Diagnostic Imaging in Veterinary Dental Practice

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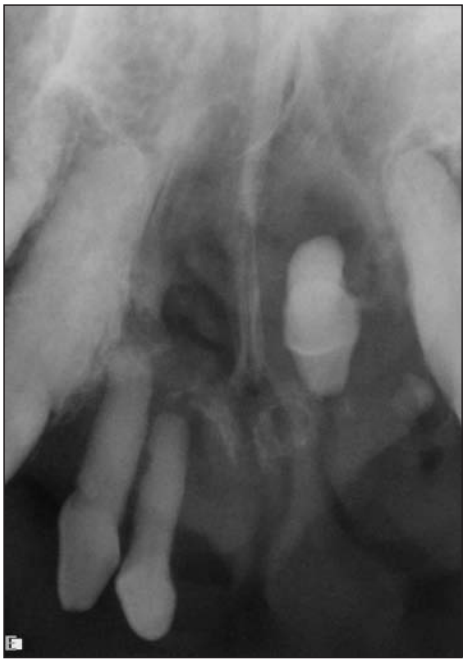

Figure 1—Occlusal radiographic view of the rostral portion of the maxillary region of a 14-year-old 5.3-kg (11.7-lb) spayed female Shih Tzu evaluated because of halitosis, multiple mobile teeth, and marked calculus accumulation and gingivitis.

History and Physical Examination Findings

A 14-year-old 5.3-kg (11.7-lb) spayed female Shih Tzu was evaluated because of halitosis, multiple mobile teeth, and marked calculus accumulation and gingivitis. Three and a half months earlier, the dog had fallen down a set of stairs and been evaluated at an emergency center. The attending veterinarian suspected that the dog had sustained trauma to the jaws and face but was unable to examine the dog without sedation, which was declined. A grade II of VI heart murmur and second-degree atrioventricular block in a Mobitz type 2 pattern was detected at that time. Chronic mitral valve disease without left atrial enlargement and mild tricuspid valve disease were diagnosed on the basis of echocardiographic findings, but treatment was considered unnecessary.

Four days earlier, the dog had been examined at an emergency center because of multiple episodes of choking, gagging, coughing, and difficulty breathing. According to the owner, each episode lasted about 3 minutes, and after each episode, the dog's breathing returned to normal. The owners also noticed a gurgling sound in the dog's throat as well as sneezing and nasal discharge.

A physical examination performed after the dog was sedated revealed an edematous right tonsil that was approximately twice the size of the left tonsil. No laryngeal abnormalities were seen, but several teeth were missing. Multiple mobile teeth and mandibular symphyseal laxity were also noted. Examination of skull radiographs obtained at the emergency center did not reveal any mandibular or maxillary fractures or other abnormalities, and thoracic radiographs were unremarkable. It was suggested that periodontal disease had caused the enlarged palatine tonsil, which in turn was causing the choking and gagging episodes. The dog was referred for evaluation and treatment of periodontal disease.

Results of a preanesthetic CBC and serum biochemical profile were unremarkable except for high total protein concentration (7.9 g/dL; reference range, 5.1 to 7.8 g/dL), high globulin concentration (4.9 g/dL; reference range, 2.1 to 4.5 g/dL), and monocytosis (1,443 monocytes/L; reference range 150 to 1,350 monocytes/µL). The dog was anesthetized, a complete oral examination was performed, and full-mouth, digital, dental radiographs were obtained with a size No. 2 sensor and bisecting angle and parallel techniques. The examination revealed halitosis, severe gingivitis, heavy calculus accumulation, and mandibular symphyseal laxity. No nasal discharge was present at the time of examination. The right maxillary first incisor tooth, all 3 left maxillary incisor teeth, and several other teeth were missing. There was stage 3 furcational bone loss at most of the remaining multirooted teeth and mobility of most of the remaining teeth. Dental radiography revealed generalized horizontal alveolar bone loss ranging from < 25% to > 50% and bilateral loss of the incisive portions of both mandibular bodies. An intraoral radiographic view of the rostral portion of the maxillary region was obtained (**Figure 1**).

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This report was submitted by Diane S. Carle, DVM, and Bonnie H. Shope, VMD, DAVDC; from Veterinary Dental Services LLC, 138 Great Rd, Acton, MA 01720.
Address correspondence to Dr. Carle (dcarle@veterinarydental.com).

Diagnostic Imaging Findings and Interpretation

Dental radiography revealed a unilateral, oblong (8.6 × 4.1 mm), radiopaque structure with smooth contours at the level of the left palatine fissure (**Figure 2**). There was marked loss of alveolar bone associated with the maxillary canine teeth and the right second and third incisor teeth. There was increased soft tissue and fluid opacity in the left nasal cavity with loss of detail of the nasal turbinates, consistent with swelling or edema of the turbinate mucosa, fluid accumulation, or bone loss. The root of the right maxillary second incisor had an irregular lucency along the distal margin of the apical half of the tooth, most likely representing external inflammatory tooth resorption.[1] The right maxillary canine tooth had an irregular opacity along the mesial margin consistent with calculus deposition. There was loss of the periodontal ligament space on the mesial and distal aspects of the right maxillary canine tooth and the mesial aspect of the left maxillary canine tooth consistent with ankylosis and aging. The incisive bones and maxillae had a generalized decrease in bone density, which is common with advanced periodontal disease. There was also a 2-mm-diameter, circular radiopacity mesial to the left maxillary canine tooth.

