Canine and Feline Dental Radiology

Presented by

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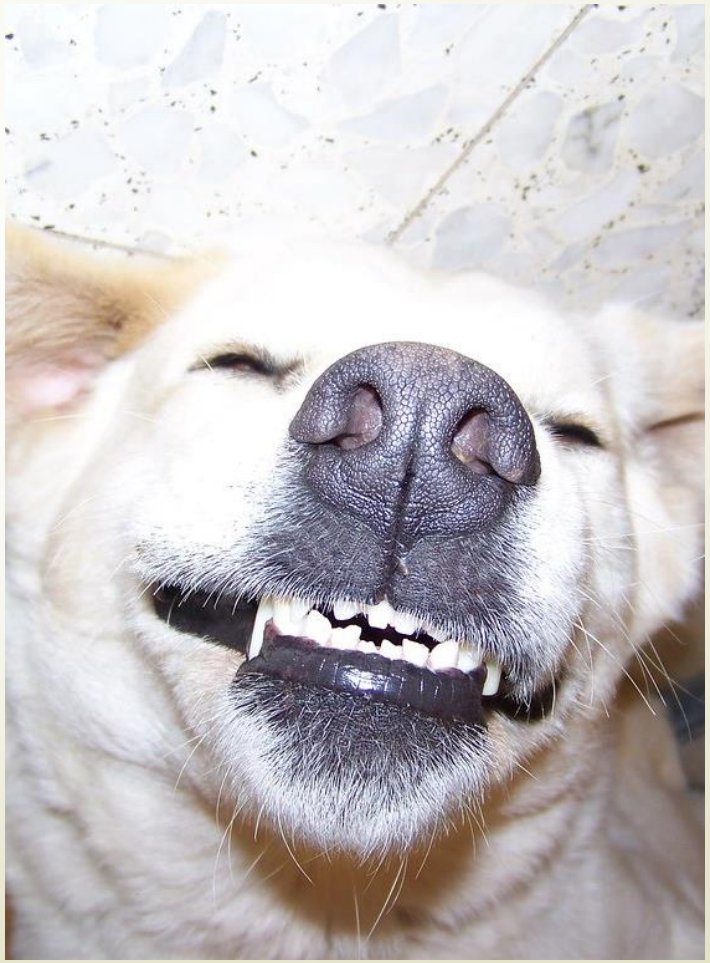


Radiation Safety

- Stand directly behind the tube head when taking a dental radiograph
- Do not use hands to hold the positioned sensor
- Using the lowest possible exposure time means less radiation exposure

Why Take Dental radiographs?

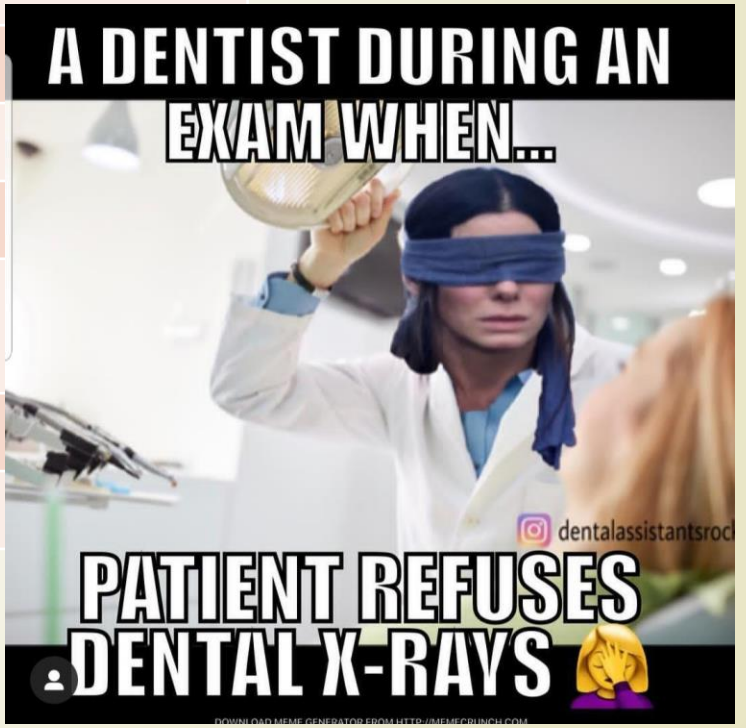
It is not possible to provide good quality dental care without utilizing radiographs.

Most pathology lies below the gingival margin and cannot be visualized without dental radiographs.

Failure to utilize dental radiology will result in missed treatments and potentially leave a patient with unknown oral pain.

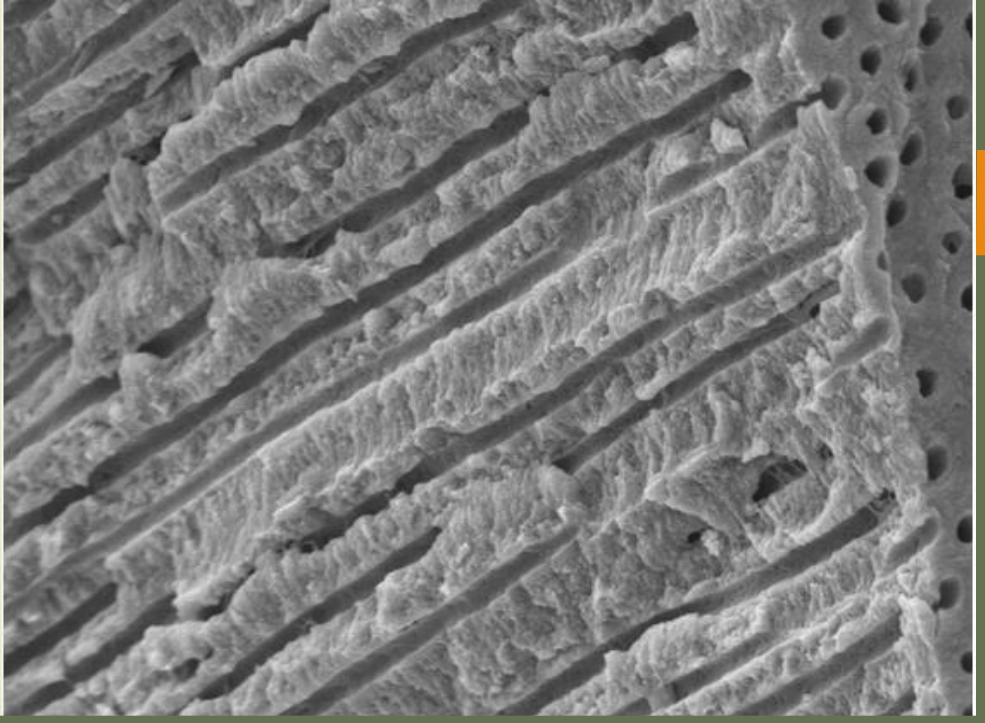
Indications for dental radiographs

Missing teeth	Epistaxis – nosebleed
Fractured teeth	Evaluation of prior treatment
Evaluating vitality of teeth	Evaluation of disease progression
Resorptive Lesions	Pre- and Post-extraction
Periodontal disease	Client education
Pockets over 3 mm in dogs	Nasal radiographs
Oral enlargements/masses	Baseline evaluation
Draining tracts on the gums, maxilla or mandible	
Painful or sensitive teeth	
Nasal discharge	



Dentigerous Cyst

- Fluid-filled lesion associated with an unerupted tooth
  - Treatment
    - Removing the tooth causing the cyst and the entire cyst lining



How can a tooth with dentin exposure become infected?

