



Home Care for Prevention of Periodontal Disease in Dogs and Cats

What the owner does at home on a daily basis for plaque control influences long-term oral health as much as professional dental care.

For animals predisposed to or afflicted with periodontal disease, professional treatment is only part of the plan. What the owner does at home on a daily basis for plaque control influences long-term prognosis as much as professional dental care. In order to successfully treat and prevent periodontal disease in pets, a multidimensional approach must be taken. Exacerbating factors should be identified and eliminated, and the animal should receive regular home dental care after examination by a professional. Over the years, many therapeutic and preventive interventions have been advocated for

Case Study

A 7-year-old, 66-lb male Irish Setter is evaluated for severe halitosis and reluctance to eat dry food. Examination of the oral cavity reveals moderate accumulations of plaque and calculus on both dental arcades, periodontitis, exposure of the furcation of tooth roots, and loss of attachment; these findings are most prominent around the caudal mandibular premolars and molars. The remainder of the physical examination is unremarkable. Antibiotics are administered to the dog to help control infection of oral tissues while further diagnostic evaluations are performed. Results of a complete blood count, serum biochemistry analysis, and urinalysis are normal.

After the dog is anesthetized, supragingival scaling, root planning, and subgingival curettage are performed. Severe periodontal disease is found around some left mandibular teeth (fourth premolar and first molar). These teeth are extracted and the extraction sites are closed with sutures. The remaining teeth are polished. Orally administered antibiotics and a canned recovery-type food are dispensed. On follow-up evaluation two weeks later, the extraction sites are healed. The owner comments that the dog is more active. The attending veterinarian considers changes that could be made to the dog's diet to reduce future accumulation of plaque and calculus.

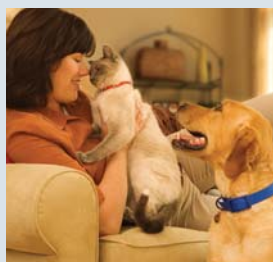




The Owner–Animal–Environment Triad in Managing Periodontal Disease

1. Know the Owner

- ▶ What is the owner's relationship with the pet?
- ▶ Is the pet a well-loved member of the family, or does it have little social contact with the family?
- ▶ Is the person who brought the animal to the hospital the family member who cares most for the animal, and is she likely to take primary responsibility for oral health care decisions?
- ▶ What is the owner's attitude toward dental care in general?
- ▶ Does the owner have anxiety about dental treatment (dental phobia)?
- ▶ What does the owner perceive to be the problem (eg, halitosis, stained teeth, difficulty chewing)?
- ▶ What are the owner's physical capabilities?
- ▶ Will the owner be able to train the animal to enjoy home care and then provide this attention regularly?
- ▶ What does the owner expect from treatment?



2. Know the Animal

- ▶ Is the pet likely to be cooperative with home care?
- ▶ Does the animal have a medical problem that makes one form of treatment preferable to another?
- ▶ Does the pet have any medical or anatomic considerations that make one form of treatment preferable to another?

3. Know the Environment

- ▶ What is the dietary history (commercial foods; "people" food; treats; access to other pet food, such as a dog consuming cat food)?
- ▶ How many other pets are in the household, and what kind are they?

4. Know the Evidence

- ▶ What is the quality and strength of evidence supporting use of a therapeutic or preventive intervention?

Adapted from Hale FA. The owner–animal–environment triad in the treatment of canine periodontal disease. *J Vet Dent* 20:118-122, 2003.

periodontal disease, but evidence of efficacy or effectiveness is highly variable. Several materials accumulate on tooth surfaces and participate in the pathophysiology of periodontal disease. These substances are commonly referred to as tooth-accumulated materials or *dental substrates*. These substrates accumulate in a dynamic process.

Goals and Limits of Dental Home Care

Oral health is achieved through a combination of professional therapy and home care. Dental home care refers to the procedures animal owners use at home to control dental substrate accumulation. The primary goal of dental home care is daily plaque control to maintain oral hygiene and prevent the devel-

opment of gingivitis and periodontal disease. Home care can be harmful to the pet and the owner and can be counterproductive if not approached in the proper manner.

Home care does not routinely remove existing calculus and is not effective for treating established disease, nor is it a substitute for regular professional examinations or treatment. Therefore, dental home care should only be instituted after appropriate professional treatment has established a clean and healthy mouth. It is then used to prevent the situation from deteriorating.

