

# Radiographic Techniques



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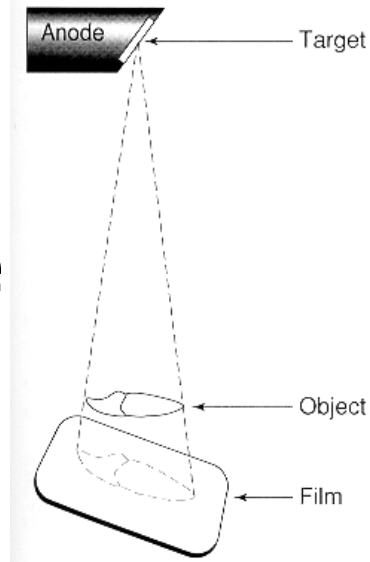
# Principles of Image Formation

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- Also known as *shadow casting*
- Basic objective is to direct radiation toward client's face so that radiation passes horizontally & vertically through the tissues to be examined & to the film at the most favorable angle with minimal distortion of the resulting image.

# Principles of Image Formation

- Ideal results:
  - Sharp image
  - Image of the true shape and size of the object being radiographed





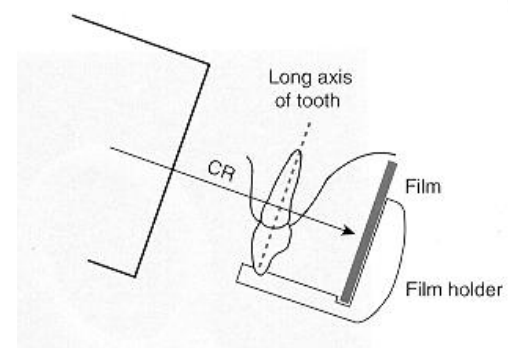
# Five Fundamental Principles of Shadow Casting

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- **S**mallest radiation source
- **T**arget-film-distance long as practical
- **O**bject-film-distance short as possible
- **P**arallel film to long axis of teeth
- **P**erpendicular alignment of beam to film & objects

# Paralleling Technique

- Technique of choice due to image accuracy
- Implication of name
- Developed 1920
- Requires use of long target-film-distance
  - 16" PID or recessed tubehead



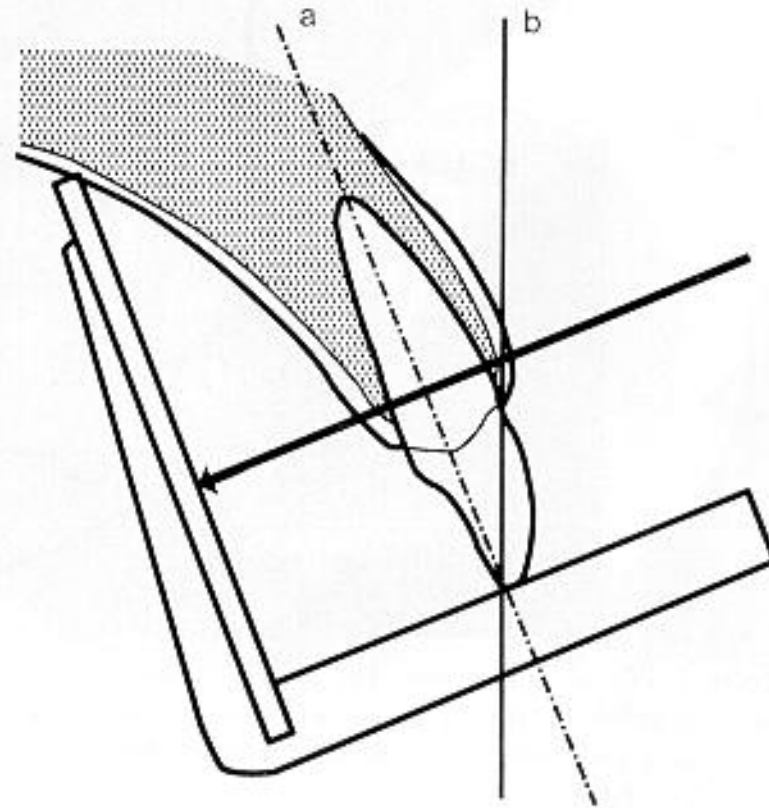


# Principles of the Paralleling Technique

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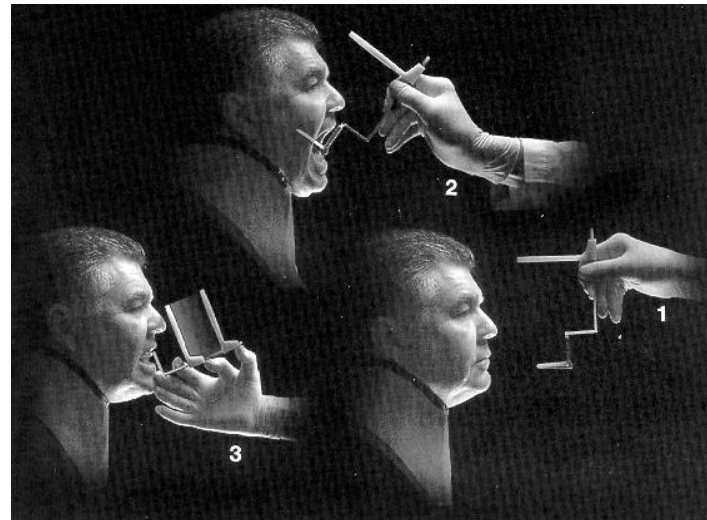
- Film placed *parallel* to long axis of teeth
- Beam directed *perpendicular* to film & long axis of teeth
- Film holder used to keep film flat & unbent
- Long PID or TFD to offset increased magnification due to great OFD

# Principles of the Paralleling Technique



# Steps of the Paralleling Technique

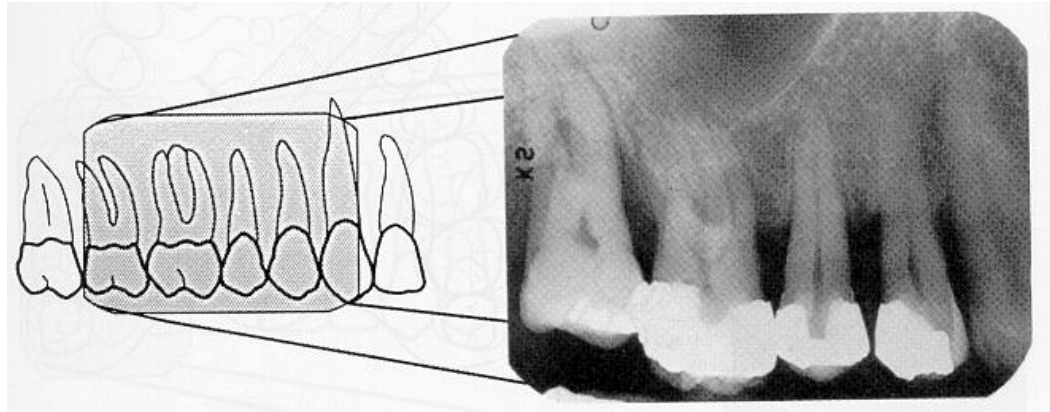
- Film placement
- Film position
  - Vertical dimension
    - Parallel to long axis
    - Two-point contact
  - Horizontal dimension
- Beam alignment
  - Vertical
  - Horizontal
- Film exposure





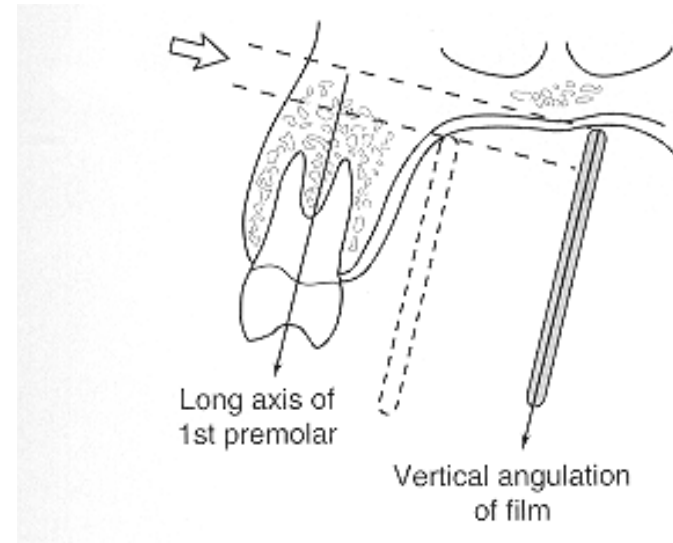
# Steps of the Paralleling Technique

- **Film placement:** position film to cover prescribed area (teeth to be examined)



# Steps of the Paralleling Technique

- **Film position**
  - **Vertical dimension:** position film *parallel* to long axes of teeth by placing far away from lingual surfaces of teeth





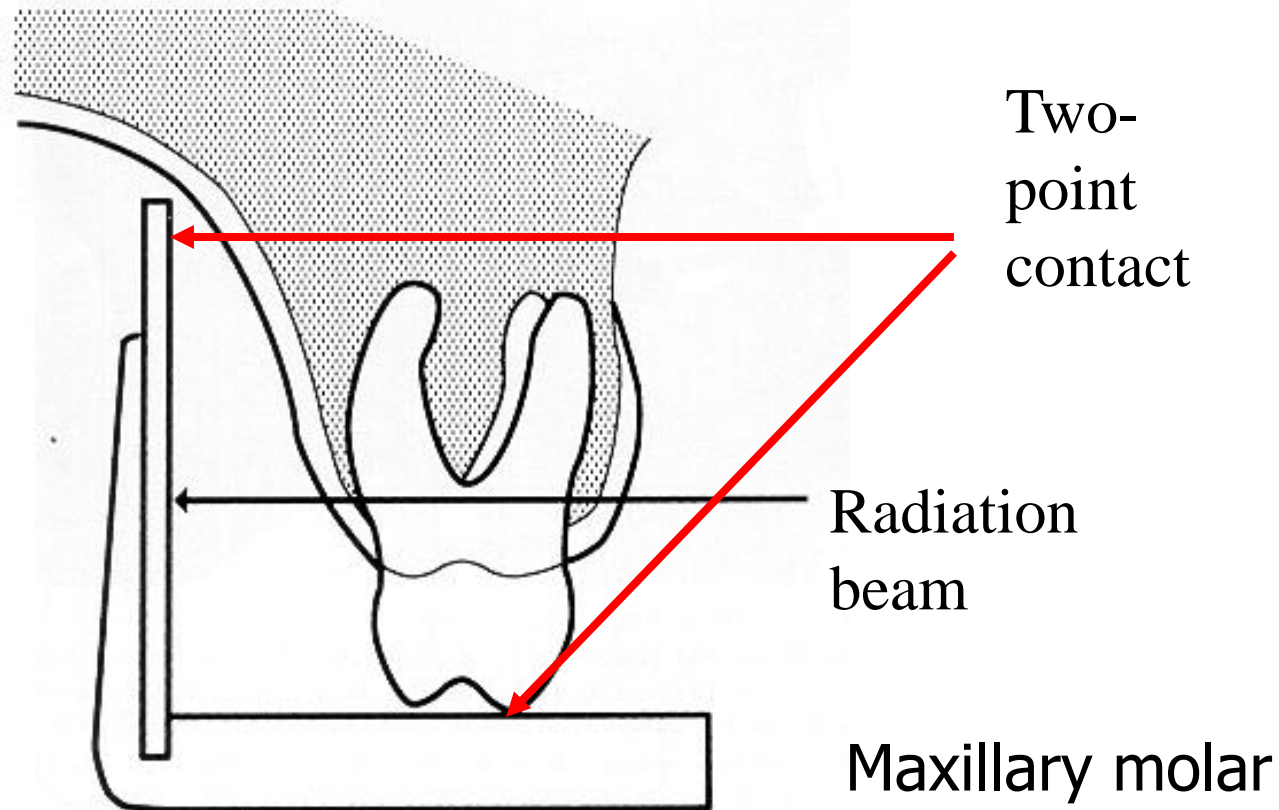
# Steps of the Paralleling Technique

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- **Film position**

- **Vertical dimension:** position film *parallel* to long axes of teeth by placing far away from lingual surfaces of teeth
- **Two-point contact:** maintain contact of top edge of film with palate & bite portion of holder with maxillary occlusal surfaces

# Steps of the Parallelizing Technique





# Steps of the Paralleling Technique

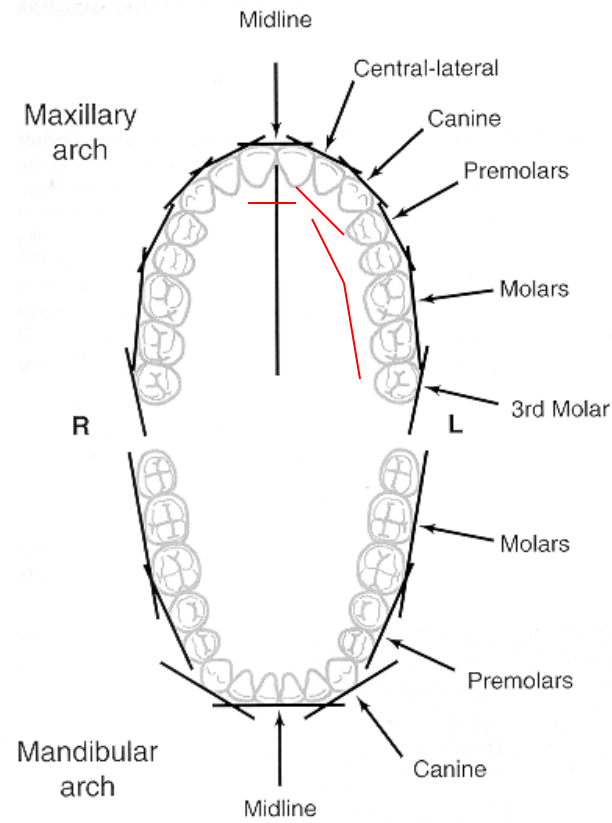
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- **Film position**

- **Horizontal dimension:** position horizontal plane of film parallel to facial surfaces of teeth being radiographed

# Steps of the Paralleling Technique

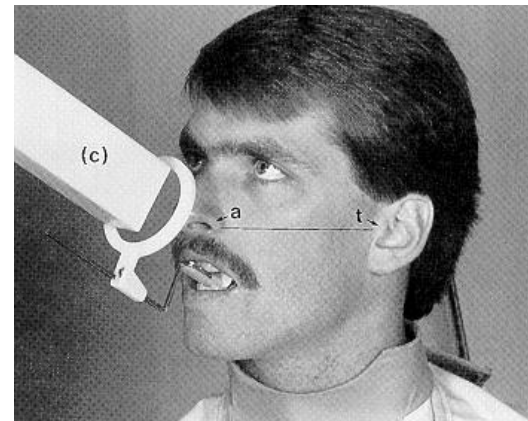
Horizontal position of film



# Steps of the Paralleling Technique

- **Beam alignment**

- **Vertical:** direct radiation beam *perpendicular* to film & long axes of teeth
- **Horizontal:** direct radiation beam through the contact areas of the teeth



# Criteria of Diagnostic Acceptability

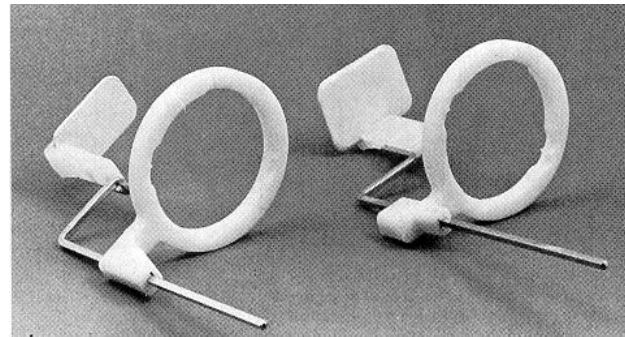
- What's a "good" film?
  - Area of interest clearly displayed
  - Apical regions visible with 2-3 mm of surrounding bone
  - Entire tooth/teeth length displayed
  - No cone-cutting in region of interest





