

Module 6: Radiographic Techniques

Lesson 16: Periapical Radiographs & Intraoral Surveys



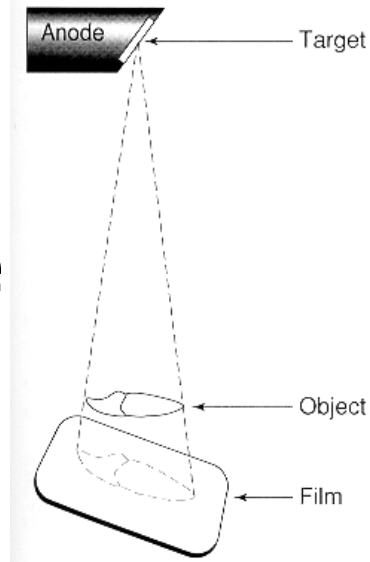


Principles of Image Formation

- 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



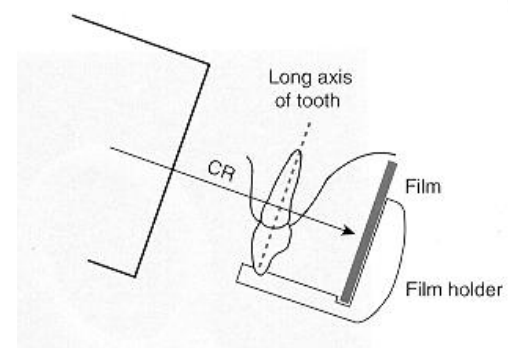


Five Fundamental Principles of Shadow Casting

- **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

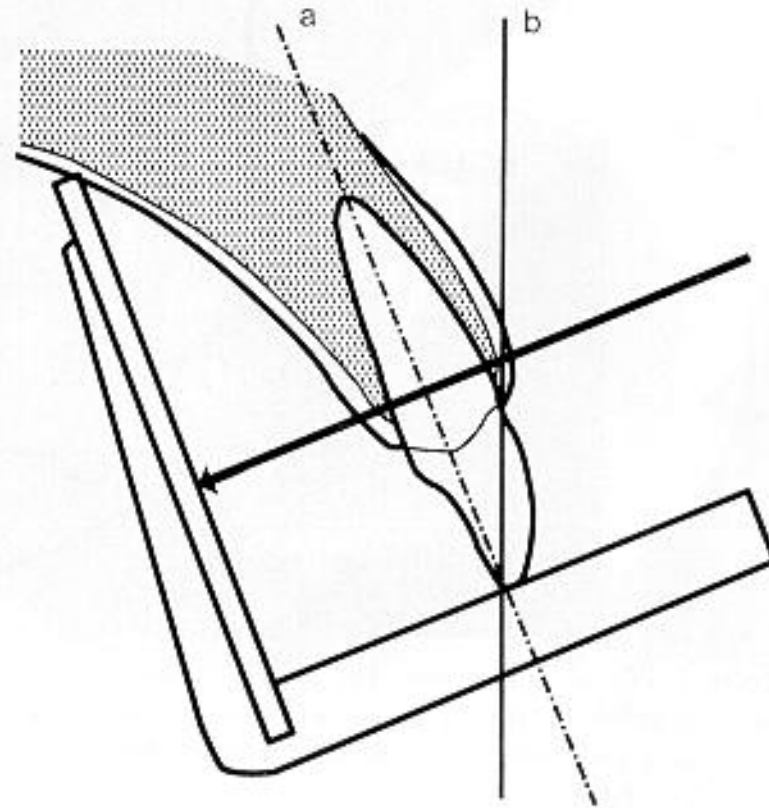




Principles of the Paralleling Technique

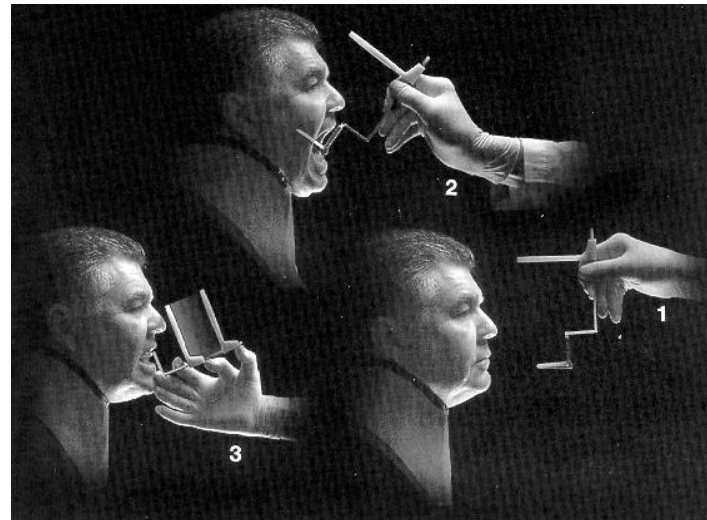
- Film placed *parallel* to long axis of teeth
- Beam directed *perpendicular* to film & long axis of teeth
- Film holder used to keep film flat & unbent
- Long PID or TFD to offset increased magnification due to great OFD

