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CASE REPORT

Sialolith in a minor salivary gland of an 8-year-old European domestic shorthair cat: a case report

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Abstract

Sialolithiasis is a rare condition in cats. An 8-year-old neutered female European domestic shorthair cat was evaluated for halitosis, reduced appetite and weight loss. General physical examination was unremarkable, except for a low body condition score. A complete oral examination revealed generalized periodontal disease and tooth resorption. Full-mouth radiographs confirmed the presence of multiple teeth affected by tooth resorption. Additionally, dental radiographs also identified a radiopaque calcified structure adjacent to the caudal part of the body of the left mandibular bone. Differential diagnoses included a floating radicular rest, a sialolith, ectopic dental tissue or a mineralised foreign body. On detailed examination of this region, the hard structure was palpated in the lower lip, vestibular to the mandibular molar area. The structure was surgically excised and submitted for histopathological analysis, which confirmed a sialolith involving the minor salivary glands. Follow-up oral examination showed complete healing, resolution of clinical signs, and no evidence of recurrence. This case highlights the importance of dental radiography and histopathological confirmation in the diagnosis of oral calcified deposits in cats. To the authors' knowledge, this is the first report in the peer reviewed literature describing sialolithiasis originating from a minor salivary gland in a cat.

Keywords Feline · Sialolithiasis · Oral calcifications · Dental radiography · Histopathology

Introduction

Sialolithiasis, the formation of calcified deposits within the salivary glands or ducts, is an uncommon but documented condition in cats (de la Puerta and Emmerson 2020). There are more published reports in dogs (Jeffreys et al. 1996; Trumpatori et al. 2007; Ryan et al. 2008; Swert and Van Goethem 2021). Although sialolithiasis in cats is occasionally detected as an incidental finding on routine dental radiographs, the condition remains undocumented and poorly characterised in the veterinary literature. However, it can present clinically with signs of excessive salivation, halitosis, oral discomfort and localised swelling (Spangler and Culbertson 1991; Reiter and Gracis 2018).

Studies have examined the localisation of microliths using both light microscopy and ultrastructural studies using electron microscopy (Harrison et al. 1993a; Fromme et al. 2016). Ultrastructural examination of normal feline sublingual glands, in particular, has provided critical insight into microlith formation and distribution (Harrison et al. 1993a). Computed tomography (CT) imaging has also helped to describe their anatomical characteristics (Fromme et al. 2016). Other studies have investigated how secretory inactivity contributes to microlith formation in feline salivary glands after parasympathectomy and found a significant increase in microliths in the mandibular gland after the procedure, suggesting a link between reduced secretion and microlithogenesis (Harrison et al. 1993a). Stagnant secretory material and increased autophagy in acinar cells appear

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to drive this process (Triantafyllou et al. 1992, 1993a, b; Harrison et al. 1993a, b).

The differential diagnosis of oral calcifications in cats includes ectopic dental tissue, ectopic bone formation, osteomas, mineralised foreign bodies and neoplastic processes, highlighting the critical role of histopathological examination in achieving an accurate diagnosis (Spangler and Culbertson 1991; Reiter and Gracis 2018). Sialoliths in dogs and cats may occur in one of the four major salivary glands (parotid, mandibular, sublingual and zygomatic glands) or in the disseminated glandular tissue in the submucosa of the lips, cheeks and soft palate (Orsini and Hennet 1992; Reiter and Soltero-Rivera 2014; Reiter and Gracis 2018). Tumours of the major salivary glands have been described in cats, including cases of adenocarcinoma (Carberry et al. 1988; Burek et al. 1994; Morgado Laureano et al. 2023).

This report details a case of sialolithiasis in a European domestic shorthair cat, emphasizing the importance of comprehensive diagnostic evaluation and the role of dental radiography and histopathology in guiding clinical management. To the best of the authors' knowledge, the presence of a sialolith originating from a minor salivary gland located in the lower lip vestibular to the first mandibular molar area in a cat, has not been previously reported in veterinary literature.

Case presentation

An 8-year-old, 4.3-kg (9.47-lb), spayed female European domestic shorthair cat was referred for examination due to decreased appetite, weight loss, and halitosis for three weeks. The cat was adopted from a cat shelter three years prior. No other previous significant medical history was reported. General physical examination was unremarkable apart from being underweight with a body score condition (BSC) of 3/9. Haematological and serum biochemistry parameters were within their respective reference ranges except for mild thrombocytopenia (PLT: 65 × 10^3/µL; reference: 200–500 × 10^3/µL).