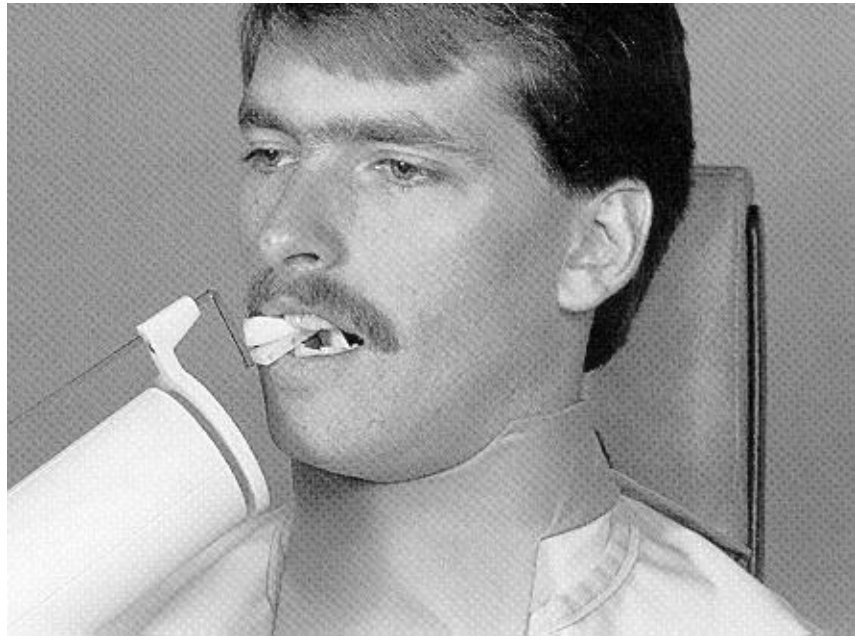
# Beam Alignment Devices

- XCP
  - Plastic bite block or styrofoam
  - Metal arm supports plastic ring
  - Arm used to align horizontal & vertical beam alignment



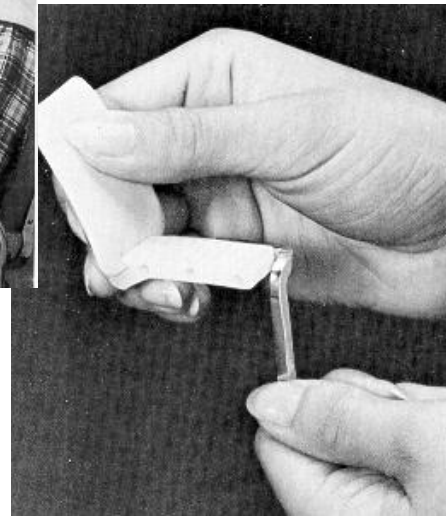
# Beam Alignment Devices

- Ring further aligns beam & prevents cone cutting
- Cotton rolls used for stabilization
- Rectangular PID or lead collimators available



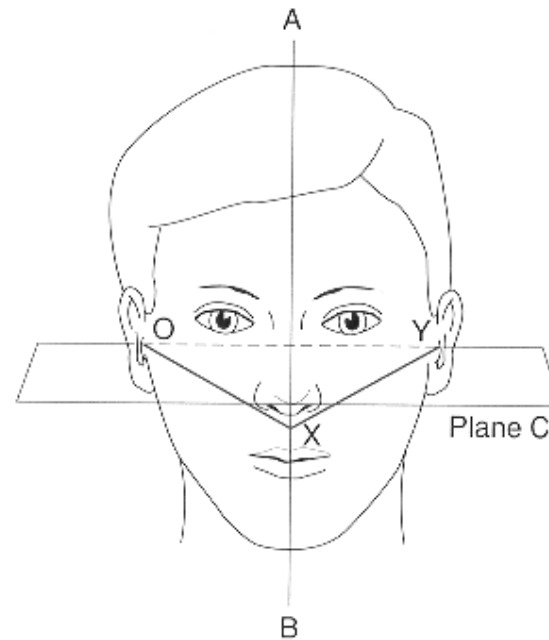
# Positioning

- Client
- Film packet



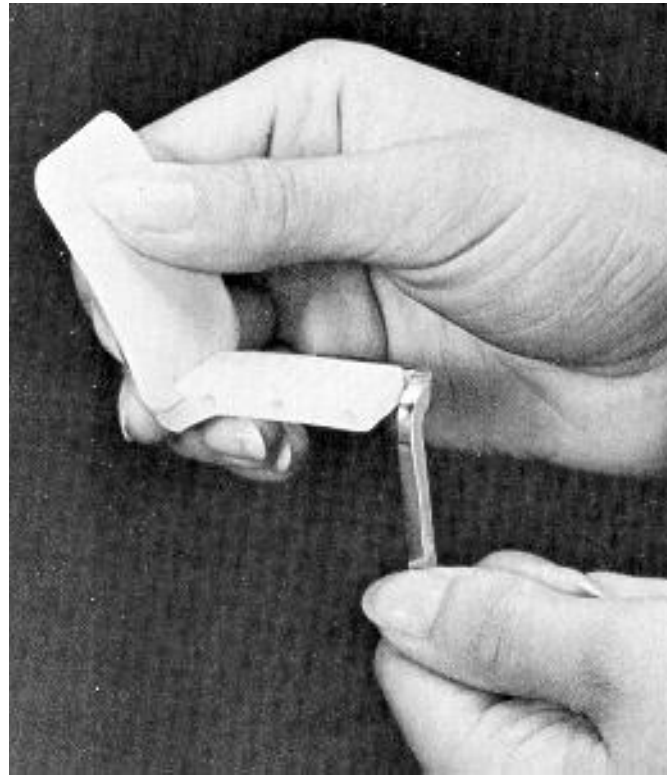
# Client Positioning

- Midsagittal plane perpendicular to floor
- Maxillary occlusal plane parallel to floor for maxillary films
- Mandibular occlusal plane parallel to floor for mandibular films



# Film Packet Positioning

- Film holder
  - **Anterior:** longest dimension of film placed vertically
  - **Posterior:** widest dimension of film placed horizontally
  - **Dot** in the slot
  - **XCP:** flex backing plate to open film slot





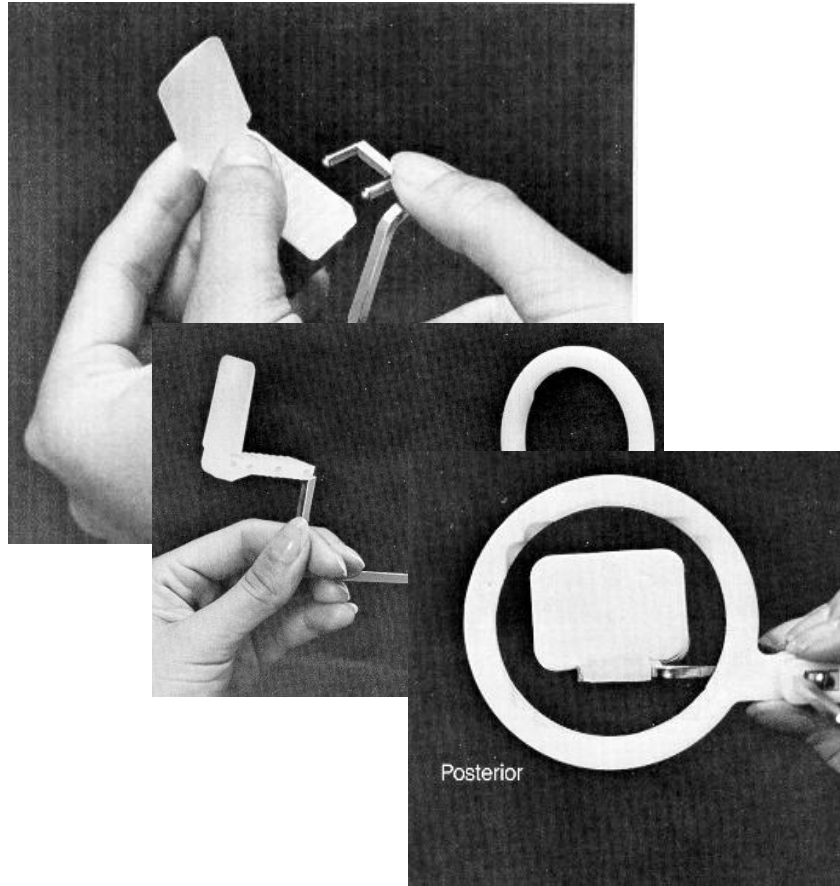
# XCP Holders

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- Assembly
- Positioning
- Step-by-step procedures

# XCP Assembly

- Insert rod into openings in bite block
- Insert indicator rod into aiming ring slot
- Check for correct assembly





# XCP Placement Into Oral Cavity

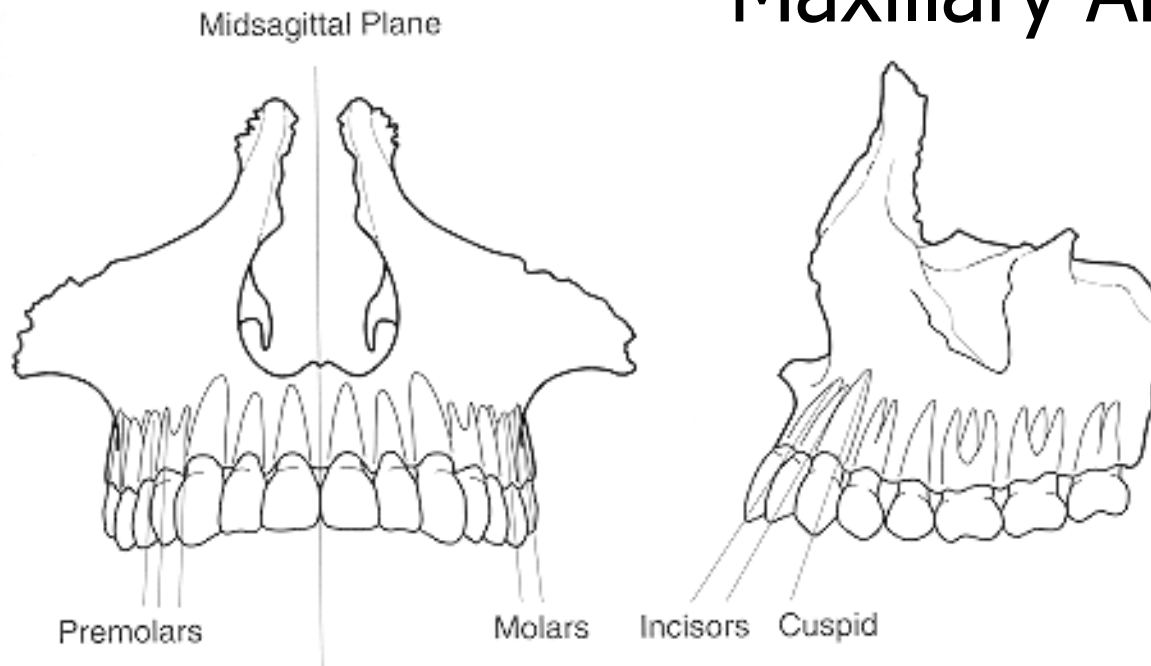
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- Center film & holder behind teeth to be radiographed
- Maintain film parallel to long axis of teeth & buccal surfaces of teeth
- Stabilized bite block against occlusal surfaces of teeth to be radiographed



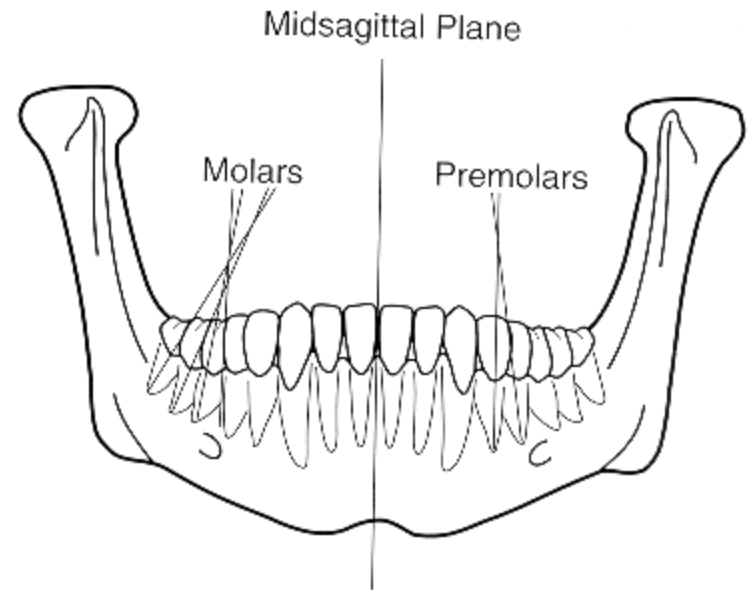
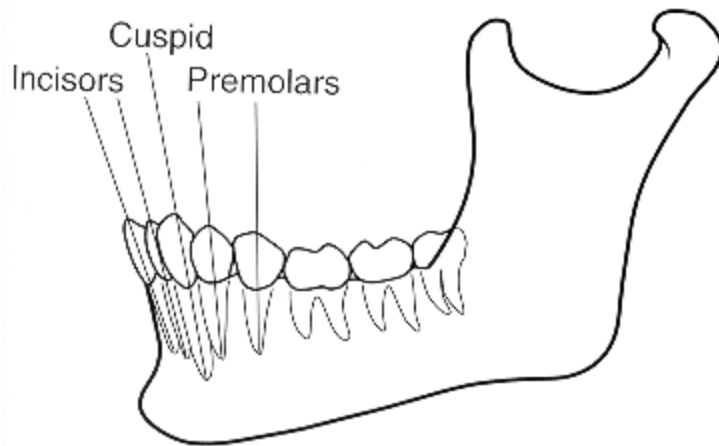
# Long Axes of the Teeth

## Maxillary Arch



# Long Axes of the Teeth

## Mandibular Arch



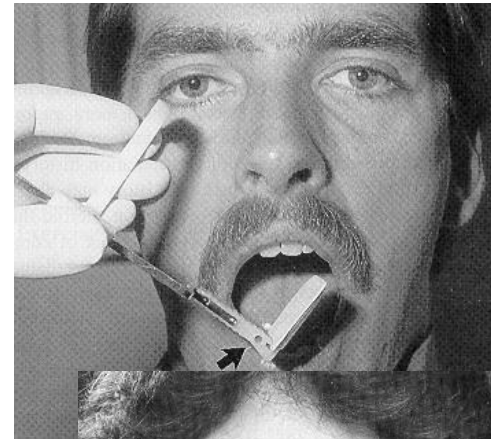


# Sequence of Films

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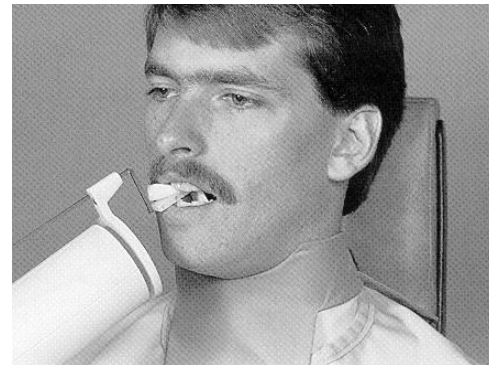
- Several possibilities
- Need to remember which films have been exposed
- #1-32
- Cross arch
- Anterior first

# XCP Placement Into Oral Cavity



# XCP Placement Into Oral Cavity

- Insert cotton roll under bite block
- Instruct client to close firmly
- Slide aiming ring along indicator rod until close to client's skin
- Expose film!





