Periodontal disease is a disease of the supporting structures of the oral cavity. It affects more than 85% of dogs over three years of age. Cats are affected as well. The health of the entire body is subject to the flood of bacteria from the mouth each time the animal eats, chews, grooms, plays, or otherwise uses the mouth. Perhaps we would consider periodontal disease to be more than just “bad breath” if we called it “Osteomyelitis of the Oral Cavity!”

Plaque is the cause of periodontal disease. Plaque is the soft, sticky material that we brush from our teeth at least twice each day. Pets develop plaque as quickly as we do. Plaque is composed of bacteria, the glycocalyx they form, and other materials in the mouth. Some of the primary bacteria in plaque that cause periodontal disease are of the Porphyromonas family. There are many others, as well, that are pathogens.

There are two types of plaque: supragingival and subgingival plaque. Supragingival plaque forms coronal to the gingival margin or leading edge of gingival, on the tooth crown. Supragingival plaque is composed primarily of Gram-positive aerobic organisms. Subgingival plaque forms below the gingival margin and is more complex. There are aerobic, and as oxygen decreases, anaerobic bacteria. A study of subgingival plaque was released by Harvey et al. in 1995. In that study, 58% were aerobic organisms, 42% were anaerobic, with a total of 462 isolates. If plaque is not removed, it mineralizes into calculus but is still covered by plaque!

Major tissues around the tooth are the gingiva (gums), which has many components, and anatomical areas, which are well described elsewhere; the periodontal ligaments, which hold the tooth in the alveolus; the alveolar bone; and the cementum, which covers the roots and into which the periodontal ligaments insert. In the healthy mouth, the tissues all function normally to protect the oral cavity. When pathogenic organisms become established, the tissues are affected by their byproducts of metabolism. These by-products cause inflammation. Inflammation creates a cascade of destructive events in tissues.

The epithelial attachment (a structural component of the gingival), where the oral soft tissue attaches to the tooth, is one of the most important internal defenses the mouth has against periodontal disease in the dog, I think. Inflammation causes the epithelial attachment to loosen, and bacteria and plaque can move from the gingival sulcus, a little moat around each tooth in the mouth (it is where the popcorn husks get stuck and where IgA is excreted), into the periodontal ligament space. Helping to keep the oral tissues healthy in the dog and cat is the job of the veterinary team as well as the owner. A good way to reinforce a “dental conscience” in the owner is to introduce the idea that “you only have to brush the teeth you want to save” in the pet’s mouth. Yes, plaque removal is THAT important.

Some of the predisposing factors for developing periodontal disease are plaque retention, (no brushing); mouth breathing; malpositioned teeth; crowded or rotated teeth; retained deciduous teeth; genetic predisposition; dietary build-up of plaque and calculus; systemic and metabolic disease; and many other factors. In my experience, the smaller the mouth or the adult weight of the dog, the earlier periodontal disease begins if rigorous home care is not part of a daily routine from the very beginning. Places I have found to be “hot spots” for periodontal disease are anywhere around the canine teeth and spaces between upper and lower fourth premolar and upper and lower first molar teeth.

Dental prophylaxis, or at least a dental check-up, should be scheduled, in my opinion, at about 9–12 months for dogs weighing less than 10 pounds. A check-up at this time would allow the veterinarian to assess the oral cavity and check for any retained deciduous teeth and any areas of inflammation. Scheduling a professional dental cleaning before significant problems develop is the true dental prophylaxis, or preventive dental treatment.

