



**Figure 1**—Clinical photograph of the rostral mandibular region of a 10-month-old Chartreux that was evaluated because of an oral mass and apparent absence of the left mandibular canine tooth. There was no evidence of pain on palpation of the region.



**Figure 2**—Lateral (A) and occlusal (B) intraoral radiographic views of the left mandible of the same cat as in Figure 1.

## History and Physical Examination Findings

A 10-month-old 6-kg (13.2-lb) neutered male Chartreux was referred for evaluation of an oral mass noticed 4 months earlier and associated with clinical absence of the left mandibular canine tooth. No history of disease or trauma was reported. Examination of the oral cavity in the awake cat revealed a 15 X 10 X 10-mm mucogingival swelling at the site of the missing canine tooth and labial displacement of the left mandibular incisor teeth (**Figure 1**). The swelling was moderately firm, and palpation did not elicit signs of pain. No medication had been previously administered for the condition. Remaining results of the physical examination, including palpation of peripheral lymph nodes, were otherwise unremarkable.

Results of a CBC and serum biochemical analysis were within the respective reference ranges. The cat was anesthetized; oral examination with dental charting did not reveal other abnormalities. Lateral and occlusal intraoral radiographs were obtained. Selected radiographic views are provided (**Figure 2**).

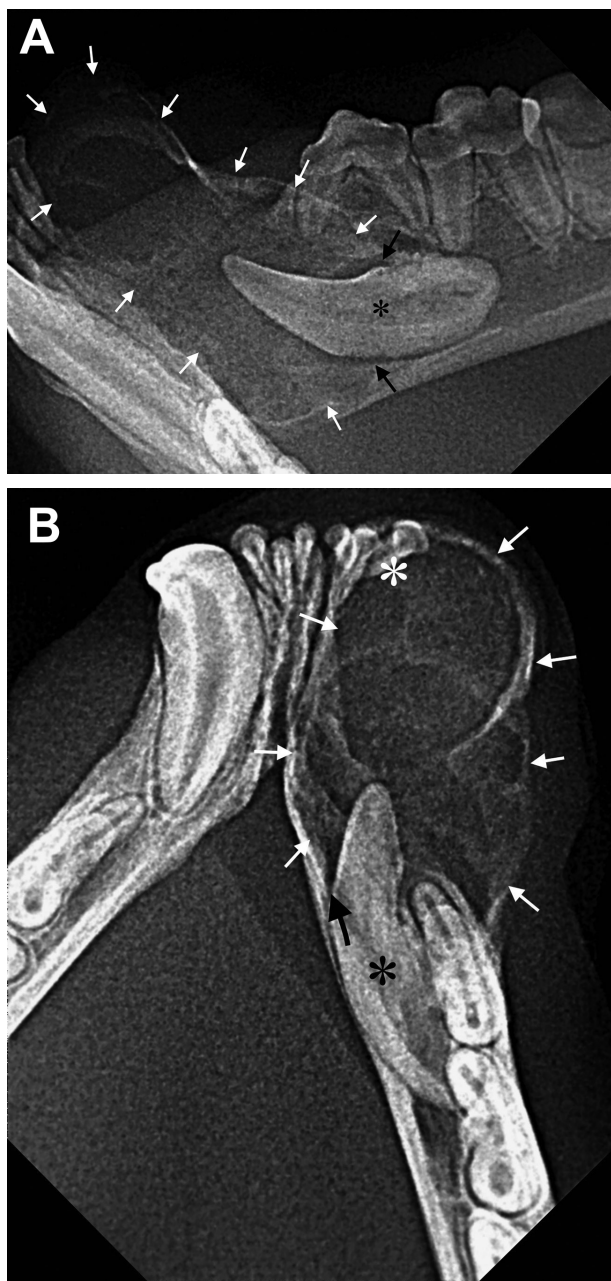
**Determine whether additional studies are required, or make your diagnosis, then turn the page →**

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## Diagnostic Imaging Findings and Interpretation

On radiographs of the left mandible, an unerupted permanent canine tooth was observed ventral and lingual to the third premolar tooth and the mesial root of the fourth premolar tooth (**Figure 3**). A 19 X 10 X



**Figure 3**—Same lateral (A) and occlusal (B) radiographic images as in Figure 2. An expansile cyst-like lesion (white arrows) is evident in the rostral part of the left mandible between the incisor teeth and the third premolar tooth. The left mandibular canine tooth is unerupted (black asterisk) and located lingual and ventral to the third premolar tooth. The distal part of the lesion extends to the cemento-enamel junction of the unerupted canine tooth (black arrows). The incisor teeth are displaced mesially and very slightly labially (white asterisk) by the space-occupying lesion.