Principles of the Paralleling Technique



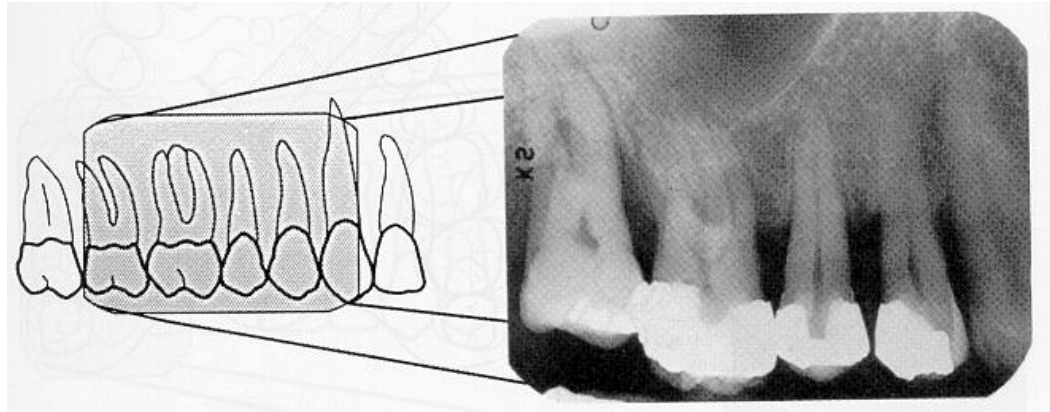
Steps of the Paralleling Technique

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



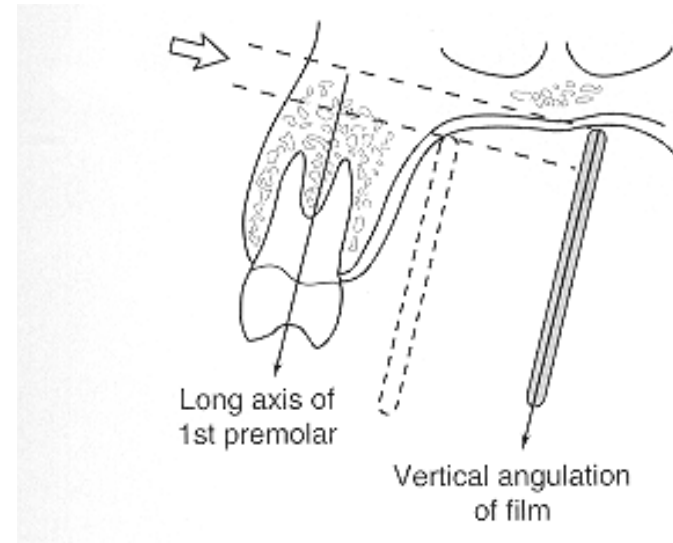
Steps of the Paralleling Technique

- **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



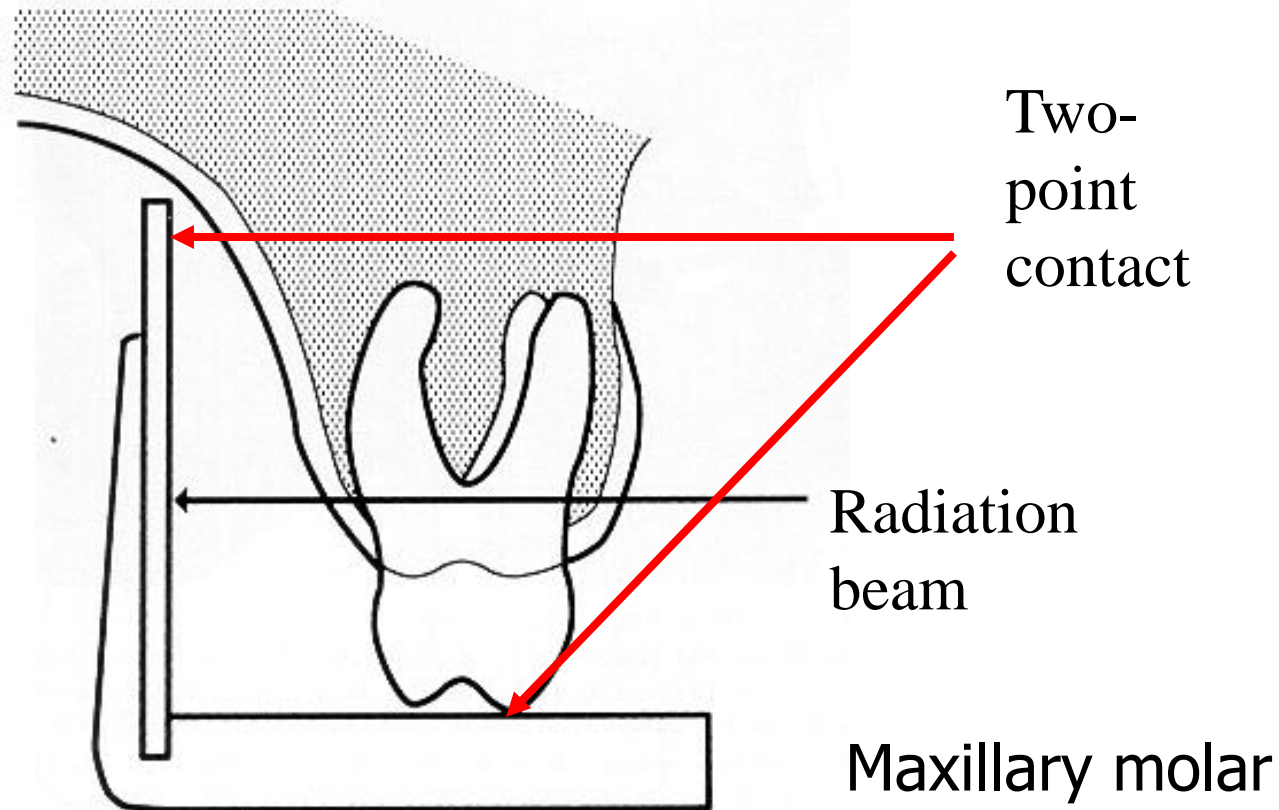


Steps of the Paralleling Technique

- **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





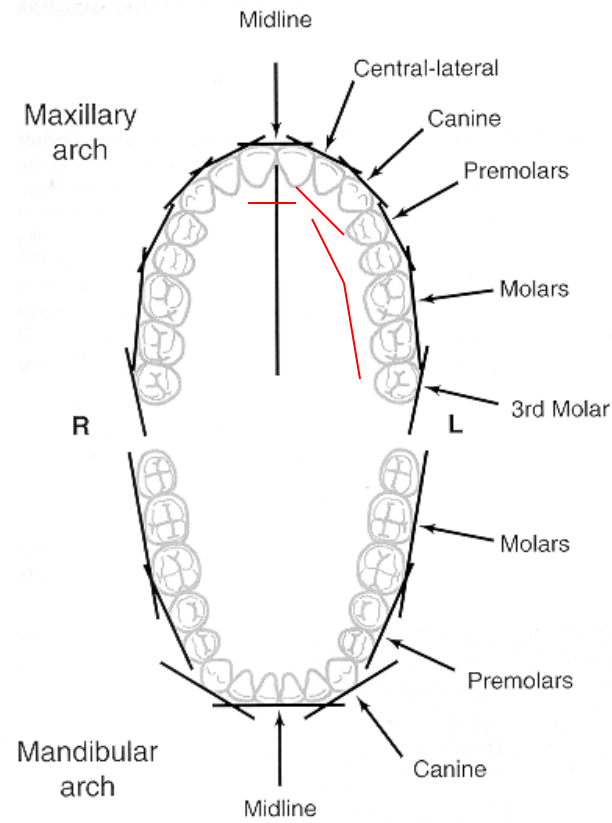
Steps of the Paralleling Technique

- **Film position**

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

Steps of the Paralleling Technique

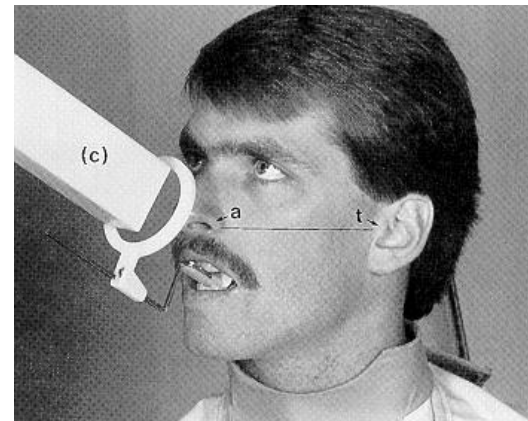
Horizontal position of film



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



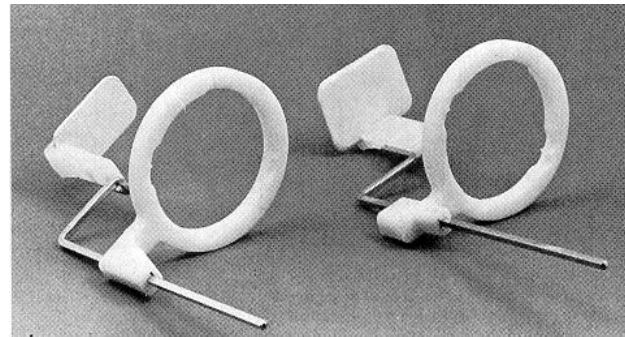
Criteria of Diagnostic Acceptability

- 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



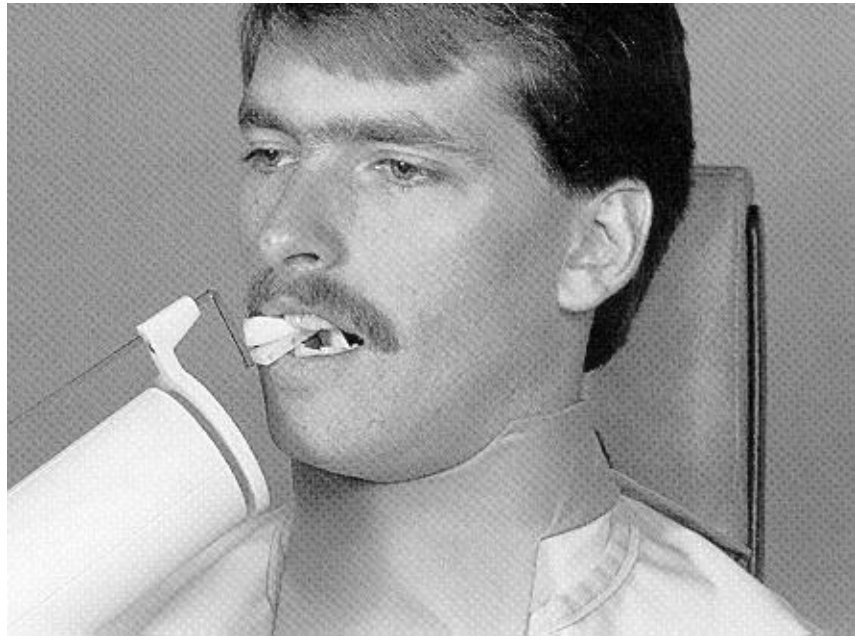
Beam Alignment Devices

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



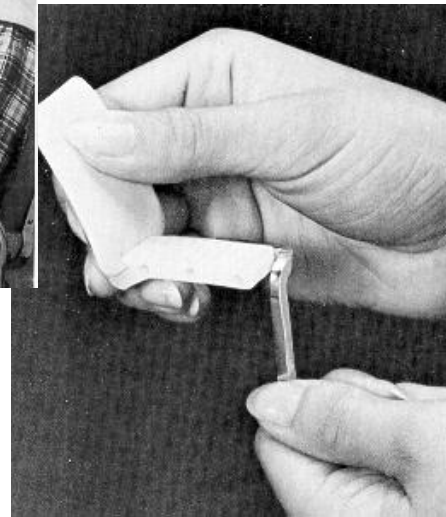
Beam Alignment Devices

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



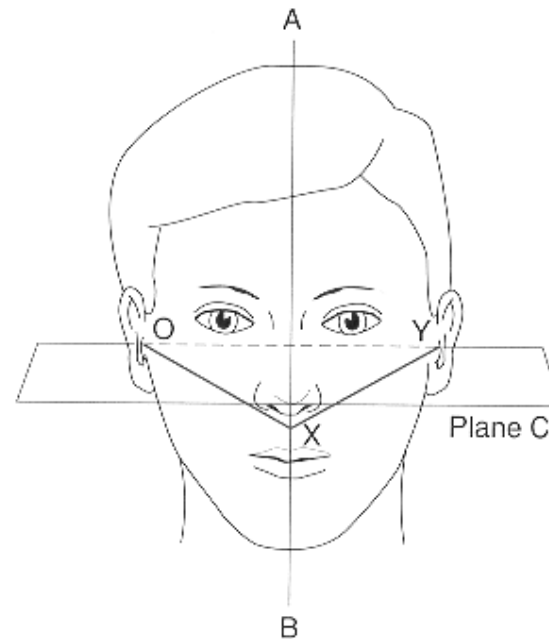
Positioning

- Client
- Film packet



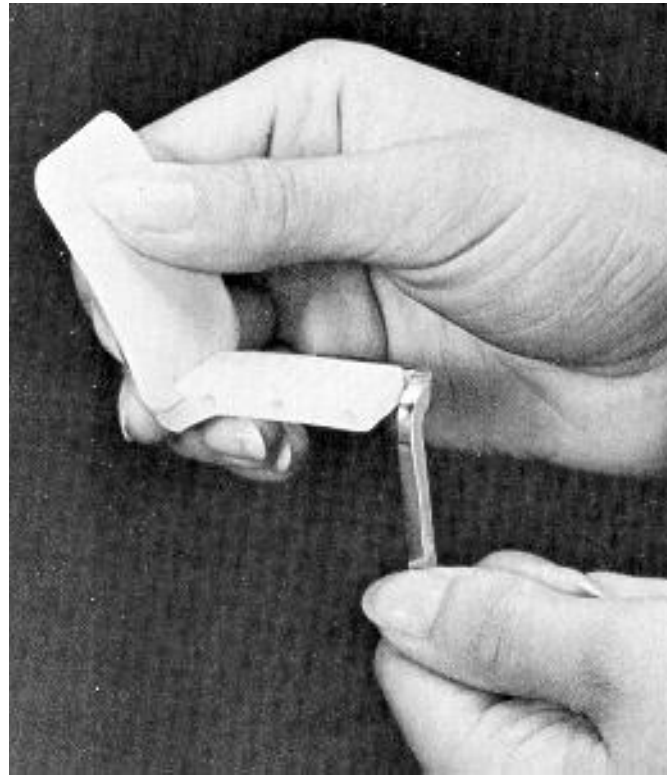
Client Positioning

- 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



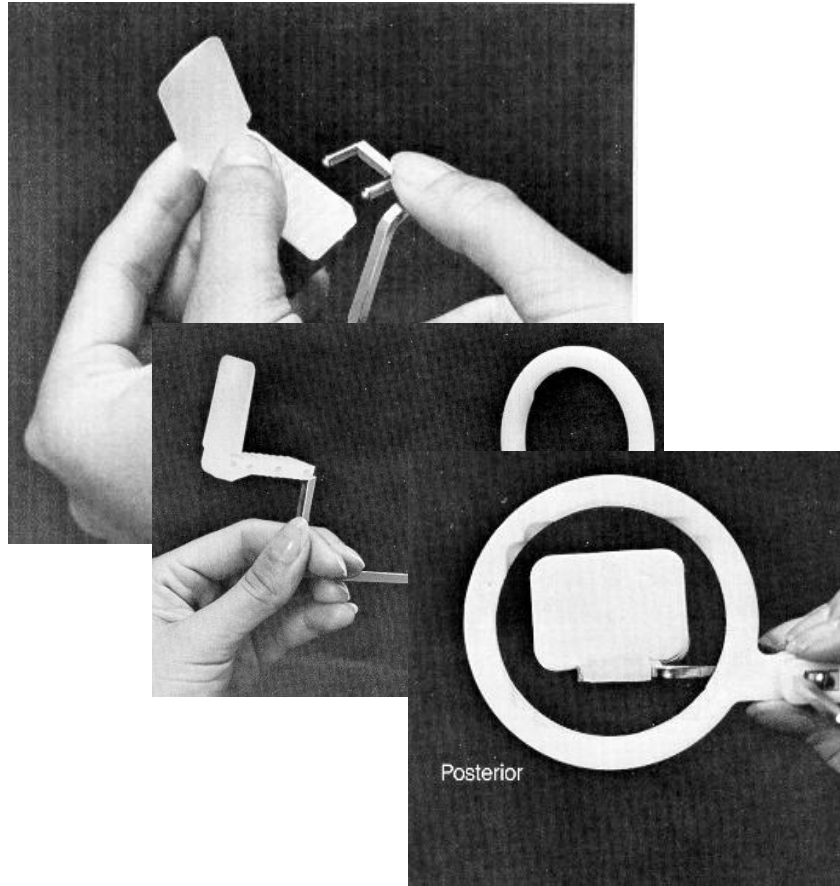


XCP Holders

- 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



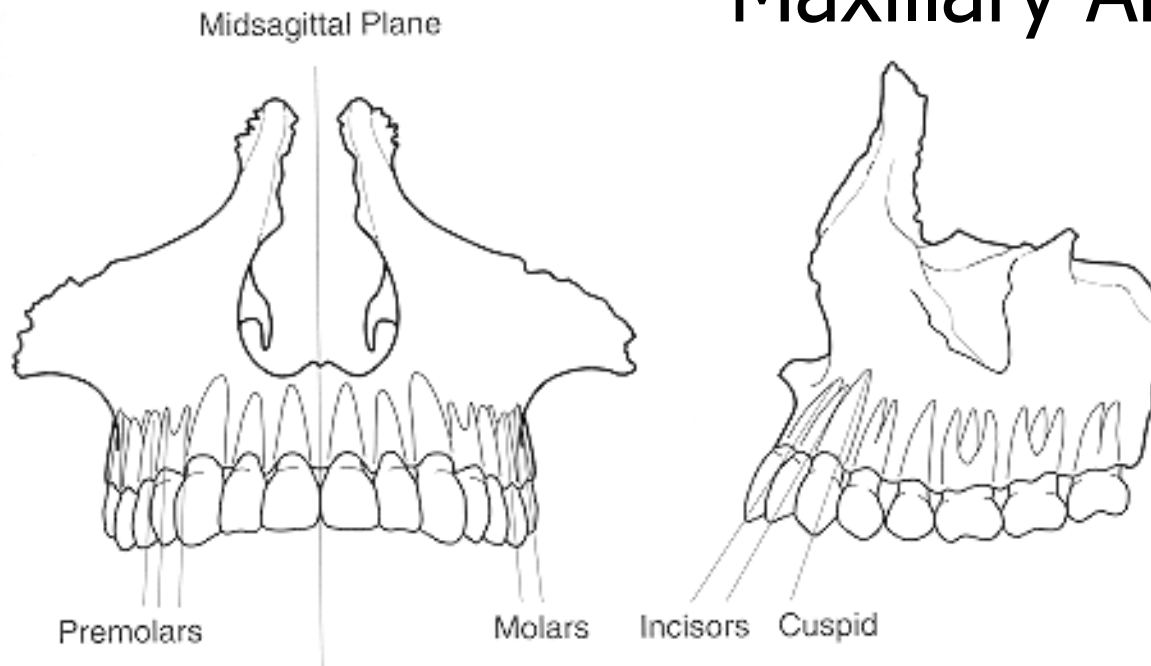


XCP Placement Into Oral Cavity

- 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

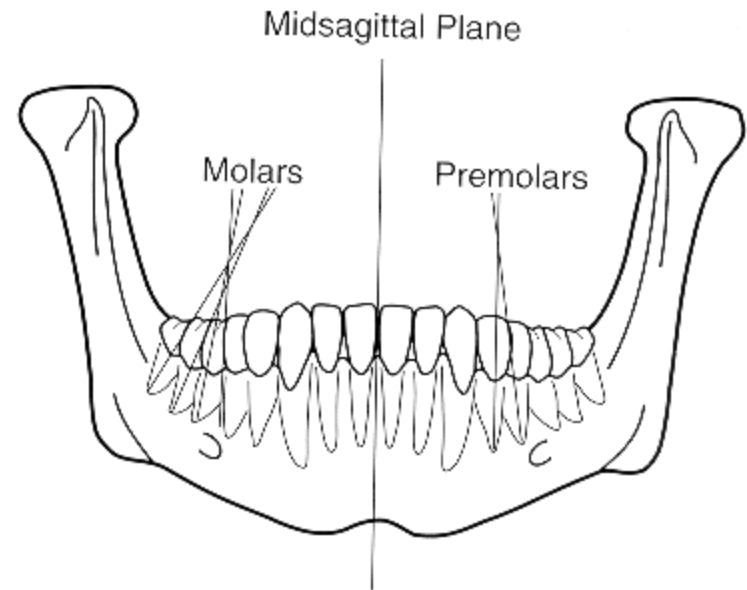
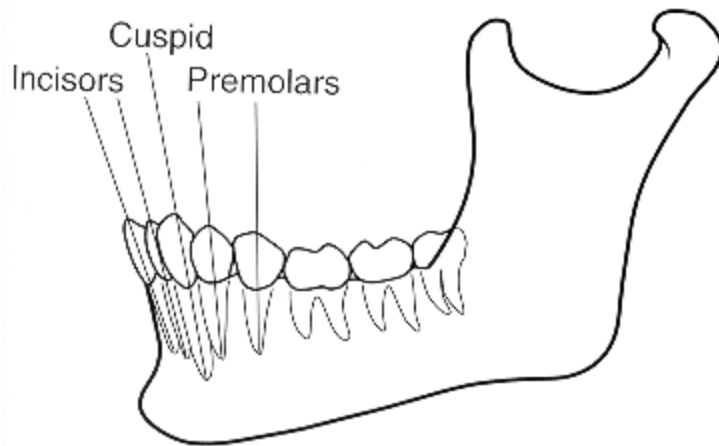
Long Axes of the Teeth

Maxillary Arch



Long Axes of the Teeth

Mandibular Arch

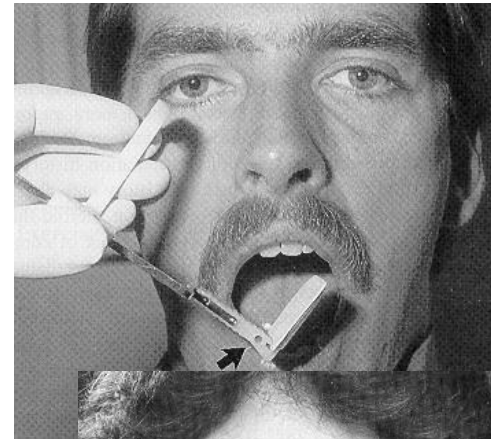




Sequence of Films

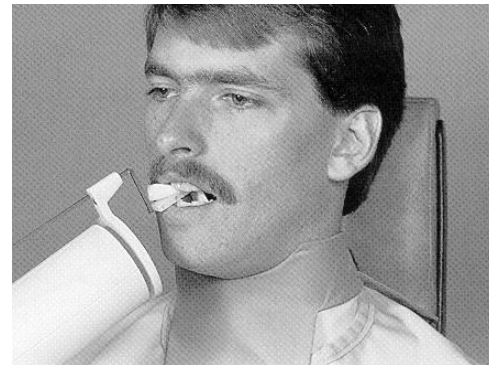
- Several possibilities
- Need to remember which films have been exposed
- #1-32
- Cross arch
- Anterior first

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

- Film Placement
 - Holder
 - Oral Cavity

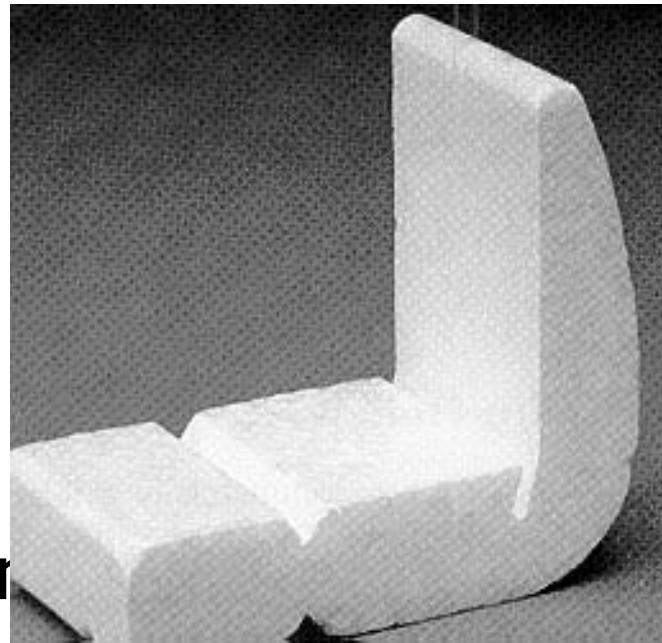


Stabe Holder

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

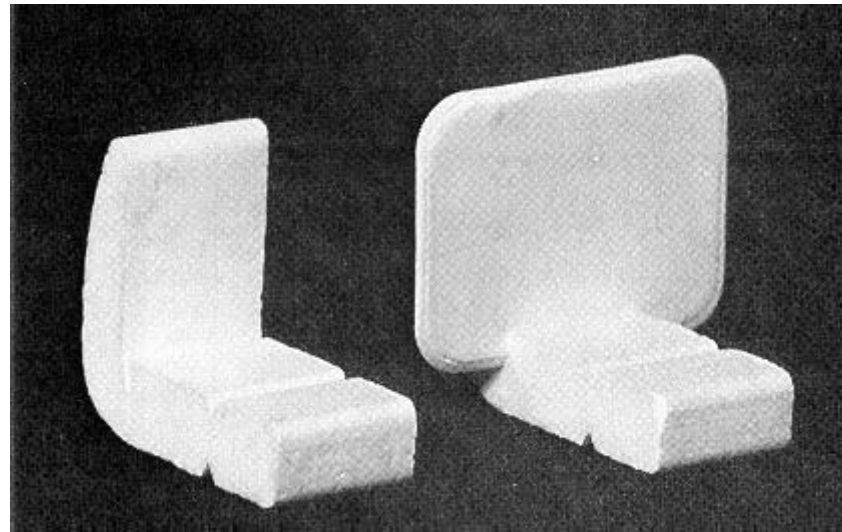
Stabe Holder

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



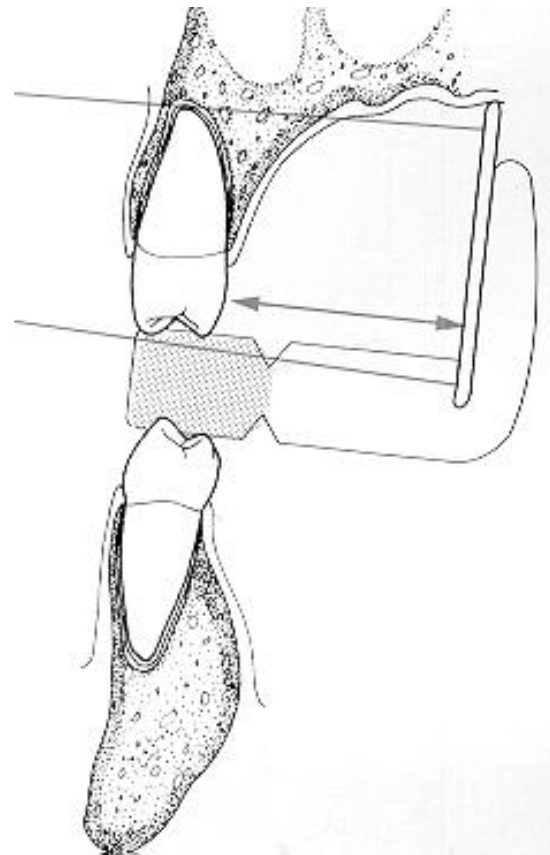
Stabe Holder Film Placement

- 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)



