

## **SUCCESSFUL DENTAL HOME CARE: SELECTING THE APPROPRIATE REGIMEN FOR CLIENTS AND PATIENTS**

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### **INTRODUCTION**

Dental home care refers to the procedures and applications utilized by the client to provide plaque and tartar control for their pet. Maintaining oral health depends on professional periodontal management combined with appropriate, effective home care. Determining a home care regimen that is effective as well as orally and systemically safe can be challenging and optimal results require consistent communication and education between the veterinarian, the technician, and the client.

### **PATHOPHYSIOLOGY OF PERIODONTAL DISEASE**

Periodontal disease is a very common and serious disease of adult dogs and cats. Understanding the pathophysiology of periodontal disease, particularly the relationship between dental substrates and disease progression is important to successful periodontal management. Periodontal disease is an infection caused by bacteria in the biofilm (dental plaque) that forms on oral surfaces. Left untreated, periodontal disease leads to oral pain, dysfunction, and tooth loss. These changes often lead to behavior changes such as changes in eating habits to general behavioral changes such as reluctance to grooming and socialization or signs of 'depression'. There is an association between the severity of periodontal disease and pathologic changes in other organ systems. Systemic effects result from both bacteremia and by chronic systemic release of inflammatory mediators and bacterial degradation byproducts.

Periodontal disease commonly refers to gingivitis and periodontitis. Gingivitis is reversible and can be appropriately treated and largely prevented with thorough plaque removal and effective supragingival plaque control. Periodontitis is more severe and primarily irreversible, and may require advanced therapy and meticulous plaque control to prevent progression of the disease. Gingivitis may progress to periodontitis and although the course is unpredictable and heavily dependent on individual animal variability it is known that gingival inflammation is the first step in the development of more severe periodontitis.<sup>1</sup>

### **Role of Plaque and Calculus**

Bacterial plaque is the most important substrate in the development of periodontal disease. Bacterial colonization occurs almost immediately after a dental prophylaxis. Aggregates of bacteria combine with salivary glycoproteins, extracellular polysaccharides, and epithelial and inflammatory cells to form a soft adherent plaque that covers tooth surfaces. Supragingival dental plaque forms above and along the free gingival margin; subgingival dental plaque is formed entirely within the gingival sulcus. Growth and maturation of supragingival plaque are necessary for subsequent colonization of subgingival surfaces by dental plaque.

Plaque accumulation along the gingival margin induces inflammation in adjacent gingival tissues. Without plaque removal or control, gingivitis progresses in severity inducing local changes allowing subsequent bacterial colonization of subgingival sites. Inflammatory mediators damage the integrity of the gingival margin and sulcular epithelium, allowing further infiltration of bacteria. The immune

response of the host attempts to localize the invasion of the periodontal tissues; the result may be further destruction of local tissues due to cytokines released from inflammatory cells.

Dental calculus is mineralized plaque. Calculus is a hard substrate formed by the interactions of salivary and crevicular calcium and phosphate salts with existing plaque. Calculus accumulates supra- and subgingivally, and calculus deposits thicken with time. It has been demonstrated that calculus control in the absence of plaque control is cosmetic; however, calculus provides a roughened surface that enhances bacterial attachment and plaque development and chronically irritates gingival tissues. Undisturbed calculus is always covered by vital dental plaque.

### **THE IMPORTANCE OF DENTAL HOMECARE**

Periodontal disease is a common, chronic infection in dogs and cats. Prevention of periodontal disease in pets requires identification and elimination of exacerbating factors, professional examination and care on a regular basis, and must include an effective dental home care program.

If examination reveals a healthy mouth, the appropriate home care regimen to maintain oral health should be recommended. If examination reveals periodontal disease, appropriate periodontal therapy followed by an effective home care regimen to prevent recurrence should be recommended. It is unreasonable to expect a pet's mouth to stay healthy without appropriate plaque and tartar control between veterinary visits.

Periodontal therapy and home care recommendations depend on the both the degree of oral pathology and the extent of owner compliance. To make an effective home care recommendation, veterinarians and technicians should evaluate the pet's oral pathology to frame the necessary degree of plaque control, be knowledgeable of products that provide proven, effective plaque control, understand the client's willingness and ability to provide oral hygiene and assess the pet's response to oral applications or manipulations.

