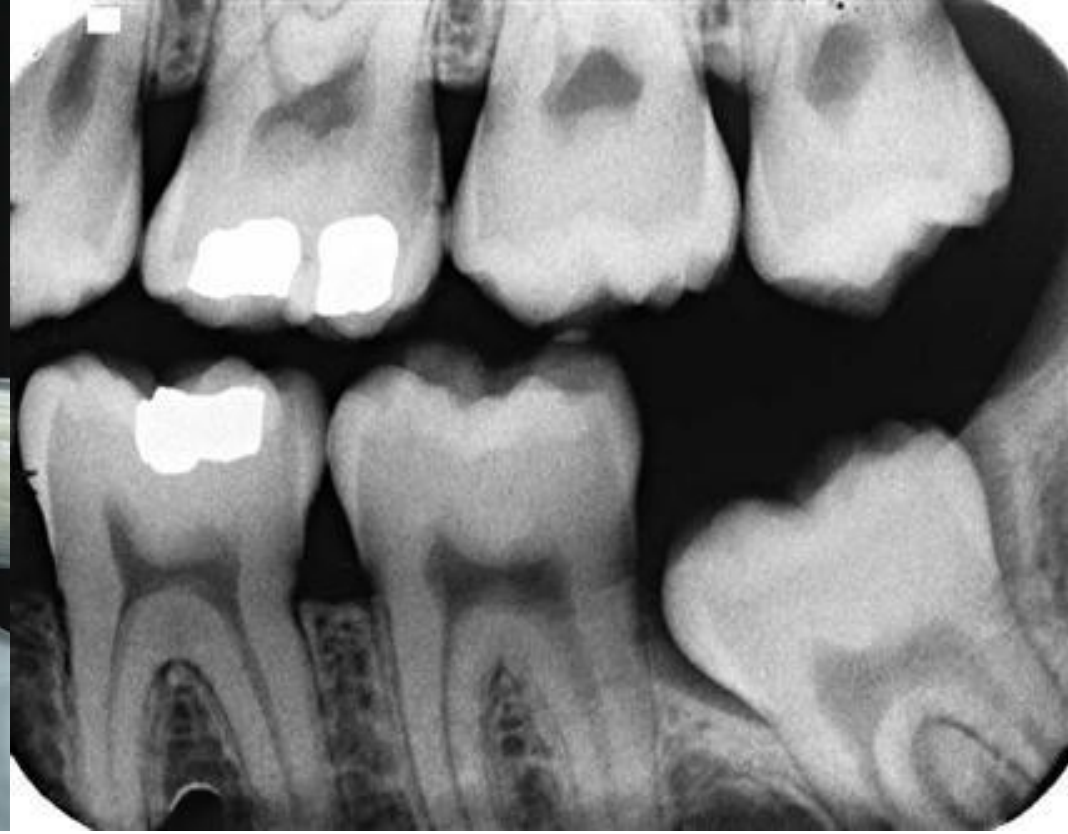

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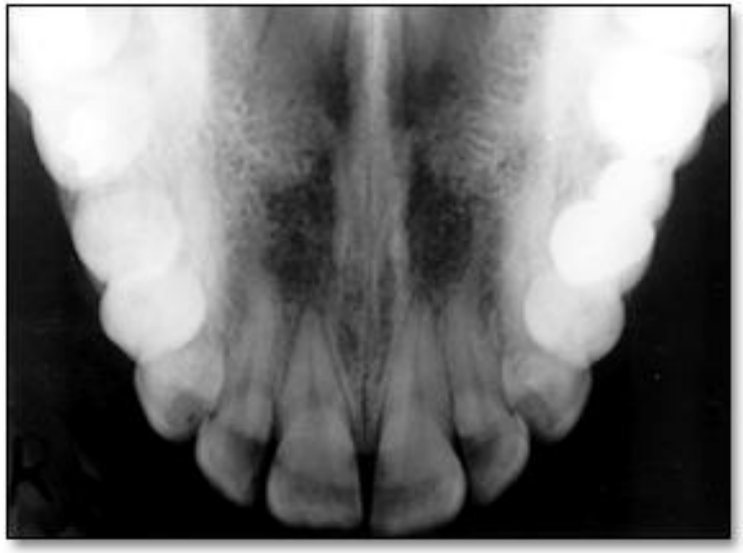
Point of Entry.

