



Animal Dentistry
& Oral Surgery

Dental Radiograph Interpretation



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Goal:

To be able to make a confident treatment decision for each tooth, on the basis of gross observations and radiographic findings.

Today's plan:

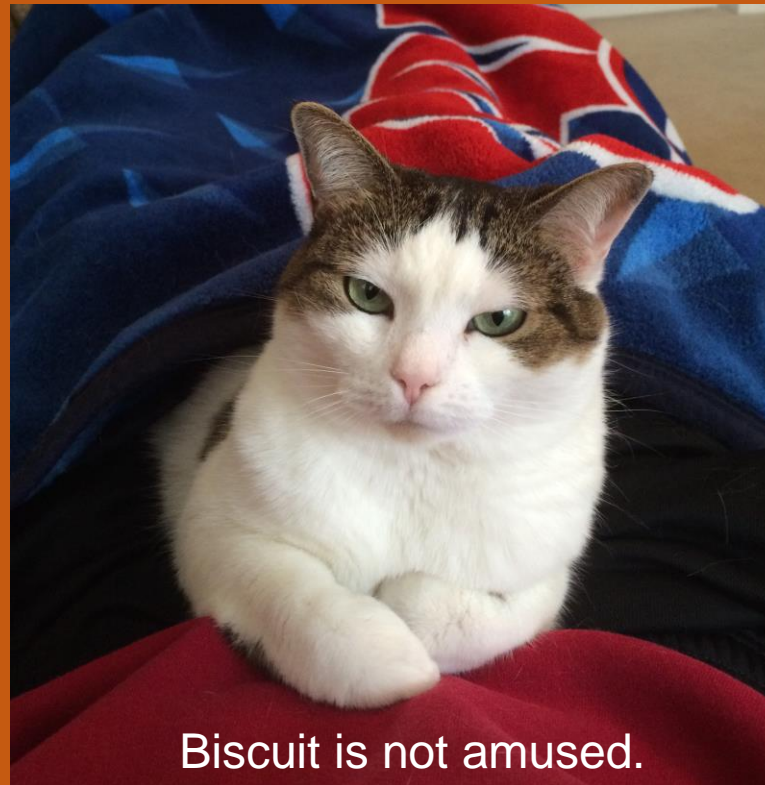
I. Normal radiographic anatomy

II. Radiographic Pathology

III. Notes on “missing” teeth (oligodontia)

IV. Notes on grossly normal teeth

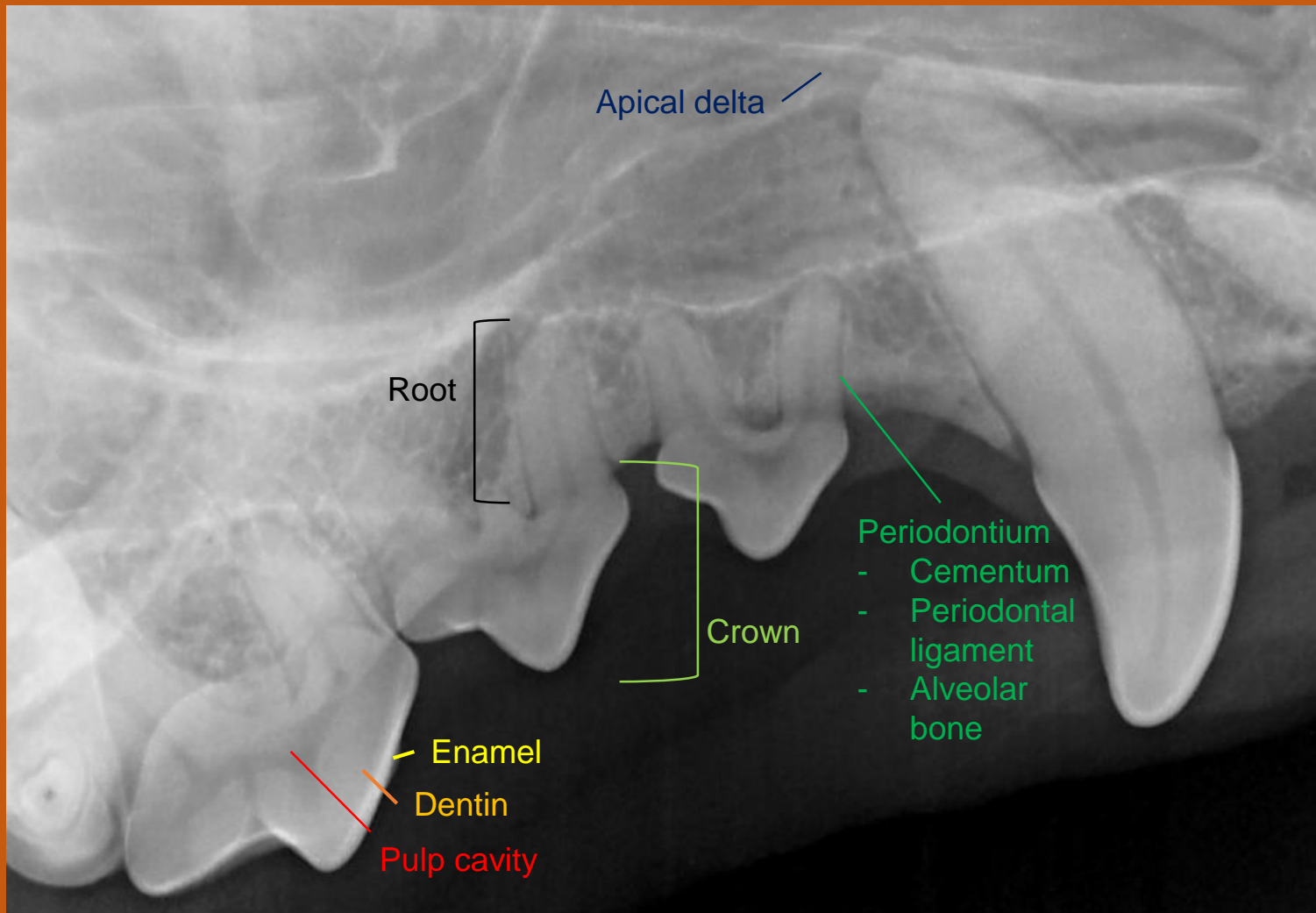
V. What's new at ADOS?!



Biscuit is not amused.



I. Normal Radiographic Anatomy





II. Radiographic Pathology–*Periodontal Disease*



Periodontium: The support structure of the tooth, including the cementum, periodontal ligament, alveolar bone, gingiva, and gingival sulcus



Periodontal Disease – Stage I



- Defined by gingivitis
- While many factors mediate the severity and progression of gingivitis, the cause is bacterial plaque
- With Stage I periodontitis, there is no bone loss, so radiographs can appear normal
- Treatment?



Periodontal Disease – Stage II



- Defined by bone loss of <25%
- The progression to stage II and beyond is very individualized, true for humans as well
- It is more common and more rapid in small breed dogs, older patients, and patients with conditions that have created crowded teeth
- Treatment for a 13 yr Lab?
 - For a 3 yr Maltese?



Periodontal Disease – Stage III



- Defined by bone loss of 25-50%
- Periodontitis is often not grossly evident
- At stage II-III, can see furcation exposure
 - Treatment for FE
 - Stages FE 1-3
- Treatment for this second premolar?
 - For focal stage III perio at the distal aspect of a mandibular first molar?



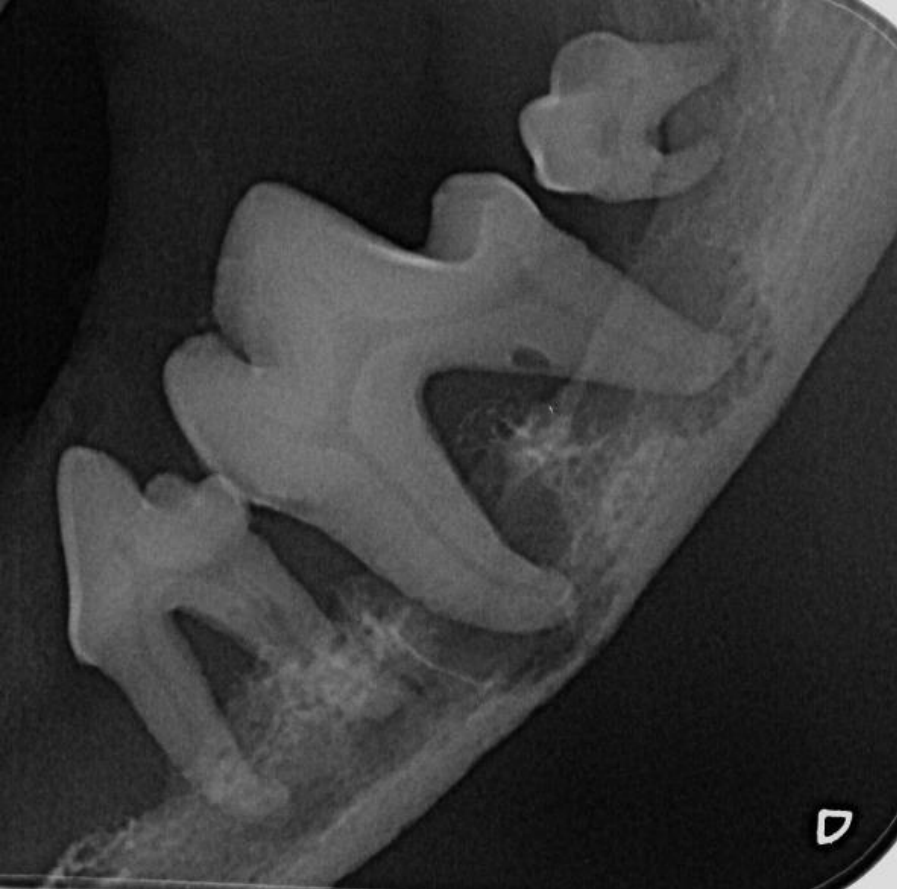
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Periodontal Disease – Stage IV



