



## CASE REPORT

### Canine Severe Maxilla and Mandible Osteolysis Associated with Periodontal Disease Unperceived by Proprietors

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#### ARTICLE HISTORY

Received: February 22, 2012  
Revised: October 11, 2012  
Accepted: October 23, 2012

#### Key words:

Dog  
Osteolysis  
Periodontal disease

#### ABSTRACT

A case of extremely severe osteolysis secondary to periodontal disease in a 13 years old Yorkshire dog is presented. When referred to our Hospital, the patient had suffered a great loss of dental pieces, severe massive osteolysis in maxilla, mandible and nasal bone leading to oro-nasal fistula and extreme weakening of the affected areas. However, the proprietors had only observed a suppurative wound in the skin. To the authors' knowledge, the extreme severity of osteolysis affecting both jaws in this dog can not be found in previous scientific descriptions on this species. The treatment consisted of complete teeth removal and general antibiotic medication (Spiramycin/Metronidazole; 10 mg/kg every 24 hours for 10 days, starting 2 days before extraction). The totally satisfactory evolution of the patient was controlled at days 4<sup>th</sup> and 14<sup>th</sup> after surgery. Normal alveolar cicatrization was verified. Soft food intake is painless after the teeth removal.

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**To Cite This Article:** Whyte A, J Obón, A Leuza, J Whyte and LV Monteagudo, 2013. Canine severe maxilla and mandible osteolysis associated with periodontal disease unperceived by proprietors. *Pak Vet J*, 33(2): 263-265.

#### INTRODUCTION

Periodontal disease (PD) affects the tooth-supporting structures (gum, periodontal ligament and alveolar bone). Approximately 85% of dogs over three years old suffer some degree of PD. The PD primary etiological agents are microorganisms that colonize periodontal pockets (Harvey, 2005; Senhorinho *et al.*, 2012). Gingival inflammation, hemorrhagic gingivitis, halitosis, heavy plaque and calculus accumulation, shrinking gums, furcation, involvement, tooth mobility, tooth loss and mouth ulcers are among PD symptoms. Purulent processes can be followed by bone resorption (Harvey, 2005).

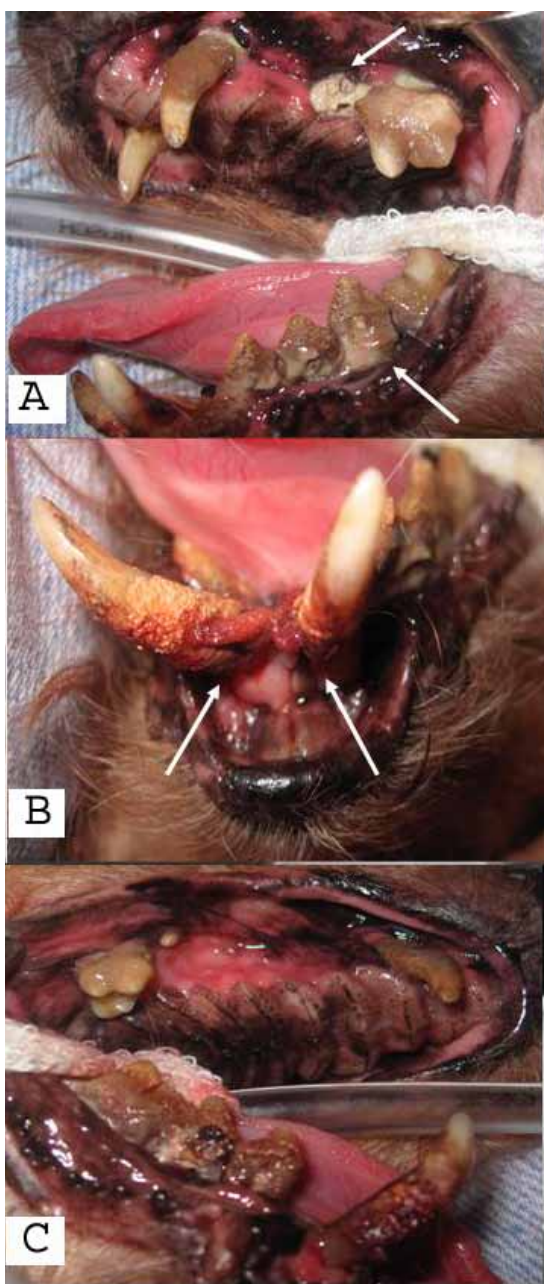
We are reporting the case of a male dog evaluated for a suppurative wound below the right eye area causing pain on palpation. No other signs were reported by the owners before veterinary exploration. However, severe PD with osteolysis was diagnosed to be at the origin of the wound.