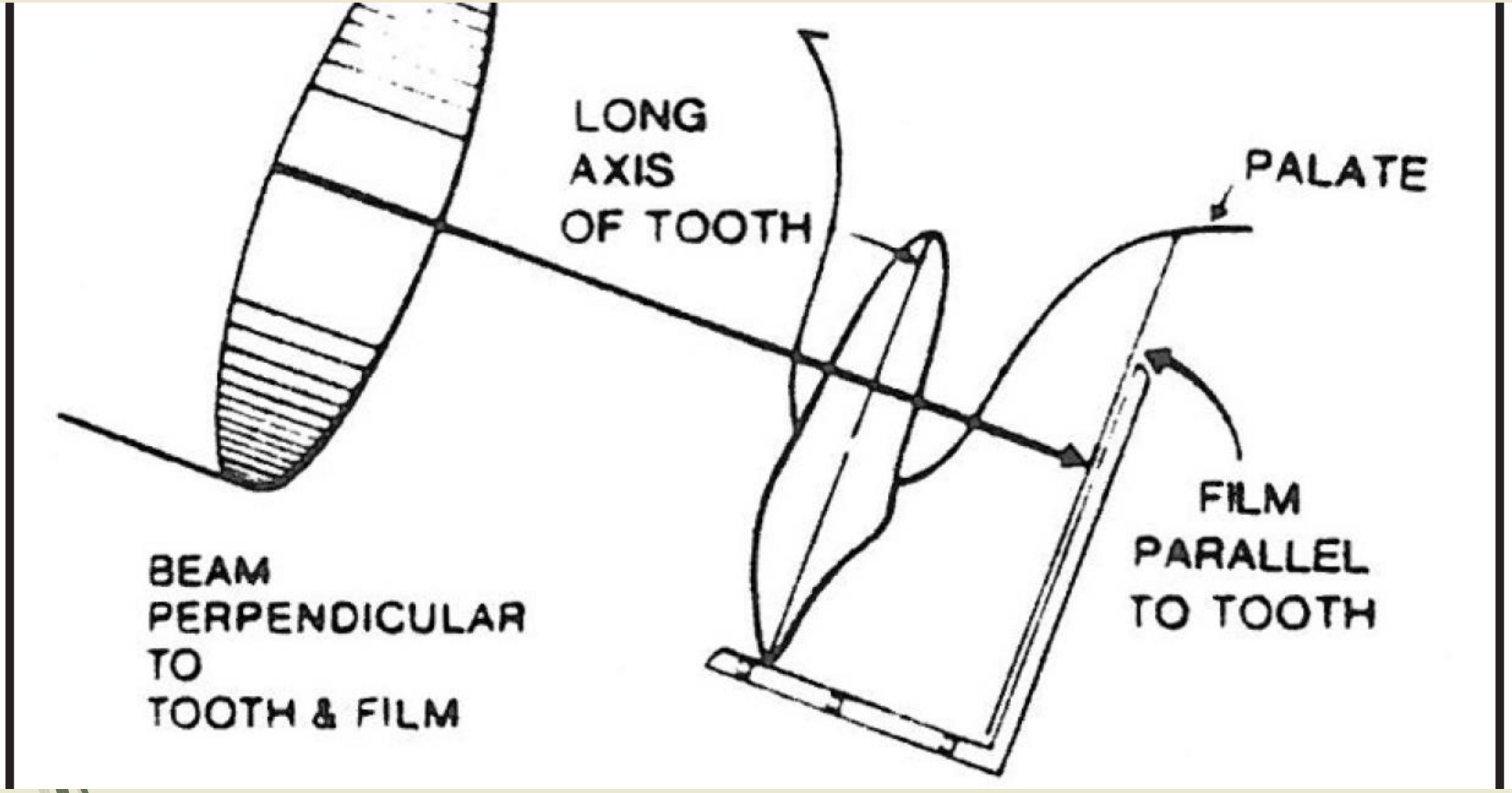
- Dentin tubules allow bacteria to get into the pulp (nerve). If enough bacteria make it into the pulp, the body cannot fight off the infection and it can cause pulp necrosis and death eventually abscessing out the end of the tooth.
  - The only way to know if this has happened is radiographic imaging!

Positioning for dental radiographs

- When positioning for a dental radiograph, keep the x-ray head 1-2 inches off the patient's fur/skin.
- After shooting a dental radiograph make sure the image shows at least 3 mm around every crown and root of the targeted tooth.
- Correct positioning is required to produce a diagnostic dental film. Any mistake made in positioning will involve one of three factors:
  - Tube angulation
  - Tube position
  - Film (sensor) position

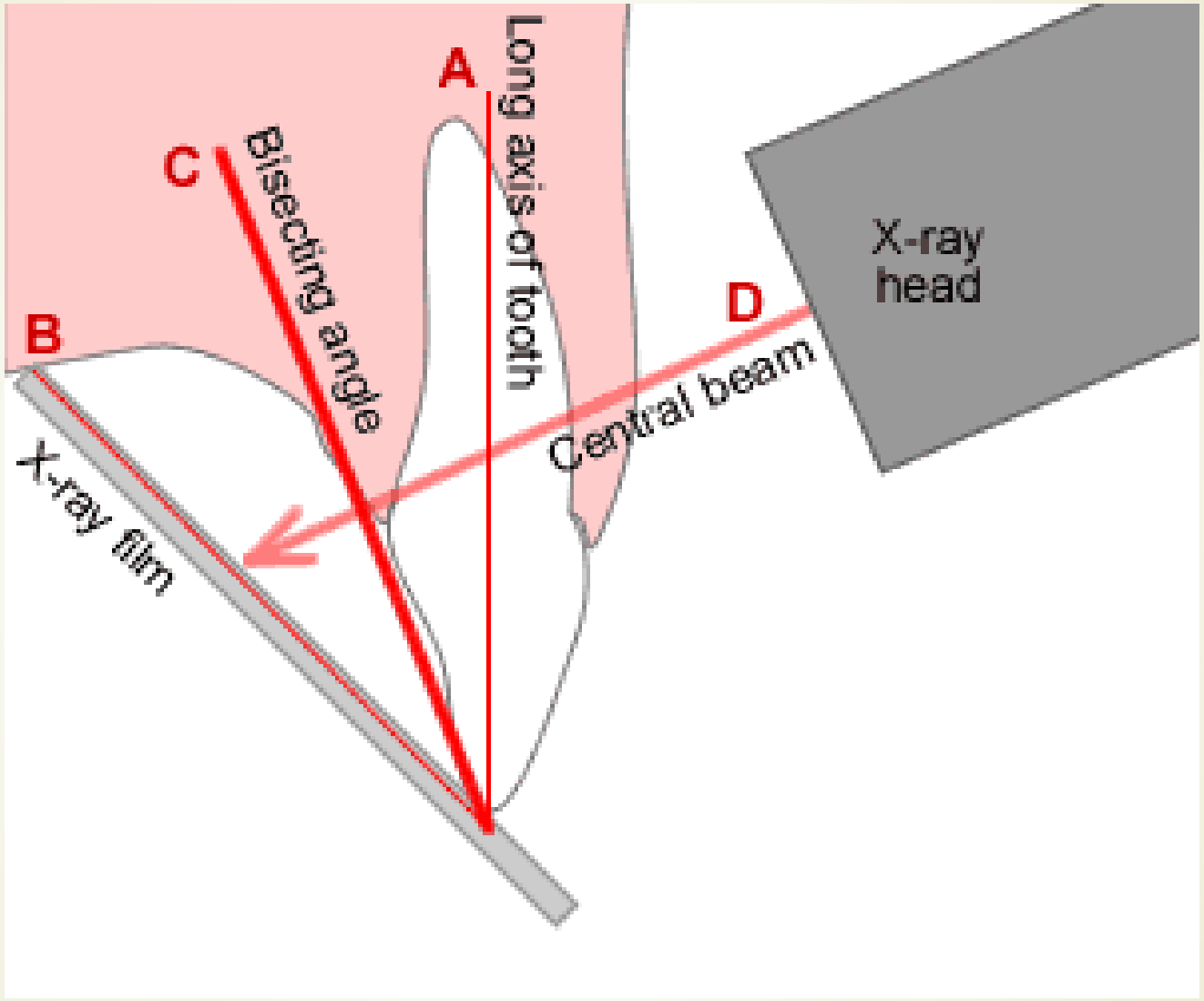
Tube Angulation

- Parallel technique
  - Used for imaging the lower premolars and molars
  - The plane of the tooth and the film are parallel, and the beam is directed perpendicular to them both
  - This is the same technique used in taking a lateral radiograph of an extremity


LONG
AXIS
OF TOOTH
PALATE
BEAM
PERPENDICULAR
TO
TOOTH & FILM
FILM
PARALLEL
TO TOOTH

Tube angulation continued

- Bisecting angle technique
  - The anatomy of most of the oral cavity prevents the film from being placed in the same plane as the tooth.
  - To compensate for, this the beam is angled so that it is half-way between perpendicular to the film and perpendicular to the long access of the tooth.

