Penn
Veterinary Medicine

Oral pathology and dental radiography

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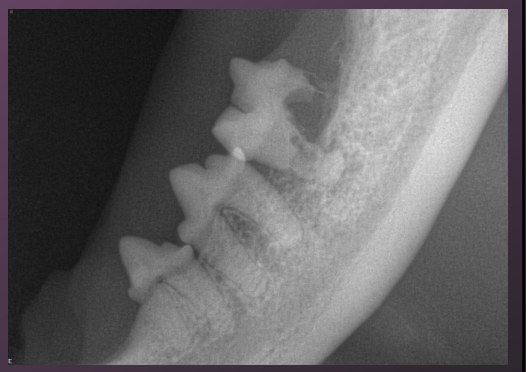


A
B
C
D

How many molars does a dog have?

- A: Maxillary: 2 Mandibular: 3
- B: Maxillary: 3 Mandibular: 2
- C: Maxillary: 2 Mandibular: 2
- D: Maxillary: 1 Mandibular:2

How many molars does a dog have?

- A: Maxillary: 2 Mandibular: 3
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- D: Maxillary: 1 Mandibular:2

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Outline

- Basics of oral pathology
  - Periodontal disease
  - Endodontic disease
  - Resorption
  - Oral tumors
- Radiograph interpretation of above pathologies
- Case examples
  - interactive

Dental Radiography is Recommended in Evaluation of:

- Tooth resorption
- Evaluation of periodontal disease
- Evaluation of nasal discharge
- Evaluation of endodontic disease including discolored teeth and facial swellings
- Evaluation of retained roots, missing teeth, abnormally located teeth & malformed teeth

Dental Radiography is Recommended in Evaluation of:

- Osteomyelitis
- Boney lysis secondary to neoplasia
- Metabolic bone disease
- Localization of cysts
- Traumatic injuries
- Legal ramifications

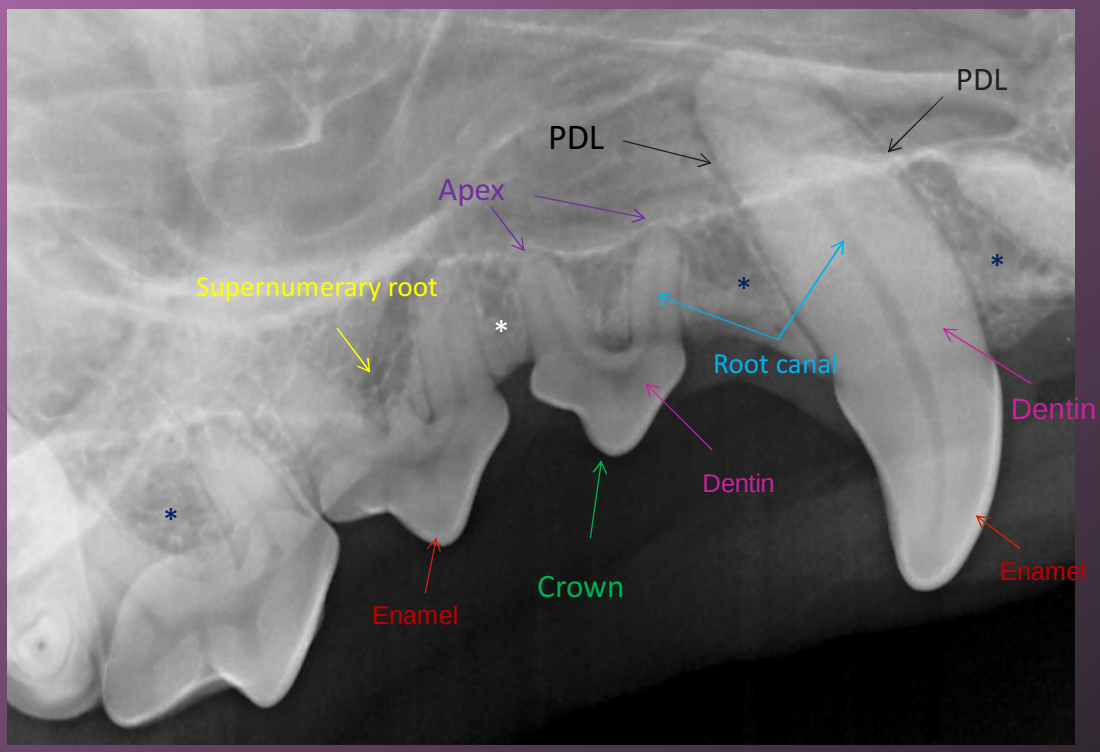
Dental radiography is essential for development of appropriate treatment plans!

Diagnostic Value of Full Mouth Dental Radiography in Dogs & Cats

- Previous reports show that the diagnostic yield of full mouth radiographs in feline and canine patients is high
- Routine full mouth radiography is justified
- These studies found that if disease existed, radiographs were clinically useful in 86.1% of cats and 72.6% of dogs in these studies

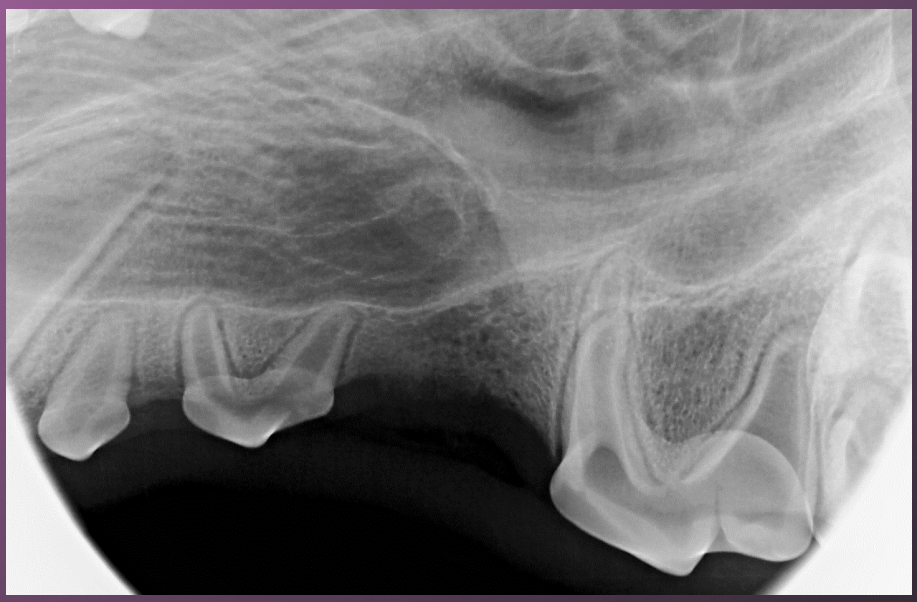
Verstraete FJ, Kass PH, Terpak CH. Diagnostic value of full-mouth Radiography in dogs. Am J Vet Res 1998:59(6):686-691.
Verstraete FJ, Kass PH, Terpak CH. Diagnostic value of full-mouth Radiography in cats. Am J Vet Res 1998:59(6):692-695.

Normal periodontal anatomy



* Alveolar bone

Based on these dental radiographs, is this patient young or old?



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Periodontal Disease

- One of most common disease processes in dogs and cats
- Increases with age and tends to be most severe in toy and small-breed dogs
- Certain breeds are at greater risk (greyhounds, poodles etc…)

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What are the 4 components of the periodontium?