**Case presentation:** This paper reports the case of a 13 year old Yorkshire dog presented to the Hospital Clínico Veterinario (Universidad de Zaragoza, Spain) with a suppurative wound below the right eye and pain on palpation. According to the owner, the food intake and the behaviour were normal. Bilateral submaxillary glands

enlargement was observed. Vital sign recording was normal and body temperature was stable at 38.3°C.

In oral examination, total loss of incisors (upper and lower: 101, 102, 103, 201, 202, 203, 301, 302, 303, 401, 402, 403) was observed. In the upper right hemi-arcade, four premolars and one molar (105, 106, 107, 108, 110) were not found, while there was absence of the first and second premolar and one molar in the lower part (405, 406, 410, 411). Moreover, first, second and third premolar and the second molar (205, 206, 207, 210) were not present in the upper left hemi-arcade, and the second and third molar (310, 311) were not found in the lower part. Total alveolar bone destruction in the mandible canine teeth (304, 404) and severe PD with oral mobility were diagnosed (Fig. 1A, 1B, 1C). Pre-surgery blood test (blood cell counts, clotting and biochemistry) was within normal range.

Radiological exploration revealed osteolysis in the left upper maxillary quadrant, where the periodontal ligament appeared markedly swollen in the rostral zone and several septic foci were observed in the canine (204) and the fourth upper premolar (208). Severe osteolysis of the nasal bone at the level of the right upper canine (204) had produced an oro-nasal fistula (Fig. 2A). Periapical septic foci in the canine (104) and in the first molar (109) had led to massive destruction of the alveolar bone in the

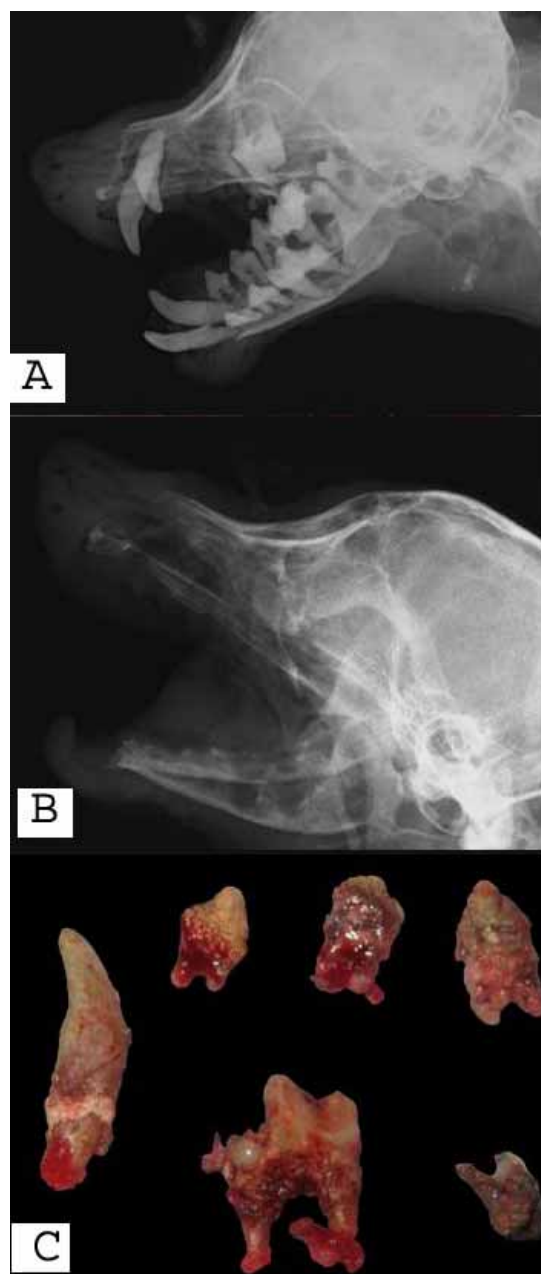


**Fig. 1:** (A) Lateral view of the left hemi-arcade showing severe periodontal disease and loss of dental pieces. Extensive infection with pus (arrow) is also seen in the alveolus of the third pre-molar, extending to the fourth upper premolar. (B) Frontal view of the mandible. Extensive osteolysis of the alveolar bone around the canine teeth is observed (arrows). (C) Lateral view of the right hemi-arcade showing severe periodontal disease. Loss of dental pieces is appreciated in the maxilla while the roots' furcations are exposed in the mandible, where extensive gum retraction and infection are visible.

upper right quadrant, exactly under the reported external suppurative wound.

