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EFFICACY OF THE PREPARATION DENTISEPT IN DOGS WITH GINGIVITES

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Summary

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The actuality of dental diseases in pets is a prerequisite for the creation and evaluation of oral antibacterial and deodorizing medications, intended for both prophylaxis and therapy.

The aim of the present study was the evaluation of the antibacterial and antiinflammatory effect of the preparation Dentisept (Primavet, Sofia) in dogs with different forms of gingivites, when applied independently or in combination with other antibacterial preparations.

It was observed that the commonest microbial agents isolated from the buccal cavity of dogs with various dental diseases (dental tartar, gingivites, paradonthopathies etc.) were Gram-positive cocci (staphylococci and streptococci). Their sensitivity to Dentisept was determined on solid nutrient media.

The therapeutical efficacy of Dentisept was assessed via the antibacterial effect, evaluation of salivary pH and the depth of the gingival pocket. It was concluded that Dentisept had an antibacterial and anti-inflammatory effect.

Key words: antibacterial therapy, Dentisept, gingivites, veterinary dentistry

INTRODUCTION

Recent studies showed that dental, periodontal and gingival diseases in dogs are problem of a present interest (Hennet, 1991, Borissov, 1999; Gorrel, 2001; Pavlica, 2002).

The high incidence and percentage of inflammatory gingival diseases determine the need of dental help and effective medications (Terry *et al.*, 2000; Okuda, 2002).

According to the studies of Robert and Young (1997) and Terrry *et al.* (2000) gingivites and periodontites are most commonly caused by *Streptococcus spp.*, *Pasteurella multocida* and Gram-positive anaerobes.

Shipp and Fahrenkrug (1992), Harvey and Emily (1993) have applied clindamycin for the treatment of inflammatory gingival diseases while Grove (1985) suggested the use of ampicillin. According to the latter, the efficacy was significantly improved when the oral cavity was washed with 0.2% chlorhexidin.

For the treatment of chronic marginal gingivites, Zetner (1981) and Borissov and Sivrev (1995) recommend good oral hygiene and application of weak antiseptic solutions of ethacridine (rivanol), acrifla-

vine (tripaflavine), nitrofurazone (furacillin) etc.

Many investigators (Fahrenkrug, 1991; Zetner and Thiemann, 1993) showed that after the depuration, the application of chemotherapeutics is absolutely necessary. The most appropriate combination was that of spiramycin and metronidazole with duration of the treatment at least 7–10 days. Zetner and Thiemann (1993) outline that the treatment of gingivostomatites have to be complex and to include as early as possible chemotherapy with Antirobe (clindamycin) or Suanamed (spiramycin and metronidazole).

Zetner (1981) and Shipp and Fahrenkrug (1992) reported that in the early stage of gingivitis chemotherapy could be performed independently while the opinion of Habey *et al.* (1990) is that the administration of antibiotics is not obligatory, especially in patients with immune suppression.

Despite the availability of many drugs for local and systemic antibiotical therapy of oral diseases, including gingivites in dogs, the problem is still actual and new medications are needed.

The aim of the present study was to evaluate the antibacterial and therapeutic effect of Dentisept in dogs with various forms of gingivites used independently (local application) and in cobination with other antibacterials.

MATERIALS AND METHODS

Patients

The clinical studies were performed on 108 dogs aged 2–15 years with various forms of gingivitis. They weighed between 6 and 20 kg and were predominantly from small breeds – Bolognese, Poodle, Pintscher and Pekinese. From all patients, 27 were with ulcerative gingivitis, 39 – with purulent gingivitis, 21 – with catarrhal gingivitis and 21 – with hyperplastic gingivitis.

A microbiological analysis of specimens obtained from 18 dogs with clinical forms of gingivitis was performed. The isolation and identification of bacteria was done by routine methods (Koneman *et al*., 1992; Murray *et al.*, 1995). A semi-quantitative evaluation of predominant microbial isolates was made prior to their identification by genus or species.

