

## CASE REPORT

**COMPLICATIONS AFTER INCOMPLETE DENTAL EXTRACTIONS IN A CAT**Faruk Tandir<sup>1,2</sup>, Nejra Dučić<sup>2\*</sup>, Rizah Avdić<sup>1</sup>, Anel Vejzović<sup>1</sup>, Redžep Tandir<sup>3</sup>

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**ABSTRACT**

Exodontics is one of the most commonly performed procedures in veterinary dentistry. One of the essential steps in every dental procedure is taking preoperative and postoperative dental radiographs in order to determine the severity of the disease, root abnormalities and retained root fragments. Present case report describes a cat with signs of oral inflammation and discomfort after previous dental treatment due to signs of gingivostomatitis one month earlier. Thorough dental examination and dental radiographs revealed retained root fragments of teeth 208, 209, 308 and 309 on the left side of the maxilla and the mandible. Extraction of retained root fragments and alveolectomy were performed, followed by postoperative antimicrobial treatment. Three weeks after the procedure, the extraction sites were healing and the patient started showing usual behaviour.

**Keywords:** Cat, exodontics, retained roots

## INTRODUCTION

Exodontics, also known as tooth extractions, is one of the most commonly performed procedures in veterinary dentistry. There is a series of indications for tooth extraction, some of them being fractured teeth which cannot be restored, supernumerary teeth, persistent deciduous teeth, teeth affected by periodontal disease, severe chronic gingivo-stomatitis and teeth affected by odontoclastic resorption (Tutt, 2008; Dučić et al., 2023). Surgical approach is required in most cases, especially when multirooted teeth are affected (Moore and Niemiec, 2014). One of the essential steps in every dental procedure is taking preoperative and postoperative dental radiographs, in order to determine the severity of the disease, root abnormalities and retained root fragments (Niemiec, 2009; Moore and Niemiec, 2014; Shannon, 2017).

Even though dental diseases have a high prevalence in veterinary medicine, research suggests that doctors of veterinary medicine receive inadequate education in small animal dentistry during their studies (Fitzpatrick and Mellor, 2003; Gorrel, 2013; Anderson et al., 2017). When taking into consideration lack of necessary equipment and insufficiently developed skills, several complications associated with extractions can occur. Some of them include: tooth fractures, mandible/maxilla fractures, damage of adjacent teeth, iatrogenic oro-nasal communication, and repulsion of tooth root fragments into mandibular or infraorbital canal (Reiter et al., 2004). Remaining root fragments are a common complication when extracting cat's teeth. Tooth roots are often curved or hooked which makes their extraction very difficult (Woodward, 2006). Retained root fragments can cause periapical pathology, and their extraction is obligatory in most cases (Moore and Niemiec, 2014). This case report describes a cat presented with signs related to oral inflammation, oral discomfort and worsening of the general health condition after previous dental treatment.

## CASE DESCRIPTION

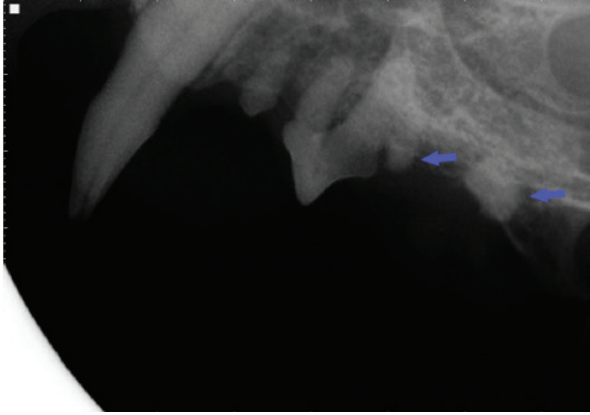
A 5-year-old 3.2-kg female domestic shorthair cat was referred to the Clinic for Veterinary Dentistry at Veterinary Faculty in Sarajevo for a dental examination. The patient had received dental treatment involving multiple tooth extractions at another clinic one month prior to this visit due to signs of gingivostomatitis. The owner mentioned that the patient hadn't been eating properly since the treatment, and only used its right side of the mouth. The patient was an indoor/outdoor cat living in a multi-cat household. On physical examination, the patient was apathic and showed signs of oral pain and discomfort with notable hypersalivation and halitosis. Oral evaluation revealed severe inflammation of periodontal tissues with spontaneous bleeding of the gingiva when being touched, along with several root remnants located in the left side of the maxilla and the mandible. No root remnants were observed on the right side of the maxilla and the mandible.

Complete blood count (CBC), biochemical profile and SNAP FIV/FeLV Combo test were performed. The blood tests revealed neutrophilia ( $20.38 \times 10^9/L$ ), monocytosis ( $1.61 \times 10^9/L$ ), eosinophilia ( $1.64 \times 10^9/L$ ), hyperglycemia (16.56 mmol/L), hyperglobulinemia (67 g/L) and increased TP level (94 g/L). The patient tested positive for FIV.