# Stabe Holder

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- Film Placement
  - Holder
  - Oral Cavity



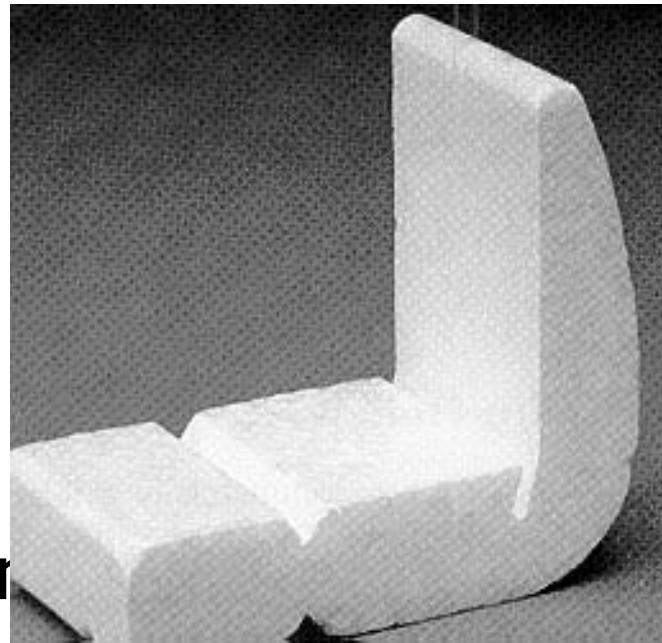
# Stabe Holder

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- Anatomical considerations
  - Long axes
  - Apices location
- Beam alignment/angulation
  - Vertical
  - Horizontal
  - Point of entry
  - Centering exposure field

# Stabe Holder

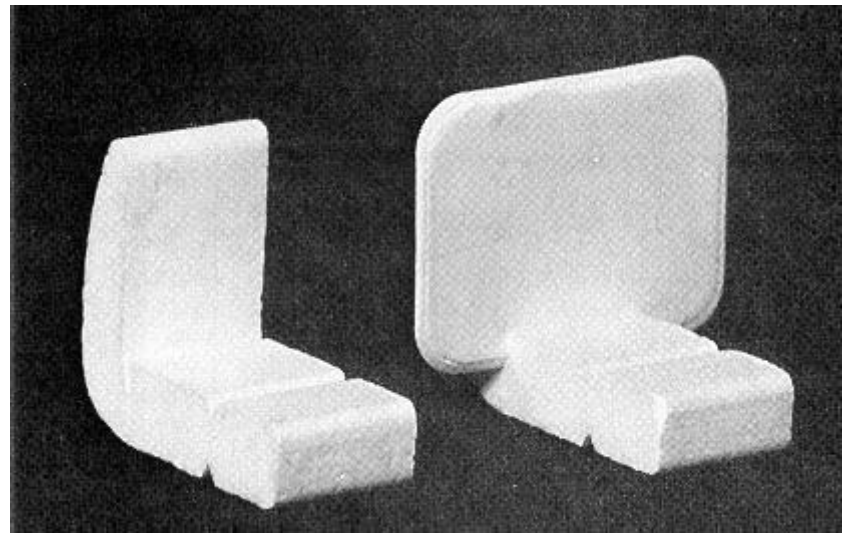
- Design features
  - Radiolucent
  - Rigid back
  - Disposable
  - Bite stability
  - Long bite portion





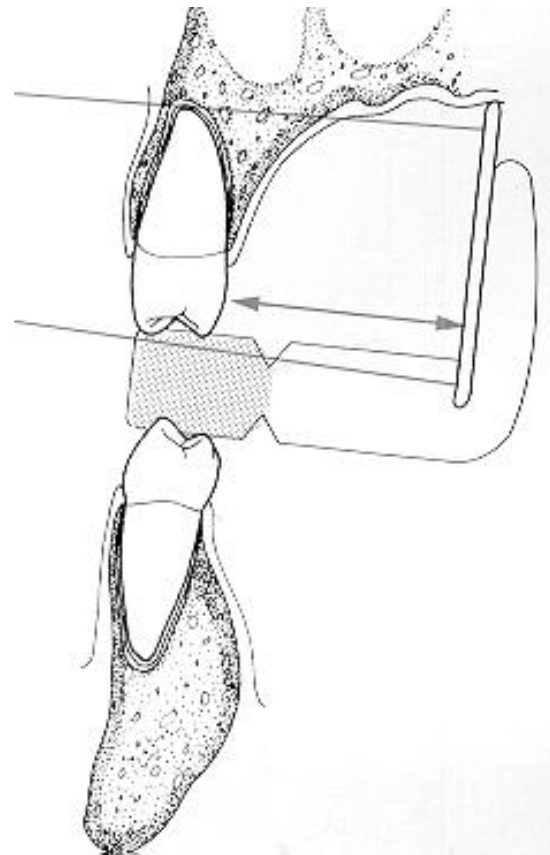
# Stabe Holder Film Placement

- Dot in slot
- Center film in holder
  - Anterior = vertical
  - Posterior = horizontal



# Stabe Holder Film Placement

- Position behind teeth of interest
- Place film parallel to long axes of teeth
- Stabilize holder against occlusal surfaces of teeth being radiographed (two-point contact)





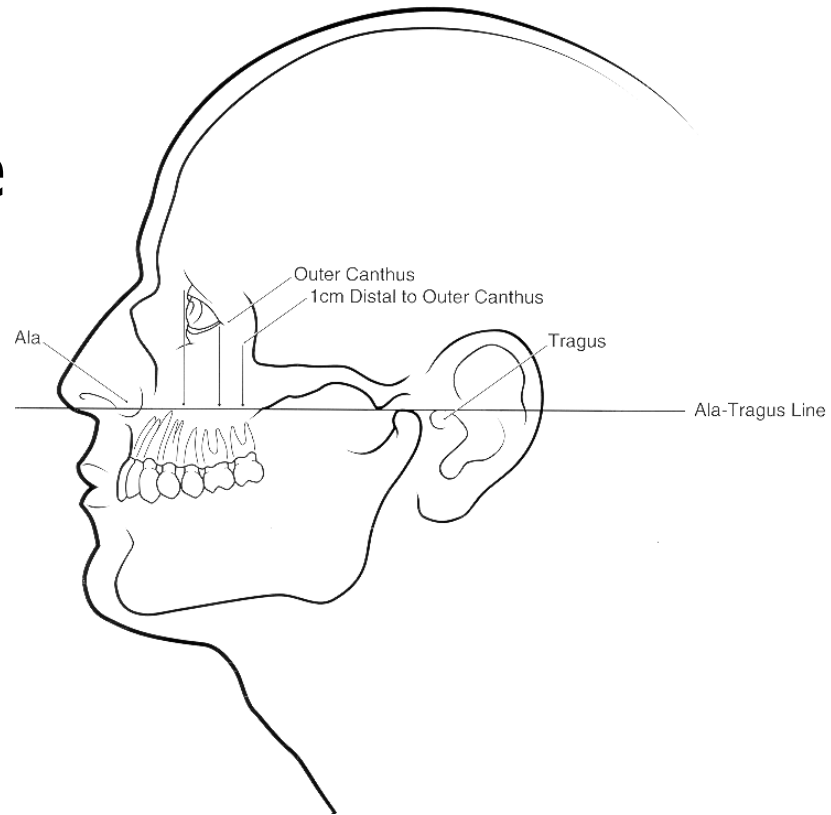
# Stabe Holder

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- Anatomical considerations
  - Long axes
  - Apices location

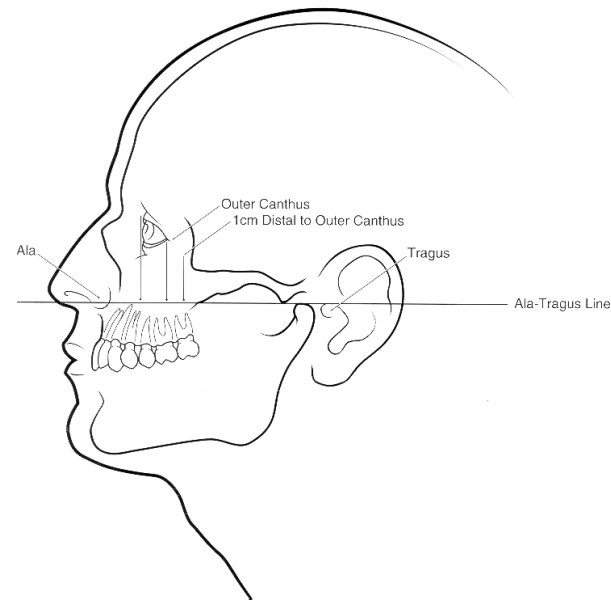
# Location of Apices

- **Maxillary:** A-T line
- **Mandibular:** One inch above inferior border of mandible



# Point of Entry

- **Central/lateral:** side of nose
- **Canine:** ala of nose
- **Premolar:** pupil of eye
- **Molar:** outer corner of eye





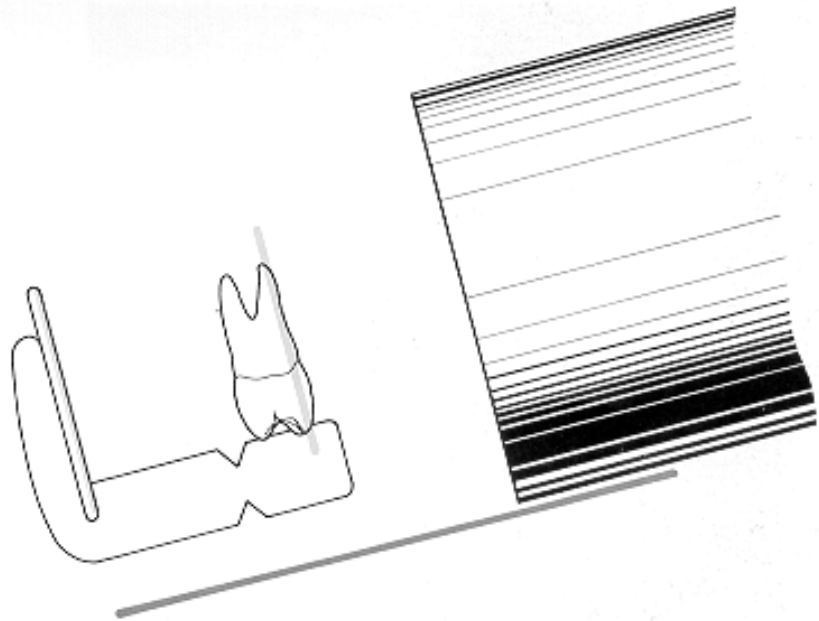
# Stabe Holder

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- Beam alignment/angulation
  - Vertical
  - Horizontal
  - Point of entry
  - Centering exposure field

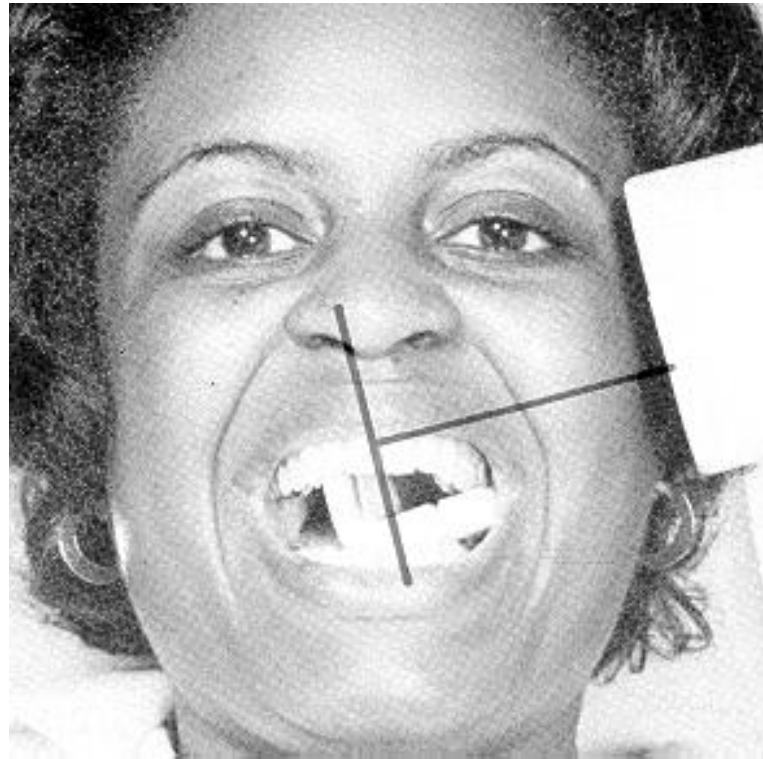
# Vertical Beam Alignment

- Two steps
  - **Step 1:** Parallel PID with bite portion of Stabe holder
  - **Step 2:** Position center of PID over point of entry



# Horizontal Beam Alignment

- Align face of PID parallel with film





# Center Exposure Field

- To avoid cone cut sight down one side and top or bottom of PID



# Module 6: Radiographic Techniques

## Lesson 17: Interproximal Surveys



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Dental Hygiene Department  
William Rainey Harper College



# Composition of Interproximal Radiographs

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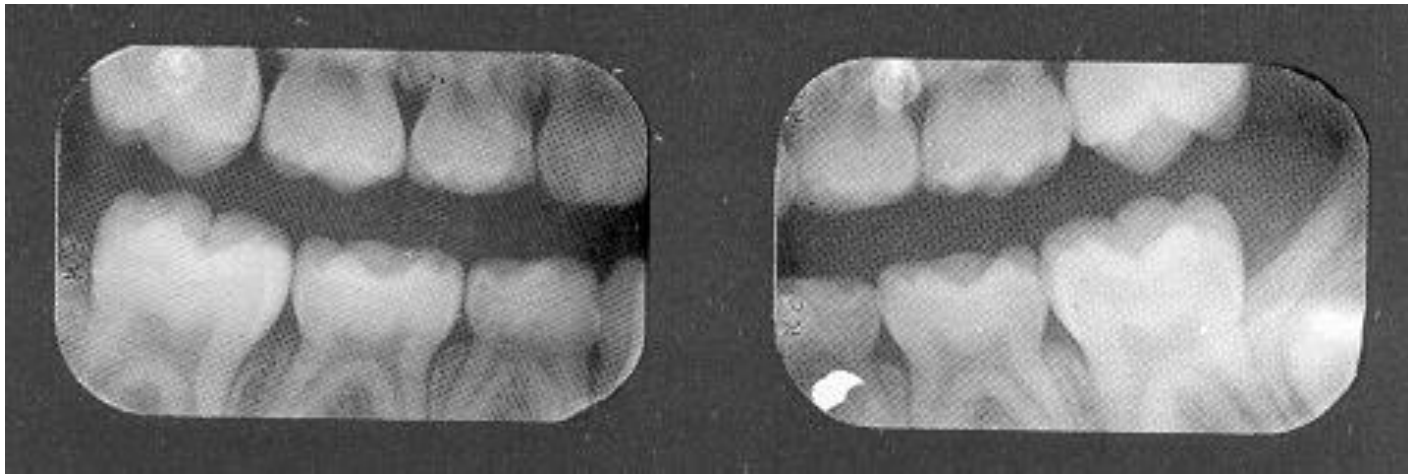
- Composition
  - *Adult*: four posterior #2 films
  - *Mixed dentition or deciduous*: try for two #2, but four #1 are acceptable

# Interproximal Survey

## Pedo

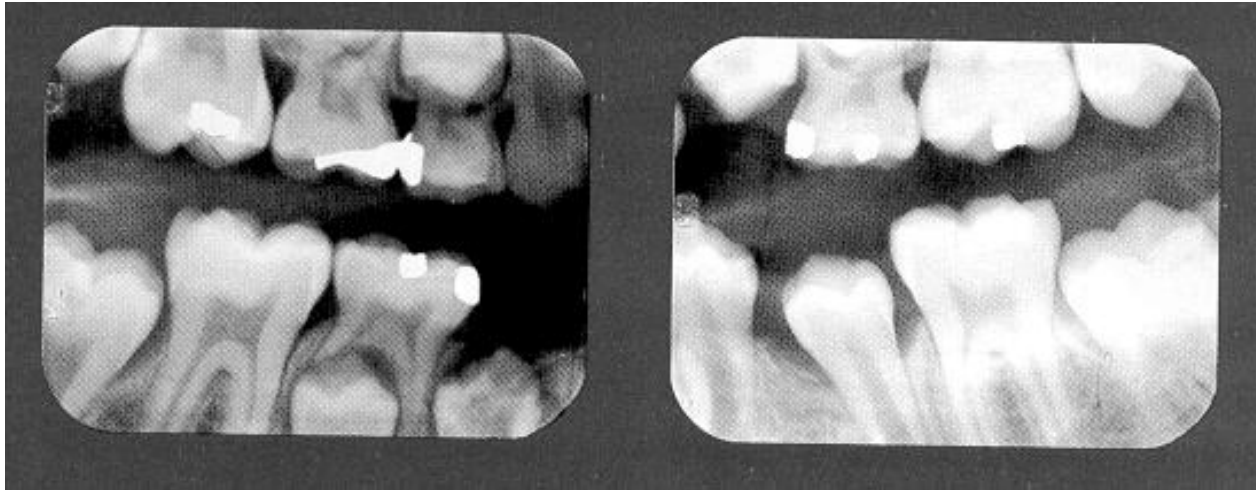
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- Two #1 films used



