Diagnostic Imaging In Veterinary Dental Practice

In cooperation with
AVDC
AMERICAN VETERINARY DENTAL COLLEGE

Figure 1—Photograph of the left mandibular canine tooth in a dog examined because of a mass on the buccal aspect of the tooth.

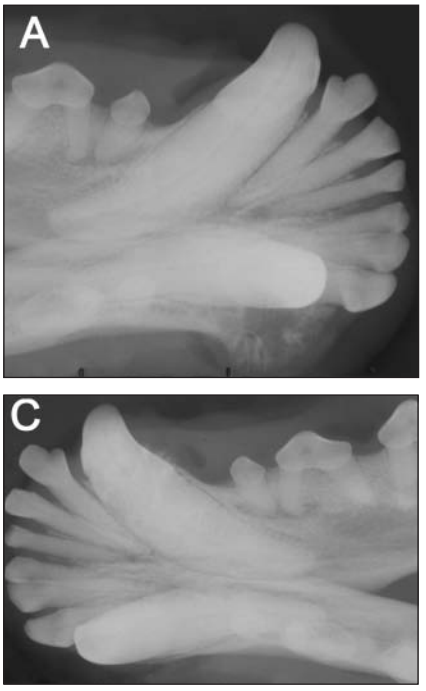


Figure 2—Lateral radiographic view of the right mandibular canine tooth (A), occlusal radiographic view of both mandibular canine teeth (B), and lateral radiographic view of the left mandibular canine tooth (C) in the dog in Figure 1.

History and Physical Examination Findings

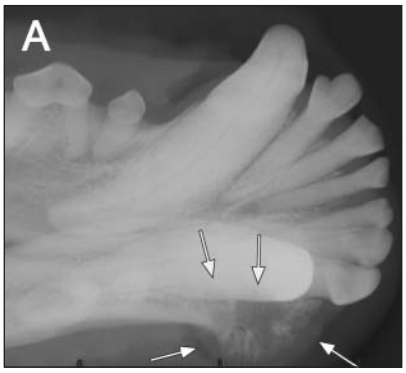
A 7-year-old castrated male Border Collie was evaluated because of a mass on the buccal aspect of the left mandibular canine tooth. The mass had been visibly increasing in size and had developed an irregular surface.

Results of a complete physical examination were unremarkable. Oral examination confirmed a 16 × 9-mm gingival mass with a lobulated surface at the buccal margin of the left mandibular canine tooth (**Figure 1**). The irregular surface affected only about a third of the mass. The mass appeared to extend ventrally under the alveolar mucosa, and raised tissue under normal-appearing gingiva felt as firm as bone on palpation. The left mandibular canine tooth appeared to be slightly displaced lingually. Abrasions were visible on the coronal tips of the canine, mandibular incisor, and premolar teeth. The mandibular first incisor teeth had uncomplicated crown fractures, as did the left maxillary second incisor tooth. Results of a CBC and serum biochemical profile were within reference limits.

The dog was anesthetized, and complete supra- and subgingival scaling and polishing were performed. Periodontal charting was performed, and occlusal and lateral radiographic views of both mandibular canine teeth were obtained (**Figure 2**).

Determine whether additional studies are required, or make your diagnosis, then turn the page →

This report was submitted by Judy Force, DVM; from Dentistry for Animals, 2651 Soquel Ave, Santa Cruz, CA 95076, and the Aggie Animal Dental Service, 2345 Fillmore St, San Francisco, CA 94925.
Address correspondence to Dr. Force (j.force2@baymoon.com).



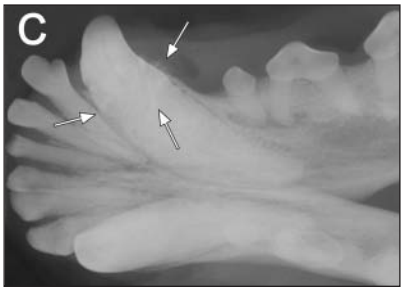


Figure 3—Same radiographic views as in Figure 2. Notice the areas of bone lysis and the sunburst periosteal reaction involving the marginal alveolar and buccal bone of the left mandibular canine tooth (arrows). On the occlusal radiographic view (B), notice the partial superposition of the left mandibular canine tooth and left mandibular third incisor tooth suggestive of lingual displacement of the left mandibular canine tooth. There are uncomplicated crown fractures of the mandibular first incisors and abrasions of the canine, mandibular incisor, and premolar teeth.

