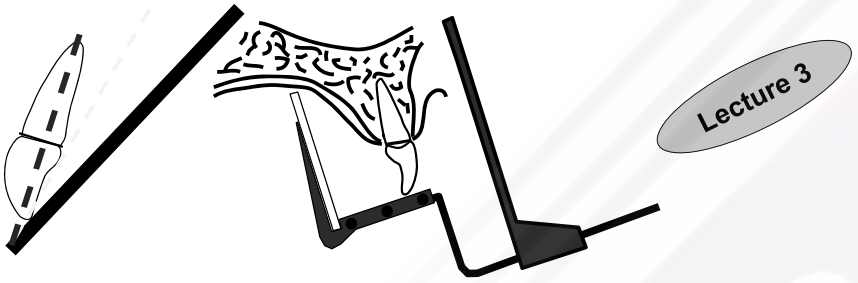
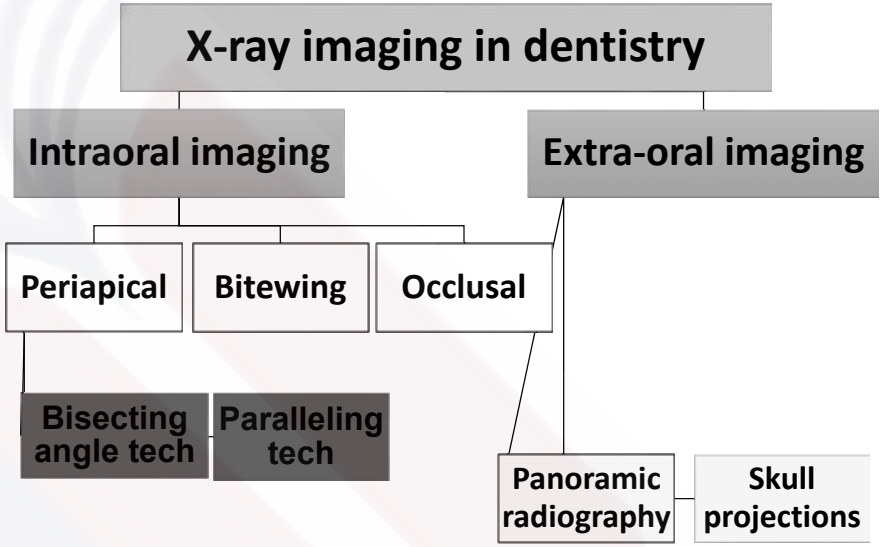
Syrian Private University
Faculty of Dentistry
Department of Oral Medicine

Intraoral imaging techniques



Lecture 3

Imad Brinjikji

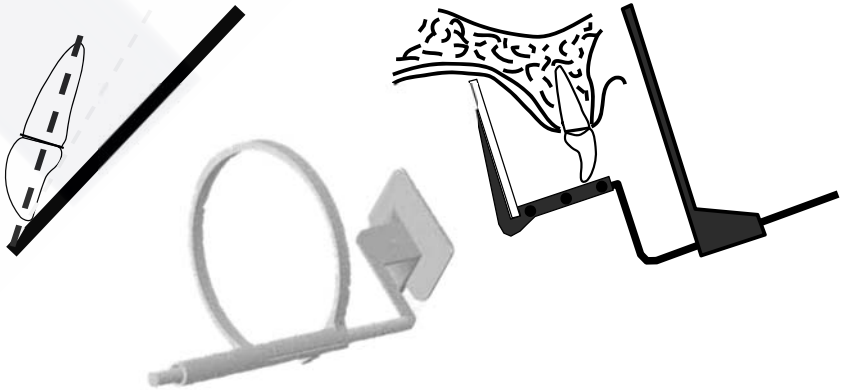


Criteria of quality

Intraoral imaging is the backbone of imaging for general dentists (even with the introduction of advanced imaging techniques). Radiographs should have:

- Full length f the root and at least 2 mm of the periapical area for periapical radiograph.
- Least amount of distortion.
- Optimal density and contrast.

