

SYNOPSIS OF REPORT

Reducing Calculus Formation With Tartar Shield Soft Rawhide

Abstract

A crossover clinical study was conducted in adult mixed-sex Beagle dogs in the Indiana University School of Dentistry following the guidelines of the Veterinary Oral Health Council (VOHC). The dogs were maintained on tap water and a commercially-available dry diet. They were stratified into two groups using a random block procedure and normal calculus formation rates for the dogs. The two groups were provided either a no-rawhide regimen or a single piece of soft rawhide provided about 4 hours after being fed the dry diet. At the initiation of each 4-week test period the dogs were anesthetized, given a dental prophylaxis and provided their assigned regimens. At the end of each test period the dogs were anesthetized and examined for the formation of dental calculus, plaque and gingivitis. Following a 1-week washout period the foregoing procedures were repeated with the dogs receiving the alternative regimens. The results of the study indicated that the regimen involving the soft rawhide resulted in significant reductions in the formation of dental calculus (28%), plaque (19%) and gingivitis (46%).

Background

The unique soft rawhide used in this investigation is prepared by a proprietary extrusion process in Indiana. The rawhide is minced, the particles coated with sodium tripolyphosphate, an anti-calculus agent, and cetyl pyridinium chloride, an anti-microbial agent, and the material is processed and carefully dried resulting in a soft fibrous rawhide roll. The chemical additives are commonly used materials and are approved by the U.S. Food and Drug Administration for use in a variety of products. Previous studies have demonstrated the dental health benefits of this unique soft rawhide product and those studies coupled with the present investigation resulted in the awarding of the coveted VOHC Seal for Calculus by the Veterinary Oral Health Council on October 2007.

Methods and Materials

This study (#1434) was designed as a 2-way crossover study and was conducted in adult mixed-sex Beagle dogs in the AAALAC-accredited Bioresearch Facility at the Indiana University School of Dentistry (IUSD) according to guidelines provided by the Veterinary Oral Health Council (VOHC). The study was approved by the IUSD Institutional Animal Care and Use Committee prior to initiation. The dogs were maintained on tap water

and a commercially-available dry diet (Purina Dog Chow). The two test regimens involved either no treat or a daily treat consisting of a single piece of the soft rawhide. The dogs were stratified into 2 groups using a random block procedure with calculus formation rates obtained from a previous study. Immediately prior to initiating each 4-week test period the dogs were anesthetized, given a dental prophylaxis to remove all exogenous deposits on the teeth and they were then provided their assigned regimens. The dogs assigned to the treat regimen received a single piece of the soft rawhide about 4 hours following the basal diet and consumption was monitored.

At the conclusion of the 4-week test period (and 18-24 hours after the last feeding of the treat) the dogs were examined in a randomized sequence for oral malodor, gingivitis, dental plaque, and calculus by experienced clinical examiners who were unaware of the group assignments of the animals. The oral malodor assessments were made using a volatile sulfur meter (Halimeter) positioned next to the buccal surface of the right and left maxillary P₄ with the highest reading during a 10-15-second period recorded. The average of the two readings was considered the score for the dog.

The gingiva adjacent to the buccal surfaces of the maxillary I₃, C, P₂, P₃, P₄, M₁ and mandibular C, P₂, P₃, P₄, M₁ teeth of the dogs was then visually divided into mesial, buccal, and distal thirds and examined for gingivitis using the following criteria: 0 = no gingivitis; 1 = incipient or very mild gingivitis (red, swollen but no bleeding on probing); 2 = mild gingivitis (red, swollen with delayed bleeding on probing); 3 = moderate gingivitis (red, swollen with immediate bleeding on probing); or 4 = severe gingivitis (ulceration, spontaneous hemorrhage and profuse bleeding on probing). The tooth score was the mean of the three sites and the animal score was the mean value for each tooth examined.

Dental plaque was then disclosed by spraying the tooth surfaces with an aqueous solution containing 1.5% D&C Red No. 28 (Butler Red Cote) and the gingival and occlusal halves of each buccal tooth surface was scored for coverage and thickness using the following criteria: 0 = no observable plaque; 1 = scattered plaque covering less than 25% of the surface; 2 = plaque covering between 25 and 49% of the surface; 3 = plaque covering between 50 and 74% of the surface; and 4 = plaque covering more than 75% of the surface. Plaque thickness was estimated using: 1 = light (<0.5 mm); 2 = moderate (0.5-1.0 mm); and 3 = heavy (>1.0 mm). The coverage score was multiplied by the thickness value for each half-surface and average values obtained for the gingival half as well as the whole tooth surface.

