Vermont Veterinary Medical Association

2025
Winter CE Conference

February 1 and 2

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Dental Radiographs

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Equine dental radiology: obtaining and interpreting diagnostic digital radiographs

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PennVet New Bolton Center
University of Pennsylvania

GARDEN STATE EQUINE
VETERINARY DENTISTRY
A more comfortable horse today, a healthier horse tomorrow.

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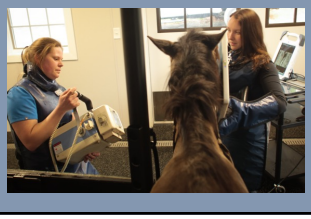
Summary

- Equipment needed
- Obtaining diagnostic dental radiographs
- Interpreting dental radiographs



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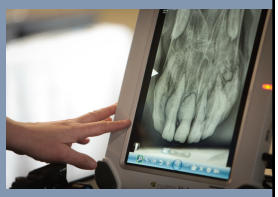
Reasons to obtain dental radiographs

- Investigating pathology found on oral exam
- Evaluating any disease where a dental differential exists
- Pre-purchase exam



3

What makes a good dental radiograph?

- Entire quadrant visible and in the center of the image
- Open mouth
- No motion
- Interproximal space visible
- Just enough obliquity to be diagnostic
- Labeled image

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Keys to Success

- Identify the structure you are interested in so that you can select the correct view
  - **Oral exam before radiographs**
- Well sedated patient
  - 8 – 10 mg detomidine IV for an average sized horse
- Take the same views every time
  - Technique is highly sensitive to small changes in positioning or angle
- Always image bilaterally, mirrored image
- PRACTICE, don't be afraid to take another view (or 10)

5

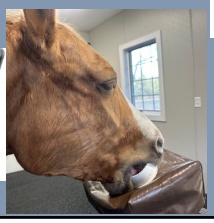
Keys to Success

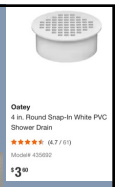
- Head resting on fixed object (head stand, garbage can, etc)
- Rest the receptor and the head on the same object or receptor between speculum and head

6

Positioning tips

- **Mouth must be open**
  - Bite blocks (2.5 inch to 4.5 inch widths)
  - PVC drain pipe
  - Gunther
  - Stubbs
  - X Spec





Oatey
4 in. Round Snap-In White PVC Shower Drain
(4.7 / 61)
Model# 435692
$3.93

7

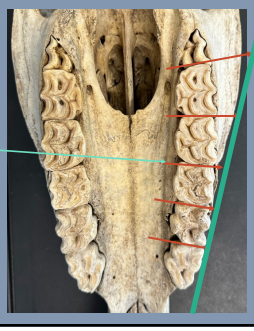
Positioning tips

- Start with x-ray beam perpendicular to the sensor and rotate the generator dorsally or ventrally dependent on the age and size of the horse
- Have the horse's head level (i.e. not tilted to one side or another)
- Center at the level of the rostral end of the facial crest

8

Positioning tips

Tail to tail!



Side ipsilateral to the sensor is the area of interest

- **Sensor on left side-looking at 200 quad**

9

Keys to success

Tail to tail with the generator to go through the interproximal spaces

Area of interest is the side ipsilateral to the sensor

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Basic (6 view) equine cheek tooth radiographic study

- Latero-lateral
  - Can forgo the lateral-lateral if just imaging mandibular cheek teeth or if no sinus pathology
- Dorso-ventral
- Right and left open mouth DV lateral oblique
- Right and left open mouth VD lateral oblique

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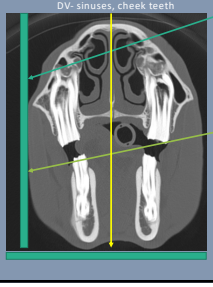
Basic cheek teeth views



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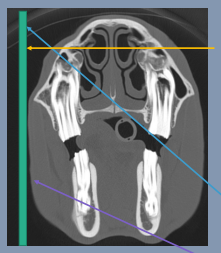
Basic cheek teeth views



Lateral-lateral- Sinuses (sinuses only, this view is not helpful for evaluating cheek teeth)

VDO- Palatal root of max cheek teeth or, less steep angle, crown of max cheek teeth