The effectiveness of a dental home care program is linked to the knowledge and commitment of the owner and to cooperation from the pet; therefore careful planning should be employed to achieve optimal results. This dynamic has been termed the *owner–animal–environment triad* for the treatment of periodontal disease. Owners must be involved in the planning process and realize that they play a very important role in the desired clinical outcome.

Evidence-Based Veterinary Dentistry

Veterinarians and veterinary dentists often rely on clinical experience and judgment, perhaps supported by the advice of colleagues who practice similarly. Scientific evidence is the product of appropriately designed and carefully controlled research investigations. A single study does not constitute evidence; rather, it contributes to a body of knowledge that has been derived from multiple studies investigating the same area. Unfortunately, there is neither a central repository for veterinary dentistry information nor a single system for establishing quality evidence. However, the Veterinary Oral Health Council (VOHC) was established in 1997 to provide independent, objective, and credible means of recognizing veterinary dental products that effectively control accumulation of plaque or calculus. The VOHC is run by the American Veterinary Dental College and is endorsed by many international veterinary dental organizations. The VOHC does not conduct dental testing; rather, the council reviews results of tests performed in accordance with VOHC-approved protocols. Those products approved by the council can display the VOHC seal for tartar or plaque control on their packaging and promotional materials.

Foods and Treats that Support Dental Care

Dental Foods

Most dogs and cats eat something every day; therefore, use of foods that provide dental benefits seems appropriate. Conventional wisdom suggests that typical dry, crunchy commercial foods provide a dental benefit to cats and dogs. Although consumption of soft foods may promote plaque accumulation, the general belief that dry foods provide significant oral cleansing should be regarded with skepticism. A moist food may perform similarly to a typical dry food in affecting plaque, calculus, and stain accumulation. In a large epidemiologic survey, dogs consuming dry food alone did not demonstrate improved oral health when compared with dogs eating moist foods.

Several complete and balanced adult pet foods are available that provide substantial oral cleansing compared with typical dry, moist, or snack foods. These foods are distinguished by their enhanced textural characteristics, which provide mechanical cleansing of the teeth. Combining increased fiber content with a size and pattern (texture)

that promote chewing and maximize contact with teeth is critical to obtaining a dental benefit. As a tooth penetrates a typical kibble or biscuit, the initial contact causes the food to shatter and crumble, with contact occurring only at the coronal tip of the tooth surface. Dental foods with specific textural characteristics do not crumble, allowing each piece of food to maintain prolonged contact with the tooth surface, thereby gently removing plaque accumulation. Numerous short-term and long-term (lasting at least 6 months) studies have demonstrated that dental foods with enhanced textural characteristics provide significant plaque, calculus, and stain control in laboratory colony cats and dogs when used after an oral hygiene procedure. **I** **II**

Dental Treats

Treats would include any consumable item that adds to the total calorie intake. No treat has ever been shown to be able to



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maintain clinically healthy gingiva regardless of the quantity consumed. Treats are only a part of the plaque control program and should be used in addition to (not instead of) brushing.

Several dental treats rely on mechanical abrasion to help reduce dental substrate accumulation. One small study showed that daily addition of an enzyme-containing feline dental hygiene chew to a dry cat food resulted in decreased dental substrate accumulation in client-owned cats. It is unknown if the improvements noted in cats in this study were attributable to abrasive action of the chew, enzyme activity, or a combination of both. **I** **II**

Biscuit Treats

The Association of American Feed Control Officials supports and recommends guidelines developed by the Center for Veterinary Medicine of the U.S. Food and Drug Administration for dental health claims. These guidelines state that food products bearing claims to cleanse, freshen, or whiten teeth by virtue of their abrasive or mechanical action are not objectionable. On the other hand, food products bearing claims for plaque or calculus reduction or prevention or control of breath odor may be misbranded. Enforcement of guidelines is a low priority, and many products that claim to control plaque or calculus offer little or no evidence to document their effectiveness. Hexametaphosphate is a sequestrant that binds salivary calcium, making it less available for precipitation as calculus. Often added to the surface of baked biscuit treats, this agent was shown to significantly reduce calculus accumulation in research colony and client-owned dogs over a 4-week period compared with a regimen of plain, baked biscuits and dry food alone. A separate study demonstrated no significant differences in plaque or calculus accumulation in laboratory colony dogs fed dry food, dry food plus baked biscuits, or dry food plus hexametaphosphate-coated biscuits for 3 weeks. **IV**