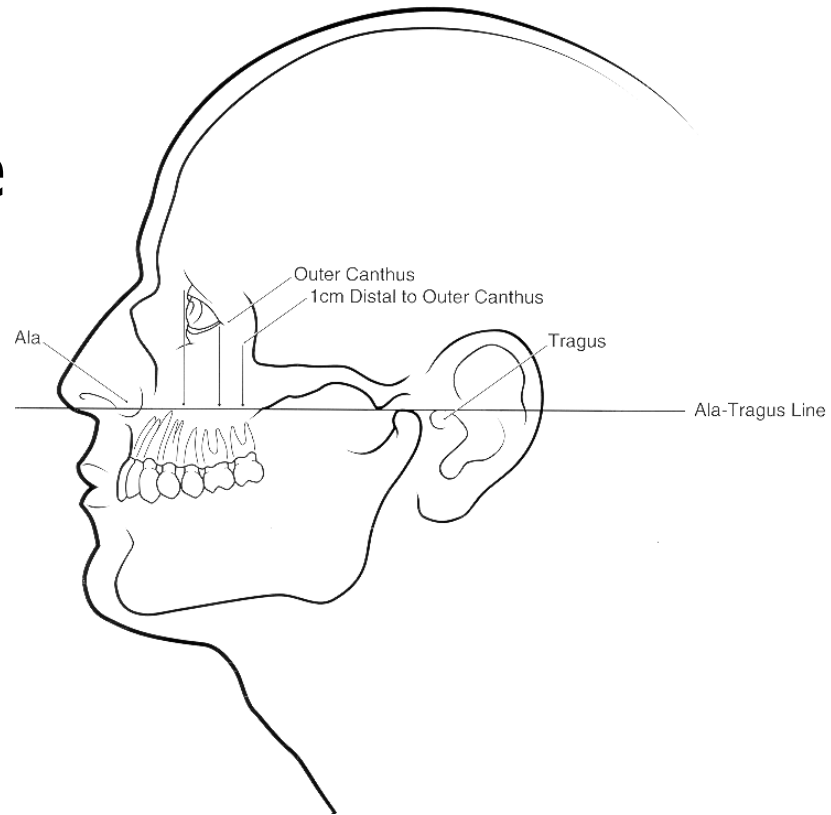


Stabe Holder

- Anatomical considerations
 - Long axes
 - Apices location

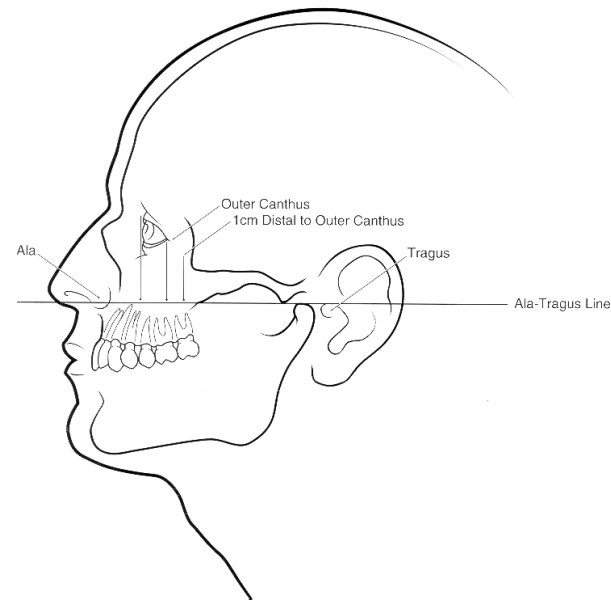
Location of Apices

- **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



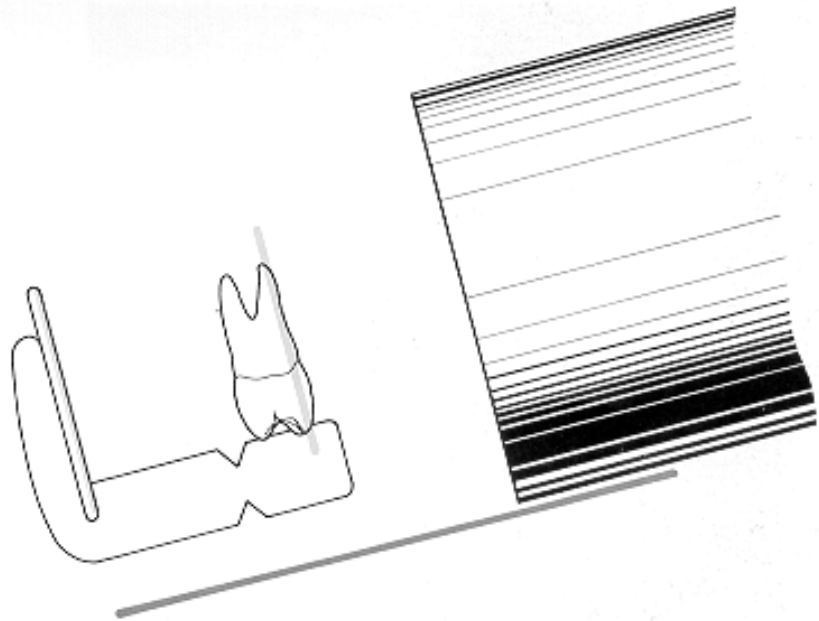


Stabe Holder

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

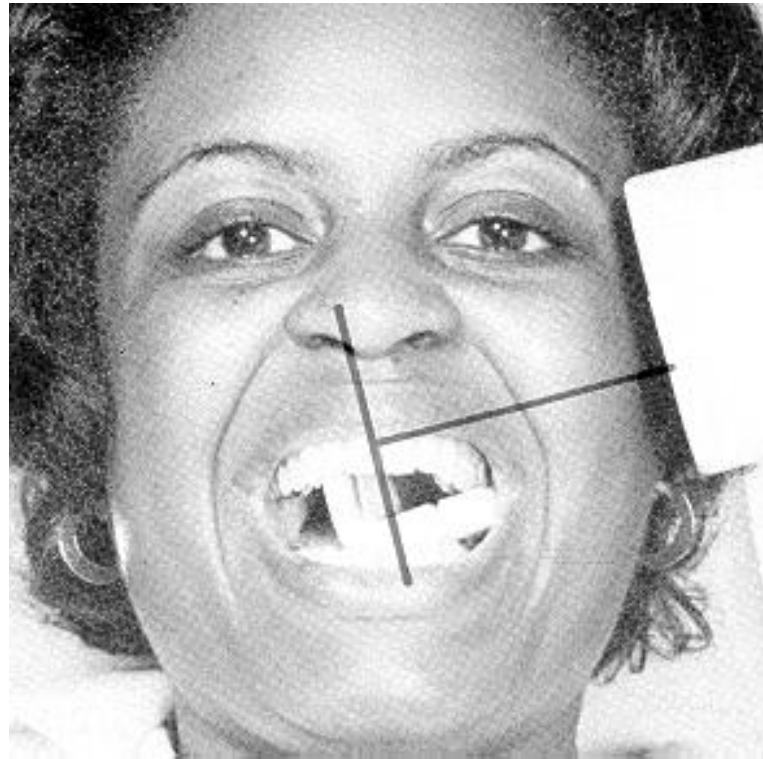
Vertical Beam Alignment

- 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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Composition of Interproximal Radiographs

