

Veterinary Dentistry:
Pictures and Perspectives for Veterinary Professionals
Updated April 2019



www.companionanimaldentalsolutions.com

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Dental diseases in dogs and cats are the most common diseases seen in small animal veterinary practice. Even with the recent attention of our profession, the conditions are largely overlooked and not being diagnosed or treated efficiently. It was my goal to produce a resource that would provide a basic level of information that would be suited for use in a general practice setting. Many of the abbreviations will change based on recommendations of the American Veterinary Dental College and may not be reflected here. The purpose of this guide is to establish reasonable methods of recognizing common diseases and communicating these findings with your clients. If you want to be more precise and keep up with ever-changing nomenclature, this will not be the place to seek information. However, if you are seeking a user-friendly set of abbreviations for charting purposes, I think this guide will serve you well. It is my intention that this guide be utilized in a digital format so there is a higher quality and value of the pictures and radiographs. You can take pictures of diseased areas of your patient's mouth then compare with the images contained within and use the outline to the side to share the expected options for treatment. Unfortunately, there has been very little education regarding the need for a healthy mouth, so we are in a position of performing more procedures to remove teeth rather than to prevent their loss. I suspect this will be the trend for some time as we become more aware of the problems in the mouth and more diligent to offer this needed care. There are many resources for a deeper understanding of dental abnormalities. I recommend attending classes at dental training centers which are becoming increasingly available to increase your ability to treat these conditions. Here is my "common sense" approach to learning veterinary dentistry.

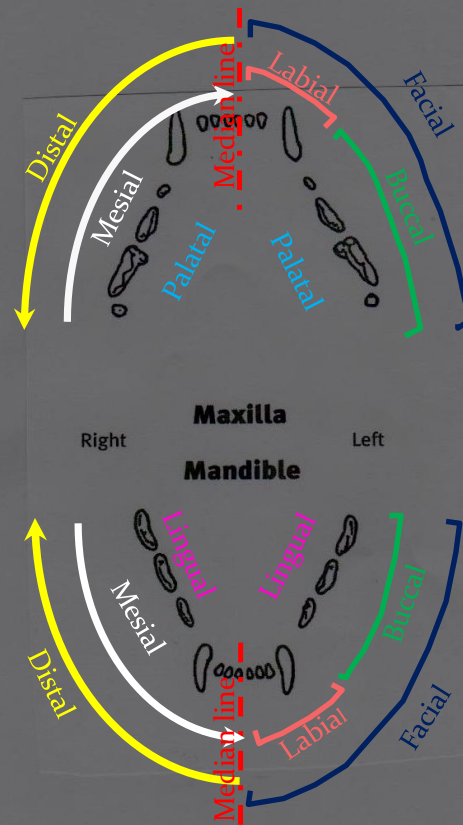
If we only consider only periodontal disease, which will affect the largest percentage of the pet population by the age of 4, the following approach would make sense as a natural progression of education. Learn to diagnose periodontal disease with detailed probing, charting and full-mouth dental radiographs on every patient. The most common treatment will be surgical extraction of affected teeth. In the event a tooth can be saved, you would need to perform periodontal therapy. Learn to perform and interpret dental radiographs, perform surgical extractions and minor periodontal therapy. Once you have developed confidence area and apply it on a regular basis, you may want to seek training in more advanced oral surgery, by getting instruction on procedures for oral cancer, fracture repair, salivary gland issues and other conditions. Next, you might be interested in procedures to try to save broken teeth which would be endodontic therapy, which will involve some restorative dentistry as well. After this, you could focus on orthodontic work, crown therapy or other areas of interest. There is so much to learn that it is reasonable to have some sort of plan to accomplish this. A human dentist will go to school for 4 years to gain the knowledge and skills for the basic work. Most of you will not be able to put your current career on hold to go back to school, so learning a little at a time is a reasonable approach.

I hope you find this guide useful as you make the journey in veterinary dentistry. This has been a very rewarding area of practice for me as I have helped many animals that have been suffering for years and experience near- immediate gratification.

****Abbreviations are mostly from www.avdc.org nomenclature****

Anatomy

- Median line – mid line of the dental arch(not the head)
- Mesial – toward the median line
- Distal – away from the median line
- Buccal – toward the cheek
- Labial – toward the lips
- Lingual – toward the tongue
- Palatal – toward the palate
- Facial - encompasses labial and buccal



Approximate Eruption Times

Dog	Incisors	Canines	Premolars	Molars
Primary (weeks)	3-5	3-6	4-10	-----
Adult (months)	3-5	3.5-6	3.5-6	3.5-7

Cat	Incisors	Canines	Premolars	Molars
Primary (weeks)	2-3	3-4	3-6	-----
Adult (months)	3-4	4-5	4-6	4-6

Wiggs RB, Lobprise HB: *Veterinary Dentistry Principles and Practice*, Philadelphia, 1997, Lippincot-Raven, page 97.

Normal teeth and gingiva



Normal, healthy gingiva is smooth, shiny, tightly attached to the tooth and free of redness. It can be a pink color or sometimes be dark from pigmentation. There should not be recession or root exposure, redness, swelling or bleeding.

Normal teeth are a white to off white in color and consistent with neighboring teeth. They should not have fractures or be a different color than surrounding teeth.

When examining the mouth, it is good to look for missing teeth, discolored teeth, broken teeth, loose teeth, extra teeth, crowded teeth, rotated teeth, retained baby teeth, signs of redness, calculus, plaque, ulcers, tumors, malocclusions or swellings.

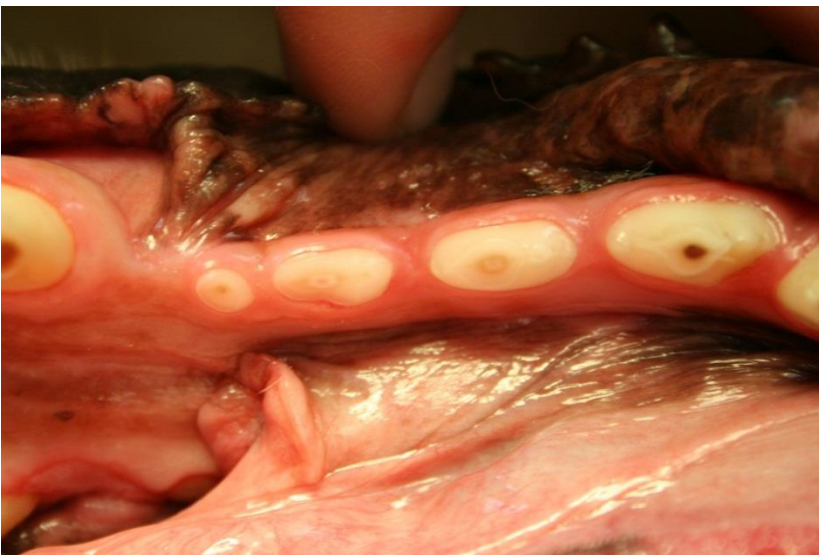


Feline gingiva and teeth are similar to the canine. They have fewer teeth and all are pointed since cats are obligate carnivores. This picture shows normal gingiva as well as an area of inflammation with enlarged gingiva that has receded.



Abbreviations List

<u>Abrasion-AB</u>	<u>Gemination – T/GEM</u>	<u>Persistent Deciduous Tooth - DT/P</u>
<u>Attrition-AT</u>	<u>Gingival Hyperplasia-GH</u>	<u>Pulp Exposure - PE</u>
<u>Biopsy/Excisional-B/E</u>	<u>Gingival Recession-GR</u>	<u>Periodontal Pocket - PP</u>
<u>Biopsy/Incisional-B/I</u>	<u>Gingivoplasty-GP</u>	<u>Pyogenic Granuloma - PYO</u>
<u>Bone Graft-BG</u>	<u>Gingivectomy-GV</u>	<u>Restoration-Composite - R/C</u>
<u>Caries-CA</u>	<u>Hair Impaction-HI</u>	<u>Root Canal Therapy - RC</u>
<u>Chewing Lesions</u>	<u>Juvenile Periodontitis</u>	<u>Root Exposure - RE</u>
<u>Cleft Palate-CFP</u>	<u>Lip Entrapment</u>	<u>Root Planing Open - RPO</u>
<u>Crowding-CWD</u>	<u>Mobility-M</u>	<u>Retained Root Tip - RRT</u>
<u>Crown Amputation-CRA</u>	<u>Malocclusion-MAL</u>	<u>Retained Tooth Root - RTR</u>
<u>Contact Ulcer-CU</u>	<u>MAL 1</u>	<u>Rotation - ROT</u>
<u>Dentigerous Cyst-DTC</u>	<u>Caudal Crossbite – CB/C</u>	<u>Staining Extrinsic-SE</u>
<u>Electrical Injury – TMA/E</u>	<u>Rostral Crossbite-CB/R</u>	<u>Staining Intrinsic-SI</u>
<u>Enamel Defect-ED</u>	<u>Rostrally Displaced Canine</u>	<u>Supernumerary Tooth-T/SN</u>
<u>Enamel Infraction – T/FX/EI</u>	<u>MAL 2</u>	<u>Stomatitis-ST</u>
<u>Enamel Hypoplasia</u>	<u>MAL 3</u>	<u>Symphyseal Separation-SYM/S</u>
<u>Enamel Hypomineralization</u>	<u>Wry Bite</u>	<u>Tooth Avulsion – T/A</u>
<u>Foreign Body-FB</u>	<u>Microdontia – T/MIC</u>	<u>Tooth Impaction-T/I</u>
<u>Fracture-FX</u>	<u>Odontodysplasia</u>	<u>Tooth Luxation – T/LUX</u>
<u>Fractured Mandible – FX/MN</u>	<u>Oral Mass-OM</u>	<u>Tooth Resorption-TR</u>
<u>Fractured Maxilla – FX/MX</u>	<u>Oro-Nasal Fistula-ONF</u>	<u>Under-eruption-UE</u>
<u>FX1</u>	<u>Osteosclerosis - OSS</u>	<u>Extraction-X</u>
<u>FX2a</u>	<u>Palatal Trauma-PTM</u>	<u>Extraction Sectioned-XS</u>
<u>Fx2b</u>	<u>Periodontal Disease-PD</u>	<u>Surgical Extraction-XSS</u>
<u>Fx3a</u>		
<u>Fx3b</u>		
<u>Fx4</u>		



Abrasion (AB) – abnormal tooth wear from external objects (tennis ball, hair chewing, etc)

Diagnosis:

- dental radiograph with comparison to contralateral tooth for signs of vitality as well as looking for lesion of endodontic origin (LEO)
- probe and explore tooth for pulp exposure (PE)
- trans-illuminate to determine vitality; dullness indicates non-vital (NV)

Treatment:

- pulp exposure (PE) requires endodontic care or exodontia
- no pulp exposure AND absence of radiographic evidence of endodontic disease can recheck in 6-9 months;
- remove abrasive substrate
- crown therapy to stop wear



Attrition (AT) – abnormal tooth wear from tooth on tooth contact

Diagnosis:

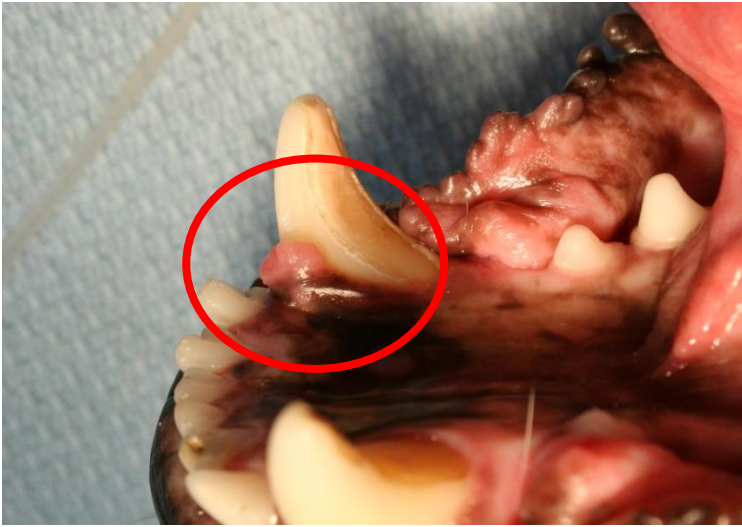
- dental radiograph with comparison to contralateral tooth for signs of vitality as well as looking for lesion of endodontic origin (LEO)
- probe and explore tooth for pulp exposure (PE)
- trans-illuminate to determine vitality; dullness indicates non-vital (NV)

Treatment:

- pulp exposure (PE) requires endodontic care or exodontia
- no pulp exposure AND absence of radiographic evidence of endodontic disease can recheck in 6-9 months;
- remove offending teeth

Severe scarring on under-side of tongue from being cut on sharpened teeth in previous photo

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Biopsy/Excisional (B/E) – biopsy sample is obtained while removing the lesion in question.