- Defined by bone loss of $>50\%$
- Best treatment choice is usually extraction
 - If not extracted, this lesion will continue to progress...
- If a tooth is abnormally mobile, it has stage IV perio
- Not all stage IV teeth are mobile!



Periodontal Disease – Stage IV



- *General* periodontal indications for extraction:
 - Stage IV perio
 - Grade 3 FE
 - Most stage III perio
 - All periapical abscesses that are due to periodontal disease



Periodontal Disease – Pathologic fracture



- A sequela of stage IV perio
- Also a useful explanation for recommending extraction
- Treatment for that photo?
- Treatment for the ensuing fracture?



Tooth Resorption—Type 1



- Odontoclastic in nature, cause otherwise unknown
- Type 1 TR originates at the crown or at the gingival margin
- Normal periodontal ligament remains
- Commonly seen at feline premolars and molars
- The first affected tooth is usually the mandibular 3rd premolar (307/407)
- Treatment?



Tooth Resorption—Type 2



- Odontoclastic in nature, cause otherwise unknown
- Type 2 TR originates in the root, obliterating the periodontal ligament
- Often seen in cat canines, especially mandibular
- Treatment?



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Tooth Resorption Exercise!





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Tooth Resorption Exercise!





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Tooth Resorption Exercise!





Endodontic Disease—Tooth Fractures



- Complicated tooth fracture
- An open pulp cavity is generally infected by oral bacteria about 2 hours after fracture
- Left untreated, that infection naturally will progress to the apex of the tooth and continue to destroy periapical bone
- Must be treated
- Treatment options?



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- Treatment:
 - Root canal therapy
 - Extraction
 - Vital pulp therapy



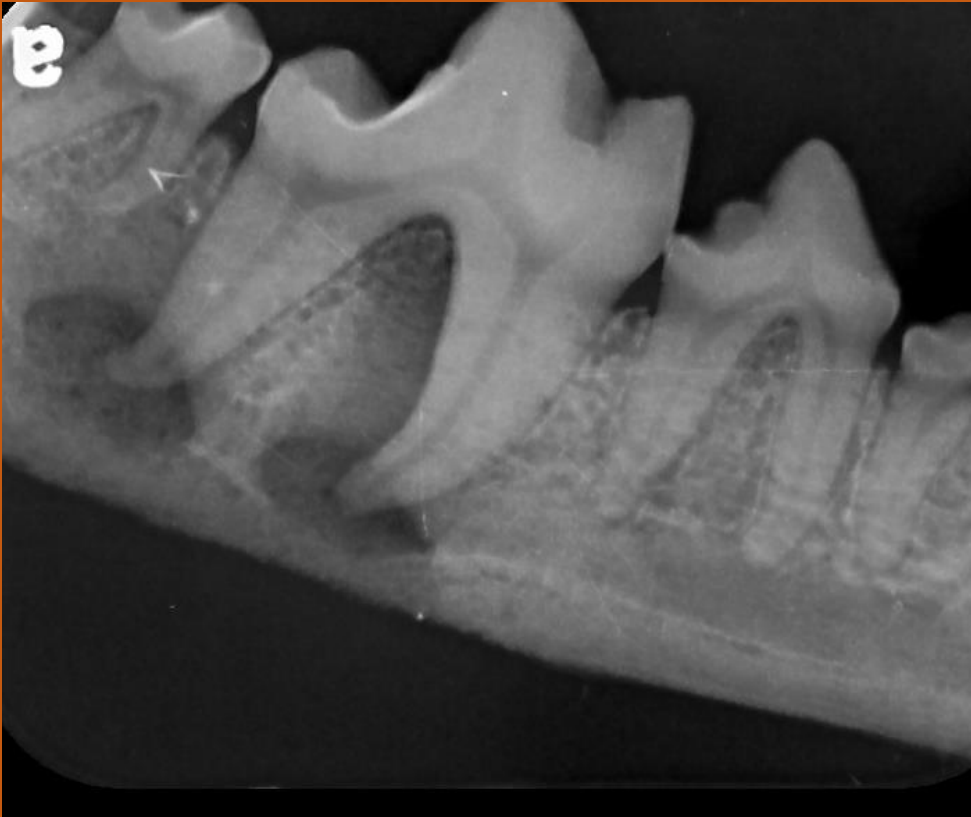
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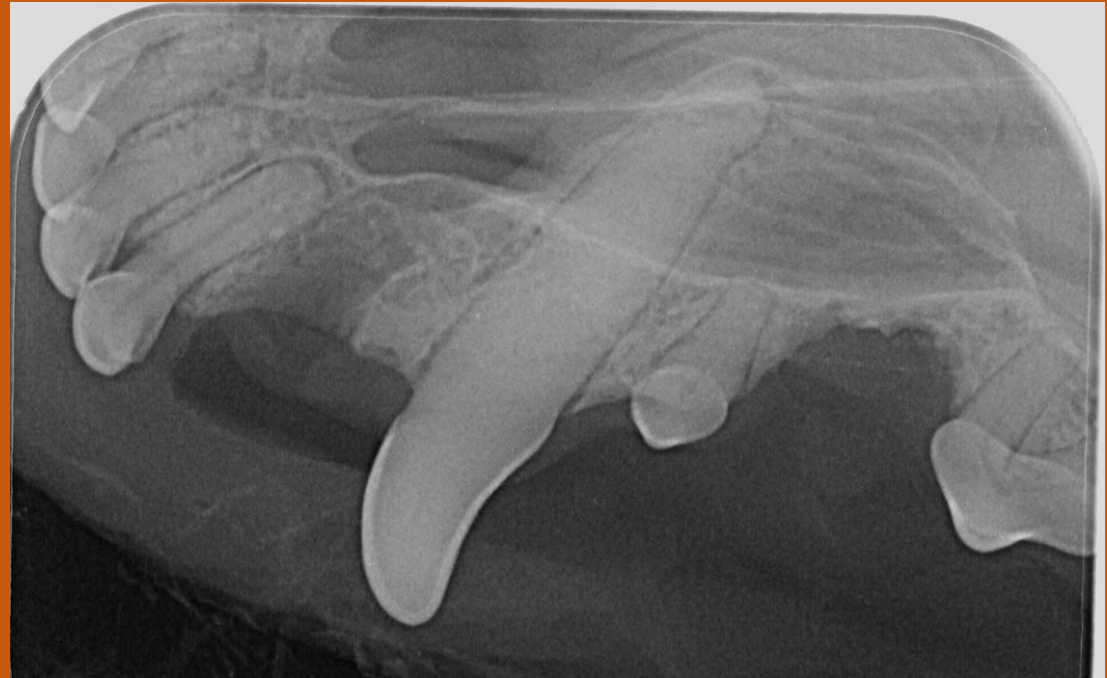
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Endodontic Disease—Tooth Fractures



- Contraindications for RCT:
 - Large or draining periapical abscess
 - Stenotic canal





