ABSTRACT

Key words: *peiodontal disease dog, etiopathogenesis, diagnostic, treatment.*

The periodontal disease is the most common illness in both human and dog pathology and is the most frequent cause of tooth loss. The veterinary dentistry is a branch of medicine that had a rapid growth in the last decades as a result of the increase in awareness from the clinicians and dog owners.

This paper is structured in two parts:

Part I contains bibliographic researches of the periodontal anatomy, etiopatogenesis, clinical signs, diagnostic and therapy of the periodontal disease. It spans on 44 pages, includes 5 images and is structured in four chapters:

In **chapter I** is shown the periodontal anatomy (gingiva, periodontal ligament, root cementum and alveolar bone), and the particularities of the dentition in dog.

Chapter II contains informations about the etiology and patogenesis of the periodontal disease in dog, determinant and favorable factors that lead to the occurance and evolution of this condition.

In **chapter III** are shown the clinical signs and evolution stages of this condition. The most frequent clinical signs include halithosis, plaque and calculus deposits on the tooth surfaces, attachement loss, furcation exposure and pathologic tooth mobility. Periodontal disease has four evolution stages, from gingivitis to early, moderate and severe periodontitis. In the last phase the destructive lesions of the periodontium are extended and the finality of this condition is marked by the loss of the affected tooth or teeth.

Chapter IV shows the current therapy of the periodontal disease in dog. The main treatment is the dental scaling and root planning, and it should be done at leat twice a year. This is mandatory because of the lack of self oral hygiene of the dog, unlike the human. Other therapies include the administrations of general or topic antibiotics and surgeries for correcting soft or hard tissue defects.

Part II, personal researches, spans on 108 pages and contains 82 original images and 9 tables and is structured in five chapters

In **chapter V** are shown the general purpose of the researches, the objectives and activities.

In **chapter VI** are shown the researches of the etiopathogenesis and clinical signs of the periodontal disease in dog. It was tested the influence of the most common favorable factors in the occurence and development of this condition, amongst which the breed, age, gender, consistency of the food eaten and the concern given by the owners to the oral hygiene of the dogs.

We demonstrated that the **breed** is a favorable factor with a strong influence on the development of the periodontal disease, the tiny and small breed dogs being more predisposed to the occurence of the condition than the medium-size or large breed dogs. This aspect can be explained by the fact that the teeth of the small breed dogs are more crowded in the oral cavity because of the size of the maxilary and mandible bones. This hinders the physiological cleaning processes during the mastication. Another aspect is the fact that the thickness of the alveolar bone wall is smaller and thus the progression of the bacterial metabolic products and lytic enzymes is easier.

The selective breeding that lead to these small breeds also caused a decrease of the passive immunity, which in term lead to a weaker response to the irritating action of the microorganisms. That is why the destructive phenomenons tend to be more severe and the progression of the disease more rapid in the tiny and small breed dogs.

Another favorable factor with impact on the occurance and mostly on the progression of the periodontal disease is the **age** of the dog. This is easily explained by the fact that this condition is most of the time chronic and the lengh of the evolution spans on several years, with long latency periods between the active ones. In this study we demonstrated that the severity of the clinical signs of periodontal disease is directly proportional with the age of the dogs. The modern veterinary medicine alloed the increase of the life span of dogs, and thusly, indirectly, the evolution duration of the periodontal disease.

The **gender** of the dogs has small influence on the occurence and progression of the periodontal disease, in contrast to the human, where it is proven that the man has in general more severe forms of periodontitis than the woman. It was explained that the woman makes a more thorough oral hygiene. Smoking, another important favorable factor in human oral pathology, is more frequent in man than in woman.

The **type of food** eaten and especially the consistency of it is an important favorable factor in dog`s oral pathology. Initially the dog was strictly carnivorous. Over the centuries,

during domestication, his died has diversified, currently he is considered omnivorous. Hunting and eating raw meat provided a very efficient mechanical cleaning of the teeth. Now the raw meat diet is avoided by most owners, on the one hand due to the risk of occurrence of parasitic infestation, and on the other hand due to the major impact of commercial promotion of processed and packaged food.

Foods with higher consistency helps mechanical cleaning of the teeth directly, and indirectly by stimulating the production of saliva, which removes plaque by the action of physical and biological factors with antimicrobial properties (eg lysozyme). Lysozyme (Muramidase) is a bacteriolytic enzyme of 14.4 kiloDalton molecular weight which is able to destroy the cell wall of Gram-positive bacteria by hydrolyzing carbohydrates (Jalil și colab., 1992, Logan, 2006, van Palenstein Helderman, 1976).

Soft food, on the other hand, has a low consistency, favoring the accumulation of food debris and their adherence to tooth surfaces and gums. It creates an environment suitable for the development of plaque, by creating a physical medium on which microorganisms can attach and by providing organic matter (Baer, 1956, Case și colab., 2011).

The quantity and quality of saliva has a major ecological role on the development of plaque. It is known that in dogs with reduced salivary flow ("dry mouth") the formation and the development of plaque is more marked (Wiggs și Lobprise, 1997).