This performed when there is reason to believe it will be curative and can avoid an additional surgical procedure or in cases where incisional biopsy will leave gross disease present and want to relieve pain or infection regardless of tumor type to increase quality of life.



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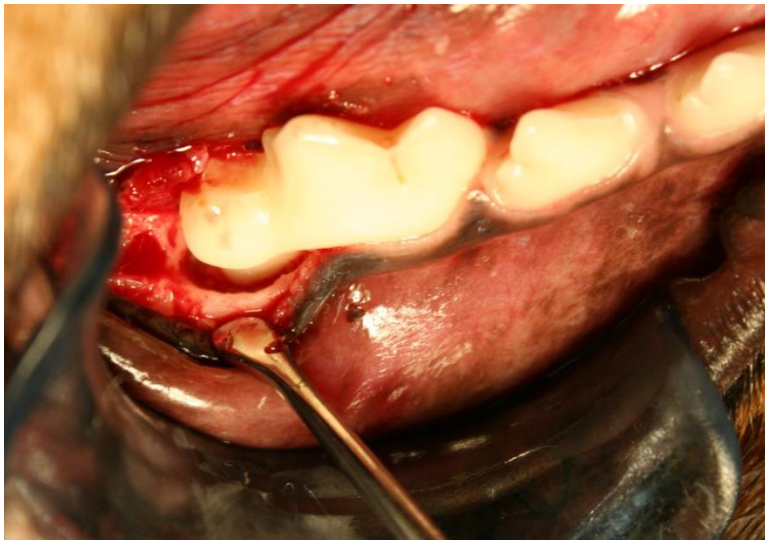


Biopsy/Incisional (B/I) – biopsy is obtained by removing a piece of tissue from the lesion but leaving the lesion otherwise undisturbed

This method may be chosen when there is a need for identification of mass for staging purposes and determination of prognosis and appropriate treatment.



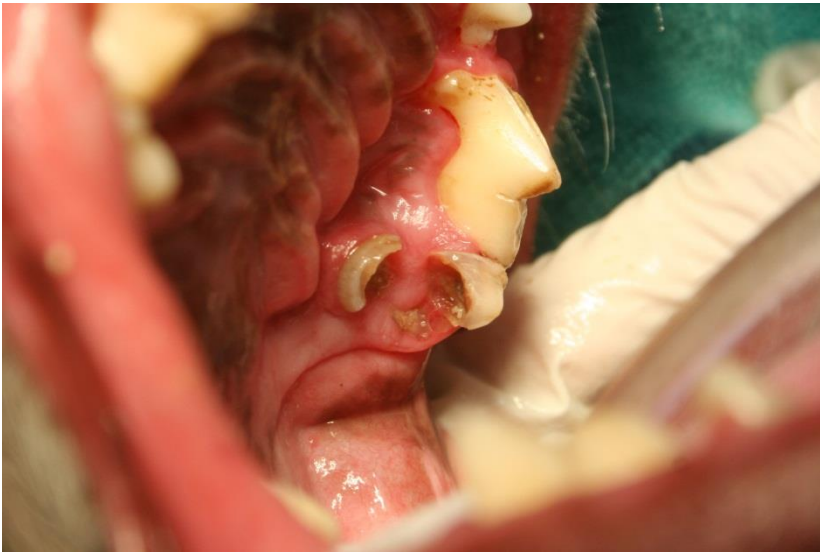
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Bone Graft (BG) – synthetic or natural material is placed to augment bone replacement. This includes products such as Consil, Osteoallograft, or harvested bone used for the purpose of rebuilding areas of destruction



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Caries (CA) – decay of the tooth structure brought about by the effects of acids and other products of fermentation of bacteria

Rare occurrence compared to human frequency, but more common on the occlusal surface of the upper molars in dogs.

Diagnosis:

- visualization
- probing with dental radiographs to determine depth of caries

Treatment:

- caries involving enamel and dentin only can be restored by accepted methods too advanced to discuss here
- most commonly extraction is best as the lesions are usually advanced by the time they are recognized

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Chewing Lesions (CL) – Areas of soft tissue trauma from interference with occlusion. Further specification is based on location and noted as follows:

Cheek (CL/B)

Lip (CL/L)

Palate (CL/P)

Tongue/Sublingual Region (CL/T)

Diagnosis:

- Visual
- Patient displays a chattering motion when closing mouth

Treatment:

- Removal and biopsy of lesions
- Must alleviate trauma by reshaping or removal of offending teeth

Compliance Tip

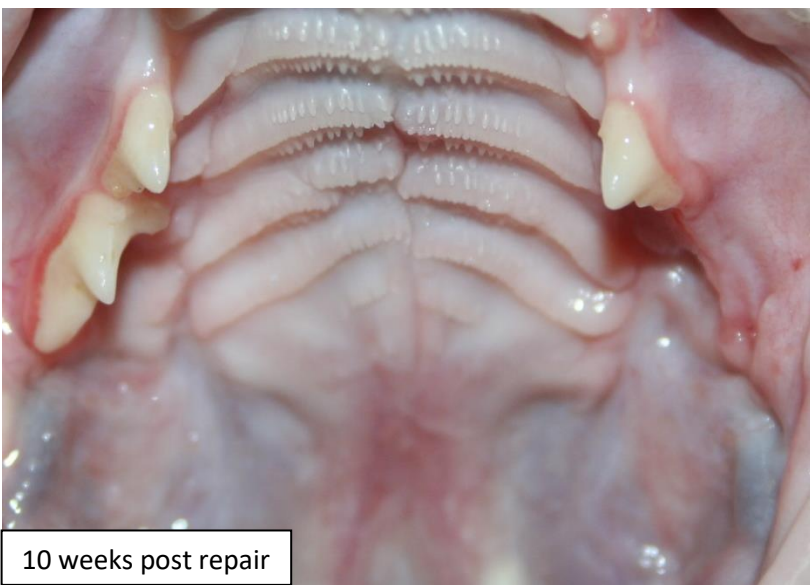
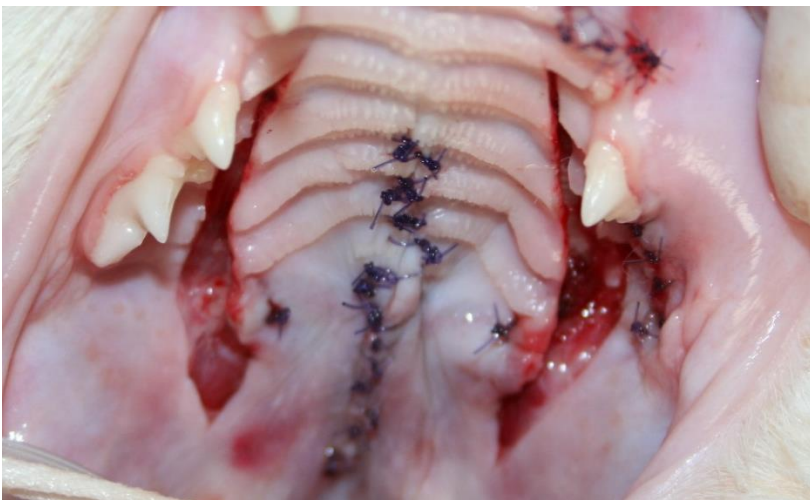
Ask client if they have ever bitten their cheek or tongue then gently share how bad this must hurt when occurs repeatedly



Suspected secondary cleft caused by traumatic event



Grass in nasal passage through defect



10 weeks post repair



Primary cleft palate

Cleft Palate (CFP) – an abnormal

development or traumatic event of the maxilla that leads to a separation at the level of the nose, hard palate and/or soft palate

Usually nasal infection and even aspiration from inability to swallow normally

Diagnosis:

- Visual
- Upper respiratory signs
- Primary – lip
- Secondary – hard palate

Treatment:

- Closure of defect following accepted surgical methods
- Tension free closure
- Chronicity may lead to damage of nasal tissues making full resolution challenging

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Crowding (CWD) – teeth are too close together causing tooth on tooth contact and preventing healthy attachment of gingiva around the tooth. Healthy, attached gingiva is essential for long-term viability of teeth. Strategic teeth should be prioritized when determining treatment options. Many times, the author will sacrifice non-strategic teeth to saved strategic teeth.

Diagnosis:

- visual and radiographic diagnosis
- predisposing factor for the development of periodontal disease

Treatment:

- removal of crowded teeth with the intention of preventing periodontal disease (PD) from affecting strategic teeth (all canines, upper PM4, lower M1)

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Crown Amputation (CRA) – controversial procedure performed on teeth with advanced stages of tooth resorption (TR) where there is minimal tooth structure remaining and appears to be replaced by bone; the crown of the tooth is removed as well as 1-2 mm of tissue beneath the gum followed by closure of the area; It is important to mark this on the record instead of extraction as well as needed follow up to ensure healing. I do not like leaving any identifiable tooth structure behind unless there is a high chance of doing harm to the patient during attempted removal.