VDO- reserve crown/ roots of man cheek teeth

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Latero-lateral view

- Marker on the side of the head with the sensor
- Center just dorsal and caudal to the rostral end of the facial crest
- Technique chosen for sinus structures not teeth.
- Ideally for right quadrants, nose to right and left quadrants, nose to left
- Ideally all the sinuses visualized and overlapping of the infraorbital canal

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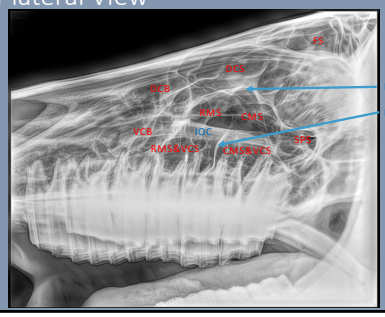
Lateral-lateral View



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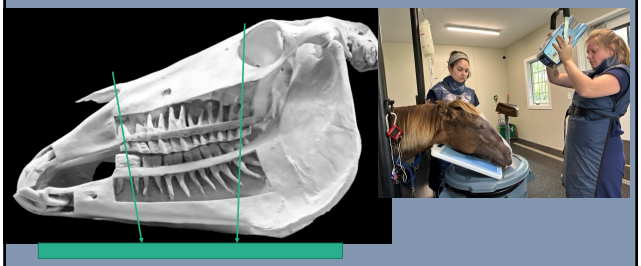
Dorsal-ventral view



https://www.pictorem.com/705783/Horse%20Skull%20Showing%20Embedded%20Teeth.html

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Dorsal-ventral view

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Offset mandible DV views

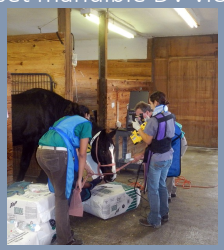

Photo courtesy Dr. Bob Baratt

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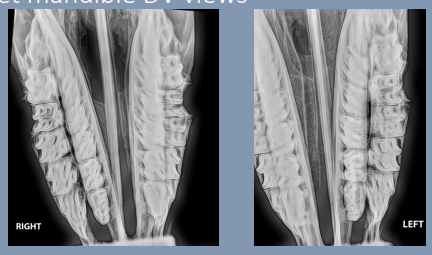
Offset mandible DV views



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Open mouth views (4)

- RtD-LeVO and LeD-RtVO
- RtV-Le DO and LeV-Rt DO

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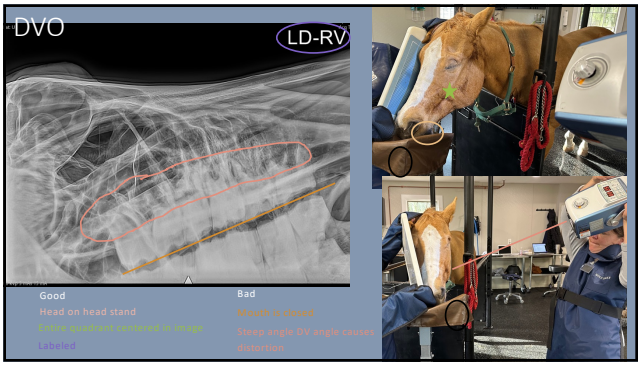
DVO



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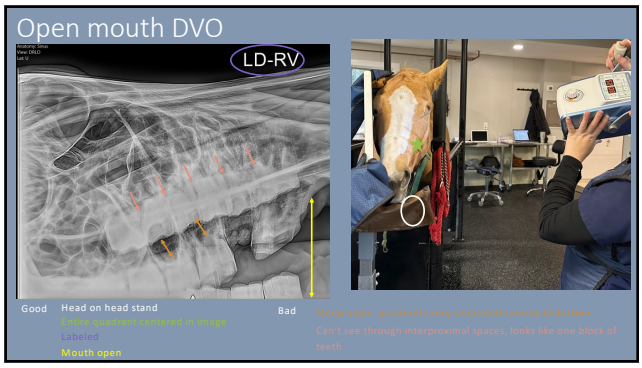
Open mouth DVO
LD-RV
Good
Head on head stand
Entire quadrant centered in image
Labeled
Mouth open
Bad
Steep angle, quadrants very separated causing distortion
Can't see through interproximal spaces, looks like one block of teeth

