

CRITICALLY APPRAISED TOPIC:

Dental Home Care

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Dental diets, treats and chew aids can be an effective part of a dental health program.

CLINICAL QUESTION

Is there evidence that nutritional intervention, in the form of dental treats or diets, is effective in preventing the development of gingivitis and periodontal disease?

CLINICAL BOTTOM LINE

There is evidence to support the hypothesis that feeding dental treats, chew aids and formulated diets can help to prevent calculus buildup and periodontal disease in dogs. Limited evidence exists for cats. Dental diets, treats and chew aids are not a substitute for other home care practices, such as brushing, or for professional dental examination and cleaning by veterinary professionals.

EVIDENCE SUMMARY

Search string:

- Google scholar: Diet AND dental OR periodontal canine OR feline.
- References citing Boyce: Feline experimental models for control of periodontal disease.
- Article databases: PubMed, Veterinary Clinics of North America: Small Animal Practice.

Main Results

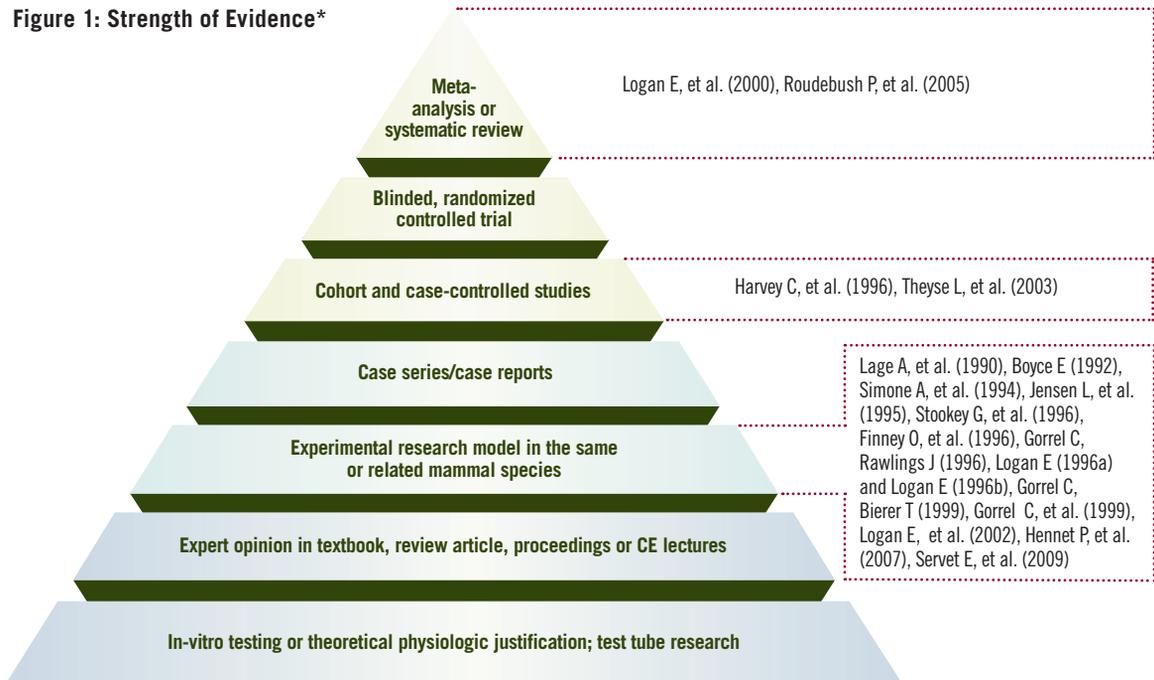
- There is good evidence that polyphosphate-coated biscuits control calculus accumulation in dogs and cats.¹⁻⁴

- There is good evidence that hard dental treats control calculus accumulation in dogs and that dental treats containing polyphosphates or enzymes control calculus accumulation in cats.⁵⁻⁷
- There is good evidence that chew aids (such as rawhide chew strips) provide short-term control of calculus. No evidence exists regarding long-term calculus control or the use of chew aids in cats.^{4, 8,9}
- There is good evidence that dental foods control calculus accumulation in cats and dogs, decrease gingivitis in cats and dogs and control halitosis in dogs.¹⁰⁻¹⁷ There is limited but good quality evidence that some dental foods may even reduce existing calculus.¹⁸