The central ray should enter the cheek below the lateral canthus of the eye at the level of the occlusal plane.

Occlusal Radiography :



The occlusal film is some time referred to as a sandwich film , since it is retained by biting of the patient on the film .

In edentulous arch ,the film is held against the maxillary ridge by the patient's thumb and on the mandibular ridge by the four fingers .

Occlusal film is used to demonstrate an area of greater dimensions than is possible on a single periapical film .It is inserted in the patient ,s mouth with the longest dimension of the film in a anterioposterior position .

Indications of occlusal radiography :

Useful when larger area to be visualized .

Indications of occlusal radiographs

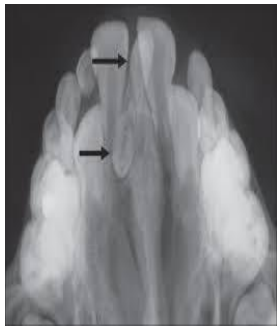
- To examine the area of cleft palate.
- To precisely locate retained roots of extracted teeth, supernumerary teeth, unerupted and impacted teeth.
- This technique is especially useful for impacted canines and third molars and also to localize foreign bodies on the maxilla and mandible.
- To locate sialoliths in the ducts of sublingual and submandibular glands.
- To demonstrate and evaluate the integrity of the anterior, medial, and lateral outline of the maxillary sinus.
- To aid in the examination of patients with trismus, who can open their mouths only a few millimetres.
- To obtain information about the location, nature, extent, and displacement of fractures of the mandible and maxilla.
- To detect disease in the palate or floor of the mouth and determine the medial and lateral extent of disease (cysts, osteomyelitis, malignancies).

Occlusal radiography:

The occlusal film is some time referred to as a sandwich film , since it is retained by biting of the patient on the film . In edentulous arch ,the film is held against the maxillary ridge by the patient's thumb and on the mandibular ridge by the four fingers .

Occlusal films are used to show larger areas of the maxilla or mandible.

Occlusal film is used to demonstrate an area of greater dimensions than is possible on a single periapical film .It is inserted in the patient ,s mouth with the longest dimension of the film in a anterioposterior position



The size of the film is 57 × 76 mm.

Indications of occlusal radiographs:

- To examine the area of cleft palate.
- To precisely locate retained roots of extracted teeth, supernumerary teeth, unerupted and impacted teeth.
- This technique is especially useful for impacted canines and third molars and also to localize foreign bodies on the maxilla and mandible.
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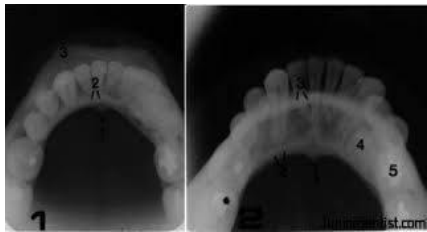
- To obtain information about the location, nature, extent, and displacement of fractures of the mandible and maxilla.
- To detect disease in the palate or floor of the mouth and determine the medial and lateral extent of disease (cysts, osteomyelitis, malignancies).
- To measure the changes in the size and shape of the maxilla and mandible.
- To study the expansion of the palatal arch during the orthodontic jaw expansion