The results of the study showed that the evolution forms of periodontal disease were more severe in dogs who consumed only wet food, cooked and commercial, compared to those fed dry food.

Oral hygiene is the most important factor favoring the emergence and development of periodontal disease, both in human and in the veterinary medicine. In the case of man, this can be improved by the dentist explaining the consequences of failure to appropriate and rigorous hygiene. In addition cure is dependent on patient cooperation.

If the dog getting lasting cooperation of the owners is much more difficult. Most of them do not realize or do not give enough importance to oral health of the dogs, as periodontal disease causes no major behavioral changes or acute pain.

Over 75% of the surveyed owners give no importance to the oral hygiene of the dogs. Only 6% of owners take their dog to the vet regularly to perform scaling and cleanings and give commercial products for oral hygiene to their pets. This statistic explains why periodontal disease is the most common disease of the dog.

The clinical signs found in the examined dogs are the plaque deposits, which are like a pasty material, white-grey, at the line between the dental crown and the gingival edge. The

calculus deposits vary in color, from yellow, brown, grey, metalic green to black, depending on the inorganic salts in their composition.

The changes in the marginal gingiva are progressive during the evolution of the periodontal disease, starting from a reddish line at the free gingiva, determined by the active hyperemia of the tissue. As the disease progresses, the gingival mucosa becomes thicker as a result of hyperemia and edema, the colour changes to purple because of the blood stagnation in the capillaries and the epithelium appears sleek and wet. In some cases, as a result of the microbial irritation, the gingival edge can become irregular with spots of hypergrowth, thus increasing the depth of the gingival sulcus. This change does not determine the migration toward apical of the jonctional epithelium, thus the gingival pocket is a pseudopocket. As the periodontitis progresses, the gingival undergoes a retraction process, exposing the root surface and favoring the advancement of the plaque and calculus towards apical.

Another common sign in the case of multirooted teeth is the furcation exposure (space between roots). Because of its position, once the destructive process has begun, the mechanical physiological cleaning becomes virtually impossible and this leads to the rapid increase of the plaque deposits, accelerating the resorbtive processes.

Due to the progression of periodontal disease, which causes enlargement of the area around the tooth root by the destruction of the periodontal ligament and alveolar bone resorption, there is a pathological tooth mobility. This prevents periodontal healing processes and eventually lead to the loss of the affected teeth.

A good indicator of the health of the periodontium is the bleeding on periodontal probing. In the examined dogs, depending on the stage of development of periodontal disease, there were varying degrees of bleeding on probing. This is due to the erosion of the lining of the gingival sulcus or ulcers occurring at this level as a result of inflammation.

In **chapter VII** is shown a histological study of the gingival mucosa and the microscopic lesions that occur in different stages of periodontal disease. The mucosa fragments were taked from fresh dog corpses. The instruments used have allways beed sharp, not to determine the destruction of the soft tissues. The fixation of the tissue fragments was carried out with 10% formalin. The staining was done with hematoxylin-eosin methylene blue.

Histological lesions intensity was directly proportional to the severity of the phase of development of periodontitis. We have observed the phenomena of active and passive hyperemia, swelling, vacuolization and necrosis of epithelial cells, epithelial hyperplasia, microabscesses and inflammatory infiltration with lymphocytes and plasmocytes.

In the day to day veterinary practice the gingival biopsy method is rarely used because it is a major factor of stress and discomfort for the animal. It is used mainly for the differential diagnosis of autoimmune diseases.

Chapter VIII contains the radiological diagnosis of periodontal disease. The study was conducted in collaboration with Dr. Camil Stoian in the Dr. Lorinson Surgery Center in Vösendorf, Austria.

Radiologicaly we observed the extent of the periodontal lesions and the viability of the affected teeth. We found root fractures and apical abscesses and demonstrated the importance of radiology in the diagnosis of periodontal disease.

In **chapter IX** we have made contributions to periodontal disease therapy by conducting a clinical trial on a group of dogs in the Shelter of stray dogs in Miroslava, Iasi.

The standard therapy of periodontal disease, both in human and veterinary medicine, is the dental scaling and root planning. As adjuvant therapies can be administered antibiotics, locally or systemically. In human medicine it is succesfully used to reduce periodontal pocket depth the doxycycline 20mg, twice daily, for a long period of time. In this dosis the doxycycline has no antimicrobial effect and does not cause antibiotic resistance.

The premise of this study was to verify the effectiveness of a subantimicrobial action dose of doxycycline as an adjunct to scaling and root planing in the dog.

The dogs selected for the trial were diagnosed with periodontitis in one of the three evolution stages and were divided into three groups: a control group (A), a group on which only scaling and root planning was made (B), and a group on which, besides scaling and root planning, a dose of **0.5 mg / kgc** doxycycline was given twice daily for 30 days (C). The pocket depth was mesured at the start of the trial and at 15, 30 and 45 days after.

The results were similar to the ones in the human studies, observing a substantial reduction of the periodontal pockets in the dogs that received doxycycline compared to the ones in groups A and B.