There are two major stages of periodontal disease: gingivitis and periodontitis. Gingivitis is completely reversible with a complete dental cleaning and polishing. There has been no attachment loss. Periodontitis is irreversible but controllable in animals with a healthy immune system. Periodontitis has several stages. First soft tissue attachments are lost, and periodontitis progresses to bone loss (osteomyelitis of the oral cavity) in degrees. The final stage is tooth loss. After the tooth is lost, that area can return to health. All stages may be present around a given tooth at the same time. All of the stages involve the onslaught of bacteria to the heart, kidneys, and liver. Not all dogs, cats, or humans develop periodontitis, even without regular dental care, but they are in the minority.
In humans, there are numerous links between systemic disease and periodontal disease. To think that they do not exist in dogs and cats is unrealistic. Decades ago I read a paper, which I cannot find now. It described litter sizes and puppy birth weights in the dog. Those bitches with periodontitis had fewer, smaller offspring than bitches without periodontitis. There has been one report in the literature of endocarditis secondary to dental prophylaxis.

What goes wrong in treating periodontitis? I have observed two major problems in treating periodontitis. The first major problem is not locating and/or incompletely treating periodontal pockets. Periodontal pockets form as the attachment of the periodontal ligaments break down and plaque forms in the periodontal ligament space. Periodontal pockets are the result of periodontitis. Subgingival plaque hardens into subgingival calculus and the pockets become larger. Periodontal pockets are first located using a hand instrument called an explorer/periodontal probe, which is used to measure the gingival sulcus depth. The periodontal probe measures the depth; the explorer is the operator’s eye within the gingival sulcus to locate rough cementum and subgingival calculus. If the pockets are not located, they cannot be treated.

Subgingival calculus is black. It is formed by the black-pigmented Bacteroides species. Subgingival calculus is tightly adhered to the cemental surface of the root. It is removed by scaling with an ultrasonic scaler with a thinline tip or hand instruments called curettes. It needs to be completely removed. In most cases, removal is performed blindly. That is, the tooth root surface is not visualized by the operator because no surgery is performed to expose the root.

The root surface needs to be smoothed as completely as possible by root planing using a curette. Complete cleaning to the point of removal of all bacteria is an impossible task. However, if the subgingival calculus and plaque are not addressed as aggressively as possible, periodontitis continues unchecked, even thought the tooth crowns may be clean. The use of products such as Consil® (Nutramax Laboratories), a proven bone enhancement material, and Doxirobe® (Pfizer Animal Health) to deliver doxycycline to the tissues in the pocket area is beneficial in pets with periodontitis.

One of the most difficult periodontal pockets to treat is found on the palatal aspect of the upper canine tooth. To locate this pocket, the use of the explorer/periodontal probe is essential. If this pocket is left untreated, especially in small breed dogs, an inapparent oronasal fistula (IONF) will result. An IONF is a hole between the mouth and the nose. An IONF is virtually impossible to resolve. (I have found IONFs in small dogs as young as 4 years of age.) There may be unilateral or bilateral nasal discharge, sneezing, epistaxis, and/or constant nose licking. The end result is the removal of the upper canine tooth to resolve the infection in the nasal conchae. Other diseased teeth in the maxilla can occasionally cause these signs and have a root that forms an IONF.

The second major problem I see is the failure to follow-up with retreatment as often as needed. The frequency of retreatment is the surprising part. When humans are fighting periodontitis, they brush four or five times a day and visit a periodontal specialist monthly. They use mouth rinses multiple times a day. We, as veterinarians, may schedule a retreatment in six months. That may be too long! The patient may need several treatments at monthly intervals along with judicious home care from the owner to improve to the point where scheduling 4–6 months between treatments keeps periodontitis under control. The point of 4- to 6-month treatment intervals may never be reached. In that case, the patient should have the affected teeth extracted. Serious discussions with the owner of a pet with significant periodontal disease should take place. Controlling periodontal disease is time consuming and expensive. The owner needs to understand this commitment before a treatment plan can be made for the patient.

Some pets affected by periodontitis are reluctant to eat, and weight loss may be the first sign to the owner that something is amiss. They may have dysphasia as a result of the severe oral pain secondary to abscesses and inflammation of diseased tissues.