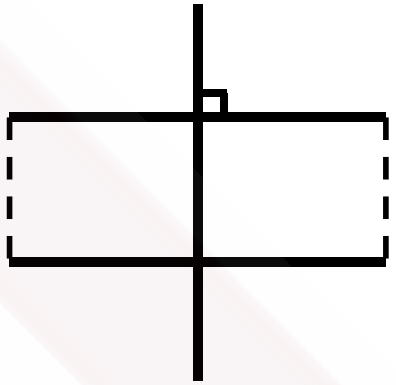
Intraoral imaging techniques



I. Periapical imaging

Paralleling Technique

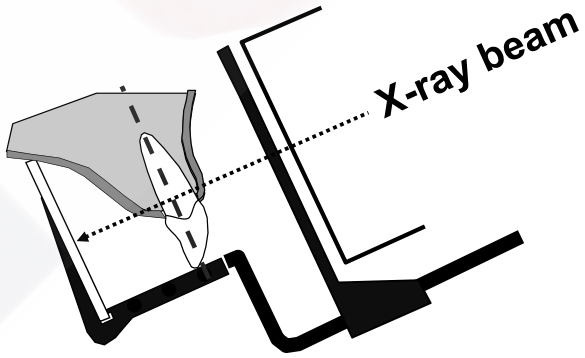
Parallelism theory



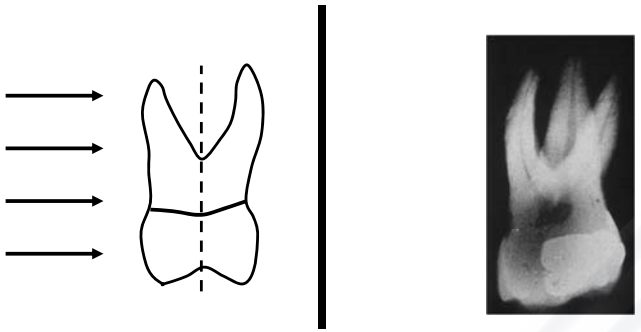
The geometric principle of this technique

The geometric principle of paralleling technique

- Parallel technique is based on the parallelism theory.
- Two lines are equal when they are parallel and are joining two parallel planes.



Film/tooth/ring all parallel
X-ray beam perpendicular to tooth/film



Long axis of the tooth <u>parallel</u> with long axis of the film

Paralleling Technique

The full-mouth series requires 17 radiographs (some references indicate that only 15 radiographs are required).

It is also called “Right-angle” or “Long-cone” technique.

Paralleling Technique

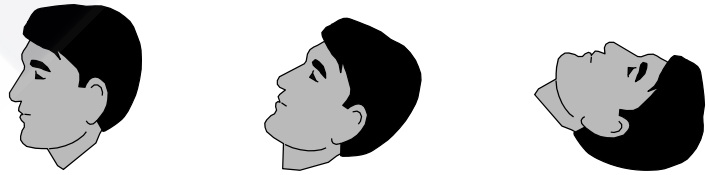
In general, radiographs taken with the paralleling technique have **higher quality** than radiographs taken with bisecting-angle technique (less geometric distortion).

The paralleling technique is the most appropriate technique for digital imaging and when rectangular collimators are used.

Require the use of receptor-holding instrument.

Paralleling Technique

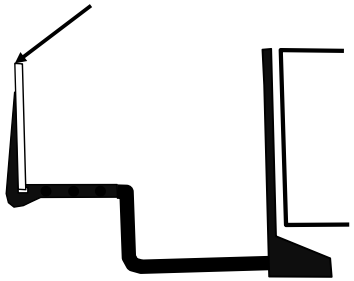
Head Position is not crucial in parallel technique.



