



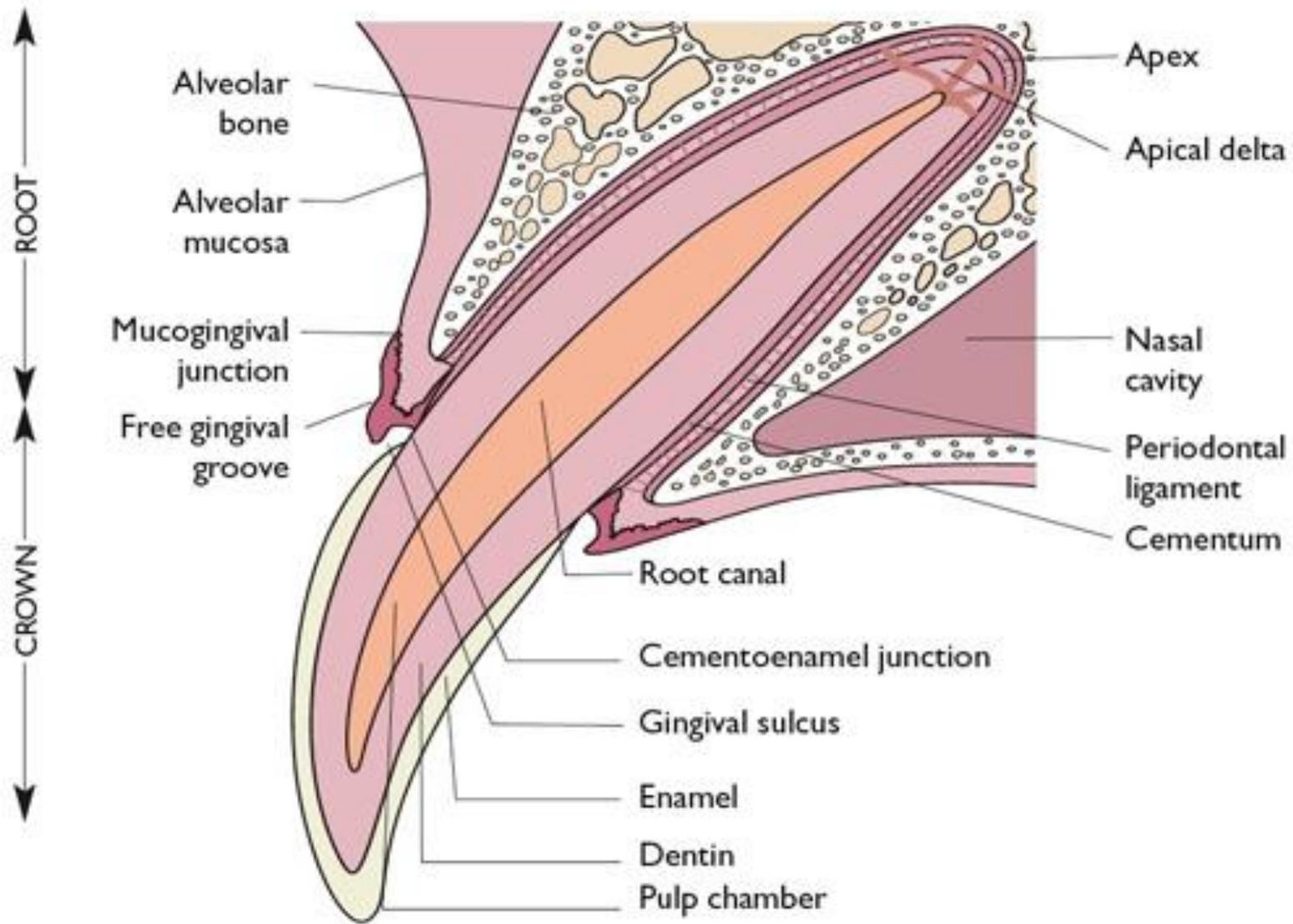
Veterinary Dentistry

BY

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2018

Anatomy & Histology



Enamel

Dentin

Pulp

Gingival Sulcus

Gingival Sulcus

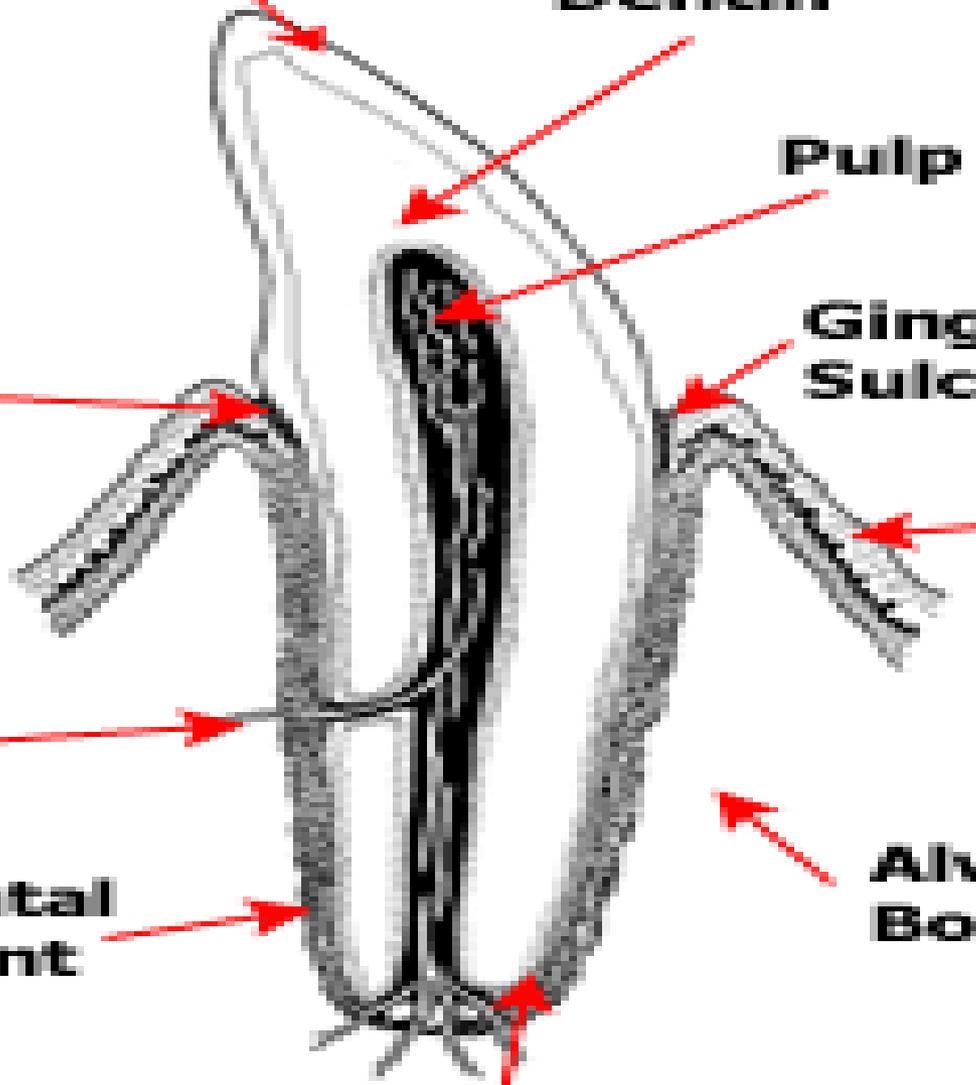
Gingiva

Lateral Canal

Peridontal Ligament

Alveolar Bone

Cementum



DENTAL ANATOMY OF DOGS

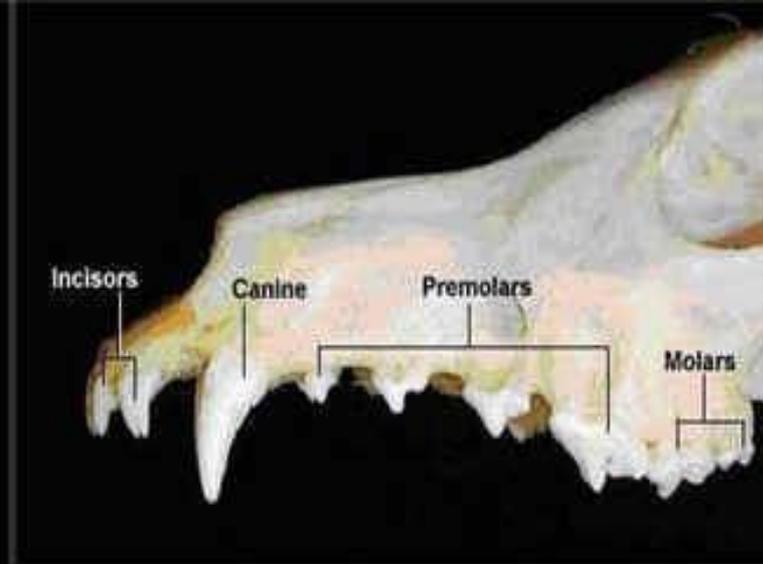
Dental Formula