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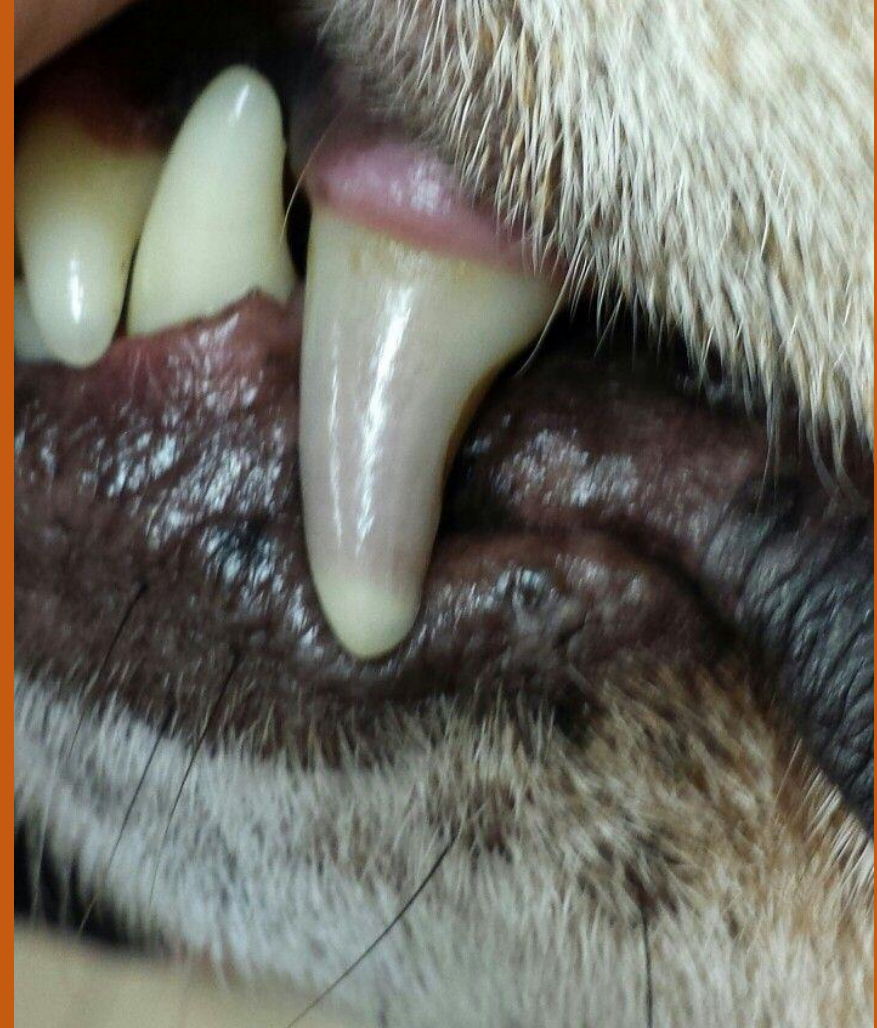
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Endodontic Disease—Non-vital Tooth

- Over 92% of teeth discolored in any shade of tan, pink, purple or grey are non-vital.
- Half of these will have no radiographic abnormality.
- **Discolored teeth need root canal (if radiographic and periodontal candidates) or extraction.**
- Necrotic pulp acts as a nidus for inflammation
→ periapical granuloma





Endodontic Disease—Non-vital Tooth

- Widened pulp cavity:
 - At a young age, the pulp cavity occupies almost the entire tooth.
 - The function of pulp is to produce dentin.
 - As this dentin deposition occurs, the pulp cavity naturally narrows as life progresses.
 - A “widened pulp cavity” on radiographs is visual confirmation that this normal process was stopped long ago (the pulp has died).





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Periapical abscess



- Often seen as a swelling rostral to the eye (when affecting the maxillary PM4)
- That swelling is a PM4 abscess unless proven otherwise--dental imaging and surgical extraction are indicated
- Periapical disease can occur via a periodontal pathway or an endodontic pathway
- Sometimes an obvious cause is not found



Periapical abscess—Maxillary PM4 (108/208)



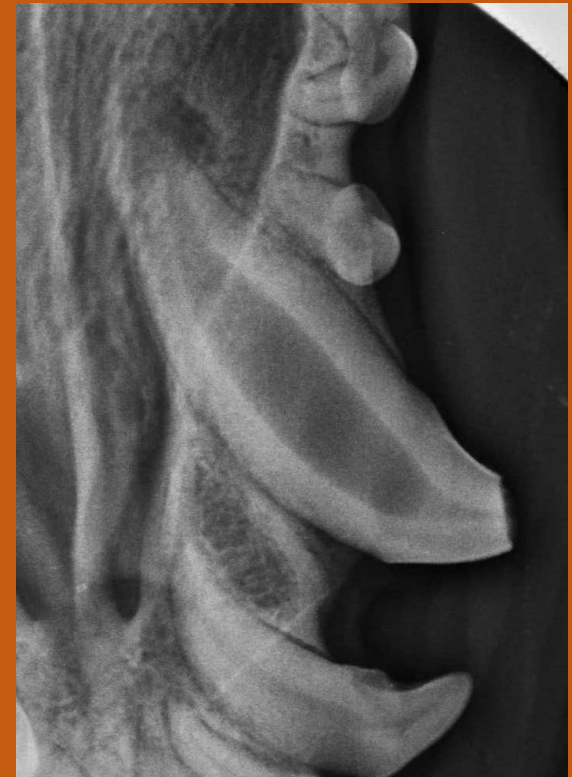
- When a focal swelling is seen on the muzzle:
- First step is to just look at the teeth
- If PM4, you'll usually (not always) see a fracture or significant perio
- On other teeth, often can see it as a parulis (draining tract)
- What are your findings on this radiograph of the previously pictured dog?



Periapical abscess

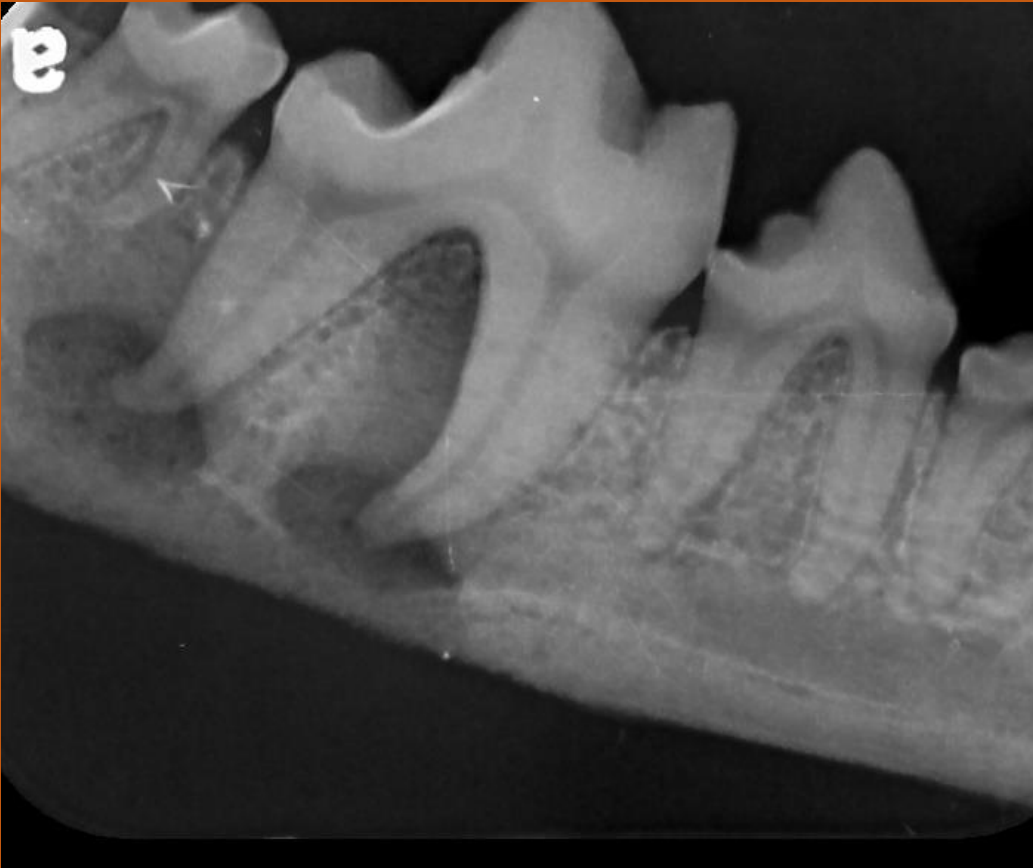


- When in doubt, very helpful to look at the contralateral rad in that particular patient





Periapical abscess—Parulis



- You will generally be able to probe through the parulis to the bone
- Radiograph with gutta percha point if you need further verification





Periapical abscess



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- Radiograph with gutta percha point if you need further verification





Early periapical abscess diagnosis



- What if the abscess is not so dramatically obvious?
- Q: How do you know when a periapical lucency is indicative of disease?
- A: By experience with normal and abnormal over a wide variety of survey dental radiographs.

Your diagnosis and treatment?



Early periapical abscess diagnosis



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Your diagnosis? → Chevron sign (the radiographic representation of the apical delta)



Early periapical abscess diagnosis

Your diagnosis and treatment?





Early periapical abscess diagnosis

Your diagnosis and treatment?

- Periapical lysis
- Apical root resorption
- Inadequate root canal obturation
- Tx: Extract (vs. consider retreatment)





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Early periapical abscess diagnosis

Your diagnosis and treatment?





Early periapical abscess diagnosis

Your diagnosis and treatment?