Best **OK** **OK**

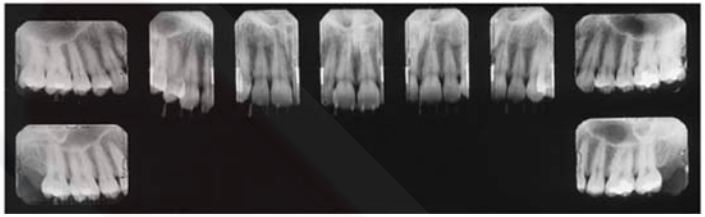
Receptor-holding instrument

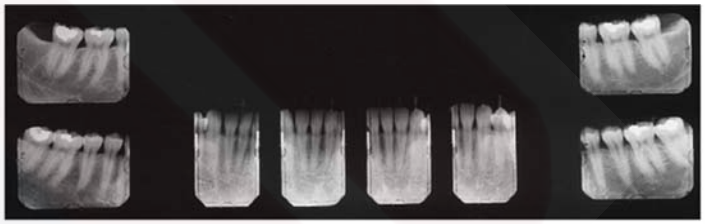
The receptor



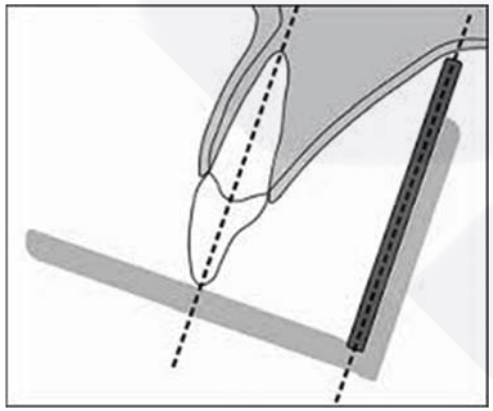
The receptor may be film / sensor / PSPP.

Paralleling Technique

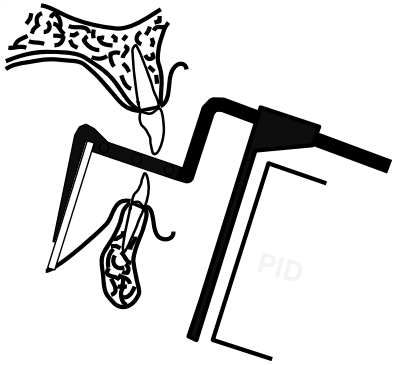




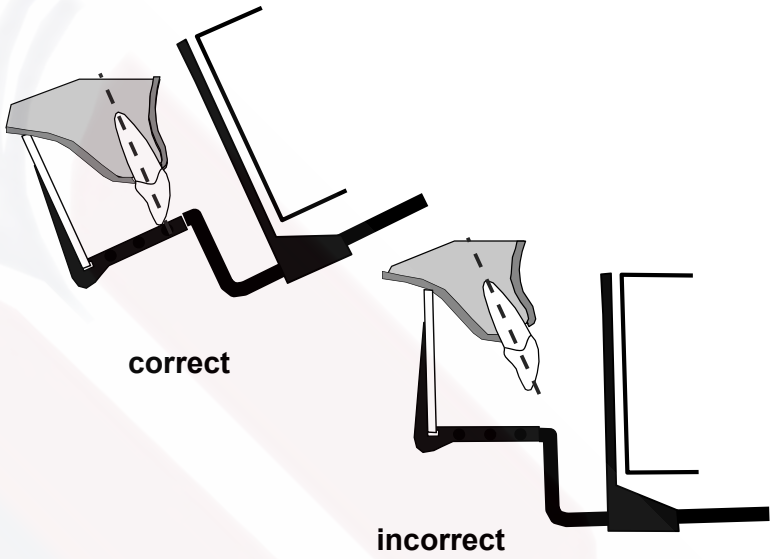
For maxillary projections, the superior border of the receptor generally rests at the height of the palatal vault in the midline.



For mandibular projections, the receptor should be used to displace the tongue posteriorly or toward the midline to allow the inferior border of the receptor to rest on the floor of the mouth away from the mucosa on the lingual surface of the mandible.