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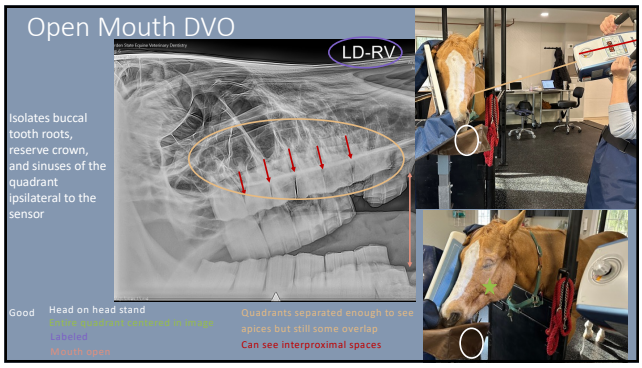
Open Mouth DVO
LD-RV
Isolates buccal tooth roots, reserve crown, and sinuses of the quadrant ipsilateral to the sensor
Good
Head on head stand
Entire quadrant centered in image
Labeled
Mouth open
Quadrants separated enough to see apices but still some overlap
Can see interproximal spaces

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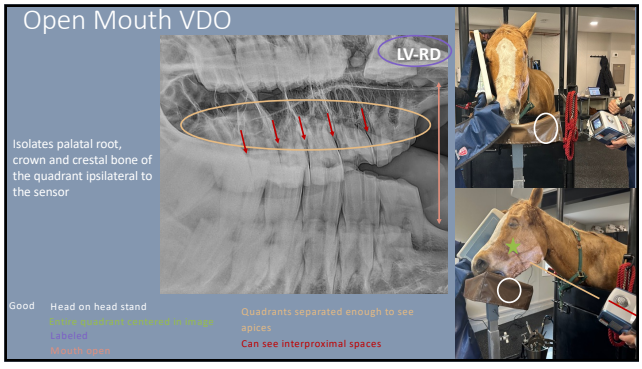
Open Mouth VDO
LV-RD
Isolates palatal root, crown and crestal bone of the quadrant ipsilateral to the sensor
Good
Head on head stand
Entire quadrant centered in image
Labeled
Mouth open
Quadrants separated enough to see apices
Can see interproximal spaces

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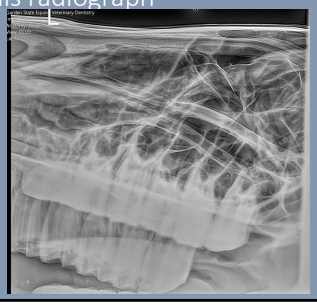
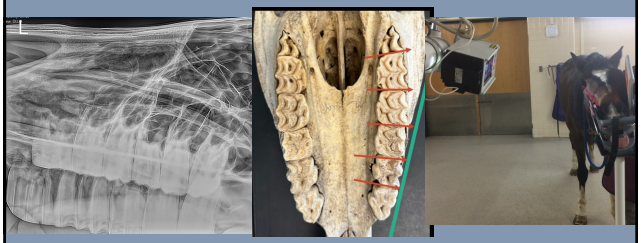
Critique this radiograph



25

Much better



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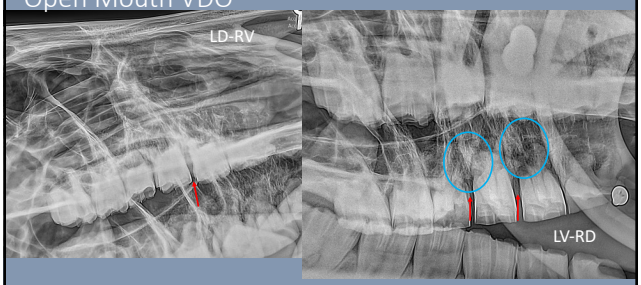
Open Mouth VDO



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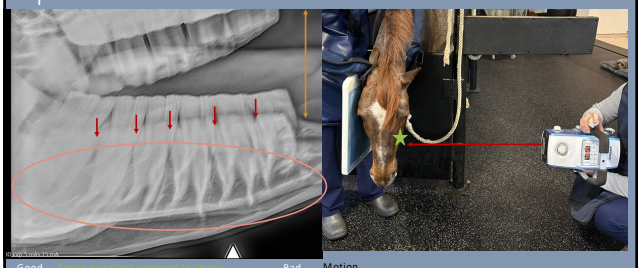
Open mouth VDO