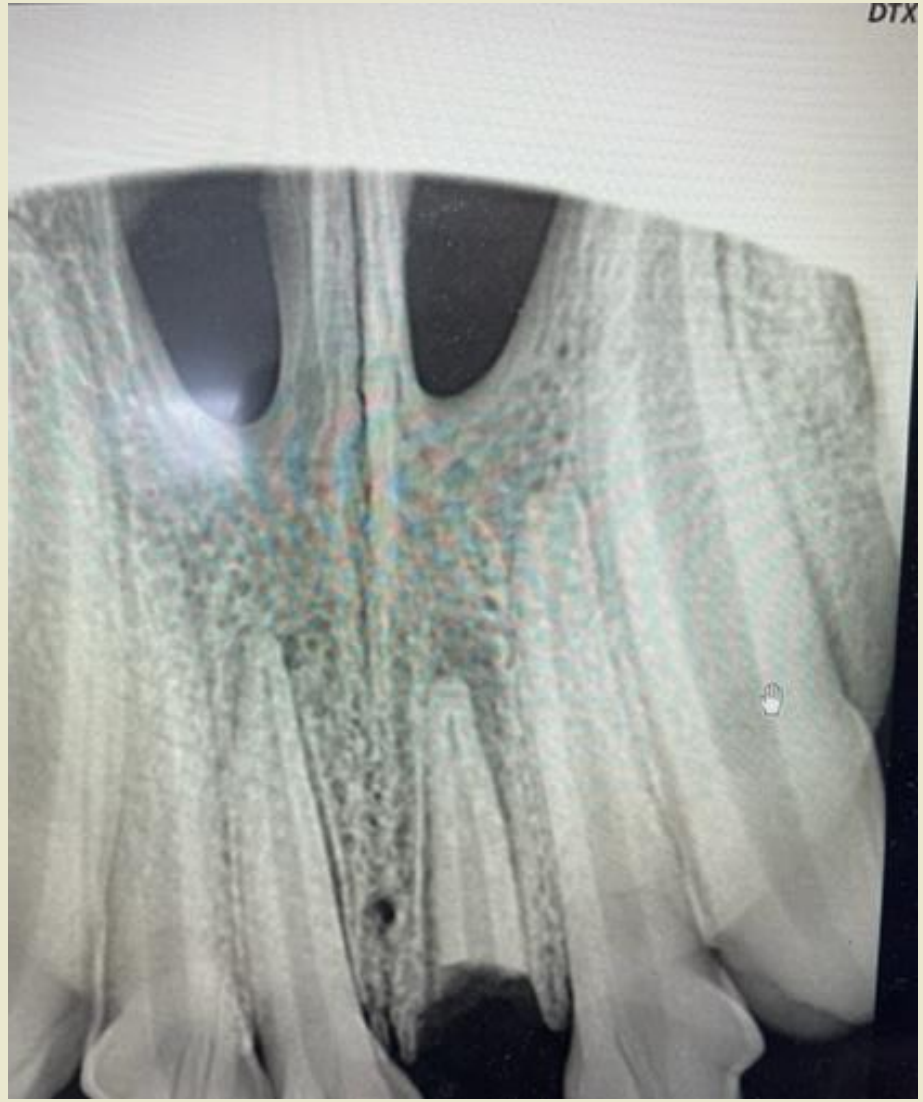

A
C
Bisecting angle
Long axis of tooth
B
D
X-ray head
Central beam
X-ray film

Tube position

- Cone Cut
  - When the tube head is not centered over the sensor (film) the radiograph will cut off at the edge of the beam, resulting in a white area
  - To remedy this, position the beam (tube) over the center of the sensor (film).

Cone Cut

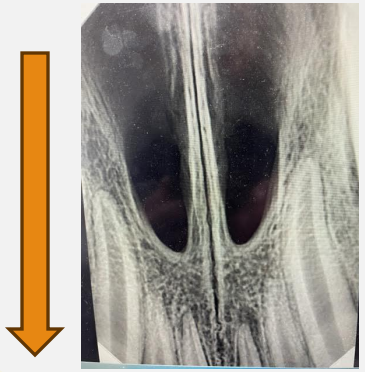
Move the beam towards the cone cut



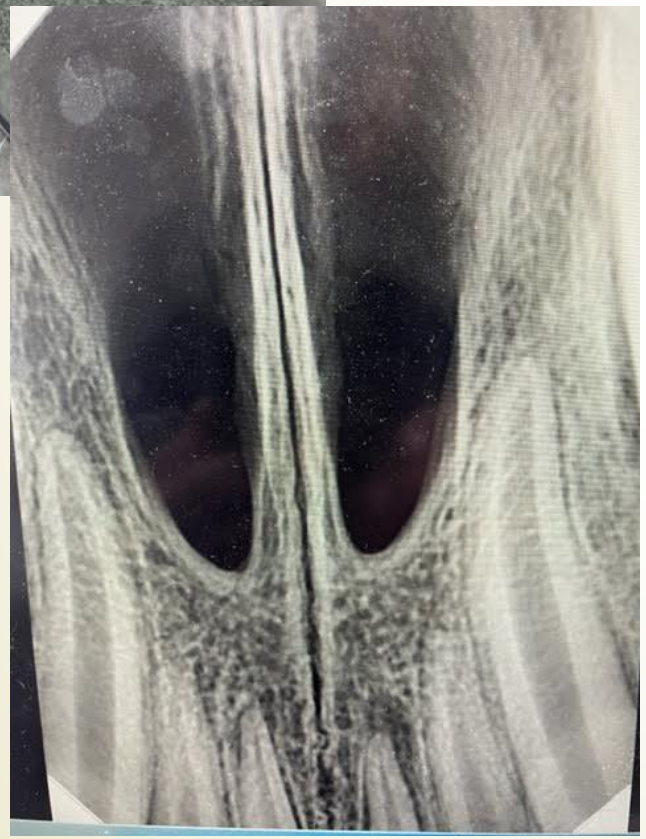
Sensor (film) position

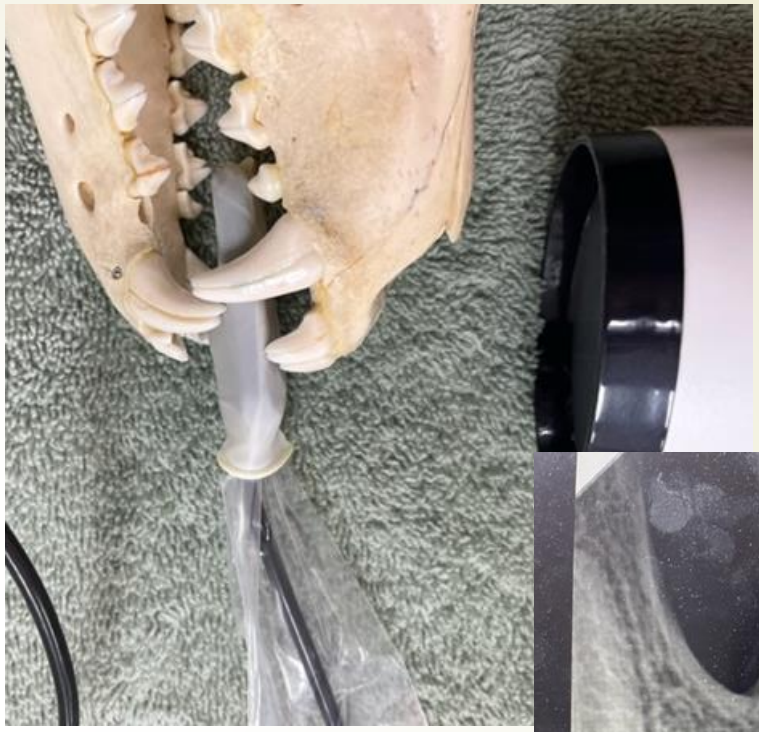
Position the sensor so the cord is coming out of the patient's mouth and the flat surface is against the tooth.

Position the sensor so the image you would like to radiograph is centered over the sensor.