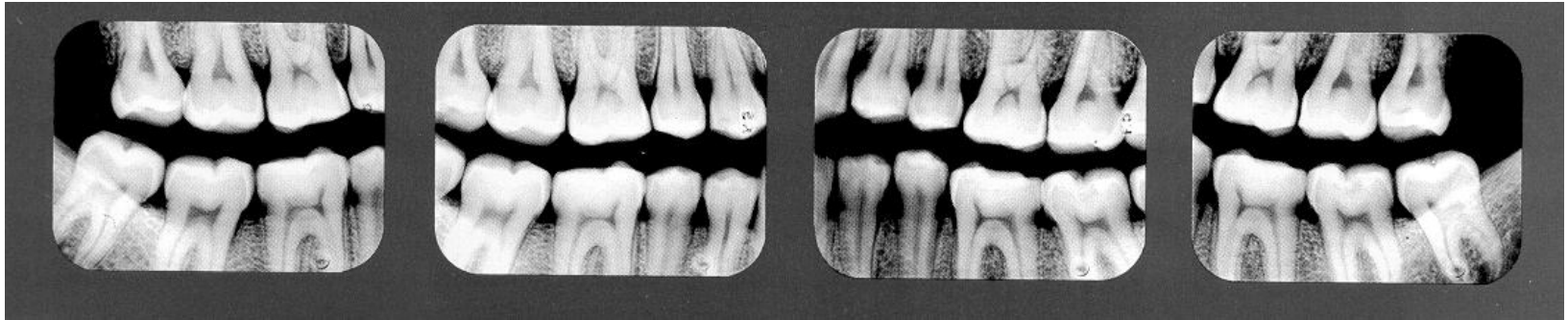
# Interproximal Survey Mixed Dentition

- Two #2 films used



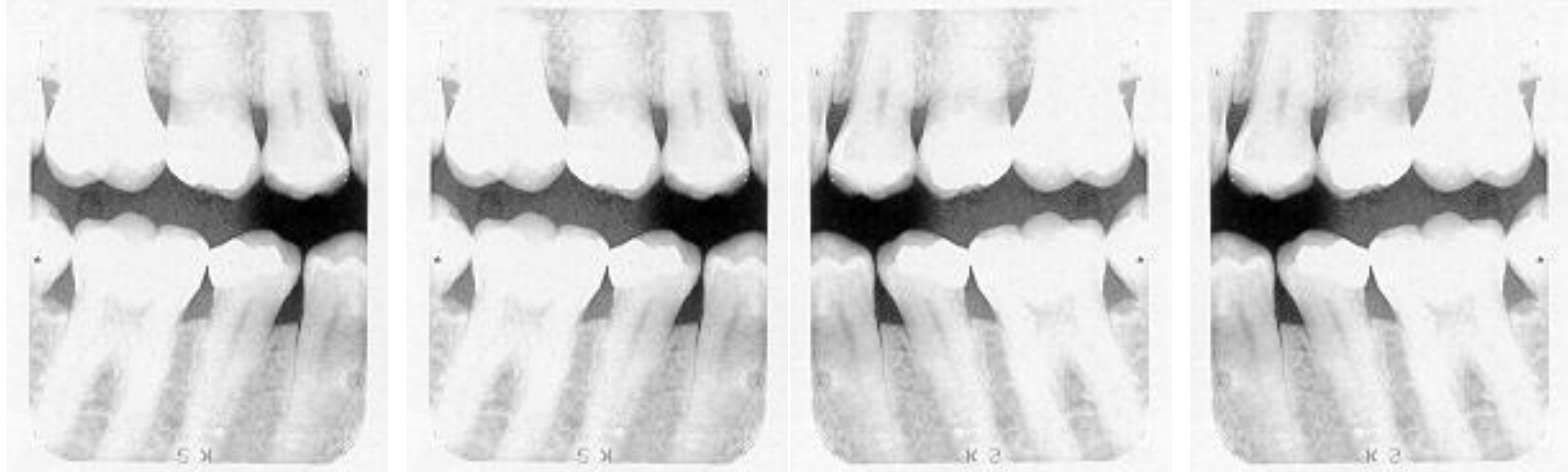
# Interproximal Survey Adult Dentition

- Four #2 films used



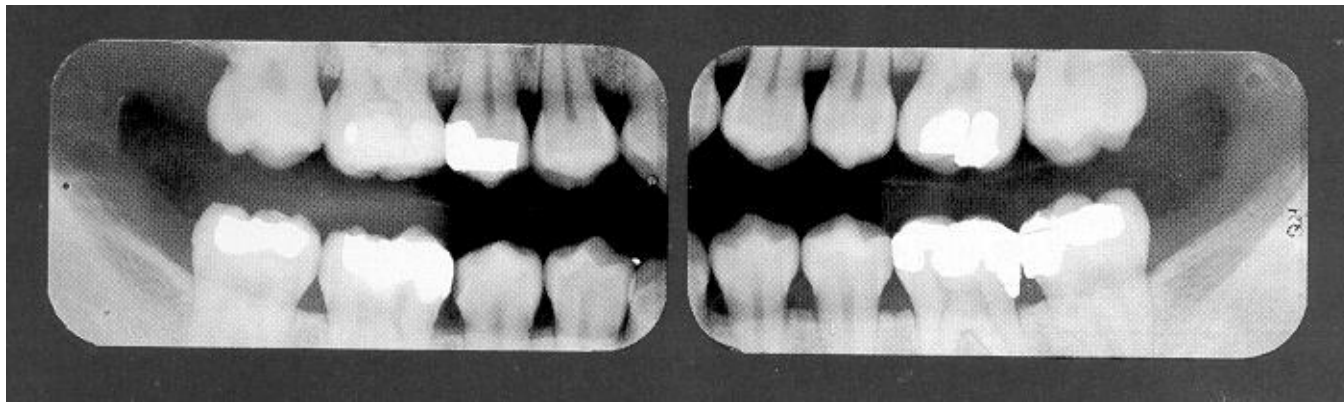
# Interproximal Survey Adult Dentition

- Four or six #2 films used for vertical placement



# Interproximal Survey Adult Dentition

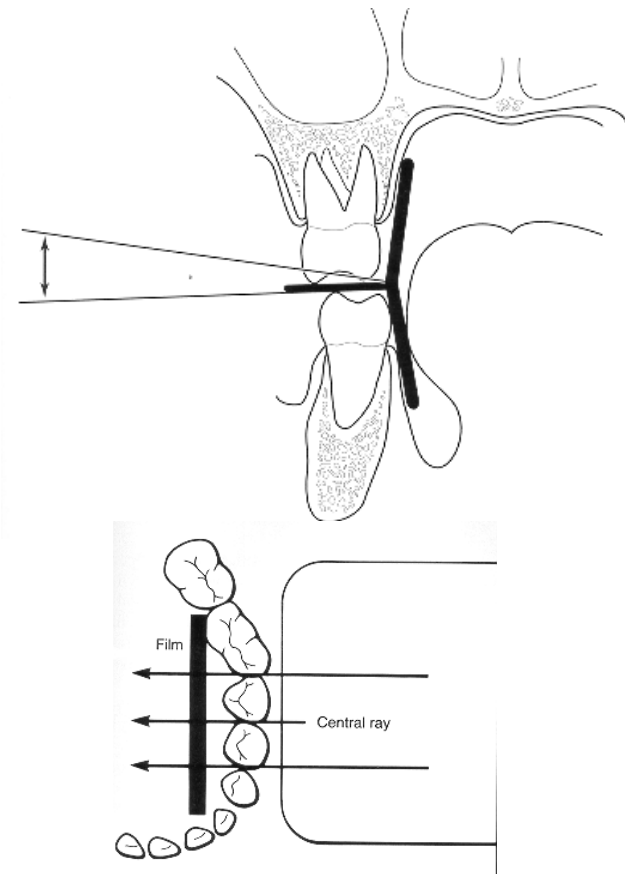
- Two #3 long bitewing films used





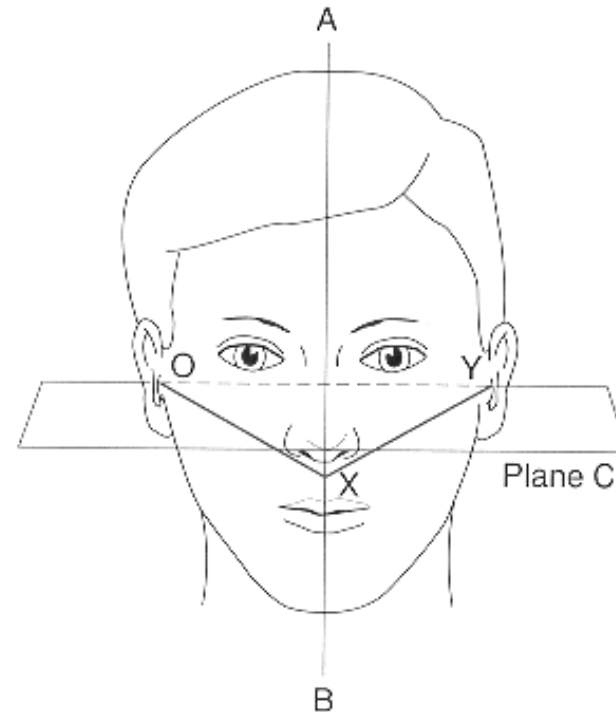
# Interproximal Radiographic Technique

- Principles
  - Center film behind the teeth of interest
  - Place film close & parallel to teeth
  - Direct radiation beam perpendicular to teeth & film



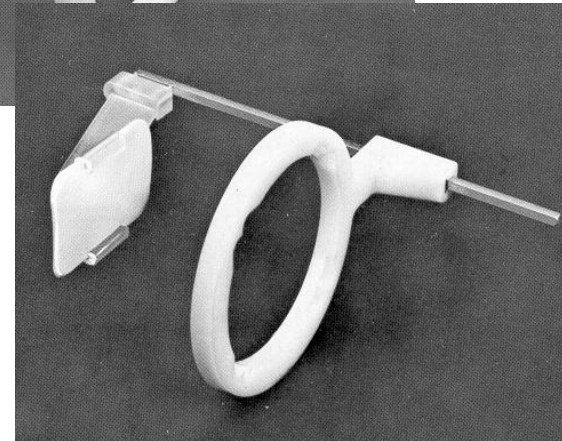
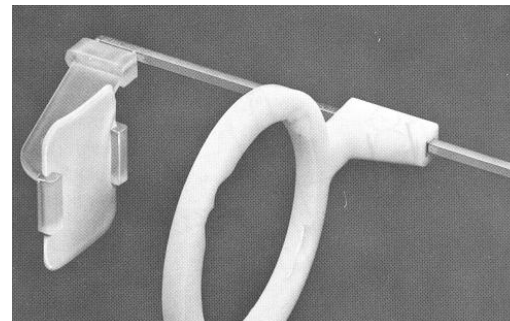
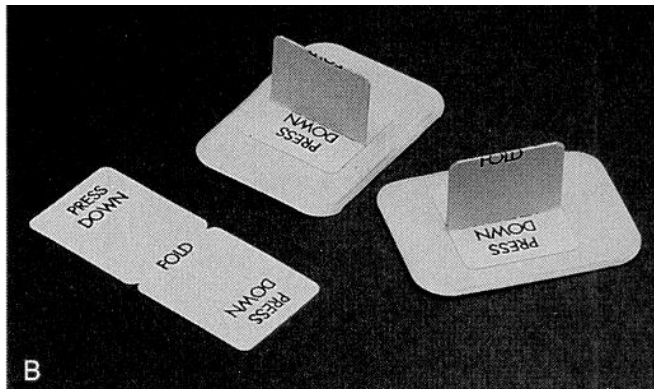
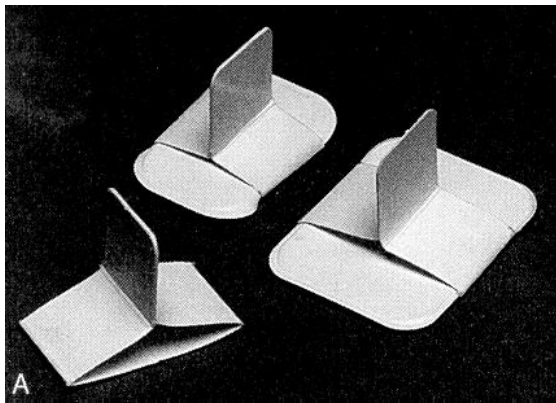
# Client Positioning for Interproximal Radiographs

- Client positioned upright
- Midsagittal plane perpendicular to floor



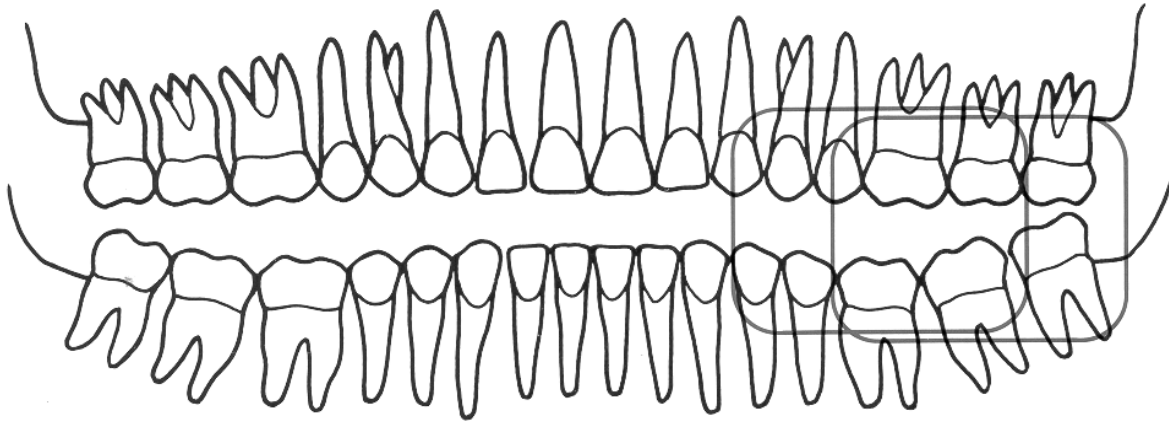
# Film Holders for Interproximal Radiographs

- Film placed in tab, loop or XCP holders



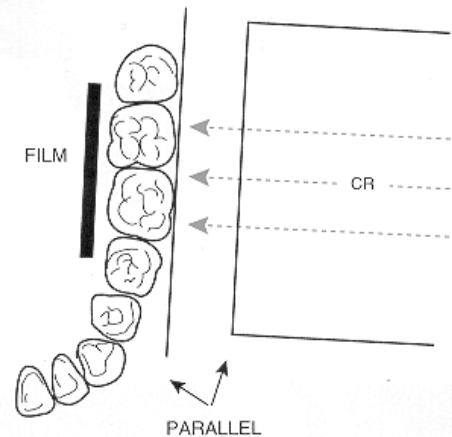
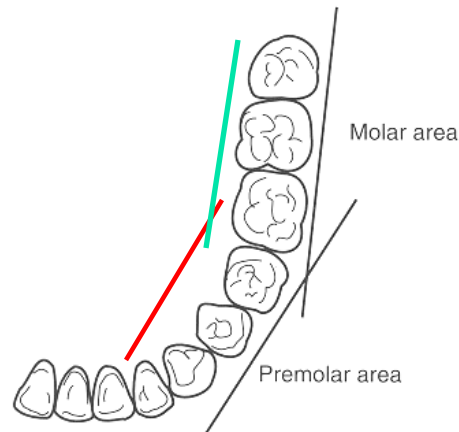
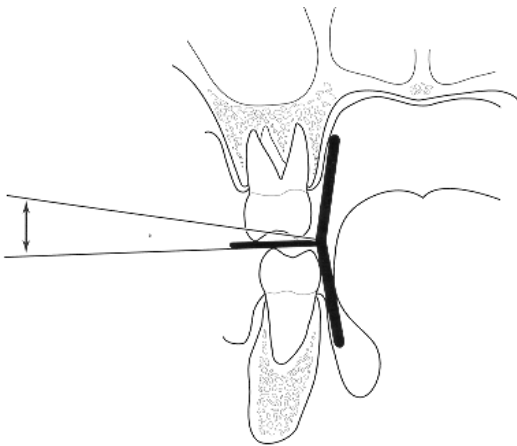
# Film Placement for Interproximal Radiographs Using XCP

