

DENTAL DISEASE IN FERRETS: MORE SERIOUS THAN WE THOUGHT

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While most practitioners are familiar with dental disease and oral health issues in dogs and cats, many do not provide the same thorough dental examinations and care for ferrets. Ferrets, as carnivores, develop many if not all of the common dental disorders as do dogs and cats. An oral examination should be included in all physical examinations, and at least annual prophylaxis provided. Owners can be taught how to care for their ferret's teeth at home to provide continued care.

DENTITION AND ORAL ANATOMY

The ferret is a strict carnivore and has teeth and jaw structure to accommodate such a diet. The jaws are short with the articular condyle of the mandible fitting into a transverse articular fossa. This has a postarticular process preventing dislocation upon wide opening for a strong bite. The tooth-bearing arcades of the jaws are approximately equal in length, but the lower arcade is narrower and fits medially to the upper arcade. This allows for the shearing motion during chewing. The six upper incisors are slightly longer than the six lower incisors. The second incisors of the mandible are set back from the others. The mandibular canines close in front of the maxillary canines. While usually there are four premolars in Carnivora, only three are present in the ferret. The first premolar has been lost in development. The last maxillary carnassial tooth (third cheek tooth) is the fourth premolar. It has three roots. There is a single molar in the maxillary arcade that has three roots. It is wider in the buccolingual breadth compared with the mesiodistal length making it appear to be rooted at right angles to the rest of the teeth. It has a narrow depressed waist that separates its lingual side from the buccal side of the crown. There are two small cusps on the buccal part and a single cusp on the lingual part. This tooth may be overlooked in an awake ferret examination due to its location. The large mandibular carnassial tooth (fourth cheek tooth) is the first molar. All living mustelids only have the first molar in the maxilla and both the first and second molars in the mandible. The crown of the first mandibular molar has a crown with three distinct cusps. Two form the blades of the carnassial and the smaller, lower cusp in conjunction with the second molar, interlocks with the cusps of the maxillary molar. The first mandibular molar has two roots, although sometimes there is an accessory slender central root present. The second mandibular molar is a small tooth with a single root and a simple crown with a minor ridge and cusplets.² It does not occlude with any maxillary teeth, but helps with the crushing function for the caudal cusp of the first mandibular molar. Congenitally this tooth may be missing in many pet ferrets. There is speculation that it is in the evolutionary process of becoming lost or

vestigial as has happened in other carnivores. Mustelids crush their food using the post-carnassial molars. The domestic ferret has 28 to 30 deciduous teeth (di3–4/3: dc1/1: dm3/3). The permanent dental formula is I3/3: C1/1: PM3/3: M1/2 = 34.

Ferrets have relatively large oral cavity. The labial commissures extend farther caudally than the carnassial teeth.¹ The orbicularis oris muscle is moderately well-developed. The lower lip is closely attached to the mandibular gum, with little flexibility. The opening of the parotid duct is at the level of the maxillary carnassial tooth. The mandibular gland opens on a sublingual papilla and joins with several small ducts from the sublingual gland. The molar or buccal gland's duct opens into the oral cavity just opposite the mandibular molars. The zygomatic gland has several ducts opening opposite the upper cheek teeth. Duct openings should be examined routinely during any oral examination or procedure.

Periodontal and gingival tissues and structures are similar to that of other carnivores. Oral flora, pH, and enzymes have not been characterized as they have in other species such as dogs. Using dog and cat dentistry as guidelines for veterinary and home care appears to be relevant.

DENTAL DISEASE CONDITIONS

As mentioned previously, there may be congenital lack of mandibular second molars. There may also be supernumerary teeth, most commonly found between the first and second maxillary incisors. Dental disease includes dental calculus, osteomyelitis/periodontal disease association with tooth infection and/or gingival infection or inflammation, fractured teeth, necrotic teeth, tooth damage from chewing on cage bars, dental abscesses, wear from diets or toys, and teeth lost due to a variety of disease processes including malnutrition, renal disease, and neoplasia.

