



### THE CASE OF THE MISSING TOOTH

Dental radiography is recommended whenever examination of the oral cavity reveals missing teeth.



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## CASE REPORT: DENTISTRY

# Impacted Maxillary Canine Tooth in a Persian Cat

**MEET THE AUTHOR**

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Case reviewed by: **Donnell Hansen, DVM, DAVDC**

Jessica Johnston, CVT, VTS (Dentistry), is a native Minnesotan who became a Certified Veterinary Technician in 2008. After 6 years in a high-volume corporate practice, Jessica switched gears to specialty care in Minnesota's BluePearl hospitals.

One of the few CVTs to earn her Veterinary Technician Specialty (VTS) in dentistry, Jessica found her passion in dentistry/surgery and is busy making the world a better place—one clean, pain-free mouth at a time.

In her free time, Jessica enjoys her pet family, Darla, a French bulldog, and Lady, a Lab mix, in the great outdoors. She also loves taking risks and getting her adrenaline flowing!

**HISTORY**

A 2-year-old, 5.13-kg, neutered male Persian cat presented for evaluation and treatment of a clinically absent left maxillary canine tooth (204). The referring veterinarian had noted the tooth's absence during a routine physical examination, performed dental radiography, and diagnosed an impacted 204. The patient was otherwise healthy, was up-to-date on vaccinations, and did not receive any at-home dental care.

**PRESENTATION AND DIAGNOSIS**

A conscious physical examination was unremarkable. The patient had a 5/9 body condition score and normal hydration status. Vital parameters, including heart rate and rhythm, temperature, respiration, blood pressure, capillary refill time, and mucous membrane color, were within normal reference ranges. During the conscious oral examination, 204 was noted as absent. Generalized mild gingivitis and calculus were also noted. The patient's occlusion was normal.

Review of the provided dental radiograph showed the missing tooth to be impacted: that is, present, but prevented from erupting by intervening bone.<sup>1</sup> Impacted teeth can be treated by orthodontic extrusion, operculectomy, or extraction. In this case, surgical extraction was recommended based on the tooth's position and rotation. Early detection and surgical extraction of an impacted tooth are recommended to avoid potential pathologic conditions, notably dentigerous cyst formation. A dentigerous cyst is a



buildup of fluid between a reduced layer of specialized enamel-forming epithelium and an unerupted tooth.<sup>2</sup>

A cost estimate, including general anesthesia, dental prophylaxis, full-mouth dental radiographs, and extraction of 204, was provided to the patient's owner. After consultation with the veterinarian, the owner elected to proceed with surgical extraction of 204.

## ANESTHESIA PREPARATION AND INDUCTION

The referring veterinarian had performed a complete blood count and serum biochemistry panel with electrolytes the day before, so no further blood work was required. Dexmedetomidine 0.5 mg/mL (0.005 mg/kg; 0.05 mL total) and buprenorphine 0.3 mg/mL (0.02 mg/kg; 0.34 mL total) were administered intramuscularly to the patient. These premedications were selected for their sedative and pain control properties and were deemed safe to administer based on the patient's healthy status.

Thirty minutes after the premedication injection, a 20-gauge intravenous catheter was placed in the left cephalic vein and used to administer 26 mg (2.6 mL) of propofol via slow infusion. The patient was then placed on a heated table and a 3.5-mm, cuffed endotracheal tube was placed and inflated until a seal was achieved. After intubation, the patient was attached to a circle anesthetic delivery system with a 0.5 L bag and started at 1 L of oxygen and 2% isoflurane. Electrocardiogram electrodes, a pulse oximeter, a temperature probe, and a size 2 blood pressure cuff were placed on the patient. Intravenous Plasma-Lyte



**FIGURE 1.** Presurgical intraoral photograph demonstrating missing 204.

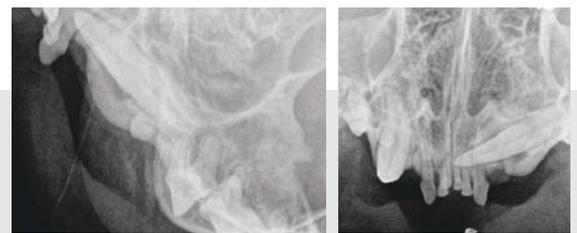
was started and continued throughout surgery at a rate of 26 mL/hr (5 mL/kg/hr; 29 mL, total). The patient was continuously monitored and vital parameter readings were recorded at 5-minute intervals throughout the procedure. Isoflurane was adjusted based on the patient's parameters and response to the procedure as needed.

## IMAGING AND CHARTING

Once the patient was at a stable plane of anesthesia, full-mouth intraoral radiographs to further characterize the position of the impacted tooth and to document and identify the degree of periodontal and/or endodontic disease were obtained (using size 2 phosphor plates and a handheld Nomad radiograph generator). After exposure, the phosphor plates were developed with a ScanX radiography system to create a digital image. Next, a comprehensive oral examination with periodontal probing and dental charting was performed. During the anesthetized examination, the veterinarian confirmed that 204 was missing (**FIGURE 1**). Radiographs confirmed that the missing tooth was impacted under the gum line (**FIGURE 2**). The veterinarian confirmed extraction as the best option for the patient's comfort and oral health.