Chew Aids

This category includes consumable items that are not considered to be a significant source of calories, such as rawhide strips/bones

Key Points

- ▶ Dental home care should center on daily plaque control to prevent gingivitis and periodontal disease.
- ▶ Home care will be most effective after a veterinarian has established that the animal's mouth is clean and healthy.
- ▶ The VOHC was established to provide independent, objective, and credible means of recognizing veterinary dental products that effectively control accumulation of plaque or calculus.
- ▶ When evaluating the strength and quality of dental research evidence, the distinction between efficacy (results under ideal conditions) and effectiveness (results under home conditions) must be considered.

**Some Commercial Foods and Treats Recognized by the VOHC for Effective Plaque and Calculus Control** ▲

Product	Type	Claim
Prescription Diet® Canine t/d® Original and Small Bites*	Food	Plaque & Tartar
Prescription Diet® Feline t/d®*	Food	Plaque & Tartar
Science Diet® Oral Care Canine Adult†	Food	Plaque & Tartar
Science Diet® Oral Care Feline Adult*†	Food	Plaque & Tartar
Greenies® Edible Dog Treats‡	Edible Treat	Plaque & Tartar
Hartz® Flavor Infused Oral Chews‡	Rawhide Treat	Plaque & Tartar
Del Monte Tartar Check® Dog Biscuit§	Biscuit Treat	Tartar
Friskies® Cheweez®**	Rawhide Chew Treat	Tartar
Iams® Chunk Dental††	Food	Tartar
Eukanuba® Adult Maintenance Diet for Dogs††	Food	Tartar

*Manufactured by Hill's Pet Nutrition, Inc.

†Manufactured by S&M NuTec, LLC.

‡Manufactured by The Hartz Mountain Corporation.

§Manufactured by Del Monte Foods Company.

**Manufactured by Nestlé USA Inc.

††Manufactured by The Iams Company.

toothbrush and may have a number of functions. Most veterinary pastes are flavored for the particular taste preferences of dogs and cats, thereby acting as a positive reinforcer that encourages cooperation from the pet. Pastes also often contain some abrasive material, such as ground walnut shells, to improve the mechanical cleaning action of the brush. Massaging the gingiva with a toothbrush produces epithelial thickening and increases keratinization, blood circulation, and mitotic activity in the epithelium and connective tissue. Whether these changes provide substantial protection against microorganisms or are necessary for gingival health is debatable. The plaque removal effect of tooth brushing is likely far more important.

Most veterinarians and veterinary dentists recommend brushing a pet's teeth at least 3 times weekly; however, this regimen may not be often enough, particularly for those with established periodontal disease. Most animal

Dental Products and Procedures Supported by High-Quality Evidence

- ▶ Tooth brushing (cats and dogs)
- ▶ Chlorhexidine (dogs)
- ▶ Textural dental foods (cats and dogs)
- ▶ Zinc ascorbate (cats)
- ▶ Proprietary dental treats (dogs)
- ▶ Short-term use of clindamycin and dental sealants (dogs)

and pig's ears. Any item that a dog may chew into little bits (and possibly swallow) bears some risk of gastrointestinal upset or blockage. Consider each item and its relative risk and choose the safest one available.

Studies suggest that chew aids can be used as an adjunct to other dental home care techniques. Dogs in one survey with access to chewing materials had less calculus accumulation, gingivitis, and periodontitis than those without any enhanced chewing activity. Unfortunately, the study did not measure how often or how long dogs chewed on their respective materials. ▲

Other Dental Home Care Strategies**Tooth Brushing**

Tooth brushing on a regular basis offers one of the best methods for daily plaque control by mechanically disrupting plaque accumulation. After a plaque film has formed, it resists most passive control methods. The use of toothpastes or gels may facilitate removal of dental substrates, but effective brushing can occur without their routine use. Pastes are meant to be used on the