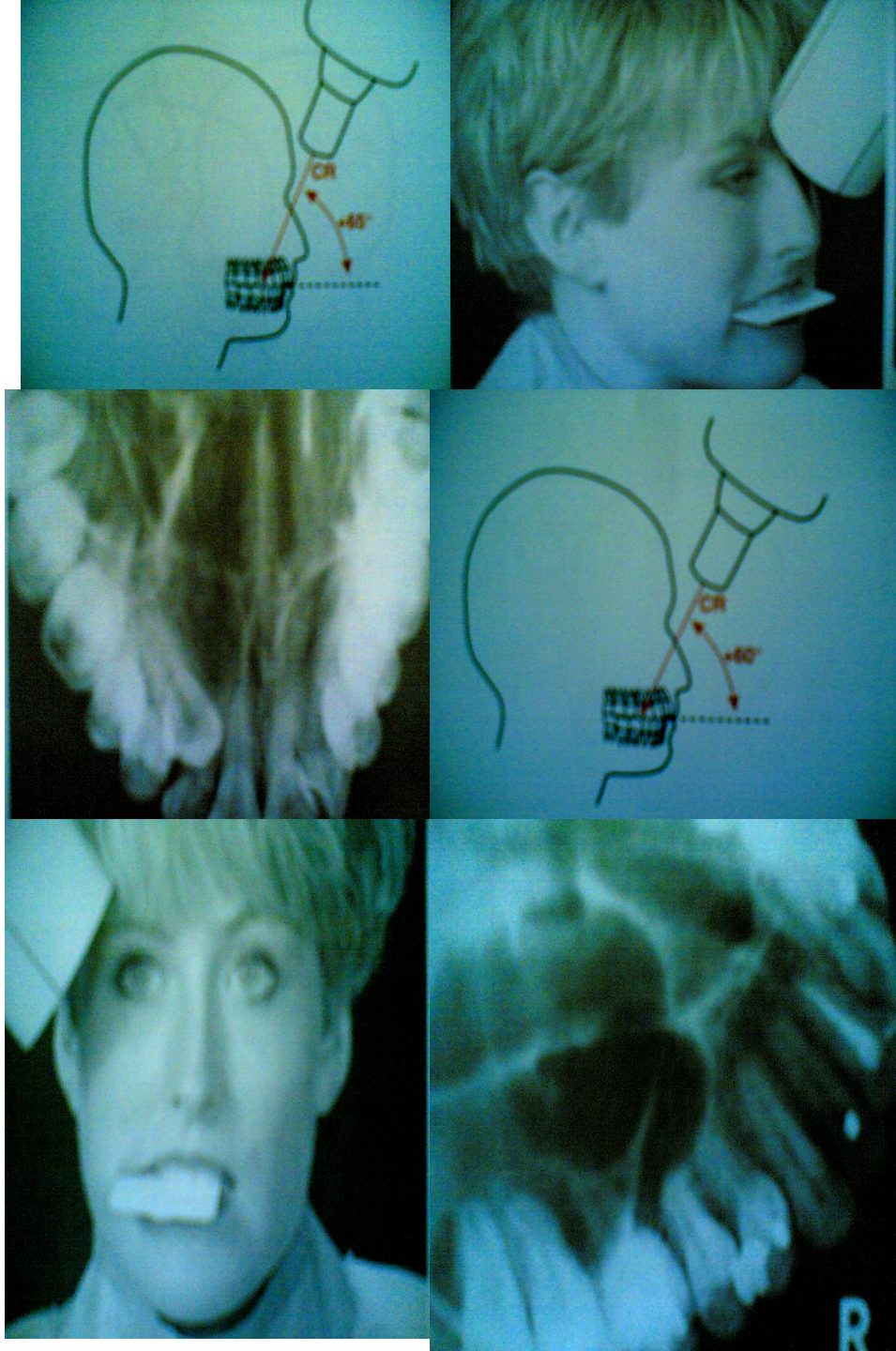
Maxillary occlusal projections:

1.The maxillary topographic projection :

Is used to examine the palate and the anterior teeth of the maxilla ,fractures of the anterior teeth and alveolar bone ,also determination of the bucco –palatal position of un erupted canine .

