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Full Length Research Paper

Evaluation of Canine Dental Health Problems in Ibadan, Nigeria

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ABSTRACT

Clinical evaluation for Dental Disease Conditions (DDC) in companion animals is an integral aspect of routine dental health care procedure in veterinary practice which often is less practice in Nigeria. This study evaluated the occurrence of DDC and possible inciting causes with a focus of providing a meaningful basis for canine dental health care in Nigeria. Fifty-seven dogs (30 males and 27 females) made up of 10 different breeds and presented at 3 major Veterinary Hospitals in Ibadan, Nigeria were assessed for periodontal disease (PD), dental calculus (DC), dental abrasion (DA) and their association with other systemic diseases using Dental probe, Glucometer, Urinalysis strip and PD survey questionnaire. Data were analyzed using descriptive statistics and correlation at > 0.05 level of significance. The prevalence of PD was the highest (82.46%) while DC was 80.70% and DA, 57.89%. PD was observed to be more common in male (83.33%) dogs, while calculus formation and dental attrition were more common in female dogs. The incidence and severity of dental disease conditions increased with age. There was a positive correlation ($p=0.04$) between PD and DC and between DC and DA ($p=0.00$). The order of nutritional inciting cause of PD, DC and DA is compounded food $>$ home food $>$ waste from eateries. This investigation showed a high incidence of DDC in dogs with no dental health care and nutrition could be an inciting cause. This showed that there is need for patients' dental health care in veterinary practice in Nigeria

Key words: *Dental disease, dogs, Ibadan*

INTRODUCTION

A dog's teeth are a set of highly mineralized living tissues used by the animal to hold, tear, and chew. They are significant for eating and defence. The set of teeth within oral cavity of an adult dog is made up of 3 incisors, 1 canine, 4 premolars and 2 molars at the upper jaw, and 3 incisors, 1 canine, 4 premolars and 3 molars

at the lower jaw, all embedded in the alveoli of the maxillary and the mandibular bones and covered at the root by the cementum and further by the gingiva (John and Alexander, 2010).

Clinical evaluation for Dental Disease Conditions (DDC) in companion animals is an integral aspect of routine dental health care procedure in veterinary practice which often is less practiced. Dental health care

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in dogs is necessary for their optimal performance as dental disease conditions could render a dog incapable of performing its necessary roles such as providing companionship, security, and breeding.

Periodontal disease, an integral part of DDC refers to the progressive loss of attachment between the teeth and the four periodontal tissues: gingiva, alveolar bone, periodontal ligament and cementum (Wigg and Lobprise, 1997). It is the most common oral disorder affecting dogs and cats worldwide, with prevalence of 20.5% and 24.2% respectively (Lund, *et al.*, 1999). The prevalence of periodontal disease in dogs is five times that in human beings because of the alkaline nature of dogs' saliva which favours plaque formation (Wigg and Lobprise, 1997). The formation of plaque on teeth often lead to calculus or tartar build-up and to gingivitis; and if left untreated, progresses to more advanced forms of periodontal disease (DuPont, 1997). The bacteria in plaque cause the immune system to recognize it as foreign and mobilize white blood cells whose enzymatic activities result in breakdown of the gum tissue causing inflamed gums, necrotic tissue, and teeth loss (Wigg and Lobprise, 1997) however a link between periodontal disease and bacteraemia has been suggested in some investigations (Cutcher *et al.*, 1971; Calvert *et al.*, 1985). Apart from the bacteraemia, the extent or degree of teeth attachment or loss has also been related with changes in systemic inflammatory variables and renal indices (Rawlinson *et al.*, 2011).

In this paper, the prevalence of dental disease conditions and possible inciting causes were evaluated with a focus of providing a meaningful basis for canine dental health care in Nigeria.

MATERIALS AND METHODS

Information on the Dogs Used

A questionnaire was administered to owners to obtain information on the sex, age, feed administered and level of oral hygiene in dogs in Ibadan, Oyo state, Nigeria. Fifty-seven dogs (30 males and 27 females), (Alsatian-40.4%, Mongrel-21.3%, Rotweiller-21.1%, Boer-boel-7.0%, Pitbull-5.3%, Caucasian-3.5%, with Dachshund, Ridgeback, Samoyed and Bullmastiff constituting the remaining 7.2%) presented at 3 major Veterinary Hospitals in Ibadan, Nigeria were enrolled in this study. These dogs were grouped according to their ages as reported by their owners into: 1-3 years, 4-6 years, 7-9 years and 10-12 years. The dogs were also classified according to their body weight: into medium breed (10-20kg), large breed (21-30kg) and extra-large breed (31-40kg).