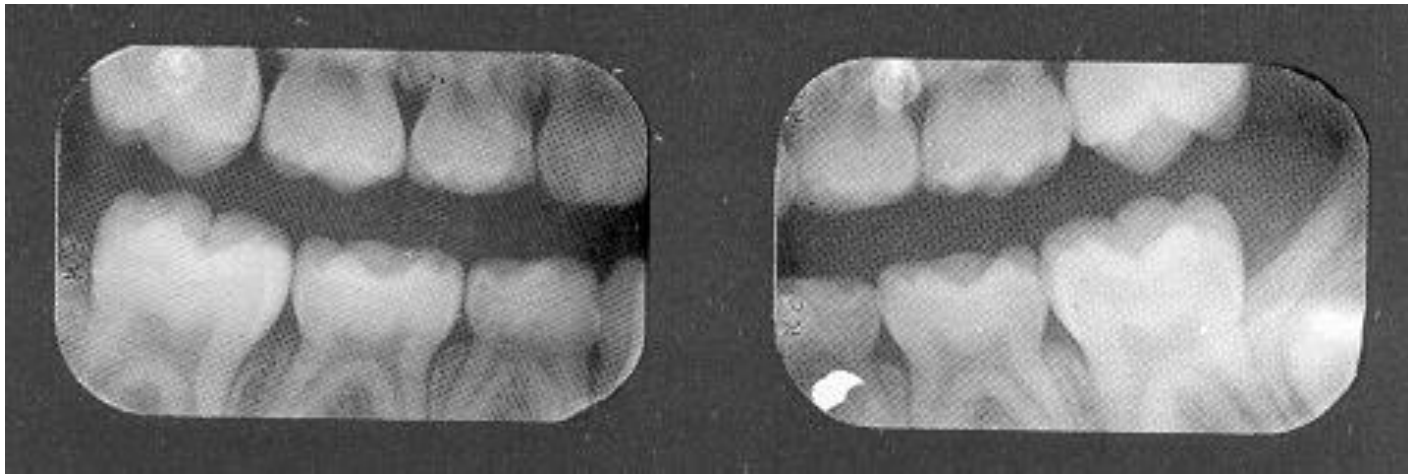
- Composition

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

Interproximal Survey

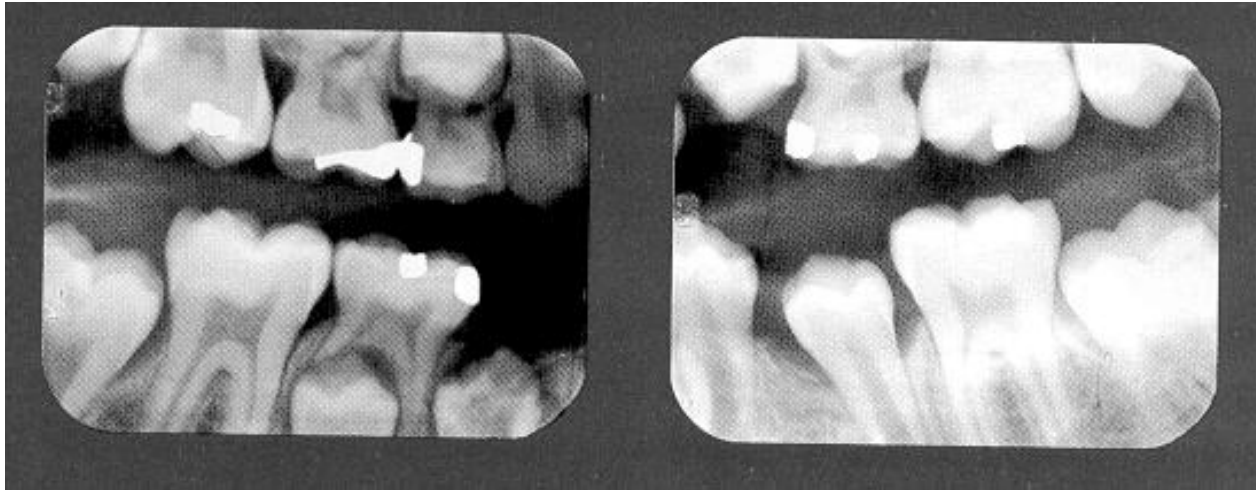
Pedo

- Two #1 films used



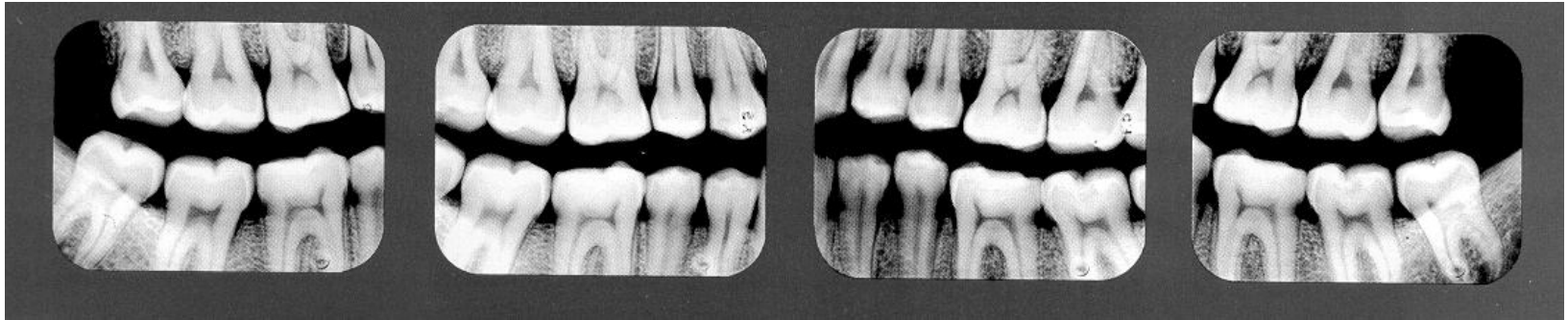
Interproximal Survey Mixed Dentition

- Two #2 films used



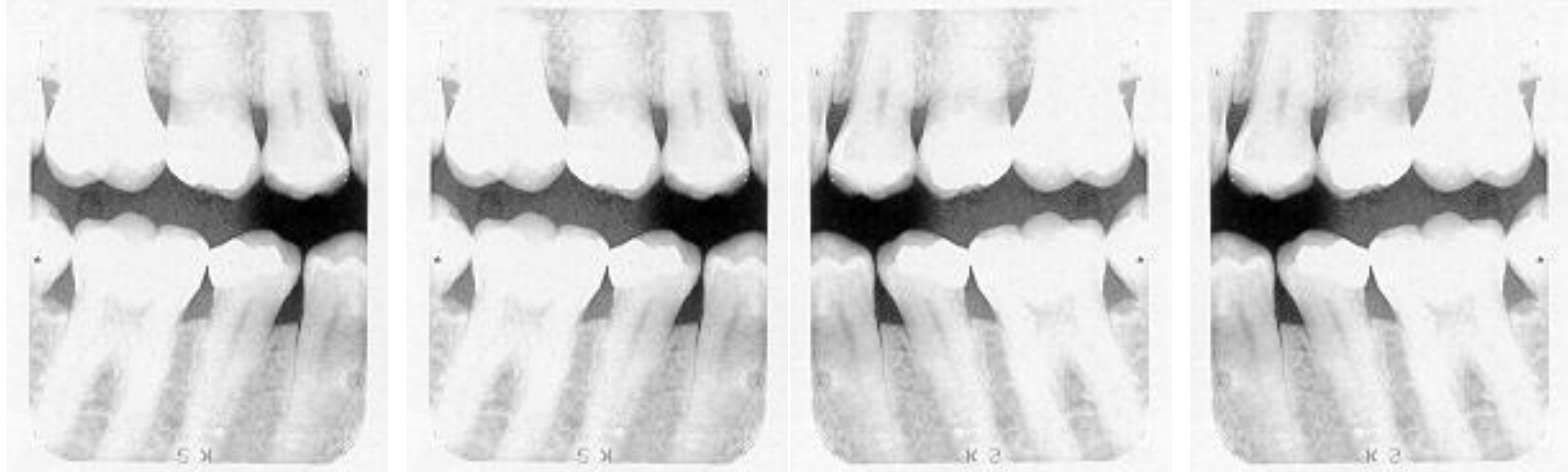
Interproximal Survey Adult Dentition

- Four #2 films used



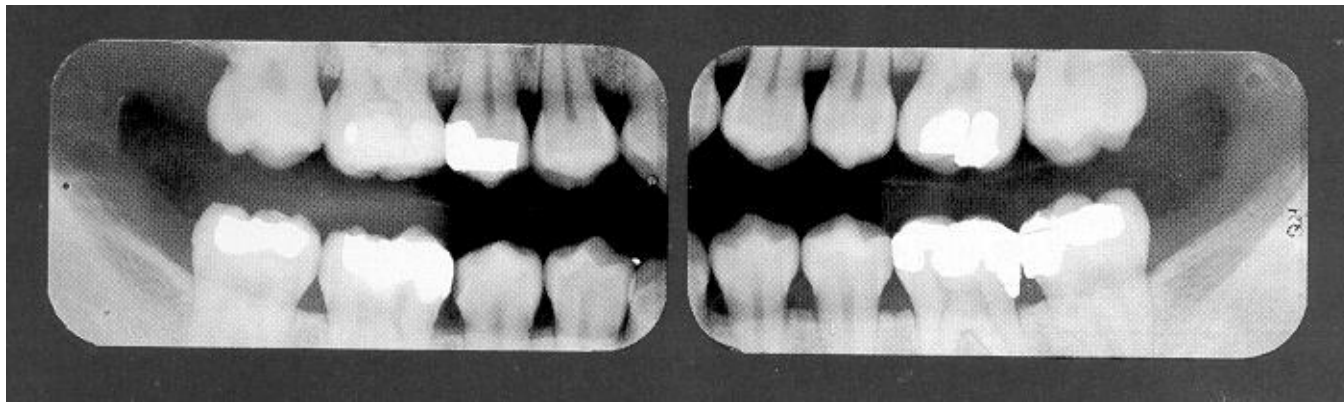
Interproximal Survey Adult Dentition

- Four or six #2 films used for vertical placement



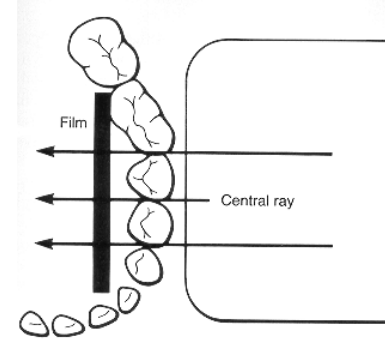
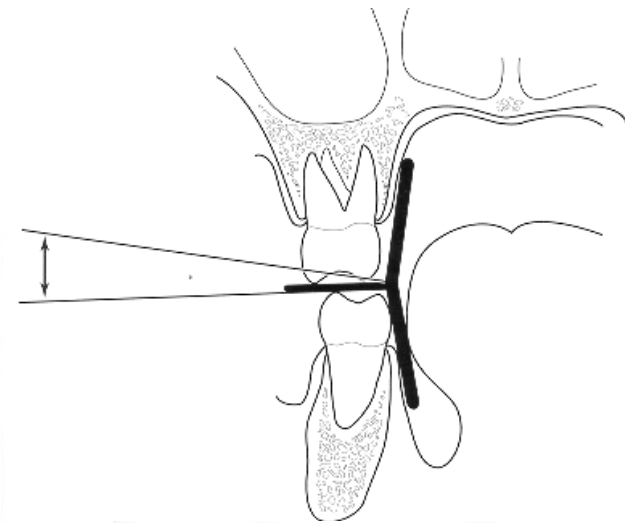
Interproximal Survey Adult Dentition

- Two #3 long bitewing films used



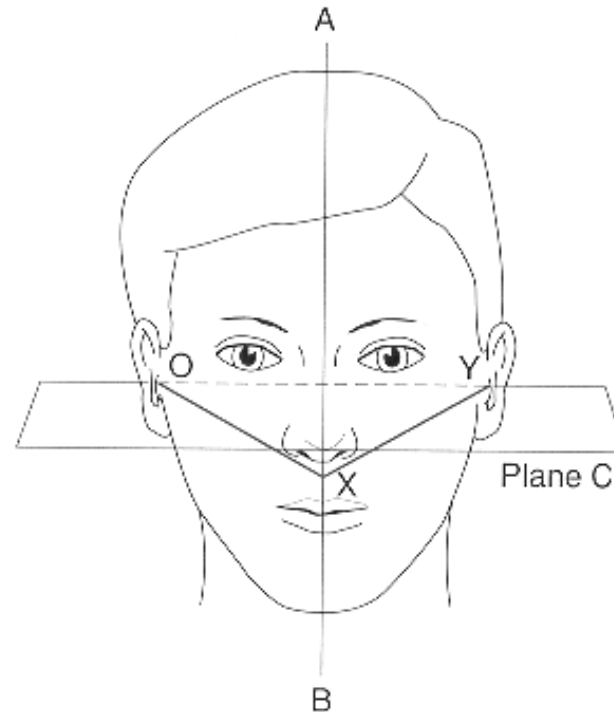
Interproximal Radiographic Technique

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



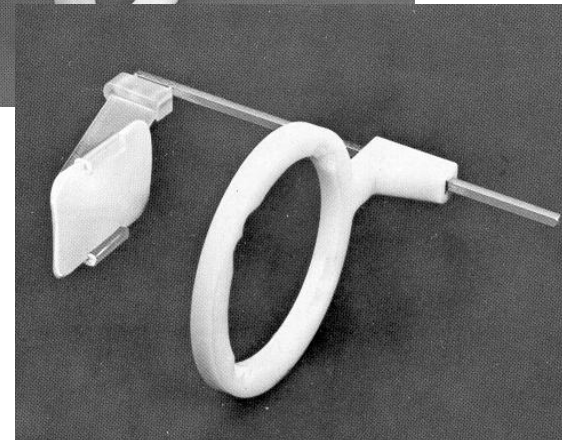
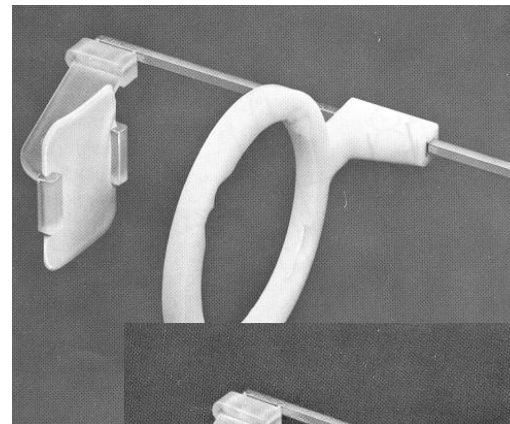
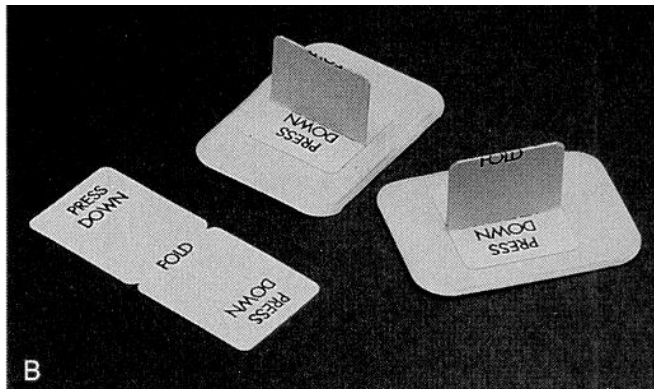
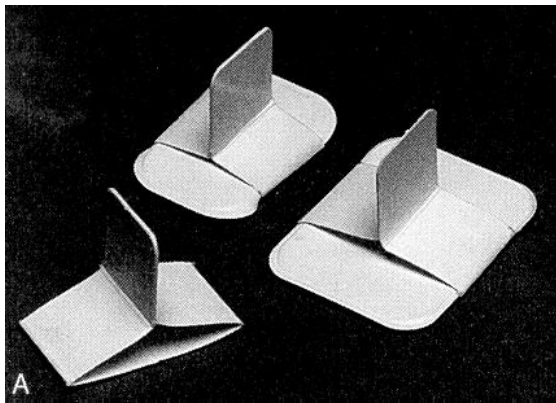
Client Positioning for Interproximal Radiographs

- Client positioned upright
- Midsagittal plane perpendicular to floor



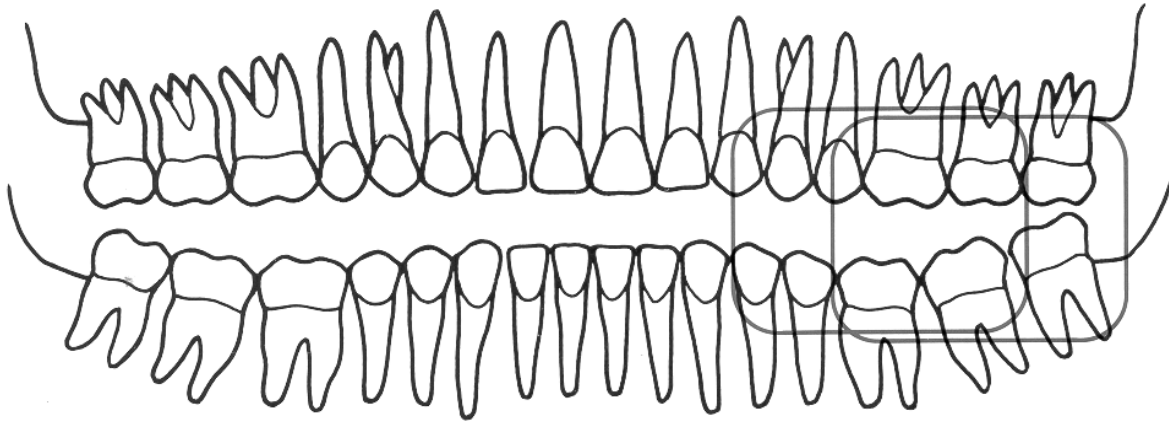
Film Holders for Interproximal Radiographs

- Film placed in tab, loop or XCP holders



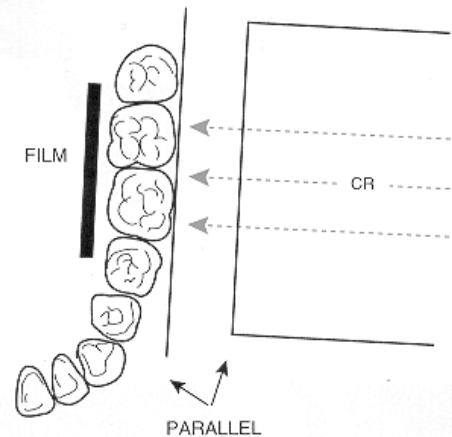
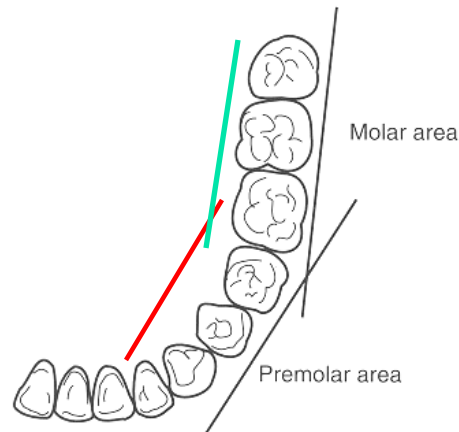
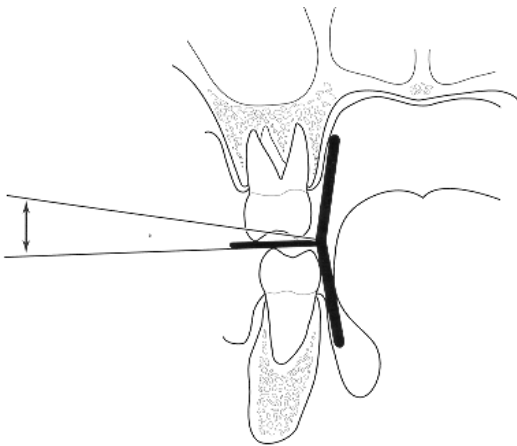
Film Placement for Interproximal Radiographs Using XCP

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



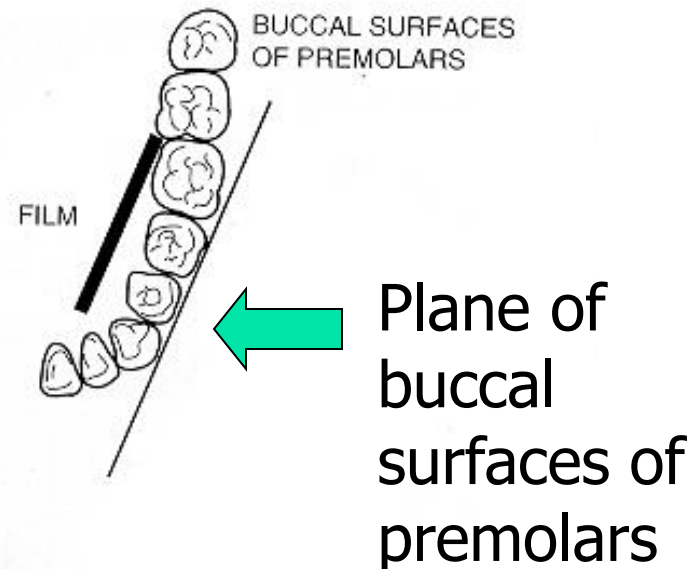
Film Placement for Interproximal Radiographs Using XCP