- Chevron sign 409 and 410
- No treatment indicated
- Crown fractures at 408 and 409
- Examine for complicated vs uncomplicated and treat accordingly





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Early periapical abscess diagnosis

Your diagnosis and treatment?





Early periapical abscess diagnosis

Your diagnosis?

- Stage IV periodontal disease 309
- Leading to periapical abscesses at both the mesial and distal roots
- Treatment: Extraction 309





Neoplasia—Radiology

- Oral masses require biopsy to diagnose
- However, there are common radiographic features of benignity vs malignancy

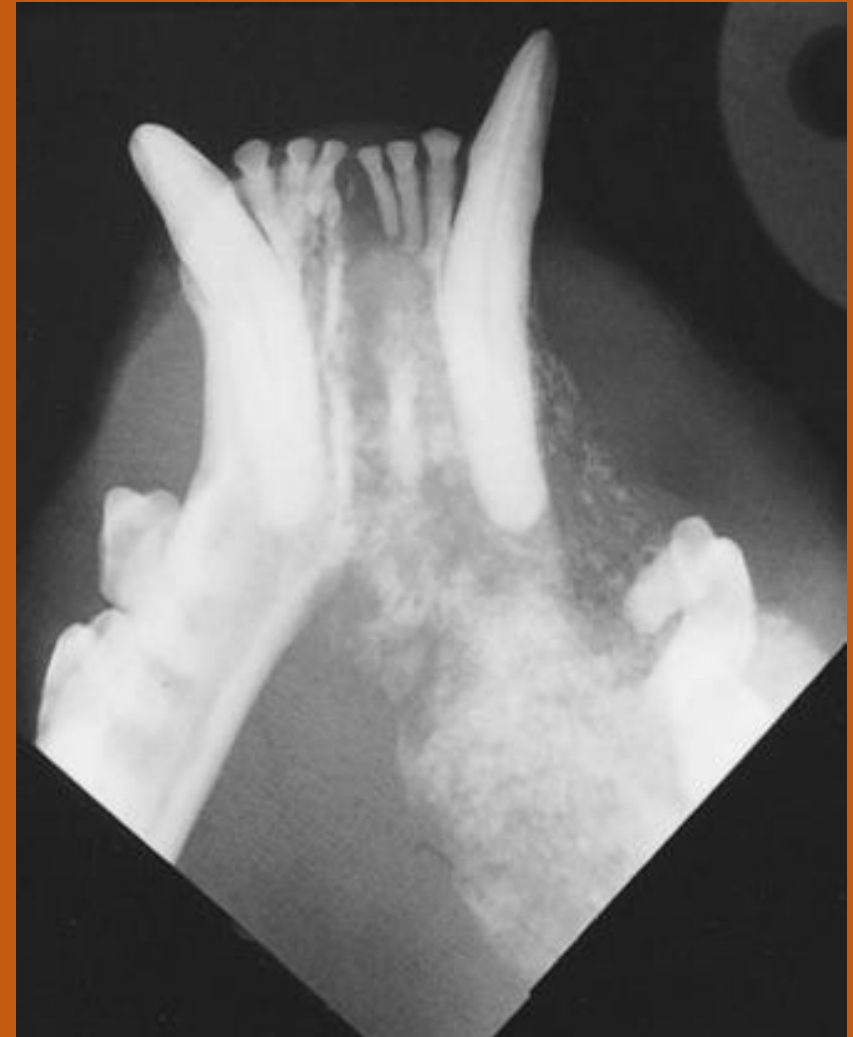


Peripheral odontogenic
fibroma (POF, formerly
“fibromatous epulis”)



Neoplasia—Radiology

- Features of benignity:
 - Mass pushes the teeth apart without destroying the anatomy
 - Some periosteal new bone might be seen
- Features of malignancy:
 - If mass is osseous, it blows through anatomy, creating abnormal appearance to bone, or just lysis or destruction of bone
 - May or may not destroy teeth

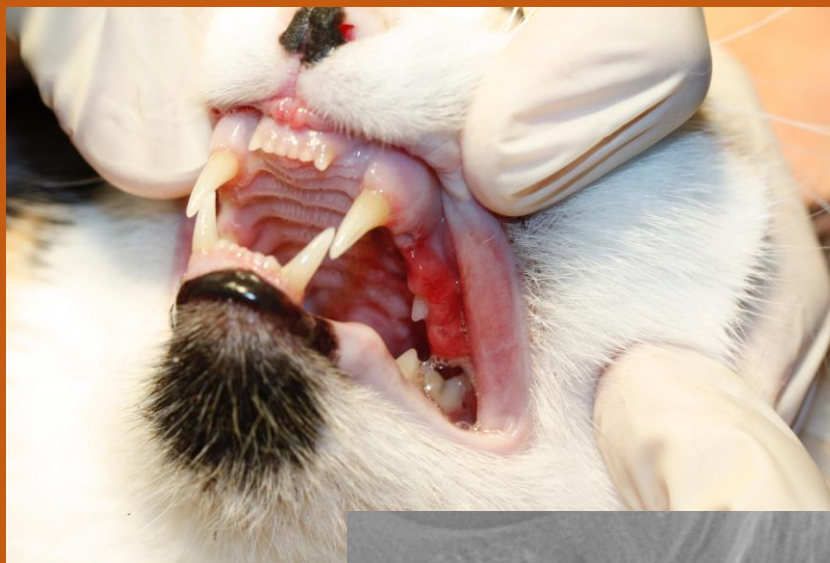
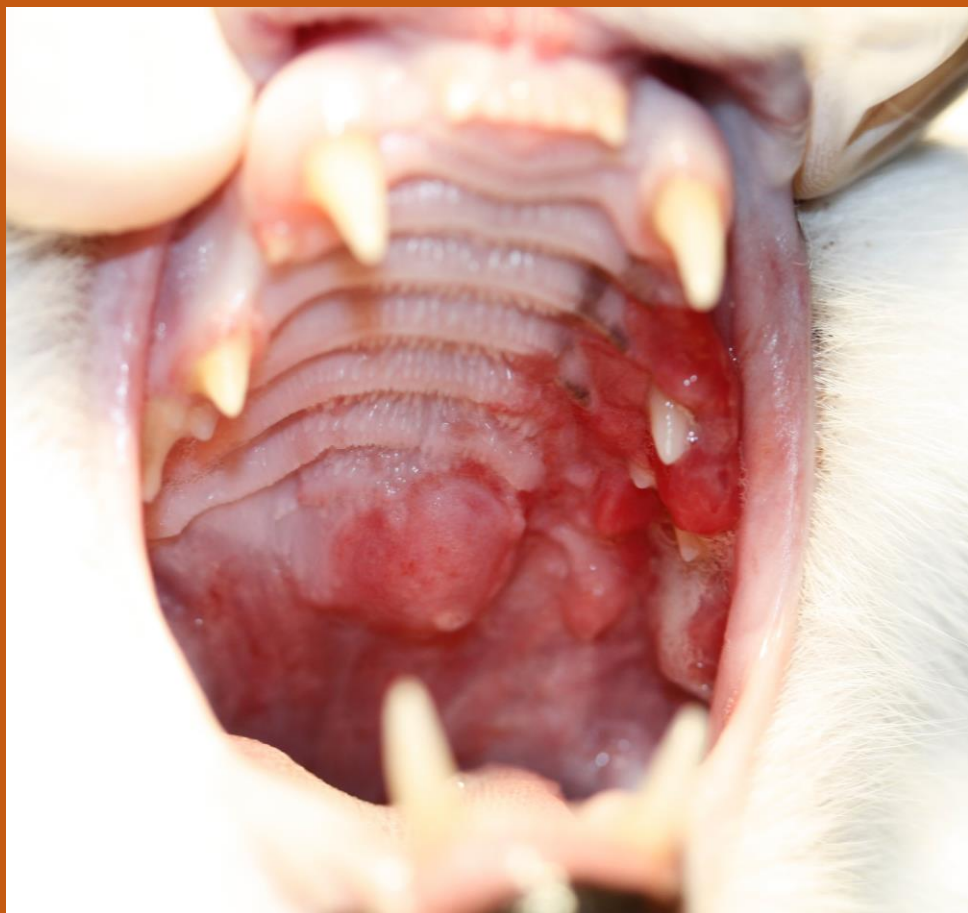