Orient the aiming cylinder of the x-ray machine in the vertical and horizontal planes to align with the aiming ring.
This will ensure appropriate vertical and horizontal angulation.



Paralleling Technique

ADVANTAGES

(compared to Bisecting Angle technique)

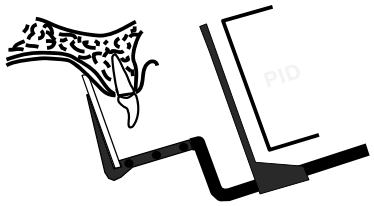
1. **Better dimensional accuracy**
2. **Beam alignment simplified**
3. **Easier to standardize films**
4. **Head position not critical**

Paralleling Technique

DISADVANTAGES

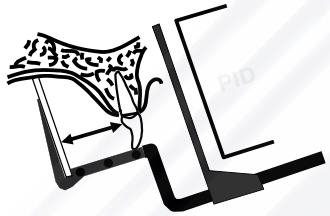
(compared to Bisecting Angle technique)

1. **May be uncomfortable**
2. **Limited by anatomy**



Because the palate and floor of the mouth are shallower as you approach the lingual of the teeth, the film often cannot be positioned properly close to the teeth.

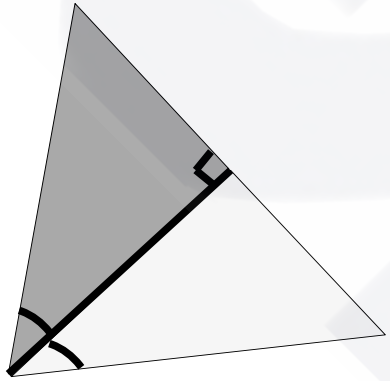
Film positioned away from teeth to achieve parallelism.



Periapical imaging

Bisecting-angle Technique

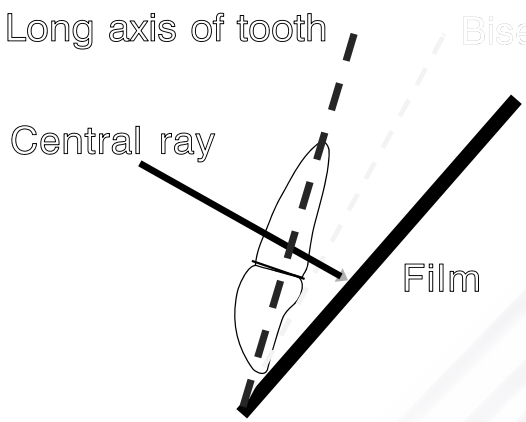
Bisecting Angle Technique



The geometric principle of bisecting-angle technique

- Bisecting-angle is based on the rule of isometry of two triangles.
- Two triangles are equal if they have two equal angles and share a common side.

Positioning the X-ray Beam



Bisecting Angle Technique

ADVANTAGES

- **When anatomical landmarks impede the use of paralleling technique (Shallow palate/palatal torus/ Shallow/tender floor of mouth/ Short lingual frenum).**
- **Impacted third molars.**

Bisecting Angle Technique

DISADVANTAGES

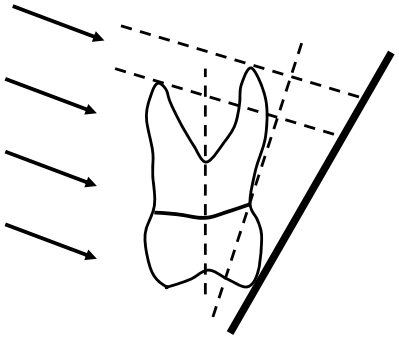
(compared to Bisecting Angle technique)

1. **Images distorted**
2. **Harder to position beam (when receptor holders are not used)**
3. **Film less stable**

It is recommended to use this technique when paralleling technique cannot be used.