Drugs

The efficacy of the medication Dentisept (Primavet, Sofia, Bulgaria) representing a solution containing 5.0 g chlorhexidine gluconate, 8.0 g extractum folliorum Rhois, 10.0 g ascorbic acid, 10.0 g zinc oxide, 200.0 g citric acid and glycerol ad 1 000 mL was tested. It was applied via spreading on gingival edges. The procedure was repeated twice daily for 10 days. The effect of Dentisept was compared to that of Stomorgyl-10 tablets (Meryal, Lyon, France). Each tablet contained 75 000 IU spiramycin and 125 mg metronidazole. The preparation was applied orally at a dose of 1 tablet/10 kg m once daily for 10 days.

Experimental design

Diseased animals were divided into 2 groups. Group I (controls) included 10 dogs with gingivites, left untreated and group II (experimental) – 98 dogs with various forms of gingivitis, in which treatment was applied. The treated dogs were further divided into 3 subgroups:

- Subgroup 1 (n=58) (Table 2): treated by depuration with air scaler followed by local treatment with Dentisept for 10 days, twice daily;
- Subgroup 2 (n=20) : treated orally with Stomorgyl-10, once daily for 10 days;
- Subgroup 3 (n=20): treated locally

with Dentisept and orally with Stomorgyl as mentioned above.

The control group included 3 dogs with ulcerative gingivitis, 4 – with purulent gingivitis, 2 – with catarrhal gingivitis and 1 – with hyperplasic gingivitis. Each of subgroups 2 and 3 was composed by 6 dogs with ulcerative gingivitis; 8 – with purulent gingivitis; 4 – with catarrhal gingivitis and 2 – with hyperplasic gingivitis.

The effectiveness of Dentisept was evaluated on the basis of microbiological studies, the changes in salivary pH and the depth of the gingival pocket.

The sensitivity of isolated microorganisms to Dentisept was done by the method of Erickson and Cheri (1973) on Mueller Hinton agar and determined as presence or absence of suppression of the respective isolate.

Salivary pH was determined before the treatment and afterwards up to hour 8 by an electronic pH-meter (OP-211, Hungary). The depth of the guingival pocket was measured with a special periodontal probe up to post treatment day 14. These determinations were performed in 10 dogs from group I and 10 dogs from group II, subgroup 1.

The efficiency of the treatment in subgroups 2 and 3 was based on the clinical status.

Data were statistically processed by one-way analysis of variance.

RESULTS

The most frequently isolated microbial agents in dogs with gingivites were: alpha- and beta-haemolytic streptococci and Gram-positive cocci from *Staphylococcus spp*. (*Staphylococcus aureus* and some coagulase-negative staphylocci, CNS) (Table 1).

Dentisept had an inhibiting effect upon the development of streptococci and staphylococci.

In control animals, salivary pH values were between 5.9 – 6.4. After the treatment with Dentisept, salivary pH changed from acidic to alkaline as early as hour 2 and this change persisted up to hour 8 (Fig. 1). All differences vs controls from hour 2 to hour 8 were statistically significant ($p<0.001$).

The changes in gingival pocket depth are presented on Fig. 2. It shows that in patients with gingivites following a careful dental tartar depuration and 10-days treatment with Dentisept, there were significant changes, visible as early as day 3 after the initiation of the treatment when the gingival pocket decreased from 5.3 to 4.9 mm. Fourteen days after the beginning

Table 1. Microflora in dogs with gingivites

No.	Species of isolated microorganisms	Incidence of isolated microbial agents
1	Alpha-haemolytic streptococci (*Str. viridans*)	+++++
2	Beta-haemolytic streptococci	+
3	Gram-negative cocci (*Neisseria spp.*)	+++++
4	*Staphylococcus aureus*	+++
5	Coagulase-negative staphylococci (CNS)	+++
6	Gram-positive rods	+++++
7	*Pseudomonas spp.*	+
8	*Proteus mirabilis*	+

Legend: + 20% of patients; +++ 60% of patients; +++++ 100% of patients.