Feline oral squamous cell carcinoma



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Oral SCC





III. Missing teeth

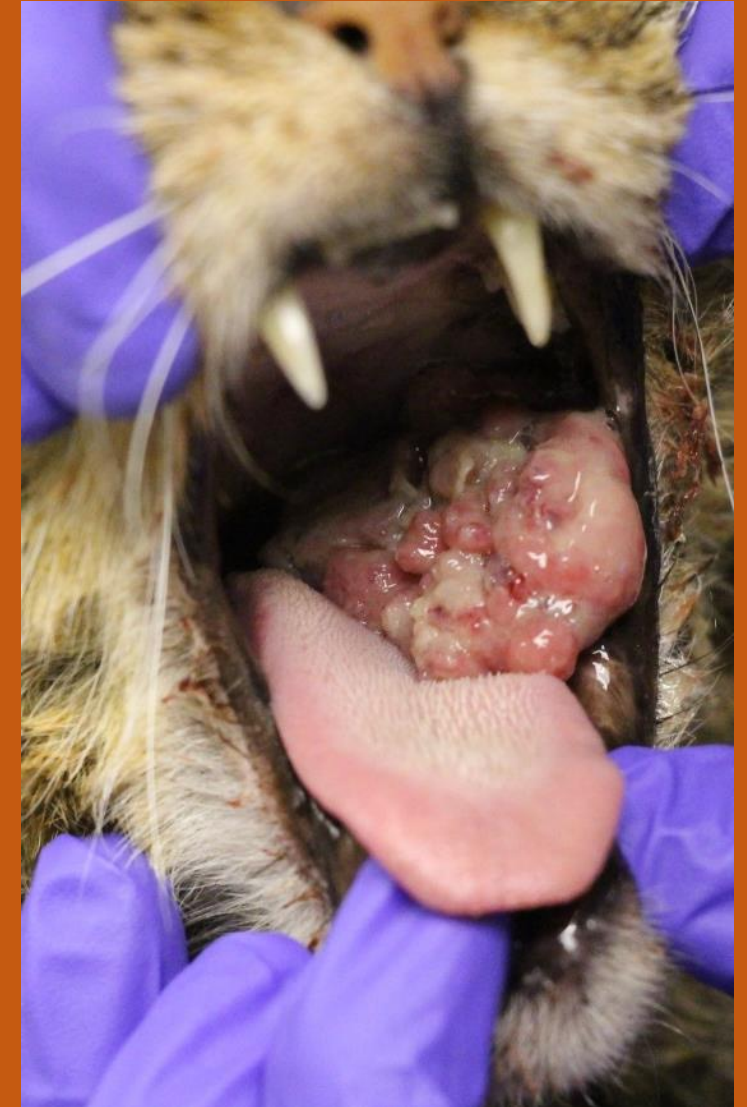
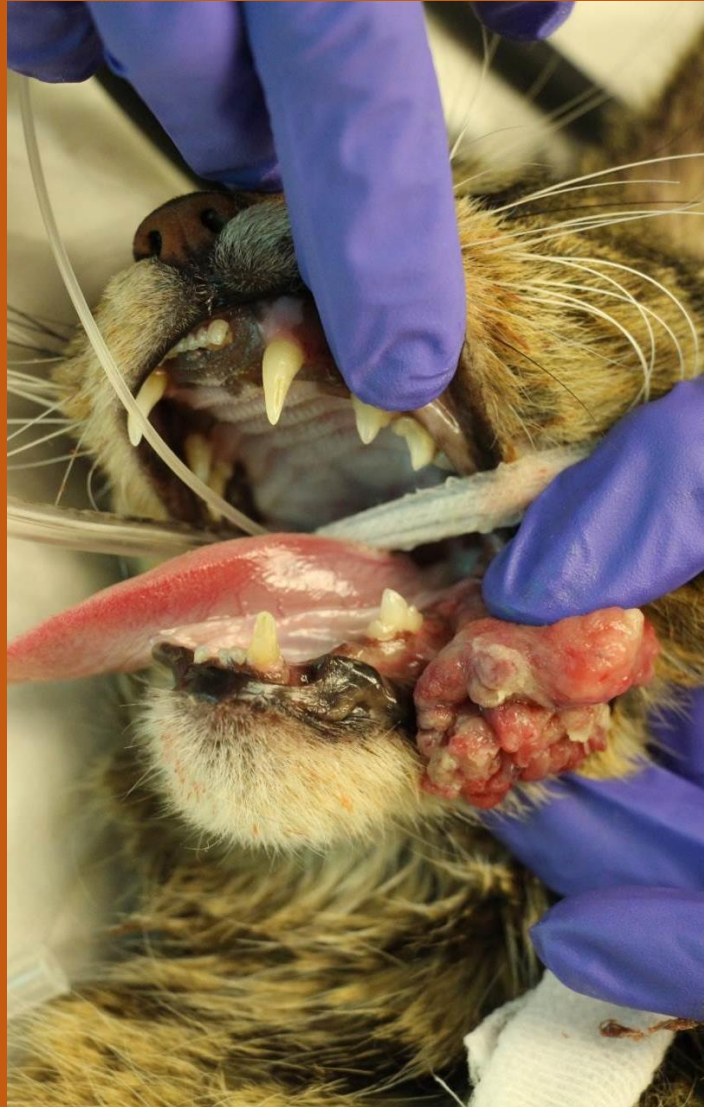
- Missing teeth need to be radiographed. Why?
 - Retained roots →
 - Impacted teeth
 - Dentigerous cysts





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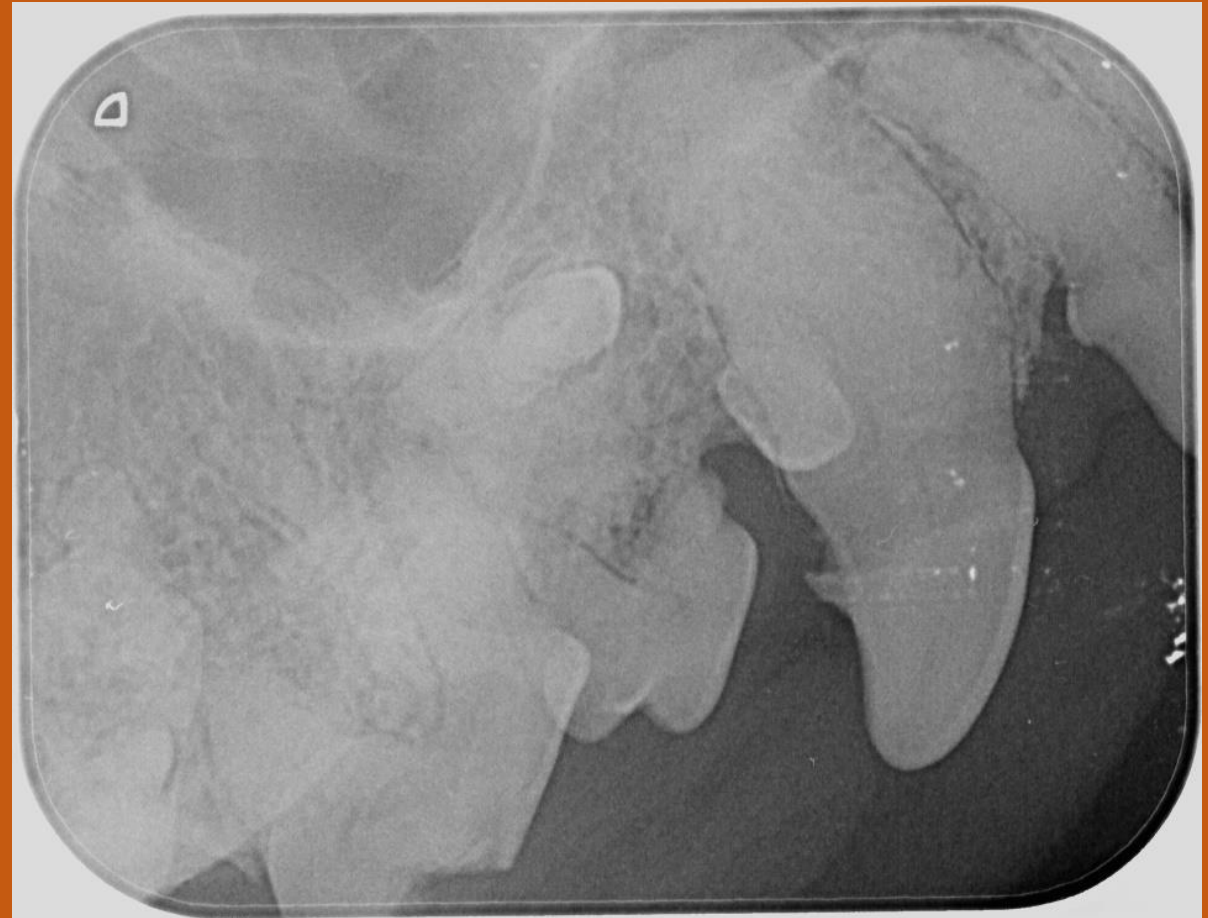
- Missing teeth need to be radiographed. Why?
 - Retained roots →
 - Patient was immunocompromised (14-yr diabetic)