Key Points

- ▶ No treat has ever been shown to be able to maintain clinically healthy gingiva regardless of the quantity consumed.
- ▶ Plain baked dog biscuits have not been shown to significantly reduce plaque and tartar accumulation.
- ▶ One survey showed dogs with access to chewing materials had less calculus accumulation, gingivitis, and periodontitis than those without any enhanced chewing activity.
- ▶ Foods providing the greatest dental benefit have a texture that promotes chewing and maximizes contact with teeth.
- ▶ Most veterinarians recommend brushing a pet's teeth at least 3 times weekly, but this frequency may be insufficient for pets with established periodontal disease.
- ▶ Most chemical agents will reduce or retard plaque accumulation to a degree, but they cannot stop it from forming.

owners do not sustain the level of dedication and motivation required to brush pet's teeth regularly. Although these studies show that tooth brushing is beneficial, the compliance rate with tooth brushing at home by dog and cat owners is approximately 40% to 50% after 6 months. These compliance data, however, were achieved with highly motivated pet owners; there is limited information about long-term compliance rates with tooth brushing by typical pet owners. ▲▲

Chemical Plaque Control

Chemical plaque control agents come in many forms, including toothpastes, gels, rinses, and water treatments. No chemical agent has been shown to be effective in plaque control by itself. Most will reduce or retard plaque accumulation to a degree, but they cannot stop it from forming. Once a plaque film has formed, it will be very resistant to chemical agents that are applied passively.

Conclusions

The concepts of evidence-based medicine can be readily applied to veterinary dentistry, as demonstrated here for evaluating dental

Case Study Revisited

There are several randomized, controlled clinical studies that evaluated the effect of dietary modification for dogs with plaque and tartar accumulation, gingivitis, and oral malodor. The studies were conducted in laboratory settings and involved the use of a nutritional product in dogs with naturally developing oral disease. Results of these studies reveal that dogs that were fed a therapeutic food specially formulated for management of dental conditions had less plaque, tartar, gingivitis, and oral malodor than those fed a typical dry food. This constitutes high quality evidence. The patient is extremely similar to the dogs used in the published studies, and the food is one that is readily available and economically feasible. On the basis of this evidence, use of Hill's® Prescription Diet® Canine t/d® should be strongly recommended for this dog, provided that owner and patient preferences are satisfied.



home care products and programs for management of periodontal disease in cats and dogs. Quality of evidence guidelines previously published in the veterinary literature serve as an excellent example of a rigorous application of an evidence-based appraisal system. Evidence classified as either Grade I or II is most likely to be indicative of outcomes to be expected in clinical practice. In the case of research regarding plaque and gingivitis control, the highest quality of evidence exists for tooth brushing (cats and dogs), chlorhexidine use (dogs), dental foods with textural characteristics (cats and dogs), zinc ascorbate (cats), proprietary dental treats (dogs), and short-

term use of clindamycin or dental sealants (dogs). These are the products and procedures that should be recommended for dental home care programs to control periodontal disease in cats and dogs. With regard to controlling calculus accumulation, the highest quality of evidence exists for tooth brushing (cats and dogs), dental foods with textural characteristics (cats and dogs), dental foods or treats with polyphosphates (cats and dogs), and proprietary rawhide chews (dogs). The effectiveness of other dental home care products and procedures is supported by lower-quality evidence; therefore, these strategies should not be recommended until more published studies are available. 🐕 🐈

This article as well as further information on the topic are available on the Web at www.HillsVet.com/ConferenceProceedings.

Dental Care Agents with Published Evidence

Agent	Classification	Use	Published Evidence
Clindamycin ▲▲	Antibiotic	Postprophylaxis treatment	Controlled studies in dogs showing efficacy
Chlorhexidine ▲▲	Nonspecific antimicrobial agent	Effective in inhibiting plaque accumulation and reducing gingivitis. Used in rawhides chews, dental gels, oral rinses, and bioadhesive tablets	Controlled studies in dogs showing efficacy
Hexametaphosphate and other polyphosphates ▲▲	Mineral chelators and mineralization inhibitors that bind salivary calcium	Used on food, chews, and biscuits	Evidence for and against efficacy (tartar only)
Soluble zinc salts ▲	Mineral salts with antimicrobial activity	Oral cleansing gels, rinses, and dentifrices	Randomized clinical trial in small group of cats; may also help with malodor