Deciduous	$\frac{3 \ 1 \ 3}{3 \ 1 \ 3}$	= 14	Permanent	$\frac{3 \ 1 \ 4 \ 2}{3 \ 1 \ 4 \ 3}$	= 21
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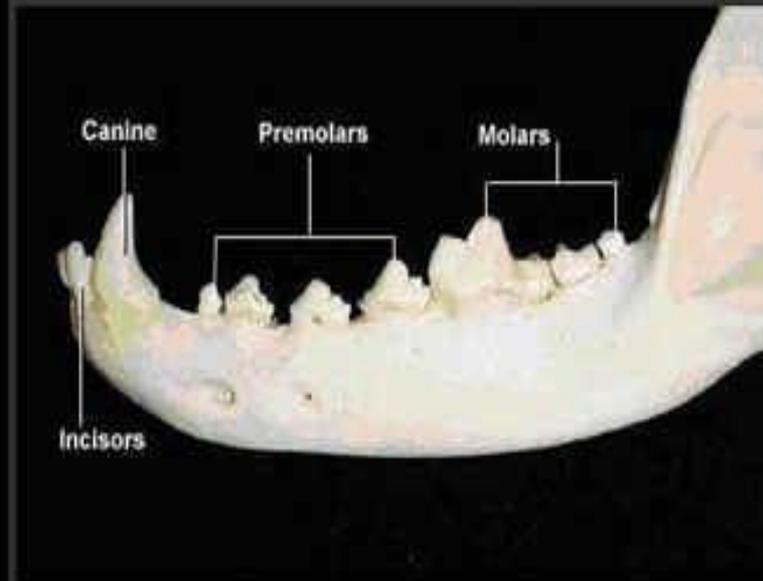
Note: P4 and M1 are the carnassial or shearing teeth

Tooth Eruption

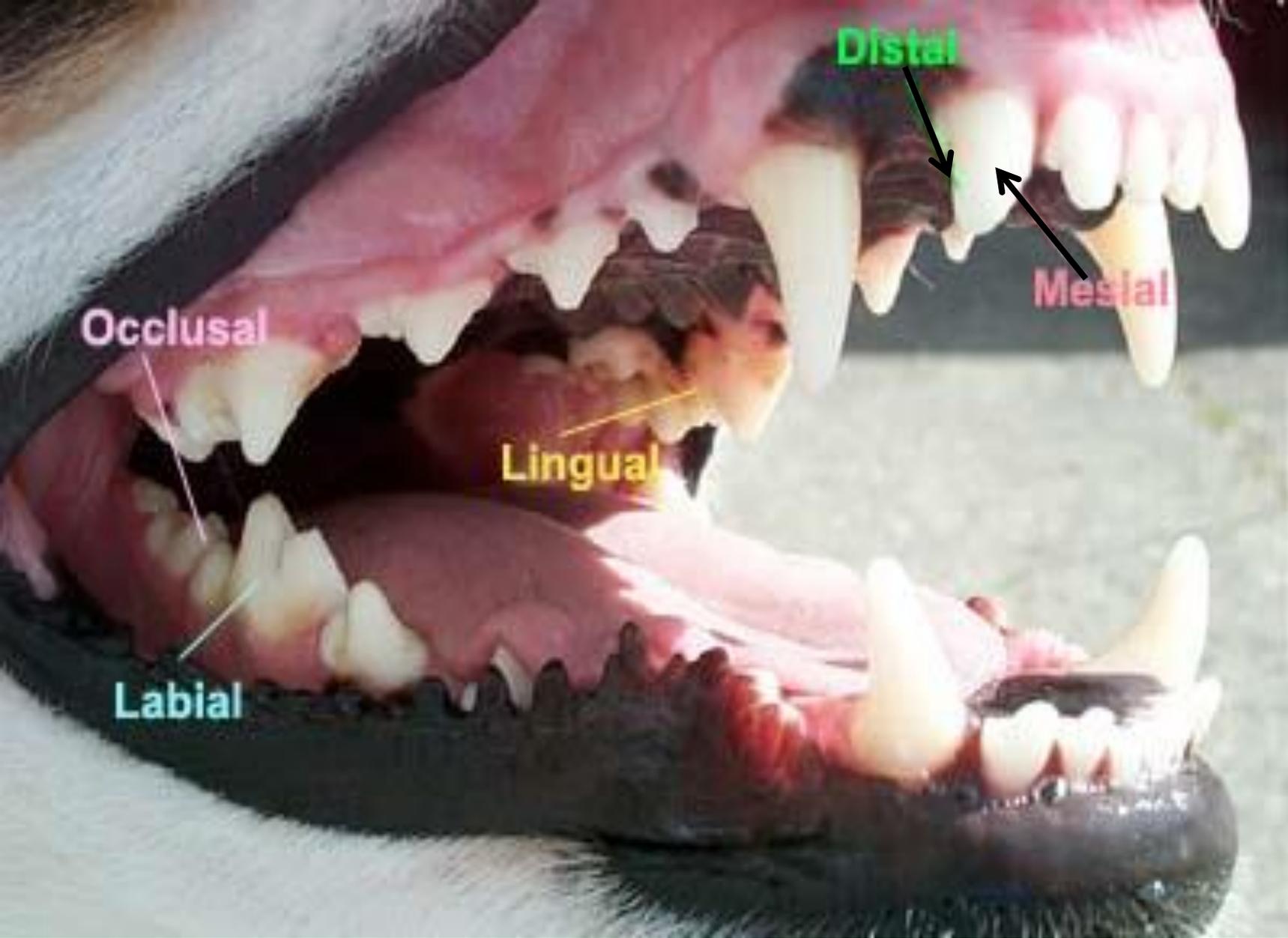
	Deciduous	Permanent
Incisors	4 - 6 weeks	3 - 5 months
Canine	5 - 6 weeks	4 - 6 months
Premolars	6 weeks	4 - 5 months
Molars		5 - 7 months