III. Missing teeth

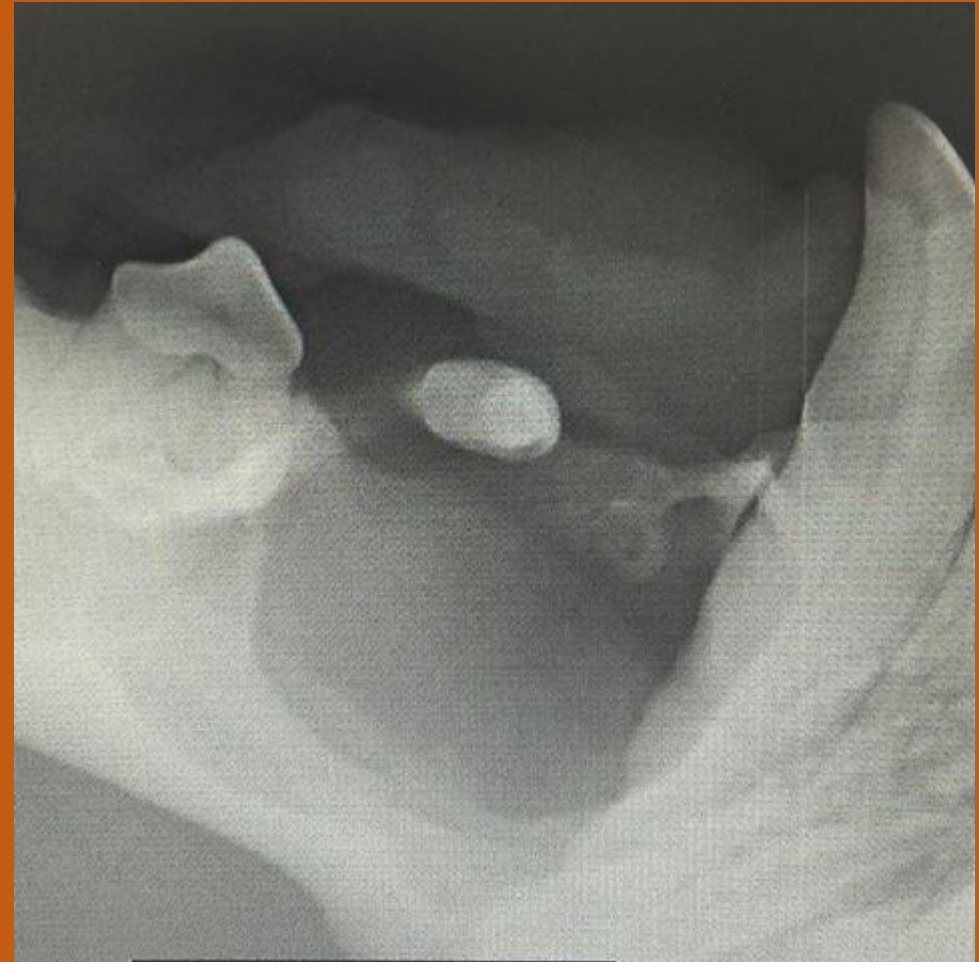
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III. Missing teeth

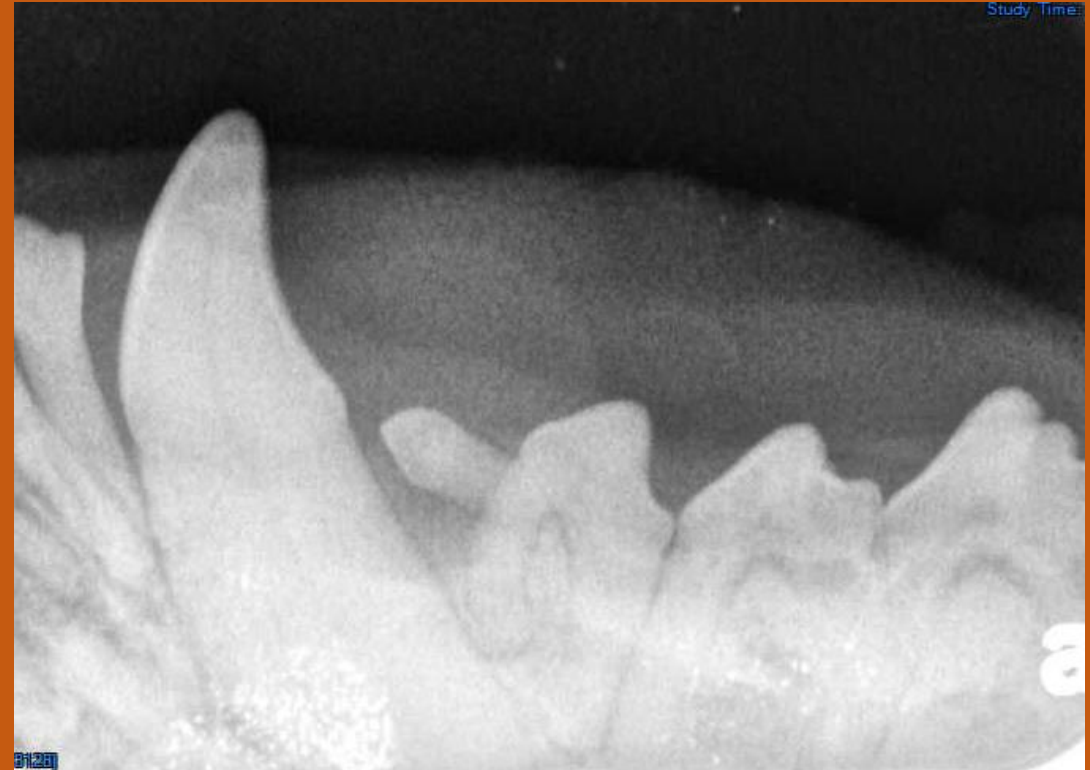
- Dentigerous cyst →
- Common sequela of impacted teeth, especially mandibular PM1
- Must be extracted and completely debrided to prevent recurrence
- Cyst epithelium and offending tooth are sent for histopathology to rule out neoplasia
- Rarely, these cysts can actually convert to SCC





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Diagnosis and Treatment?

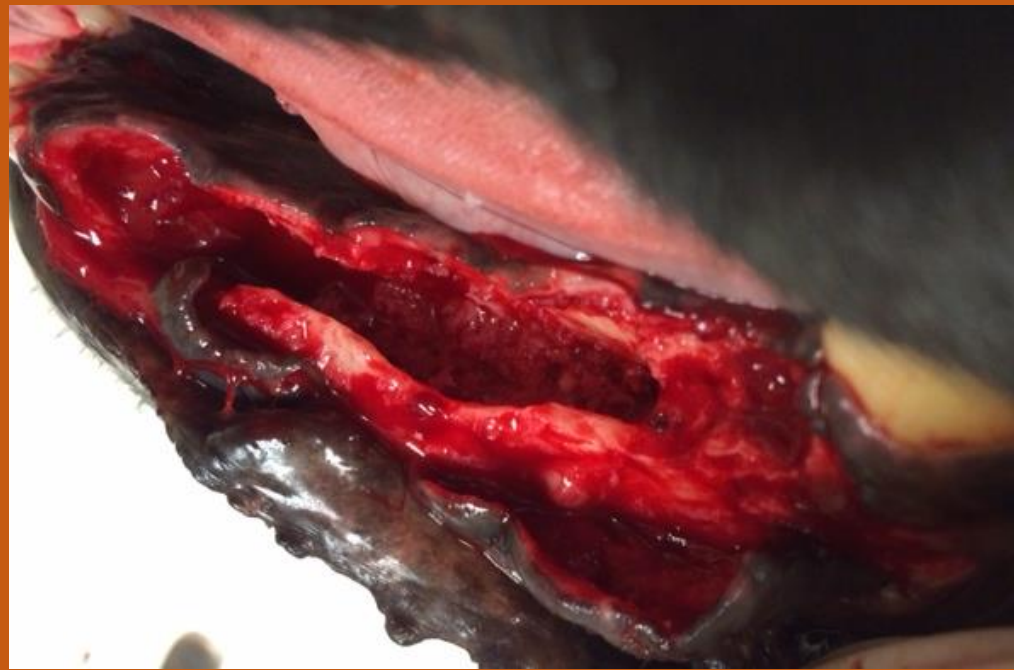
- A. Malignant neoplasia
- B. Dentigerous cyst
- C. Hyperparathyroidism
- D. Severe periodontal disease