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

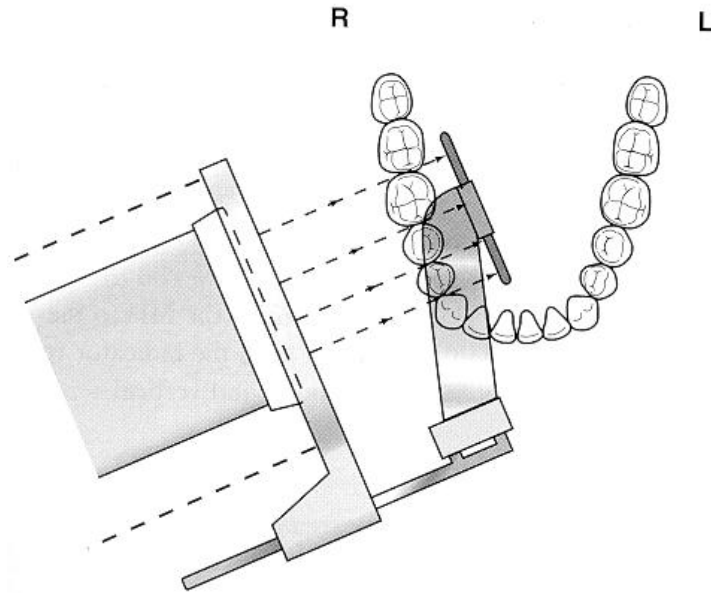
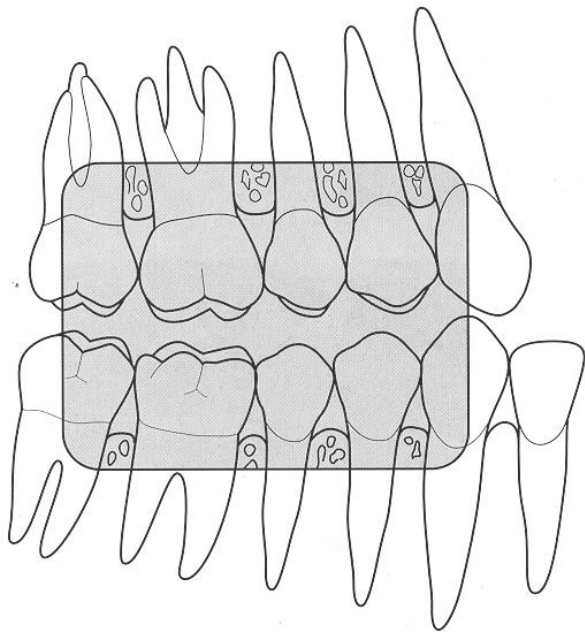


Premolar Film Placement Using XCP

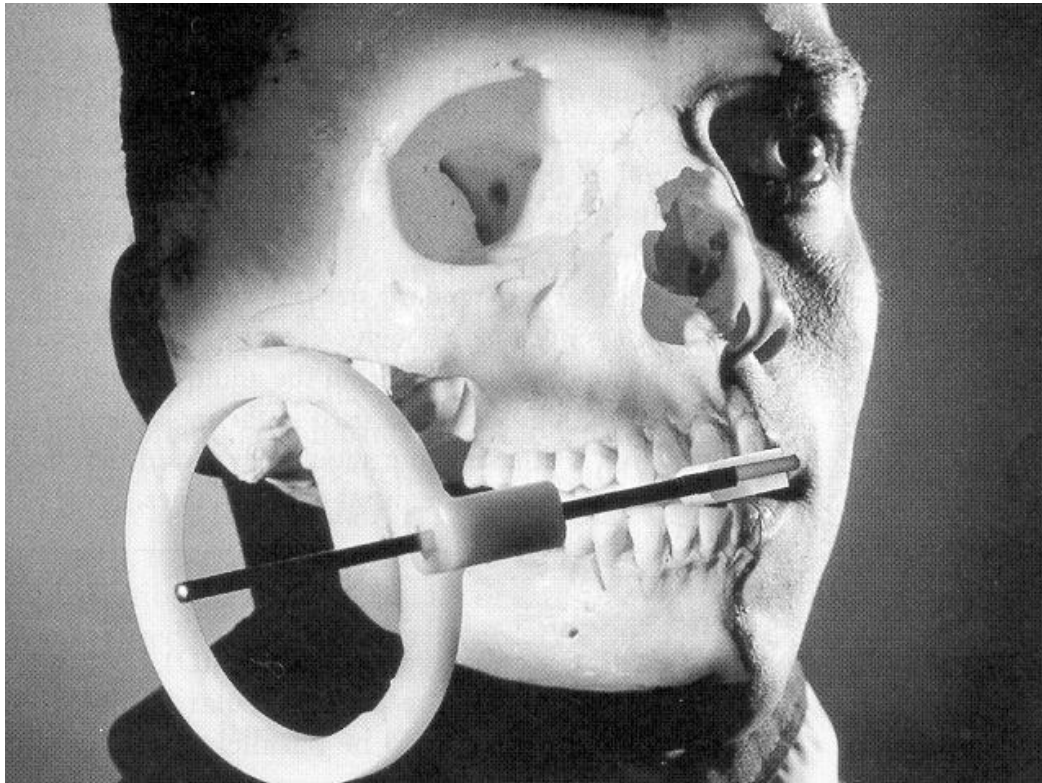
- Center films behind teeth of interest in horizontal position
- Maintain film parallel to buccal surfaces of premolars



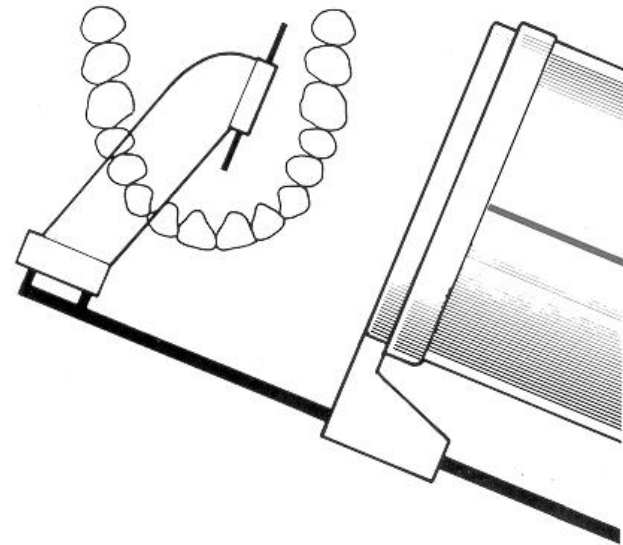
Premolar Film Placement With XCP



Premolar Film Placement With XCP



Premolar Film Placement With XCP

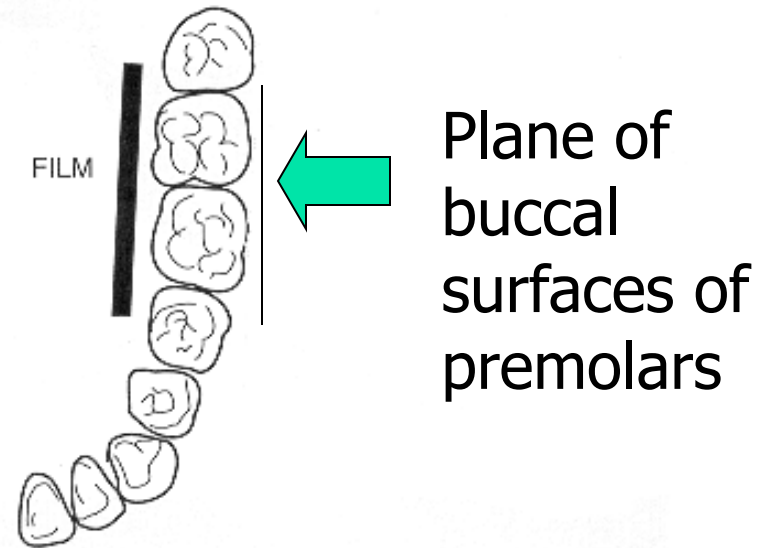


Diagnostic Premolar Radiograph

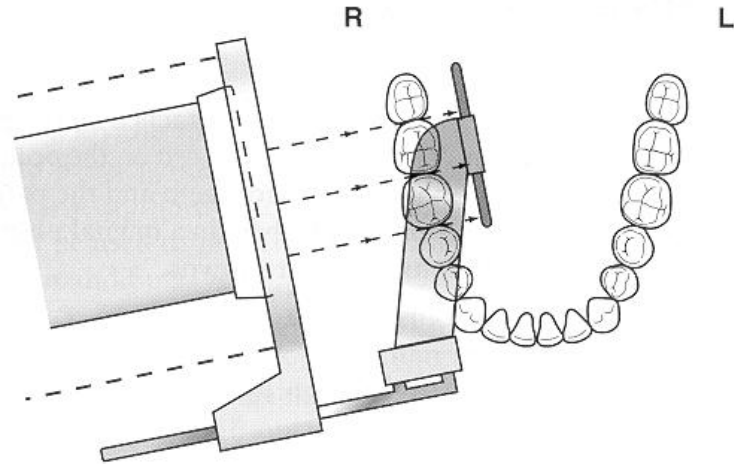
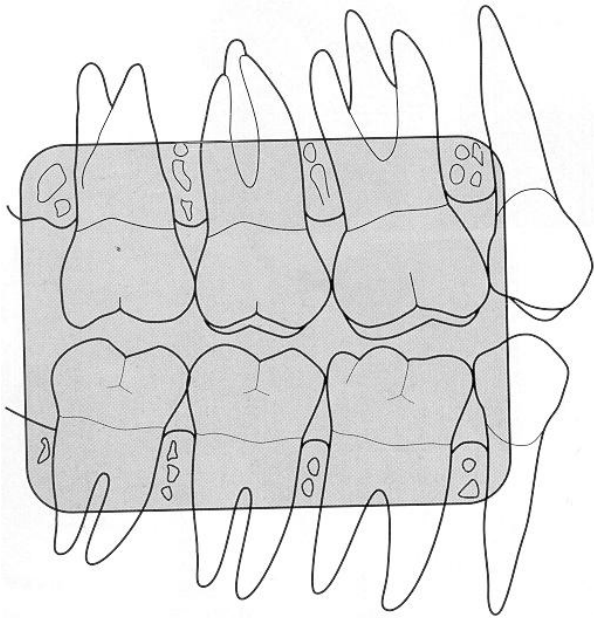


Molar Film Placement Using XCP

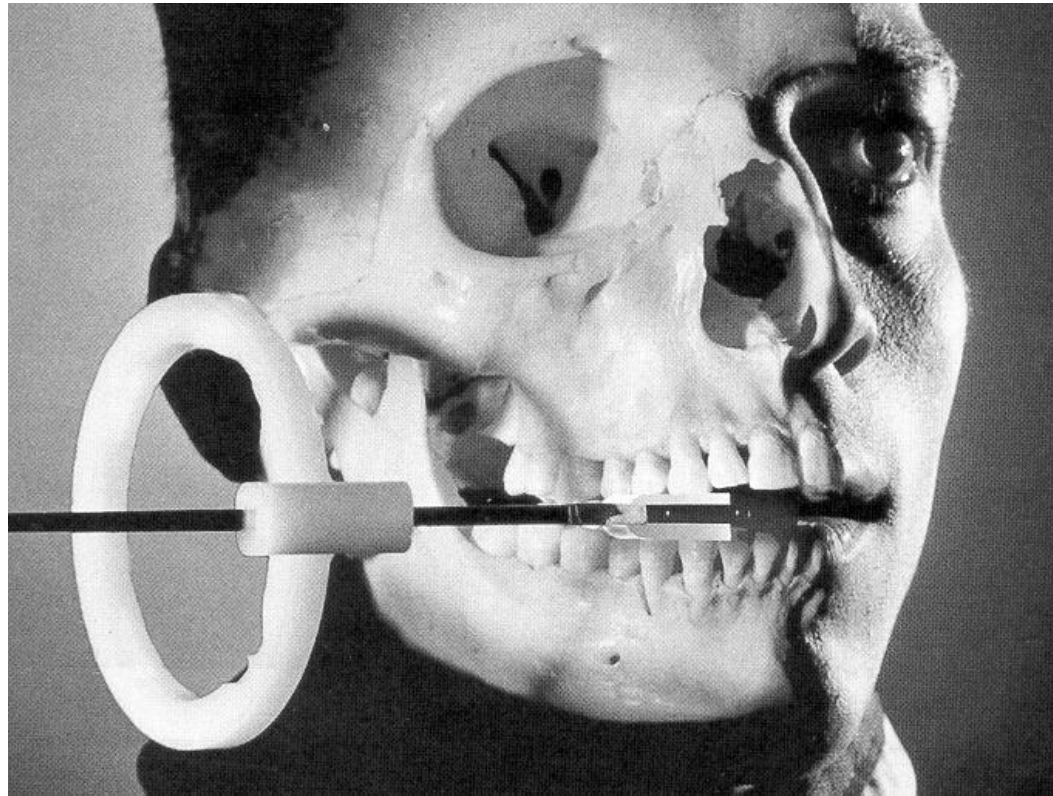
- Center films behind teeth of interest in horizontal position
- Maintain film parallel to buccal surfaces of molars