- Gingiva
- Periodontal ligament
- Alveolar bone
- Cementum
- "perio" = around

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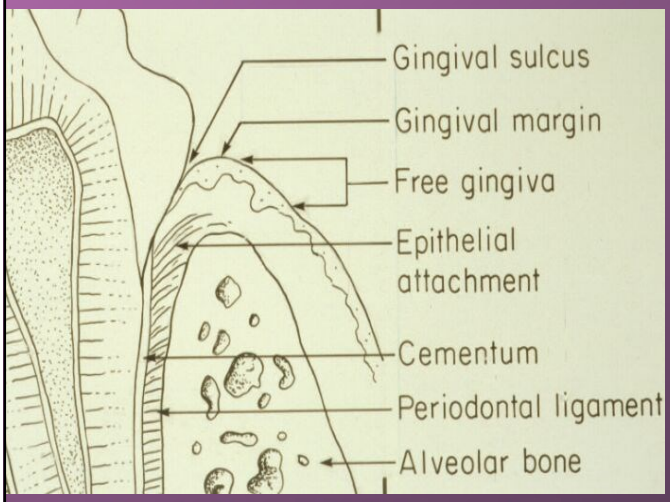
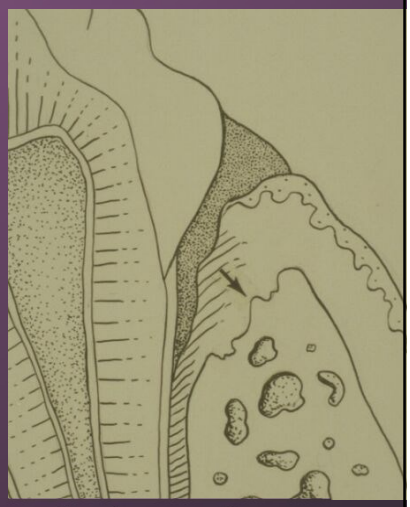
Periodontal Anatomy & Bacteria

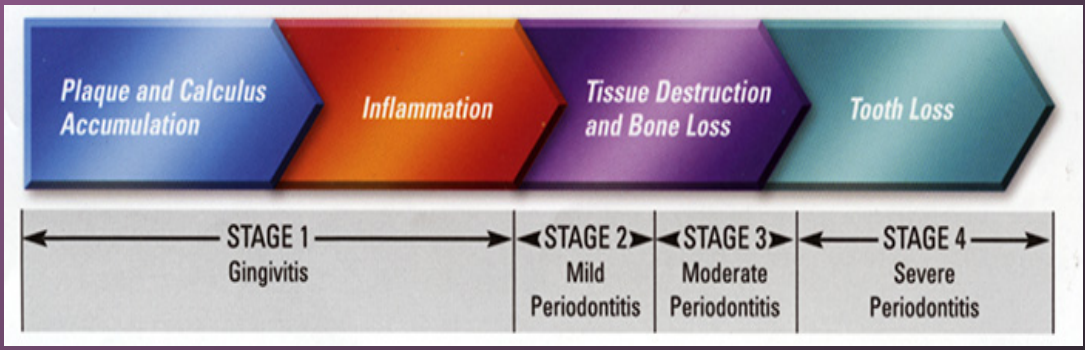




Periodontal disease is caused by an accumulation of bacteria (plaque) on the surface of teeth→gingival inflammation and bone loss (***it's the host response to plaque that governs the severity of disease!)***

Stages of Periodontal Disease

- Stage I: Gingivitis - No Attachment Loss (AL)
- Stage II: Early PD - Up to 25% AL
- Stage III: Moderate PD - 25%-50% AL
- Stage IV: Severe PD - greater than 50% AL



Stage I Periodontal Disease (Gingivitis)

Note mild plaque & dental calculus & associated gingivitis in 2-year-old patient.

- Gingivitis is the early form of periodontal disease with inflammation confined to the gingival soft tissues
- Inflammation, edema, and plaque are present
- Bleeding on probing is noted

Juvenile Gingivitis; 11 month old MC DSH

Gingivitis vs Stomatitis

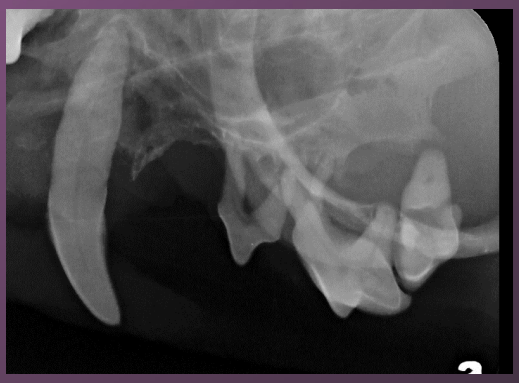
Stage II Periodontal Disease

Note periodontal pocket on mesial aspect of mesial root of mandibular 2nd molar. Less than 25% of the total periodontal attachment of both roots of tooth has been lost resulting in Stage II periodontal disease.

Stage III Periodontal Disease

Note furcation exposure of premolar tooth. Radiograph demonstrates 25-50% of attachment has been lost resulting in Stage III periodontal disease.

Stage IV Periodontal Disease



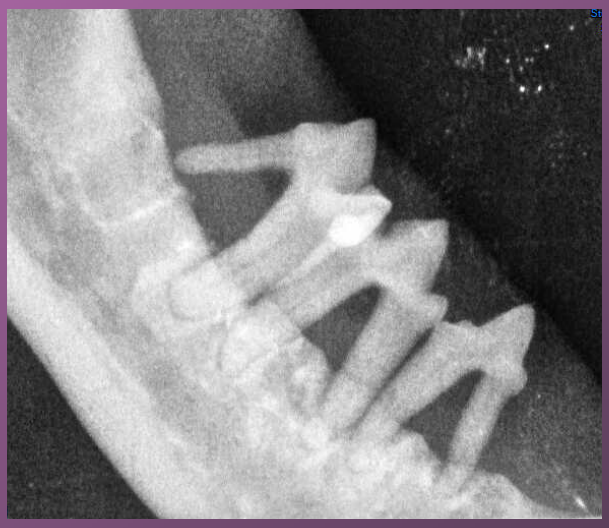
Stage 4 Periodontal disease

Bone loss around mesial roots of mandibular first molars

5 year old MC DSH, blood found around the bed several days in a row

Diagnosis?

Stage 4 periodontal disease



Endodontic Disease

- Most common cause in animals? People?
- Very important to check all fractured teeth for pulp exposure with the dental explorer- will feel like a soft spot or a pink spot will be visible (can be difficult in cats)
- Treatment options include extraction, vital pulpotomy, or root canal

Treatment options for fractured teeth

- Extraction vs root canal
- If the fracture is older than 24 hours (or even if it isn't), root canal therapy is warranted
- Better long-term outcome for mature teeth than vital pulp therapy

Discolored Teeth

- Means that the tooth has been traumatized, pulpitis
- Requires a dental x-ray to evaluate the endodontic system's health
- Compare size of pulp cavity to the corresponding teeth in the mouth and look for periapical changes on radiographs

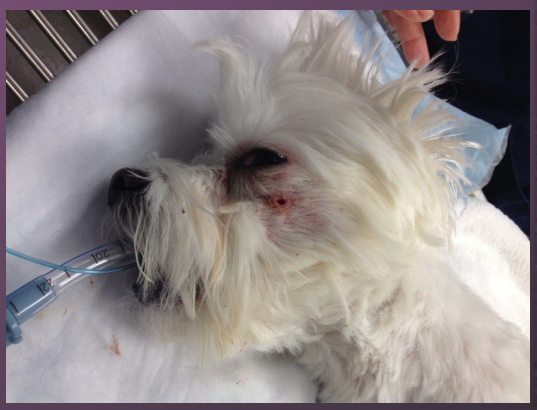
Potential Sequelae Associated with Failure to Treat Teeth Affected with Endodontic Disease

- Discolored tooth
- Abscess formation
- Cutaneous and mucosal fistula formation
- Chronic rhinitis
- Ocular signs

Where draining tracts manifest

Parulis at mucogingival line

Cutaneous



Radiographic Evidence of Chronic Endodontic Disease/Pulp Necrosis

- Periapical lysis
- Apical lysis
- Large asymmetrical endodontic systems
- Secondary destruction of periodontal structures
- Draining tract with gutta-percha point pointing to apex

This radiograph demonstrates periapical lysis, apical lysis, and an asymmetric and wide root canal

Apical lysis/resorption in a cat secondary to chronic pulpal exposure

Periapical Lysis

Simon- 13 yo MC Shepherd X

Tooth fracture, no pulp exposure

Convincing radiograph?