- No specific location for dot
- Center films behind teeth of interest



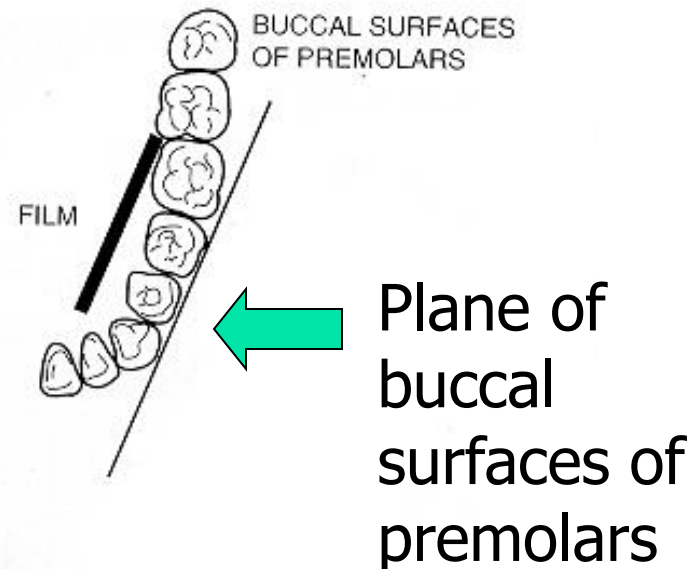
# Film Placement for Interproximal Radiographs Using XCP

- Center films behind teeth of interest in vertical and horizontal position

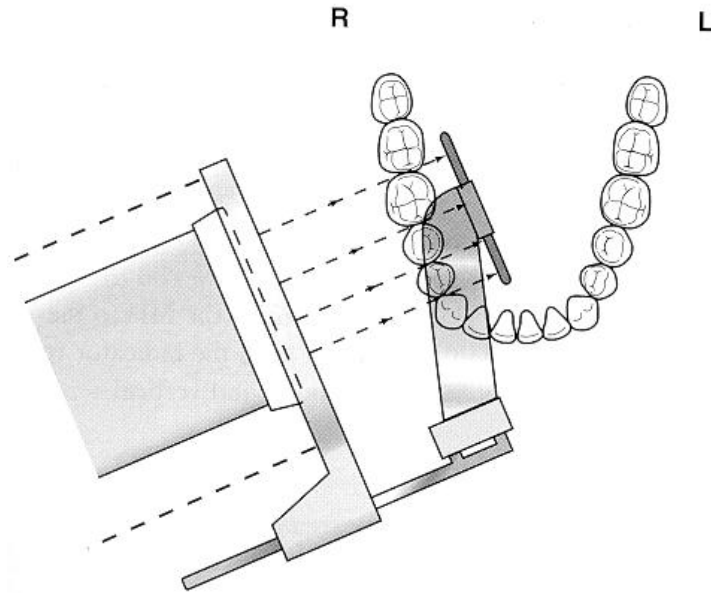
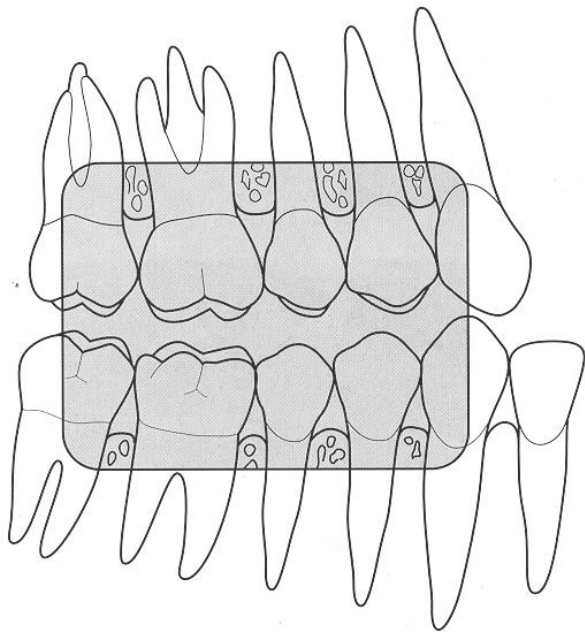


# Premolar Film Placement Using XCP

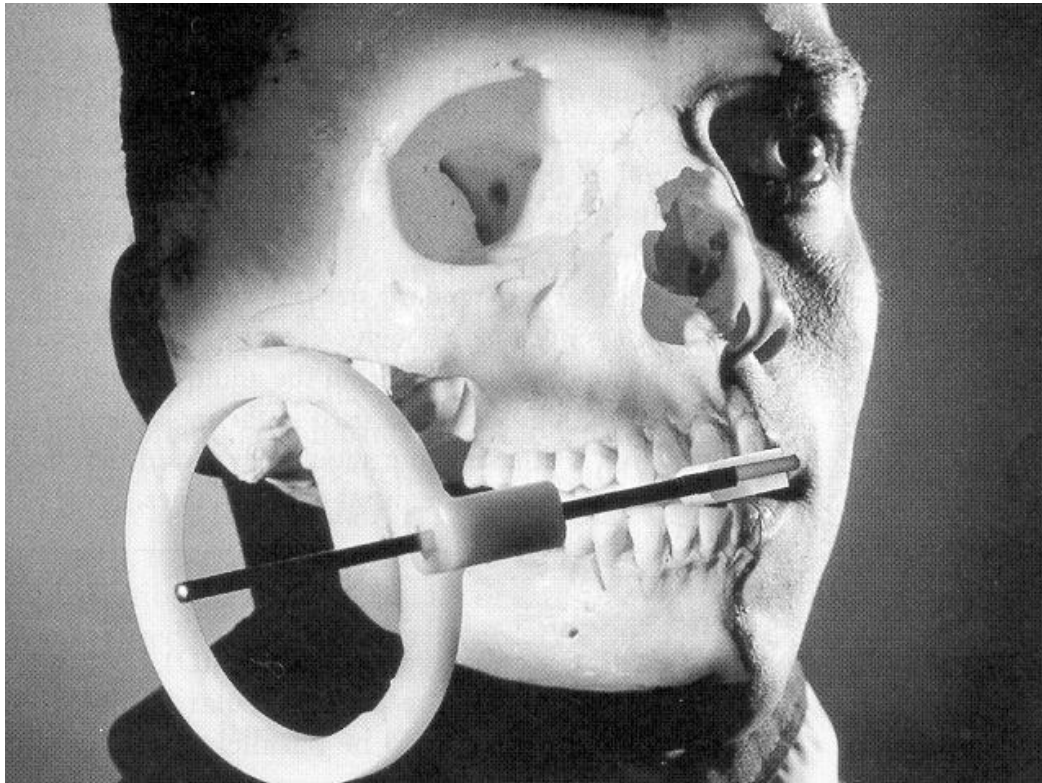
- Center films behind teeth of interest in horizontal position
- Maintain film parallel to buccal surfaces of premolars



# Premolar Film Placement With XCP

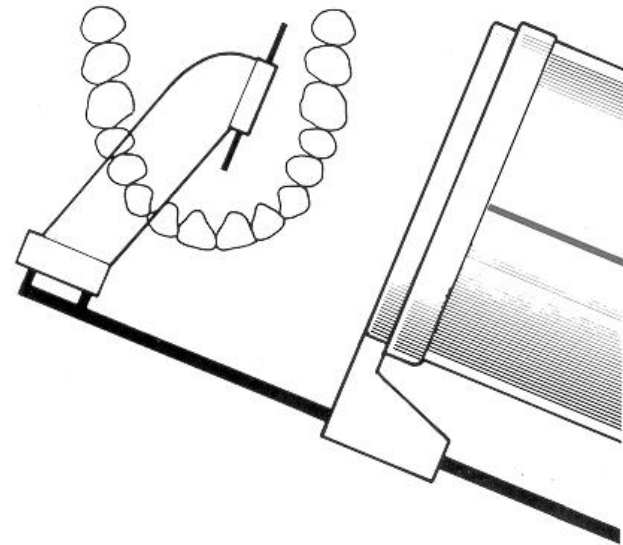


# Premolar Film Placement With XCP





# Premolar Film Placement With XCP

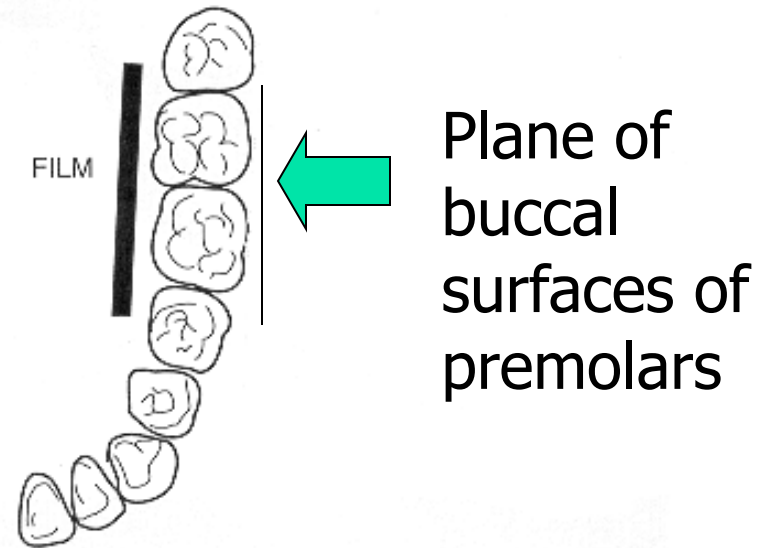


# Diagnostic Premolar Radiograph

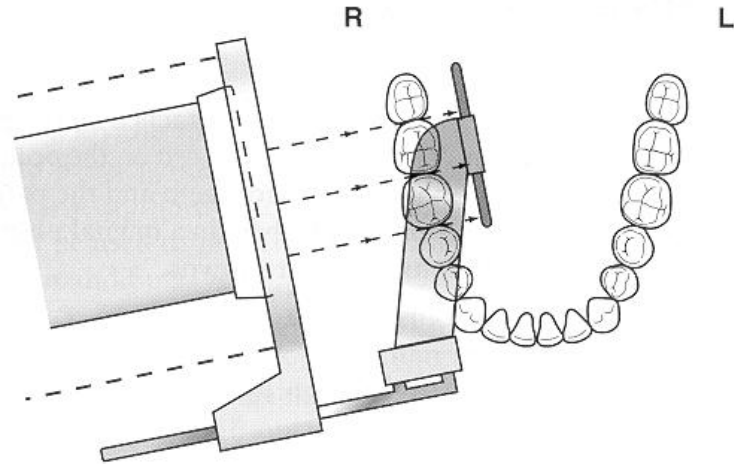
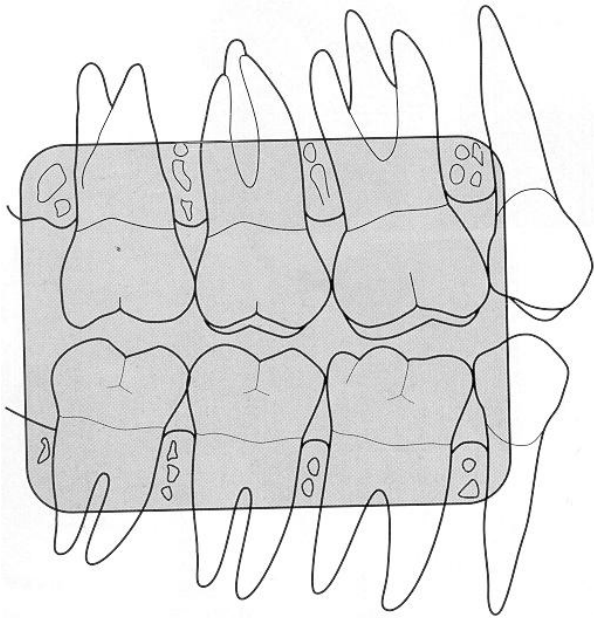


# Molar Film Placement Using XCP

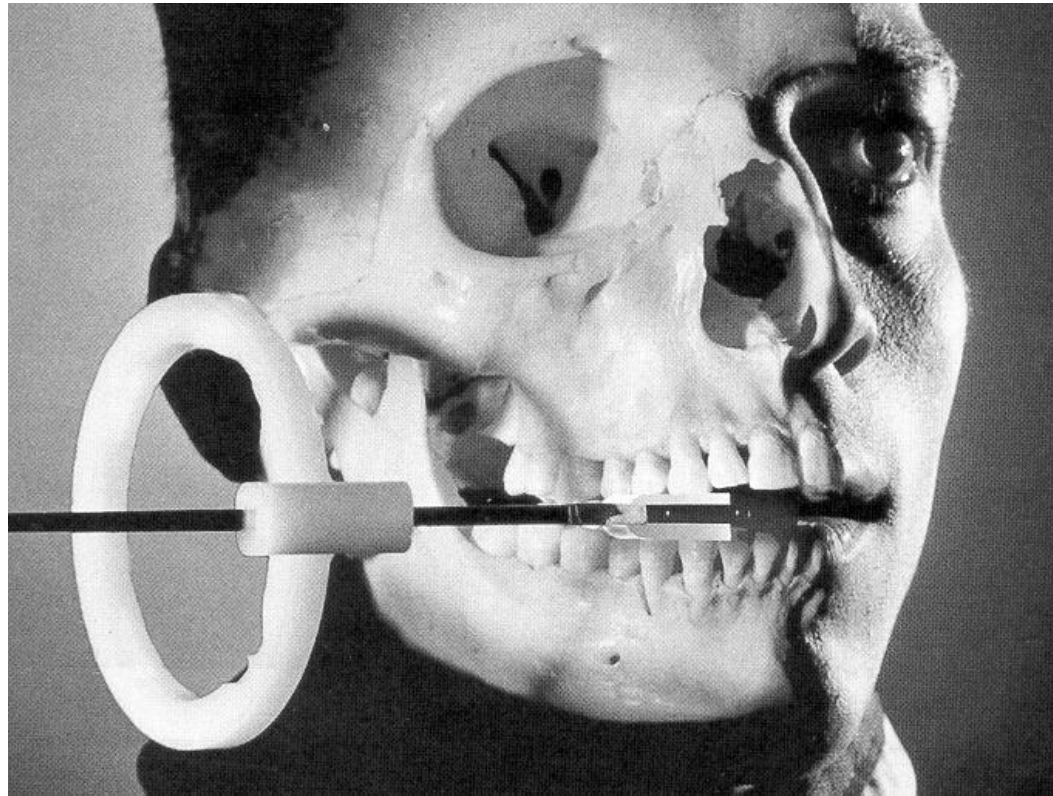
- Center films behind teeth of interest in horizontal position
- Maintain film parallel to buccal surfaces of molars



