COMPUTED TOMOGRAPHY EXAMINATION OF PERIODONTAL DISEASE IN DOG

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Abstract

Periodontal disease is a very common disease in dogs, with an incidence of 85%, which affects both the health and the quality of life of the animals (Shearer, 2010, Kortegaard et al 2014). Dog periodontitis has become a priority disease for both pet owners and practitioners. Taking in consideration the high incidence of the periodontal disease in dogs and the fact that the clinical diagnostic is limited, the aim of this study was to highlight the role and importance of imaging diagnostic tools such as Computed Tomography in the diagnostic of this pathology. The study was conducted on 20 dogs (30% female and 70% male) with age from 1 year to 12 years. The patients were clinically examined and after that were sedated and a radiographic evaluation and a CT scan of the head was performed. Classification of periodontal disease take in consideration the retraction of alveolar bone and formation of periodontal pocket, retraction of alveolar bone was visible on CT examination compared to radiographic examination in which the overlapping of bony structures of the mandible and maxilla make the bone retraction less evident. Computed tomography examination is more accurate than radiography, giving the possibility to evaluate all the roots of the teeth and bone retraction, and come to complete the clinical evaluation.

Keywords: Periodontal diseases, dog, Computed Tomography, head

Introduction

Periodontal disease is one of the most prevalent disease in dogs and result in infections with inflammation of the gums and gingival pocket formation (Pavlica *et al.* 2008; Shearer, 2010; Kortegaard et al 2014). Periodontal disease diagnostic is based on clinical examination and 2D radiography, the last method present difficulty in assessing the gums and bone retraction in advance stages of periodontitis. Introduction of Computed Tomography (CT) examination for periodontal disease help evaluate the bone level changes and three-dimensional architecture of osseous defects (Mish et al 2006).

Taking in consideration the high incidence of the periodontal disease in dogs and the fact that the clinical diagnostic is limited, the aim of this study was to highlight the role and importance of imaging diagnostic tools such as Computed Tomography in the diagnostic of this pathology.

Materials and Methods

The study was conducted on 20 dogs (30% female and 70% male) with age from 1 year to 12 years. The patients were clinically examined and after that were sedated and a radiographic evaluation and a CT scan of the head was performed.

In the first stage of the clinical evaluation the gums and the presence of dental plaque was evaluated, the second stage of the clinical evaluation consist in evaluation of teeth mobility and bone retraction using a marked periodontal probe of 2 cm that was introduced in the gingival sulcus for evaluation of gingival retraction and apparition of gingival and periodontal pocket. All the data were registered in a dental examination sheet.

CT examination was performed after the patients were sedated, the CT images were obtained using a 512*512 matrix, bone tissue kernel and a pitch of 0.85. The patient was positioned

in ventral decubitus. The images were evaluated and the measurement were performed using RadiAnt DICOM viewer.

Results and discussions

The most common symptoms that indicate the occurrence of periodontitis are in descending order: dental plaque, gingivitis, bone and gum retractions, dental mobility and halitosis.

Dental plaque is usually the first visible symptom that occurs being visible from clinical examination. Classification of periodontal disease take in consideration the retraction of alveolar bone and formation of periodontal pocket, (Niemiec, 2008; Glickman et al, 2011) retraction of alveolar bone was visible on CT examination compared to radiographic examination in which the overlapping of bony structures of the mandible and maxilla make the bone retraction less evident).

The capability of Computed Tomography to render a 3D image base on the DICOM scanned images help evaluate the retraction of the bone, this method is less invasive than the evaluation of the periodontal pocket with a probe.

Evaluation of the periodontal disease stages is based on the support loss of the dental structures that became more easily done on the CT.

Retraction of the gums with formation of the periodontal pocket, make in time visible the furcation of the teeth, a periodontal pocket dipper than 5 mm indicate bone loss, normal sulcal depth in dog is between 0 and 3 mm (Niemiec, 2008). CT evaluation of the teeth permit measurement of the bone loss and also evidentiation of furcation.

The measurement are done starting from the teeth crown until at the base of the alveolar bone (Fig. 1, Fig. 2). Other convenient aspect of the CT examination is that on the 3D reconstruction the retraction of the bone is visible showing the early stages if the furcation, this is not evident all the time in clinical evaluation because the dental plaque can cover the presence of furcation (Fig. 3, Fig. 4).

Late complication of the periodontal disease, like oro-nasal fistula and decay of the bone can be seen on the CT scan. The CT scan better delineate the bone loss and the degeneration of the bone tissue than classic radiography (Fig. 5).

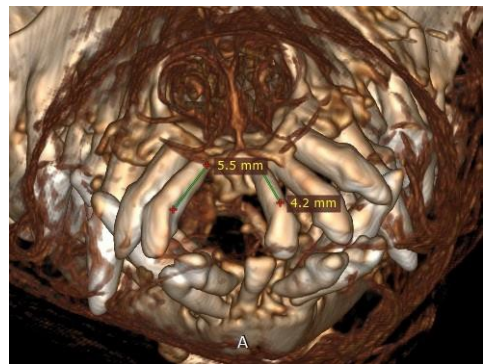

Figure 1 Evidentiation of furcation

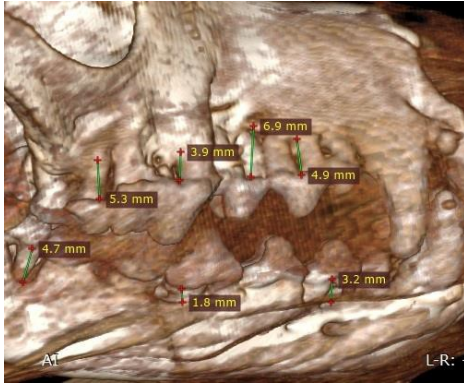**Figure 2** Massive bone loss of the incisive alveolar bone

Figure 3 CT aspect with bone los and evidentiation of furcation

Figure 4 At inspection the furcation is not evident even so the CT scanning show furcation and bone loss (see Fig 3)
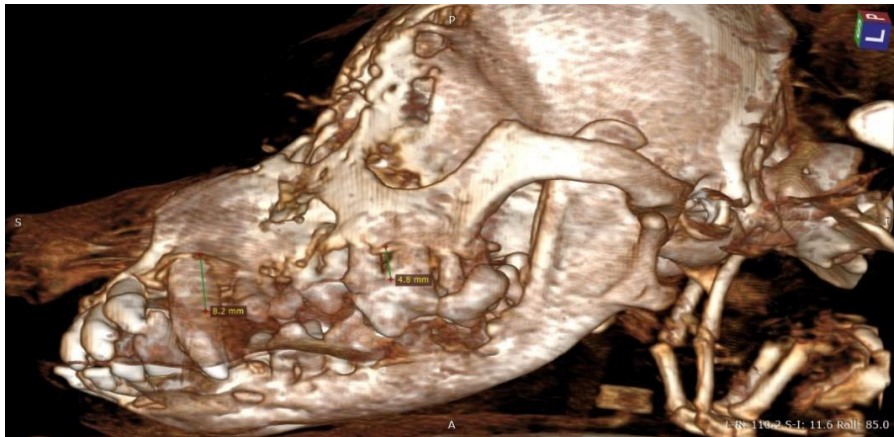

Figure 5 Bone decay and nasal fistula formation

Conclusions

Computed tomography examination is more accurate than radiography, giving the possibility to evaluate all the roots of the teeth and bone retraction, and come to complete the clinical evaluation. CT examination give aditional information that help staging the periodontal disease.

Acknowledgement

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