Clinical Examination and Scoring of the DDC

The oral mucosae of dogs enrolled in this study were examined and the teeth were assessed for periodontal disease (PD), Dental Calculus (DC) and Dental Abrasion (DA).

With the aid of dental probe (Henry Schein®, USA) alterations of the periodontium were measured using the plaque index system described by Loe and Silness (1963). Formation of dental calculus was examined and scored by a calculus indexing system (Greene and Vermillion, 1964). Tooth crown abrasion was classified as follows, (0) No abrasion of the dental crown; (1) Abrasion of less than one third of the crown; (2) Abrasion of more than one third of the crown.

Evaluation of the Glucose Level in Blood and Urine

Blood sample (1ml) was collected from each of the dogs via the cephalic vein to determine the blood glucose level using glucometer and strip (ACCU-CHECK Active® Germany). Urine sample (3ml) was collected via cystocentesis from each dog and analyzed using the Urinalysis strip (Dialab Hondastrasse, Austria).

RESULTS

The questionnaire showed that there is no routine oral health care for any of the dogs examined. Periodontal disease had the highest prevalence rate (82.46%), followed by calculus formation (80.70%) and dental abrasion (57.89%) in the 57 dogs examined (Table 1).

Table 1
Prevalence of dental disease conditions in dogs in Ibadan

Dental conditions	Frequency (n=57)	Percentage (%)
Periodontal disease	47	82.46
Calculus formation	46	80.70
Dental abrasion	33	57.89

Periodontal disease was more common in males (83.33%) than in females (74.04%) while calculus formation and dental abrasion were more common in females. (Table 2). There was an increase in incidence and severity of dental disease conditions with age: Age bracket 1-3: (P.D=72.73%, C.F=33.00% and D.A=47.73%), age bracket 4-6:(P.D=85.57%, C.F=85.57% and D.A=57.14%), age bracket 7-9:

Table 2:
Distribution of dental disease conditions in dogs in relation to sex

Dental diseases	Frequency in male dogs (n=30)	(%)	Frequency in female dogs (n=27)	(%)
Periodontal disease	25	83.33	20	74.07
Calculus formation	22	73.33	22	81.48
Dental abrasion	14	46.67	15	55.56

(P.D=100%, C.F=100% and D.A=50%) and age bracket 10-12: (P.D=100%, C.F=75% & D.A=75%). (Table 3). Dogs fed compounded ration showed more evidence of DDC compared to those fed on Home food and leftover from eateries. (Plate 1, Fig. 1)

There was a strong and positive relationship between periodontal disease and calculus formation ($p=0.04$) in this study. Also, a strong and positive relationship existed between calculus formation and dental abrasion ($p=0.00$). However, an in-significant and weak relationship existed between periodontal disease and blood glucose level. (Table 4).



Plate 1:
A one and half year old dog with early stage of periodontal disease no dental calculus and dental abrasion. **B:** A three year old dog with supra-gingival calculus covering more than one third of the dental crown. **C:** A seven year old dog with moderate periodontal disease with swelling and red mucosa, often with hemorrhages, supra-gingival calculus covering more than two third dental crown and dental abrasion of more than one third of the crown. **D:** An eleven and half year old dog severe periodontal disease with red and swollen mucosa, alveolar bone loss, probing depth more than 5.0 mm, with supra-gingival calculus covering more than two-third of the dental crown and dental abrasion of less than one third of the crown

Table 3

Distribution of dental disease conditions in dogs in relation to age

Dental diseases	1-3 years (n=44)	Percent (%)	4-6 years (n=7)	Percent (%)	7-9 years (n=2)	Percent (%)	10-12 years (n=4)	Percent (%)
Periodontal disease	32	72.73	6	85.57	2	100.00	4	100.00
Calculus formation	33	75.00	6	85.57	2	100.00	3	75.00
Dental abrasion	21	47.73	4	57.14	1	50.00	3	75.00

Table 4:

Correlation between the dental disease conditions (P.D, C.F, & D.A) and other relevant variables