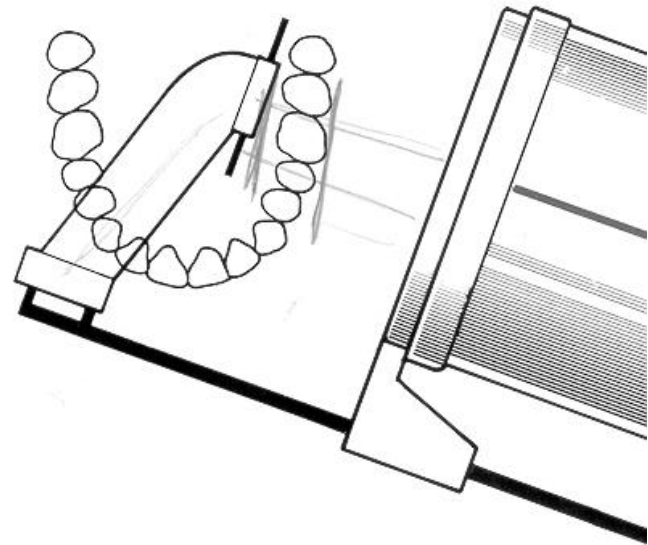
# Molar Film Placement With XCP



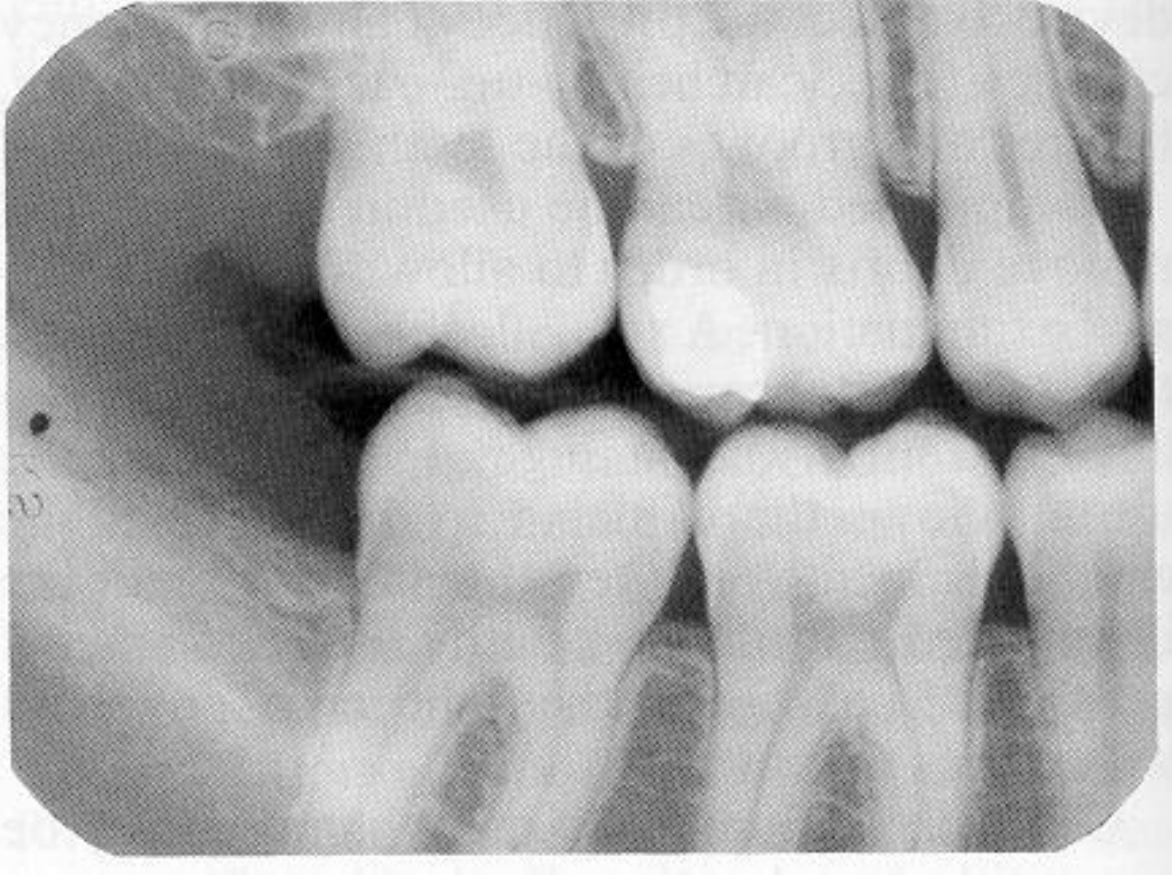
# Molar Film Placement With XCP



# Molar Film Placement With XCP

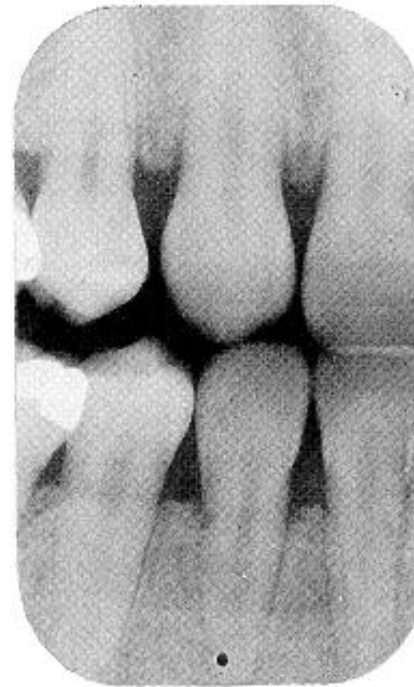


# Molar Film Placement With XCP



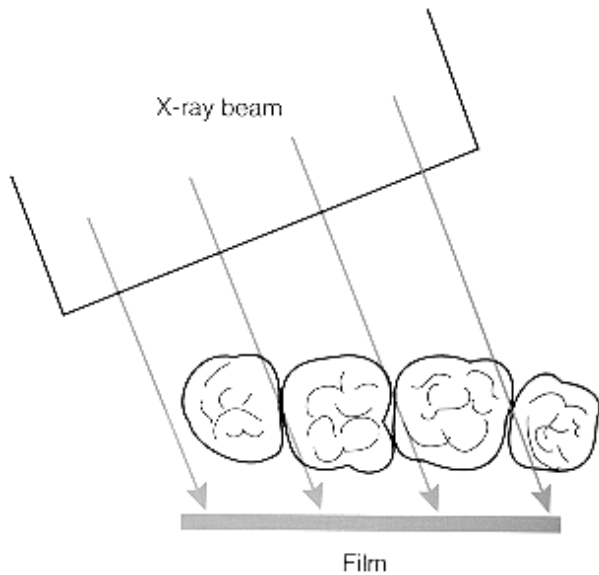
# Vertical Bitewings

- Indicated to examine alveolar bone levels in moderate to advanced periodontal disease
- Four to six films exposed depending on the number of erupted molars





# Nondiagnostic Interproximal Radiographs



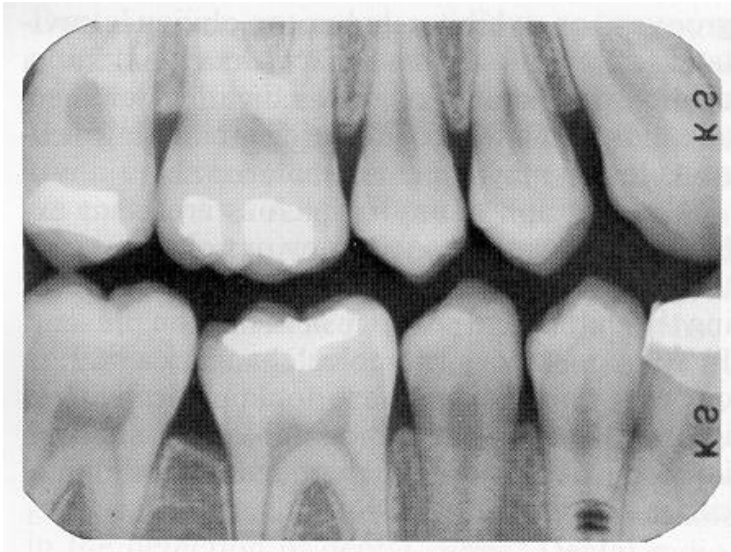


# Criteria for Diagnostic Acceptability

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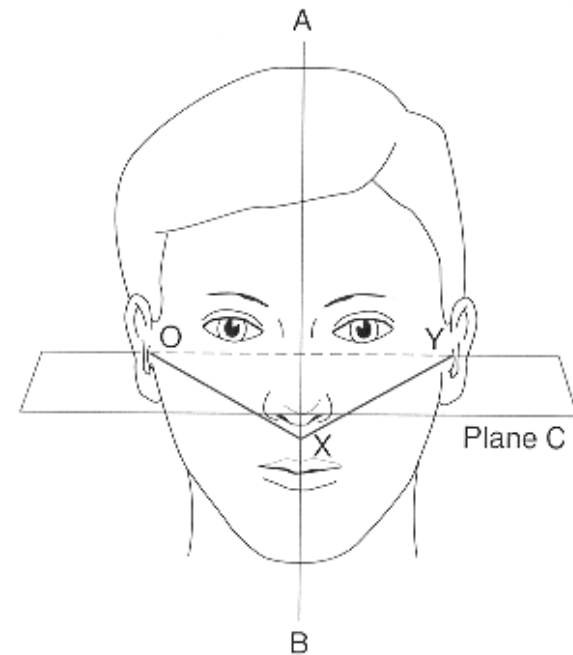
- What makes a “good” interproximal radiograph?
  - Teeth of interest visible in the film
  - Crowns & proximal surfaces of teeth of interest are visible without overlap of contact areas
  - Alveolar crestal bone is visible surrounding teeth of interest

# Criteria for Diagnostic Acceptability



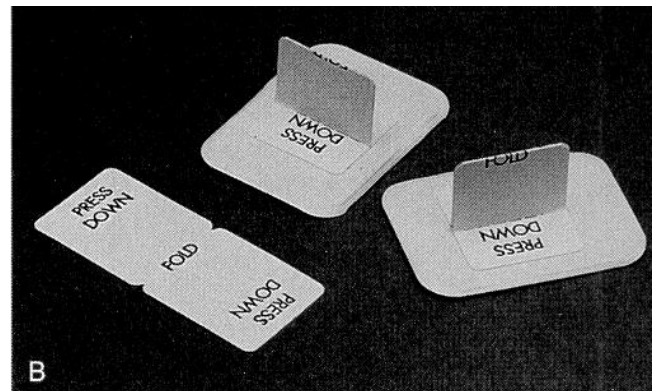
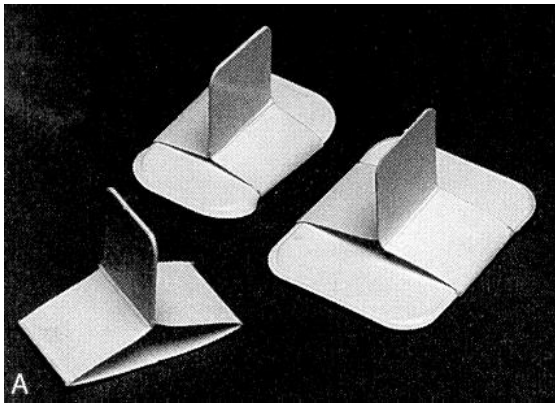
# Client Positioning for Interproximal Radiographs Using Loops/Tabs

- Client positioned upright
- Midsagittal plane perpendicular to floor
- Occlusal plane parallel to floor



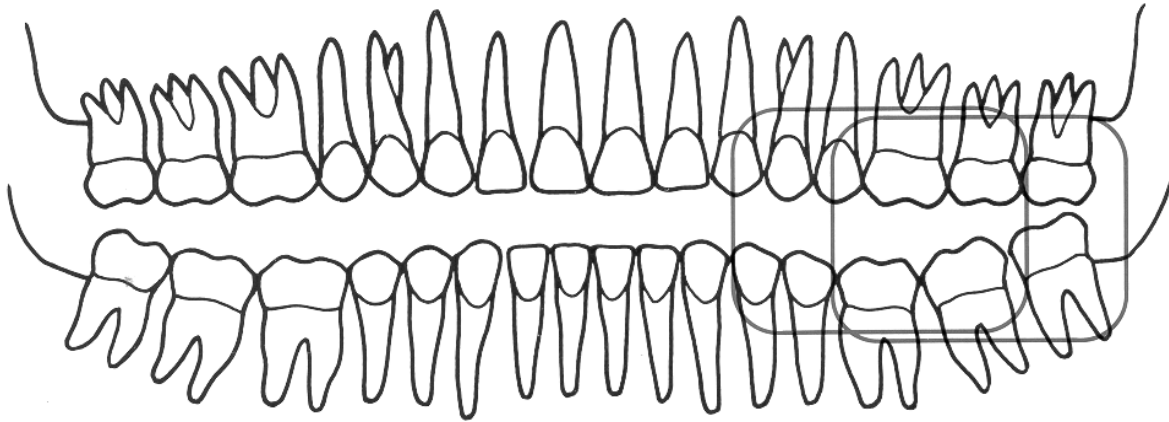
# Film Placement for Interproximal Radiographs Using Loops/Tabs

- Slide film into paper loop or place stick-on-tab across center of film



# Film Placement for Interproximal Radiographs Using Loops/Tabs

- No specific location for dot
- Center films behind teeth of interest



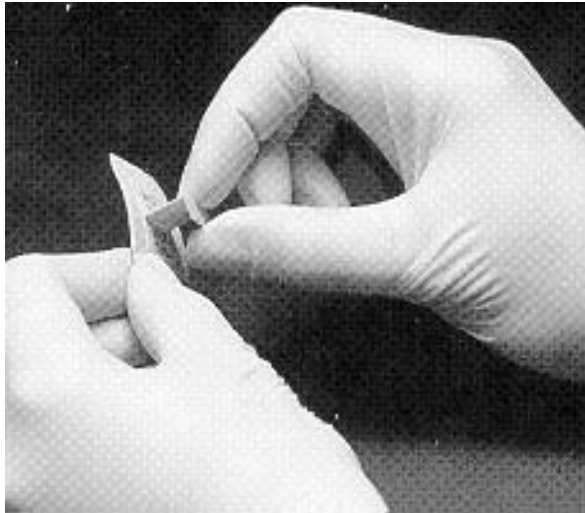


# Film Placement for Interproximal Radiographs Using Loops/Tabs

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- Fold tab upward against film
- Hold film between thumb & index finger
- Insert into oral cavity
- Place lower half of film between tongue & teeth
- Turn tab downward & hold against occlusal surfaces of the mandibular teeth

# Film Placement for Interproximal Radiographs Using Loops/Tags







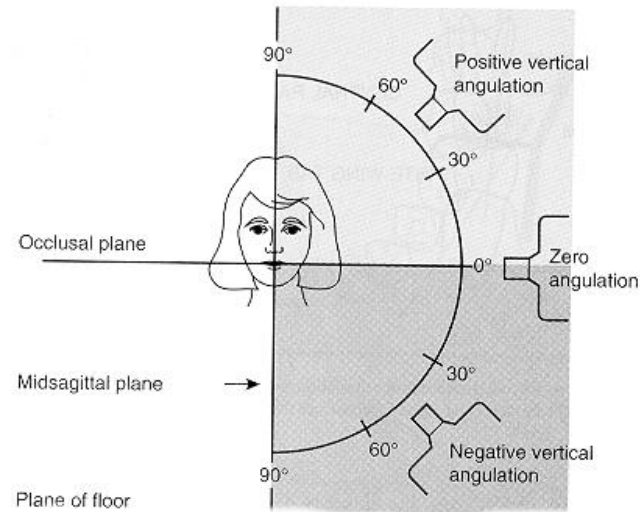
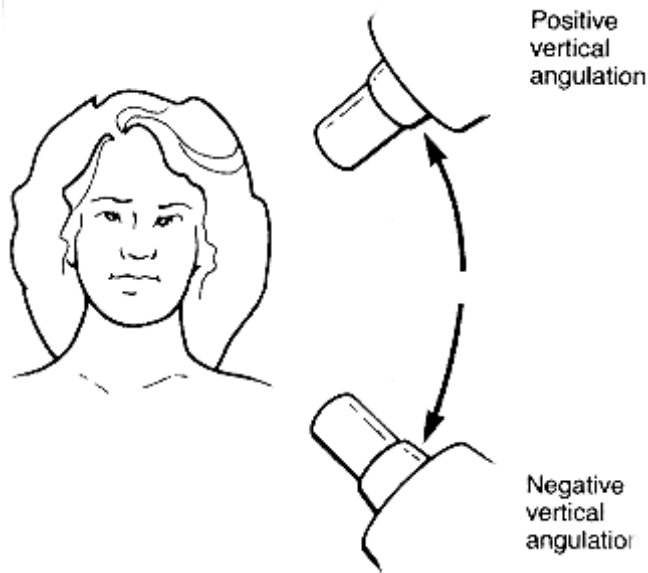
# Beam Alignment for Interproximal Radiographs Using Loops/Tabs

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- Vertical angulation: (Up/down plane)
  - May be positive or negative
  - Measured in degrees on outside of tubehead
  - Positive vertical angulation: PID above occlusal plane & beam directed toward floor
  - Negative vertical angulation: PID below occlusal plane & beam directed toward ceiling

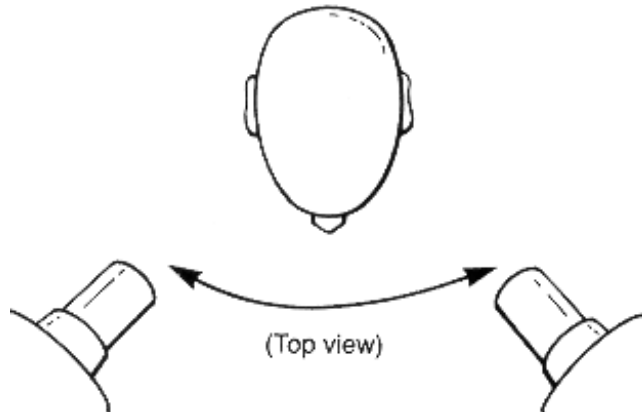
# Beam Alignment for Interproximal Radiographs Using Loops/Tabs