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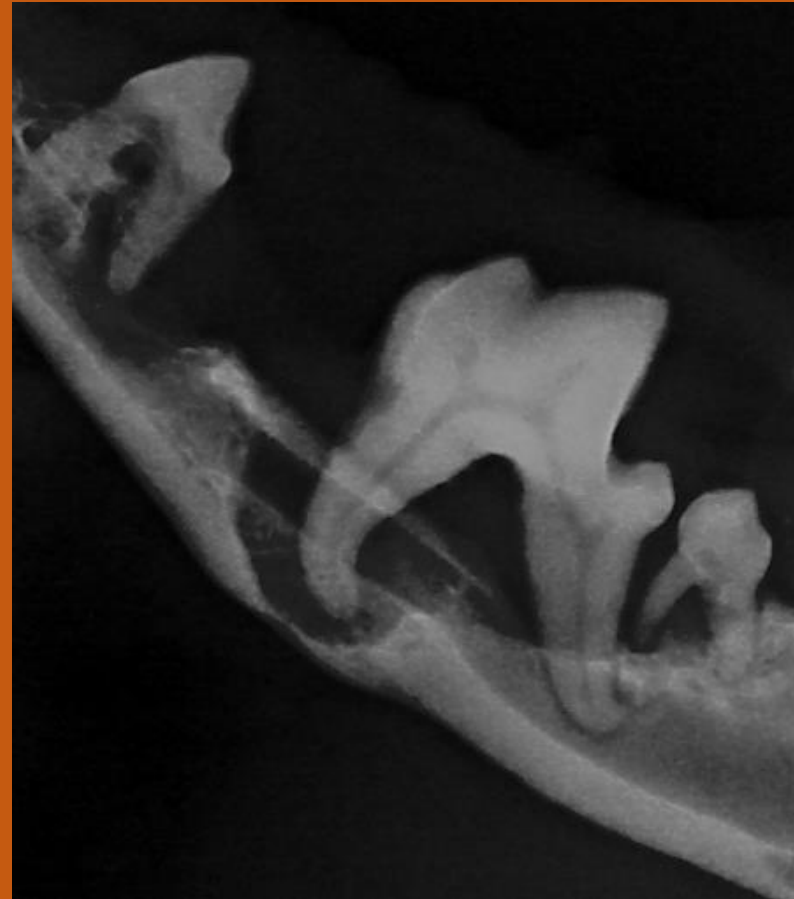
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- Tx: Extraction of impacted PM1 and all other affected teeth, complete debridement of cyst lining





The Importance of Survey Dental Radiography

- All teeth should be radiographed:
 - Periapical lucencies
 - Widened pulp canals
 - Other radicular or periapical pathology
 - Required before extraction! →
- All edentulous areas should be radiographed:
 - Retained roots
 - Impacted teeth
 - Dentigerous cysts





What's New at ADOS?

1. Dr. Raleigh ☺ as of July 2019
2. Cone-beam CT machine
 - Over twice as sensitive to bone loss as dental radiography
 - We can now routinely see 3D representations of our patients' pathology
 - Especially high resolution (1-mm slices) is perfect for differentiating oral structures
 - Brachycephalics
 - Polytrauma
 - Not good for soft tissue imaging





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Thank You!

- Symposium attendees
- CVCA and Bush Neurology
- Dr. Mary Buelow for some radiographs and photos
- My patients and their owners
- Want to visit ADOS? Email Kim at info@animaldentalspecialist.com