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Contact Ulcer (CU) – ulceration of mucosal tissue where it contacts the tooth surface

- previously called Chronic Ulcerative Paradental Stomatitis (CUPS) which is similar to stomatitis (ST) in cats
- Now called **contact mucositis**

Diagnosis:

- visualization of ulcers
- complete oral exam with radiographs
- clinical signs usually include depression, lethargy, thick mucus, bad halitosis, reluctance to eat normally
- may have no clinical signs

Treatment:

Conservative

- surgical extraction of all non-salvageable teeth
- diligent home care (twice daily brushing and oral rinse plus frequent professional cleanings) for remaining teeth (**most clients will agree to this but fail to provide adequate care**)

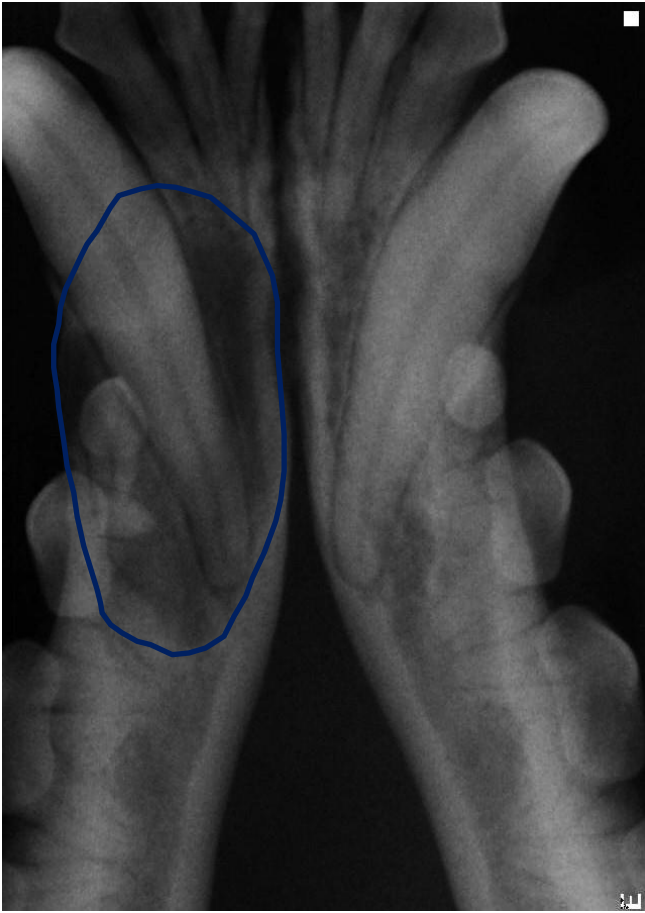
Moderate

- Teeth can be removed in areas of ulcerations followed with diligent homecare (see above) with frequent professional cleanings

Aggressive

- Severe cases require full mouth surgical extractions may be required in many cases especially those where owners are not willing to commit to home care.

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Dentigerous Cyst (DTC) – fluid filled structure usually resulting from an impacted tooth which expands over time destroying bone and can lead to a jaw fracture

Diagnosis:

- missing tooth on oral exam
- radiograph confirms tooth impaction (T/I) and bone destruction

Treatment:

- extraction of the impacted tooth with complete removal of the cyst lining
- can be avoided by early diagnosis and removal of impacted teeth



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Electrical Injury (TMA/E) – tissue damage that results from chewing on electrical cords

Diagnosis:

- Client might observe incident
- Patient may have bad odor if owner does not witness event
- Resembles chemical burn
- Have owner search for chewed cords

Treatment:

- Antibiotics and pain medications for 2 weeks to allow affected tissue to heal or slough
- If tissues slough, manage wounds
- Perform dental cleaning, tooth-by-tooth exam with full-mouth dental radiographs
- Gingival destruction is common and teeth without gingiva must be removed as well as necrotic bone

Compliance Tip

There is tendency to give a poor prognosis initially, but these wounds are much worse at initial presentation. Give it a couple weeks before deciding as most of these patients can have a great quality of life. In this case, there were multiple surgical extractions and removal of a small amount of necrotic bone and patient did amazingly well. I fixed the fan for the owner, but she did not want it back.

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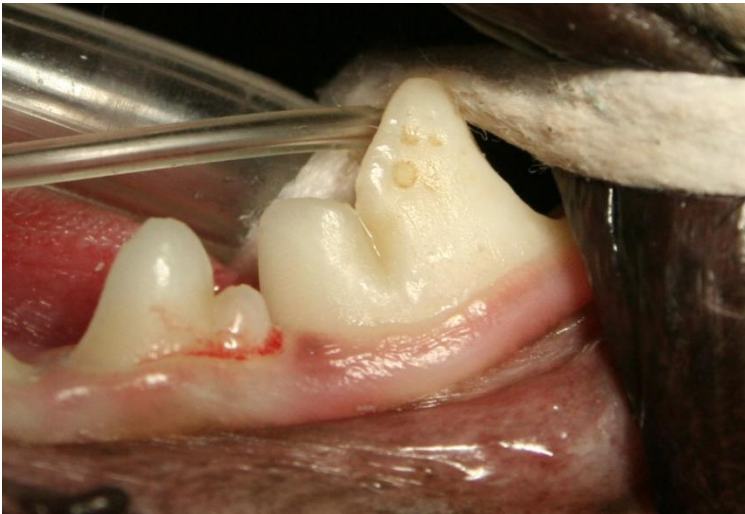
Enamel Defect (ED) – abnormal formation of the enamel surface of a tooth, may be a small or large area; genetic, infection during enamel formation, electrocution, amelogenesis imperfecta

Diagnosis:

- visualization and tactile sensation with shepherd hook explorer
- radiographs to determine if endodontic disease or deeper defect

Treatment:

- generally, a benign finding requiring no treatment unless has deeper involvement of tooth structure
- endodontic disease requires root canal therapy or extraction



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Enamel Hypoplasia – abnormal formation of the enamel and may be surrounded by normal enamel (see photo)

Enamel Hypomineralization - abnormal formation resulting in softer enamel affecting many or all teeth and usually wears more rapidly (no photo available)

Diagnosis:

- visual and tactile sensation with curette
- radiographs to determine endodontic disease
- may need to compare to same tooth on other side

Treatment:

- composite restoration (after endodontic treatment if required)
- extraction if endodontic disease and treatment declined
- observation as long as no evidence of endodontic disease

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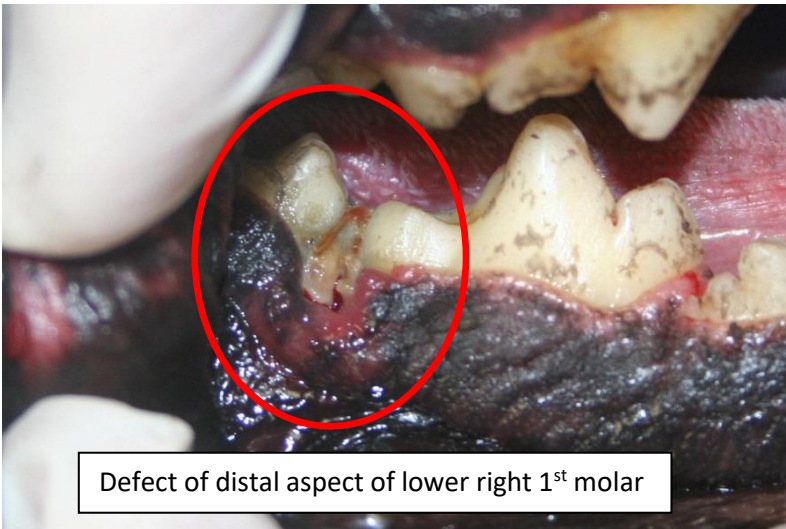
Foreign Body (FB) – any object that doesn't belong in the mouth which may cause damage to oral structures (sticks, plastic, string, plant material, etc...)

Diagnosis:

- visualization and tactile sensation; after removal look for damage of surrounding tissues

Treatment:

- May be simple removal of FB or may require additional therapy of effected tissues
- Follow up is essential as damage can occur creating ongoing disease the patient cannot tell you about



Defect of distal aspect of lower right 1st molar



Bur removed from defect pictured above

Fracture (FX) – damage to tooth (T), mandible (MN), maxilla (MX) causing a break of the hard tissues.



Enamel Infraction (T/FX/EI) – cracks of the enamel surface due to flexing of the tooth but without separation and dentin exposure

Diagnosis:

- Visual

Treatment:

- Usually no treatment needed, but recommend avoiding behavior that is putting stress on teeth to prevent further damage



FX1 or (T/FX/EF)* – enamel fracture

Diagnosis:

- Radiograph to determine tooth vitality and if endodontic disease

Treatment:

Vital

- If owner elects can restore but must warn against lack of durability if no habit change. Follow up radiographs in 6-9 months

Non-vital (NV)

- Requires extraction or root canal therapy

Follow-up:

- essential to make sure tooth is vital long-term or treatment is successful





FX2a – enamel and dentin; crown only
Uncomplicated Crown Fracture (UCF)*

Diagnosis

- Radiograph to determine tooth vitality and if endodontic disease

Treatment:

Vital

- remove offending item or habit and consider restoration

Non-vital (NV) or lesion of endodontic origin (LEO)

- extraction or root canal therapy

Follow-up:

- essential to make sure tooth is vital long-term or treatment is successful

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**FX2b – enamel and dentin; root involvement
Uncomplicated Crown-Root Fracture (UCRF)***

Diagnosis

- Radiograph to determine tooth vitality and if endodontic disease

Treatment:

- Must give consideration to the degree of root involvement and need to retain at least 2mm attached gingiva for periodontal health
- Reduce periodontal pocket with gingivectomy where indicated

Vital

- remove offending item or habit
- consider restoration

Non-vital (NV) or lesion of endodontic origin (LEO)

- extraction or root canal therapy
- same considerations of pocket due to non-attached gingiva

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**FX3a – enamel, dentin and pulp exposure (PE);
crown involvement only**

Complicated Crown Fracture (CCF)*

Diagnosis:

- Visual and tactile
- Radiograph for treatment planning

Treatment:

- **Pulp exposure (PE)** requires root canal therapy or extraction
- Root canal therapy is considered if tooth is strategic and owner is motivated to save it and follow up

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FX3b – enamel, dentin and **pulp exposure (PE)**; crown and root involvement

Complicated Crown-Root Fracture (CCRF)*

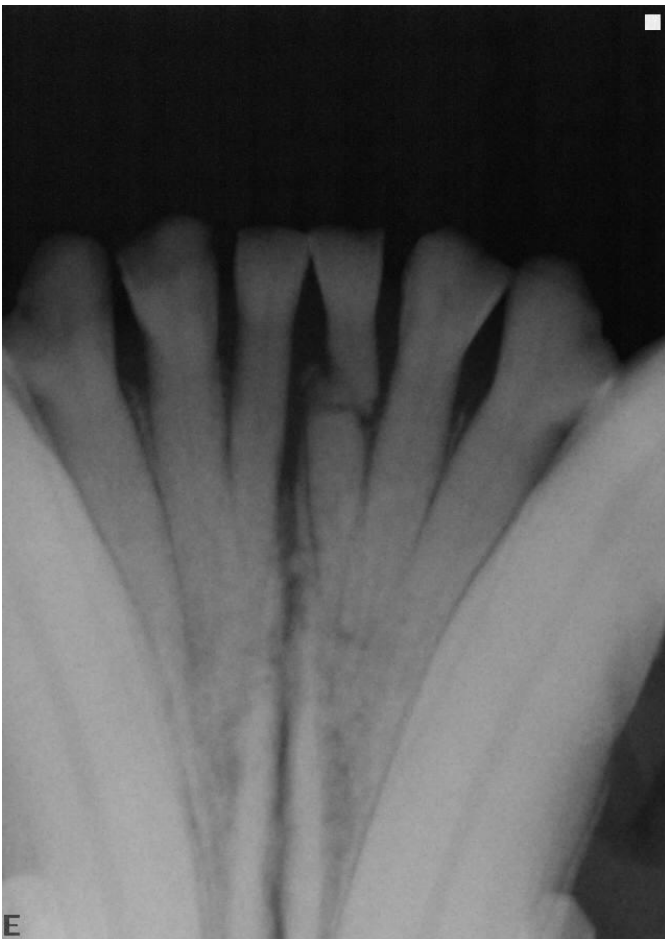
Diagnosis:

- Visual and tactile

Treatment:

- **Pulp exposure (PE)** requires root canal therapy or extraction
- **Root canal therapy (RC)** is only considered if tooth is strategic and owner is motivated to save it and follow up and the fracture segment does not extend too deep beneath the gum. Must be able to maintain at least 2 mm of attached gingiva

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FX4 or (RF)* – root fracture

Diagnosis:

- tooth is usually mobile and confirmed with radiographs

Treatment:

- most commonly extraction
- some can be monitored if no displacement but requires follow-up
- Splinting
- extraction resolves potential issue in a predictable manner

FX1, FX2a, FX2b, FX3a, FX3b, FX4 is the Fracture Severity Index from Veterinary Dental Techniques, Holmstrom, Frost and Eisner

* Denotes AVDC abbreviations

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Fractured Mandible (FX/MN) – usually result of trauma or pathologic from tumor or advanced periodontal disease

Diagnosis:

- Visualization
- Mouth appears open
- Dental radiographs
- Can be open or closed
- May involve teeth

Treatment:

- Repair by one of several methods depending on classification and location of fracture
 - Intraoral acrylic splint
 - Plating
 - External coaptation
- Removal of fracture segment (mandibulectomy)

Considerations:

- Must address teeth in fracture site although may be used initially in splint
- More expensive to repair and may involve multiple anesthetic events
- Must establish satisfactory occlusion



After splint removal



Nasal deviation after rostral maxillectomy

Fractured Maxilla (FX/MX) - usually result of trauma or pathologic from tumor or advanced periodontal disease

Diagnosis:

- Visualization
- Mouth might appear open
- Dental radiographs
- Can be open or closed
- May involve teeth

Treatment:

- Repair by one of several methods depending on classification and location of fracture
 - Intraoral acrylic splint
 - External coaptation
- Removal of fracture segment (maxillectomy)

Considerations:

- Must address teeth in fracture site although may be used initially in splint and removed later
- More expensive to repair and may involve multiple anesthetic events
- Must establish satisfactory occlusion
- Rostral maxillectomy can lead to significant deformity
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FE 1

Furcation Exposure (FE) –bone loss or gingival recession in the area where roots of a multi-rooted tooth come together

Diagnosis:

- visualization and tactile sensation with periodontal probe.
- severity is determined by the distance the probe passes in this area and reported as follows:

Treatment and Classification:

- **FE1** – slight indention. Increase home care efforts. Follow up 6 months
- **FE2** – probe goes ½ way under tooth. Increase home care efforts and recheck; discuss need for extraction if owner cannot comply. Follow up in 6 months
- **FE3** – probe passes through to the other side. Most likely course of action would be extraction by sectioning and elevation with closure of site



FE2



FE3



Fusion (T/FUS) – neighboring teeth with combined tooth structure resulting in one entity. In this example, the upper right 1st and 2nd incisors are one combined unit. The upper left 1st and 2nd incisors are also fused. The radiograph demonstrates this condition.

Diagnosis:

- Visual
- Radiograph for confirmation of root health

Treatment:

- No treatment needed if healthy, otherwise treat as any other tooth





Gemination (T/GEM) – partial or complete splitting of a single tooth bud

Diagnosis:

- Visualization
- Radiographs to determine endodontic health

Treatment:

- Depends if there is disease or risk of disease
- Often creates crowding
- Might have defects that compromise tooth requiring extraction

The tooth pictured here is an upper right 4th premolar with the gemination occurring on the mesial aspect of the tooth. There appears to be 4 distinct roots and an additional cleft in the tooth structure. The upper left 4th premolar in this patient (pictured below) had separate tooth structure which would be closer to a twin but not identical



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Gingival Hyperplasia (GH) – now referred to as gingival enlargement and can be caused by inflammation or mass effect. Commonly seen in Boxer dogs but can occur in any breed

Diagnosis:

- visualization and periodontal probing and radiographs
- look for cause of inflammation as far as a **hair impaction (HI)** or other **foreign body (FB)**, or even **tooth resorption (TR)**.

Treatment:

IF disease such as: **tooth resorption (TR)**, **periodontal disease (PD)**, **fracture (FX)** – extraction

IF no evidence of disease: **gingivoplasty (GP)** or **gingivectomy (GV)** being certain to leave adequate gingiva behind for normal health.

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Gingival Recession (GR) – measured in mm and is the amount of gingival tissue that has been reduced by periodontal disease

Diagnosis:

- visualization and measured with periodontal probe
- root exposure may lead to discomfort

Treatment:

- Must maintain at least 2mm healthy gingiva to keep the tooth
- depends on severity
- increased home care for mild cases
- extraction in severe cases
- gingival grafts (advanced procedure with many challenges and requires excellent home care)

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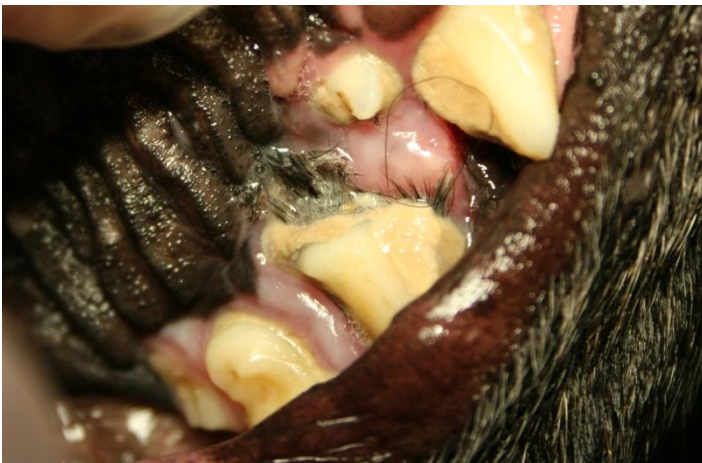
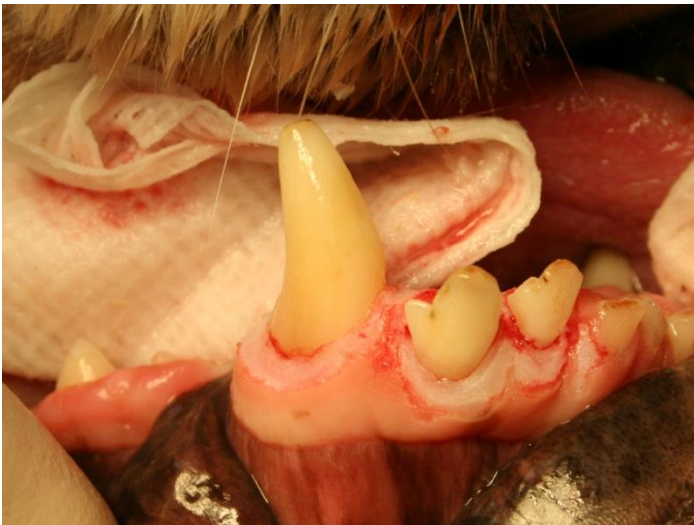


Gingivoplasty (GP) – removal of gingival tissue by contouring usually with a 12 fluted bur on a high-speed hand piece. Caution must be used not to damage enamel

Gingivectomy (GV) - excision of gingival tissue by blade, radiosurgery or laser.

Care must be taken to leave at least 2mm of healthy gingival tissue for tooth to remain healthy. This is a minimum but the more the better. Consider the eruption status of the tooth (i.e. – an under-erupted tooth will require more than gingival removal to become normal. Trimming the gingiva will lead to insufficient tissue for tooth to be healthy long-term)

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Hair Impaction (HI) – entrapment of hair in the tongue, gingival sulcus or palatal rugae which can lead to inflammation and local infection and odor

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Juvenile Onset Rapidly Progressing

Periodontitis of Cats – Severe gingival reaction with bone loss that occurs in young cats that begins when the adult erupts and seems to continue to about 18 months of age. At that time, the gingivitis will reduce, but significant bone loss remains.

Diagnosis:

- Visualization
- Dental radiographs
- Odor
- Gingivitis at a young age

Treatment:

- Complete assessment under general anesthesia
- Tooth-by-tooth exam
- Full-mouth dental radiographs
- Removal of teeth that are not salvageable
- Institute daily plaque control
- Repeat professional cleaning every 3-6 months depending on home care efforts

Patient from above 6 weeks after cleaning with daily tooth brushing

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Lip Entrapment – Traumatic lesions of the lips resulting from contact of teeth. Most commonly occurs in cats after removal of upper canine teeth due to positioning and sharp nature of teeth.

Diagnosis:

- visualization

Treatment:

- removal of offending teeth
- crown reduction with endodontic treatment
- consider surgical extraction of lower canine tooth when removing upper canine tooth



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Mobility (M) – excessive movement of tooth (up to 0.2mm is normal), usually as a result of loss of supporting bone and soft tissues from periodontal disease

M1 – 0.2mm - 0.5mm

M2 – 0.5mm – 1.0mm

M3 – greater than 1.0mm

source www.AVDC.org

Diagnosis

- visualization and periodontal probing

Treatment

- in general practice setting, most tooth mobility is treated by extraction of the affected teeth

Malocclusion (MAL) – abnormal relationship of tooth position based on a tooth or teeth being out of place or even jaw length discrepancy. Malocclusions can be quite complicated and require more advanced training to address. On a simplified basis can be classified as follows:

MAL/1 (Neutroclusion)* – Class 1 malocclusion has normal relationship between maxilla and mandible but has one or more teeth out of place (rostral cross bite (CB/R), caudal cross bite (CB/C), lance canine, base narrow canine (BNC))



Caudal Crossbite (CB/C) - Previously posterior cross bite. When one or more mandibular cheek teeth are positioned in a buccal position to the opposing maxillary teeth in the caudal aspect of the mouth

Diagnosis

- Visualization

Treatment

- Removal, modification or orthodontic movement if practical or necessary due to abnormal contact
- Depends on purpose of dog and severity and effects of malocclusion



Rostral Crossbite (RXB) - Previously anterior cross bite. When one or more maxillary incisors are caudal to the mandibular incisors

Diagnosis

- Visualization

Treatment

- Removal, modification or orthodontic movement
- Depends on purpose of dog and severity and effects of malocclusion

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Rostrally Displaced Canine Tooth (lance canine)

Diagnosis:

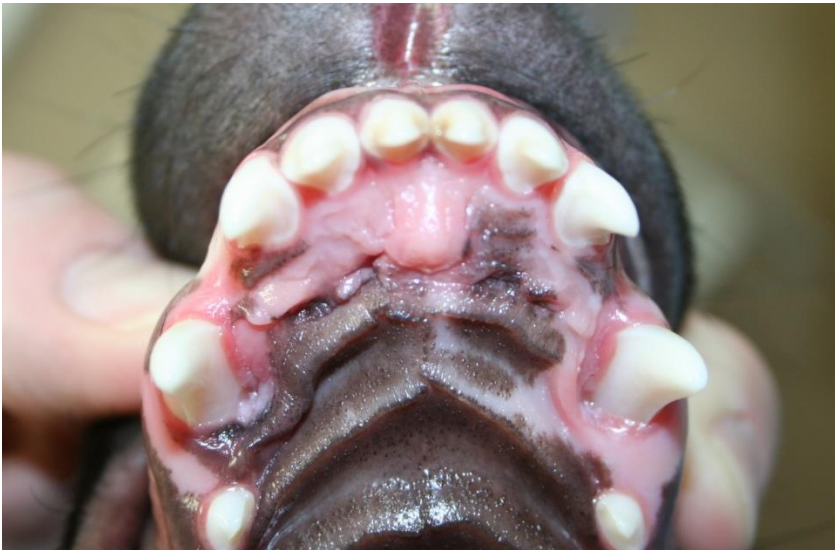
- Visualization
- Probing

Treatment:

- Orthodontic movement
- Crown reduction and endodontic therapy
- Extraction

These teeth commonly have deep periodontal pockets resulting from enamel covered crown being under the gingiva. It can be a difficult area to manage plaque control. This malocclusion can create difficulties with the bite due to interference with the lower canine tooth. If left untreated, can lead to disease in the nasal passage.