## Vertical Angulation



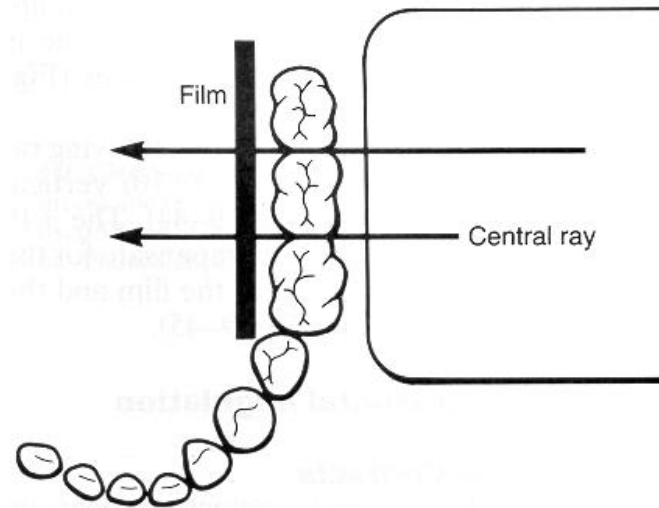
# Beam Alignment for Interproximal Radiographs Using Loops/Tabs

- Horizontal angulation: (Side-to-side plane)
  - Determines appearance of proximal teeth surfaces



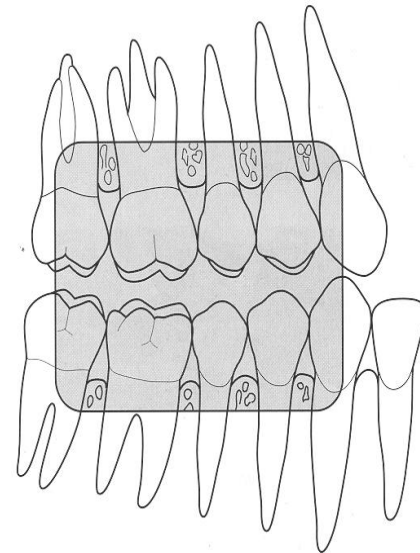
# Beam Alignment for Interproximal Radiographs Using Loops/Tabs

–Direct radiation perpendicular to curvature of arch and through contact areas of teeth



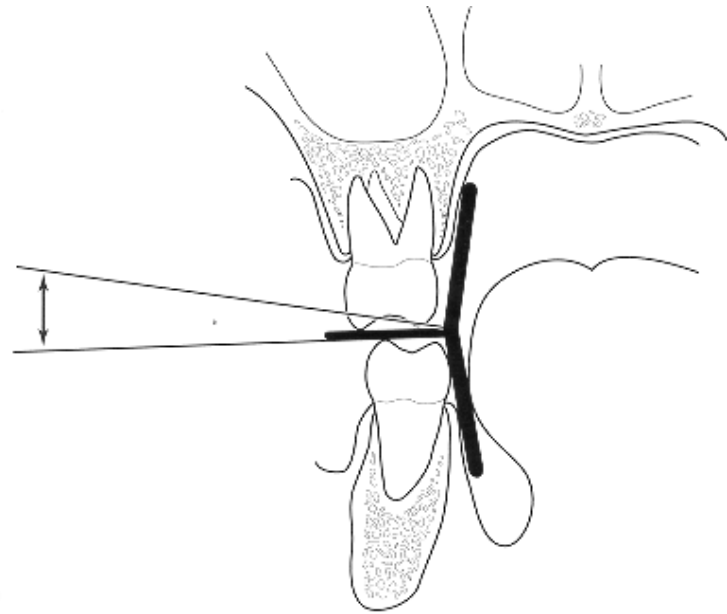
# Premolar Interproximal Using Loops/Tabs

- Insert film packet into oral cavity between tongue and premolars
- Position film far enough forward to include distal half of canines



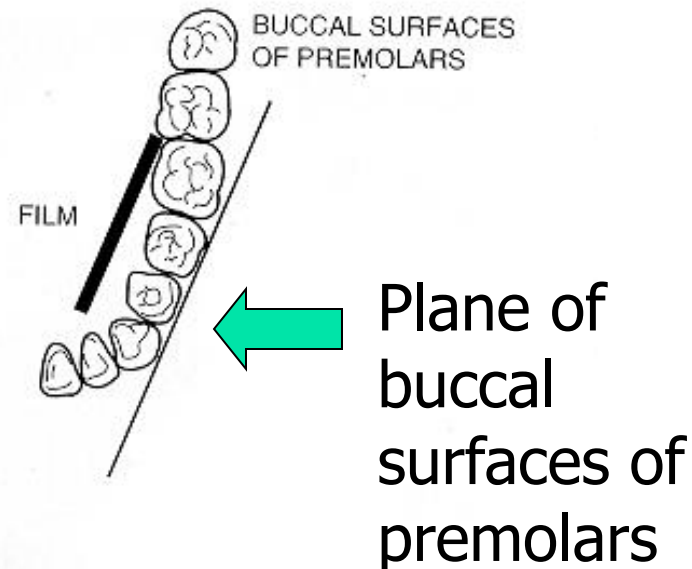
# Premolar Interproximal Using Loops/Tabs

- Center films behind teeth of interest in vertical position



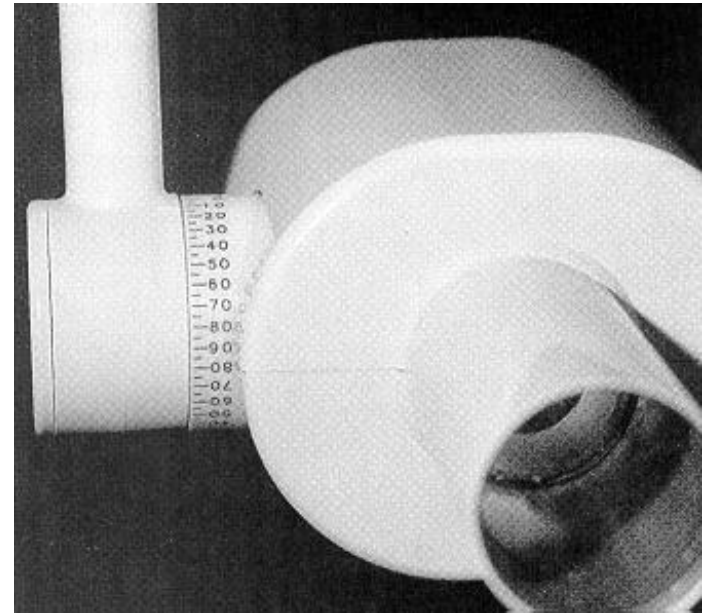
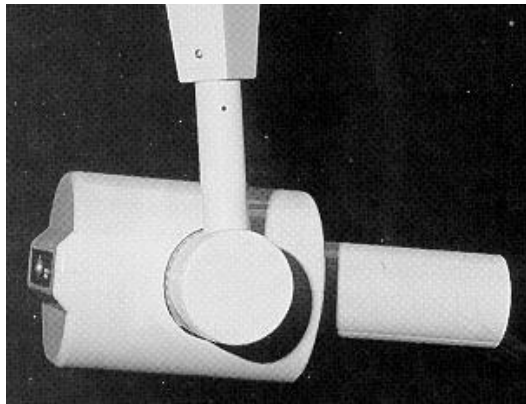
# Premolar Interproximal Using Loops/Tabs

- Center films behind teeth of interest in horizontal position
- Maintain film parallel to buccal surfaces of premolars



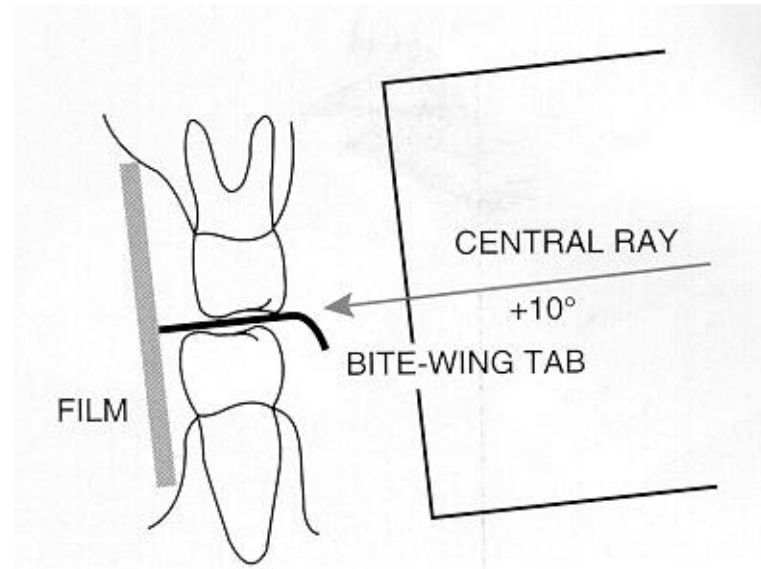
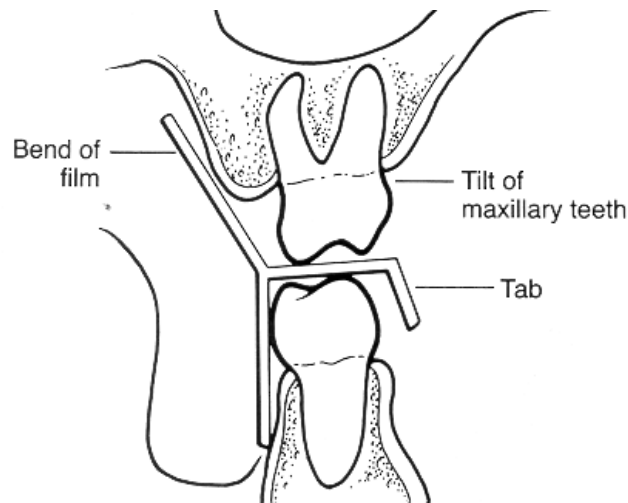
# Vertical Beam Alignment for Premolar Interproximal Radiograph

- Adjust vertical angulation to + 10 degrees



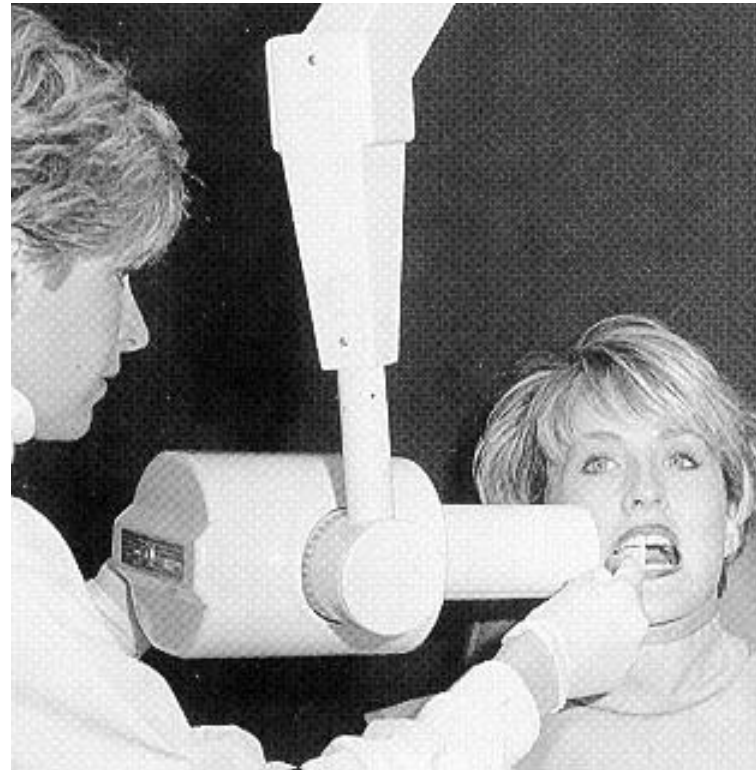


# Vertical Beam Alignment for Premolar Interproximal Radiograph

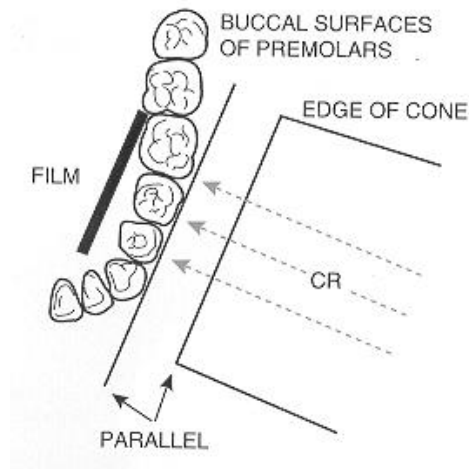


# Vertical Beam Alignment for Premolar Interproximal Radiograph

- Direct PID at occlusal plane



# Horizontal Beam Alignment for Premolar Interproximal Radiograph



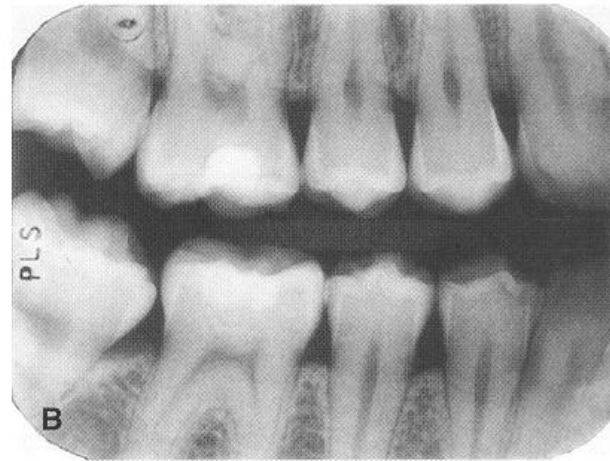
Align open end of PID with buccal surfaces of premolar teeth

# Centering Exposure for Premolar Interproximal Radiograph

- Make sure that PID covers max. & mand canines to avoid cone-cutting

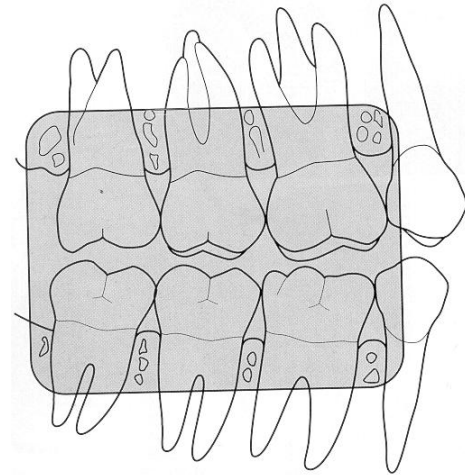


# Diagnostic Premolar Interproximal Radiograph



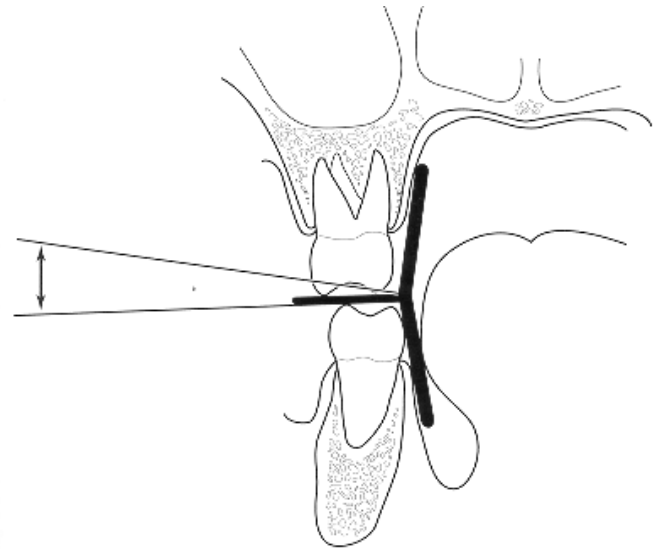
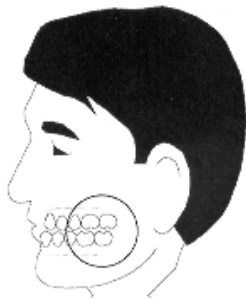
# Molar Interproximal Using Loops/Tabs

- Insert film packet into oral cavity between tongue and molars
- Position film far enough back to include the distal of the most posteriorly erupted molar