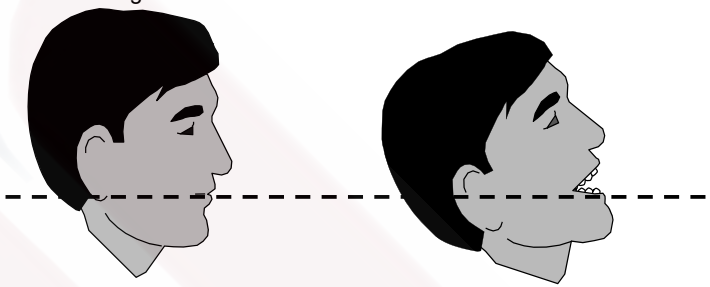
Limitations of bisecting –angle technique

- the central beam must be angled differently for each root of a multi-rooted teeth.
- The alveolar ridge appear more coronally.



X-ray beam perpendicular to line bisecting angle formed by film and long axis of tooth. This cannot be achieved for all roots together.

Head position is important in bisecting



Maxilla Mandible

(head tipped back)

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

Bisecting Angle Technique

- Receptor-holders may be used or not.

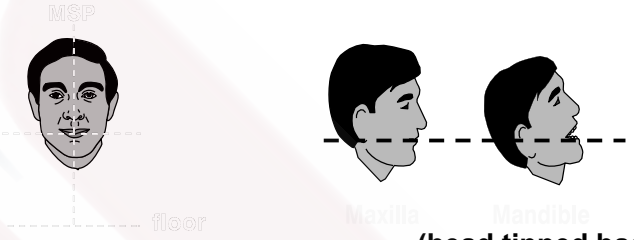
- Patients may support the receptor. This is undesirable, because:

o Patients often use excessive force and bend the receptor.

o More probability to produce cone cut.

Bisecting Angle Technique

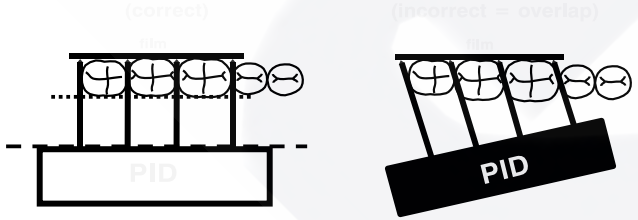
Head Position



(head tipped back)

The arch being radiographed parallel to the floor.

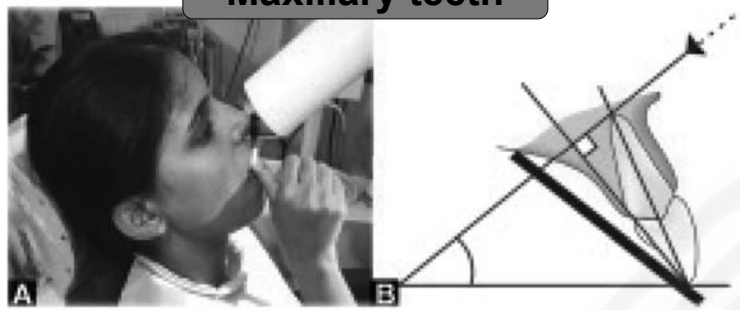
Horizontal Angulation

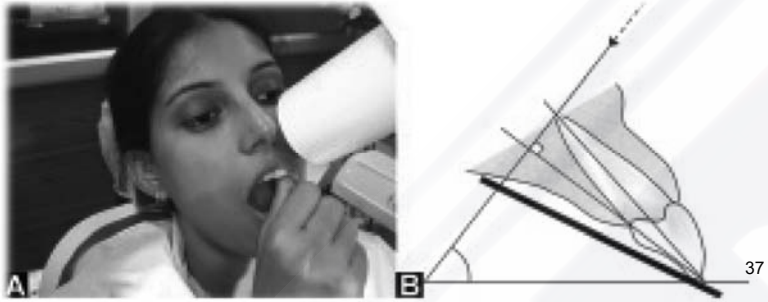


Vertical Angulation

Perpendicular to the bisecting angle between the tooth and the film.