- Options if unconvincing x-ray include:
  - Gutta perch point through draining tract
  - Repeat x-rays, different views (different angles, etc…)

Gutta percha point identifying the pathologic tooth

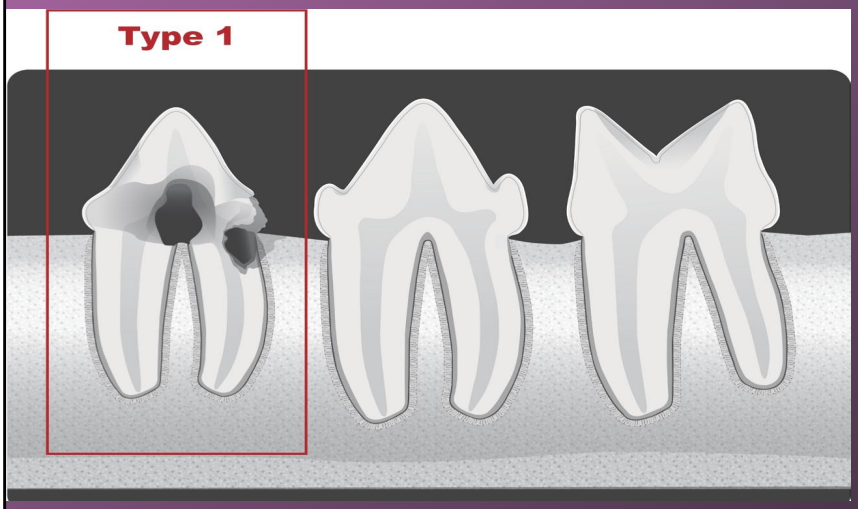
Three week post-op recheck

Resorptive Lesions

- Odontoclastic attack on teeth
- No etiology has been confirmed yet, so treatment is aimed at minimizing discomfort
- TX: Crown amputation or extraction

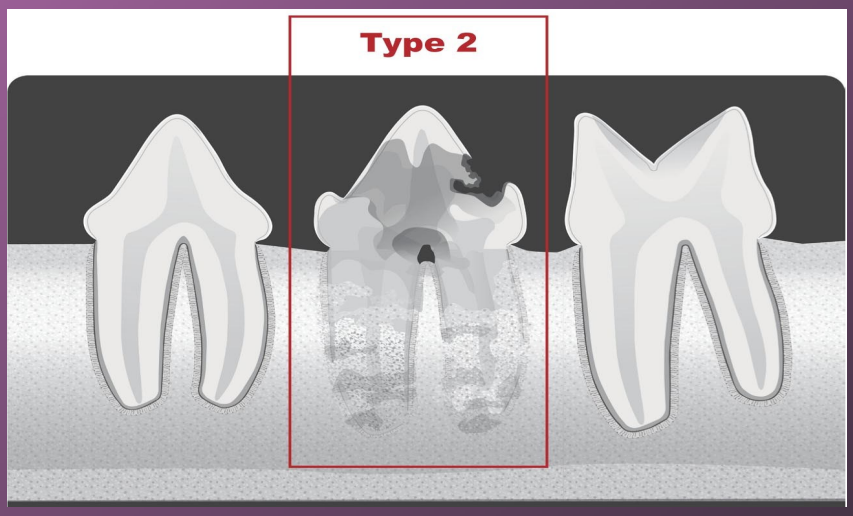
Tooth resorption is detected with dental explorer

Types of Resorption, Based on Radiographic Appearance



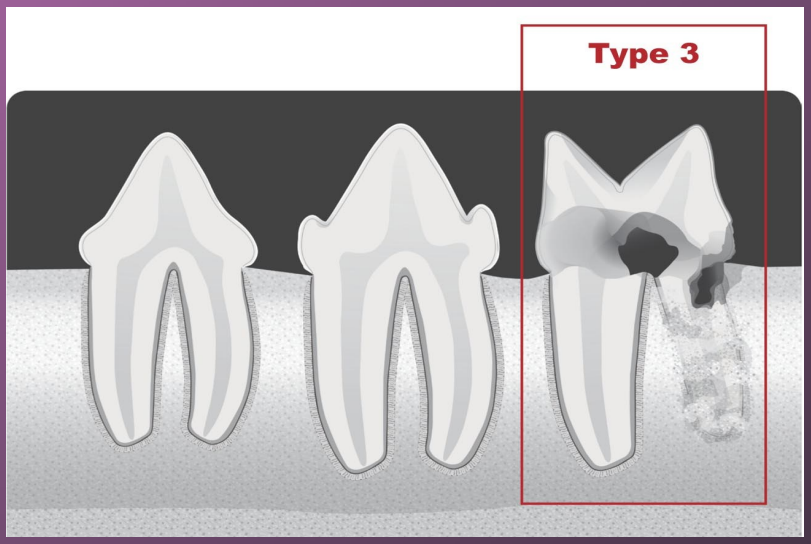
A focal or multifocal radiolucency is present in the tooth with otherwise normal radiopacity and normal periodontal ligament space: Treatment → surgical extraction

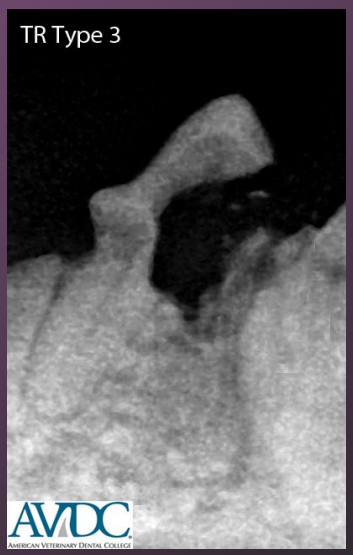
Types of Resorption, Based on Radiographic Appearance



There is narrowing or disappearance of the periodontal ligament space in at least some areas and decreased radiopacity of part of the tooth: Treatment → Crown amputation in severe cases

Types of Resorption, Based on Radiographic Appearance





Features of both type 1 and type 2 are present in the same tooth: Treatment → combination of surgical extraction & CRA

Oral Tumors

Caudal Maxillary
Melanoma
in a 10-year-old Mix Breed

- In dogs, melanoma and squamous cell carcinoma are most common (fibrosarcoma following)
- In cats, squamous cell carcinoma and fibrosarcoma are most common
- Suspicious for tumor on radiographs when there is displacement of normal structures and bony lysis or proliferation

What is your top differential in this 10-year-old cat?

A. Tooth resorption
B. Squamous Cell Carcinoma
C. Exuberant granulation tissue secondary to periodontal disease

What is your top differential for the rostral maxillary mass in this 10-year-old dog?

A. Possible melanoma or squamous cell carcinoma
B. Ossifying epulis
C. Fibromatous epulis
D. Gingival hyperplasia

15 year old Scottie with right-sided facial swelling

Right maxillary 4th premolars and 1st and 2nd molars were mobile

Case examples

What is the cause of the draining tract in this dog presented for facial swelling?

A: Periodontal disease
B: Endodontic disease
C: Oral tumor
D: Foreign body

What is the cause of the draining tract in this dog presented for facial swelling?

A: Periodontal disease

B: Endodontic disease

C: Oral tumor

D: Foreign body

What is the cause of this draining tract in this dog presented for facial swelling?

A. Vertical bone loss 2^0 to periodontal disease

What is your diagnostic plan for this lower canine tooth?

A. No diagnostics needed in this case since there is no pulpal exposure
B. Explore/probe tooth, transilluminate and x-ray
C. Recommend to owner if mandible swells then x-ray tooth
D. Recommend to owner if draining tract develops then x-ray tooth

What is your diagnostic plan for this lower canine tooth?

A. No diagnostics needed in this case since there is no pulpal exposure

B. ***Explore/probe tooth, transilluminate and x-ray***

C. Recommend to owner if mandible swells then x-ray tooth

D. Recommend to owner if draining tract develops then x-ray tooth

Trans-illumination of Teeth

Dead Tooth

Live Tooth

What is your radiographic diagnosis?

A: Periodontal disease
B: Endodontic disease
C: Super-eruption
D: All of the above
E: A and B

What is your radiographic diagnosis?

A: Periodontal disease
B: Endodontic disease
C: Super-eruption
D: All of the above
E: A and B

What is your diagnosis and treatment plan in this 3-year-old cat?

A: Type 1 resorption 108, extraction
B: Normal
C: Periodontal disease 109, extract
D: How could anyone evaluate such a poorly taken x-ray?!?!

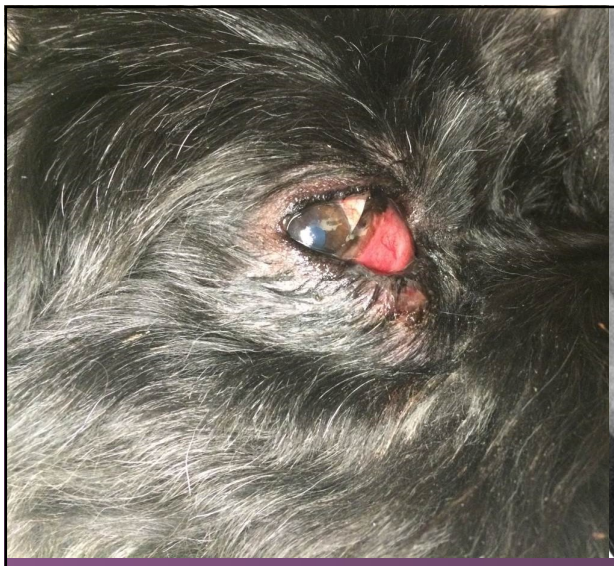
What is your diagnosis and treatment plan in this 3-year-old cat?

A: Type 1 resorption 108, extraction

B: Normal

C: Periodontal disease 109, extract

D: How could anyone evaluate such a poorly taken x-ray



9 year old Cavapoo, 6 month history of draining tract, lower eyelid. Copious pustular discharge.