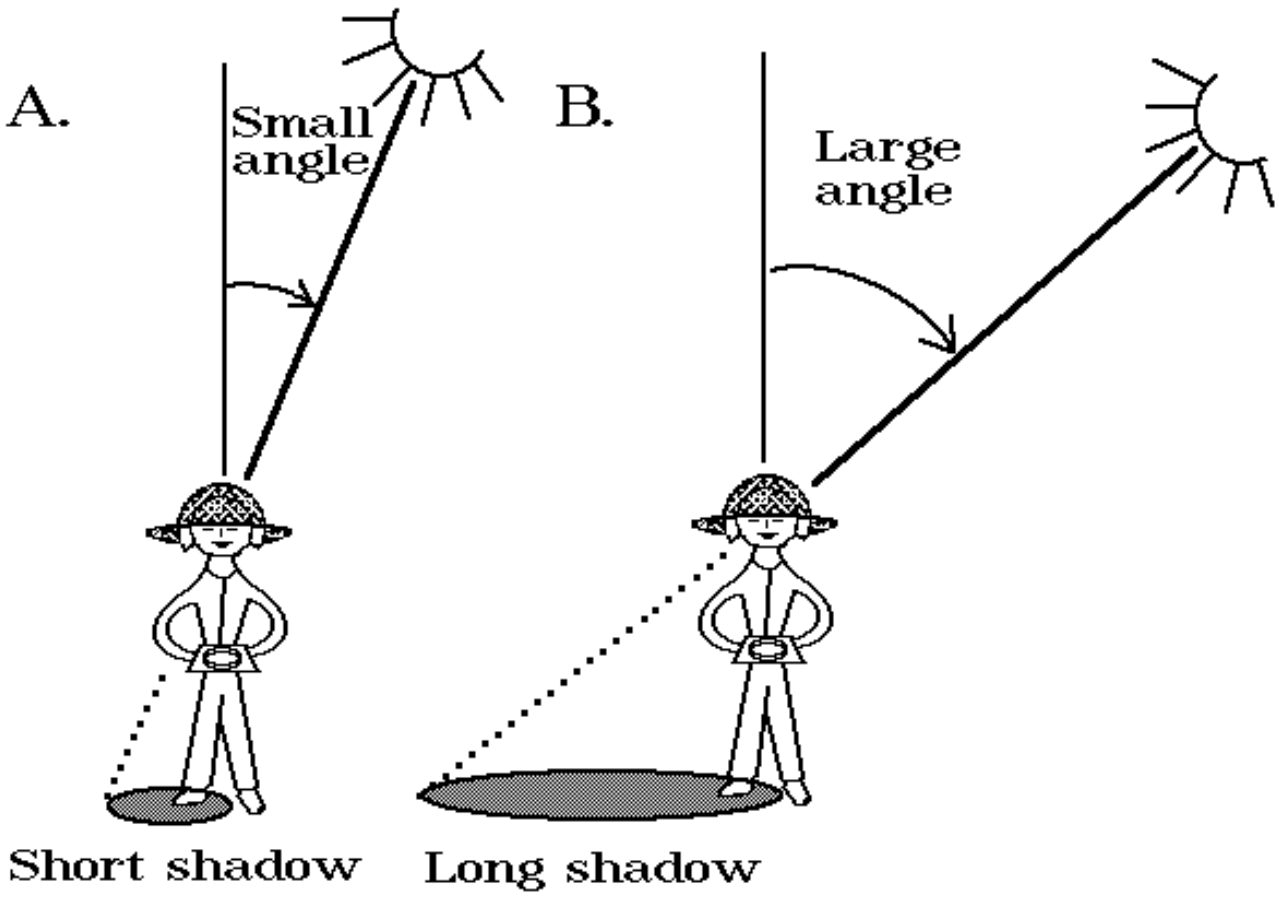
If you cut the image off at the edge of the film move the film towards the area that was cut off.





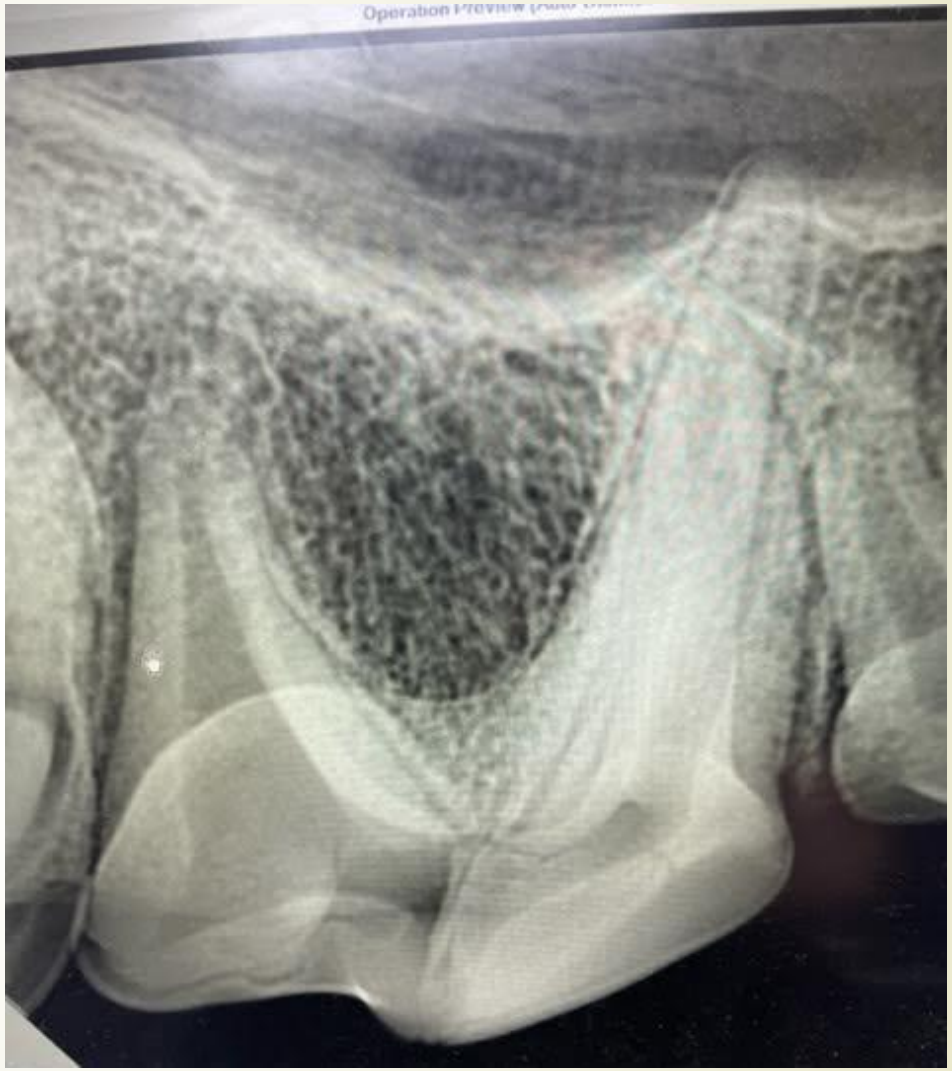
Foreshortening and elongation

- If a dental radiograph is foreshortened (premolars and molars) the tube head needs to move more lateral to the patient assuming the patient is laying in lateral recumbency.
- If a dental radiograph is elongated the tube had needs to move dorsal to the patient