### **Categories of dental home care products**

There are numerous veterinary exclusive and over-the-counter products available for pet dental care and the effectiveness as well as the evidence supporting claimed efficacy is highly variable. Dental hygiene products are typically divided into the following categories: 1) mechanical plaque and calculus control, 2) chemical calculus control, 3) anti-microbial therapy and 4) barrier agents.<sup>3-5</sup>

Mechanical plaque and tartar control refers to any means that physically disrupts the accumulation of or removes existing plaque and calculus. Commonly used methods include tooth brushing, dietary cleansing and chew aids. The most effective means of mechanical plaque and calculus control when applied correctly and consistently is tooth brushing. There are several designs of pet toothbrushes available and the softness of the bristles combined with the handle and head design make these very desirable for use in pets. It is important to fit the appropriate head size and shape to the pets' mouth to allow for safe and effective oral cleansing. Application of flavored dentifrices, gels or powders to the brush head may increase palatability and acceptability to the pet. Options to the use of a toothbrush include finger cots, gauze applicators and oral swabs.<sup>4</sup>

Mechanical plaque control can also be provided through dietary cleansing. It is common for veterinarians to recommend a dry dog food as part of an oral care routine. Typical dry pet foods may provide some cleansing benefit particularly in comparison to moist sticky foods; however, the dental cleansing provided is far from optimal. There are dental foods available through veterinarians that effectively reduce plaque and calculus accumulation and gingival inflammation.<sup>5,6</sup> Advantages of feeding a dental diet include effectiveness, increased compliance, pet acceptance and optimal nutrition. Dental foods should be assessed for dental efficacy as well as nutrient compatibility appropriate for the animal's life stage and health status.

Dietary snack foods have long claimed dental benefits for dogs and cats. Unfortunately, most of these claims are unsubstantiated and should be regarded with skepticism. Rawhide chews and other edible treats have demonstrated oral benefits. The disadvantages of these products may include pet acceptance, potential for gastrointestinal side-effects, cost, and dietary influences such as caloric excess and nutrient imbalances.

There are numerous chew toys available that claim oral benefits. Most of these claims are unsubstantiated and inappropriate use may cause gingival abrasions, fractured teeth, and gastrointestinal disturbances.<sup>3</sup>

Chemical agents used for calculus control refer primarily to polyphosphate compounds such as hexametaphosphate and pyrophosphate.<sup>7</sup> These agents act as calcium chelators, binding calcium and decreasing mineralization of plaque into calculus. It has been demonstrated that the addition of hexametaphosphate to the surface of baked biscuit treats, rawhide chews and dry foods results in reduced calculus accumulation. Polyphosphates have no known direct effect on oral micro flora populations or plaque accumulation and an effective plaque control regimen should always be the primary recommendation for prevention or post-therapeutic care of periodontal disease.

Anti-microbial agents are available for use in veterinary dentistry either topically or systemically. Chlorhexidine is a very effective plaque antimicrobial agent. It has broad-spectrum activity and binds to oral tissues providing some residual antibacterial activity. Clindamycin is an antibiotic that works by inhibiting bacterial protein synthesis. Clindamycin has been shown to control dental plaque accumulation and oral malodor when used in conjunction with a prophylactic procedure. Fluoride has been reported to decrease tooth hypersensitivity and inhibit bacterial growth and metabolism and is often applied following professional prophylaxis or therapy. Fluoride is potentially toxic and should not be used indiscriminately. Other products available that have reported anti-plaque activity include zinc ascorbate and zinc chlorhexidine solutions. Zinc has been demonstrated to exhibit some antiplaque properties and zinc and vitamin C have been associated with wound healing. Enzyme systems containing glucose oxidase and lactoperoxidase combine with oxygen and water in saliva to form hypothiocyanite which has been shown to have antibacterial activity.