What diagnostic would be a first step to confirm that the periapical lysis around the 4th premolar is the definitive cause of the draining tract?

A: CT Scan

B: Contralateral x-rays

C: Gutta Percha Point through draining tract

D: Biopsy

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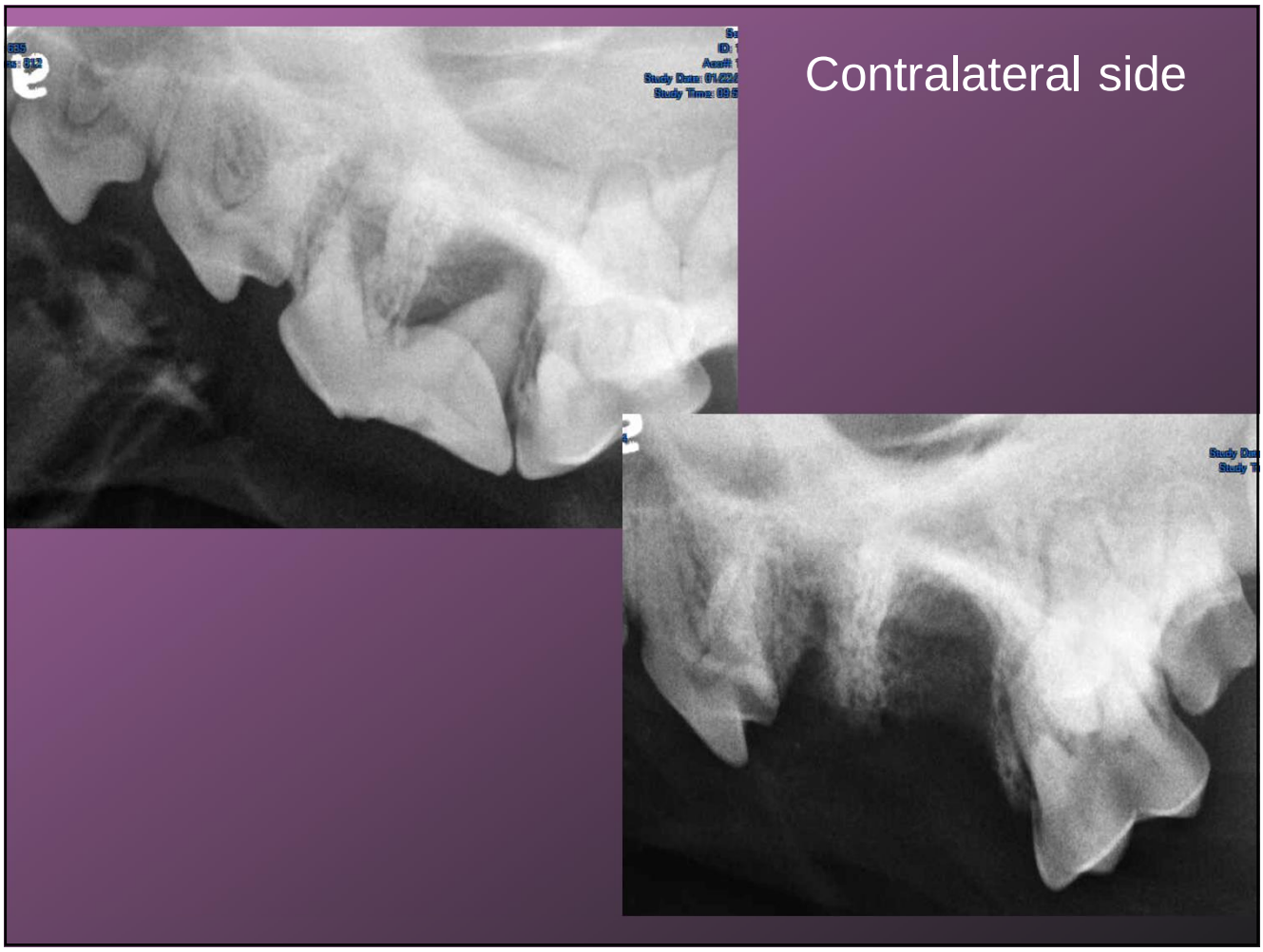
Contralateral side

Middle-aged FS DSH, lesion on 407
What is the diagnosis and treatment plan?
A: Type 1 resorption, extraction
B: Type 1 resorption, crown amputation
C: Type 2 resorption, extraction
D: Type 2 resorption, crown amputation

Middle-aged FS DSH, lesion on 407
What is the diagnosis and treatment plan?
A: Type 1 resorption, extraction
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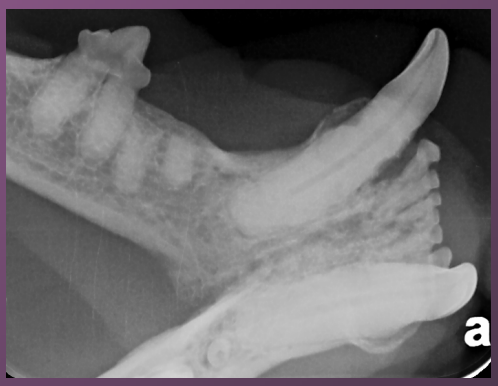

What is your radiographic diagnosis for the mandibular canines (304 and 404)?

A: Super-eruption
B: Vertical bone loss
C: Resorption
D: All of the above
E: A and C

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A: Super-eruption
B: Vertical bone loss
C: Resorption
D: All of the above
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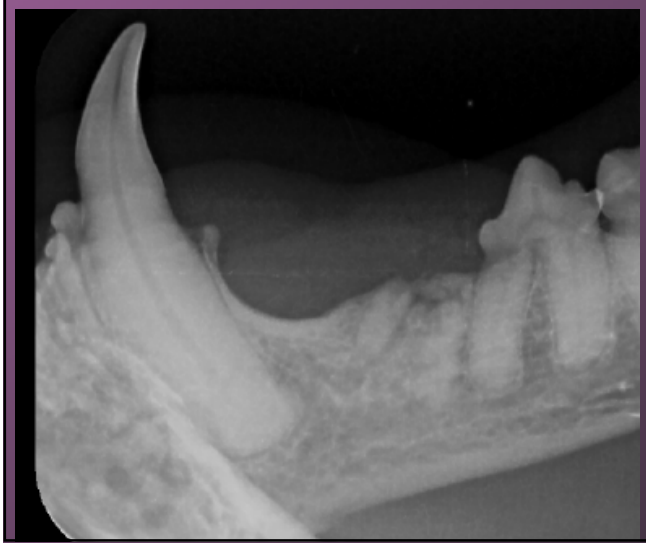
Normal Versus Supereruption (canines)

What is your treatment recommendation for the canines in this geriatric diabetic cat?



What is the diagnosis for this cat based on this picture?
A: Severe gingivitis
B: Stomatitis
C: SCC
D: Bartonella Infection
E: All of the above

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A: Severe gingivitis

B: Stomatitis

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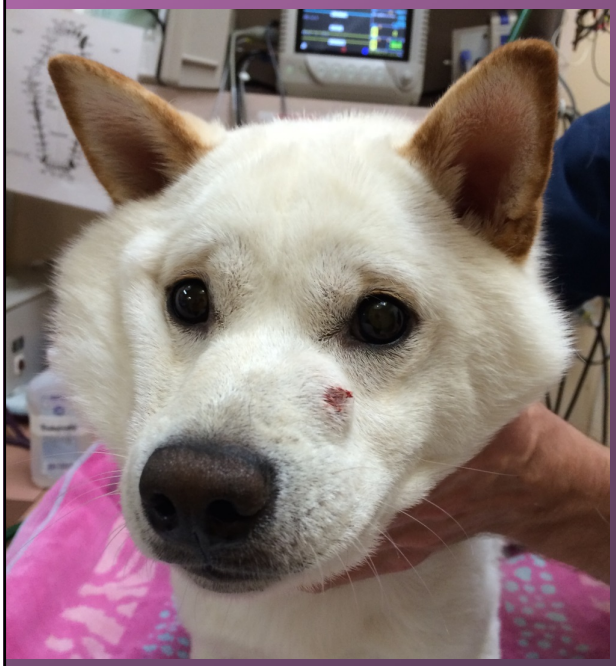

Young Shiba Inu with a 2 year history of a draining tract and swelling of left muzzle

Based on this dental x-ray, what is the cause of the swelling and draining tract?

A: Can't determine solely based on this radiograph
B: Endodontic disease due to malformation of the left maxillary canine tooth
C: Endodontic disease of the left maxillary 3rd premolar
D: Swelling of the zygomatic lymph node

Based on this dental x-ray, what is the cause of the swelling and draining tract?