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MAL/2 (Mandibular Distocclusion)* – Class 2 malocclusion where mandible is shorter than the maxilla resulting in what has been commonly called an over bite

Diagnosis:

- visualization
- look for trauma from teeth hitting soft tissue or other teeth

Treatment:

- must consider effect of treatment on closure of mouth (removing a tooth can cause mouth to close more and lead to trauma in other areas)
- If traumatic can re-shape, move or remove offending tooth/teeth to create a functional occlusion without pain
- Must follow generally accepted endodontic treatment methods when reshaping teeth

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MAL/3 (Mandibular Mesiocclusion) – Class 3 malocclusion has mandible that is longer than the maxilla and has commonly been called an underbite which is common in brachycephalic breeds

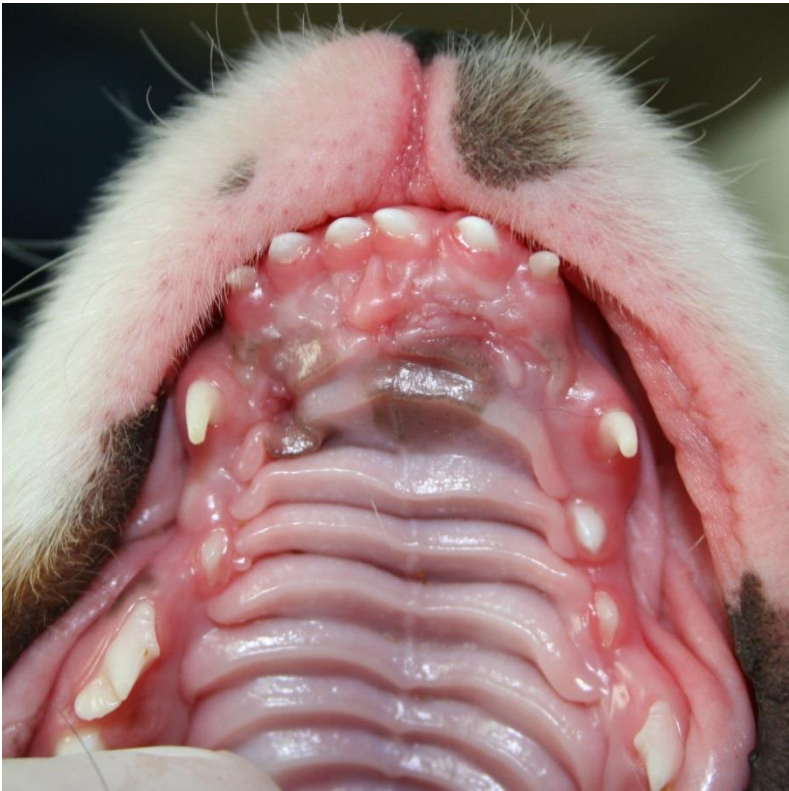
Diagnosis:

- visualization
- look for trauma from teeth hitting soft tissue or other teeth

Treatment:

- must consider effect of treatment on closure of mouth (removing a tooth can cause mouth to close more and lead to trauma in other areas)
- If traumatic can re-shape, move or remove offending tooth/teeth to create a functional occlusion without pain. Must follow appropriate endodontic principles when re-shaping teeth
- Commonly has trauma to floor of mouth and lower canine teeth from upper incisors (extraction of upper incisors common, predictable solution)

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WRY Bite – historically layman's term to describe unilateral skeletal abnormalities where one mandible or maxilla is longer than the other (Maxillary-Mandibular Assymetry)

Diagnosis:

- visualization

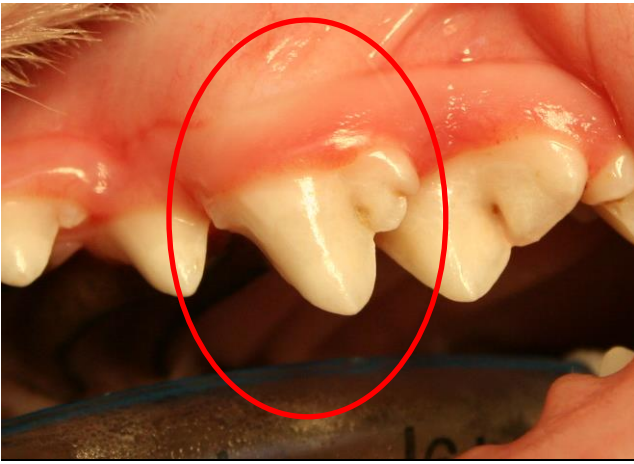
Treatment:

- Must consider effect of treatment on closure of mouth (removing a tooth can cause mouth to close more and lead to trauma in other areas)
- If traumatic can re-shape, move or remove offending tooth/teeth to create a functional occlusion without pain
- Teeth exposed to extra oral elements may be desiccated from lack of salivary bathing



Mandible (MN) – pertaining to the lower jaw (fractured mandible noted as FX/MN)

Maxilla (MX) – pertaining to the upper jaw (fractured maxilla noted as FX/MX)



Macrodontia (T/MAC) – a tooth that is larger than it should be.

Diagnosis:

- Visual

Treatment:

- If healthy and not causing crowding or trauma to other teeth can remain



Microdontia (T/MIC) – a tooth that is smaller than it should be. Not to be confused with a deciduous tooth

Diagnosis:

- Visual and radiographic

Treatment:

- If healthy, can remain



Odontodysplasia – general term for some complication during development either from genetic influence or some event during tooth formation (trauma, electrocution, infection, etc...)

Diagnosis:

- Visualization of gross abnormality
- Dental radiograph to determine extent of abnormality
- probe and explore tooth for pulp exposure (PE)

Treatment:

- Most common treatment is surgical extraction of affected teeth

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Oral Mass (OM)

Diagnosis:

- visual inspection
- radiographs
- biopsy
- advanced imaging if needed

Treatment:

- appropriate cancer workup
- excision depending on biopsy
-



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Oro-Nasal Fistula (ONF) – communication between the oral and nasal cavities. May be result of advanced periodontal disease with tooth loss or failed closure of extraction site.

History/Clinical Signs:

- Sneezing
- Nasal discharge
- Possibly responsive to antibiotics
- Possible anorexia
- Halitosis
- Owner rarely notices the problems

Diagnosis:

- visualization and periodontal probing

Treatment:

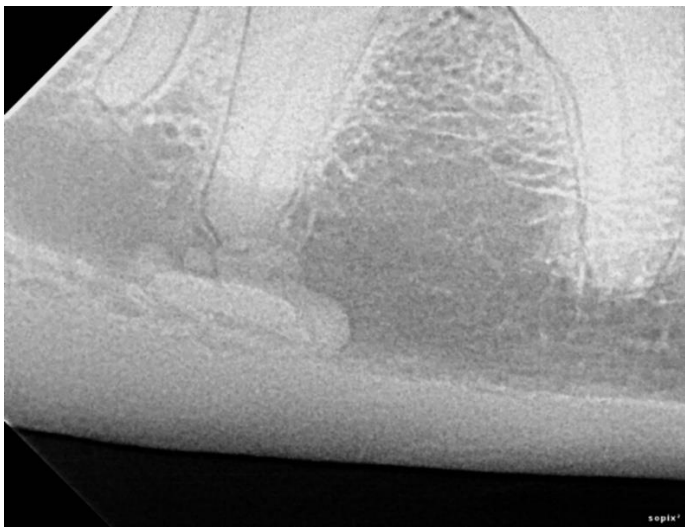
- Removal of affected teeth
- Wide-based, full-thickness muco-gingival flap
- No tension
- Debridement
- Avoid placing sutures over defect



2 weeks post-repair



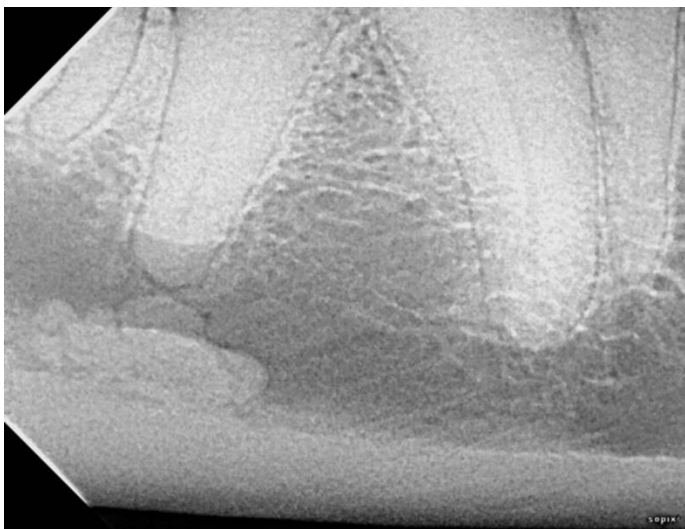
6 months post-



Osteosclerosis (OSS) – Radiographic density that is not associated with tooth pathology

Diagnosis:

- Radiograph
- Take multiple views from various angles to determine if the density moves with the tooth
- In density stays with the tooth, it is condensing osteitis with is a pathology response to disease
- Osteosclerosis is usually not a pathologic condition of concern





Palatal Trauma (PTM) – Trauma to palatal tissues commonly caused by a malpositioned tooth but could also be from other types of damage

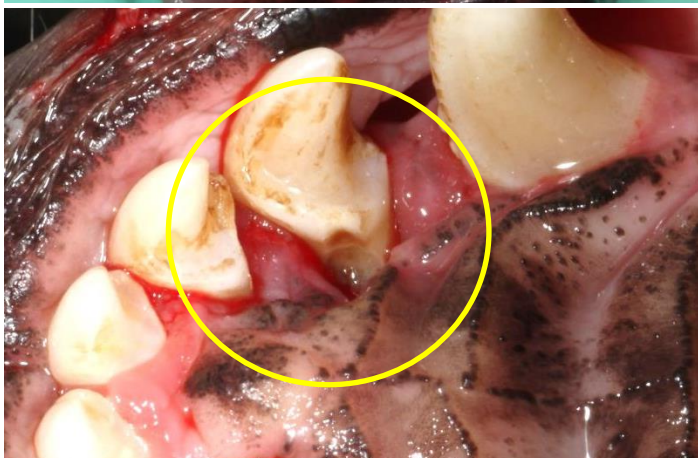
Diagnosis:

- Visualization
- Periodontal probing
- Dental radiographs to assess boney structures

Treatment:

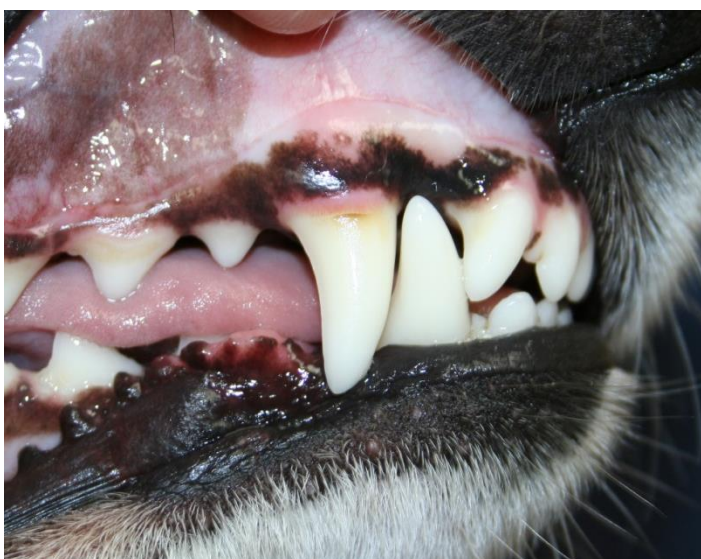
- Move offending tooth
- Remove offending tooth
- Crown shorten with appropriate endodontic therapy
- Consideration must be given to the degree of tissue damage and if the tissues can be returned to health. In the instance of a chronic problem, it may be advisable to remove teeth in the area of trauma

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PD 0



PD 1



PD2 1-25%

Periodontal Disease (PD) –

- inflammatory/ infectious disease involving gingiva, alveolar bone, periodontal ligament and cementum
- stage of disease determined by amount of bone loss measured on radiographs from cement-enamel junction (CEJ) to root apex and divided as follows:

PD 0 – normal periodontium

PD 1 – gingivitis only

PD 2 – less than 25% bone loss

PD 3 – 25-50% bone loss

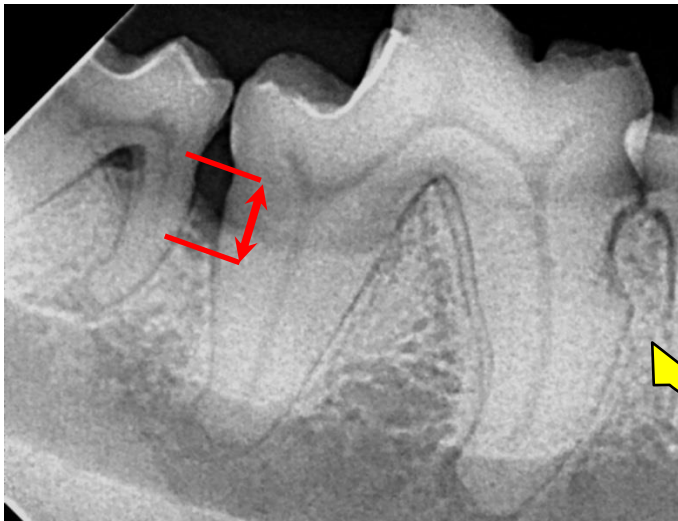
PD 4 – greater than 50% bone loss

Diagnosis:

- OraStrip® test
- periodontal probing
- dental radiographs

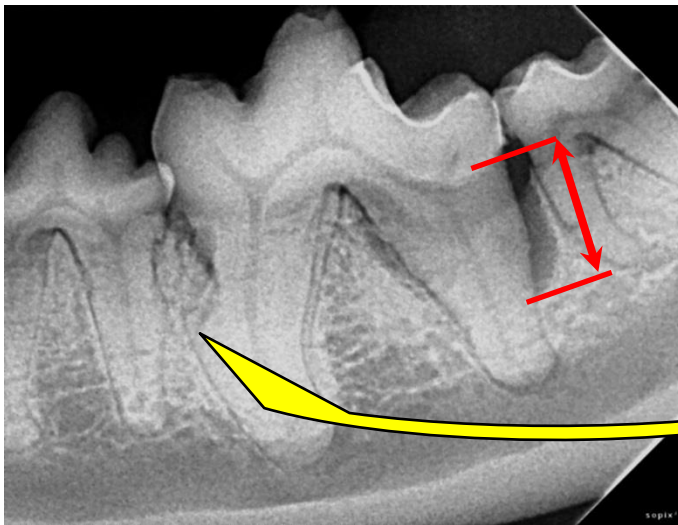
Treatment:

- depends on severity
- root planning, conditioning, perioceutic placement
- Guided tissue regeneration (GTR)
- most common treatment in general practice will be extraction unless the owner is motivated to save the teeth and willing to perform daily home care and frequent follow up visits for maintenance



Note tooth resorption with wide periodontal ligament (PDL) space on mesial root of lower right 1st molar (409) and distal aspect of lower 4th premolar (408). Both required surgical extraction

PD 3 26-50%



Note vertical bone loss on distal aspect of lower left 1st molar (309) as well as tooth resorption of mesial root and distal root of lower left 4th premolar (308). Both required surgical extraction. It would be highly likely that 310 would be removed as well.

PD 4 > 50%



Pulp Exposure (PE) – typically a fracture (**FX**), abrasion (**AB**) or attrition (**AT**) that extends through the enamel, dentin and into the pulp chamber necessitating root canal therapy, vital pulp therapy or extraction

See FX3a and FX3b under tooth fracture classification for more details



Periodontal Pocket (PP) – lesion created during periodontal infection that has walls that can retain perioceutic (**PCT**) treatments (Doxirobe Gel)

Diagnosis:

- Periodontal probing
- Dental radiographs

Treatment:

- pocket is less than 4-5mm; closed root planning (**RPC**), curettage and root conditioning with 17% EDTA followed by Doxirobe placement (**PCT**)
- pocket greater than 4-5 mm; open root planning (**RPO**), curettage and root conditioning with placement of bone grafting material (**BG**) and closure. Recheck and follow up therapy is essential and usually performed in 3-6 months and home care is important

If owner is not motivated to perform home care and follow up regularly, then extraction should be performed

Periodontal Prophylaxis (PRO) – controversial name for tooth scaling and polishing, which in humans indicates a preventative procedure but in veterinary patients is usually dealing with established disease



Pyogenic Granuloma (PYO) – an area of inflammation that is commonly caused by a malocclusion resulting in soft tissue trauma. Commonly seen in felines where the upper 4th premolar contacts the buccal aspect of the lower 1st molar. The lesions can resemble squamous cell carcinoma (SCC). Prior to onset of inflammation may be a small raised area or a wedge shaped defect from malocclusion

Diagnosis:

- Visual
- Look for evidence of tooth trauma often there is an indentation
- Biopsy of tissue

Treatment:

- Many factors to consider
- Can area be removed and still have healthy tissue surrounding affected tooth?
- Can the offending tooth be reshaped to alleviate trauma?
- Most effective is to remove offending tooth and traumatized area

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Compliance Tip

Clients fear that losing teeth will affect their pet's ability to eat. Removing an area of pain and infection will be an improvement even if the teeth must go as well

Restoration with composite (R/C) – restorative material used that is a modified plastic polymer to replace tooth structure. Technique sensitive procedure requiring specialized materials with a full understanding of restorative principles



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Root Canal Therapy (RC) – endodontic procedure performed on broken or non-vital teeth which involves making access to the inside of the tooth, removing pulp contents, filing to remove diseased dentin and shaping of the canal, disinfection, sealing the tooth, packing the canal with gutta percha to press the sealer against the walls and finally restoring the tooth structure.

Advantages of root canal therapy over extraction are:

- Tooth retains function
- Maintains occlusion and normal “scrubbing” with opposing tooth
- Less invasive than extraction

Disadvantages of root canal therapy over extraction are:

- More costly
- Requires monitoring with dental radiographs
- May require retreatment in the unlikely event of failure

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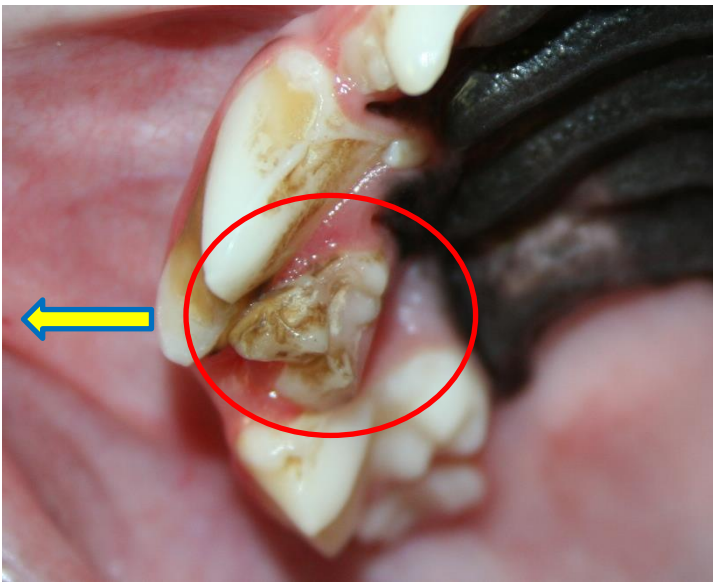
Persistent Deciduous Tooth (DT/P) – two teeth in the same spot at the same time (deciduous and adult) or the presence of a deciduous tooth with no adult counterpart. **RD** can cause malocclusions (**MAL**) and lead to more rapid tartar accumulation and consequently more periodontal disease. Deciduous teeth are not designed for long term use but occasionally can remain healthy for years

Diagnosis:

- visualization and radiographic evaluation to determine the status of root resorption and expectations for extraction
- deciduous tooth usually smaller, more sharp appearance, and a more narrow root canal diameter on radiographs with longer roots

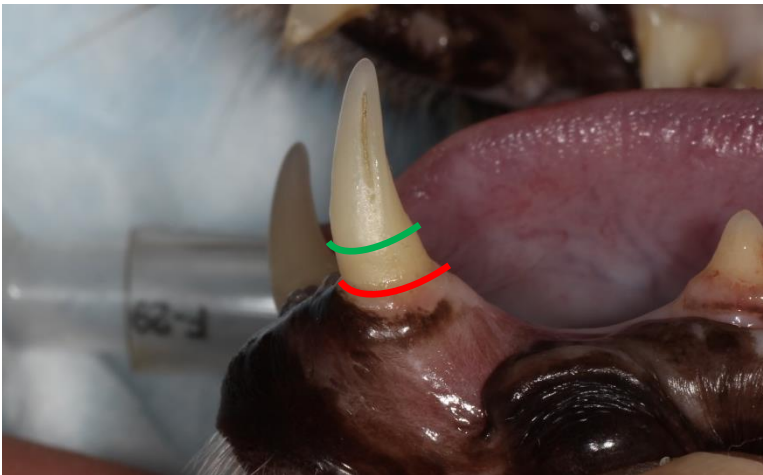
Treatment:

- gentle extraction technique as these teeth are very fragile and removal of entire tooth is essential. (If the root was going to dissolve, it would not be a retained tooth)



Red circle around retained deciduous premolar; Yellow arrow displays the direction the adult tooth is deviated

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Cemento-enamel junction (**CEJ**) is normal attachment site for healthy, normal gingiva (**green line**). Note the extent of gingival recession and/or tooth extrusion and the resulting root exposure which is measured from the CEJ to the free gingival margin (**red line**) and reported in millimeters (RE3 = 3mm of root exposure).

Root Exposure (RE) – results from recession of gingival tissues or from extrusion of teeth most commonly associated with periodontal disease. In people, root exposure can be a source of discomfort.