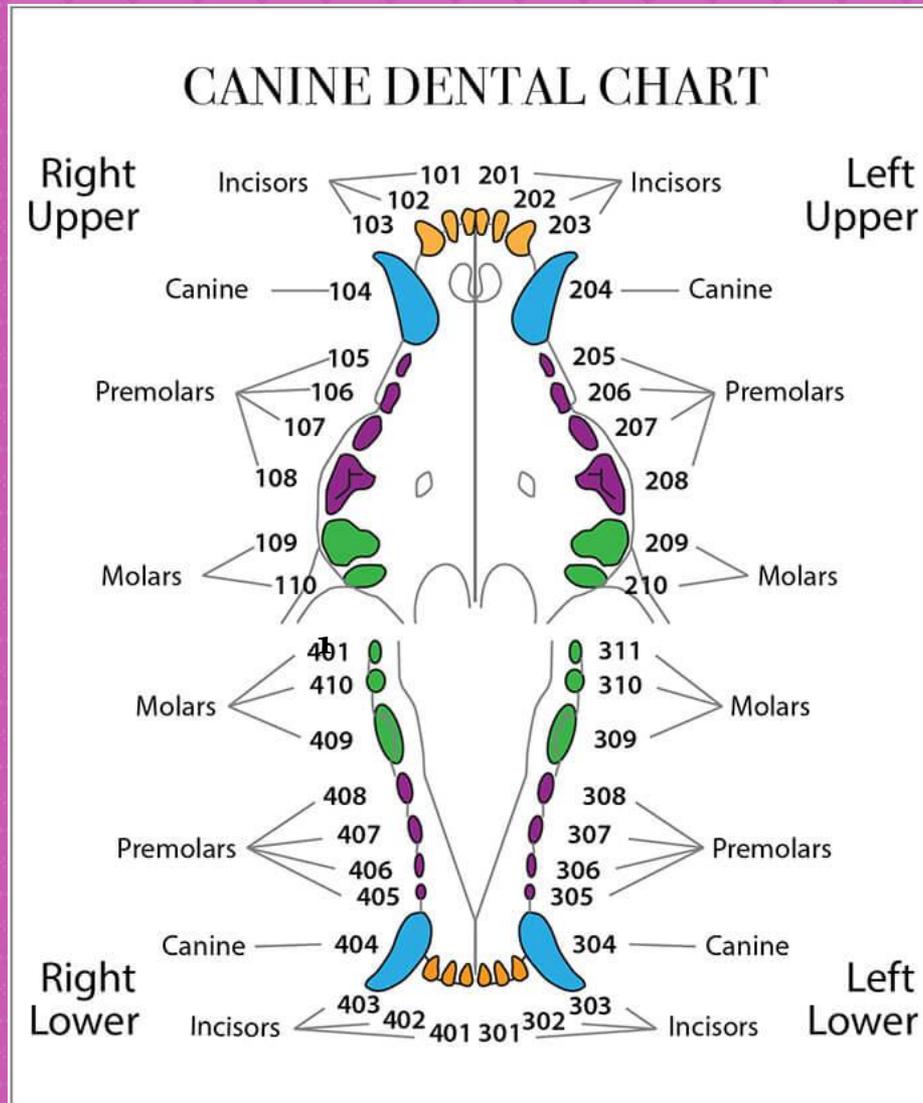
MAXILLARY ARCADE



MANDIBULAR ARCADE



Tooth numbering in dogs



ANATOMICAL CONSIDERATIONS

- Tooth has 3 parts: Crown, Neck and Root.
- **Crown** is the visible part of the tooth which is covered with enamel(hardest tissue in the body).
- **Neck** appears as a depression at the junction between crown and root.
- **Root** is the invisible part of the tooth that covered with cementum (Bone like tissue)

ANATOMICAL CONSIDERATIONS

- **Pulp Cavity** is the central cavity of the tooth extending from the crown to the root apex. Blood vessels, lymphatics and nerves enter it through the apical foramen.
- **Alveolus** is a bony cavity in the jaw in which the root is immovably inserted
- **Sharpey,s fibers** connect the cementum to the alveolus by syndesmoses.
- **Annular ligament** connects gum to the enamel

ANATOMICAL CONSIDERATIONS

- ◎ **Enamel** has 98% calcium hydroxyapatite crystals and 2% water and proteins.
- ◎ Its formation is completed before the tooth eruption and once it has formed, the ameloblasts are lost and no further development of enamel
- ◎ The enamel thickness of dogs (0.5mm) and cats (0.2mm) is thinner than that of humans (2.5mm)

ANATOMICAL CONSIDERATIONS

- **Dentine** is the bulk of the tooth which is covered with enamel at the crown and by cementum at the roots.
- It is continuously deposited throughout life by odontoblasts lining the pulp cavity.
- It composed of 70% calcium hydroxyapatite crystals, 18% collagen and 12% water.

ANATOMICAL CONSIDERATIONS

- ◎ **Cementum** is an avascular bone-like tissue that covers the roots. Its deposition is continuous throughout life as dentine. Also it is less calcified than enamel and dentine.
- ◎ **Periodontium** is an anatomical unit that attaches the tooth to the jaw.
- ◎ It is formed of gingiva, periodontal ligament, cementum and alveolar bone.

TEETH AFFECTIONS

Congenital Anomalies

CONGENITAL ANOMALIES

- ◎ **Polydontia** (supernumerary teeth): increases number of the teeth.
- ◎ **Oligodontia**: decreased number of the teeth.
- ◎ **Impacted Tooth**: unerupted tooth.
- ◎ **Persistent deciduous tooth**: failure of shedding of a deciduous tooth after eruption of the permanent one.