10-mm radiolucent expansile mass was evident in the rostral part of the mandible between the incisor teeth (first, second, and third) and the third premolar tooth. The mass was well-defined and thin walled and extended rostrally beyond the alveolar margin. The crown of the unerupted canine tooth was surrounded by the mass, which extended distally over its cemento-enamel junction. The left mandibular incisor teeth were mesially and very slightly labially displaced by the mass.

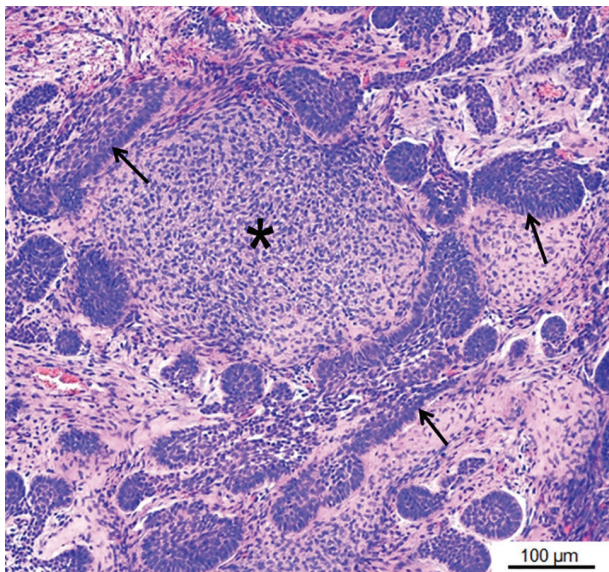
The radiographic findings were compatible with a dentigerous cyst. This anomaly is a developmental odontogenic lesion radiographically characterized by a well-defined unilocular radiolucency surrounding the crown of an unerupted tooth.<sup>1</sup> However, other diseases such as odontogenic cystic tumors can have a similar radiographic appearance,<sup>1</sup> and histologic evaluation is necessary to confirm the diagnosis.<sup>2</sup>

A helical CT scan was performed prior to surgery to allow better evaluation of the extent of the mass and its potential impact on adjacent structures such as the premolar teeth, mandibular bone, and mandibular canal. No iodinated contrast medium was used. On CT images (not shown), the mass appeared as a unilocular, cavitary lesion formed by a focal widening of the mandible. The cortices delineating the mass were thin, continuous, and smoothly outlined. The buccal cortex was expanded buccally. At its distal aspect, the mass surrounded the unerupted canine tooth. On soft tissue reconstructed images, the content (or intercortical space) of the mass was homogeneous and hypodense to the regional muscles, with a soft tissue density (measured as 30 Hounsfield units).

## Treatment and Outcome

During the same general anesthetic session as radiography, a left inferior alveolar nerve block was performed. The oral cavity was rinsed with a 0.2% chlorhexidine solution. Considering the smooth and well-defined osseous contour of the mass, an enucleation of the cyst-like lesion was performed. A vestibular full-thickness gingival envelope flap was elevated from the level of the left fourth mandibular premolar tooth to the level of the left first mandibular incisor tooth. An incision of the mandibular mass revealed a soft tissue content with no fluid in the cortical space. Alveolotomy was performed on the lateral side of the left mandibular body with a round (International Standards Organization No. 12) diamond bur in a sterile high-speed dental hand piece irrigated with sterile saline (0.9% NaCl) solution. The left incisor teeth and the left third mandibular premolar tooth were extracted. The unerupted canine tooth was exposed and completely extracted. The lining of the cavity was curetted with a Volkmann curette to the extent of bony contact. The bony walls on the dorsal and lateral aspect of the lesion were resected with a rongeur. Alveoloplasty was performed with a round (International Standards Organization No. 20) diamond