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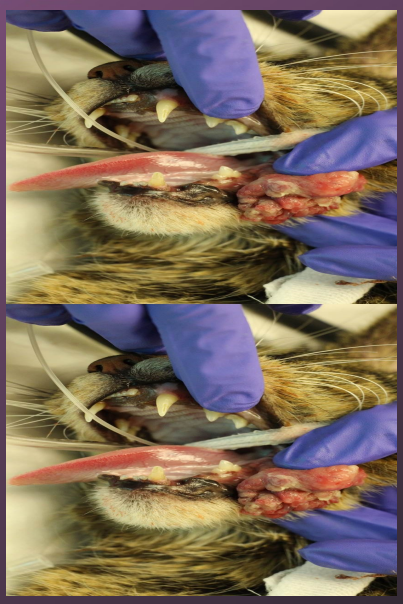
14 year old FS DSH, recurrent oral mass removed 4 times previously, biopsies revealed benign growth



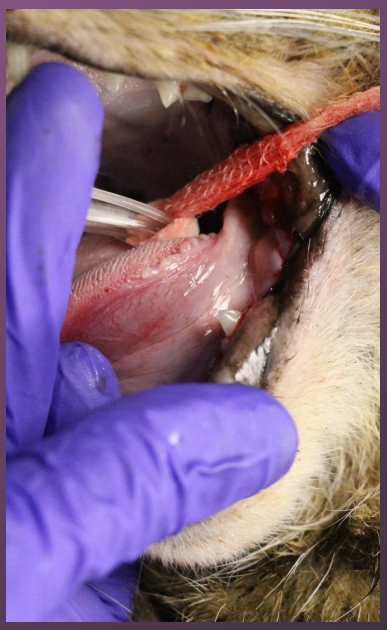
When in a natural position, the mass obstructed breathing and swallowing; found to be pedunculated, attached to region of missing 1st molar

What is the most likely cause of this pedunculated mass based on the information provided?

- A: Neoplasia
- B: Malocclusion
- C: Corn in the diet
- D: Retained tooth root

X-rays of the mandibular teeth in the 14 year old cat with an oral mass

Treatment: removal of mass and root



6-year-old MC Maltese

6 month history of a draining tract on the chin (responsive to antibiotics but would recur when they were stopped)

Based on the intra-oral picture taken in this dog, what confirms that this draining tract stems from the 1st molar?

A: Abrasion

B: Fracture of the tooth

C: Parulis at mucogingival line

D: The draining tract does not stem from the 1st molar

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6 month history of a draining tract on the chin (responsive to antibiotics but would recur when they were stopped)

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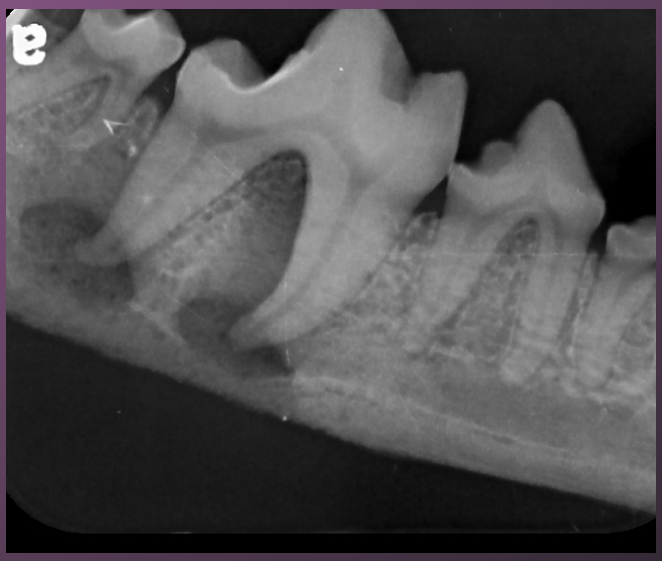

Tooth resorption present on the distal aspect of the upper left third premolar

Diagnosis and treatment?

A: Type 1 resorption: Extract

B: Type 1 resorption: Crown amputate

C: Type 2 resorption: Crown amputate

D: Type 3 resorption: Extract and crown amputate

Resorptive lesion present on the distal aspect of the upper left third premolar

Diagnosis and treatment?

A: Type 1 resorption: Extract

B: Type 1 resorption: Crown amputate

C: Type 2 resorption: Crown amputate

D: Type 3 resorption: Extract and crown amputate

What is your tentative diagnosis based on the radiograph in this dog?

A: Periodontal disease
B: Wonky tooth disease
C: Neoplasia
D: Endodontic disease

What is your tentative diagnosis based on the radiograph in this dog?

DX: Squamous Cell Carcinoma

Prognosis?

Based on the oral examination and radiographs in this patient, what is the diagnosis and treatment recommendation for this dog?

A: Periodontal disease of all mandibular incisors, close root plane

B: Discoloration 403, extract

C: Discoloration 303, extract

D: Discoloration 303, no treatment necessary

Based on the oral examination and radiographs in this patient, what is the diagnosis and treatment recommendation for this dog?

A: Periodontal disease of all mandibular incisors, close root plane

B: Discoloration 403, extract

C: Discoloration 303, extract

D: Discoloration 303, no treatment necessary

What is your radiographic diagnosis and treatment plan for the right mandibular first molar (409) in this 8 year-old dog?

A: Periapical lysis/endo disease, extract

B: Chevron lucency/ endo disease, extract

C: Chevron lucency, no treatment required

D: Periapical lysis, root canal therapy

What is your diagnosis and treatment plan for the right mandibular first molar in this 8-year-old dog?

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B: Chevron lucency/ endo disease, extract

C: Chevron lucency, no treatment required

D: Periapical lysis, root canal therapy

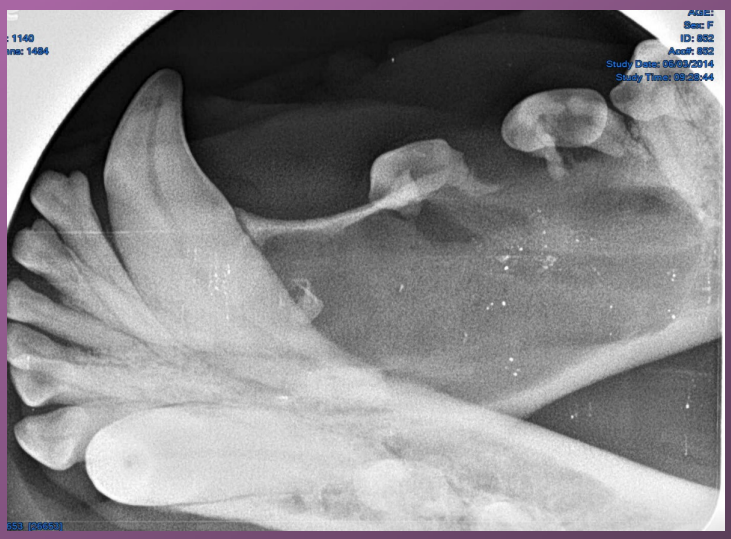
Chevron Lucency

Periapical lysis

Chevron Lucency

Periapical lysis

6 yo FS Lab, swelling of left rostral mandible, abnormal findings?



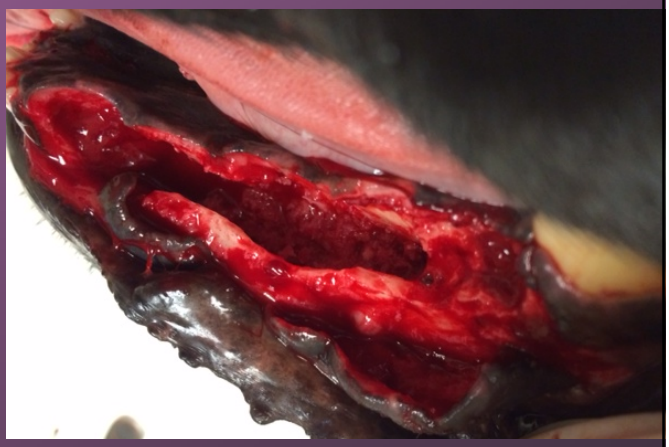
Most likely diagnosis?