CALCULUS

Calculus is defined as the mineralized buildup of plaque on tooth surfaces. It is often referred to as "tartar." The plaque itself is a buildup of saliva, bacteria, cellular and food debris, epithelial cells, and bacterial by-products. The pH of the saliva as well as enzyme content, and enzyme release from the bacteria, as well as content of the diet and consistency of the diet influence the degree of plaque buildup. However, plaque appears in pet ferrets whether fed kibble, canned diet or "dook" soup. The domestic ferret fed a processed diet appears to lack some of the dietary components that inhibit plaque buildup in wild mustelids. The conformation of the mouth itself may influence the buildup as the bite may allow pocketing of material. The author has not found studies done on the natural flora, pH (particularly in periodontal and gingival sulci), and enzyme characterization and levels. These, in combination with diet content, would aid in development of effective prophylaxis treatments.

Calculus and plaque left on tooth surfaces extended into the gingival pockets, and accumulates, causing

gingivitis. Gingivitis left unchecked along with calculus and time contribute to periodontal disease where the tissue destruction extends into the periodontal ligaments and the bone itself. As this process continues, infection and inflammation can involve the tooth root and abscess, with permanent damage occurring to the tooth. There is also considerable pain with this process. Many ferrets presented for anorexia have severe dental disease that makes eating not only painful, but likely distasteful as well.

ABSCESSSES

As mentioned above, abscess of a tooth may come from diseased gums, periodontal tissues, and underlying bone. Infection may also enter the tooth from the pulp cavity if it becomes exposed due to fracture or caries. In many cases by the time the abscess is discovered, the tooth is not longer viable, and there is enough periodontal disease and bone loss to make root canal and tooth retention not an option. Root canal in the ferret is difficult due to the extremely small size of the pulp cavity and in the canines, the added curvature. Radiographs are helpful to exam the roots and underlying structures. Abscesses should be drained, necrotic teeth and tissue removed, and in many cases packed with antimicrobial saturated hemostatic gel (Gel Foam, Pfizer, New York, NY) The gums may be sutured loosely over the opening not only to hold the gel in place, but to prevent impaction with food materials. Parenteral antibiotics, pain medications, and oral rinses will generally be successful.

FRACTURED AND LOST TEETH

One of the most common presentations is fracture of the tips of the canine teeth, particularly the maxillary canines. Pet ferrets frequently bite and pull at their cage bars when they want out. They also fracture teeth during falls and during play when they hit walls and other obstacles. If presented immediately after the fracture and the pulp cavity is exposed, and the tooth is still viable, a superficial pulpectomy can be done in the canine tooth. This involves using a high speed burr into the pulp a few millimeters below the exposed surface, drying and sterilized on the pulp chamber, and filling with a composite as is done in other species. The danger is in overheating the pulp cavity and thence destroying the pulp in the process, which will lead to eventual necrosis. The author prefers to try and preserve canine teeth if possible particularly in young ferrets, but despite "drilling and filling" many proceed to fracture them again or progress to necrosis. Parenteral antibiotics should be instigated as well as oral rinses when doing endodontic procedures. Unfortunately, many fractures are unnoticed by owners, or owners are unaware of the pulp cavity exposure when the tip becomes fractured, and the tooth is non-viable or in the process of dying (painful upon cold probing usually) when the ferret is presented. Ferrets also lose teeth from dental disease, periodontal lesions, severe trauma to the tooth or from metabolic disease that causes bone loss. These may have not been noticed by the owner. It is important to determine if

there are retained roots and eliminate the possibility of deep abscess. Radiographs are very useful to determine if remnants of teeth exist.

DIAGNOSIS, ASSESSMENT, AND TREATMENT

The author has developed a grading system to assist in determining a dental program for each ferret.³ Stage 1 is gingivitis, with inflammation of the gingival due plaque. Some of the plaque may be mineralized (calculus), although buildup is usually fairly minimal. The gingiva will be erythematous, and may be slightly swollen along the edge abutting the teeth. These usually do not bleed when the pockets are probed.

Stage 2 is early periodontitis. The gingivitis has progressed to actual infection of the gums, periodontal tissues and even the bone, although the teeth are still firmly attached, and on radiographs roots are still viable. There may be gumline abscesses at this point and there may be some gingival recession or periodontal pocket formation. Up to 25% of the dental attachments may have been lost. For oral examination and probing in the awake ferret at this stage, the author first applies an oral lidocaine 2% gel (lidocaine gel, Henry Schein, Melville, NY) to the gingival areas.