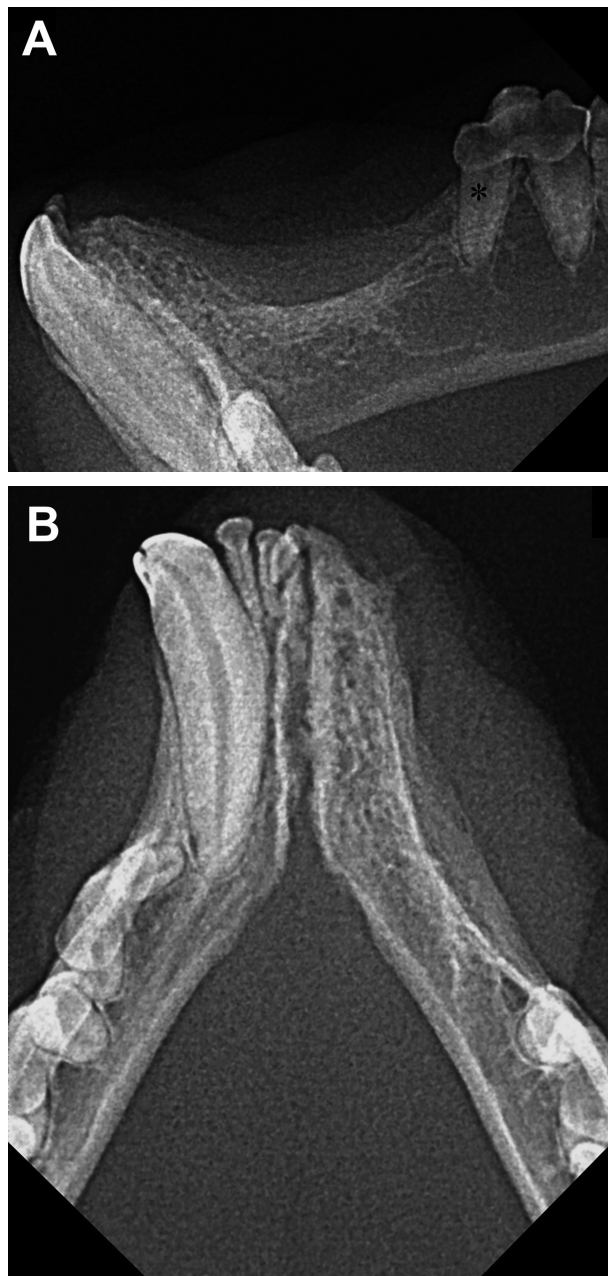


**Figure 4**—Photomicrograph of a section of the excised mass. Notice islands of odontogenic epithelium (arrows) and a dental papilla-like round aggregate of mesenchymal tissue (asterisk). H&E stain; bar = 100  $\mu$ m.

bur to smooth the bony margins. The defect was flushed with sterile saline solution. The surgical flap was closed with 5-0 poliglecaprone 25 in a simple interrupted pattern without tension. A postoperative dental radiograph was obtained to confirm that the selected dental structures had been completely removed. The patient recovered from anesthesia without complications and was discharged from the hospital with an NSAID (meloxicam, 0.1 mg/kg [0.045 mg/lb], PO, q 24 h for 3 days) and an antimicrobial (clindamycin hydrochloride, 11 mg/kg [5 mg/lb], PO, q 24 h for 5 days).

A full-thickness slice of the mass and the canine tooth were submitted for histopathologic examination. On microscopic examination, the gingiva and part of the canine tooth root were infiltrated by a poorly delineated neoplastic lesion composed of cords and nests of odontogenic epithelium separated by a variably loose mesenchymal tissue. The epithelium appeared to form an occasional rim or belt around compact round aggregates of mesenchymal tissue that resembled dental papillae (**Figure 4**). Nuclear atypia was mild, and the mitotic count was low. These pathological features were considered diagnostic of a feline inductive odontogenic tumor (FIOT).

The cat was reevaluated 1 month after surgery. The surgical site was completely healed, and the cat showed no signs of oral pain. Ten months after surgery, a follow-up CT scan and dental radiography were performed. No evidence of tumor regrowth was observed. The mandibular cortex in the region of the surgical procedure appeared to have healed, and the mandible had regained a normal trabecular pattern (**Figure 5**).