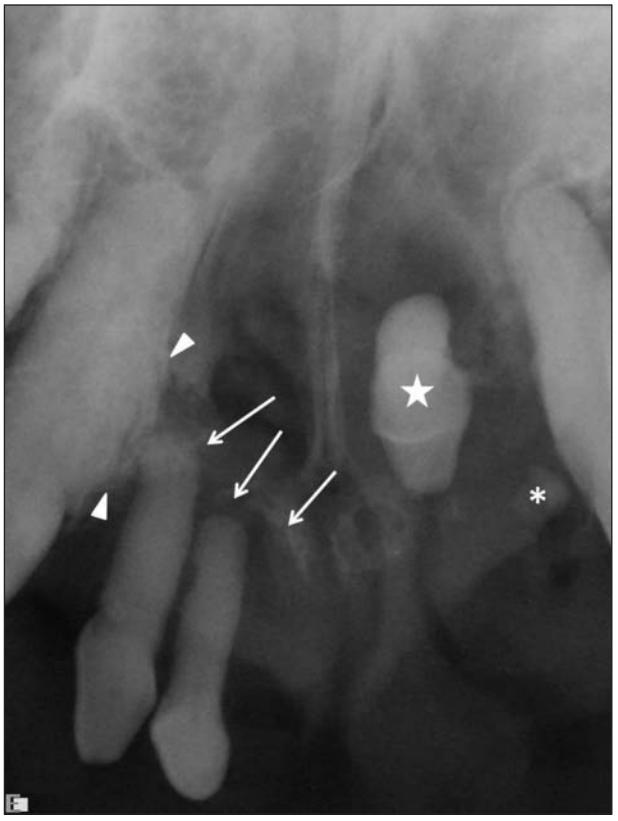

Figure 2—Same radiographic view as in Figure 1. Notice the rough appearance of the right maxillary canine tooth root consistent with calculus accumulation (arrowheads). There is severe alveolar bone loss giving the appearance of floating incisor teeth (arrows). The radiopacity mesial to the left maxillary canine tooth is a retained tooth root (asterisk). The radiopacity projecting over the left palatine fissure is an intrusive luxation of an incisor tooth (star). Image foreshortening gives the appearance of a smaller object than might be expected of a tooth.

Treatment and Outcome

An 8F red rubber catheter was placed anterograde (from the nares toward the nasopharynx) into the nasal cavity through the left nostril, and saline (0.9% NaCl) solution was flushed through the catheter, retropulsing the radiopaque object through the nasopharynx into the caudal aspect of the oropharynx, where it was retrieved and revealed to be an incisor tooth. Likely, severe periodontal disease had resulted in alveolar bone loss and the incisor tooth had intrusively luxated into the nasal cavity when the dog fell down the stairs 3.5 months earlier. The radiopacity mesial to the left maxillary canine tooth was a retained tooth root, which was extracted. All mobile teeth and teeth with severe alveolar bone loss were extracted. The remaining teeth were scaled and polished supragingivally and subgingivally. At a recheck examination 2 weeks later, the dog was bright and alert and was reported to be doing well. All extraction sites had healed. The owner reported that the dog still had some upper respiratory noises but was no longer sneezing. In addition, the owner reported that there had been no evidence of nasal discharge and no additional episodes of difficulty breathing.

Comments

Nasal foreign bodies have been identified as the underlying cause in 1.3% to 8% of cases of nasal disease in dogs.[2–5] Typical clinical signs in dogs with a nasal foreign body are sneezing, snorting, and gagging of sudden onset, with or without persistent unilateral nasal discharge.[3] In the case described in the present report, the owners reported a history of sneezing, gagging, and choking. No nasal discharge was present on examination, although the owners reported a history of discharge. The choking and gagging noted by the owner likely were caused by intermittent obstruction of the nasal cavity by the tooth, rather than the enlarged tonsil as originally suspected. Aspergillosis has been associated with nasal foreign bodies and most likely develops secondary to persistent mucosal irritation. Radiography and anterograde or retrograde rhinoscopy can be used to diagnose the presence of a nasal foreign body, although in 1 study,[3] radiography proved less sensitive than endoscopy. In the case described in the present report, because the foreign body was a radiopaque tooth, radiography was sufficient for diagnosis.

In addition to the nasal cavity, tooth foreign bodies have been identified in the mandibular canal and infraorbital foramen, most often as a complication of root tip fracture during extraction.[6] Tooth foreign bodies can also occur in the nasopharynx and respiratory tract. A tooth foreign body in the nasopharynx of an 8-year-old Shih Tzu with severe periodontal disease has been reported.[7] That dog had a 2-week history of coughing and nasal discharge. Results of skull radiography were nondiagnostic, but CT revealed the presence of a tooth. The tooth was removed via caudal rhinoscopy. Tooth foreign bodies were found in the mainstem bronchus of the lung in a Toy Poodle after a fight with another dog.[8]

Rhinoscopy and retrograde repulsion can also be used to remove nasal foreign bodies. Rhinoscopy was not available for the dog of the present report, and an-

terograde (from the nares towards the nasopharynx), rather than retrograde (from the nasopharynx toward the nares), repulsion was used because of the relative ease of passing a catheter through the nostril, compared with passing a catheter through the oropharynx and into the nasopharynx. A disadvantage of anterograde repulsion is the risk of lodging the foreign body further into the nasal turbinates.

Surgery can also be used to remove dental foreign bodies from the nasal cavity. An intrusively luxated canine tooth was removed from the rostral portion of the nasal cavity of a 9-year-old Afghan Hound through an alveolar mucosal rhinotomy.[9] In that case, the size of the tooth precluded removal through the nares.

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