Diagnostic Imaging Findings and Interpretation

There is substantial bone lysis and a sunburst periosteal reaction involving marginal alveolar and buccal bone of the left mandibular canine tooth (**Figure 3**). This is most obvious on the lateral view of the right mandibular canine tooth. Lingual displacement of the left mandibular canine tooth is visible on the mandibular occlusal view, as evidenced by partial superposition of the left mandibular canine tooth and left mandibular third incisor tooth.

The radiographic pattern of bone destruction in combination with the finding of tooth displacement was considered most consistent with a locally invasive and slow-growing neoplastic process.[1] Although the clinical history suggested that the tumor was visibly enlarging, tooth displacement as both a clinical and radiographic finding is more typical of slow-growing oral neoplasms.[1]

The differential diagnosis included axial skeletal osteosarcoma, canine acanthomatous ameloblastoma, fibrosarcoma, squamous cell carcinoma, amelanotic malignant melanoma, other oral tumors, and severe localized osteomyelitis. Given the clinical appearance of the mass and its location in the rostral portion of the mandible, the evidence of bone invasion and tooth displacement, and the radiographic appearance of the lesion, canine acanthomatous ameloblastoma was considered the most likely diagnosis.[1,2]

Treatment and Outcome

Incisional biopsy was performed by creating a wedge-shaped incision through the alveolar mucosa and into the bone. A mucogingival flap was created in normal-appearing gingiva adjacent to the tumor and rotated to cover the defect without any tension on the sutures. The biopsy specimen was preserved in neutral-buffered 10% formalin and submitted for histologic examination, which confirmed the diagnosis of canine acanthomatous ameloblastoma.

The patient was referred to a veterinary teaching hospital for treatment, and the owner elected to have a rostral mandibulectomy performed. Histologic examination of the resected tissue indicated that tissue margins were free from neoplastic cells. A recheck examination 6 weeks after surgery revealed excellent healing and acceptable occlusion.

Comments

The type of tumor identified in the dog described in the present report was previously called acanthomatous epulis but is now generally referred to as canine acanthomatous ameloblastoma.[2,3] Acanthomatous ameloblastomas are rapidly growing and locally aggressive neoplasms that typically occur in the rostral portion of the mandible.[1,2] They do not metastasize but invade bone and recur if not completely excised.[4–6] Although radiation treatment is an option, there is a risk of radiation-induced carcinogenesis.[1,7] In 2 previous studies,[4,7] 98% and 100% of dogs with acanthomatous ameloblastoma had no signs of recurrence 1 to 2 years after wide excision.

For bone lysis to be visible radiographically, > 40% of the cortical bone must be demineralized.[3] Radiography, therefore, can underestimate the extent of the tumor in dogs with acanthomatous ameloblastoma, and early, complete resection of affected bone with at least 10-mm margins of grossly normal bone is essential to prevent tumor recurrence.[3,6] Bone loss, pain, tooth loss, and pathological fractures can occur if the mass is not completely excised.[3]

Ideally, all gingival enlargements in dogs should be radiographed and biopsied at the time of identification. Factors that indicate a critical need for radiography of gingival enlargements include tooth displacement, a rapidly growing mass, evidence of gingival ulceration or irregular proliferation, bone loss, and tooth mobility. Intraoral radiography is essential to assess the extent of bone involvement, support the histopathologic diagnosis, and help determine surgical margins for complete excision of a tumor. Although not pathognomonic, a radiographic pattern of bone lysis with a cystic or moth-eaten appearance is highly suggestive of acanthomatous ameloblastoma.

References

1. Liptak JM, Withrow SJ. Oral tumors. In: Withrow SJ, MacEwen EG, eds. *Small animal clinical oncology*. 4th ed. Philadelphia: WB Saunders Co, 2007;455–472.
2. Gardner DG, Baker DC. The relationship of canine acanthomatous epulis to ameloblastoma. *J Comp Pathol* 1993;1081:47–55.
3. Verstraete FJ, Ligthelm AJ, Weber A. The histological nature of epulides in dogs. *J Comp Pathol* 1992;106:169–182.
4. Kosovsky JK, Matthiesen DT, Marretta SM, et al. Results of partial mandibulectomy for the treatment of oral tumors in 142 dogs. *Vet Surg* 1991;206:397–401.
5. Verstraete FJ. Mandibulectomy and maxillectomy. *Vet Clin North Am Small Anim Pract* 2005;35:1009–1039.
6. White RA, Gorman NT. Wide local excision of acanthomatous epulides in the dog. *Vet Surg* 1989;18:12–14.
7. McEntee MC, Page RL, Theon A, et al. Malignant tumor formation in dogs previously irradiated for acanthomatous epulis. *Vet Radiol Ultrasound* 2004;45:357–361.