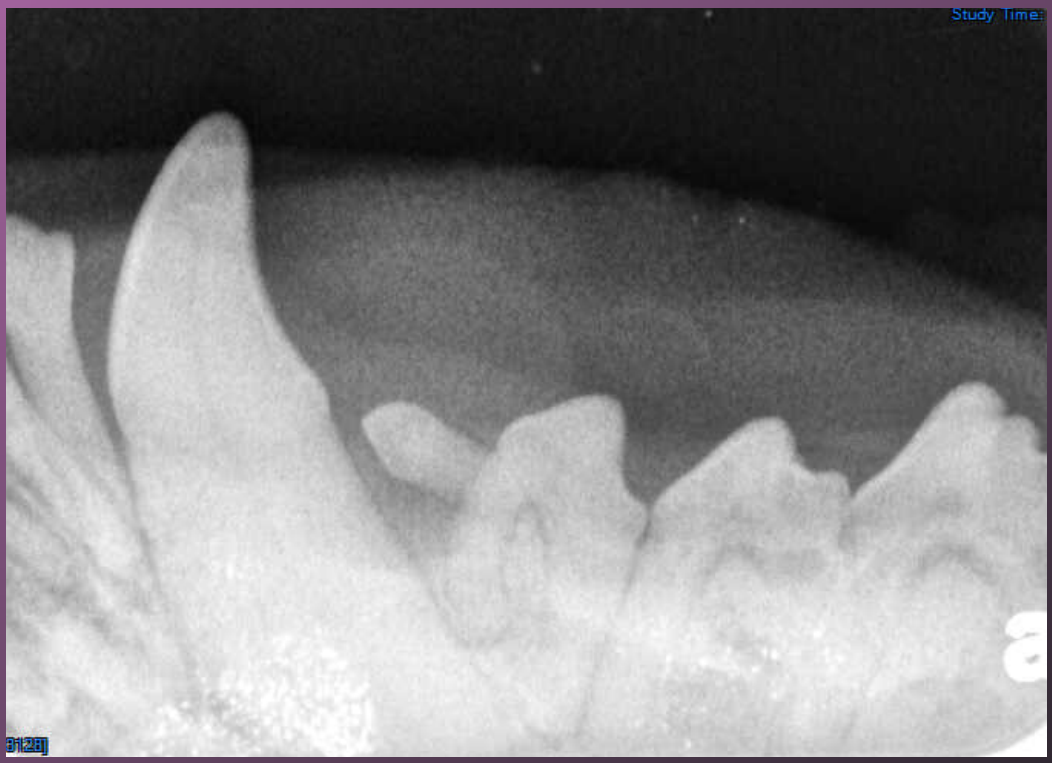
A: Neoplasia

B: Anodontia

C: Dentigerous cyst

D: Sicky McSickerton

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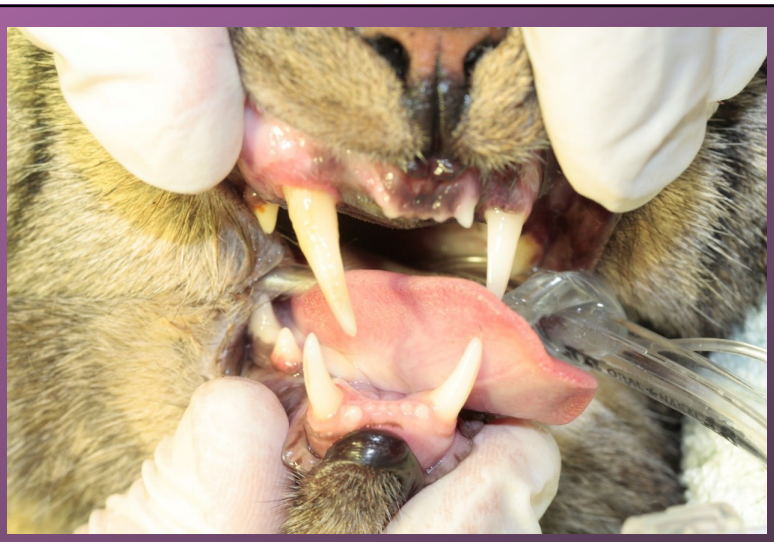
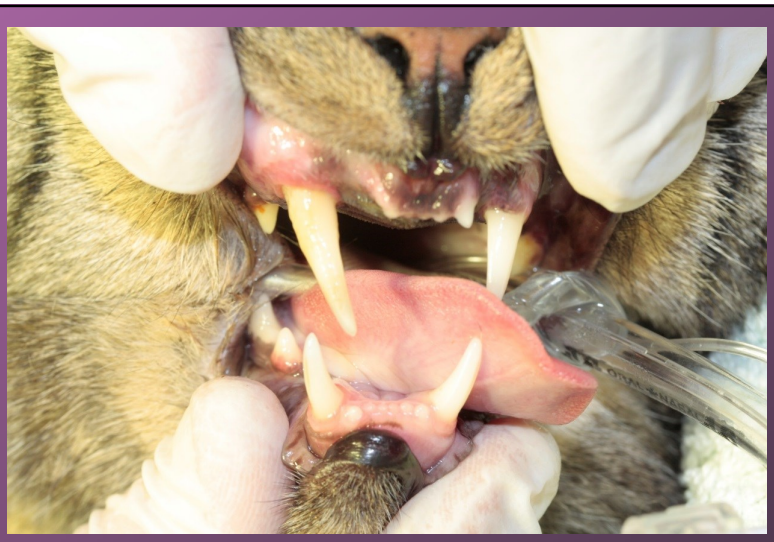


4 year old DSH presented for acute inability to close the mouth. Based on the above photograph, what is the cause for the inability to close the mouth?

- A: TMJ luxation
- B: Periodontal disease and secondary tooth luxation
- C: Neoplasia
- D: Tooth resorption



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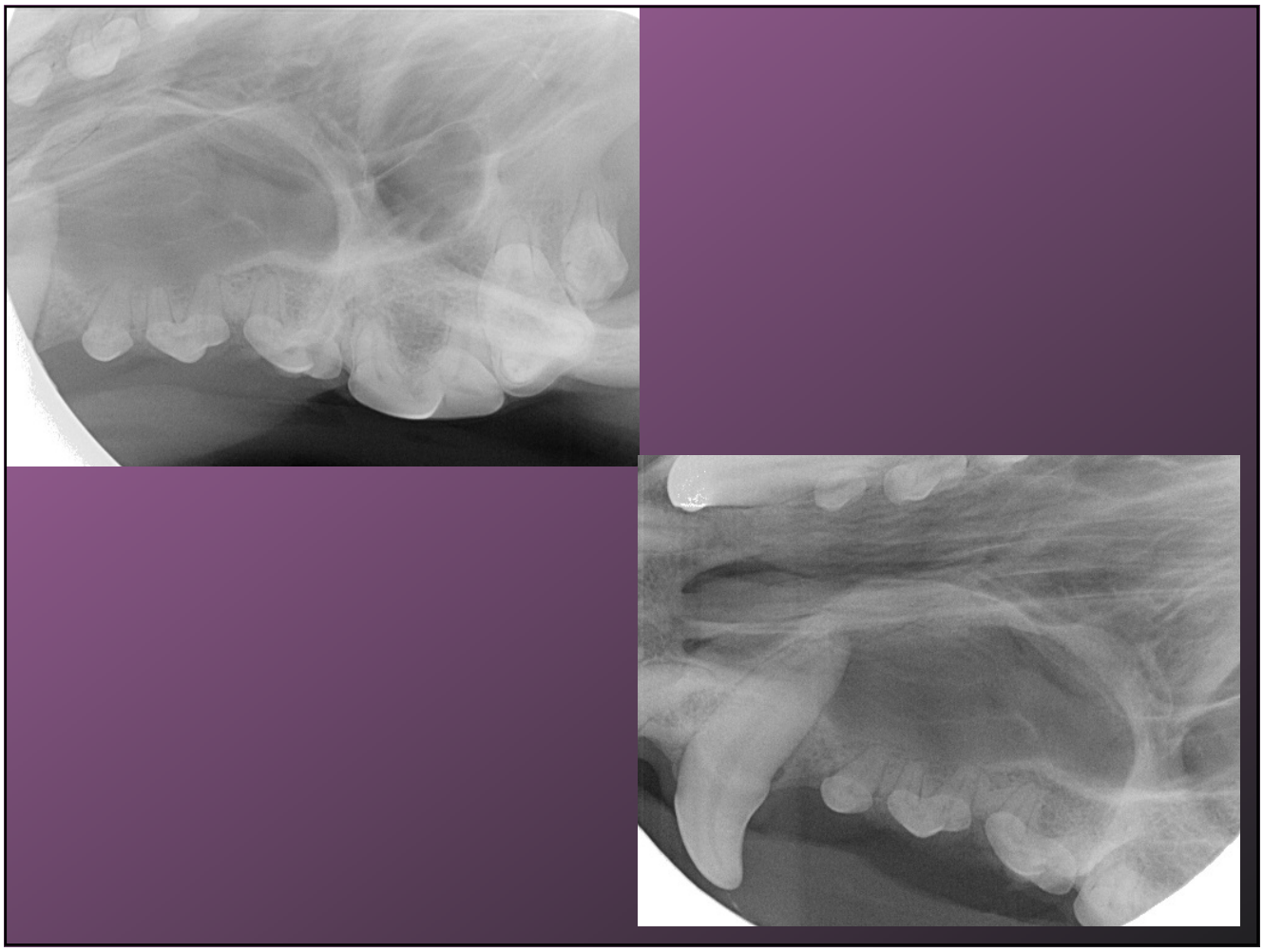
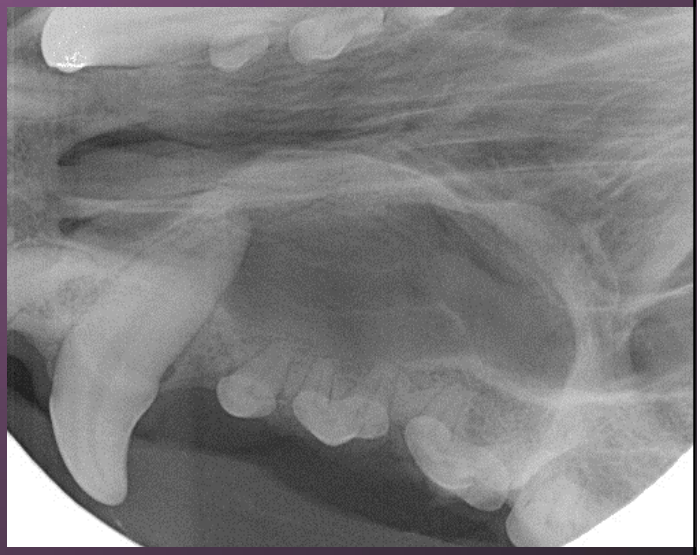
- C: Neoplasia
- Tooth resorption