Good
Entire quadrant centered in image
Mouth is open

Bad
Motion
Not labeled
Not enough obliquity to isolate apices
Can't see interproximal spaces

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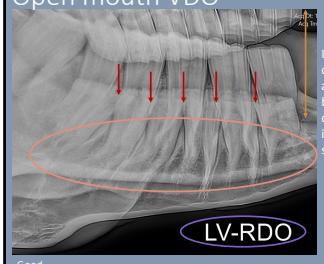
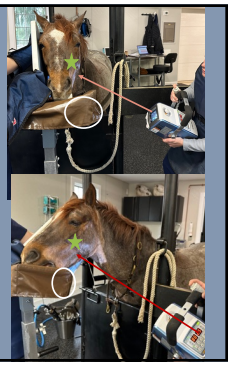
Open mouth VDO



Isolates reserve crown, roots, and peri-apical bone of the quadrant ipsilateral to the sensor

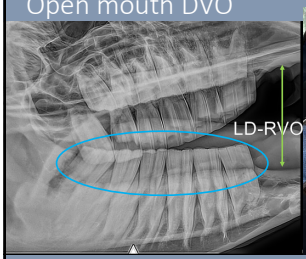


Good
Entire quadrant centered in image
Mouth is open
No motion

Labeled
Enough obliquity to isolate apices
Can see interproximal spaces

29

Open mouth DVO



Isolates crown/ reserve crown/ crestal bone of the quadrant ipsilateral to the sensor

Tail to tail
About 30 degrees D-V
Mouth must be open

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Critique this radiograph

31

Much better

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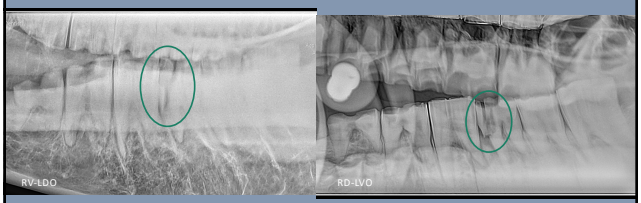
Open mouth DVO



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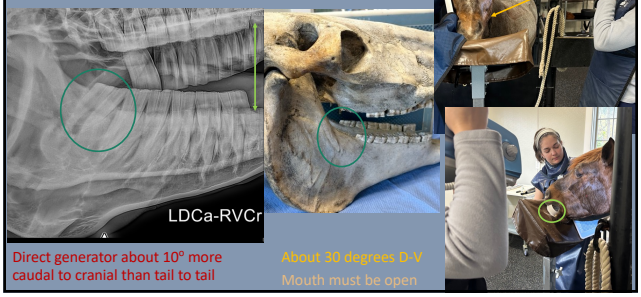
Supplemental view of the mandibular 11



Direct generator about 10° more caudal to cranial than tail to tail

About 30 degrees D-V
Mouth must be open

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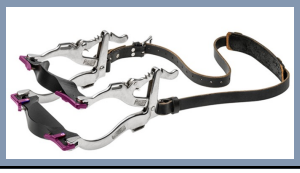
Incisors and canine teeth

- Intra-oral views for all incisors
- Intra-oral and extra-oral views for canine teeth
- Adequate sedation required to prevent chewing
- Can use aluminum speculum, PVC speculum bite plates or wedge speculum to prevent biting sensor



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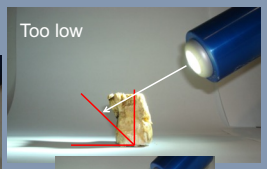
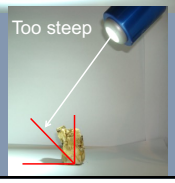
Bisecting Angle





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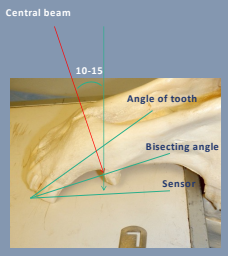
Bisecting Angle



- Start with the central beam perpendicular to the plane of the sensor
- Shift rostrally 10-15 degrees

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Intra-oral incisor views

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Intra-oral maxillary incisor views

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Intra-oral incisor views

With mandibular incisors, can usually just be perpendicular to the sensor with the x-ray beam

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Intra-oral mandibular incisor views