## TREATMENT

With a confirmed diagnosis and treatment plan, a mayo stand with the necessary instruments and supplies for surgical extraction of 204 was prepared. A regional nerve block was performed with 1 mg (0.2 mL) of bupivacaine 0.5% in the left infraorbital foramen to minimize the amount of inhalant anesthesia needed and aid in pain relief by blocking the pain pathways. A universal size 1 ultrasonic scaler was used to remove supra- and subgingival plaque and calculus from the dentition. After scaling, the teeth were polished with a disposable, soft cup; oscillating prophyl angle; and medium grit pumice paste. The remaining paste was



**FIGURE 2.** Presurgical intraoral radiographs demonstrating impacted 204.



rinsed with distilled water from an air/water dental syringe attached to the dental unit.

The veterinarian used a #15 scalpel blade to make a mucoperiosteal flap from the palatal aspect of 101, through the occlusal space, to the distal buccal mucosa of 206. The mucosa and periosteum were then elevated from the palate and alveolar bone with a selection of periosteal elevators in a lifting motion. A 699 carbide cutting burr was used in a controlled sweeping motion with a high-speed handpiece to remove overlying buccal and palatal bone until 204 was identified. A 699 and a quarter-round, carbide cutting burr were used to further remove buccal and palatal bone to isolate 204. The veterinarian then began to gently elevate the mesial, buccal, palatal, and distal aspects of the tooth, using size 1-3 wing-tipped elevators to fatigue the periodontal ligament. To stretch and tear the periodontal ligament fibers, the veterinarian held the elevator at each spot for 10 to 15 seconds. Once 204 was sufficiently mobile, an extraction forceps was used to gently rotate it clockwise and counterclockwise with a slight pulling motion until the tooth was extracted.

Although it was not visible on radiographs, an epithelial lining had formed around the crown of the tooth. A spoon curette was used to extensively curettage the walls of the bone and soft tissues to completely remove this lining, which, if left behind, could allow new cyst formation.<sup>3</sup> Following curettage, a fine-grit, diamond football burr was used to smooth the palatal and alveolar bone edges. I took a postoperative radiograph to ensure complete extraction of the tooth (**FIGURE 3**). The veterinarian then closed the mucoperiosteal flap in a tension-free manner using 5-0 Monocryl ([ethicon.com](http://ethicon.com)) in a simple interrupted pattern, with sutures spaced 2 to 3 mm apart (**FIGURE 4**).



**FIGURE 3.** Postsurgical intraoral radiograph demonstrating 204 extraction.

## RECOVERY AND DISCHARGE

After closure, I checked to ensure the seal on the endotracheal tube was still intact and inspected the oral cavity for foreign material. The mouth was rinsed using distilled water from the air/water dental syringe to remove any remaining debris or blood clots. The gas anesthetic was discontinued and the patient remained on oxygen for 5 minutes. Anesthetic monitoring continued until the patient was able to swallow, at which point the oxygen was turned off and the endotracheal cuff was deflated to allow extubation.

The patient was transferred into the intensive care unit for recovery, which was uneventful. Within 1 hour after surgery, the patient was alert, responsive, and able to walk. One hour after the procedure, I reviewed the discharge instructions with the owner. I advised the owner to feed the patient a softened diet for 10 to 14 days to allow the incisions adequate time to heal. The owner already had pain medication (buprenorphine 0.06 mg PO q12h for 5 days) prescribed by the referring veterinarian and was directed to continue giving that medication until gone.

## FOLLOW-UP

The patient returned 2 weeks after extraction for a recheck examination to confirm the mucoperiosteal incisions had healed. An annual oral examination, dental prophylaxis, and radiographic monitoring were recommended, and the veterinary nurse demonstrated how to perform daily brushing to prevent accumulation



**FIGURE 4.** Postsurgical intraoral photograph demonstrating 204 extraction and mucoperiosteal flap closure.

of plaque and calculus and minimize the harmful effects of periodontal disease.

## DISCUSSION

Dental radiography is recommended whenever examination of the oral cavity reveals missing teeth.<sup>4</sup> Radiographic findings in these patients may include retained tooth roots or misshapen, unerupted, or impacted teeth.<sup>4</sup> It has been reported that unerupted teeth are at high risk for dentigerous cyst formation<sup>5</sup> and that brachycephalic breeds are prone to having unerupted teeth.<sup>6</sup> Dentigerous cysts associated with unerupted teeth can be asymptomatic and can develop and enlarge over a long period of time unnoticed,<sup>2</sup> potentially causing significant destruction of bone and tissue.<sup>4</sup> Radiographic monitoring of unerupted teeth to detect early development of a dentigerous cyst may be considered; however, extraction is preferred to avoid cyst development and subsequent bone/tissue destruction. Fortunately, the prognosis for dentigerous cysts can be excellent with total debridement of the cystic epithelium and associated teeth. Cysts can recur

if debridement is incomplete; therefore, radiographic follow-up every 2 years or until the cyst cavity has completely reossified is recommended.<sup>2</sup> However, with careful debridement, these patients can live a long life without ongoing oral concerns related to an unerupted tooth or dentigerous cyst. **TVN**

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