A 2-year-old 8.3-kg castrated male Miniature Schnauzer was referred to a veterinary specialty hospital for evaluation of an impacted tooth structure adjacent to the mandibular canal during a routine dental procedure. Preanesthetic bloodwork at the referring practice revealed a mild neutrophilia (11,647 cells/µL; reference range, 2,060 to 10,600 cells/µL) but was otherwise within normal limits. The patient was anesthetized, and intraoral radiographs were obtained and revealed a tooth structure at the level of the mandibular canal (Figure 1). A hygiene procedure was performed, but no other treatments were performed. The remainder of the anesthetized oral examination and intraoral radiographs were unremarkable. The patient was otherwise doing well at home and eating and drinking normally. At the time of presentation, the patient was not on any medications outside of monthly preventatives and the owner reported no other medical problems. The patient was referred for further imaging and treatment.

At presentation a week later, a general physical examination, awake oral examination, repeat CBC, and abbreviated chemistry panel were performed and showed no significant findings. The patient was anesthetized, and a cone beam CT (CBCT) of the head was obtained.

**Keywords:** supernumerary tooth, impacted tooth, mandibular canal, dental radiographs, dentigerous cysts

**Diagnostic Imaging Findings and Interpretation**

Cone-beam CT (VetCAT; Xoran Technologies LLC) of the skull was performed (120 kV, 58 mA, and 0.2-mm slice thickness), and images were viewed with the use of specialized software (Xoran Technologies LLC). Findings on CBCT were consistent with those from the referring veterinarian and showed an impacted supernumerary molar tooth in the lingual aspect at the mandibular canal (Figure 2). The tooth was located ventral...
to the right mandibular first molar, with the crown at the level of the mesial root and the apex at the distal root (Figure 3). On the basis of the imaging, a supernumerary second molar tooth (SN411) was diagnosed.

### Treatment and Outcome

The tooth was extracted in an extraoral technique to avoid future complications, including trauma or cyst formation. In summary, a right inferior alveolar nerve block with 0.5% bupivacaine was given and the ventral mandible was clipped and prepped routinely. An incision was made through the skin and muscle on the right mandible at the level of the molar teeth. Blunt dissection was used to access the lingual aspect of the caudal mandible at 409 to 411, followed by bone removal with a high-speed handpiece and a 1-mm-diameter surgical carbide round to get to the level of the impacted tooth. A 0.5-mm-diameter round bur was used to remove the periodontal ligament, and the tooth was removed. An 18-diamond surgical round bur was used to perform an alveoloplasty. Postoperative radiographs confirmed complete extraction (Figure 4). The area was closed in 3 layers with 4-0 Monocryl and 3-0 Ethicon in simple continuous and cruciate patterns. Recovery from anesthesia was uneventful, and the patient was given 2.2 mg of carprofen/kg (Rimadyl) SC during recovery. The patient was discharged the same day and sent home with gabapentin (6 mg/kg, PO, q 8 to 12 h for 7 days) and carprofen (Rimadyl; 2.2 mg/kg, PO, q 12 h for 10 days) for postoperative pain relief.

At the 2-week recheck, the extraction site appeared to be well healed with minimal inflammation.
at the sutures. On palpation of the mandible, there was still a palpable defect present, but it was improving. During the recovery period, no signs of oral pain or soft tissue discomfort were noted.

Comments

For the dog of the present report, multiple imaging modalities were used to diagnose a supernumerary impacted molar tooth and aid in surgical planning. First, routine dental radiography was used to identify the structure. Second, subsequent CBCT confirmed the presence of the supernumerary tooth and aided in surgical planning. Finally, postoperative radiographs confirmed the complete extraction of the tooth. The differential diagnoses included a supernumerary impacted molar, a budding denticigerous cyst, and, less likely, a compound odontoma. In this case, histopathology was not indicated as the structure was identified as a normal tooth structure with no cystic formation identified at the time of diagnostic imaging and extraction.

A CBCT was used to aid in surgical planning for the extraction of the tooth. This technique gave a 3-D view of the structures of interest and allowed the clinician to identify the tooth without traumatizing the mandibular canal or needing to remove excessive bone to reach the site. A CBCT is exceptional for bone algorithms and has been reported to be the most sensitive type of imaging for periodontal structures and bony neoplasia.\(^1\)\(^,\)\(^2\)\(^,\)\(^3\) Unfortunately, many CBCT systems, including the one used in this case report, do not have a soft tissue algorithm included in the software. In this patient, the absence of a cyst or mandibular swelling made the clinician feel that a conventional CT with a soft tissue algorithm and postcontrast study were not needed.

Supernumerary teeth are defined as extra teeth outside of the normal dentition. Eleven percent of dogs have supernumerary teeth, and a slightly higher rate of 36% is seen in dolichocephalic dogs.\(^4\) Typically, these teeth require no treatment. However, supernumerary teeth in brachycephalic breeds may require extraction, as they can cause crowding and predispose adjacent teeth to periodontal disease.\(^4\)

Impacted or unerupted teeth are teeth that never pass the gingiva and are surrounded by bone. They are predisposed to forming denticigerous cysts, as seen with 29% to 44% of impacted teeth.\(^5\)\(^,\)\(^6\) A denticigerous cyst is defined as a stratified epithelial-lined cystic lesion arising at the coronal portion of the unerupted tooth. This type of cyst cannot occur if the tooth has erupted through the oral mucosa. The most commonly affected teeth are the mandibular first premolar teeth, with a 68.5% prevalence in 1 study, followed by canine teeth, then supernumerary teeth, but any unerupted tooth could lead to a denticigerous cyst formation.\(^6\) Treatment of impacted teeth is recommended to be extraction, though an orthodontic treatment could be considered depending on the tooth of interest. If a cyst is present, the entirety of the cyst along with the lining should be extracted to prevent recurrence. Literature has shown that diseases in concurrence of the denticigerous cyst formation include osteosarcoma, canine acanthomatous ameloblastoma, and ameloblastic odontoma, as well as invasive squamous papilloma, peripheral odontogenic fibroma, and oronasal respiratory cyst.\(^5\)\(^,\)\(^6\) Histopathology is encouraged to confirm a denticigerous cyst.

In this case, imaging provided important and useful information in identifying an abnormality that otherwise would not have been found. The patient had a normal awake and anesthetized oral examination, so there was no suspicion of underlying pathology. Without baseline dental radiographs or advanced imaging, this tooth would have been missed. After it was identified, the tooth was classified as both a supernumerary and impacted tooth, making extraction the recommended treatment. Both types of imaging modalities provided useful insight into changes happening under the gingiva not visible to the eye. This case emphasizes the importance of combining awake extraoral and intraoral examination as well as comprehensive anesthetized oral assessment findings and imaging to completely evaluate the patient’s condition before proceeding with any treatments.

Acknowledgments

None reported.

Disclosures

The authors have nothing to disclose. No AI-assisted technologies were used in the generation of this manuscript.

Funding

The authors have nothing to disclose.

References