COMMENTS

- Given the importance of periodontal disease and the huge number of products available, there is very little comprehensive published research on these products. There is even less research evaluating products in real-world settings, and there is a paucity of research data in cats. Some aspects of home care, such as bones or chew toys, have only anecdotal evidence available.
- Dental treats, chew aids and formulated diets represent only part of an effective home care regimen. Tooth brushing is the gold standard for

Figure 1: Strength of Evidence*



*See corresponding Evidence Summary, Table 1, pages 5 and 6

effective prevention, however client compliance is poor. Hence, a multifaceted approach to periodontal care is required.

- Veterinary examination and annual dental cleaning under anesthesia are also very important components of the periodontal care program. The best home care is not a substitute for regular and

thorough veterinary examinations and vice versa. An effective periodontal care program will balance aspects of professional care with multiple different home care strategies.

CAT Appraiser: Patrick Shearer, BVMS, PhD

Date CAT was "born"/expiration date: 01/20/2010 🐾

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Table 1: Evidence Summary

Study	Methods	Key Findings
Logan E, et al. (2000)	Review of multiple experiments investigating the effect of various treats and diets on periodontal health.	Certain treats and diets assist in the prevention of calculus accumulation and gingivitis.
Roudebush P, et al. (2005)	Meta-analysis of publications on various types of diets.	Good evidence for the use of dental treats, chew aids and formulated diets for control of plaque and calculus.
Harvey C, et al. (1996)	The association of calculus, gingival inflammation and periodontal bone loss with diet (dry food only, or other than dry food only), and with access to other chewing materials was analyzed in 1,350 client-owned dogs in North America.	Few apparent differences between dogs fed dry food only and those fed other than dry food only. Progressively less accumulation of calculus, less gingival inflammation and less periodontal bone loss in dogs given access to more types of chewing materials (rawhides, bones, biscuits, chew toys) compared with dogs given access to fewer or no chewing materials.
Theyse L, et al. (2003)	Compared four different methods of periodontal home care.	Home care methods that included a specially formulated dental diet were more effective at preventing plaque accumulation.
Lage A, et al. (1990)	Using a clean-tooth model, the effect of chewing rawhide and cereal biscuit on removal of dental calculus was studied in 67 dogs. Trial I used a quantitative method based on actual measurement of the area of calculus on a tooth; Trial II used a quantitative method based on an arbitrary grading system to establish a supragingival calculus index. Analysis was performed, using 2-factor (Trial I) and a 3-factor (Trial II) analysis of variance.	Dogs removed calculus from their teeth by chewing rawhide; some teeth were cleaned better than others. The optimal amount or frequency of rawhide treatment was not necessarily determined. It was determined that regular consumption of up to three rawhide strips/d for three weeks was safe. Processed biscuits were sometimes effective in removing calculus from dogs' teeth; however, biscuits were not as effective as the rawhide in removing supragingival calculus.
Boyce E (1992)	Cats' teeth cleaned at the start of the study; then cats separated into two groups. One group was fed canned soft food and the other a dry food.	Cats eating the dry food had significantly less plaque at the end of the week than cats eating the canned soft food.
Simone A, et al. (1994)	Ten judges, able to discriminate and rank malodorous chemical compounds, assessed changes in oral malodor resulting from dietary manipulation. A dry experimental food served as the test food, and a commercial dry dog food as the reference food.	Dogs fed the experimental food developed significantly less oral malodor ($p < 0.01$) than when they were fed the control food.
Jensen L, et al. (1995)	Dogs were balanced in groups of five according to baseline plaque index scores. Dental cleanings were done on Day 0. Dogs in the treatment group were fed a food formulated to reduce accumulation of plaque, stain and calculus. Control group dogs were fed a commercially available dry dog food. Twenty-two teeth were graded for plaque accumulation on Day 7 and for stain and calculus accumulation on Day 21.	Dogs fed the treatment food had significantly less plaque, stain and calculus accumulation ($p = 0.001$) than dogs fed the control food.
Stokey G, et al. (1996)	Clinical trial in laboratory dogs using an HMP-coated biscuit and a clean-tooth model. Dogs had their teeth scaled before the experiment. Dogs were fed dry food, followed either by the dental treat (test group) or by no treat (control group). A crossover design was used, with the dogs' teeth scaled again after four weeks and treatment/control groups swapped.	Feeding two or four conventional bone-shaped biscuits exerted no significant effect upon calculus formation, while the similar feeding of two HMP-coated biscuits significantly reduced calculus formation by 46 percent.
Finney O, et al. (1996)	Investigated the ability of a specially formulated dental food to reduce the amount of plaque, calculus and gingivitis in dogs with pre-existing dental disease.	Specially formulated dental foods can reduce the amount of pre-existing plaque and calculus.