Ancillary treatments for patients affected with periodontitis include antibiotic therapy. After blood work and other preanesthetic protocols establish that the patient will be scheduled for treatment of periodontal disease shortly, antibiotics and pain medication may be dispensed. There are several choices for antibiotics. Clavamox® treats aerobic and anaerobic bacteria, and I have had very good results using it pre- and postoperatively in periodontitis patients. Antirobe® is very effective against anaerobic organisms and penetrates bone well. The liquid is bitter, and many small dogs and cats do not like it, decreasing the chances of its course of treatment being completed. An antibiotic that has been used successfully in the treatment of periodontal disease for several years in Europe is
Convenia® (Pfizer Animal Health). It has not been approved for use against periodontal disease in the United States at this time. However, if I had a case that had not responded to aggressive treatment as well as Clavamox® or Antirobe®, I would try Convenia®.

Another addition to the armamentarium for fighting periodontitis is a vaccine by Pfizer Animal Health. The Porphyromonas vaccine is a killed bacterin of the three most common species of Porphyromonas—denticanis, gulae and salivosa—found in the mouths of dogs with periodontal disease.

This vaccine has been conditionally licensed to help prevent periodontal disease in dogs that do not have the disease. The patients most likely to benefit from Porphyromonas vaccine are small breeds, brachycephalic breeds, and some other breeds predisposed to periodontal disease. Porphyromonas vaccine causes antibodies of P. denticanis, gulae and salivosa to be excreted in the gingival sulcus, where these organisms are likely to be found. The vaccine should not be thought of as the first line of defense against periodontal disease. The first line of defense is a complete dental cleaning as often as needed, before the patient develops periodontal disease!

In studies of dogs with periodontitis, there was evidence of improvement in the oral health of dogs if the Porphyromonas vaccine was given after thorough cleaning and treatment (including appropriate antibiotic therapy) of existing periodontitis. The vaccine may help prevent further infection in some dogs. The Porphyromonas vaccine is given in a series of two vaccinations given three weeks apart. Appropriate guidelines of vaccination should be followed.

Dental radiology, preferably digital, should be in integral part of the oral examination in treating periodontal disease. With digital intraoral radiology, the image is instantaneous and can be amplified easily. Texts such as An Atlas of Veterinary Dentistry by DeForge and Colmery and Atlas of Canine and Feline Radiology by Williams, Beard, Mulligan, and Aller are the perfect addition to the veterinary dental library.

Following cleaning and polishing, I like to use OraVet Professional Oral Sealant® (Merial) to give the patient a little more time before the recolonization of the tooth surface with plaque. The OraVet Professional Oral Sealant® will deter plaque for about two weeks. This product is also helpful when oral surgery has been performed and oral hygiene on the patient may not be possible.

Not all teeth can or should be saved in the treatment of periodontal disease. A good selection of general dental elevators and Wiggs winged elevators should be sharp and handy when treating a patient with severe periodontitis. Teeth that are compromising the canine teeth or the carnassial teeth should be extracted or have odontoplasty (reshaping) to protect the canine and carnassial teeth. Client communication and permission to extract the teeth that are severely affected is imperative. If a client wishes, I will have him wait until the patient is under anesthesia and come into the operatory to view up close what the dental issues are with the pet. He can make an informed decision about what he thinks he and the pet will be able to accomplish in treating and controlling periodontal disease.

When suture is used in the oral cavity, I like to use 5-0 soft braided absorbable suture. I have seen cats with lesions that look like “rodent ulcers” simply because monofilament suture was used in an extraction site and they were trying to lick the discomfort away.

So the keys to controlling periodontal disease in dogs and cats with healthy immune systems are to

- remove plaque daily at home and when needed at the professional level; start a savings account
- locate and treat as thoroughly as possible any periodontal pockets
- retreat periodontitis patients monthly if necessary until the disease is under control or remove the affected teeth
- treat with antibiotics pre- and post-dental appointment
- radiograph to make sure all affected areas are discovered
- use extraction when necessary
- use ancillary treatment modalities such as Consil®, Doxirobe®, Porphyromonas Vaccine, OraVet Professional Oral Sealant®, and home care products
- encourage the clients to brush the teeth they want to save in their pets’ mouths
Recommended Reading/References