One of the newer categories of plaque and calculus control in pets is the use of a barrier method, or dental sealant. Following a dental prophylaxis, an odorless, tasteless invisible barrier sealant is applied by the veterinarian along the gingival margins of the buccal surface of the dental arcade and is then

continued by the animal owner at home on a weekly basis. The inert polymer forms a physical bond to the tooth enamel and creates a barrier that repels attachment of bacterial plaque.

Many oral hygiene aids have varying degrees or claim varying degrees of plaque and calculus control. Caution should be utilized when extrapolating results to individual patients. It is important for the healthcare team to evaluate the evidence that supports the product efficacy and the product effectiveness. Products that demonstrate efficacy under ideal conditions, for example in a research colony setting, may demonstrate variable effectiveness in the home environment. For example, effectiveness of a dental treat may vary if the client feeds less than the number of treats tested to deliver the claimed efficacy. An understanding of the product, the evidence that supports the product claims, and the expected client application will support a successful outcome.<sup>8</sup>

### **Client education and compliance**

Dental home care begins with educating the client on the pathophysiology of periodontal disease and discussing the degree of plaque control appropriate for maintenance of oral health in their pet. Most clients are aware of the importance of oral hygiene for themselves, and this awareness can be utilized to discuss the importance of oral hygiene for their pets. Demonstrating the degree of oral disease present in the client's pet also effectively stresses the importance of oral care. Discussing oral health as part of systemic health and detailing the client about potential infection to other organ systems can reinforce the importance of oral hygiene.

Owner compliance is critical to determining the type of periodontal therapy applied as well as the home care recommendations. Owner compliance is a function of both owner commitment and capability. Some clients may lack the commitment necessary to provide effective plaque control to their pet and some pets may not tolerate oral manipulation. It may take consistent training and handling over time to accustom a pet to an oral hygiene routine. The client should be instructed in techniques to condition their pet to accept oral manipulations and applications of oral hygiene tools or materials. Other factors affecting owner compliance is the lack of ability of the client to apply effective oral hygiene due to lifestyle demands or lack of manual dexterity. It may be necessary for the pet to be brought to the clinic for routine plaque control by a staff member although this may be inconvenient for some clients. The healthcare team should combine their knowledge of the pet's oral condition and degree of periodontal therapy with an understanding of the level of owner and pet compliance when recommending appropriate home care. Long term success depends on the degree of plaque control the client is capable of providing between professional visits.

The following basic guidelines are provided for reference and may be used as a starting point to customize home care procedures. In dogs and cats with healthy gingivae or gingivitis, initiation of routine tooth brushing combined with dietary cleansing is appropriate. Application of a flavored dentifrice may enhance acceptance and concurrent use of a chemical gel or dentifrice may enhance plaque control. Feeding a daily dental diet is an excellent adjunct therapy to reduce plaque accumulation and provides those clients who do not comply with tooth brushing an effective and convenient means of oral hygiene for their pets. The addition of daily dental treats may provide a benefit but should not exceed 10% of the diet to avoid caloric excess and nutrient imbalance. Chew

toys and devices provide nominal efficacy and have the potential to cause oral trauma. Caution must be taken in using the correct device appropriate for the age, size and chewing behavior of the pet.

Dogs and cats with severe gingivitis and periodontitis need more vigorous plaque control (following appropriate periodontal therapy) to prevent disease progression. Chemical plaque control agents are very beneficial in pets with moderate to severe periodontitis. Additionally, depending on the extent of oral pathology and periodontal therapy some animals may exhibit oral discomfort following treatment. The use of chemical agents applied gently through swabbing or spraying for several days following therapy will help control plaque accumulation and aid in the healing process. Typically, chemical agents are used for short time periods and then replaced with mechanical control agents for longer term plaque control.

Regardless of the type of dental home care recommended, plaque control will only be successful if applied effectively by the client and accepted by the pet. Healthcare team members should be informed about the benefits and the disadvantages of oral hygiene products. Home care goals include control of supragingival plaque consistent with maintenance of periodontal health, prevention of disease progression and maintenance of oral health between professional visits. Idealistic oral hygiene procedures may not be realistic for every case and appropriate home care should be customized to fit the degree of oral pathology and the level of owner compliance.

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