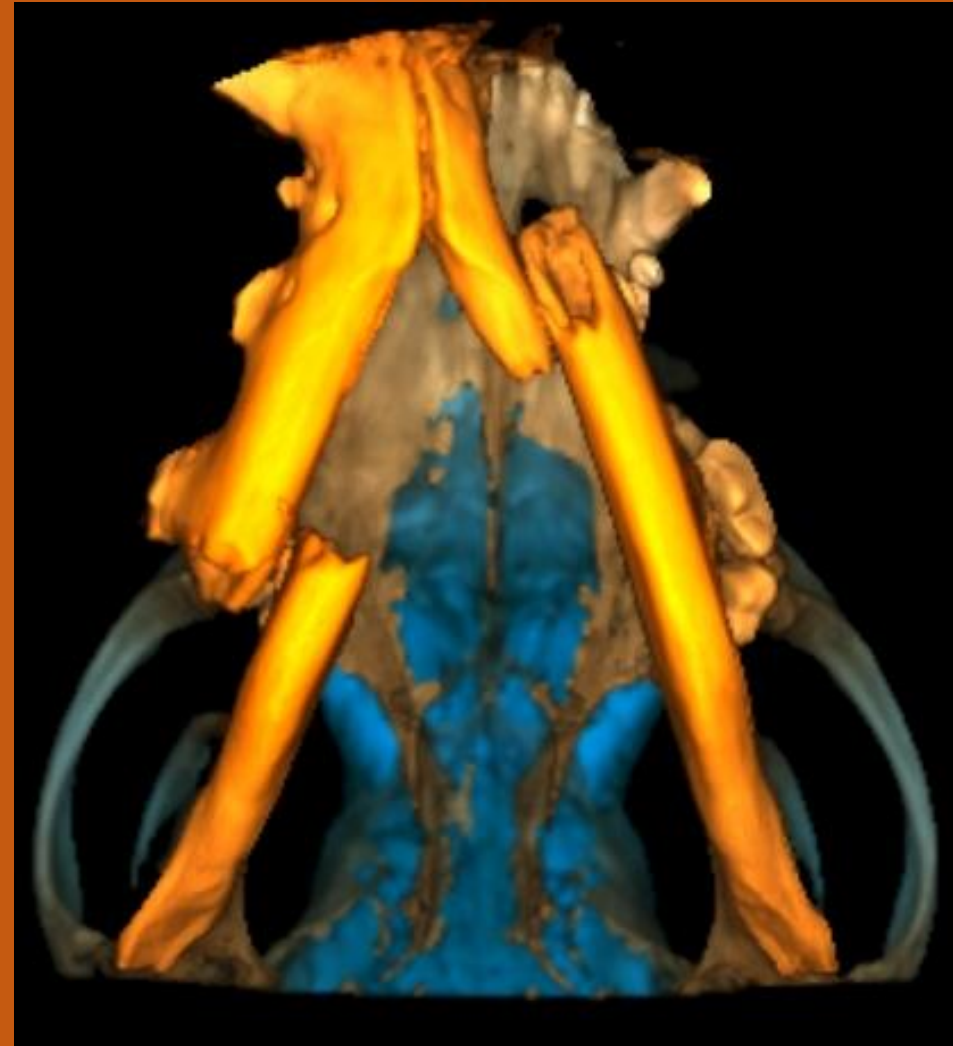


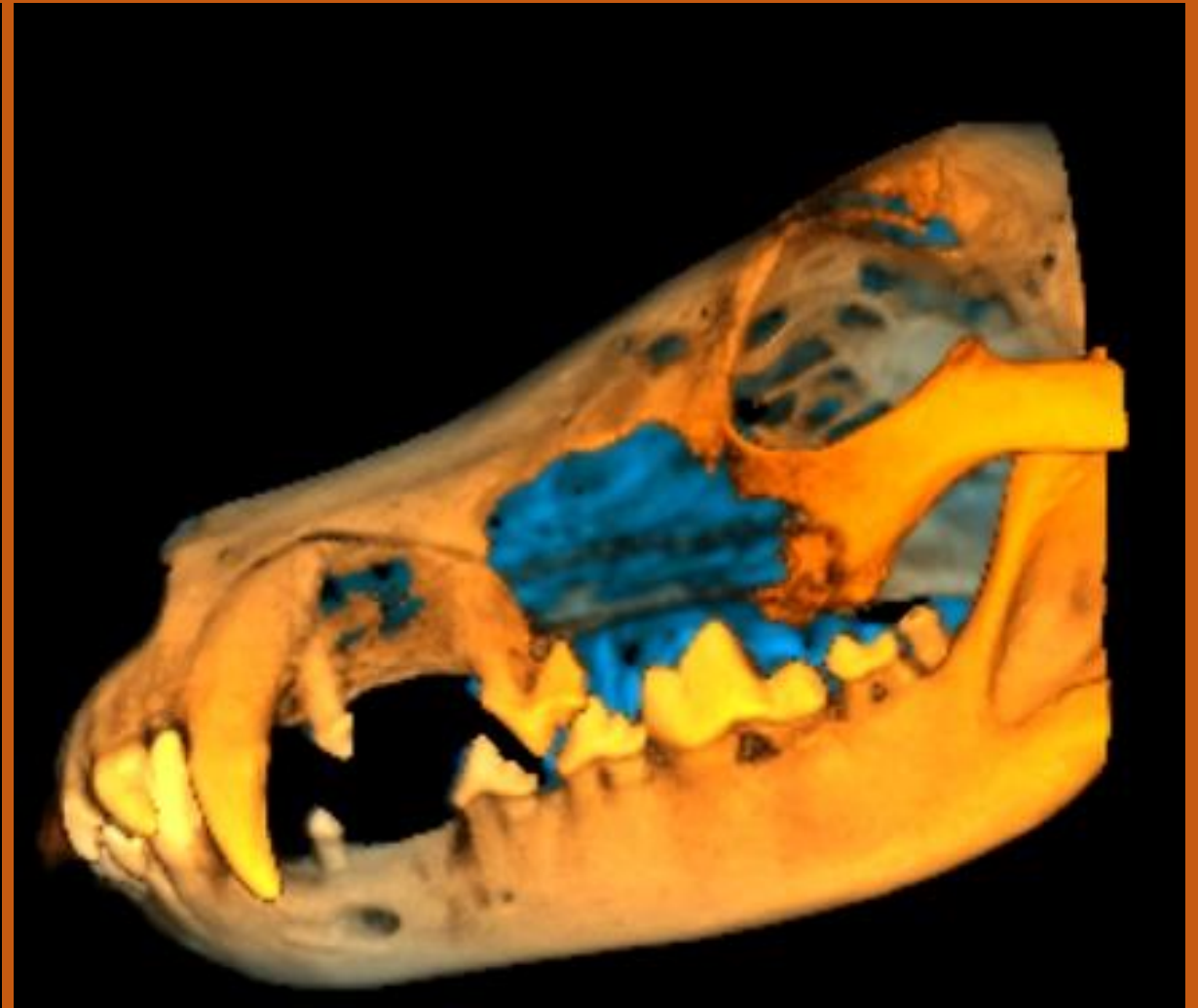
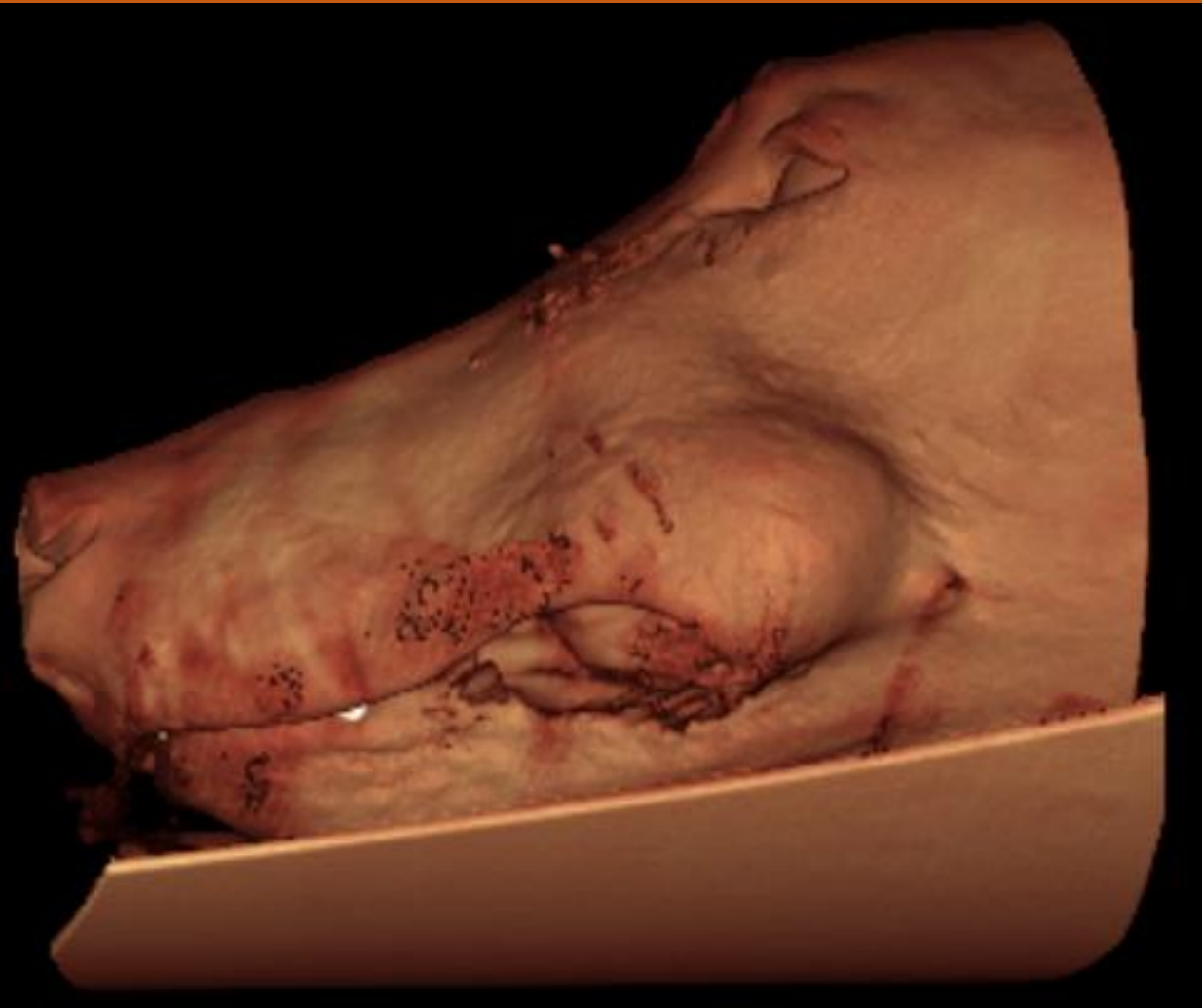


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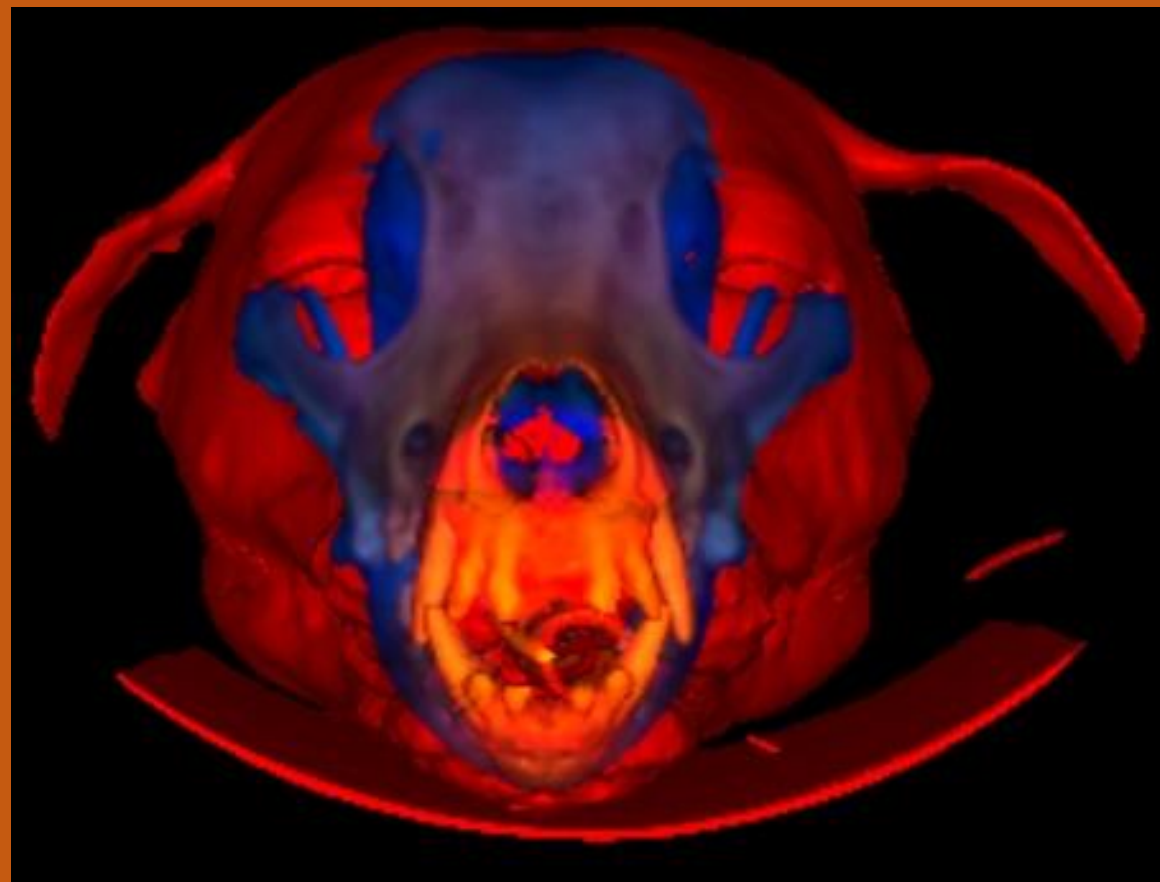
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About ADOS:

- Located in The LifeCentre:
Multiple specialty groups under one roof
- Ability to regularly consult with cardiologists, criticalists, surgeons, and internists



How ADOS is different:

- TEAM: Large team of licensed technicians, including specialists in dentistry and anesthesia.
- EQUIPMENT: Front line of cutting edge, proven technology (cbCT, piezoelectric surgery, bioceramics)
- CONTINUED LEARNING: We continually invest in CE for ourselves, our staff, and our referring veterinarian community, to ensure that we never stop raising the bar for patient care and comfort.