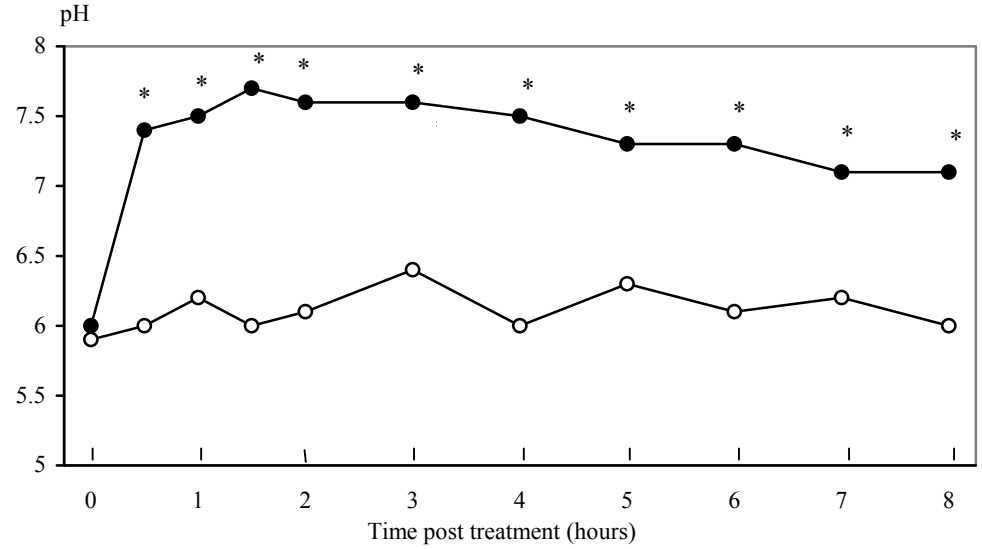

Fig. 1. Changes in salivary pH in dogs with gingivites, treated with Dentisept (–●–; experimental group, n=10) and untreated dogs; (–○–; control group, n=10) * $p<0.001$ between groups for each interval.

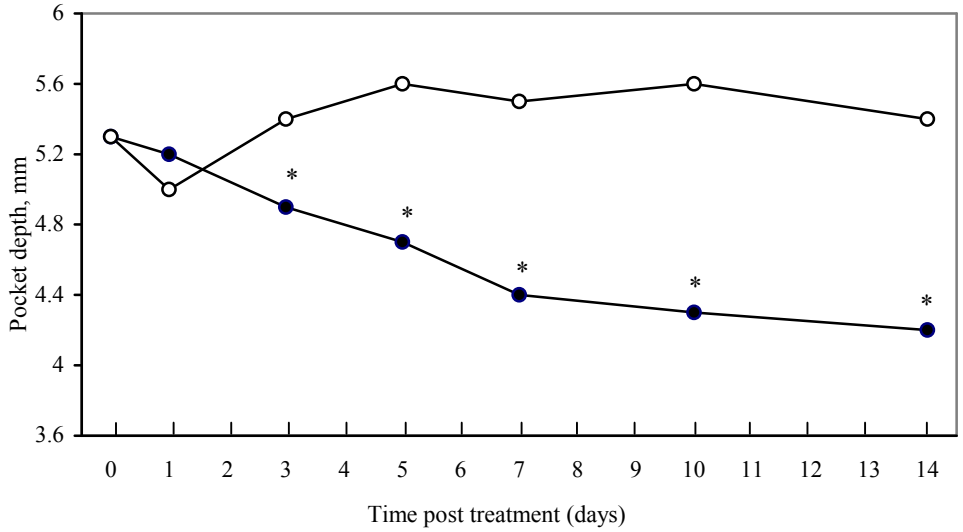

Fig. 2. Changes in gingival pocket depth in dogs with gingivites,
treated with Dentisept (–●–; experimental group, n=10) and untreated dogs (–○–; control group, n=10); * $p<0.001$ between groups for each interval.

of the treatment with Dentisept, the values were close to the reference ones (4.2 mm) while in controls dogs they remained in the range 5.3–5.6 mm. This was one of the signs evidencing the antiinflammatory and healing effect of the treatment.