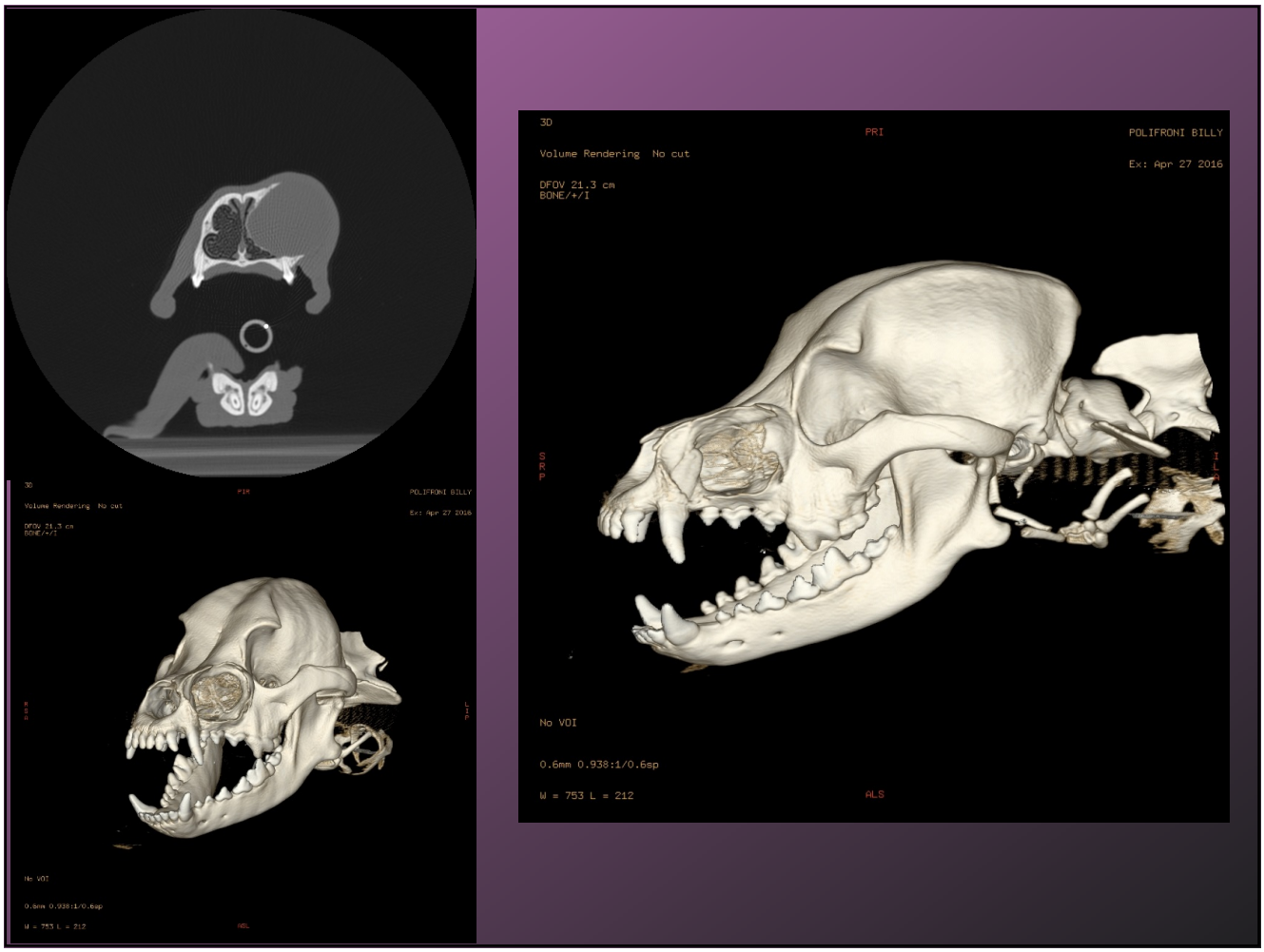
3 year old adorable mixed breed dog with an even more adorable facial swelling



Tentative Diagnosis?

- A: Dentigerous Cyst
- B: Radicular cyst
- C: Squamous Cell Carcinoma
- D: Tooth root abscess

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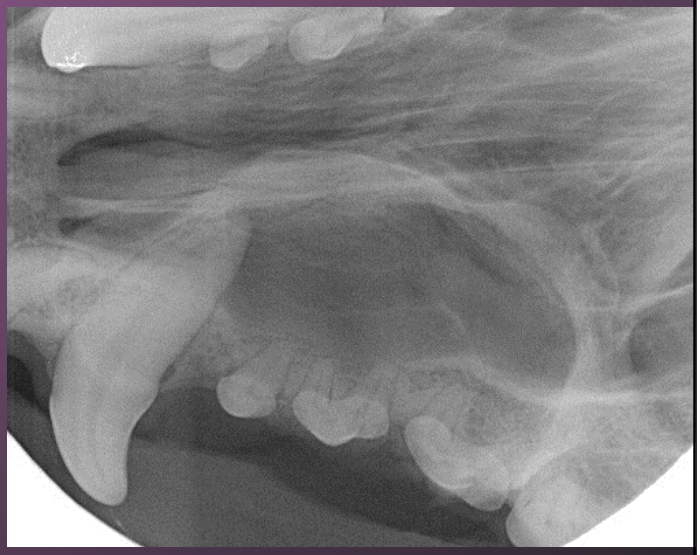
ALS

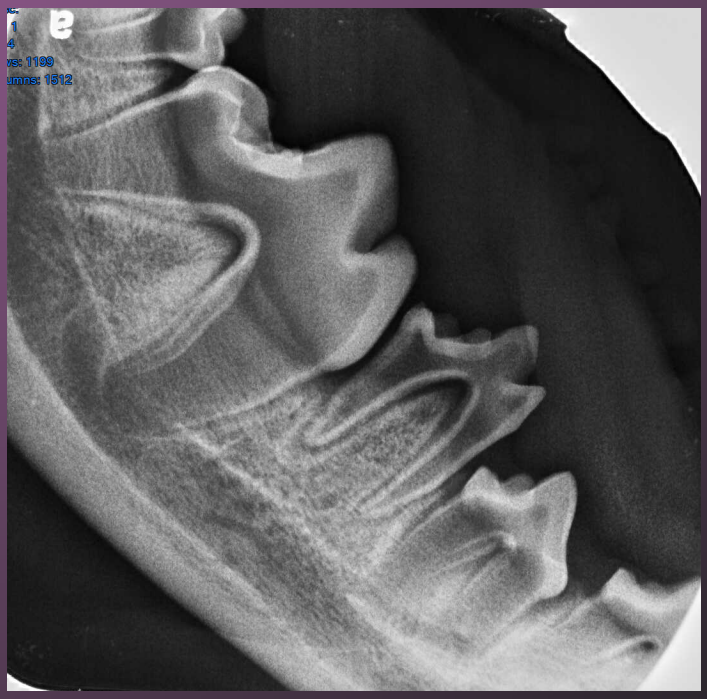
Tentative Diagnosis?