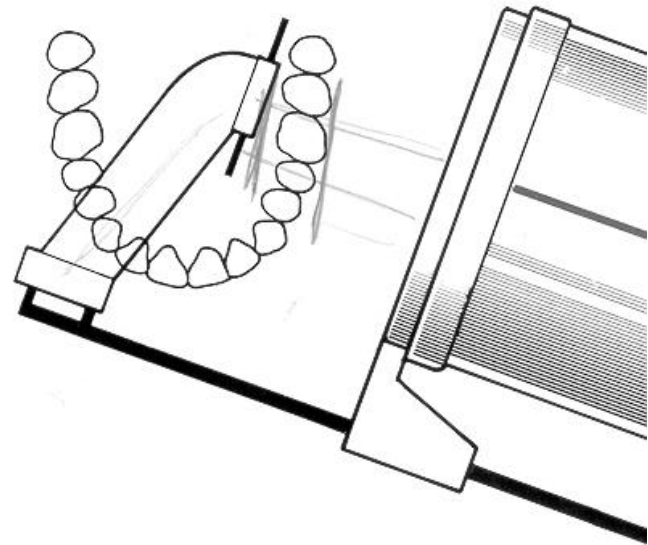
Molar Film Placement With XCP



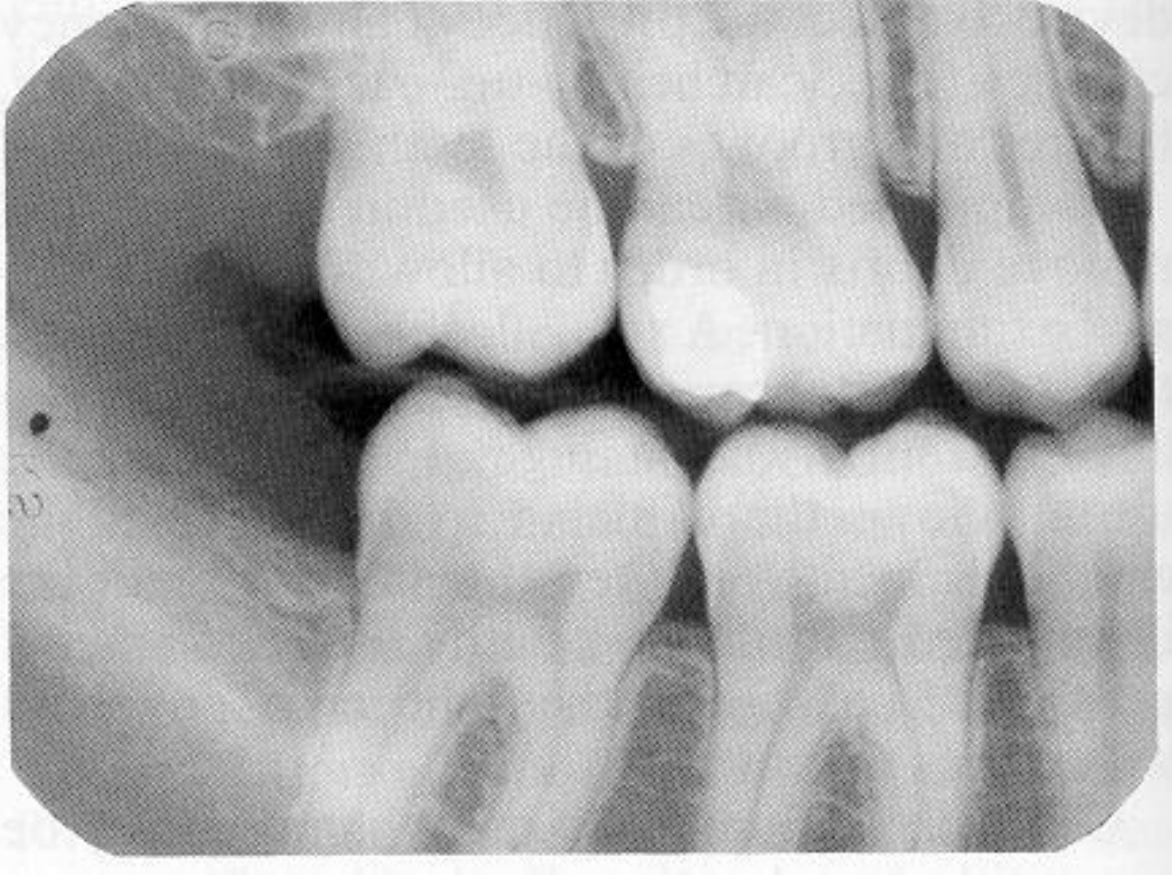
Molar Film Placement With XCP



Molar Film Placement With XCP

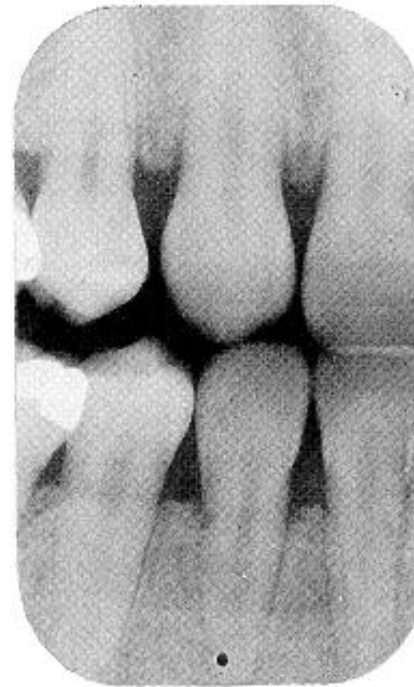


Molar Film Placement With XCP

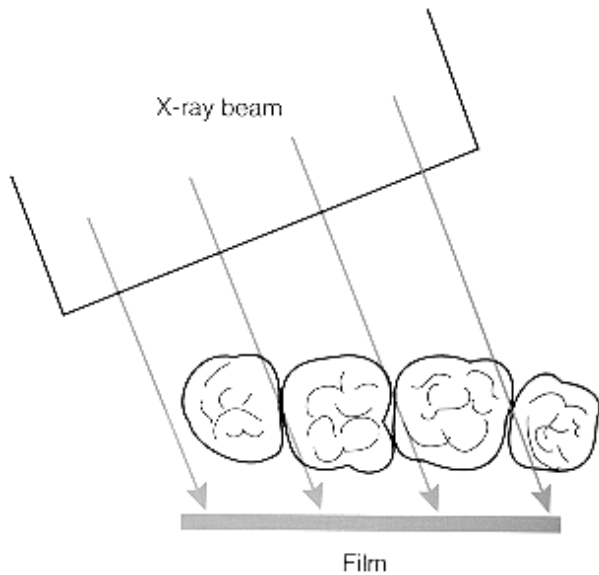


Vertical Bitewings

- 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

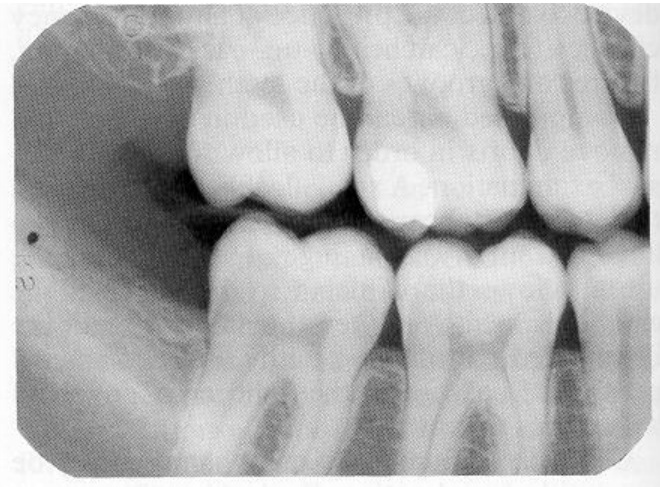
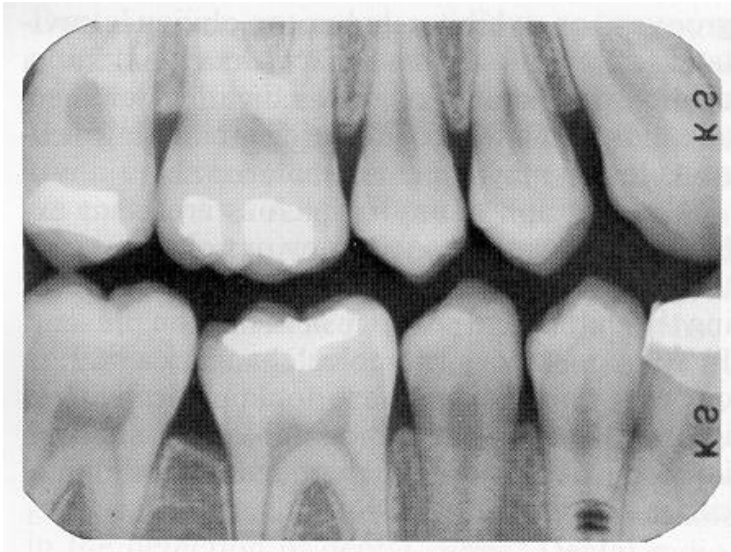




Criteria for Diagnostic Acceptability

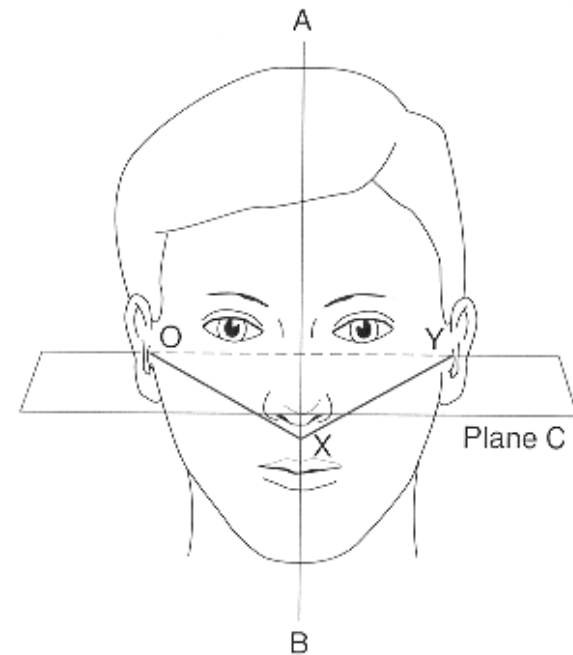
- What makes a “good” interproximal radiograph?
 - Teeth of interest visible in the film
 - Crowns & proximal surfaces of teeth of interest are visible without overlap of contact areas
 - Alveolar crestal bone is visible surrounding teeth of interest

Criteria for Diagnostic Acceptability



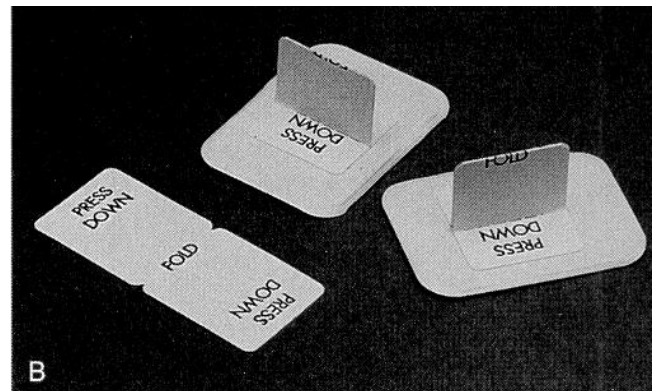
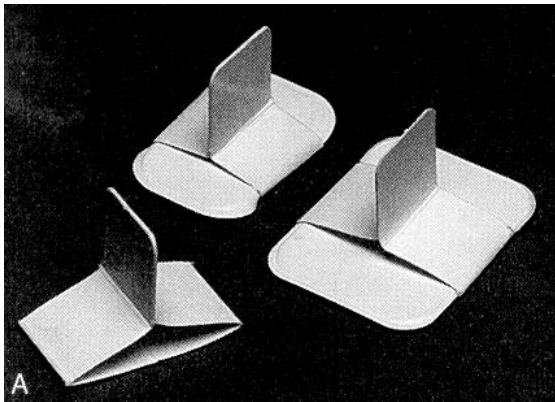
Client Positioning for Interproximal Radiographs Using Loops/Tabs

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



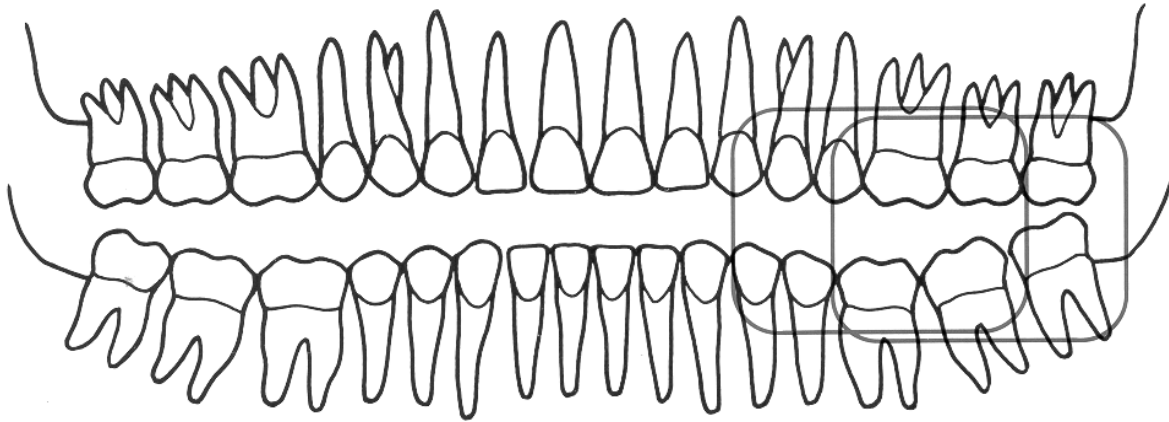
Film Placement for Interproximal Radiographs Using Loops/Tabs

- 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

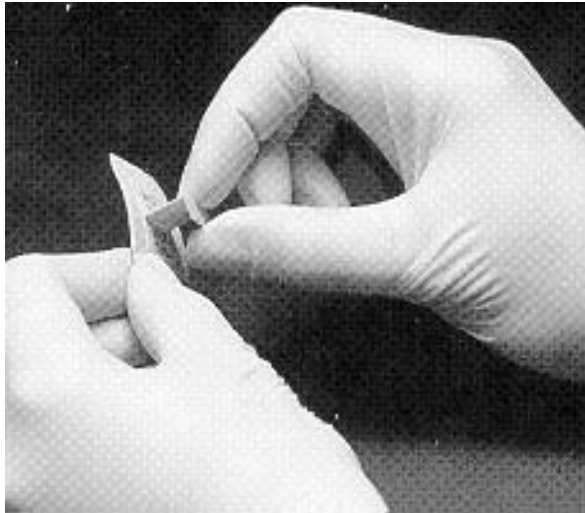




Film Placement for Interproximal Radiographs Using Loops/Tabs

- 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



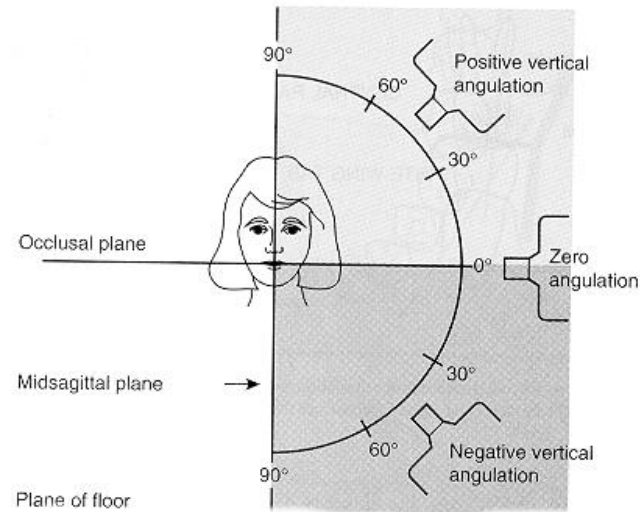
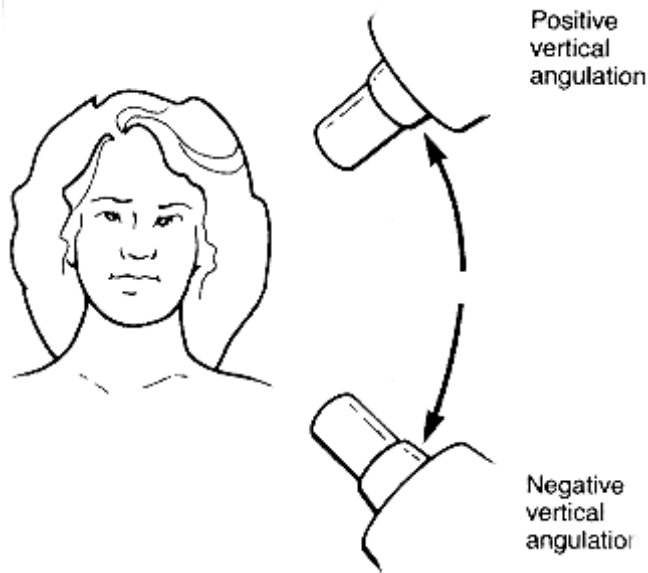


Beam Alignment for Interproximal Radiographs Using Loops/Tabs

- 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

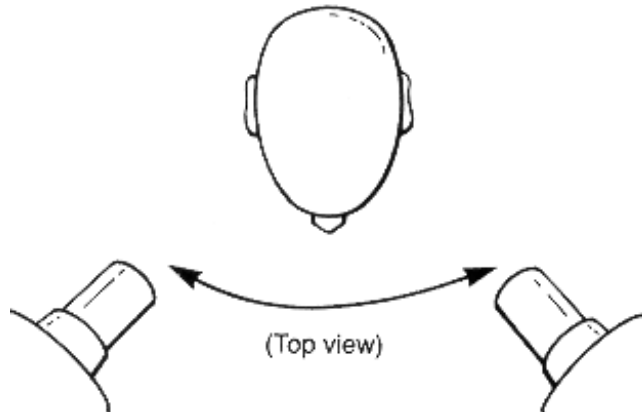
Beam Alignment for Interproximal Radiographs Using Loops/Tabs

Vertical Angulation



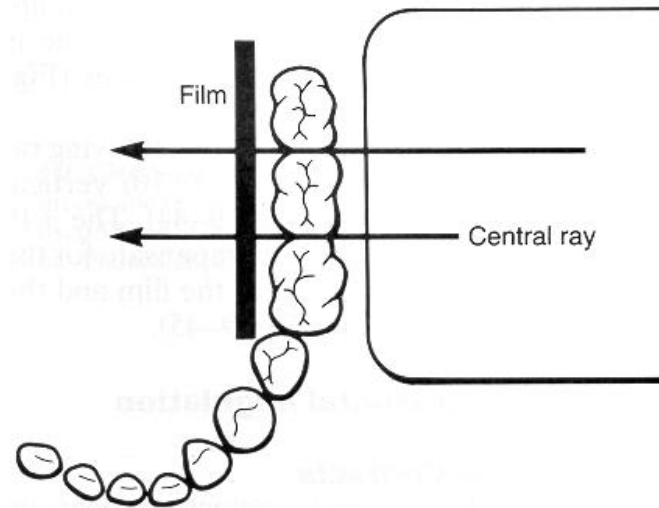
Beam Alignment for Interproximal Radiographs Using Loops/Tabs

