

Nutrition and Its Impact to Oral Health in Dogs and Cats (Study in Prof. Soeparwi Animal Hospital)

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ABSTRACT

Dental plaque has been considered as one of etiology in dental problem. It consists of collection of microorganisms that are formed and firmly attached to the tooth surface and also food deposit. With the mineralization process, dental plaque will transform into dental calculus and lead to periodontal health issues. Dental plaque formation is affected by diet especially food texture. The aim of this study is identifying the correlation between nutrition, microorganisms, and oral health status in dogs and cats. The study was conducted in Prof. Soeparwi Animal Hospital, Faculty of Veterinary medicine, Universitas Gadjah Mada, Yogyakarta, Indonesia within April-September 2020. Six animals (4 cats and 2 dogs) were examined and dental scaling was performed. Dental calculus then was collected and isolated for microbiological purposes. Results showed that all the animals were diagnosed with gingivitis and some of them have been reached into periodontitis. From the anamnesis and clinical examinations, mix diet (dry and wet food) has been given for daily routine by the owners. Another finding, Streptococcus alpha hemolytic has been found in all the dental calculus samples. The conclusion of this study was nutrition affect the oral health status of the animals

Keywords: nutrition, animals, dental calculus, dental plaque, oral health

1. INTRODUCTION

Dental plaque and calculus contribute to oral health problems in animals. In Prof. Soeparwi animal hospital, approximately 10% of animals are suffering from dental calculus and get dental treatment every year. Dental plaque is a soft layer microorganisms that is combined with food debris and firmly attached to the tooth surface [8]. Dental plaque is initiated by colonization of oral microbes and with the mineralization process it becomes hard and thick so called dental calculus or tar-tar [2],[6]. Untreated dental calculus leads periodontal problem (periodontitis) that affect physiological response especially mastication process [4].

2. CASE REPORT

This study was conducted in Prof. Soeparwi animal hospital, Faculty of Veterinary Medicine, Universitas Gadjah Mada within April-September 2020. Six animals (4 cats and 2 dogs) with gingivitis as a chief complain were examined. For cats, they were mixed breeds with age 1-6 years and 3-6 kg body weight while the dogs aged 5-10 years with 33-45 kg body weight. The owners were asked about daily nutrition, past medical history, and the chief complain. All animals were healthy with no serious medical health problems. The owners have signed the informed consent before performing dental treatment.

General anesthesia was performed prior to dental scaling with Zoetyl 50 then the endotracheal tube (ET) were put on and connected to the anesthetic gas machine containing isoflurane for maintaining the sedation effect. Dental scaling was conducted with iM3 GS tool, dental excavator for breaking the calculus, and needle holder. Dental scaling was performed in supra gingival, interdental, and sub gingival area.

For microbiology examination, dental calculus from the previous step was collected and put into sterile brain heart infusion (BHI) broth as a transport medium. Identification of microorganisms has been conducted in Laboratory of Microbiology, Faculty of Veterinary

Medicine, Universitas Gadjah Mada, Yogyakarta. The results were analyzed descriptively.

3. RESULT AND DISCUSSION

3.1. Clinical examinations

All animals came to the hospital with gingivitis as a chief complain. In Table 1, we present brief summary about anamnesis and clinical examination of the subjects.

3.2. Microbiological identification

Table 1. Summary of anamnesis and clinical examination of the subjects in Prof. Soeparwi Animal Hospital, Faculty of Veterinary Medicine, Universitas Gadjah Mada within April- September 2020

Subject code	Clinical examination result
1	Redness on gingival surface in bilateral posterior region (upper and lowerjaws)
	Dental calculus were present in posterior region
	Normal body temperature
	No systemic disorders
	Receive both wet and dry food on daily basis
	Never receive dental treatment
2	Redness on gingival surface in bilateral posterior region (upper and lowerjaws)
	Dental luxaxion in some molar teeth
	Dental calculus were present in posterior region
	Normal body temperature
	No systemic disorders
	Receive both wet and dry food on daily basis
3	Annual dental treatment (dental scaling)
	Redness on gingival surface in bilateral posterior region (upper and lowerjaws)
	Dental calculus were present in posterior region
	Normal body temperature
	No systemic disorders
	Receive both wet and dry food on daily basis
4	Annual dental treatment (dental scaling)
	Redness on gingival surface in bilateral posterior region (upper and lowerjaws)
	Dental calculus were present in posterior region
	Normal body temperature
	No systemic disorders
	Receive both wet and dry food on daily basis
5	Never receive dental treatment
	Redness on gingival surface in bilateral posterior region (upper and lowerjaws)
	Dental calculus were present in posterior region
	Normal body temperature
	No systemic disorders
	Receive mostly wet food on daily basis
6	Never receive dental treatment
	Redness on gingival surface in bilateral posterior region (upper and lowerjaws)
	Dental luxaxion in some molar teeth
	Dental calculus were present in posterior region
	Normal body temperature
	No systemic disorders
Receive both wet and dry food on daily basis	
6	Never receive dental treatment

After receiving dental scaling followed by root planning treatment, dental calculus were collected prior to microbiological examination. Microbiological results are presented in Table 2.

Table 2. Results of microbiological identification of the subjects in Prof. Soeparwi Animal Hospital, Faculty of Veterinary Medicine, Universitas Gadjah Mada within April-September 2020.

Sample code	Microbiological identification	
	Porphyromonas sp	Streptococcus alpha hemolytic
1	not isolated (negative)	Isolated (positive)
2	not isolated (negative)	Isolated (positive)
3	not isolated (negative)	Isolated (positive)
4	not isolated (negative)	Isolated (positive)
5	not isolated (negative)	Isolated (positive)
6	not isolated (negative)	Isolated (positive)

From the results, *Streptococcus alpha hemolytic* was presented in all samples while *Porphyromonas sp* was not found. It might be caused by most of the dental calculus were taken from supra gingiva area. Pérez-Salcedo [7] mentioned that majority of *Streptococcus alpha hemolytic* was found in supra gingival calculus. In other study [3] showed that *Streptococcus mutans* became predominant bacteria in oral cavity. *Streptococcus mutans* was easy to colonize and form an oral biofilm [5].

All samples in this study were given certain foods regularly by their owners. Research conducted by Clarke and Cameron [1] showed that the prevalence of calculus formation occurs more in domesticated animals than in wild animals. One reason was the diet that has been received by these animals. Previous study performed by Watson [9] showed commercial feed both wet and dry had some implications for periodontal disease in dogs and cats. Commercial diet especially wet food becomes a substrate for bacterial biofilm to grow on tooth and gingival surface an affect the oral health status.

Some researchers suggest using abrasive diets to maintain oral hygiene because of the minimal effect of calculus formation [9], [10]. This diet is a low-carbohydrate diet which will minimize plaque formation on the tooth surface. The recommended diet is reinforced meat and raw meat which is believed to

reduce the prevalence of oral and dental diseases by as much as 85%.

4. CONCLUSION

We conclude that nutrition (diet) received by the animals becomes the main factor in dental calculus formation which affect oral health status. Using of raw meat diet is suggested to prevent and maintain the oral health status followed by regular dental treatment.

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