A.
Small angle
B.
Large angle
Short shadow
Long shadow

Foreshortened

Elongated



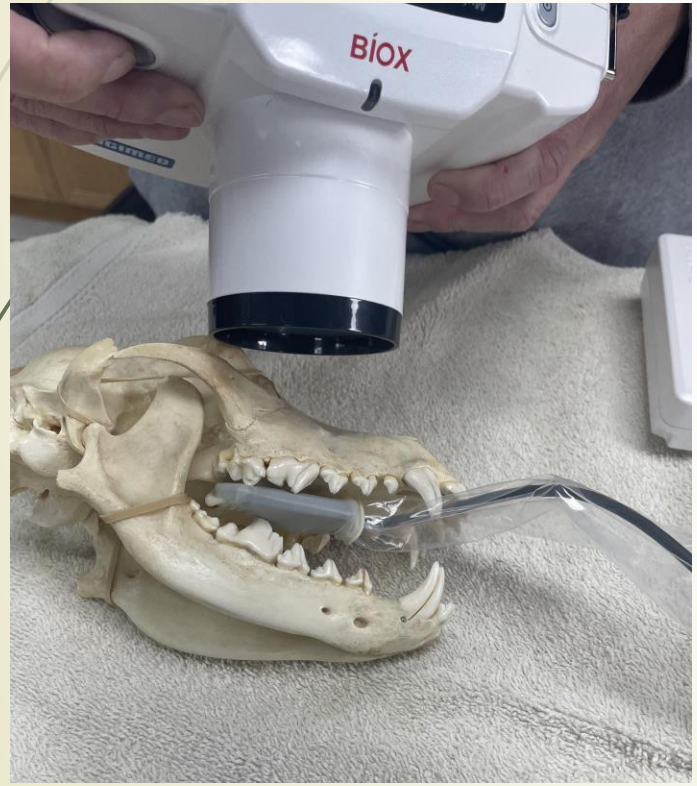
Three simple rules

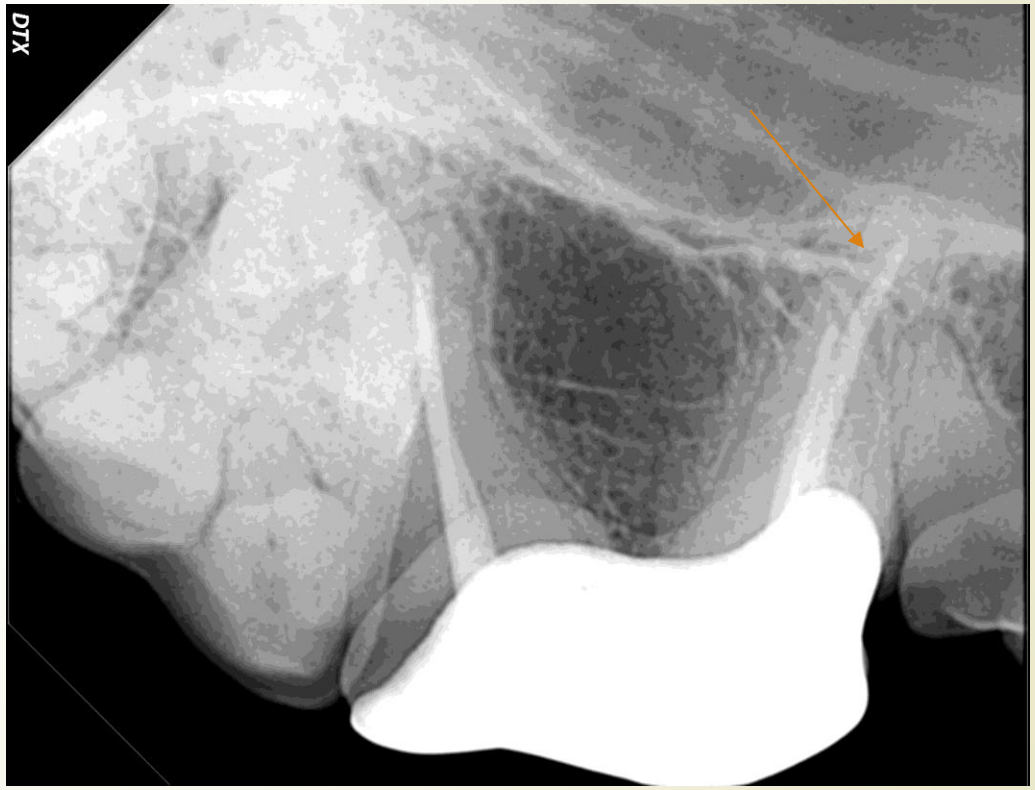
- All positioning errors involve these three parameters that we just covered.
  - If the image is foreshortened or elongated, adjust the tube angle.
    - To make the roots longer move the tube head more laterally. (lateral=longer)
  - If you cut the target off at the edge of the beam (cone cut), simply move the beam over towards the area of cone cut.
  - If you cut the target off at the edge of the sensor (film), move the sensor (film) over toward the area you cut off.

"No, my pet doesn't chew on anything!"

Caudal and Cranial oblique

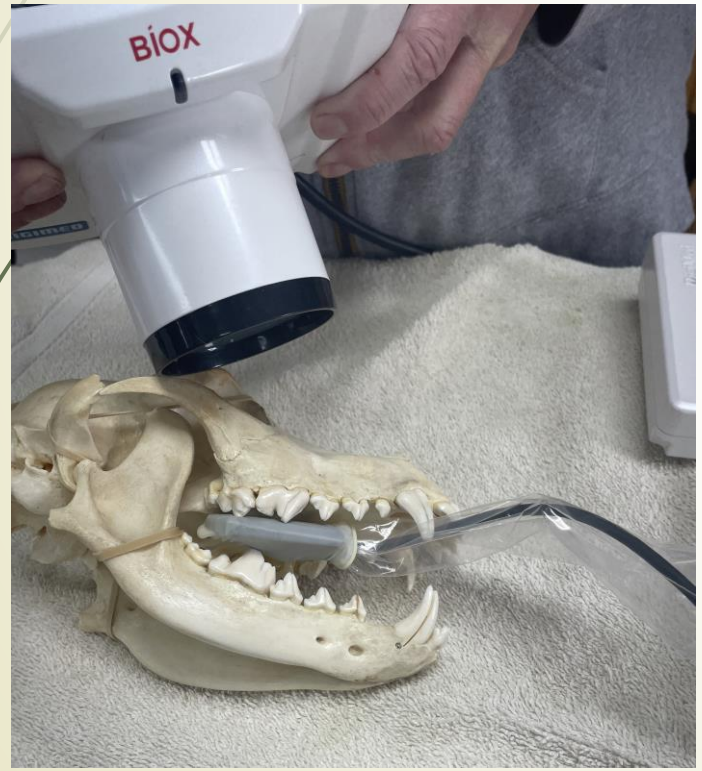
- Lateral view. Note the overlapping front roots.





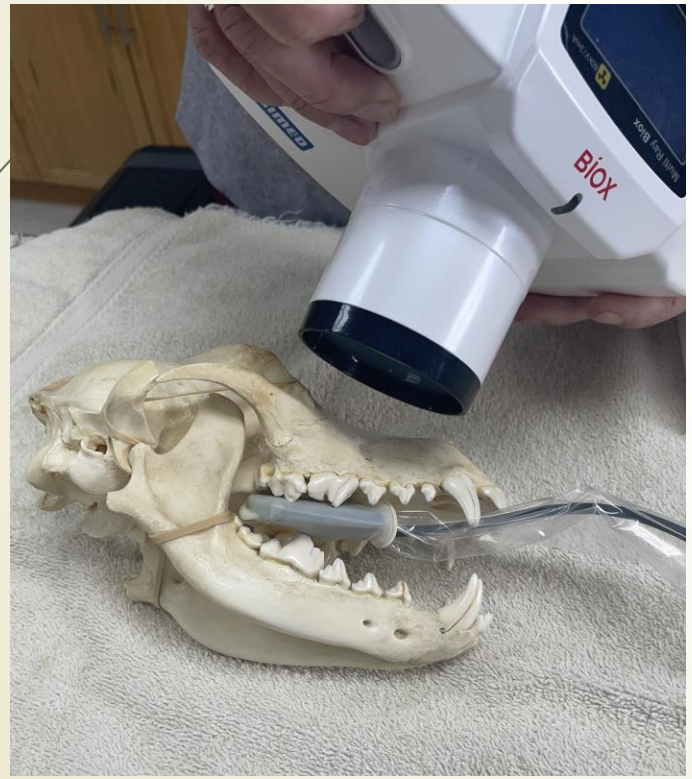
Caudal and Cranial oblique

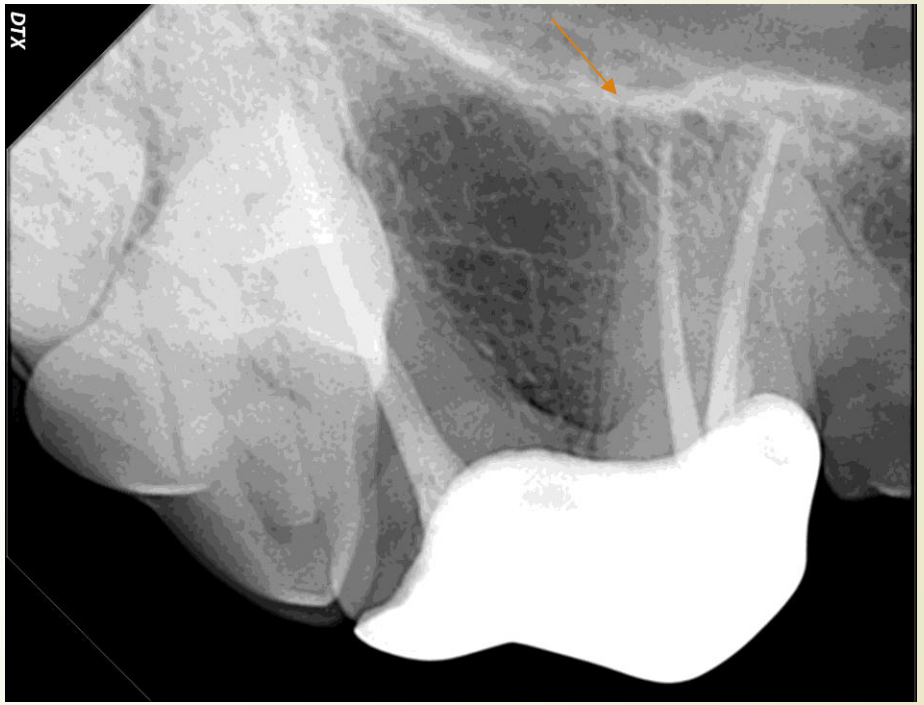
- Caudal (posterior) oblique. The Palatal (front inside) root (arrow) is isolated between the other two roots.