Extensive osteolysis was in the origin of almost total loss of the alveolar bone around the canines (304 and 404) and of periapical septic foci leading to complete destruction of the alveolar bone in premolars and molars. From the above mentioned data, PD with severe osteolysis was diagnosed.

Treatment consisted of complete teeth removal and general antibiotic medication (Spiremycin/Metronidazole;



**Fig. 2:** (A) Osteolysis is observed in the rostral area of the maxilla. The periodontal ligament is swollen in this zone and several periapical septic foci are evidenced. Alveolar bone has suffered severe resorption. The nasal bone destruction at the right upper canine level causes oro-nasal fistula. Extensive osteolysis is also observed in the rostral zone of the mandible, leading to almost total loss of the alveolar bone in the canines, together with periapical septic foci in premolars and molars, where the alveolar bone is virtually disappeared. (B) Radiograph after dental prophylaxis. (C) Extremely degraded conditions of the removed dental pieces.

10 mg/kg every 24 hours for 10 days, starting 2 days before extraction). Post-surgery radiograph showed deep loss of alveolar bone on both upper maxilla and mandible (Fig. 2B).

Microbiological cultures from samples of extracted teeth (Fig. 2C) revealed the growth of different bacterial colonies, enhancing the genus *Proteus*. The high colonies density hindered the isolation and identification of other genus. Additionally, high number of morphotypes

(bacillus, Gram + and Gram - cocci) and sporulated bacteria were found, although not showing any predominance. Neither fungi nor yeasts were detected.

Postoperative survey of the patient took place at 4th and 10th day after surgery. Satisfactory evolution and normal alveolar cicatrization were observed. According to the owner's perception, the patient had a normal behaviour and soft food intake was apparently painless.

### DISCUSSION

To the authors' knowledge, the extreme severity of osteolysis affecting both maxilla and mandible and causing oro-nasal fistula in this dog can not be found in previous scientific descriptions on this species. In spite of it, these lesions remained apparently undisclosed to the proprietors, since the patient did not show pain signs and food intake was normal.

Under poor hygiene conditions, the plaque (a bacteria-laden film deposited on the teeth) becomes more tenacious and transforms into tarter. Tarter produces gum inflammation resulting in different PD degrees, progressively leading to teeth losses by osteoclastic resorption of alveolar bone in maxillas (Haynes, 2004; Heita-Mayfield, 2005). Several other factors such as remaining deciduous teeth, malocclusion, non-abrasive diet, periodontal trauma, foreign bodies and genetic predisposition can also be responsible for PD (Albuquerque *et al.*, 2012)

A previous study on PD in 98 Beagles, remarked the predominance of bone loss, reaching values of 0.1 mm in 20% of one year old dogs. This proportion reaches 84% in three year old animals. In this last group, 44% of the animals suffered bone losses larger than 4 mm (Kortegaard *et al.*, 2008)

PD diagnosis and prognosis require a combination of clinical examination and radiography (Holmstrom, 2012) imaging to determine the severity and tendency to chronicity in each case (Arzi and Verstraete, 2009). However, their relatively low amount of alveolar bone makes small breed dogs susceptible to a more severe affection.

As stated before, the owners of this dog did not report any particular observation apart from the skin wound. In fact, the normal body temperature and the lack of signs of

pain can cause confusion in both the owners and the veterinarians in PD cases. Pain threshold is variable in individuals. Therefore, some seriously affected patients can be able to maintain an apparently painless food intake, especially in case they are fed soft diet. The owners do not usually inspect the oral cavity as far as no clear symptoms are observed. For instance, in our experience, consultations related to canine PD are often only due to bad breath, even if tarter accumulation is easily detected by the practitioner. Moreover, the risk of adverse reactions to chemical restraint prevents veterinary oral inspections in elderly animals. As a consequence, PD is often diagnosed when it has become an irreversible condition.

Affected dogs should undergo dental surgery at the first PD stages in order to avoid severe complications arising from osteolysis. Therefore, the importance of oral cavity inspection in routine periodical preventive veterinary examinations should be highlighted (Harvey, 2005). However, the evolution of the patients after surgical teeth removal and antibiotics treatment can be satisfactory, even in case of severe complications.

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