Maxillary teeth





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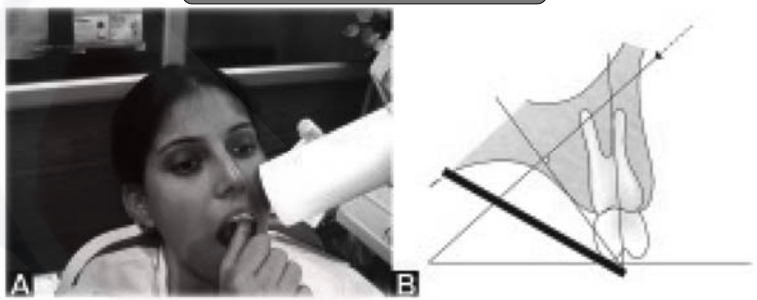
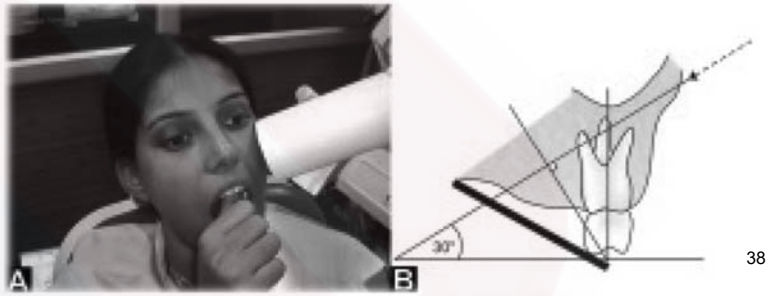
Maxillary teeth





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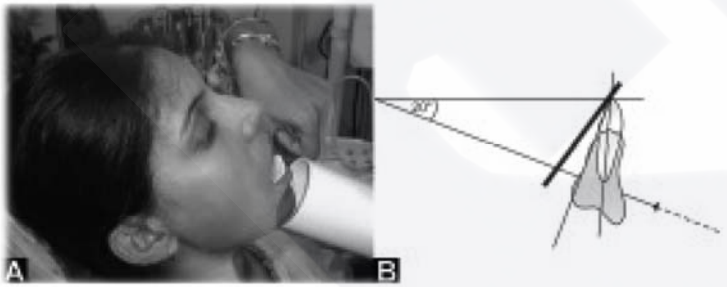
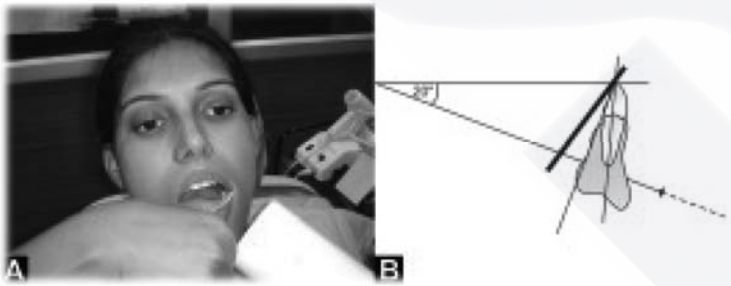
Mandibular teeth





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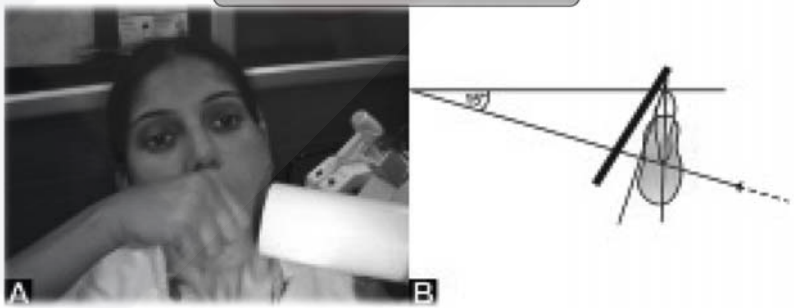
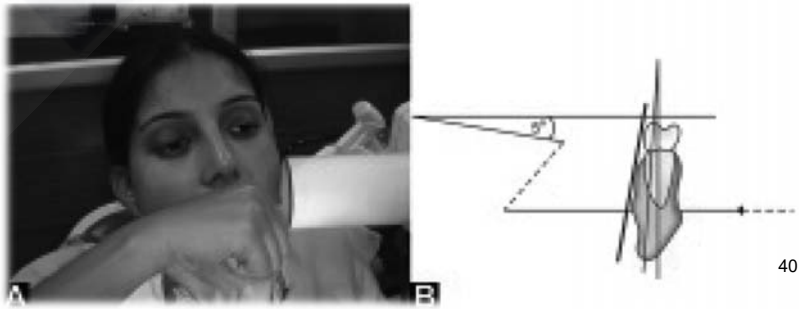
Mandibular teeth