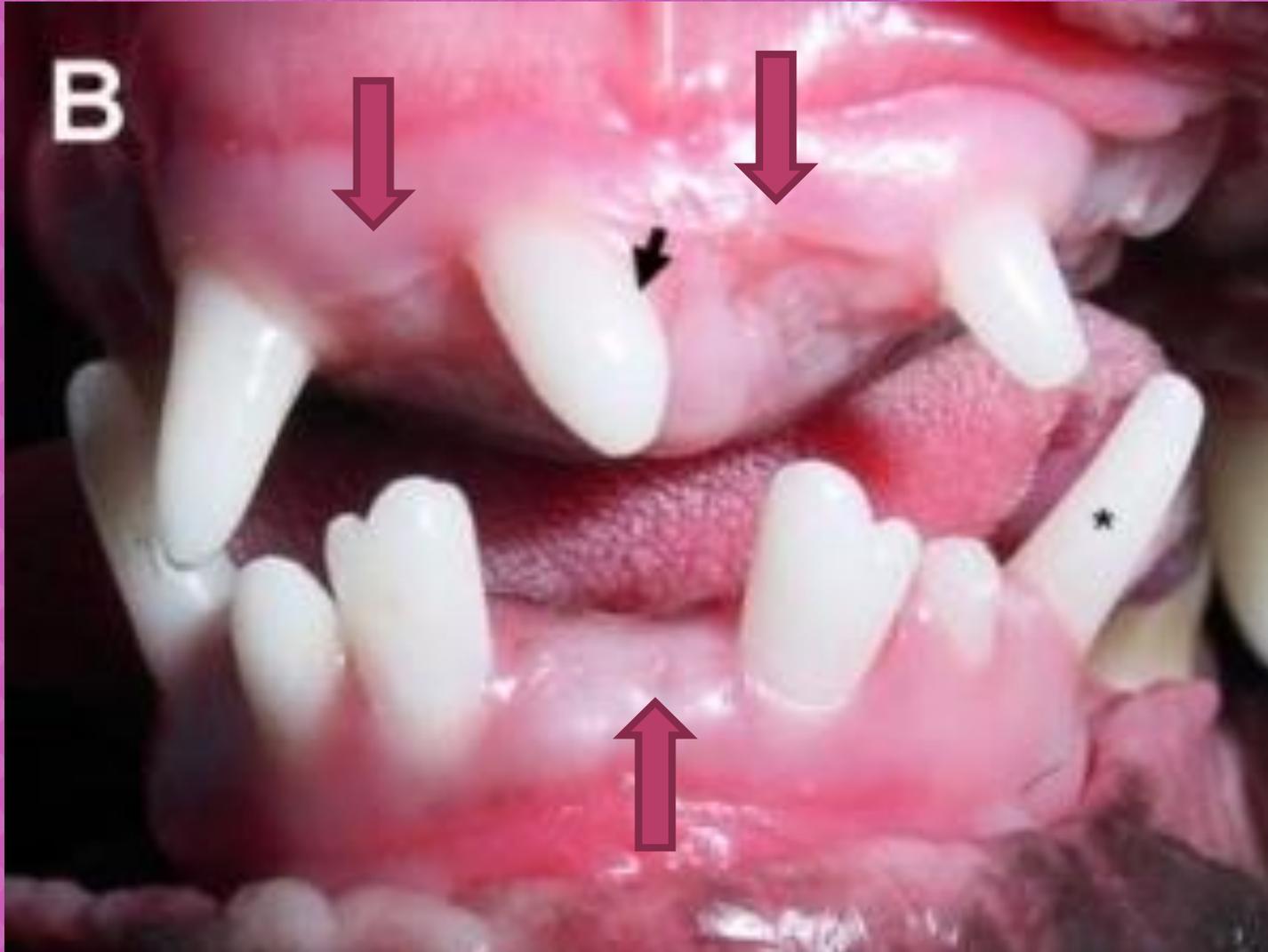
Polydontia in a puppy



Polydontia in a puppy



Oligodontia in a puppy



Impacted tooth in a dog



Persistent deciduous tooth in a puppy



CONGENITAL ANOMALIES

- ◎ **Diastema:** It is a gap between two teeth. These areas are very prone to grass and food impaction leading to periodontal disease. Flushing out the area with high pressure air and water, or in some cases actually widening the gap seems to be the best treatment
- ◎ **Dental malocclusion:** abnormal tooth alignment, pain and further dental problems are likely
- ◎ Treatment of congenital anomalies by either tooth extraction or orthodontic surgeries

Equine Diastemata



Dental Malocclusion

- ◎ Normal occlusion in dogs occurs when:
- ◎ The upper (maxillary) incisors *just* overlap the lower (mandibular) incisors
- ◎ The lower canines are located equidistant between the third incisor and the maxillary canine teeth.
- ◎ The premolar crown tips of the lower jaw point between the spaces of the upper jaw teeth.

Normal occlusion



Dental Malocclusion

There are two types of malocclusion:

- ◎ Skeletal malocclusion results when an abnormal jaw alignment causes the teeth to be out of normal orientation.
- ◎ Dental malocclusion, or malposition, occurs when one or more teeth are out of normal alignment but the jaws are normally aligned.

Dental Malocclusion

- ◉ **Neutroclusion** (Class 1 malocclusion; MAL/1): Jaw lengths are normal, but one or more teeth are in an abnormal position
- ◉ **Mandibular distocclusion** (Class 2 malocclusion; MAL/2, overbite): The lower jaw is shorter than the upper and there is a space left between the upper and lower incisors when the mouth is closed.
- ◉ **Mandibular mesiocclusion** (Class 3 malocclusion; MAL/3, underbite): The lower jaw is longer than the upper (normal in brachycephalic breeds)

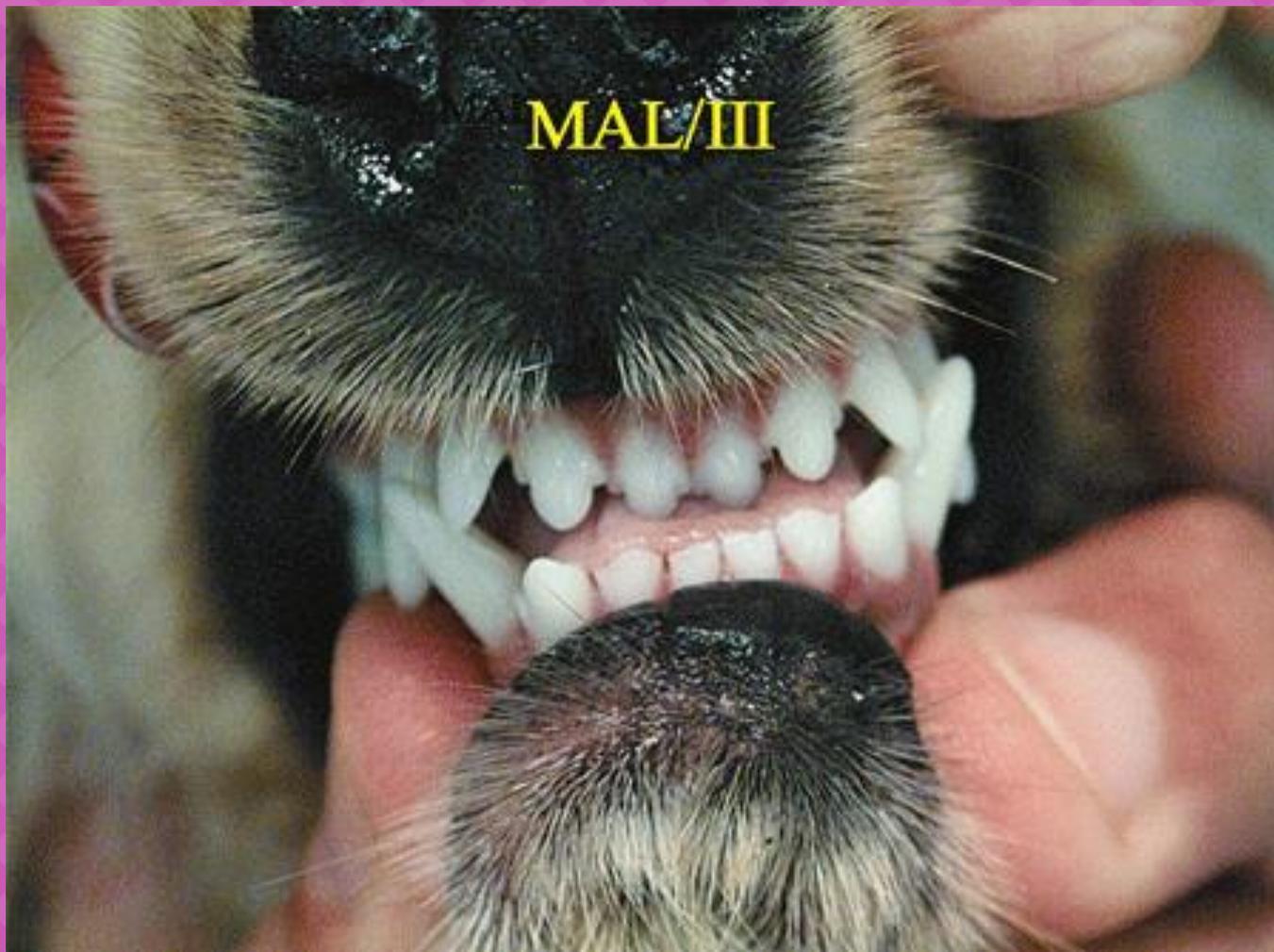
A class I malocclusion in a puppy



A class II malocclusion in a puppy



A class 3 malocclusion in a puppy



Acquired Affections

ACQUIRED AFFECTIONS

Common Signs of teeth affections:

- Loss of appetite.
- Loss of weight
- Decreased production
- Disturbed mastication
- Undigested food in the feces.
- Sometimes impaction, tympany and colic.
- Prolonged food intake.
- Excessive salivation
- Offensive oral odor.
- Sometimes fever.