**Figure 5**—Ten-month follow-up lateral (A) and occlusal (B) intraoral radiographic views of the left mandible of the same cat as in Figure 1. The previously depicted cyst-like lesion, unerupted canine tooth, third premolar tooth, and incisor teeth on the affected side were completely removed at the time of surgery (10 months prior to this visit). The surgical site has smooth and well-defined margins and is filled by apparently normal trabecular bone. The rostral part of the left mandible has continuous ventral, labial, and lingual cortices of normal thicknesses, indicating complete healing. Notice the narrowing of the pulp cavity of the left fourth premolar tooth (asterisk) as compared with the presurgical images in Figure 2, attesting to its vitality.

## Comments

The clinical case described in this report illustrated the roles and limitations of dental radiography and CT. The observation of a large radiolucent uni-

locular cyst-like lesion associated with an unerupted tooth should not automatically lead to a diagnosis of dentigerous cyst<sup>2</sup>; histopathologic examination is required for a definitive diagnosis. When evaluating an oral mass, an incisional biopsy sample is typically first obtained to define its nature and biological behavior; then surgical margins are established and adequate resection is performed. In the cat of this report, because of the well-defined unilocular cyst-like lesion surrounding an unerupted tooth and the lack of bone invasion confirmed by CT images, an incisional biopsy was not performed prior to surgical treatment. It was thought that curettage of the cystic lesion and of its lining after extraction of the unerupted tooth would provide more adequate tissue sampling for histologic evaluation. On the basis of the histologic findings, we would retrospectively advise that an incisional biopsy should be performed in such a case when typical clinical features of a fluid-filled cyst are not observed.

Previously termed inductive fibroameloblastoma, FIOT is a tumor that consists of inductive odontogenic epithelium and dental pulp-like ectomesenchyme.<sup>3</sup> It is an uncommon, benign neoplasm primarily observed in young cats.<sup>3-5</sup> The name of this tumor was modified by Gardner and Dubielzig<sup>3</sup> in 1995 to avoid confusion with ameloblastoma, a tumor of odontogenic epithelium without ectomesenchyme. No sex or breed predilection has been observed.<sup>3,6</sup> According to cases reported in the literature, FIOTs are mostly localized to the rostral part of the maxilla.<sup>3,6-8</sup> Three cases of FIOT in the mandibular area have been previously described.<sup>3,9</sup> Two cases of FIOT associated with an unerupted tooth have been reported.<sup>8,9</sup> An FIOT is considered a benign, locally invasive tumor without metastatic potential.<sup>3</sup>

In human medical literature, oral tumors histopathologically resembling FIOTs comprise ameloblastic fibroma and ameloblastic fibro-odontoma.<sup>10</sup> Both are mixed (epithelial and mesenchymal) odontogenic tumors, and they have similar biological behavior, prevalence, localization, and therapeutic approaches.<sup>11</sup> Young patients with no gender predilection are mostly affected in the mandibular region.<sup>12</sup> Radiographically, the lesion appears as a unilocular or multilocular, well-circumscribed lucency and may or may not be associated with the crown of an unerupted tooth.<sup>1</sup> In the absence of metastasis and local aggressive behavior, conservative treatment (enucleation and curettage) has been suggested.<sup>13</sup> Relapses are rare, and prognosis is excellent with adequate surgical treatment. Wide excisions have been advised for large tumors or previous incomplete curettage.<sup>12,13</sup>

In the veterinary literature, for long-term success, a wide or radical excision of the lesion (maxillectomy or mandibulectomy) has been recommended.<sup>3,14</sup> Re-

lapses have been reported in cases where the surgical resection was incomplete.<sup>3</sup> Mandibular surgery might alter a patient's quality of life. Unilateral mandibulectomy can potentially impact both quality of life and functionality. Drift of the remaining mandible is a common sequela and can lead to strain on the temporomandibular joint as well as occlusal trauma caused by the contact between the canine tooth and palate.<sup>15</sup> On the basis of surgical recommendations for odontogenic tumors in human patients and considering potential functional disturbances following mandibulectomy in cats, a conservative surgical approach with regular follow-up examinations may offer a viable alternative for treatment of well-circumscribed benign mandibular lesions.

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