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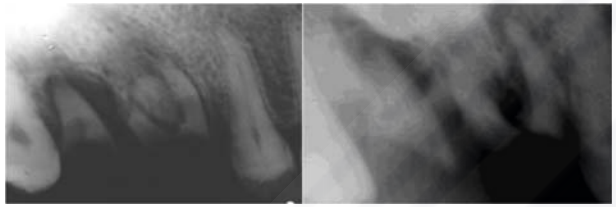
Recently, extraoral periapical radiography was suggested.



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Periapical extraoral projection

In periapical extraoral projections, an angulation of -25 to -55 was recommended for maxilla, whereas, an angulation of -10 to -35 was recommended for mandible.

Anterior extraoral projections is not applicable in this technique, as the anterior region generally can be radiographed easily.

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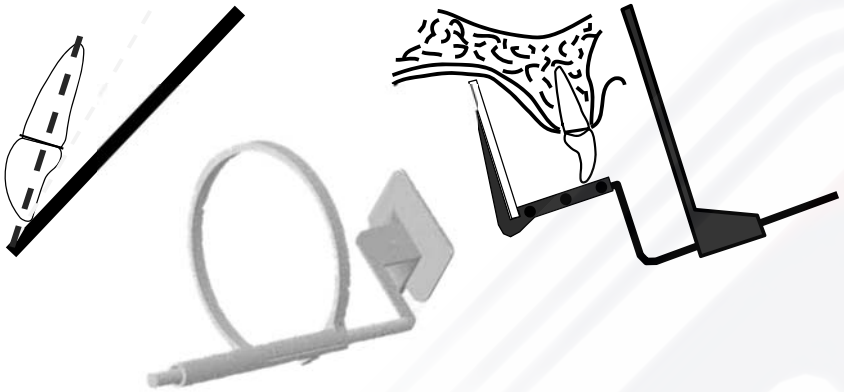
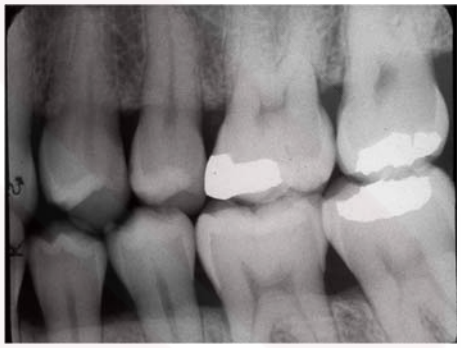
Intraoral imaging techniques



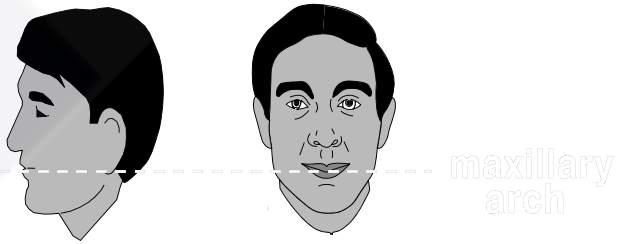
II. Bite-wing imaging



Bitewing imaging

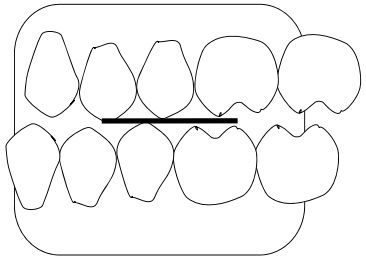
- ❑ It is also called interproximal radiography.
- ❑ They are valuable for:
  - o Interproximal caries.
  - o Secondary caries.
  - o Periodontal condition (alveolar bone crest).
  - o Evaluation of crowns and fillings.