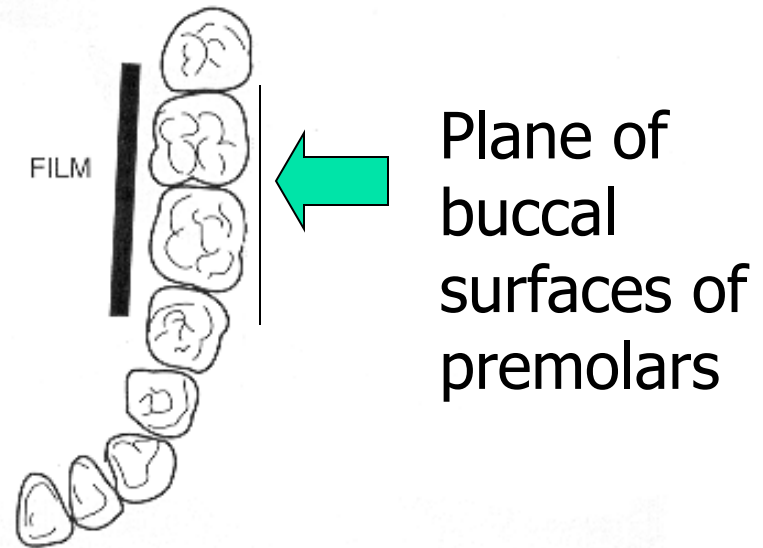
# Molar Interproximal Using Loops/Tabs

- Center films behind teeth of interest in vertical position



# Molar Interproximal Using Loops/Tabs

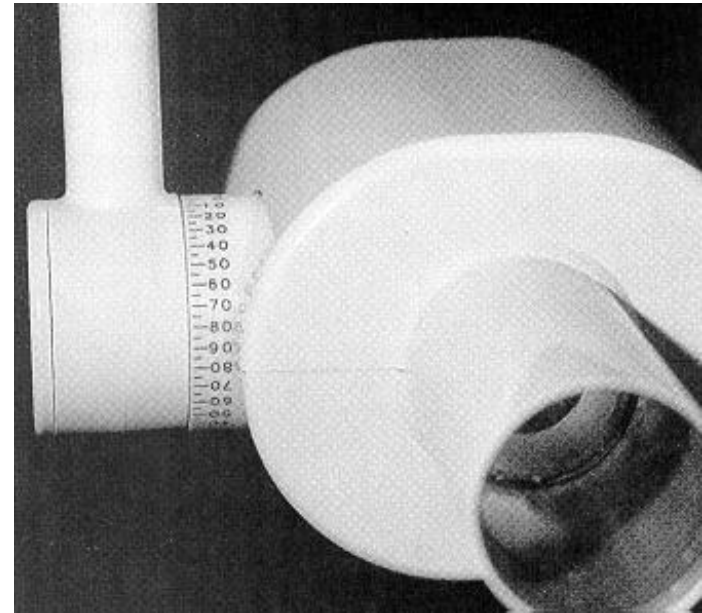
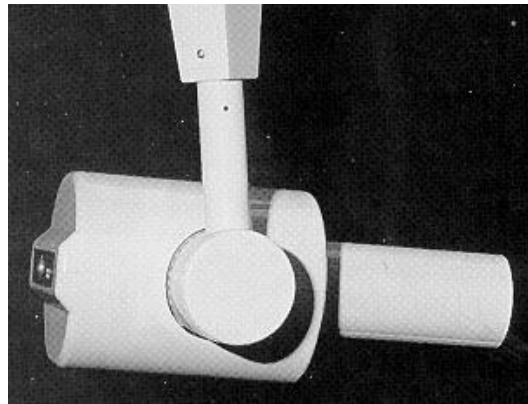
- Center films behind teeth of interest in horizontal position
- Maintain film parallel to buccal surfaces of molars



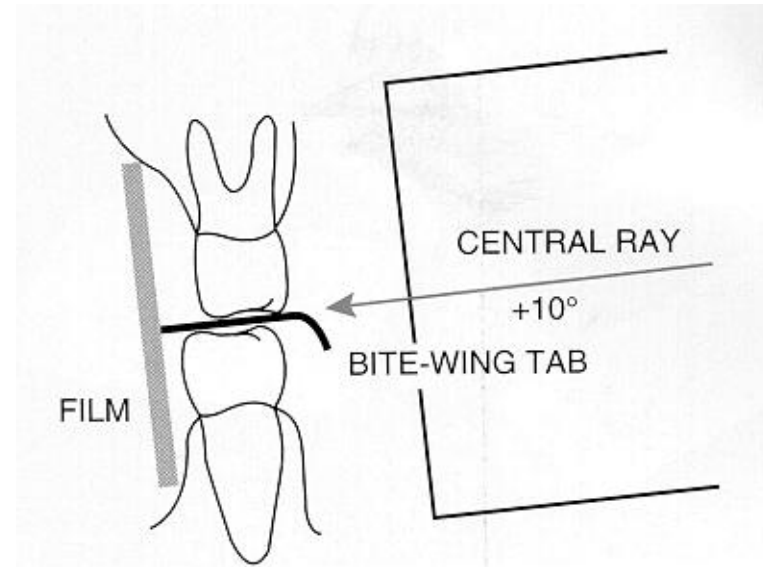
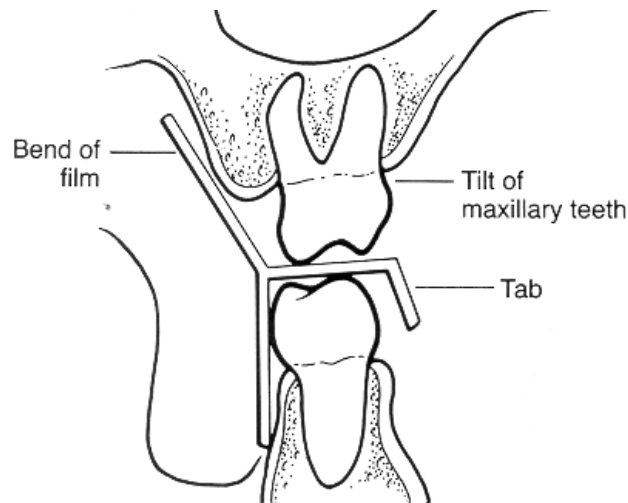


# Vertical Beam Alignment for Molar Interproximal Radiograph

- Adjust vertical angulation to + 10 degrees

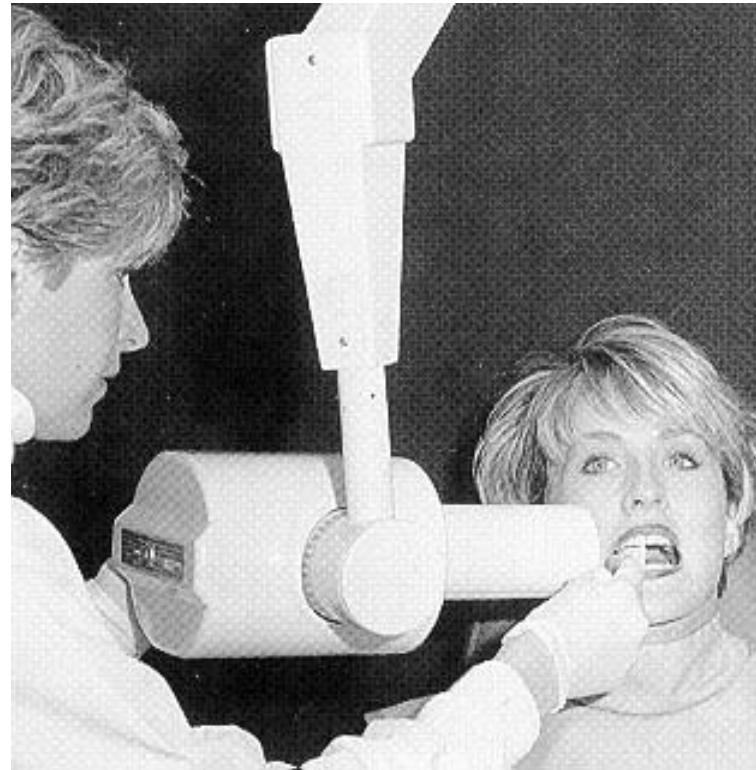


# Vertical Beam Alignment for Molar Interproximal Radiograph

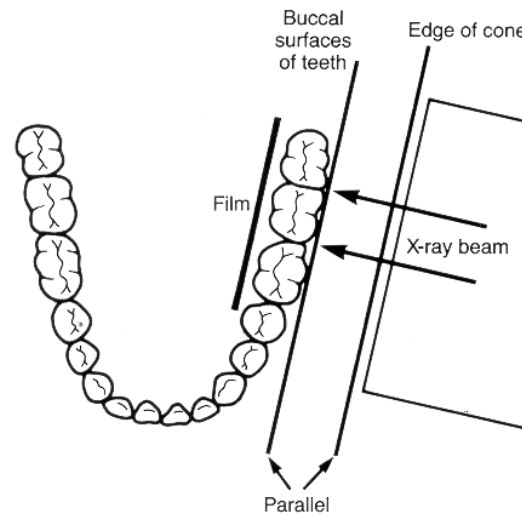


# Vertical Beam Alignment for Molar Interproximal Radiograph

- Direct PID at occlusal plane



# Horizontal Beam Alignment for Molar Interproximal Radiograph



Align open end of PID  
with buccal surfaces of  
molar teeth

# Horizontal Beam Alignment for Molar Interproximal Radiograph

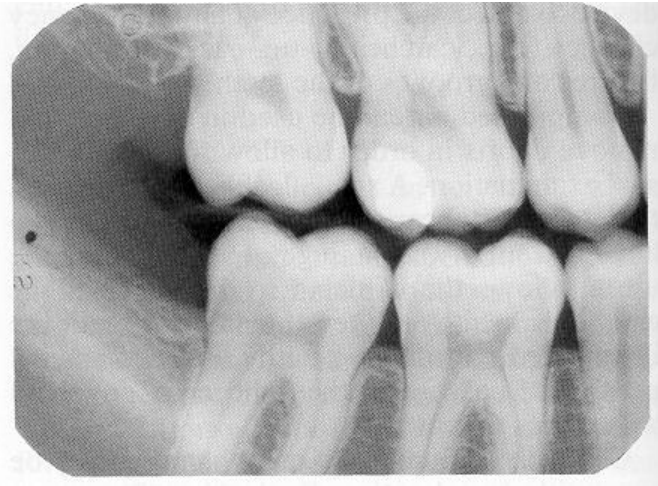


# Centering Exposure for Molar Interproximal Radiograph

- Make sure that PID covers max. & mand second premolars to avoid cone-cutting



# Diagnostic Molar Interproximal Radiograph



# Vertical Bitewings with Loops/Tabs

- Indicated to examine alveolar bone levels in moderate to advanced periodontal disease
- Four to six films exposed depending on the number of erupted molars

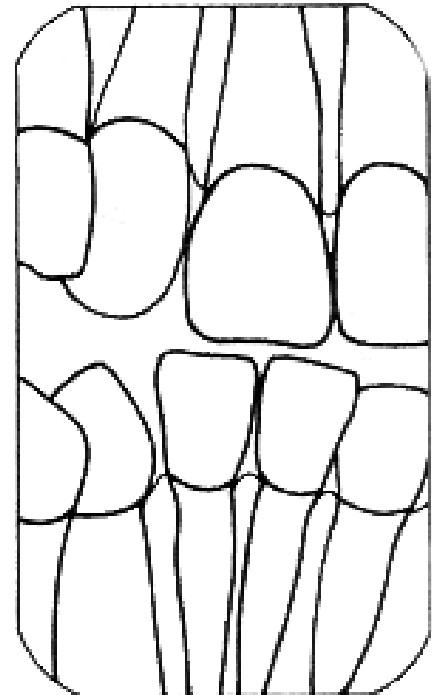
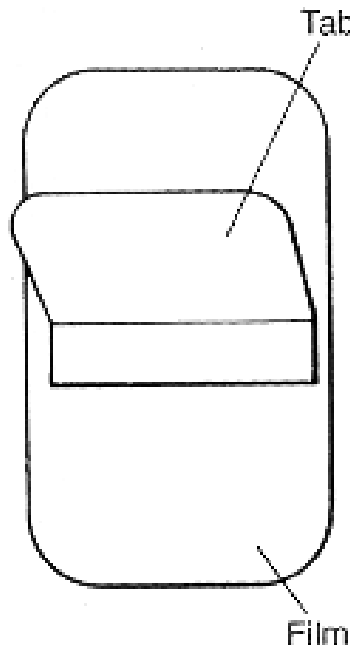




# Vertical Bitewings with Loops/Tabs

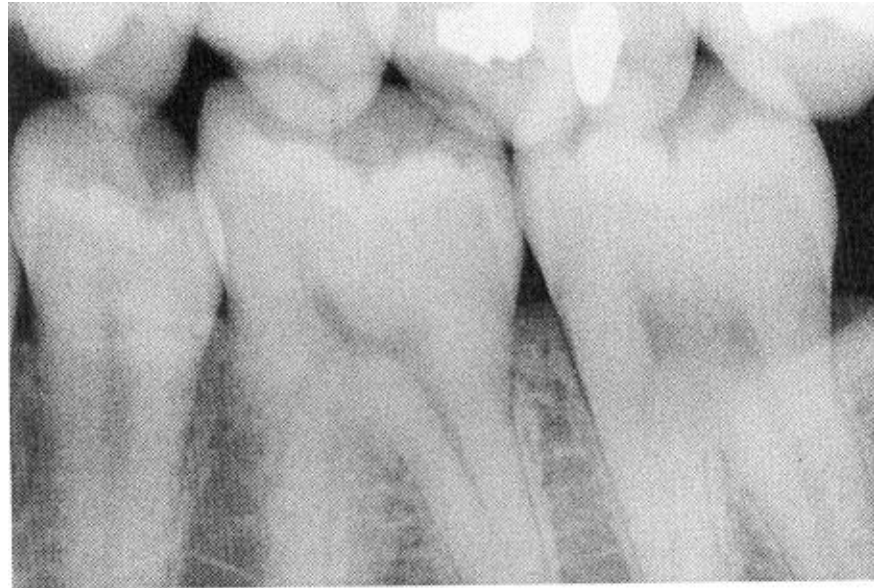
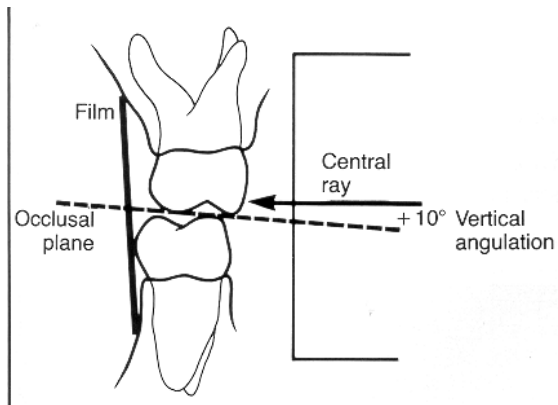
Vertical beam  
alignment = plus 15  
degrees

Horizontal beam  
alignment = the  
same as for  
horizontal  
interproximals

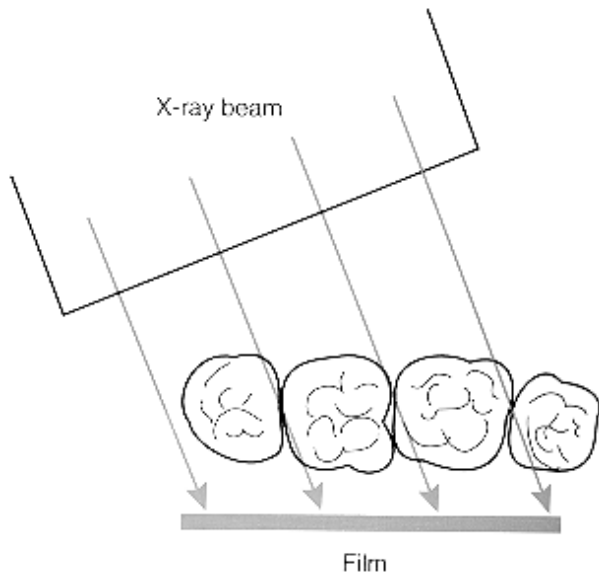


# Nondiagnostic Interproximal Radiographs

- Incorrect (negative) vertical angulation



# Nondiagnostic Interproximal Radiographs





# Criteria for Diagnostic Acceptability

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- What makes a “good” interproximal radiograph?
  - Teeth of interest visible in the film
  - Crowns & proximal surfaces of teeth of interest are visible without overlap of contact areas
  - Alveolar crestal bone is visible surrounding teeth of interest

# Criteria for Diagnostic Acceptability