Stage 3 is moderate periodontitis. Bleeding usually occurs during dental probing and affected teeth may have up to 50% loss of attachments. There may be root exposure. Some teeth may be slightly loosened. Abscesses are frequently found around the roots and accumulations of food and debris encountered in the periodontal/gingival pockets. Most ferrets require light sedation, parenteral analgesia, and topical dental anesthetics for a full oral exam at this stage.

Stage 4 is advanced periodontitis. There is greater than 50% loss of attachments, tooth roots are usually exposed due to gum and bone recession. on radiographs, tooth roots will show the lack of attachment and often degree of abscessation or destruction (lysis), and loss of viability. There is often blood and pus surrounding the tooth. The tooth may also be loose. This condition is painful and further examination requires heavy sedation, analgesia, or anesthesia. Teeth may be lost at this stage even if periodontal treatment is initiated using protocols used in dogs (including resection of gums, packing with an antibiotic gel, parenteral/oral antibiotics, brushing of the teeth).

Cleaning of ferret teeth should be done at least annually under anesthesia. Deep planing of the teeth and removal of calculi can be done utilizing a McColl's scaler which will fit under normal ferret gingiva. After gingival recess planing has been done, further removal of plaque can be done utilizing an ultrasonic dental cleaning system or by further hand scaling. Polishing of the teeth can be done utilizing a prophyl cup on a low speed handpiece with a mild abrasive polish (Zircon-F, Henry Schein, Melville, NY). After rinsing and removal of debris, the teeth can be dried thoroughly and either a fluoride paste, varnish (several brands as used in dogs, Henry Schein, Melville, NY) can be applied or a sealant (Oravet, Merial, Duluth, GA) can be used.

If extractions of teeth are necessary, the author advocates first locally blocking the area with lidocaine 2% (volume dependent on size of the dental area and weight of the ferret; for most teeth 0.05–0.1 mL is adequate), then gingivectomy. Incise the periodontal tissues. In some cases, it may be necessary to remove some alveolar bone. Once the ligamentous tissues have been severed, the tooth can be easily elevated using a fine-tipped elevator or 18-gauge needle (for the smaller teeth), and extracted often with just hemostats. If there is an open alveolus (as with the canine teeth), the cavity may be packed with a hydrostatic gel or synthetic bone matrix material (Consil Bioglass, Nutramax, Baltimore, MD). The gums can be sutured with 4-0 or 5-0 absorbable suture on a fine swaged-on taper point needle. Suturing the gums encourages healing and decreases debris being introduced. Analgesics, nonsteroidal anti-inflammatory drugs (NSAIDs), and often antibiotics will be used post extraction. Owners are usually instructed on how to apply a mild chlorhexidine rinse to the sutured area twice daily for up to a week as well.

Home dental care should include the continued application of Oravet (if that was used) on a weekly basis. If teeth are not sealed, then owners should be

instructed on how to brush their ferret's teeth. The author uses cotton swabs and an enzymatic toothpaste (CET, Virbac, Fort Worth, TX) in either malt or poultry flavor. Most pet ferrets do not mind tooth brushing as they like the taste of the toothpaste. Follow-up examinations should be done on a regular basis.

CONCLUSION

Dental disease is extremely common in pet ferrets and should be included as part of a regular wellness program as it is in other animals. Diagnosis, treatment and prevention are similar to other carnivores.

REFERENCES

1. Evans HE, An NQ: Anatomy of the ferret. In Fox JG (ed): *Biology and Diseases of the Ferret* 2nd ed. Baltimore: Williams & Wilkins, 1998; pp 19-69
2. Church B. Ferret dentition and pathology. In Lewington JH (ed): *Ferret Husbandry, Medicine and Surgery* 2nd ed. Edinburgh, UK: Saunders Elsevier, 2007; pp 467-485.
3. Johnson-Delaney CA. Ferret dental disorders: pictorial of common clinical presentations. *Exotic DVM*. 2007;9:40-43.