R

L

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Extraoral canine views

Mouth is open, aiming the beam slightly VCa-DCrO for maxillary canines and DCa-VCrO for mandibular canines

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Extraoral canine views

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Oral exam findings and history

- What are structure are we focused on (but don't get blinders)
- Serial radiographs can be helpful to look for change/ trends

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Interpreting dental radiographs

- Oral exam findings and history
- Anatomical and developmental pathologies
- Periodontal status
- Endodontic status
- Other

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Anatomical and developmental pathologies

- Correct number of teeth
- Correct occlusion
  - Malocclusions
  - Retained or impacted teeth
- Correct size and shape of teeth

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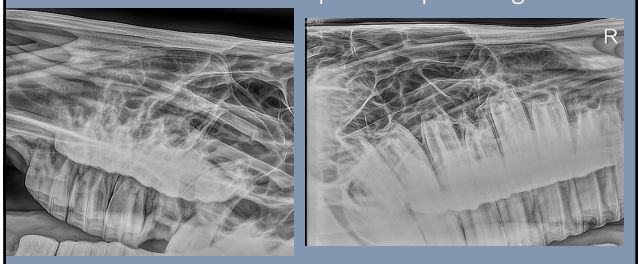
Anatomical and developmental pathologies



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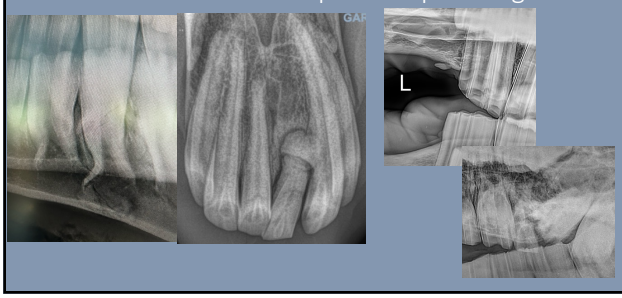
Anatomical and developmental pathologies



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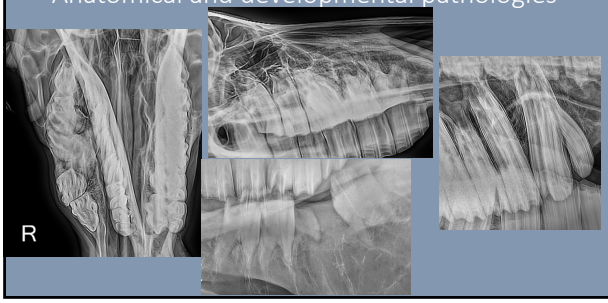
Anatomical and developmental pathologies



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Periodontal status

- Periodontal ligament widening
- Vertical or horizontal bone loss
- Periodontal-endodontic lesions

Normal (PD0):

Clinically normal; gingival inflammation or periodontitis is not clinically evident.

Stage 1 (PD1):

Gingivitis only without attachment loss; the height and architecture of the alveolar margin are normal.

Stage 2 (PD2):

Early periodontitis; less than 25% of attachment loss or, at most, there is a stage 1 furcation involvement in multirooted teeth. There are early radiologic signs of periodontitis. The loss of periodontal attachment is less than 25% as measured either by probing of the clinical attachment level, or radiographic determination of the distance of the alveolar margin from the cementoenamel junction relative to the length of the root.

Stage 3 (PD3):

Moderate periodontitis – 25-50% of attachment loss as measured either by probing of the clinical attachment level, radiographic determination of the distance of the alveolar margin from the cementoenamel junction relative to the length of the root, or there is a stage 2 furcation involvement in multirooted teeth.

Stage 4 (PD4):

Advanced periodontitis; more than 50% of attachment loss as measured either by probing of the clinical attachment level, or radiographic determination of the distance of the alveolar margin from the cementoenamel junction relative to the length of the root, or there is a stage 3 furcation involvement in multirooted teeth.

Reference: Wolf HF, Rateitschak EM, Rateitschak KH et al. Color atlas of dental medicine: periodontology. 3rd ed. Stuttgart: Georg Thieme Verlag, 2005.