Diagnosis:

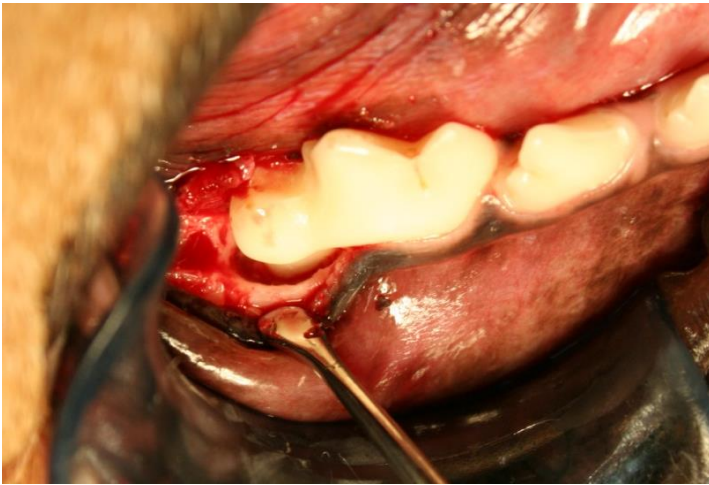
- visualization and periodontal probing; root exposure is measured from cemento-enamel junction to the free gingival margin and reported in millimeters (3mm of root exposure would be RE3 noted on the dental chart). If there is gingival recession leading to the root exposure it is not necessary to note them both however if the tooth appears to be extruding and the gingiva is normal amount then RE would be the correct notation

Treatment:

- root exposure is a most commonly associated with periodontal disease and will progress without homecare
- extraction is commonly performed late in the disease state but consideration should be given earlier in the process for the good of the patient
- if owner is willing to perform home care and there is enough healthy gingiva, can apply bonding agent according to appropriate methods to reduce sensitivity

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Root Planing Closed (RPC) – periodontal treatment using curette to smooth the root surface to remove diseased cementum and sub-gingival tartar followed by root conditioning with 17% EDTA then usually Doxirobe; usually for periodontal pockets less than 4-5mm in depth.



Root Planing Open (PRO) – periodontal treatment using curette to smooth the root surface to remove diseased cementum and sub-gingival tartar followed by root conditioning with 17% EDTA and bone grafting material with a membrane; usually for periodontal pockets greater than 4-5mm in depth and performed after elevating a flap for better exposure.

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Retained Root Tip (RRT) – tooth root tip is present after attempted extraction, tooth resorption or trauma.

Diagnosis:

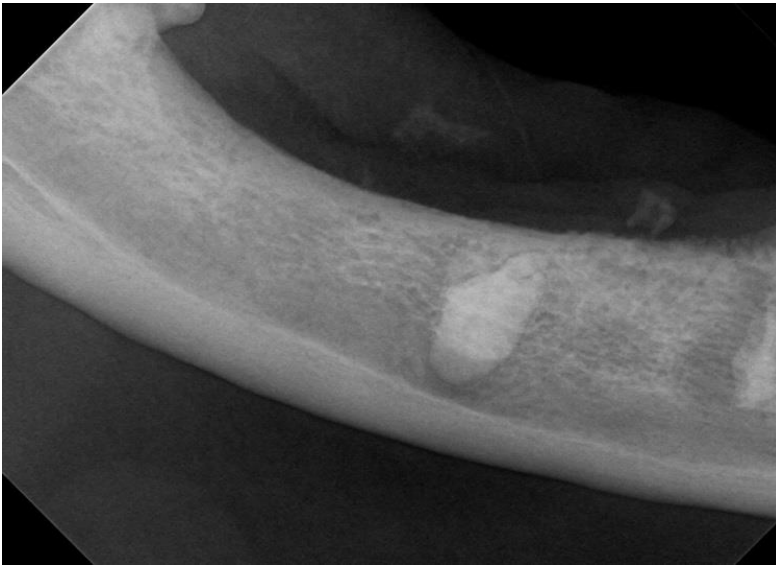
- Radiographs of area of missing tooth
- Suspected when area of missing tooth has remaining inflammation
- Rarely a history of extraction complication

Treatment:

- Determination must be made if root tip is causing pathological problems based on draining tract or inflammation as well as dental radiography
- Any root tip causing pathology should be removed
- Root tips that are not causing problems but located in an area of another extraction should be removed
- If stomatitis is present, all tooth structure should be removed
- Most predictable course of action is removal of retained root tip

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Retained Tooth Root (RTR) – similar to retained root tip but is usually a larger portion of the root. Treatment is the same as above.

Radiograph showing mesial root from lower right 1st molar with periapical lucency as well as “darker” alveolar bone adjacent which is an indication of disease requiring surgical removal



Rotated (ROT) – tooth is turned on its long axis many times resulting in crowding with poor gingival attachment or recession where tooth protrudes labially

Diagnosis:

- Visual
- Periodontal probing to determine attachment
- Common in brachycephalic breeds

Treatment:

- Surgical extraction to alleviate crowding
- Priority goes to strategic teeth



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Staining Extrinsic (SE) – staining of the tooth that is associated with the outer surface of the tooth which can include metallic stains from chewing on metal objects

Diagnosis:

- visualization

Treatment:

- usually cosmetic in nature; may require use of flour of pumice as a polishing substance



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Staining Intrinsic (SI) – discoloration of the tooth structure from within the tooth

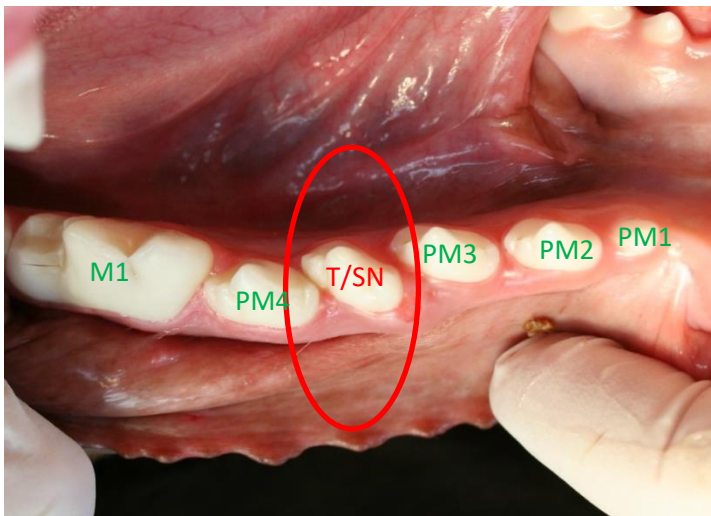
Diagnosis:

- Visualization
- dental radiographs to determine tooth vitality
- compare to contralateral tooth (same tooth on opposite side)

Treatment:

- usually an indication of previous tooth trauma and pulpitis.
- Most of the time this results in a non-vital (NV) tooth which requires root canal therapy (RC) or extraction (X, XS, XSS)





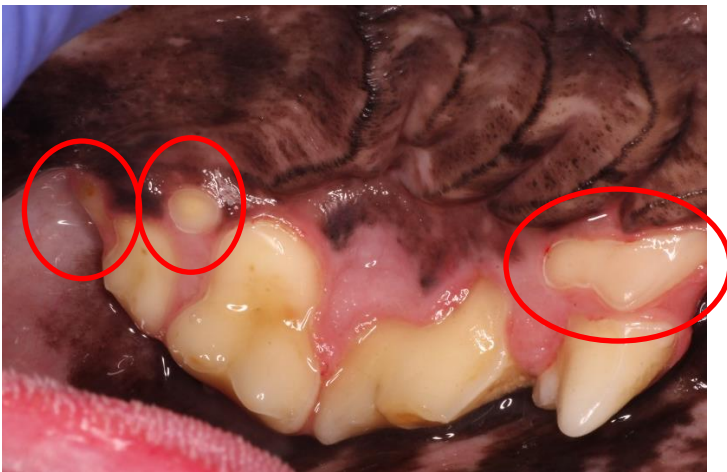
Supernumerary Tooth (T/SN) – an extra tooth which is noted as the tooth number with the abbreviation following (i.e. an extra lower right 2nd premolar would be 406 SN); commonly occurs in Boxers

Diagnosis:

- visualization

Treatment:

- Removal of SN teeth is performed if it causes crowding and therefore an increased risk of periodontal disease or if is diseased like any other tooth



Clinical Tip

It is rarely significant which tooth is the supernumerary. There is no need to spend extra time trying to figure it out. Address the one that causes concern and don't get bogged down trying to name it appropriately. In the example above, there is the possibility the supernumerary tooth is the 2nd, 3rd or 4th mandibular premolar.



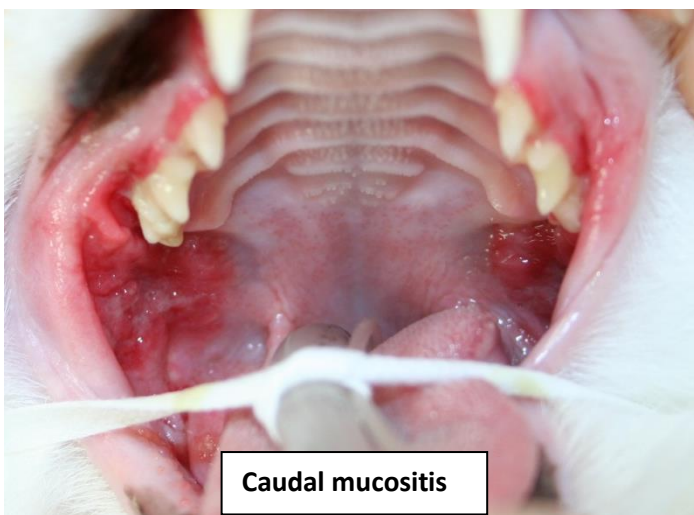
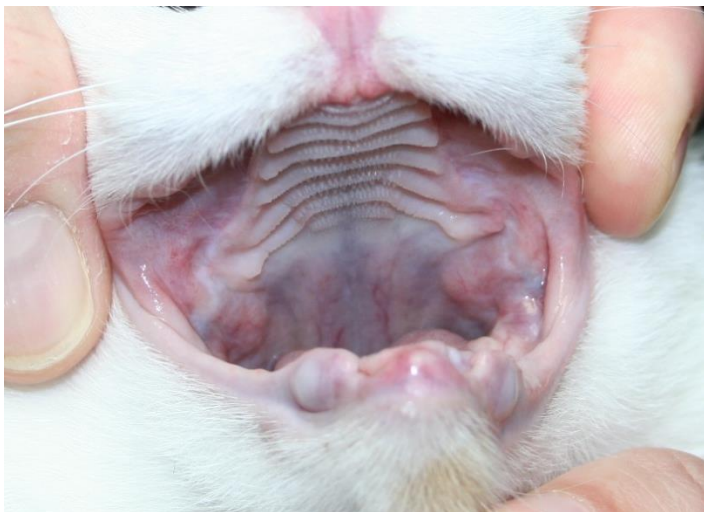
Stomatitis (ST) – Inflammatory condition of the mouth where there seems to be an intolerance to plaque resulting in severe ulceration

Diagnosis:

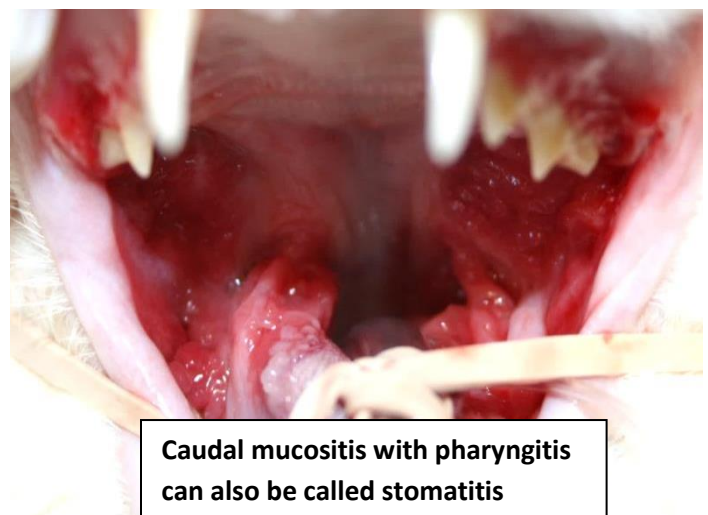
- Visualization
- Biopsy unrewarding unless localized

Treatment:

- SURGICAL DISEASE
- Best to perform full mouth surgical extractions with aggressive alveoplasty and removal of the periodontal ligament (PDL) as early in the disease process as possible to have the best chance at complete resolution. Some will remove all teeth affected by periodontal disease and tooth resorption and prescribe diligent home care with frequent follow up. This disease is multifactorial and is considered by most veterinary dental professionals to be a surgical disease. The longer this disease is medically managed the chance for complete cure goes down.