The tooth surfaces were then brushed with a soft toothbrush and water to remove the disclosed plaque. Each tooth surface was visually divided into

mesial, buccal and distal thirds and calculus was assessed in each segment using the following criteria: 0 = no observable calculus; 1 = scattered calculus covering less than 25% of the tooth surface; 2 = calculus covering 25 to 49% of the tooth surface; 3 = calculus covering 50 to 74% of the tooth surface; and 4 = calculus covering more than 75% of the tooth surface. The thickness of the calculus deposits was assessed using the criteria of: 1 = light (<0.5 mm); 2 = moderate (0.5 – 1.0 mm); and 3 = heavy (> 1.0 mm). The tooth score was the sum of the scores for each of the three segments and the average score for all graded teeth was used as the value for each dog.

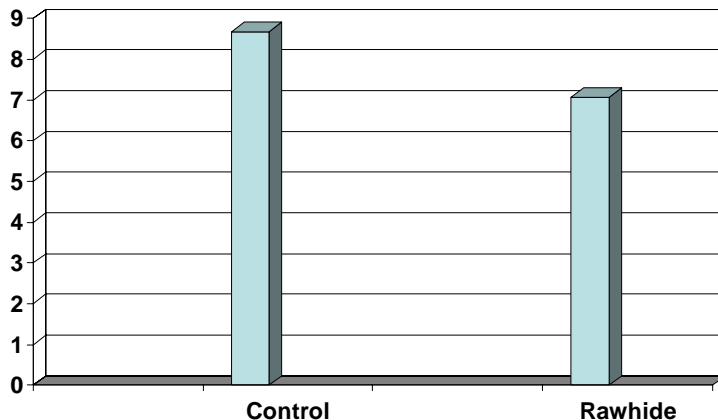
Following a 1-week washout period the dogs were again anesthetized, given a prophylaxis, and provided the alternative regimen for the second 4-week test period. At the end of this test period the dogs were again examined for the various parameters. The data were then statistically analyzed using an analysis of variance model (ANOVA).

Results

The oral malodor assessments indicated that rawhide regimen resulted in a numerical improvement of 11% even after a period of 18-24 hours had elapsed since the dogs' last rawhide treat.

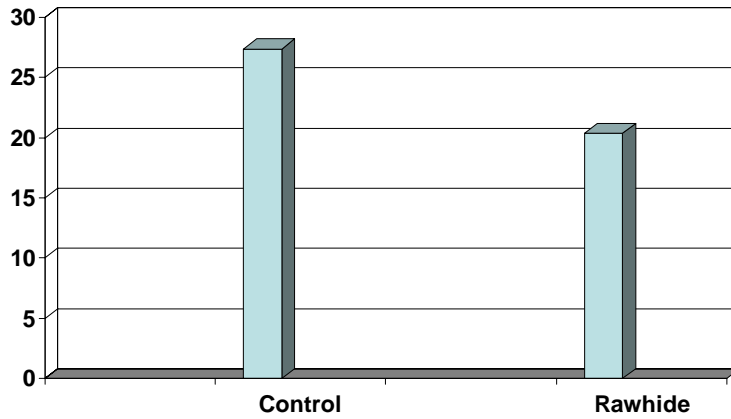
The results of the dental plaque, calculus and gingivitis examinations are summarized in the following graphs:

Tartar Shield Soft Rawhide vs. Dental Plaque



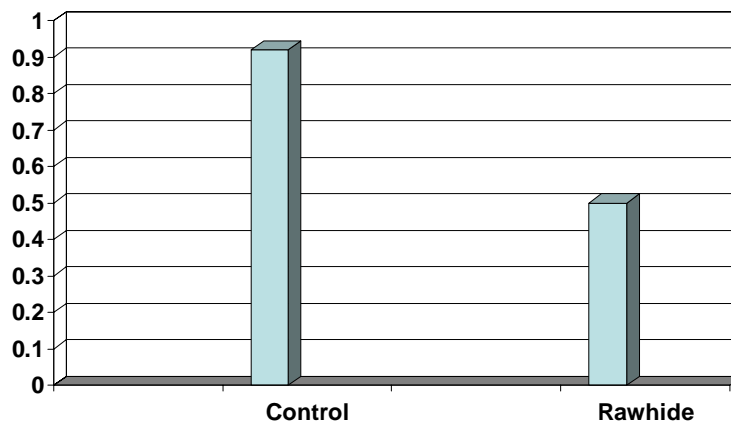
The Tartar Shield Soft Rawhide regimen significantly reduced dental plaque by 18.5%.

Tartar Shield Soft Rawhide vs. Calculus Formation



The Tartar Shield Soft Rawhide regimen significantly reduced calculus formation by 28.2%.

Tartar Shield Soft Rawhide vs. Gingivitis



The Tartar Shield Soft Rawhide regimen significantly reduced the development of gingivitis by 45.7%.

As noted from these graphs, the experimental regimen of providing dogs with a single piece of Tartar Shield Soft Rawhide daily resulted in statistically significant reductions in dental plaque, dental calculus and the development of gingivitis. These clinical data were part of the documentation provided to the VOHC to obtain the coveted VOHC Seal.