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



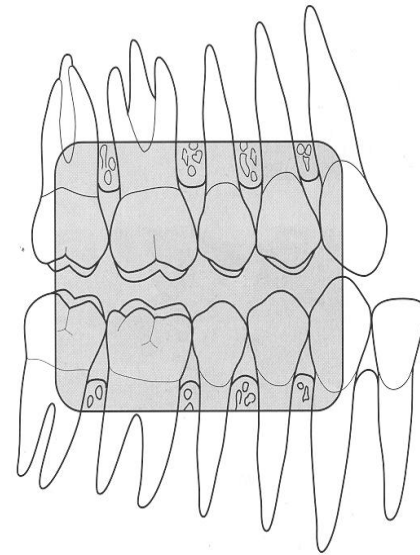
Beam Alignment for Interproximal Radiographs Using Loops/Tabs

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



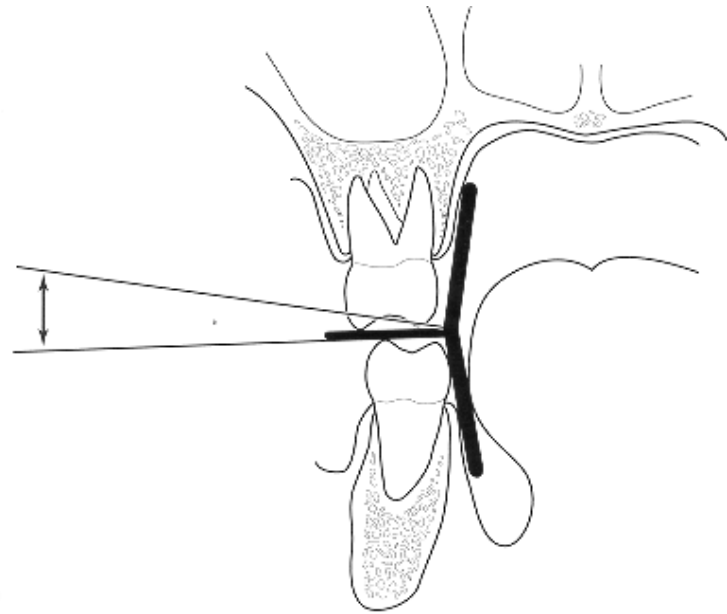
Premolar Interproximal Using Loops/Tabs

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



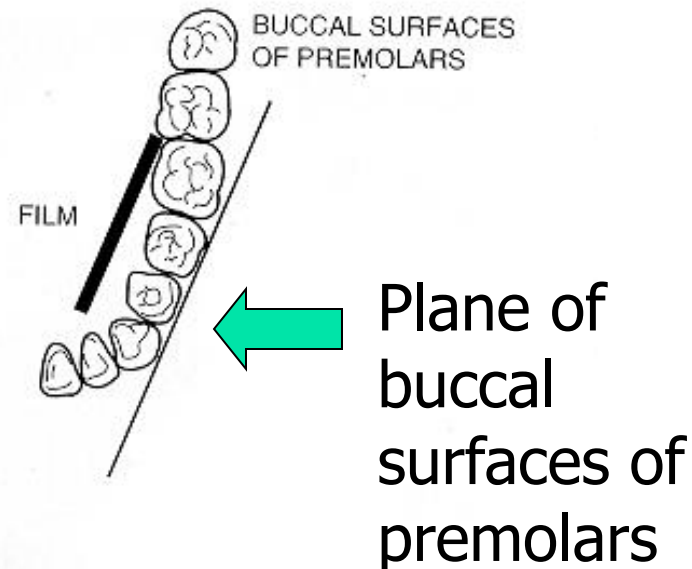
Premolar Interproximal Using Loops/Tabs

- Center films behind teeth of interest in vertical position



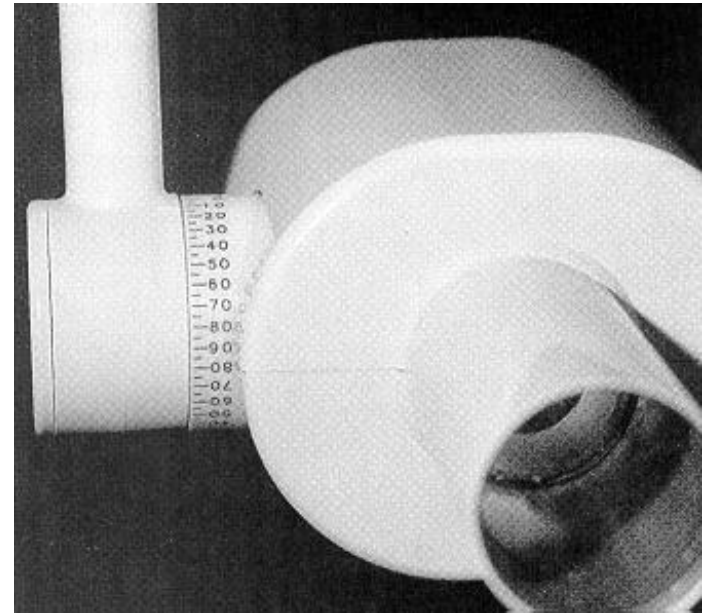
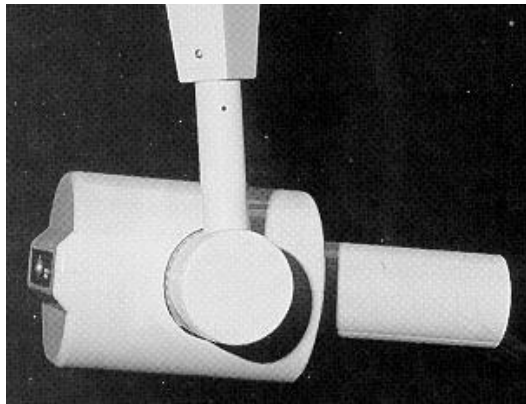
Premolar Interproximal Using Loops/Tabs

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

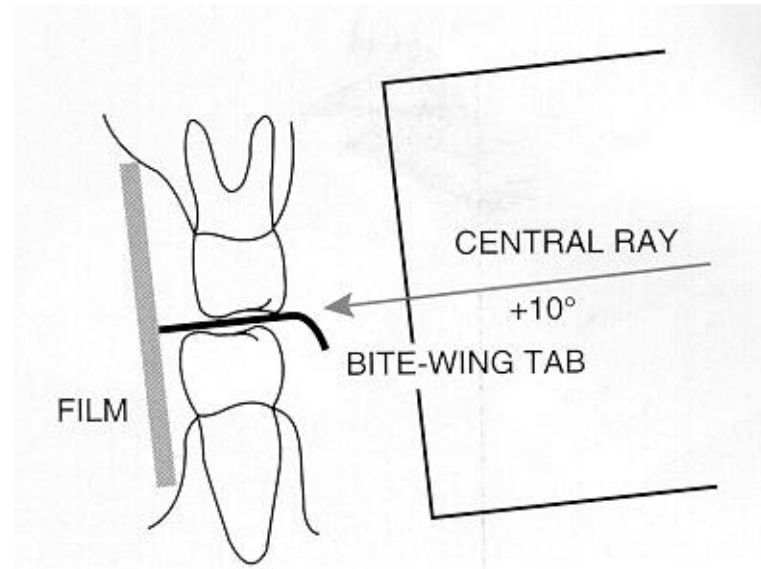
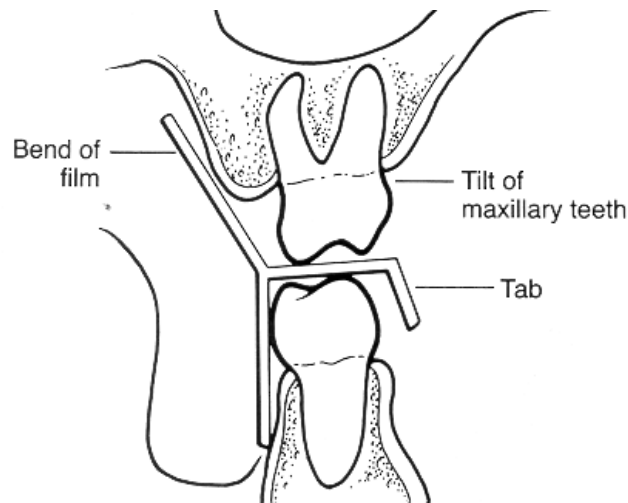


Vertical Beam Alignment for Premolar Interproximal Radiograph

- Adjust vertical angulation to + 10 degrees

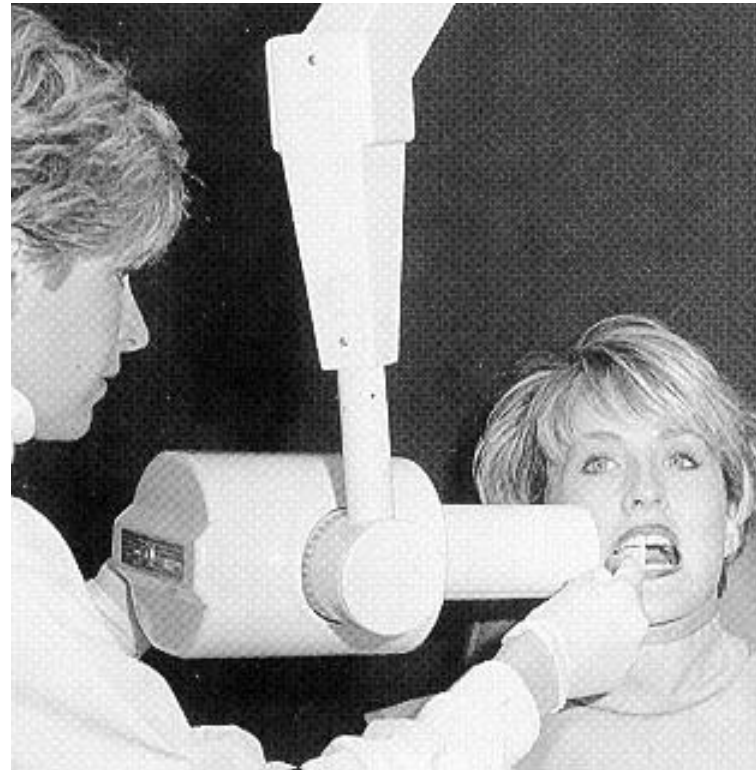


Vertical Beam Alignment for Premolar Interproximal Radiograph

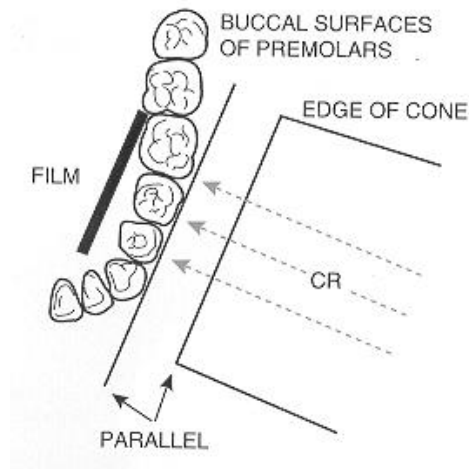


Vertical Beam Alignment for Premolar Interproximal Radiograph

- Direct PID at occlusal plane



Horizontal Beam Alignment for Premolar Interproximal Radiograph



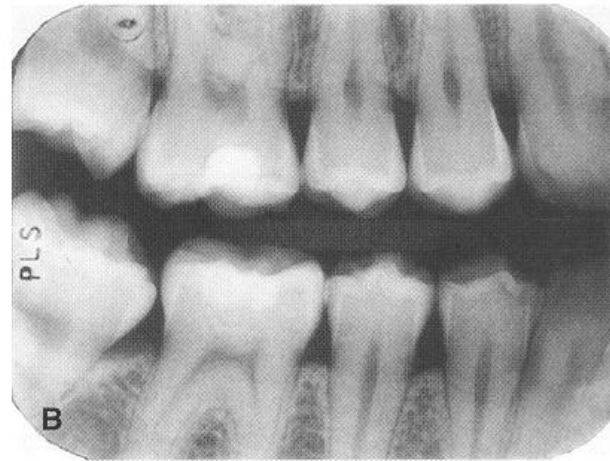
Align open end of PID with buccal surfaces of premolar teeth

Centering Exposure for Premolar Interproximal Radiograph

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

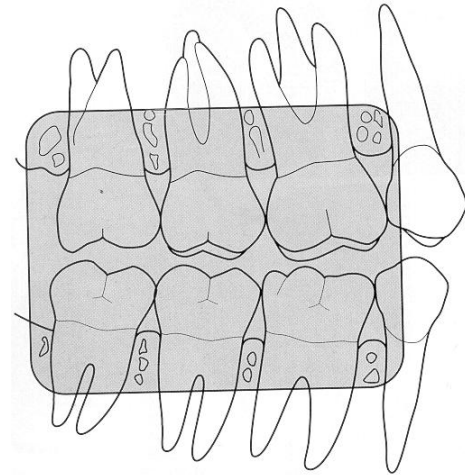


Diagnostic Premolar Interproximal Radiograph



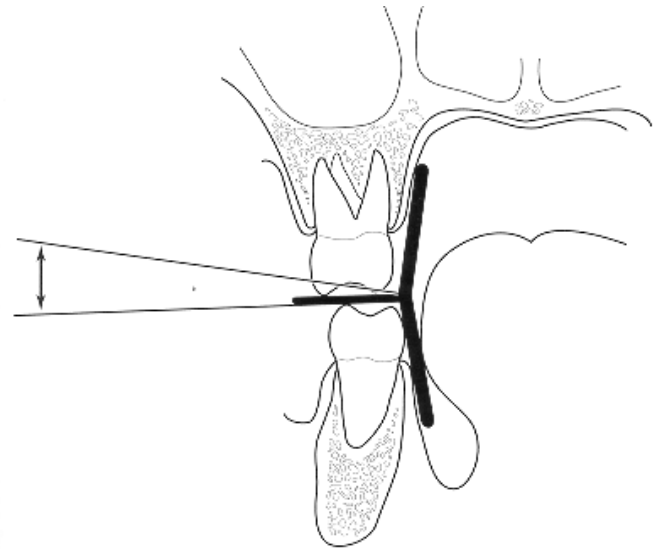
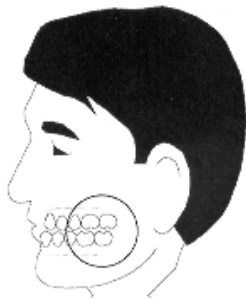
Molar Interproximal Using Loops/Tabs