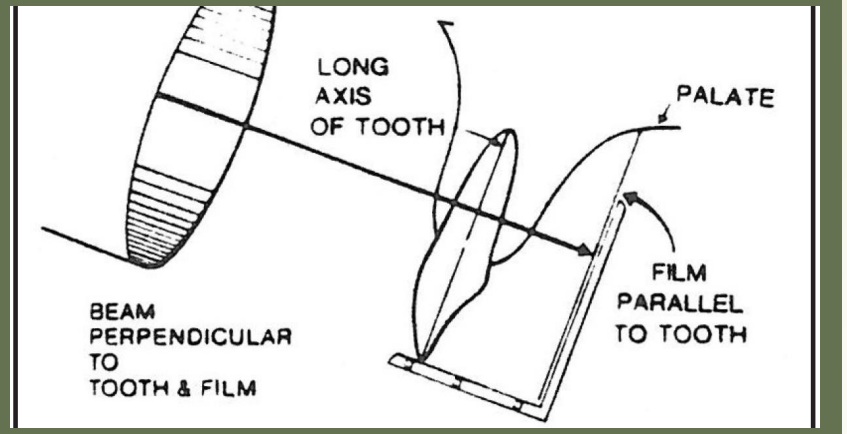
Caudal and Cranial oblique

- Cranial (anterior/rostral) oblique view. Note that the mesio-buccal (front outside) root (arrow) is now isolated between the other two roots.





Canine specific radiographs



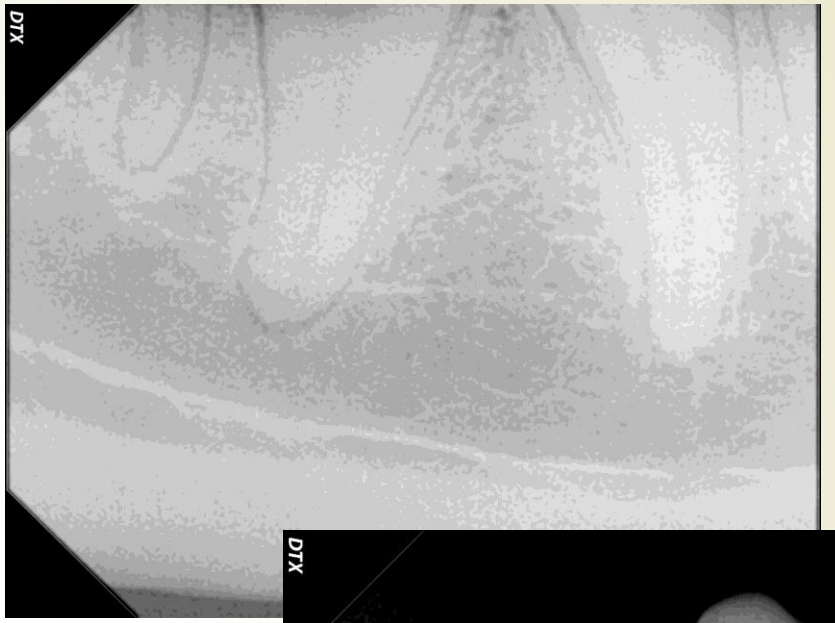
Mandibular Premolars and Molars

Place film between the tongue and teeth

The beam is angled perpendicular to the film

This is the only "parallel technique"

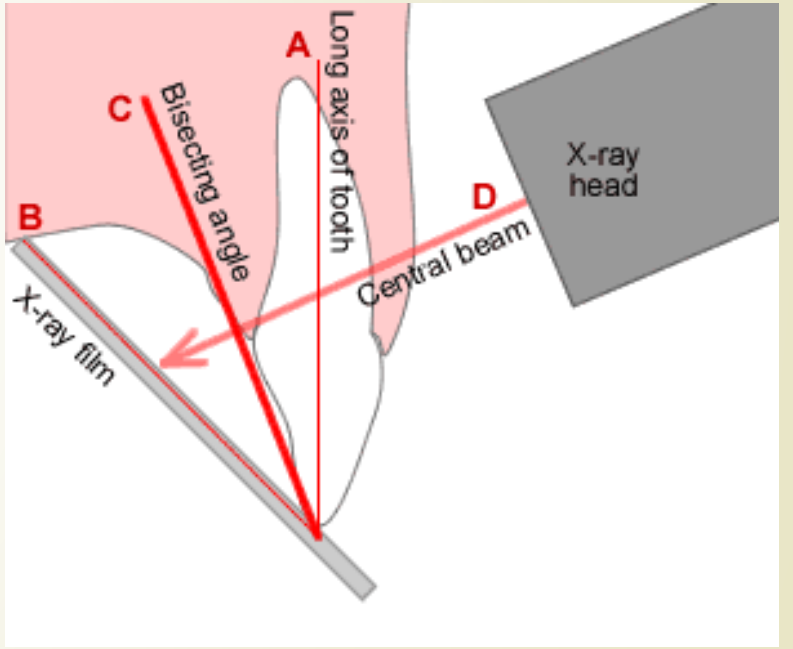
In larger dogs, the first molar needs to be taken in 2 separate radiographs (separating the crown and root) because the tooth is too large to image in one view


DTX


DTX

Modified Positioning for Mandibular Premolars

- Normal anatomy of the mouth prevents the parallel technique in the rostral mandible
- A bisecting angle is required
- Place the sensor across the floor of the mouth
- Position the beam perpendicular to the plate then move the beam angle 30-45 degrees lateral.

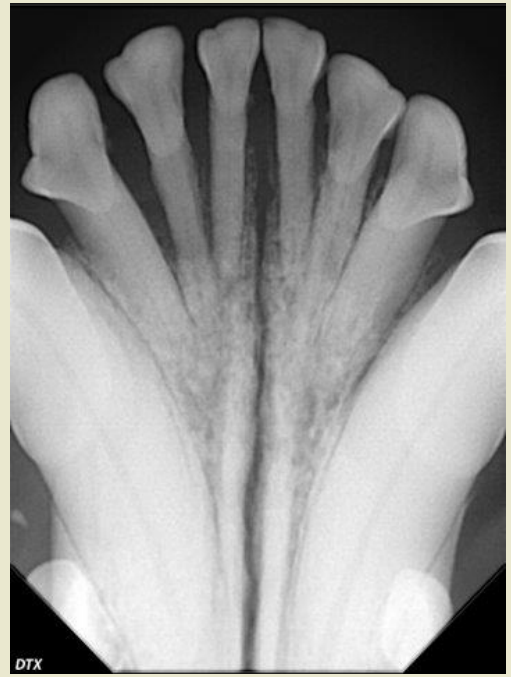



BIOX


DTX

Mandibular incisors

- Center the plate directly in the middle of the mandible to get all the incisors and canines.
- Beam is on ventral midline perpendicular to the film, then tip the tube head rostral 20-30 degrees.