1-SHARP ENAMEL POINTS (SHARP TEETH)

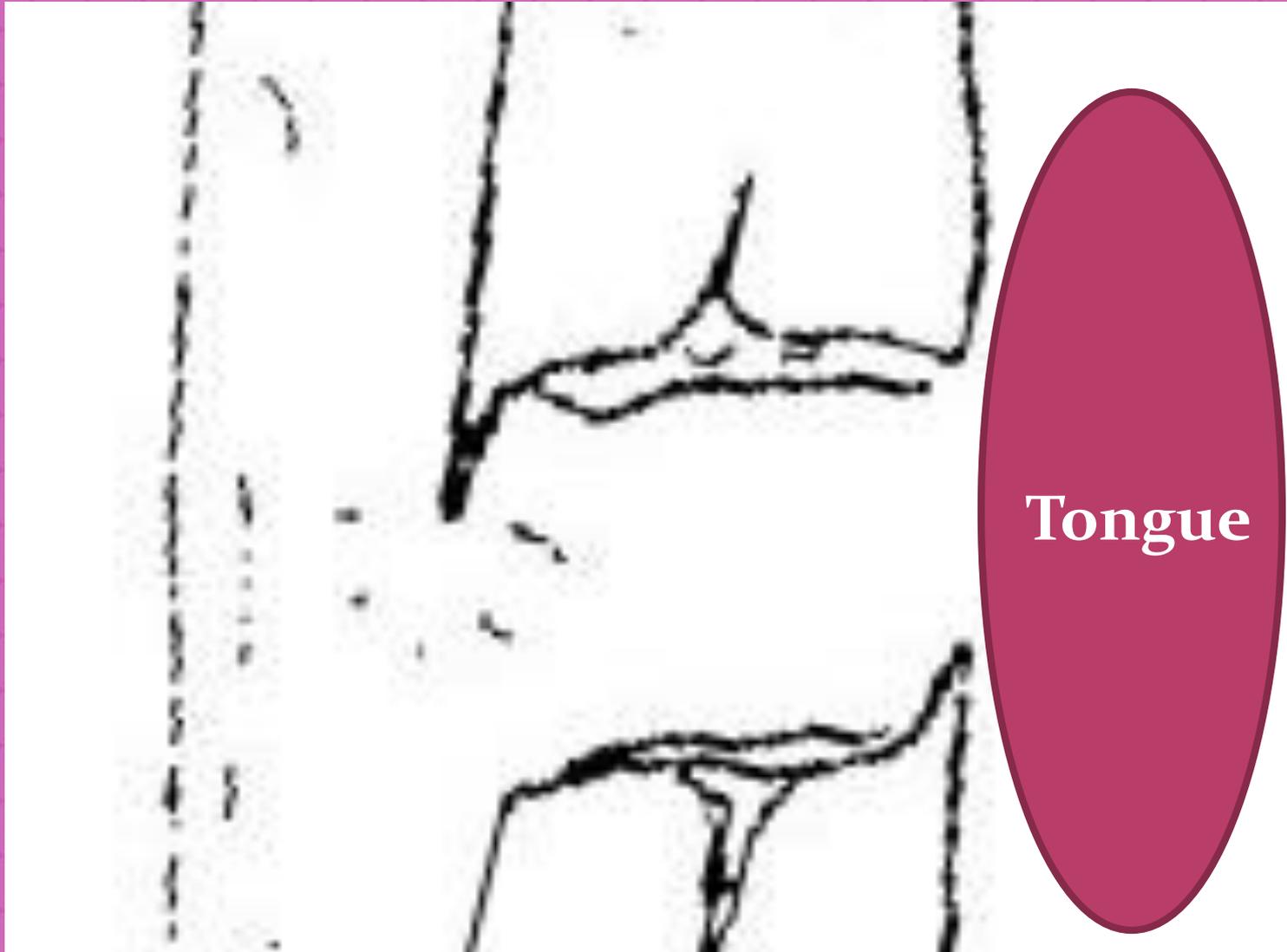
Definition:

It is a disease of equine characterized by sharpness of buccal border of the upper and lingual border of the lower check teeth.

Pathogenesis of sharp teeth: Maxilla is wider than mandible in equine



Sharpness of buccal border of the upper and lingual border of the lower check teeth.



SHARP TEETH

Etiology:

- Feeding on soft food (Bran or prepared food) for long time.
- Weakness of masseter muscle.
- Painful affection in the mandibular joint.
- Any oral affection that causes a restricted movement of the jaw to only one side

SHARP TEETH

Symptoms:

- ◎ Common signs of teeth affections
- ◎ Absence of grinding sound during eating
- ◎ Holding the head to one side during chewing
- ◎ Quidding of food (partial chewing of coarse food) then dropping out in the ground.
- ◎ Laceration in the cheek mucosa
- ◎ Sharpness of buccal border of the upper and lingual border of the lower cheek teeth.

SHARP TEETH

Diagnosis:

- ◎ Case history
- ◎ Clinical symptoms
- ◎ Oral examination

Treatment:

- ◎ Rasping the sharp teeth by tooth rasp
- ◎ Anti tetanic serum
- ◎ Oral wash with antiseptic solution



Teeth rasping in equine



Teeth rasping in equine



Various sizes and shapes of tooth rasp in equine



Teeth rasping technique in equine

2-DENTAL CARRIES

◎ **Definition:** It is demineralization of the hard tooth substance caused by acid producing bacteria.

◎ **Etiology/ Pathogenesis:**

Acid producing bacteria (*St. mutans* and *St. salivarius*) + carbohydrates \longrightarrow Lactic acid + sticky polysaccharide.

Sticky polysaccharide + food debris + bacteria and fungi \longrightarrow Plaque

Plaque + Lactic acid \longrightarrow Enamel demineralization
 \longrightarrow Dental caries

2- DENTAL CARIES

Incidence:

Dental caries occurs in all animals but less frequently in carnivora due to:

- ⊙ Less cariogenic substance in their food.
- ⊙ Rare acid producing bacteria in their mouth
- ⊙ Cone – shaped appearance of their teeth so rare chance for retention of food and bacteria

2- DENTAL CARIES

Common Sites:

- ◎ **Large animals:** in molars.
- ◎ **Cats:** in canines, premolar and molars (especially at the neck of tooth).
- ◎ **Dogs:** in maxillary M1 and Canines (especially at the neck of tooth).