- 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



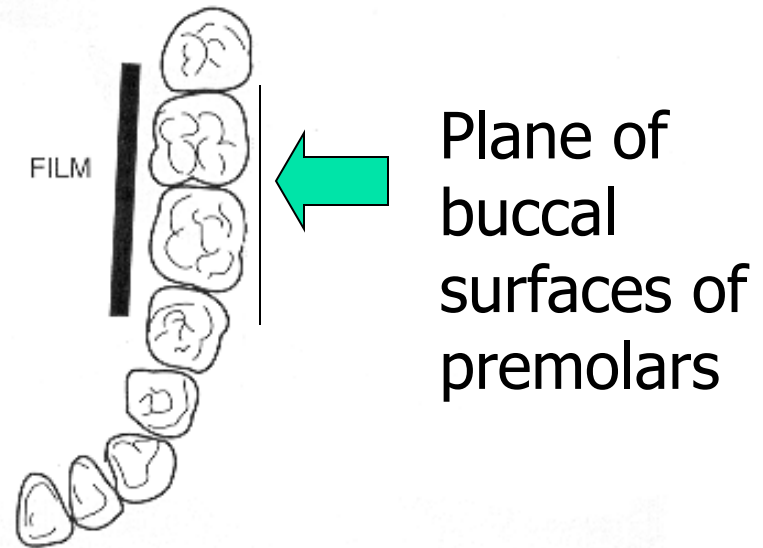
Molar Interproximal Using Loops/Tabs

- Center films behind teeth of interest in vertical position



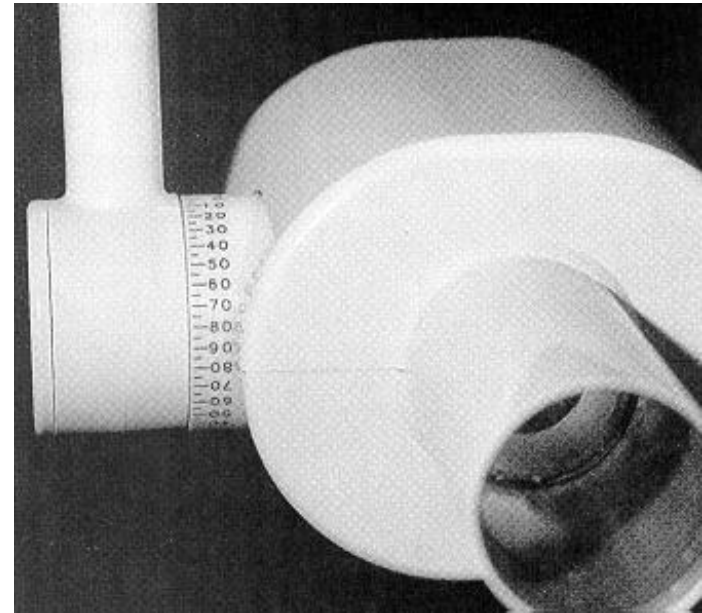
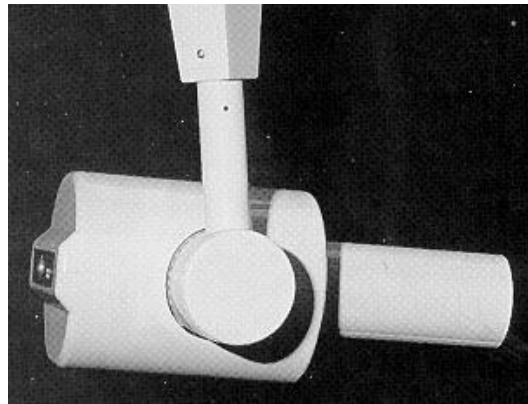
Molar Interproximal Using Loops/Tabs

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

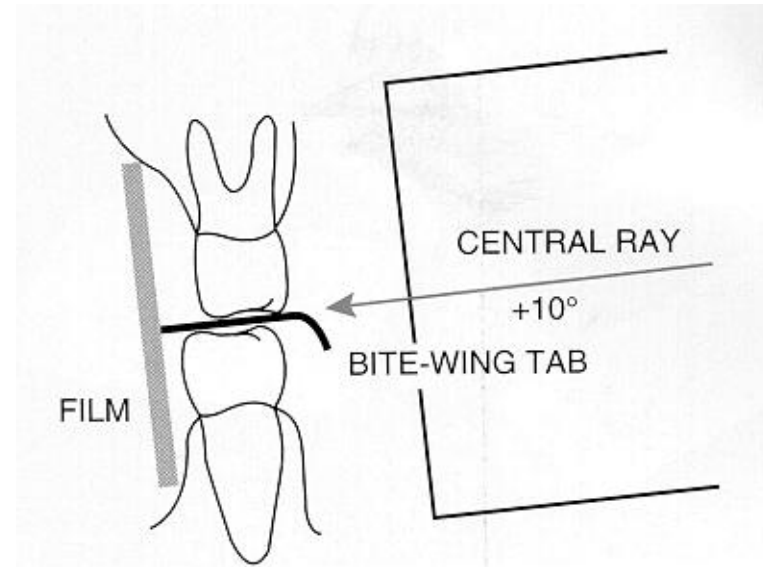
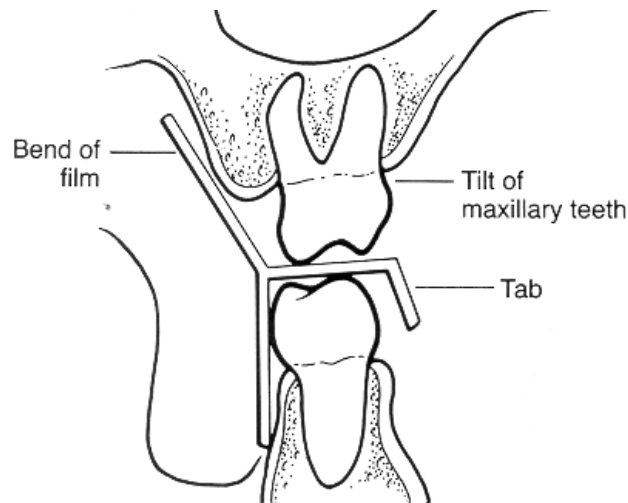


Vertical Beam Alignment for Molar Interproximal Radiograph

- Adjust vertical angulation to + 10 degrees

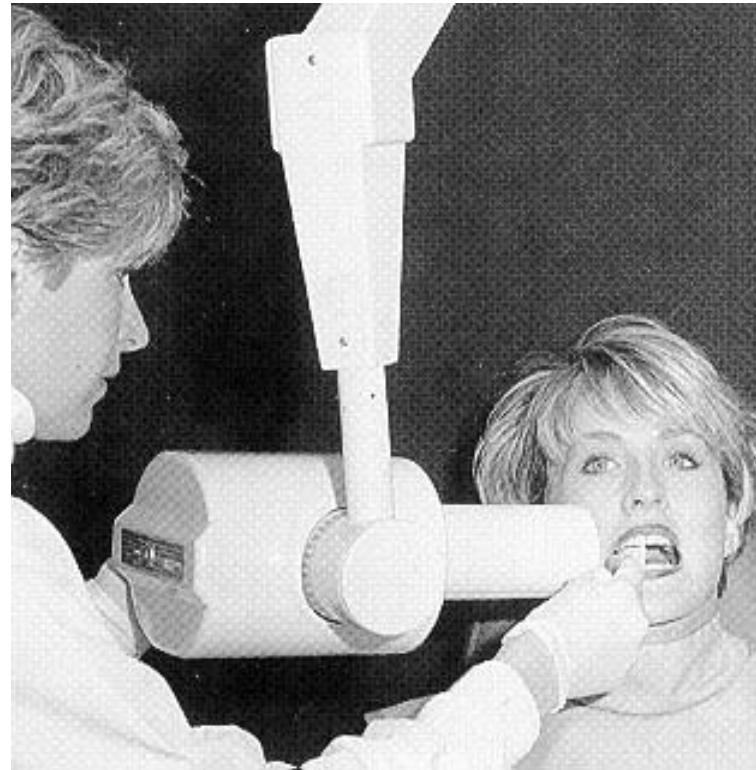


Vertical Beam Alignment for Molar Interproximal Radiograph

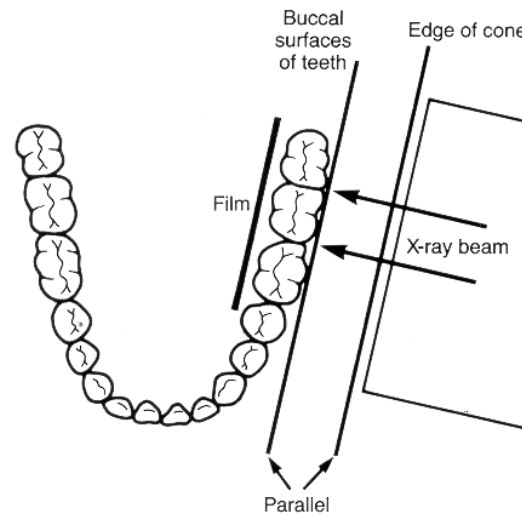


Vertical Beam Alignment for Molar Interproximal Radiograph

- 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

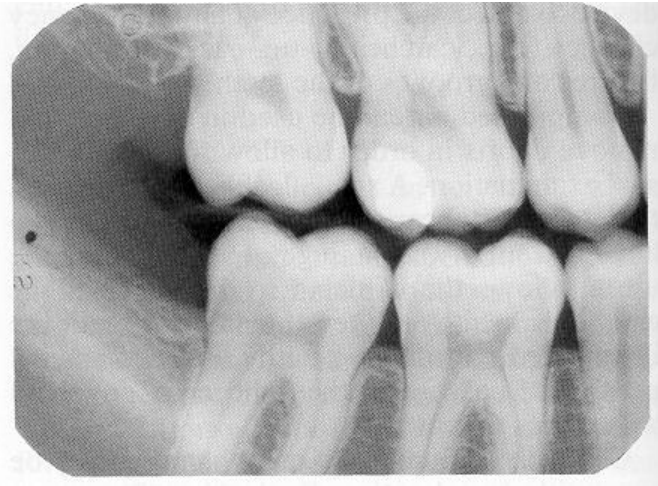


Centering Exposure for Molar Interproximal Radiograph

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

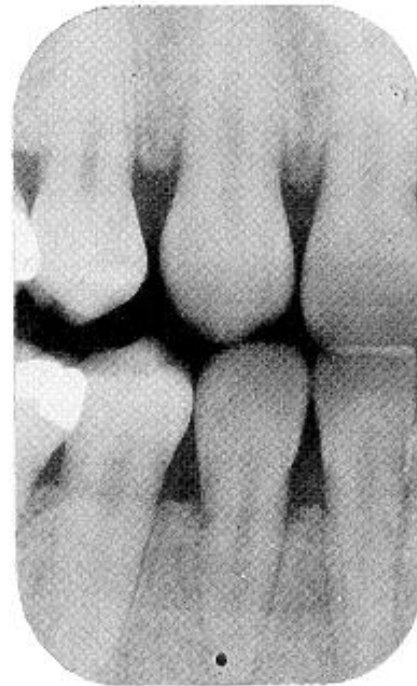


Diagnostic Molar Interproximal Radiograph



Vertical Bitewings with Loops/Tabs

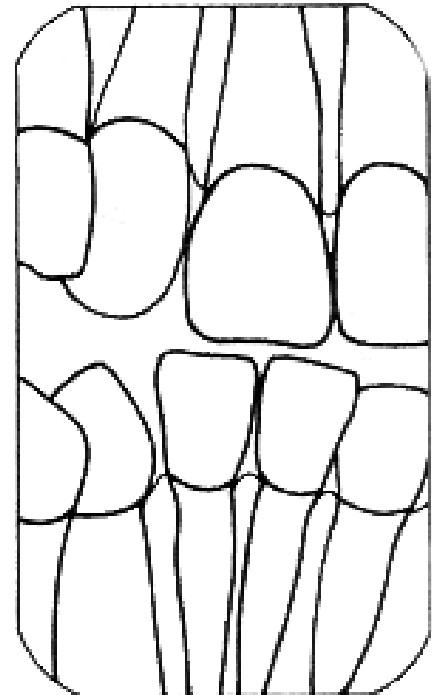
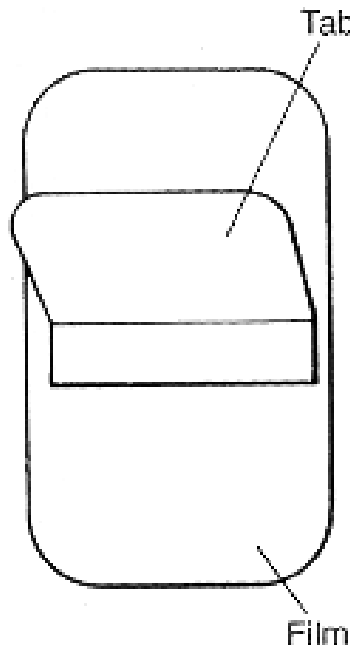
- Indicated to examine alveolar bone levels in moderate to advanced periodontal disease
- Four to six films exposed depending on the number of erupted molars



Vertical Bitewings with Loops/Tabs

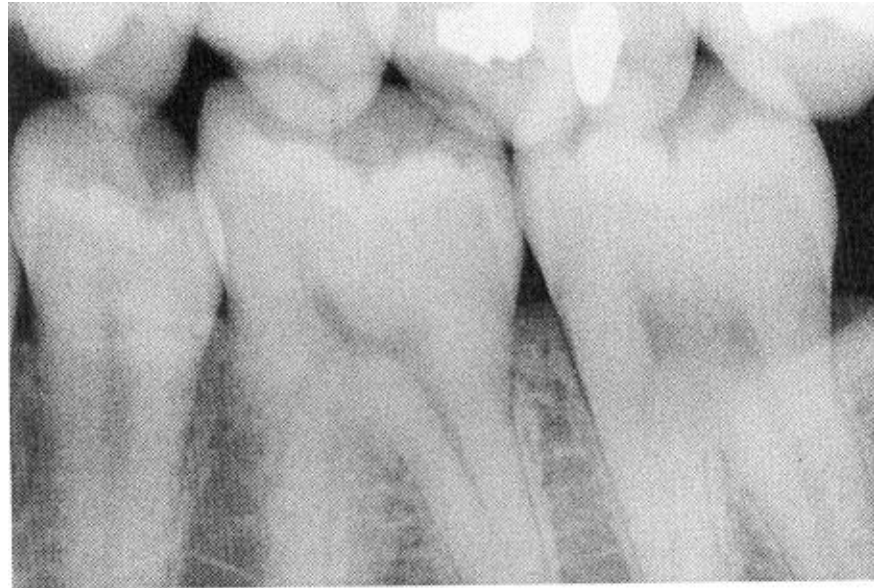
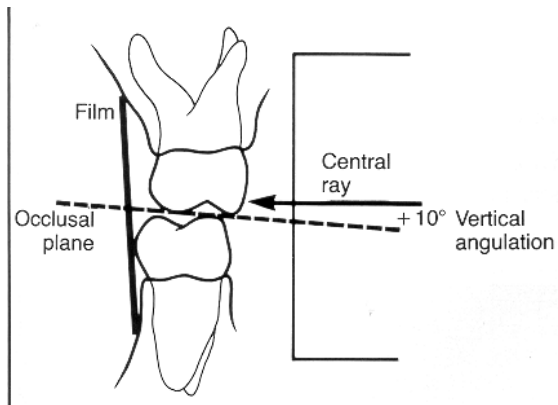
Vertical beam
alignment = plus 15
degrees

Horizontal beam
alignment = the
same as for
horizontal
interproximals

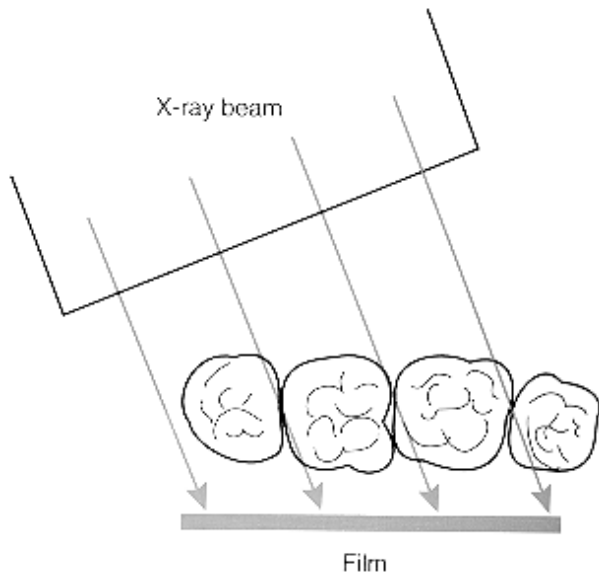


Nondiagnostic Interproximal Radiographs

- Incorrect (negative) vertical angulation



Nondiagnostic Interproximal Radiographs





Criteria for Diagnostic Acceptability

- 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