		Type of diet	Bone supply	Calculus formation	Dental abrasion	Level of blood glucose	Level of glucose in the urine
Periodontal disease	Pearson correlation	.083	.074	.378*	.201	.234	.140
	Sig. (two-tailed)	.565	.607	.004	.125	.140	.337
Calculus formation	Pearson correlation	-.038	-.108	.378*	.585**	.250	-.218
	Sig. (two-tailed)	.794	.451	.004	.000	.115	.132
Dental abrasion	Pearson correlation	-.140	-.088	.210	.585**	.234	.169
	Sig. (two-tailed)	.328	.538	.125	.000	.140	.245

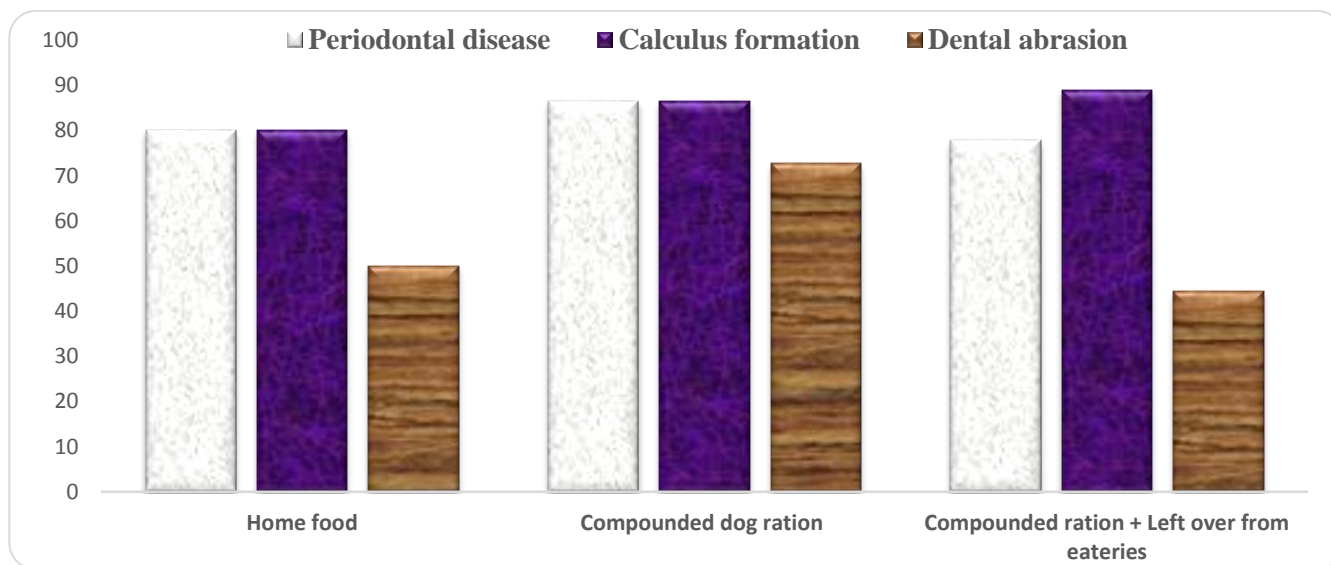


Figure 1

Relationship between food types fed to dogs and dental disease conditions in Ibadan

DISCUSSION

This investigation showed that DDC is prevalent in dogs in Ibadan, Oyo state Nigeria since the Veterinary hospitals used serve as referral centers to other veterinary clinics in Ibadan and neighbouring cities. Dogs below one year of age were purposefully excluded from this study because studies showed that the onset of DDC to be between year two and three (Clarke, 1999).

Periodontal disease was observed to be the most prevalent dental disease condition in dogs examined with a higher prevalence in males than in females. This observation was consistent with earlier studies in other parts of the world (Genco *et al.*, 1998; Gorrel, 1998, Lund *et al.*, 1999). However, calculus formation and dental abrasion were more prevalent in the females dogs, which could be related to the fact that female dogs are commonly kept for a longer period in the kennel for breeding purposes and out of boredom often bite on hard surfaces. Besides, mineral requirements during pregnancies often prone such dogs to eating concrete and sand. These behavioural pattern cause enamel wear due to the abrasive nature of sand particles (DuPont, 1997). The increase in incidence and severity of DDC in older dogs is consistent with information in literatures (Harvey, 1998). This has been associated with the accumulation of calculus on the teeth of older dogs which provides a good environment for anaerobic bacteria proliferation with its adverse effects on the teeth and the surrounding structures. (DuPont, 1997). The high incidence of DDC in dogs fed with compounded ration in this investigation was consistent with earlier findings (Genco *et al.*, 1998; Gorrel, 1998; Harvey, 1998; Lund *et al.*, 1999) possibly because of leftover in the mouth after eating which encourages bacteria growth and multiplication. Besides most of the compounded ration fed to the dogs in our environment, were often formulated without a strict adherence to the nutritional requirements of dogs which may result in mineral deficiency.