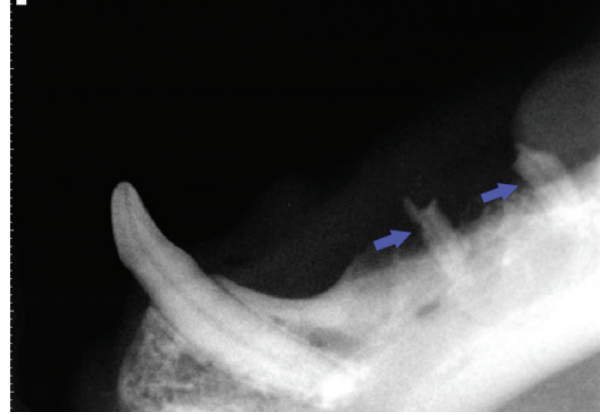
In order to perform a more detailed oral examination and take dental radiographs, anesthetic induction was performed with intramuscular medetomidine-hydrochloride (80  $\mu\text{g/kg}$ ), butorphanol (0.4 mg/kg) and ketamine (5 mg/kg). Endotracheal intubation was performed using Magill type 3.5 mm cuffed endotracheal tube. One perioperative injection of meloxicam (0.2 mg/kg SC) was administered. Full-mouth intraoral radiographs were obtained and revealed the presence of fractured roots of the fourth premolar (tooth 208) and first molar (tooth 209) in the left side of the maxilla (Figure 1), and the third premolar (tooth 308) and first molar (tooth 309) on the left side of the mandible (Figure 2). The teeth were fractured at the point where the crown meets the dental cervix. The

fourth maxillary premolar (tooth 208) has a large distal root and two thinner mesial roots (buccal and palatal), while the first maxillary molar (tooth 209) is a small, two-rooted tooth. The mandibular

third premolar (tooth 308) has two roots, mesial and distal, whereas the mandibular first molar (tooth 309) has a large mesial root and a very thin distal root.



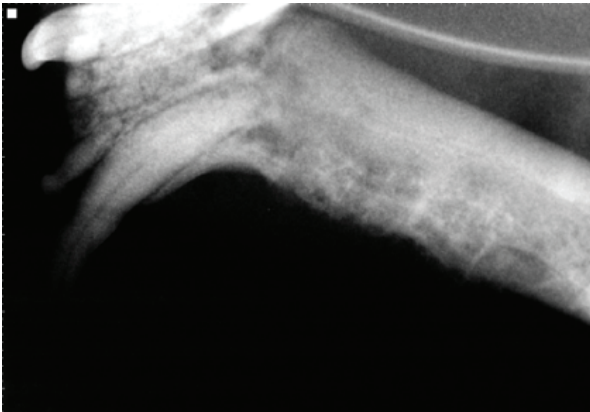
**Figure 1** Left side of the maxilla; arrows are showing remnants of roots of teeth 208 and 209



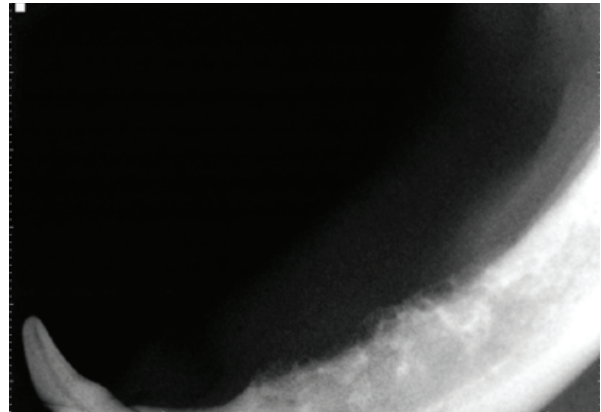
**Figure 2** Left side of the mandible; arrows are showing remnants of roots of teeth 308 and 309

Left maxillary and mandibular nerve blocks were performed using 2% lidocaine-hydrochloride (2 mg/kg). Extraction was performed using 190/2 Bein root elevator with a 3 mm tip, followed by alveolectomy using a round bur on Alegra TE-95 high-speed turbine. The extraction sites were

evaluated by dental radiography before being closed using 5-0 polydioxanone suture (Figures 3 and 4). Postoperative instructions included antimicrobial treatment (clindamycin, 11 mg/kg) and semi-liquid food for 10 days after the conducted method, along with liquid supplements.



**Figure 3** Postoperative radiograph of a successful extraction of teeth 208 and 209 root fragments



**Figure 4** Postoperative radiograph of a successful extraction of teeth 308 and 309 root fragments

Reevaluation was carried out 3 weeks postoperatively. The extraction sites were healing and the owner mentioned that the patient started eating well and showing usual behaviour.

## DISCUSSION AND CONCLUSION

Preoperative and postoperative dental radiographs were not performed during the initial dental treatment, nor was the owner aware of the retained root fragments.