2.The maxillary lateral occlusal projection :

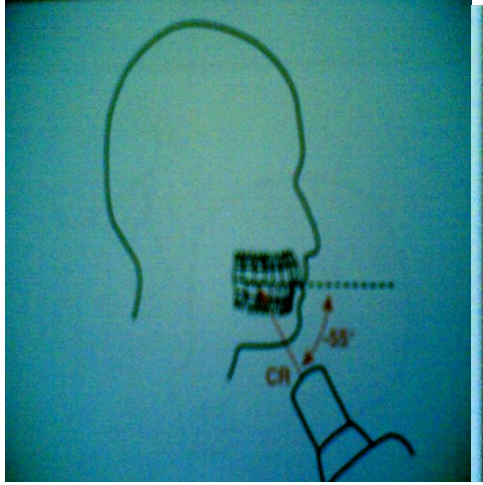
is used to examine the palatal roots of molar teeth . It may also be used to locate foreign bodies or lesions in the posterior maxilla ,fractures of the upper posterior teeth and alveolar bone including the tuberosity ,and determination of position of root displaced into the antrum during extraction of upper posterior teeth .



Mandibular occlusal projection :

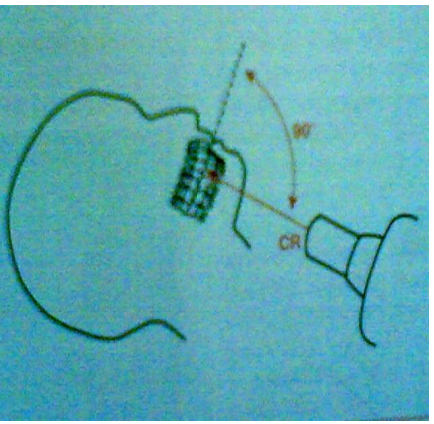
1-Topographic projection:

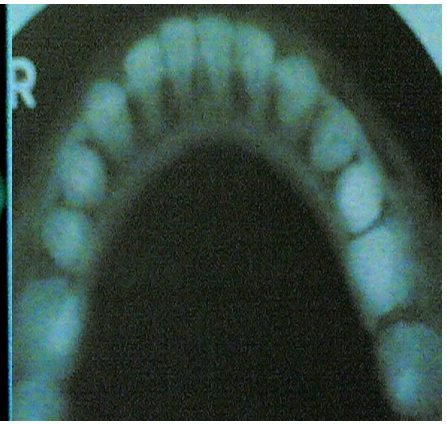
Is used to examine the anterior teeth of the mandible ,the presence and position of radioopaque calculi in the submandibular salivary duct ,and fracture in the posterior part of the body of the mandible in the horizontal plane

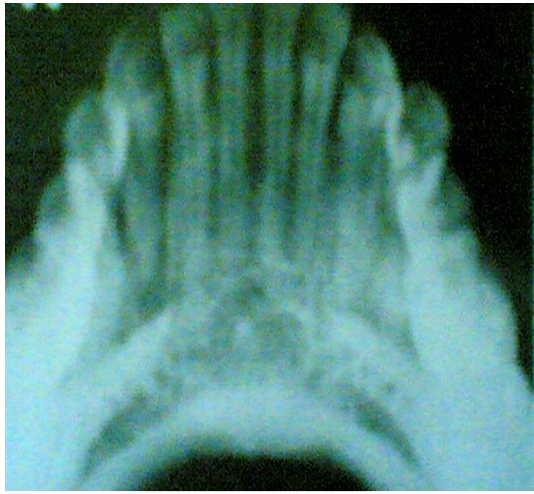


2-Mandibular cross – sectional occlusal projection:

Is used to examine the buccal and lingual aspects of the mandible ,it is also used to locate foreign bodies or salivary stones in the region of the floor of the mouth .







Thank You