Table 2. Efficacy of Dentisept in dogs with various forms of gingivites

Clinical forms of gingivitis	Total number of treated dogs	Number of cured dogs	Efficacy, %
Ulcerative gingivitis	12	10	83
Purulent gingivitis	19	16	84
Catarrhal gingivitis	11	10	90
Hyperplastic gingivitis	16	14	87
Average efficacy, %			86

The result from the cure of dogs with various forms of gingivites is presented in Table 2. The highest efficacy was observed in dogs with catarrhal gingivitis – 90%. The summarized data of the independent application of Dentisept in treated dogs resulted in an average efficacy of 86%.

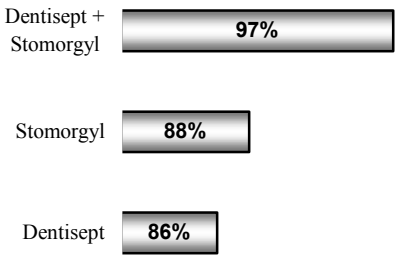

Fig. 3. Comparative efficiency of the various methods of treatment of dogs with gingivites.

The results of comparative studie are presented on Fig. 3. They evidenced that the efficacy in dogs treated with Stomorgyl was 88% and in dogs treated with Dentisept plus Stomorgyl – 97%.

DISCUSSION

The chemoprophylaxis and therapy of gingivites is known for a long time. Among the first having used chlorhexidine in veterinary dentistry were Walker (1988) and Wennstrom (1988). They included it in the composition of oral gels, intended to control gingival inflammation. It was assumed that its effect was achieved through the interaction of the positively charged chlorhexidine molecule and the oppositely charged bacterial cell walls resulting in change in bacterial cell permeability and finally**,** in destruction of bacteria and coagulation of the cytoplasmic content (Hennet, 1990).

Recent studies evidenced that chlorhexidine was absorbed on the hydroxyapatite grid of dental surfaces, releasing in a stepwise manner and thus, exercting an antiplaque effect. Its ability to be absorbed on tooth enamel guarantees a relatively prolonged and effective result (Pedersen, 1997).

It could be suggested that the efficacy of Dentisept was primarily due to chlorhexidine, that possessed a clear antibacterial effect against pathogenic oral microflora (Atanassova and Atanassov, 1993; Botushanov, 1995, Mandel, 1994). The microbiological studies performed by us showed a considerable inhibiting activity upon microbial agents isolated from the oral cavity of dogs.

The results from our clinical studies evidenced that Dentisept influenced salivary pH changing it from acidic to alka-

line and that it had a clear antiinflammatory effect. Glycerol apart being a flavour agent, probably contributed for alkalizing the saliva as well.

Our microbiological and clinical resutls are similar to those of Atanassova and Atanassov (1995) reporting that the combination of chlorhexidine gluconate and extractum foliorum Rhois had a synergetic effect against the oral microflora. The extract contains about 35% tannins, carotenes, flavonoids, tocopherols, sterols etc. that probably aid antibacterial and antiinflammatory effects.

The analysis of data suggested that Dentisept could be used independently for treatment of gingivites, but the efficacy was significantly higher when the local therapy was combined with a systemic antibacterial therapy with Stomorgyl.

CONCLUSIONS

Dentisept had an antibacterial effect against microorganisms involved in the various forms of gingivites in dogs. Its application resulted in change of salivary pH from acidic to alkaline and in normalization of gingival pocket depth.

The efficacy of the independent application of Dentisept in dogs with gingivites was 86%, and when combined with Stomorgyl – 97%.

The clinical studies of the preparation showed that it could be used as an effective prophylactic and therapeutical agent against gingivites in dogs.

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