In another case report, an author describes a cat with local and systemic complications after incomplete dental extractions, where 22 root remnants were retained (Reiter et al., 2004). A study conducted by Moore and Niemiec (2014) revealed that the rate of complete extractions was very low, and retained root fragments caused periapical pathology in 39 of 74 dogs and 27 of 42 cats evaluated in the study. A retained mesial root of the first mandibular molar associated with periapical periodontitis was detected in a male Pomeranian dog after previous dental treatment where extractions were performed (Shannon, 2017). In a research done by Ng et al. (2020), it was observed that 85 of 383 dogs that underwent a full-mouth radiographic evaluation had at least one retained tooth root fragment. A report by Galante and Beard (2004) described a chronic draining tract of the left mandible related to a retained root of the left mandibular canine tooth.

Since December 2022, there have been 7 other cases with the retained root fragments recorded at the Clinic for Veterinary Dentistry at University of Sarajevo. These patients have been treated at different clinics. However, the present case report describes a patient whose overall condition was worsening.

Dental radiography is an essential part of every dental procedure, especially when planning surgical extractions. Preextraction radiographs enable determination of the severity of a disorder, whereas postextraction radiographs serve as a proof that the extraction was performed successfully, and no root fragments were left (Niemiec, 2009; Lemmons, 2013). A very important segment of pain management in dental procedures such as the one described in this case report, is dental nerve blocks. Knowledge of the location and dimensions of the foramina in a cat's head, as well as the position and morphology of the teeth, is crucial for

successful administration of dental nerve blocks prior to dental procedures (Dučić et al., 2024; Tandir et al., 2024).

Present-day veterinary curricula offer little or no training in techniques of surgical exodontics and dental radiography (Greenfield et al., 2004; Moore and Niemiec, 2014). Data from a survey done by Anderson et al. (2017), showed lack of curricular time dedicated to veterinary dentistry in veterinary schools in the USA, Canada and the Caribbean. A cross-sectional study of all UK final year veterinary students done by Perry (2014) showed that less than 40% of students felt that the teaching had prepared them for entering practice, and over 50% reported that they didn't feel confident in discussing dental problems with clients or performing oral examinations.

At Veterinary Faculty – University of Sarajevo, dental morphology of domestic animals is studied only as an elective subject in the third semester. However, this subject has been integrated in the curriculum 10 years ago, which means that doctors of veterinary medicine who graduated before that received little to no knowledge about the teeth morphology. Knowledge of teeth morphology is crucial in almost all dental procedures, along with dental radiography and adequate instruments. The lack or deficiency of any of these components will lead to professional errors that can cause both local and systemic complications in patients. Considering the fact that this is not the first case we have encountered, it is evident that there is a need for better education in the field of dental morphology and veterinary dentistry at University of Sarajevo. This would include more hours of the subject Dental morphology of domestic animals, as well as obligatory clinical practice at the Clinic for Veterinary Dentistry. Organization of educational courses for veterinarians who work in small practice in order to draw their attention to the importance of the teeth morphology and the correct use of dental equipment is also considered as an option. Additionally, a variety of educational videos are available on the Internet that can serve as a source of useful information in the field of veterinary dentistry.

## CONFLICT OF INTEREST

The authors declared that there is no conflict of interest.

## CONTRIBUTIONS

Concept – FT, ND; Supervision – FT, RA; Data Collection and/or Processing – ND, AV; Analysis and/or Interpretation – FT, AV; Literature Search – ND, RA; Writing Manuscript – ND, FT; Critical Review – FT, RA, RT.

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## KOMPLIKACIJE NEPOTPUNIH DENTALNIH EKSTRAKCIJA KOD MAČKE

### SAŽETAK

Egzodoncija predstavlja jednu od najčešće izvođenih procedura u veterinarskoj stomatologiji. Jedan od osnovnih koraka u svakoj dentalnoj proceduri jeste preoperativno i postoperativno rendgensko snimanje koje se izvodi sa ciljem određivanja težine bolesti i dijagnosticiranja abnormalnosti korijena i fragmenata zaostalih korijena. Naš prikaz slučaja opisuje mačku sa znacima oralne inflamacije i nelagode nakon prethodnog dentalnog tretmana izvedenog zbog znakova gingivostomatitisa mjesec dana prije. Kompletan dentalni pregled i dentalni rendgenogrami su pokazali postojanje fragmenata zaostalih korijenova zuba 208, 209, 308 i 309 na lijevoj strani maksile i mandibule. Izvedeni su ekstrakcija fragmenata zaostalih korijenova i alvelektomija uz postoperativni antimikrobni tretman. Tri sedmice nakon procedure područja ekstrakcije su zarastala, a pacijent je počeo pokazivati znakove uobičajenog ponašanja.

**Ključne riječi:** Egzodoncija, mačka, zaostali korijeni