Bitewing Head Position



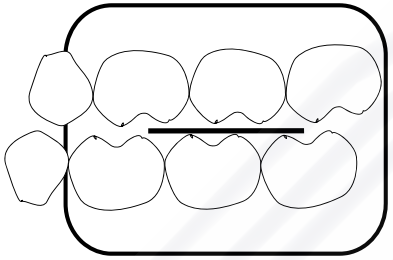
Bitewing Film Placement

Premolars bitewing



Film approximately centered on 2nd premolar

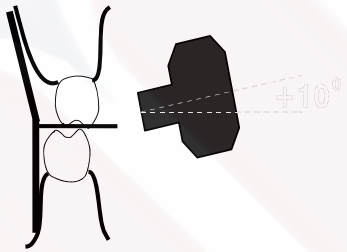
Molars bitewing

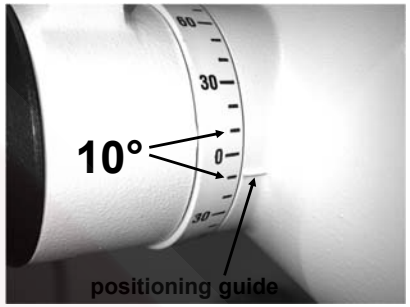


Film centered on second contact between 1st and 2nd molar.

For children 12 years or younger, one bitewing for each side is enough.

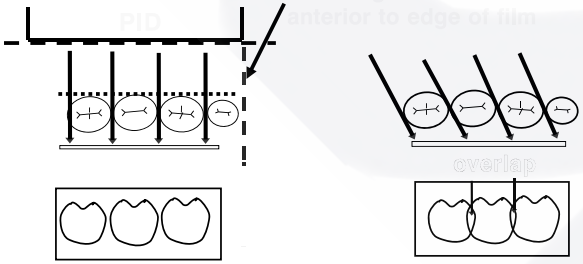
The vertical angulation



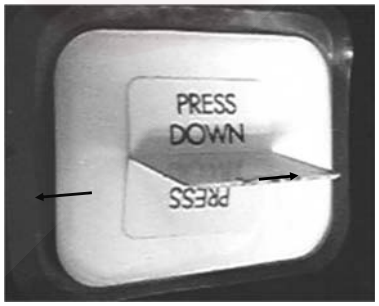


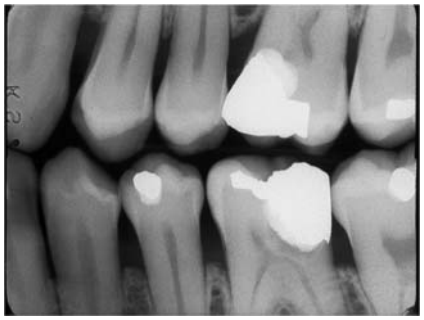
From +7 to +10

The horizontal angulation



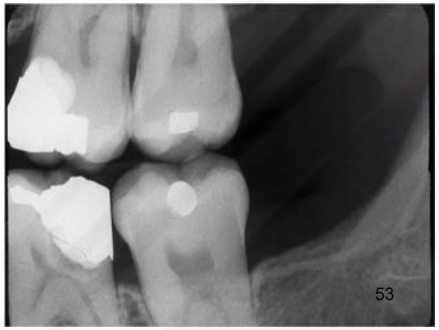
correct **incorrect**





Premolar Bitewing

Molar Bitewing



III. Occlusal imaging

Will be described later in-sha'a Allah.

THE END