modified positioning for mandibular canines - Roots

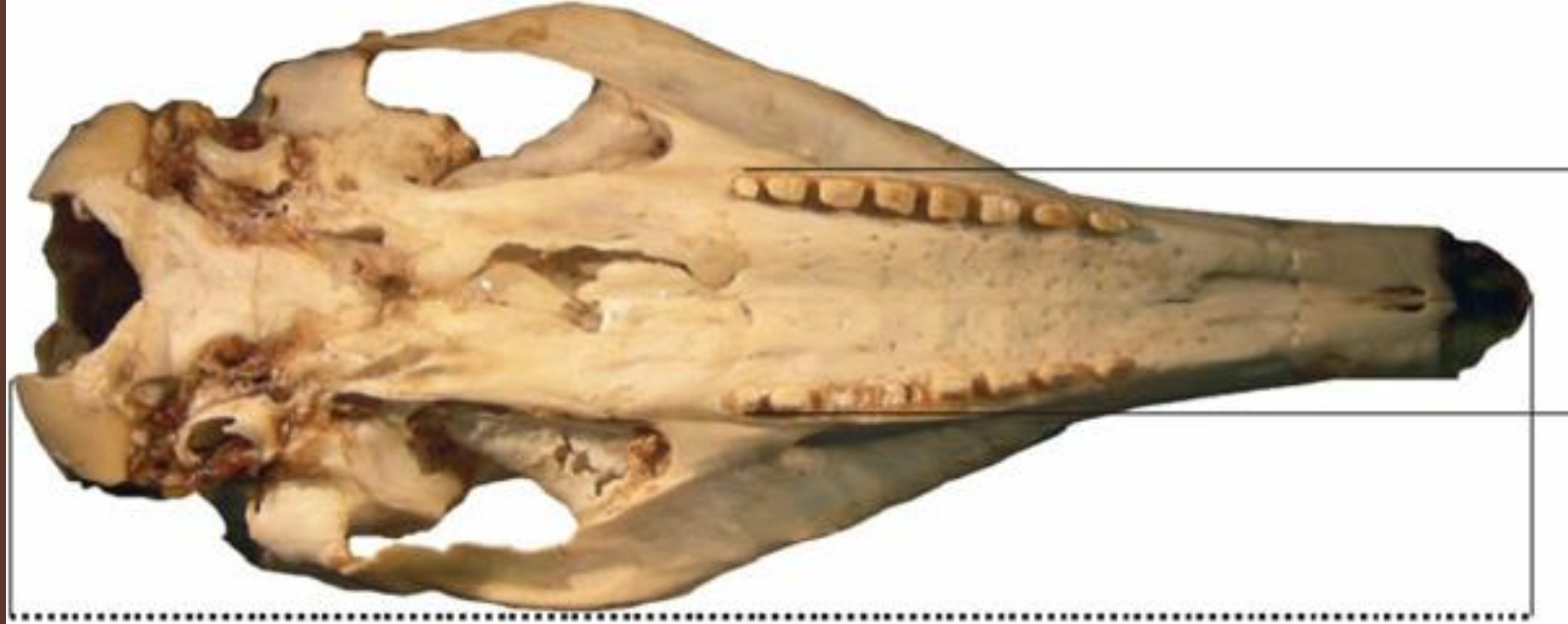
- Position the film over the center of the mandible just behind the crowns of the canine teeth
- Position the beam perpendicular to the film, with no tipping required
- Center the film over the second premolars, which is the approximate level of the ends of both roots

modified positioning for mandibular canines - crown

- Canines in large dogs need to be taken in two radiographs.
- Place the film over the crown at a "near-parallel" position

Maxillary incisors

- Place the film directly against the crowns of the incisors and palate. Point the beam perpendicular to the plate then tip the tube head 30 degrees rostrally



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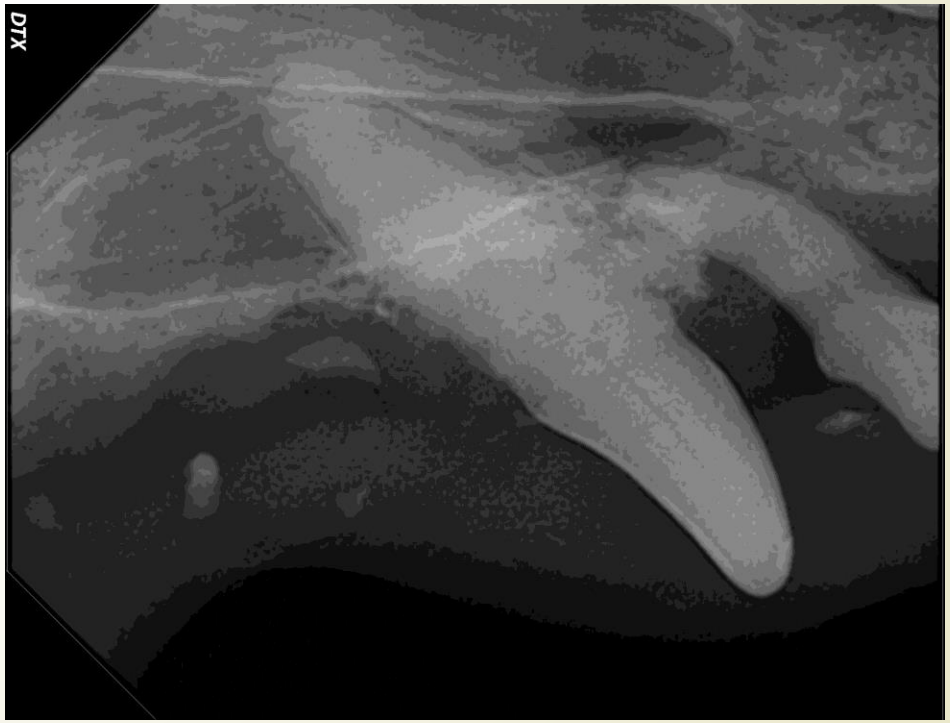
Maxillary Canines

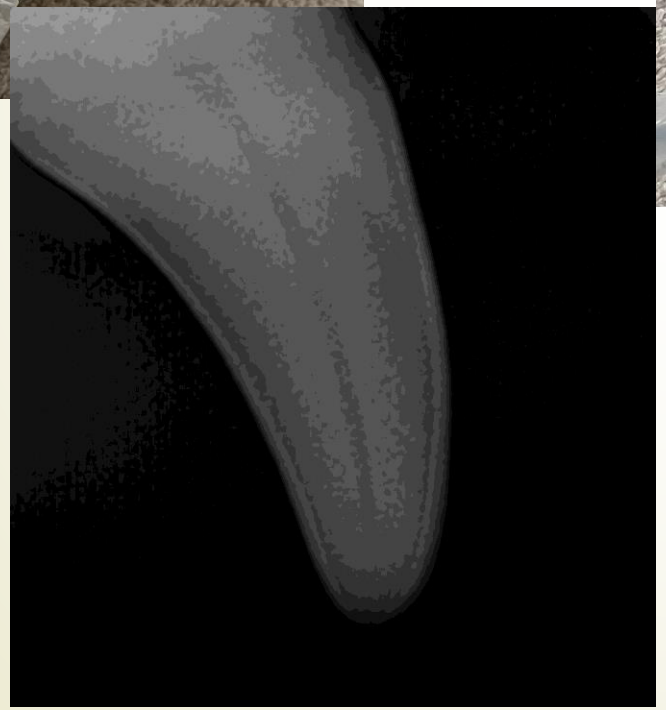
- Aim the beam dorsally over the top of the canine, then tip the tube head 30 degrees rostral and 30 degrees lateral (to the patient)

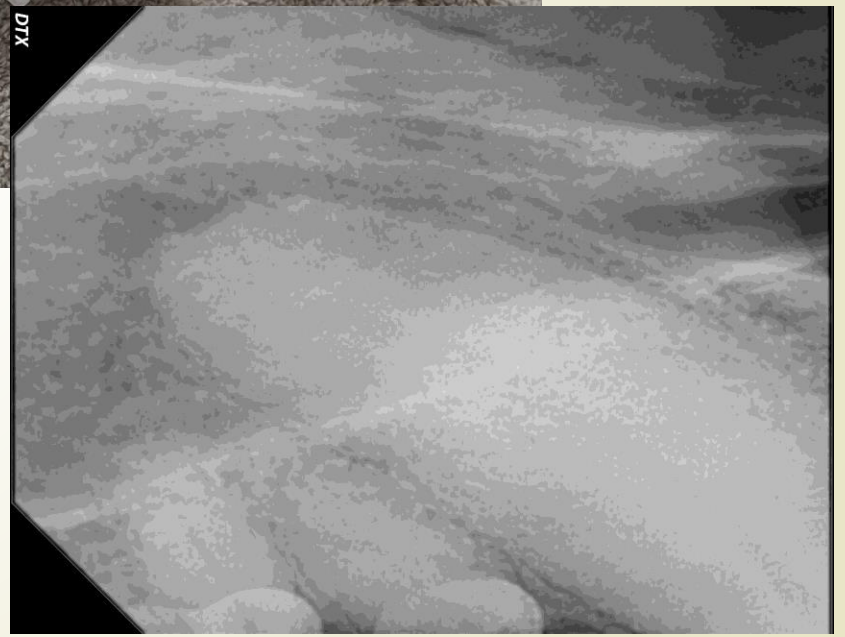


Modified Positioning for Maxillary Canines

In larger dogs, separate radiographs must be taken of the crown and roots of the upper canines

- Crowns
  - Take the same as lower canine crown (near parallel)
- Roots
  - Position the film just behind the crown of the upper canine tooth
  - Place the beam over the top of the nose perpendicular to the sensor
  - Tip the beam laterally 30 degrees