Table 1: Evidence Summary (cont'd)

Study	Methods	Key Findings
<p>Gorrel C, Rawlings J (1996)</p>	<p>Using a clean-tooth model, the accumulation of dental deposits and the development of gingivitis were assessed in two groups of dogs; one fed a dry diet only, and the other group fed the same dry diet supplemented by the daily addition of the dental hygiene chew.</p>	<p>The daily addition of the chew to the dry diet was effective in reducing plaque (at one week and three weeks) and calculus (at three weeks) accumulation on the tooth surfaces. The daily addition of the chew also reduced the severity of gingivitis as compared to feeding the dry diet only.</p>
<p>Logan E (1996a)</p>	<p>Using a clean-tooth model, 40 adult mixed-breed dogs were fed either dry dog food or a specially formulated dental food for six months.</p>	<p>Dogs fed the dental food had 39 percent less plaque accumulation and 36 percent less gingival inflammation than dogs fed the control food.</p>
<p>Logan E (1996b)</p>	<p>Cats were fed either dry cat food or a specially formulated dental food.</p>	<p>Cats fed the dental food had less plaque accumulation than cats fed the control food.</p>
<p>Gorrel C, Bierer T (1999)</p>	<p>Long-term study investigating the effects of feeding a dental hygiene chew that has been shown to be effective in promoting periodontal health in dogs in short-term studies.</p>	<p>Oral malodor, calculus, and plaque scores were still significantly lower after 21 months in the group that was receiving the dental hygiene chew, although gingivitis scores no longer differed significantly.</p>
<p>Gorrel C, et al. (1999)</p>	<p>Using a clean-tooth model, the accumulation of dental deposits, development of oral malodor, and development of gingivitis were assessed in two groups of dogs; one fed a dry diet only, and the other fed the same dry diet supplemented by the daily addition of the new dental hygiene chew.</p>	<p>Daily addition of the chew to the dry diet was effective in reducing plaque and calculus accumulation on the tooth surfaces, and also reduced the severity of gingivitis and oral malodor as compared to feeding the dry diet only.</p>
<p>Logan E, et al. (2002)</p>	<p>Using a clean-tooth model, study compared the effects of a typical dry food and a dental food on plaque accumulation and gingival inflammation in dogs during a six-month period.</p>	<p>Daily feeding of the dental food significantly reduced plaque and gingivitis by 39 percent and 36 percent, respectively, compared with daily feeding of the typical dry food.</p>
<p>Hennet P, et al. (2007)</p>	<p>Forty female Beagle dogs, aged 12 to 24 months, were divided into four groups of 10 dogs each. Each group was fed a different diet, which varied by size and addition of a polyphosphate.</p>	<p>Increasing kibble diameter by 50.0 percent was associated with a 42.0 percent calculus reduction. Coating the kibbles with sodium tripolyphosphate (STPP), an anti-calculus agent, further induced a 55.0 percent calculus reduction. Sodium tripolyphosphate was shown to be at least as effective as sodium hexametaphosphate.</p>
<p>Servet E, et al. (2009)</p>	<p>Using a clean-tooth model, 30 mixed-breed cats were divided into groups of 10 and fed either a diet with triangular kibbles, rectangular kibbles, STPP and a proprietary plaque-reducing nutrient (PRN); triangular kibbles and STPP.</p>	<p>The diet with rectangular kibbles and STPP plus PRN had a greater reduction in generalized and gingival plaque at days 7 and 28 than the other diets. Cats eating this diet also had less calculus at days 28 and 56 than cats eating the other diets.</p>

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