In this investigation, there was no significant relationship between periodontal disease and other systemic diseases like diabetes and renal failure (Lonsdale 1993, Latimer and Mayer 1989), this may be related to the fact that most of the dogs examined during the course of this study had normal blood glucose level. In this investigation, lack of dental health care and type of feed were the major factors that account for the occurrence of DDC. Although this study did not establish a relationship between dental disease conditions and other systemic diseases, there is need to investigate this relationship as observed in other studies

in dogs and humans (Lonsdale 1993, Latimer and Mayer 1989). It is expedient therefore to include veterinary dentistry in the veterinary curriculum in Nigerian Veterinary schools and patients' dental health care should be emphasized in veterinary practice.

REFERENCES

- Calvert, C.A., Green, C.E., Hardie, E.M (1985):** Cardiovascular infections in dogs: epizootiology, clinical manifestations, and prognosis. *Journal of the American Veterinary Medicine Association*, Schaumburg, v.187, n.6, pp 612-616
- Clarke D.E (1999) :** The crystalline components of dental calculus in the domestic cat. *Journal of Veterinary Dentistry*; 16: 165 – 168.
- Cutcher J.L. et al (1971):** Control of bacteremia associated with extraction of teeth. II. Oral Surgery, Oral Medicine and Oral Pathology, Saint Louis, v.31, n.5, pp 602-605.
- DuPont, G.A.: Understanding dental plaque; biofilm dynamics. *Journal Veterinary Dentistry*; 14: pp 91-94 (1997)
- Genco C.A., Van Dyke T., and Amar S. (1998).** Animal models for Porphyromonas gingivalis-mediated periodontal disease. *Trends in Microbiology*, edn 6, pp 444–449
- Gorrel C. (1998):** Periodontal disease and diet in domestic pets. *The Journal of Nutrition*, 128, 2712S–2714S
- Greene J.C. and Vermillion J.R.: The simplified oral hygiene index. *Journal of the American Dental Association*, 68, pp 7–13 (1964).
- Harvey C.E (1998):** Periodontal disease in dogs. Etiopathogenesis, prevalence, and significance. *The Veterinary Clinics of North America – Small Animal Practice*, 28, pp 1111–1128
- Harvey C.E., Shofer F.S. and Laster L (1994):** Association of age and body weight with periodontal disease in North American dogs. *Journal of Veterinary Dentistry*; 11: pp 94 - 105
- John R. L. and Alexander M. R (2010):** Anatomy and Physiology In: A Colour Handbook of Small Animal Dental, Oral & Maxillofacial Disease. Manson Publishing Ltd, 73 Corringham Road, London NW11 7DL, UK. pp 9 – 38
- Krasse B. and Brill N.: Effect of consistency of diet on bacteria in gingival pocket in dogs. *Odontologisk Revy*, 11, pp 152–165 (1960).
- Latimer K. S. and Meyer D. J (1989b):** Leukocytes in health & disease, *Veterinary Textbook of Internal Medicine*, 3rd edition. Ed S.J. Ettinger, W.B. Saunders, Philadelphia, pp 2205
- Lonsdale T (1999):** Preventive dentistry, *Veterinary dentistry, Proceedings of the post graduate committee in Veterinary Science*, University of Sydney, Sydney 212, 235-244 (1993b).
- Lund EM, et al.:** Health status and population characteristics of dogs and cats examined at private veterinary practices in the United States. *JAVMA.*; 214(9):1336-1341
- Page R.C. and Schroeder H.E (1982): Periodontitis in Man and Other Animals: A Comparative Review. Karger, Basel, pp 330

Rawlinson J.E., Goldstein R.E., Reiter A.M., Attwater D.Z. and Harvey C.E (2011): Association of periodontal disease with systemic health indices in dogs and the systemic response to treatment of periodontal disease. Department of Clinical Studies-Philadelphia, University of Pennsylvania, Philadelphia. www.pubmed.com

Watson AD (1994): Diet and periodontal disease in dogs and cats. *Aust Vet J.*; 71(10):313-318

Wigg R.B. and Lobprise H.B (1997): Periodontology. In: Wigg R.B. Lobprise H.B. editors. *Veterinary dentistry, Principles and Practice*. Philadelphia, PA, USA: Lippincott – Raven Publishers: 186-231.