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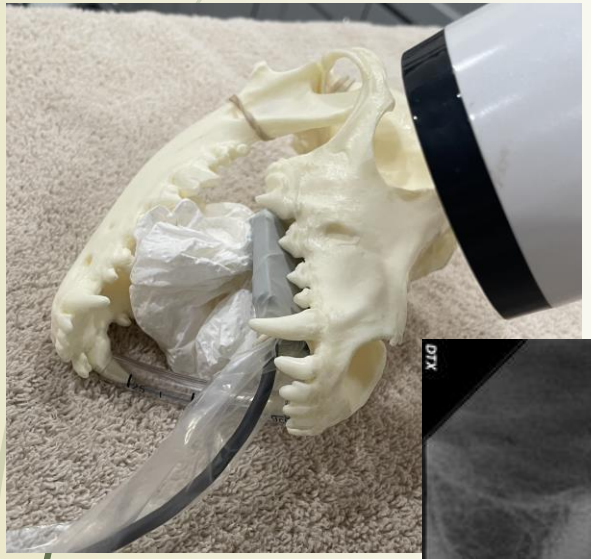
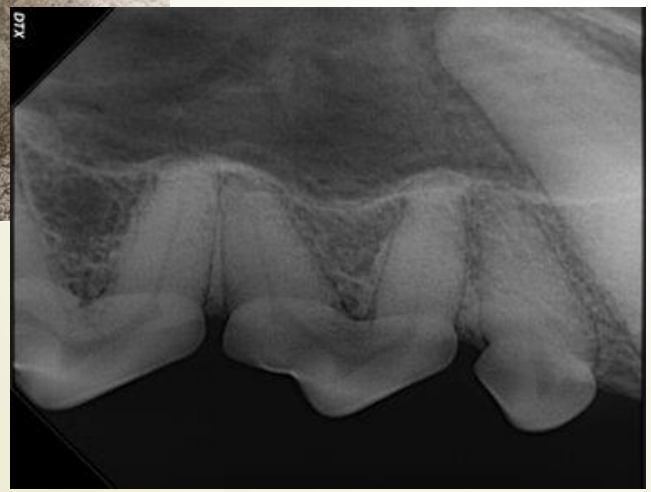
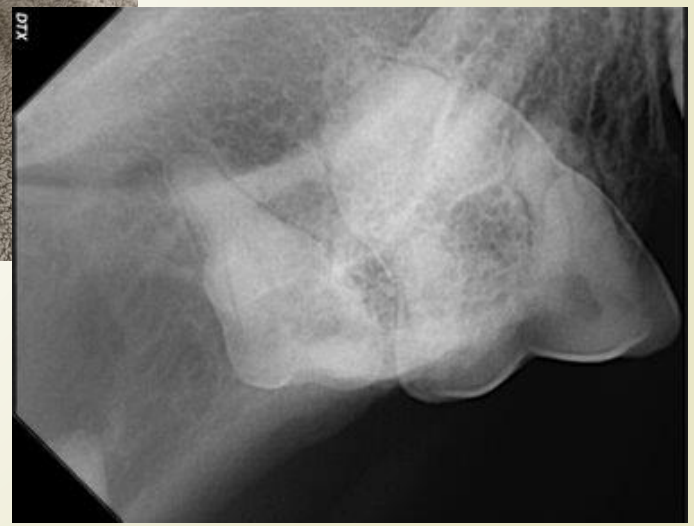
Maxillary Premolars and Molars

- Place one side of the film against the crown of the tooth and the other side against the palate. Aim the tube head 45 degrees laterally



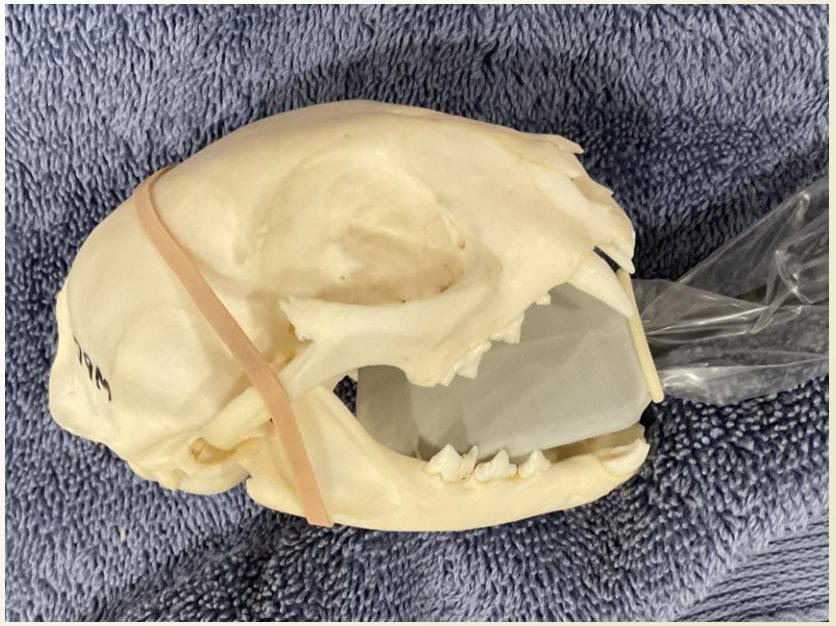




Feline specific radiographs

FELINE MAXILLARY PREMOLAR AND MOLARS

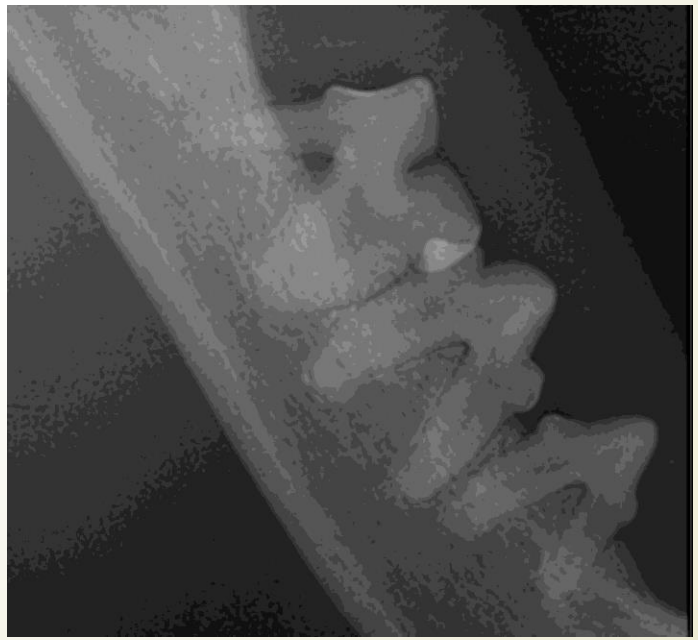
- Normal anatomy of the upper jaw prevents positioning without overlapping the teeth and roots by the zygomatic arch. This requires a modified technique and unique positioning of the sensor in the mouth.
  - Place the sensor diagonally in the mouth as shown below:



With the patient in lateral recumbency, position the tube head perpendicular to the table. Then tip the tube head approximately 15-20 degrees dorsal (to be near-parallel to the sensor).

Mandibular premolars and molars

- Place film between the tongue and teeth
- The beam is angled perpendicular to the film using the parallel technique



Maxillary canines

- Aim the beam dorsally over the top of the canine, then tip the tube head 20 degrees rostral and 20 degrees lateral (to the patient)

Maxillary incisors

- With the beam on the dorsal midline, perpendicular to the film, tip the tube head 20 degrees rostrally.

Mandibular incisors and canines

- Center the plate directly in the middle of the mandible to get all the incisors and canines.
- Direct the beam on the ventral midline perpendicular to the film, then tip the tube head 20 degrees rostrally

Key Takeaways

- All positioning errors involve these three parameters that we just covered.
  - If the image is foreshortened or elongated, adjust the tube angle. To make the roots longer move the tube head more laterally. (lateral=longer)
  - If you cut the target off at the edge of the beam (cone cut), simply move the beam over towards the area of cone cut.
  - If you cut the target off at the edge of the sensor (film), move the sensor (film) toward the area you cut off.
- Show 3 mm around every crown and root of the tooth you are taking a radiograph of.
- Keep the tube 1-2 inches off the patient's fur/skin.
- Always use the lowest exposure possible, stand behind the radiation and never use your hands to position.

Thank you!
Questions?