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Nutrition as a Tool to Control Periodontal Diseases in Dogs and Cats



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Abstract

The relationship between food and alteration in oral health has been studied. Whether the mechanical effect of the food on the bacterial plaque, the use of additives to control the plaque calcification or even supplements capable of modulating the oral micro biota, all these techniques have already been tested to maintain or improve the oral health in pets. It is well established that soft foods are associated with increased frequency and severity of periodontal diseases, and that harder diets promote a mechanical removal of bacterial plaque. The phosphate salts have anti-calculus forming properties, and it has been used by the pet food industry for years. Igy-GP blocks the effect of gingipain and improves the oral health of cats and dogs. Omega-3 can be an allele in controlling the inflammation caused by periodontal disease.

Keywords: Oral health; Supplement; Diet

Introduction

Affecting more than 60% of the adult companion animal population, periodontal disease is associated with pain, halitosis, mucosal ulceration and loss alveolar bones and teeth, being progressive with age and more frequently affecting animals fed with wet diets [1-4]. Many commercial treats aimed at improving the oral health of pets by the use of mechanical scraping to clean the teeth by changes in texture and size of kibbles. This mechanical effect disaggregates the plaque and calculus from the tooth surface while the animal chews, but this benefit is only accomplished on the teeth that are used during chewing [5,6]. Another approach is to coat kibbles or snacks with phosphate salts, such as sodium polyphosphate or hexametaphosphate. These additives reduce dental plaque mineralization by its chelating effect on the salivary calcium, avoiding its deposition over the teeth [7-12]. Immunoglobulin Y against gingipain (Igy-GP) has emerged as promising alternatives to promote oral health. Blocking the effect of gingipain this additive prevents the formation of periodontal pocket and consequently the progression of periodontal disease. Positive results with the use of Igy-GP in the oral health of dogs and cats have been reported, reducing dental plaque in cats and dental calculus and gingivitis in dogs [13,14]. Omega-3 can control the production of inflammatory compounds aiding in cases where periodontal disease already causes inflammation and pain [15]. Xylitol may help improve

oral health in pets, with interesting results in cats where its use has reduced the plaque and calculus accumulation [16].

Discussion

It is already well established that diet management and home oral hygiene are important factors that influence oral health in dogs and cats [3,5, 9,17-21]. Feeding dogs and cat with dry food diet has a positive influence on oral health, decreasing the occurrence of mandibular lymphadenopathy, dental deposits and periodontal diseases in comparison with mixed food (dry and soft food) and soft food [3]. Another study found that home-prepared diet increased the probability of an oral health problem in both cats and dogs [20]. Looking at the side of kibble size, increasing kibble diameter by 50% was associated with a 42% calculus reduction in dogs [9].

The use of chewing items to reduce dental calculus is very common practice. Dogs that received one dental chew each day had a statistically significant reduction in plaque and calculus accumulation, and oral malodor [21]. Another study reported that the use of daily oral hygiene chews reduced in 17.3% plaque deposition and 45.8% calculus accumulation in small breed dogs [6]. For cats, the use of daily dental chews was effective in reducing plaque and calculus accumulation on tooth surfaces, as well as reducing the severity of gingivitis [5,22].

One of the most used supplements to control periodontal disease in the pet food industry is phosphate salts, among them the sodium polyphosphate or hexametaphosphate. The phosphate salts are a sequestrant that binds salivary calcium making it less available for precipitation as dental calculus [7,8]. Normally, these salts are added to the surface of dental treats or dental diet and it promotes a significant reduction on the calculus accumulation in studies with dogs [7-12]. Coating the kibbles with sodium tripolyphosphate induced a 55% calculus reduction in dogs [9].

Although polyphosphates control plaque calcification, it does not prevent the proliferation of pathogenic bacteria. In this sense, the use of anti-gingipain IgY (IgY-GP) has emerged as a promising alternative to conventional prevention and treatment methods. By blocking the effect of gingipains it avoids the disruption of cell adhesion and therefore, prevent the formation of periodontal pocket and consequently the progression of periodontal disease [23,24]. In cats, the consumption this additive on the diet coat (4g/kg of diet) was able to reduce dental plaque [14]. In dogs, 35mg/kg of body weight once a day and 17.5mg/kg of body weight twice a day reduced significantly the dental calculus and gingivitis [13].

Another supplement that has been studied to improve oral health is the omega-3. The argument for the use of omega-3 is that this additive is capable of decreasing the production of pro-inflammatory cytokines [25]. Diets with the 10:1 ratio (omega-6:omega-3) lowered pro-inflammatory cytokines compared to the diet with the 40:1 ratio in cats with chronic gingivitis/stomatitis [15], but more studies in this species as well in dogs are necessary. Another additive that needs more studies is xylitol, with has been shown to have an antibacterial effect on oral bacteria and dental plaque, as well as anti-calculus forming properties [26-29]. Adding xylitol to the water of cats resulted in the reduction of plaque and calculus accumulations [16].

Conclusion

Based on the evidence presented, information currently available suggests that diet can control and improve the oral health of dogs and cats. Being the most used by the pet food industry the mechanical effect along with the use of polyphosphate salts. Though, the use of IgY-GP, omega-3, and xylitol can potentially be used in the pet food market. However, more studies are needed to define the best dose and vehicle to promote its best effect on controlling and preventing the periodontal disease.

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