2- DENTAL CARRIES

Clinical Signs:

- ◎ Common signs of teeth affections
- ◎ Severe dental pain in case of pulp exposure.
- ◎ Presence of brown, grayish or black spots in the affected teeth.
- ◎ Long standing cases lead to pulpitis, pulpal necrosis and periodontal pathosis.

Dental caries in premolars of dogs



2- DENTAL CARIES

Diagnosis:

- ◎ Case history
- ◎ Clinical symptoms
- ◎ Oral examination
- ◎ Radiography

2- DENTAL CARIES

Treatment:

- ◎ **Early case:** Excavation of carious site in a cone-shaped manner. Filling the cavity with silver amalgam, composite or glass ionomer (Restorative materials).
- ◎ **Moderate case:** exposure of dentine, indirect pulp capping (unexposed pulp) or direct pulp capping (exposed pulp) with Calcium hydroxide, MTA, Biodentine or Propolis then using the restorative material

Steps of direct pulp capping in a dog



Steps of direct pulp capping in a dog



Steps of direct pulp capping in a dog



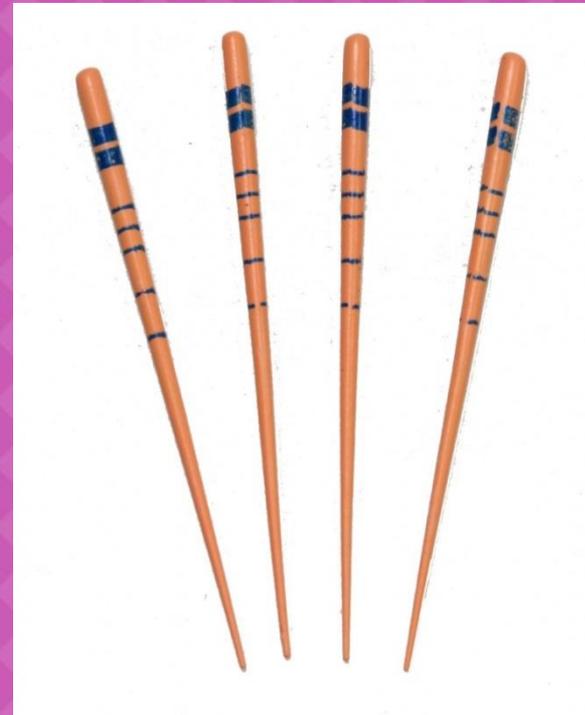
2- DENTAL CARRIES

◎ **In Late case:** if pulp infection and necrosis occur, pulpectomy is essential, then cleaning with antiseptic solution (Sodium hypochlorite 2.6% solution) and application of triple antibiotics paste (Equal parts of Metronidazole 500 mg tablets, ciprofloxacin 250 mg tablets and doxycycline 100 mg capsules).

◎ Then closing with temporary restorative substance as zinc oxide cement for 3 weeks.

2- DENTAL CARRIES

- ◎ Next visit, opening of the pulp cavity, cleaning with Sodium hypochlorite 2.6% solution, filling with gutta-percha and sealer and then using of permanent restorative substance such as glass ionomer.
- ◎ Recently, regenerative endodontic by revascularization (by induction of bleeding) of the dental pulp is performed in immature permanent teeth (Opened apical foramen)
- ◎ In case of no facilities or badly damaged tooth, tooth extraction is carried out.



Gutta-percha



Radiograph showing gutta-percha and permanent filling substance

3-DENTAL TARTAR OR CALCULUS

◎ **Definition:** It is a mineralized plaque. It is grey to brown hard deposits of the dental surface.

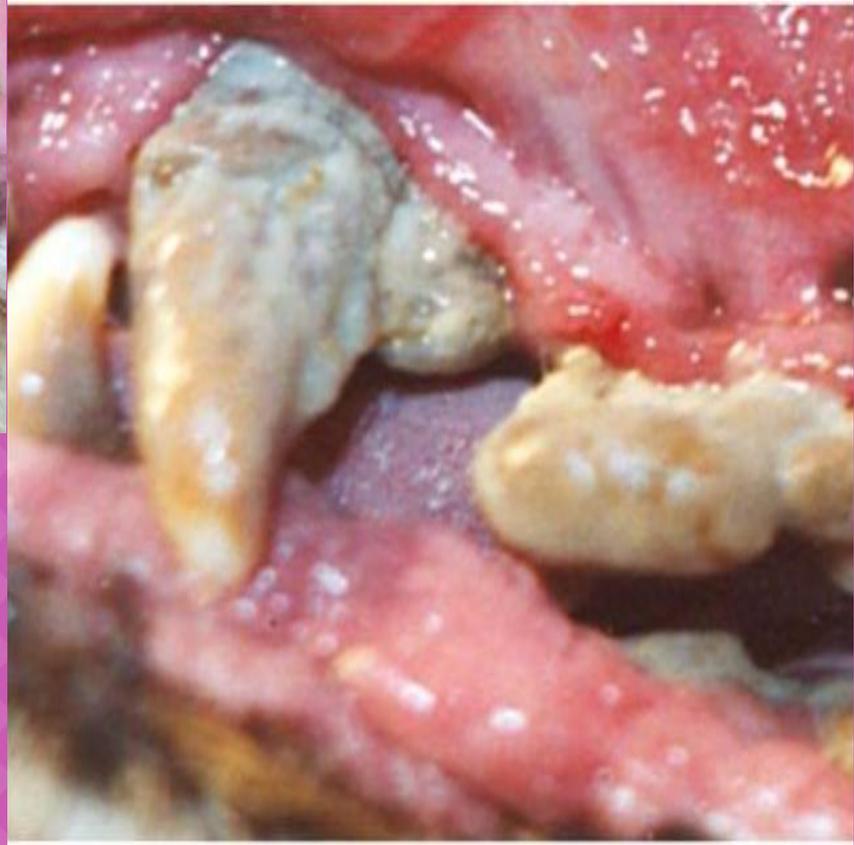
◎ **Etiology:** crystallization of saliva on dental plaque (Pale yellow biofilm, that develops naturally on the teeth due to colonizing bacteria trying to attach themselves to the tooth's smooth surface) forming calcium carbonate and phosphate or magnesium carbonate salts.

3- DENTAL TARTAR OR CALCULUS

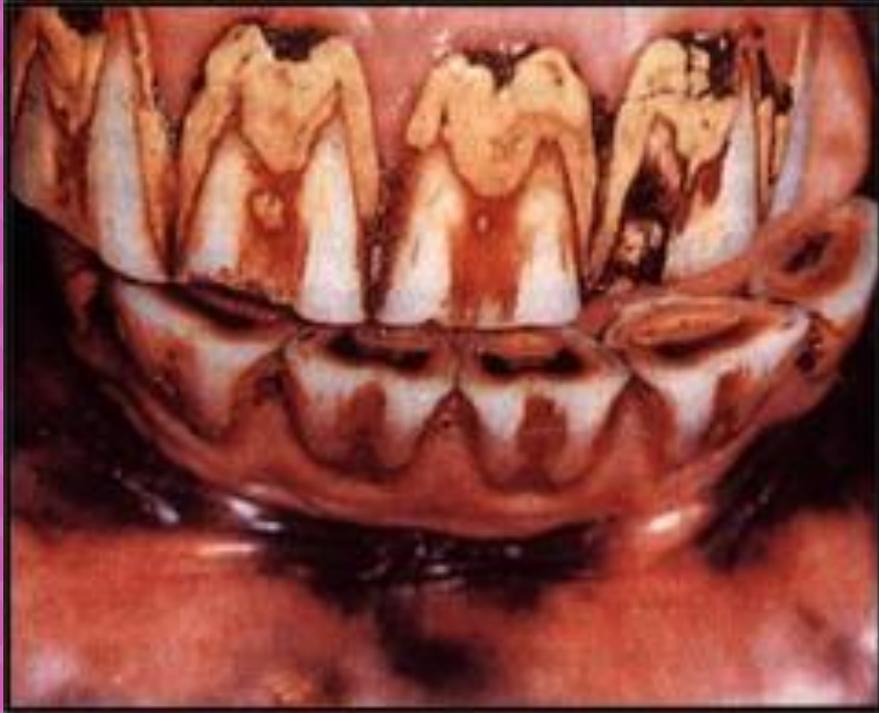
◎ Sites:

Tartar is mainly formed at the buccal surface of maxillary premolar 3, 4 and molar 1 in dogs and maxillary premolar 4 in cats where the parotid duct opens inside the oral cavity

Dental tartar in dogs



Dental tartar in horses



3- DENTAL TARTAR OR CALCULUS

Symptoms:

- ◎ Common signs of dental affections
- ◎ Visible supragingival easily removed brownish deposits.
- ◎ Severe gingivitis.
- ◎ In late case, subgingival tartar is formed

3- DENTAL TARTAR OR CALCULUS

Treatment:

- ◎Scaling of the tartar by using tooth scaler or ultrasonic cleaner then dental polishing to smooth the dental surface.
- ◎Topical irrigation of the gingival pockets by antiseptic solution
- ◎Systemic antibiotics to protect against bacteremia.

4-PERIODONTAL DISEASE

Definition:

- ◎It is a collective term for a number of plaque-induced inflammatory lesions that affect the periodontium
- ◎It is the most common oral affections in dogs and cats mainly over 3 years old.

4-PERIODONTAL DISEASE

Etiology:

- ◎ It occurs due to accumulation of plaque on dental surface which resulted in collagenase, hyaluronidase and bacterial toxins that destroy gingival and periodontal tissues.

Four Stages of Periodontal Disease

CANINE

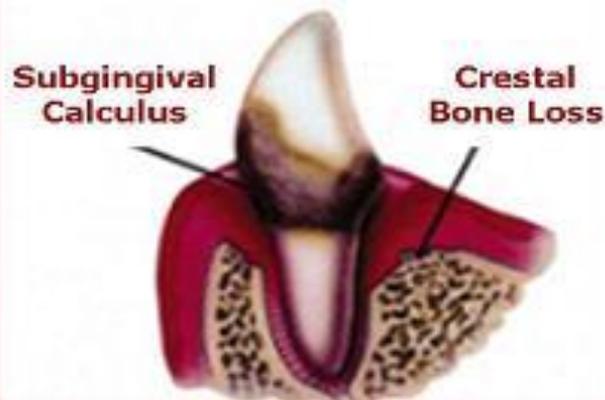
GINGIVITIS

Stage I Gingivitis -
Margin of attached gingiva (gum) is inflamed and swollen. Plaque covering teeth. Treatment can reverse condition.



EARLY PERIODONTITIS

Stage II Early Periodontitis -
Entire attached gum is inflamed and swollen. Mouth is painful and odor begins to be noticeable. Professional treatment and home dental care can prevent this from becoming irreversible.



Stage III Moderate

Periodontitis -

Cherry red and bleeding attached gum is being destroyed by infection and calculus (tartar). Sore mouth affects eating and behavior. Bad breath is present. Beginning of periodontal disease. May be irreversible.

MODERATE PERIODONTITIS

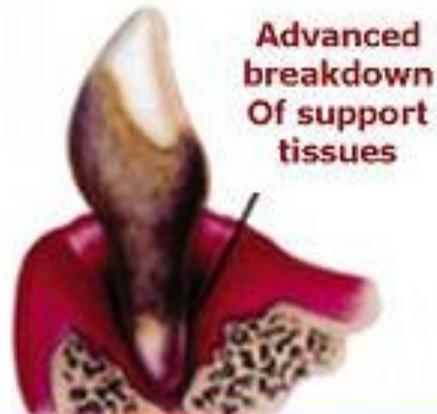


Stage IV Advanced

Periodontitis -

Chronic bacterial infection is destroying the gum, tooth and bone. Bacteria may be spreading throughout the entire body via the bloodstream and may damage the kidneys, liver and heart.

ADVANCED PERIODONTITIS



4- PERIODONTAL DISEASE

Signs	Stage 1 Gingivitis	Stage 2 Early Periodontitis	Stage 3 Moderate Periodontitis	Stage 4 Advanced Periodontitis
Plaque	++	+++	+++	+++
Tartar	+	++	+++	+++
Bad Breath	+	++	+++	+++
Gingivitis	Mild	Moderate	Advanced	Severe
Bleeding on probing	No	Yes	Yes	Yes
Edema	No	Yes	Yes	Yes
Purulent discharge	No	No	Yes	Yes
Bone loss	No	< 25%	25-50 %	> 50%
Tooth mobility	No	No	Yes	Yes
Furcation involvement	No	No	No	Yes
Systemic reaction	++	+++	+++	+++

4-PERIODONTAL DISEASE

Diagnosis:

- ◎ Case history
- ◎ Clinical symptoms
- ◎ Oral examination
- ◎ Radiography.

Radiograph showing advanced periodontal disease in a dog with radiolucent areas around the roots



4- PERIODONTAL DISEASE

Treatment:

- ◎ Tooth scaling to remove tartar.
- ◎ Systemic antibiotics for 7 days.
- ◎ Cleaning of gingival pocket by 0.5 % Povidone iodine or chlorhexidine solution
- ◎ In case of deep pocket, gingivectomy is recommended.
- ◎ In advanced periodontitis, tooth extraction is done

5-DENTAL FISTULA

Definition:

- ◎It is a fistula between the tooth alveolus and outside.

Etiology:

- ◎Alveolar periostitis
- ◎Hematogenous infection

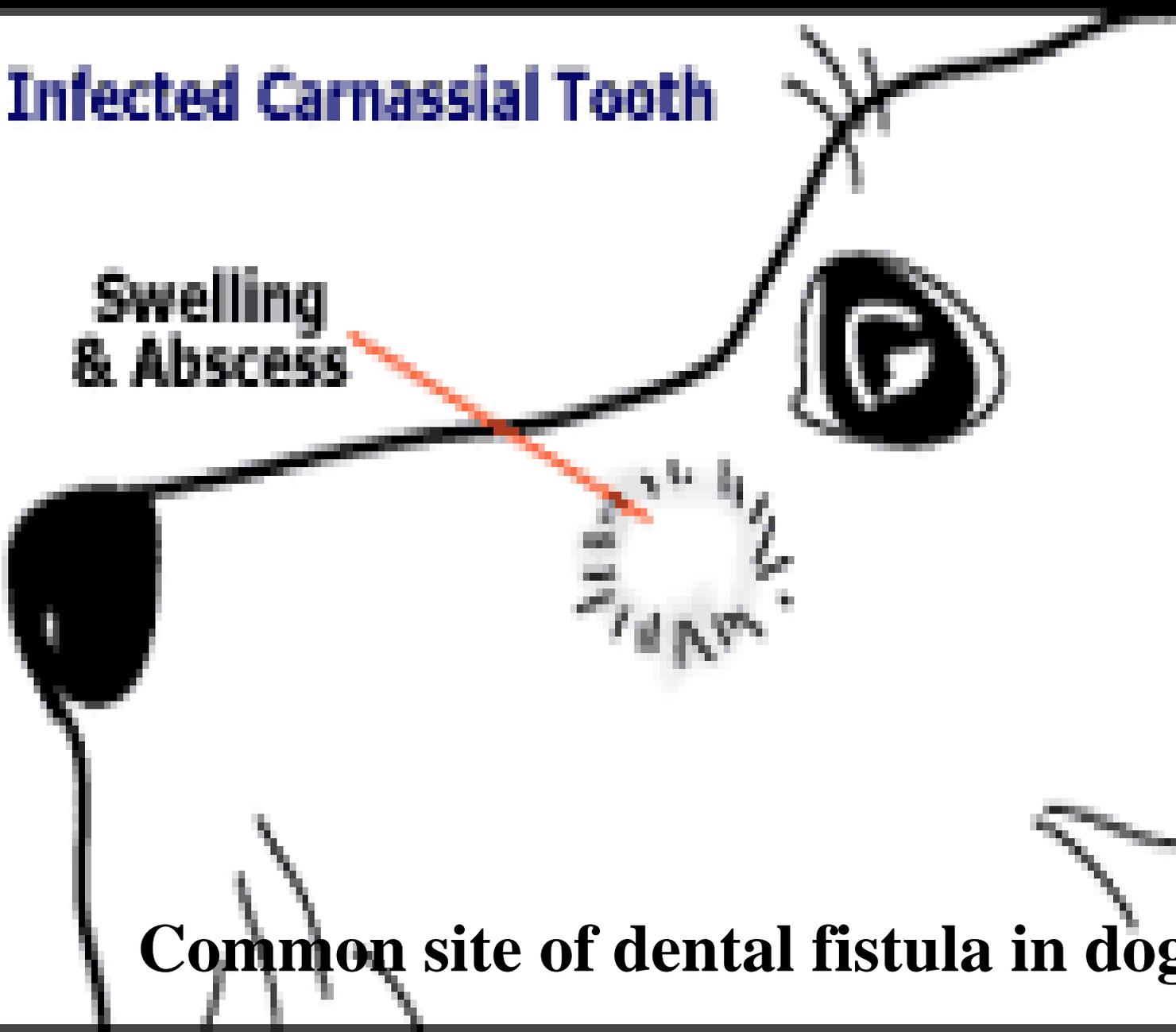
5- DENTAL FISTULA

Occurrence:

- ◎ Mainly in dogs and horses.
- ◎ **In dogs**, it usually occurs below the eye opposite to the maxillary 4th premolar due to it has 3 roots that firmly anchored to the bone. In addition, maxillary bone at this area is very thin so the fistula occurs before tooth shedding
- ◎ **In horses**, it mainly affects horses 2-5 years old at 3rd., 4th. mandibular premolar and 1st. molar and sometimes in maxilla.

Infected Carnassial Tooth

Swelling
& Abscess



Common site of dental fistula in dogs

5- DENTAL FISTULA

Symptoms:

Common signs of teeth affection

Purulent swelling or opening discharging pus and surrounded with granulation tissue below the eye in dogs.

The corresponding tooth may be loose and surrounded with pus

Maxillary sinusitis with unilateral nasal purulent discharge may be occur in horses

Dental fistula in dogs



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5- DENTAL FISTULA

Diagnosis:

- ◉ Case history
- ◉ Clinical signs
- ◉ Oral examination
- ◉ Probing of the fistula.
- ◉ Radiography.

5- DENTAL FISTULA

Treatment:

- ◎ Systemic antibiotics for 7 days
- ◎ Good drainage by widening the fistulous canal
- ◎ Good drainage by tooth extraction (Dogs) or tooth repulsion (Horses, maxillary trephining if maxillary tooth is affected).

5- DENTAL FISTULA

- ◎ Curetting the fistulous canal
- ◎ Application of drain with daily dressing with antiseptic solution till granulation tissue formation

TOOTH EXTRACTION

Indications:

- ◎ Severely crowded teeth
- ◎ Severely rotated teeth
- ◎ Advanced stage of the periodontal disease
- ◎ Fractured tooth with exposed pulp
- ◎ Apical abscess.
- ◎ Late stage of dental caries.

PREVENTIVE DENTISTRY

- ◎ Client education about the home care of the animals teeth.
- ◎ Teeth brushing on a daily basis or at least twice a week. **DO NOT USE HUMAN TEETH PASTE** because chronic fluoride toxicity may occur as a result of swallowing of the paste.

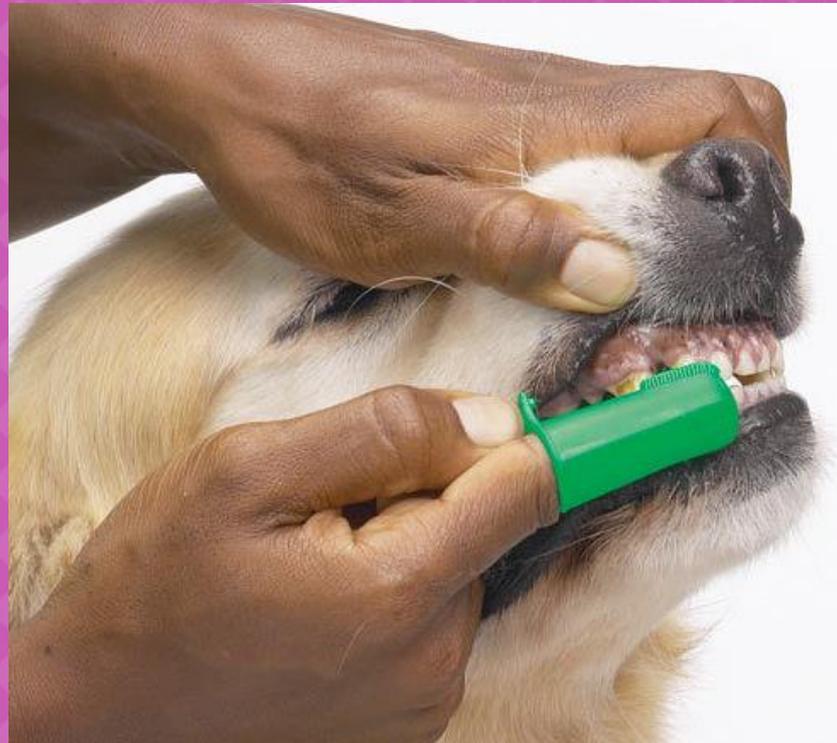
PREVENTIVE DENTISTRY

- ⊙ Professional teeth cleaning at least once a year.
- ⊙ Providing dental diets (coarse foods) to encourage chewing.
- ⊙ Providing dental hygiene chews to encourage chewing.

TYPES OF TOOTHBRUSH



Methods of teeth brushing in dogs



Dental hygiene chews



VETERINARY DENTISTRY IN WEB

- **European Veterinary Dental Society**
- <http://www.evds.org/>
- **European Veterinary Dental College**
- <http://www.evdc.info/>
- **European Veterinary Dental Forum
(congress)**
- <https://evdf.org/homeevdf>
- **Veterinary Oral Health Council**
- <http://www.vohc.org/>
- **Academy of Veterinary dentistry**
- <http://www.avdonline.org/>



Do not forget to brush your teeth daily

THANK YOU