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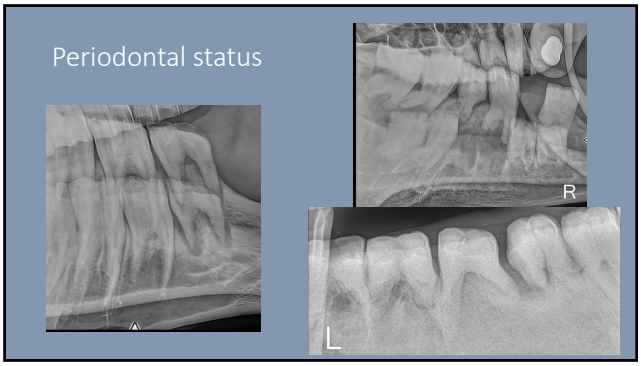
Periodontal status



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Endodontic status

- Pathology to pulp canal
- Tooth fracture/ crown lucency
- Tooth resorption/ hypercementosis
- Failure to narrow/ pulp stones
- Apical changes
- Abnormalities of the lamina dura

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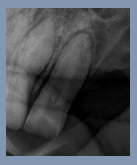
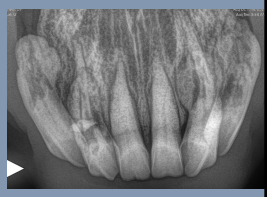
Endodontic status

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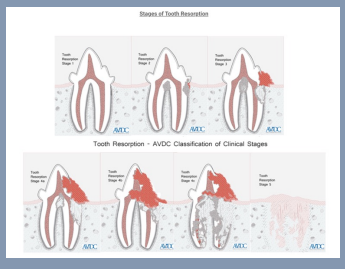
Endodontic status



https://avdc.org/avdc-nomenclature/

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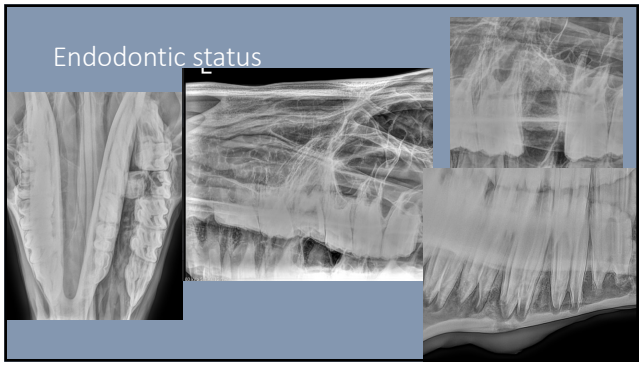
Endodontic status



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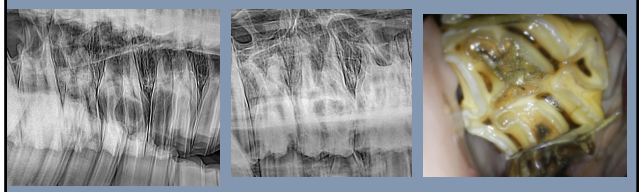
Endodontic status



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Other pathologies

- Bone fracture
- Sinonasal disease
- Neoplasia
- Cysts

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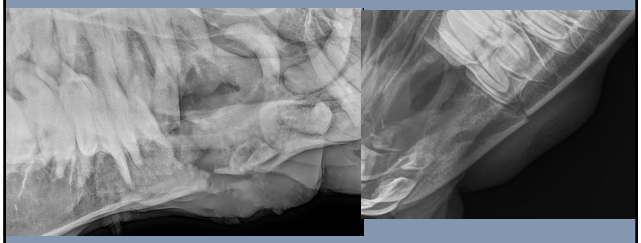
Other pathologies



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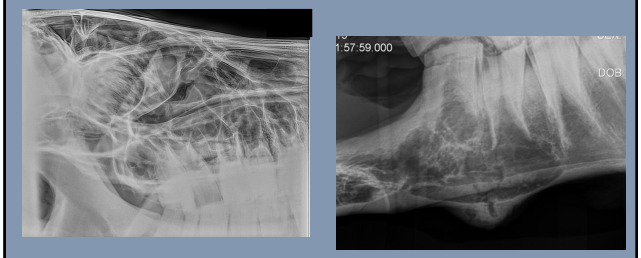
Other pathologies



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Summary

- Dental radiology
  - Correct positioning key- may take a few tries to get right
  - Always take left and right
  - Open mouth views are the new diagnostic standard

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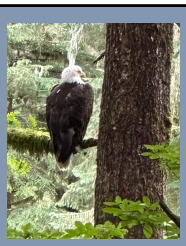
Questions?



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