- A: Dentigerous Cyst
- B: Radicular cyst
- C: Squamous Cell Carcinoma
- D: Tooth root abscess



Based on this image, is this puppy show quality or pet quality?

A: Show quality
B: Pet Quality



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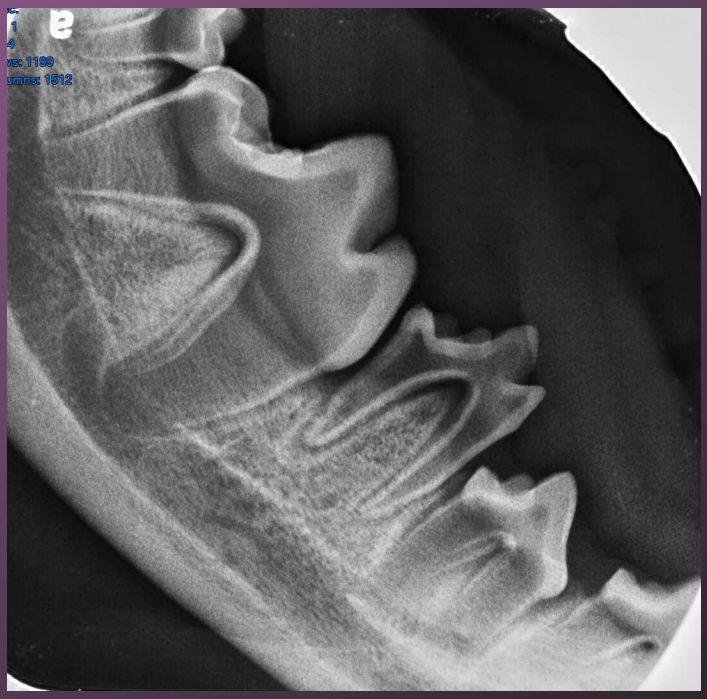
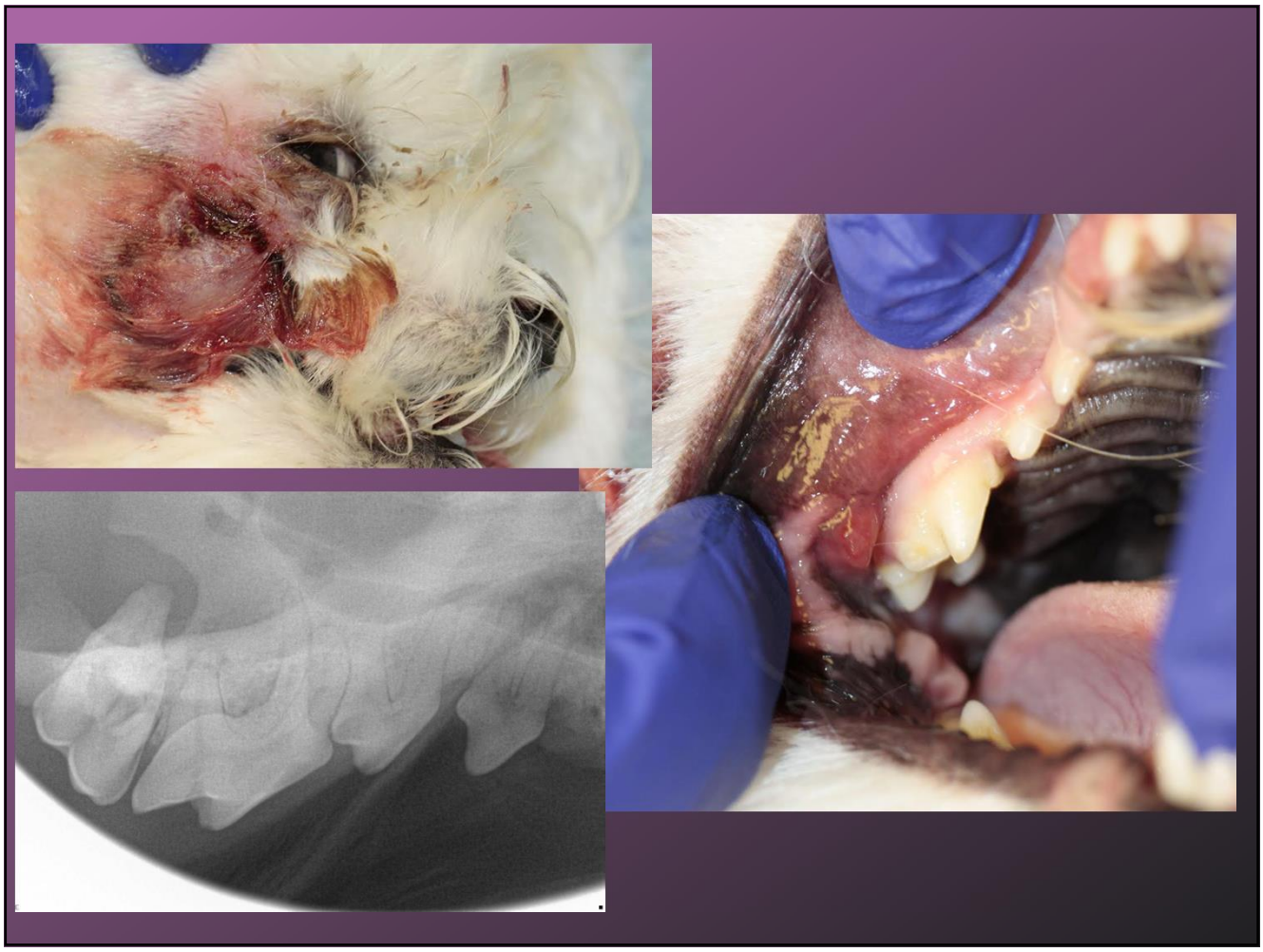


What is the diagnosis based on this radiograph?

- A: Tooth root abscess, right 4th PM
- B: Neoplasia
- C: Maxillary Fracture
- D: Tooth root abscess, left 4th PM
- E: Tooth root abscess, right 1st M



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11 month old Tibetan Terrier

Diagnosis?

11 month old Tibetan Terrier

- A: Crown reduction and vital pulp therapy of 404
- B: Extraction of 404
- C: Orthodontic movement of 404
- D: All of the above
- E: None of the above, tooth will self-correct with growth

11 month old Tibetan Terrier

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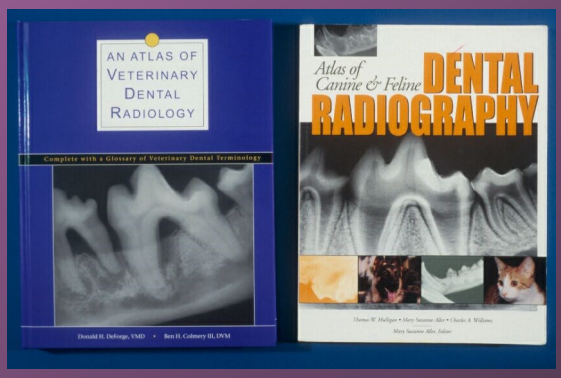
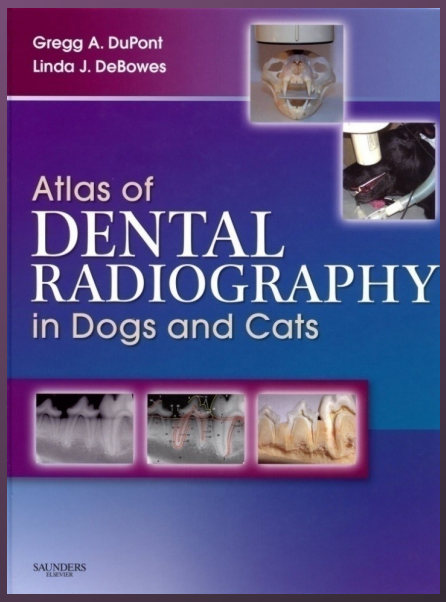
Summary of Veterinary Dental Digital Radiology

- Essential component in daily delivery of high quality dental care
- Digital dental radiography rapid and easy way to produce and evaluate images
- Improves patient care while providing profit center for hospital
- Proper training will allow veterinarians & veterinary technicians to obtain high quality dental images which will result in recognition of more lesions which can be treated

Veterinary Dental Radiography Textbooks





QUESTIONS?