Caudal mucositis



Caudal mucositis with pharyngitis can also be called stomatitis

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Symphyseal Separation (SYM/S)

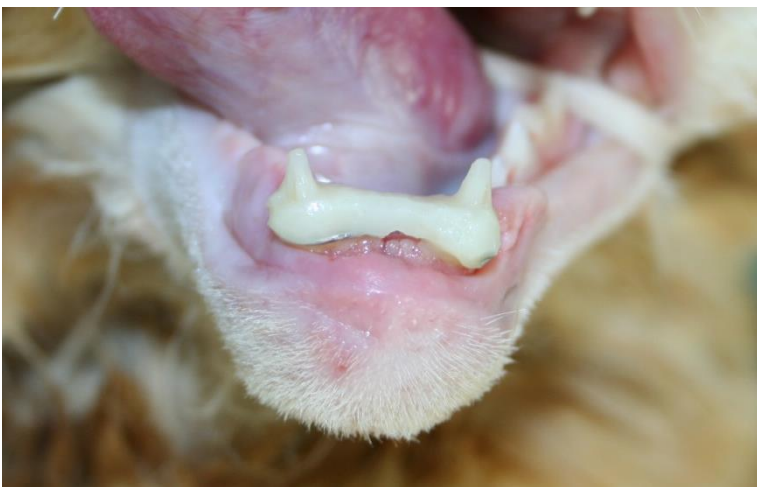
- ranges from slight laxity to complete separation
- acute or chronic

Diagnosis:

- visualization
- manipulation
- dental radiographs

Treatment:

- acute trauma should be wired or a splint placed to allow a chance for healing; chronic separation usually requires no treatment even though historically, wire placement was recommended but has been proven ineffective as this is a fibrous union and not likely to stabilize unless acute injury



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Tooth (T) – abbreviation for tooth used with other abbreviations (i.e. tooth impaction = T/I)



Tooth Avulsion (T/A) – Complete removal of tooth from socket following some traumatic event

Diagnosis:

- Visual

Treatment:

- Dental emergency
- Tooth needs to be preserved in milk or transport media
- Gently rinsed and placed back in alveolus
- Splinted in place followed by root canal therapy
- If not saving tooth, dental radiographs to ensure tooth completely removed followed by debridement of alveolus and closure with tension free flap





Tooth Impaction (T/I) – when a tooth is located beneath the gum-line

Diagnosis:

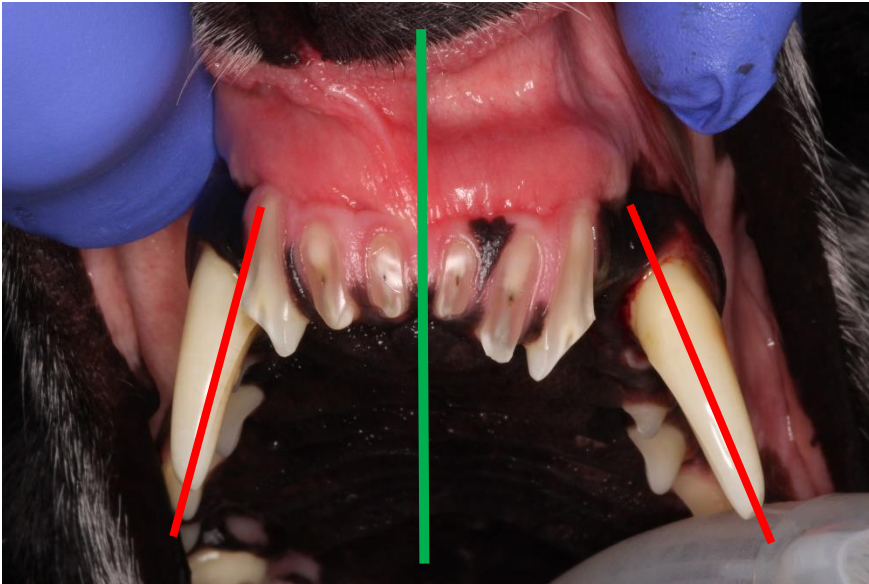
- visual inspection reveals decreased tooth number
- dental radiograph to confirm presence/absence of a tooth
- absent tooth noted by a circle around the tooth on the dental chart
- Impacted teeth can also have dentigerous cyst (DTC) formation (see above)

Treatment:

- extraction of the impacted tooth to prevent formation of [a dentigerous cyst \(DTC\)](#)
- In cases where the tooth has been impacted for a number of years without cyst formation, it is unlikely to become a problem however, the client should be educated to follow up regularly if they opt not to extract. Extraction is preferred to be certain there will be no problem



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Tooth Luxation (T/LUX) - Tooth is moved from the normal position in the alveolus but remains mostly in the socket. Note the angle of the canine teeth depicted by the red lines. The canine tooth on the right side of the picture (dog's left upper) is displaced laterally. The circled areas in the lower picture demonstrate lacerations of the gingiva and mucosa

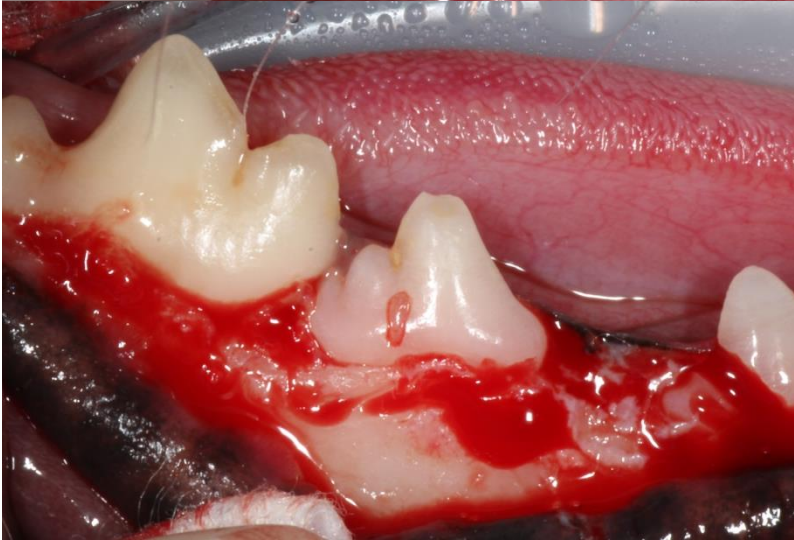
Diagnosis:

- Visual
- History of trauma
- Dental radiographs

Treatment:

- Replace and stabilize if fresh
- If chronic, might already be stable
- Monitor for signs of tooth death
- May require root canal therapy or extraction





Tooth Resorption (TR) – common but poorly understood destructive process of tooth structure which can expose pulp tissue leading to pain and infection; occurs in both dogs and cats. More detailed information regarding stages and types of tooth resorption can be found at www.avdc.org

Diagnosis:

- visualization
- periodontal probing
- dental radiographs

Treatment:

- reports of restoration exists but not practical or successful
- complete removal of identifiable tooth structure is most predictable
- atomization of tooth structure should NOT be performed to avoid complications with nerves, vessels or retained dental tissues
- make a moat around the root to aid in elevation
- crown amputation (CRA) is a treatment option IF tooth root is replaced by bone AND attempted extraction may cause damage to patient.
- Follow-up radiographs are essential to document appropriate resolution

More information about classification is available at www.avdc.org



Type 1



Type 2



Type 3 (both type 1 and type 2)

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Under-eruption (UE) – failure of a tooth to erupt fully resulting in the crown of the tooth to be below the normal gingiva creating a pseudo or false pocket which can lead to more susceptibility to periodontal disease

Diagnosis:

- visualization
- periodontal probing
- dental radiographs

Treatment:

- crown lengthening
- if mild may not require therapy
- surgical extraction if severe

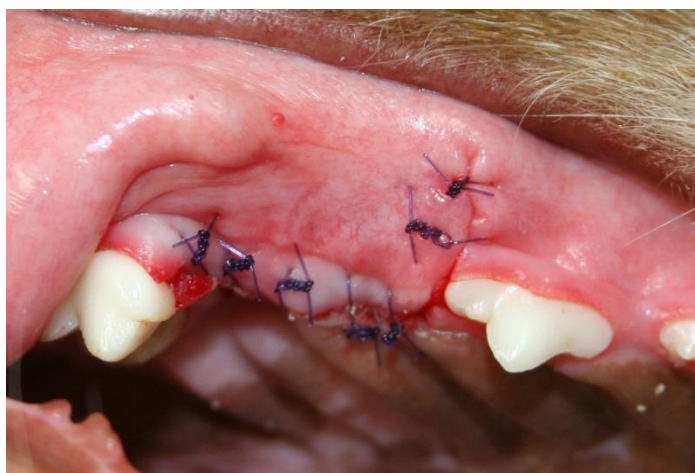
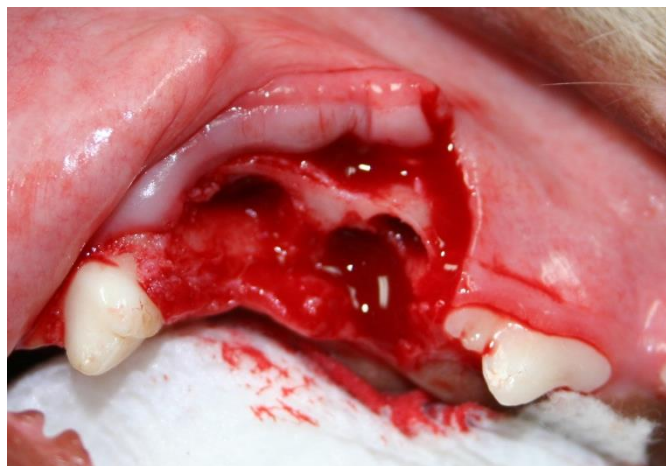


Extraction (X) – refers to extraction by simple elevation

Extraction sectioned (XS) – refers to multi-rooted teeth that require sectioning and simple elevation without flap elevation

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Extraction surgical (XSS) – refers to method of tooth removal that involves designing a flap, sectioning tooth into single-rooted segments, removal of alveolar bone and elevation of roots followed by smoothing of remaining bone and tension-free closure



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