During the initial conscious oral examination, severe generalized periodontal disease and tooth resorption was detected. Absence of multiple teeth was also noticed including the left mandibular third and fourth premolar teeth and left mandibular molar tooth (Fig. 1A). The cat was anesthetised to perform full-mouth intraoral radiographs, and a complete oral examination with periodontal probing and charting. The cat was premedicated with dexmedetomidine (2 µg/kg IM) (Sedadex 0.5 mg/ml, Dechra) and methadone (0.3 mg/kg IM) (Semfortam 10 mg/ml, Dechra). Anesthesia was induced with propofol intravenously to effect until orotracheal intubation was possible. Isoflurane 1.5% vaporized in a mixture of oxygen and air was used for the maintenance of anesthesia.

The complete oral examination confirmed the initial conscious oral examination findings. The full-mouth dental radiographs showed severe periodontal disease, and multiple tooth resorption lesions. In the caudal portion of the body of the left mandibular bone, presence of the roots of the fourth premolar tooth and the distal root of the molar tooth were detected and found to be affected by tooth resorption. Additionally, a radiopaque calcified structure (sialolith; histopathologically confirmed) was observed adjacent to the distal root of the molar tooth. Supplementary radiographic views were performed to demonstrate that the mineralized structure was not associated with the mandibular bone (Fig. 1B). A CT scan was proposed but it was declined by the patient's guardian.

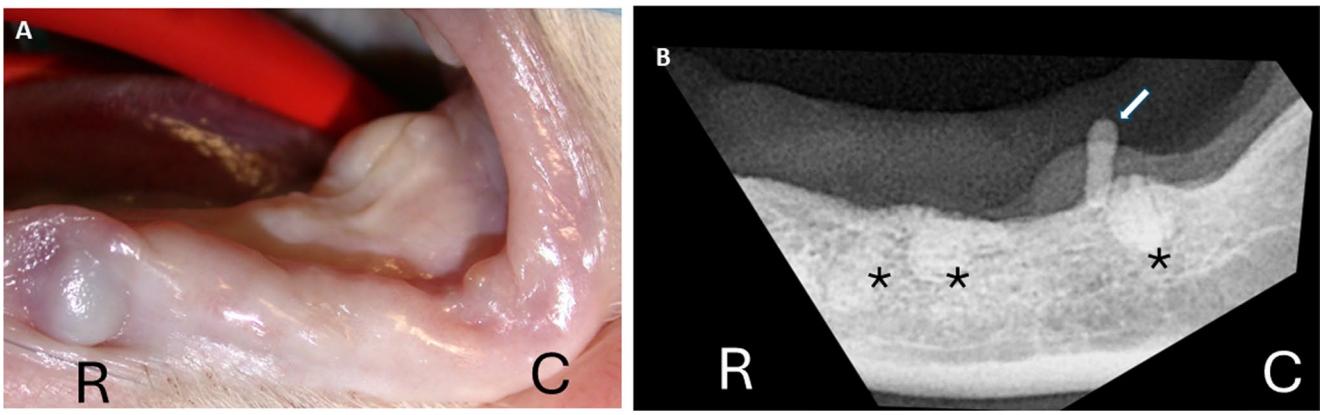


Fig. 1 (**A**) Photograph of caudal view of the left mandibular bone of an 8-year-old, 4.3-kg (9.47-lb), spayed female European domestic shorthair cat, showing the mandibular labial mucosa. R = rostral, C = caudal. (**B**) Intraoral radiograph of the caudal aspect of the left mandibular bone. The image was obtained with a parallel technique. Roots of the fourth premolar tooth and the distal root of the first molar tooth were detected (black asterisk). Additionally, a radiopaque calcified structure (sialolith) was adjacent to the distal root of the first molar tooth (white arrow). Although slightly superimposed on the mandibular bone in this view, the sialolith was embedded within soft tissue. R = rostral, C = caudal

The structure was palpated in the vestibular mucosa of the lower lip, adjacent to the site of the mandibular molar tooth. The surrounding tissue was dissected using a 15-scalpel blade, revealing the hard structure within the area of minor salivary tissue (Fig. 2A). The hard, non-adherent structure measured 4-mm in length; it was removed and submitted for histopathological examination (Fig. 2B). The site was sutured to achieve proper healing in a simple interrupted pattern with absorbable monofilament 5/0 suture.

Under the same general anesthesia, periodontal treatment including ultrasonic scaling, polishing, and dental extractions were performed. The clinical differential diagnoses were sialolith, ectopic dental tissue, exogenous or endogenous tooth oral tumour, mineralised granuloma, or mineralised foreign body.

After preservation in formalin, the structure was decalcified, sectioned, and processed routinely for preparation of a histologic section stained with hematoxylin and eosin. Histological evaluation by a board-certified veterinary pathologist revealed acellular amphophilic material arranged in concentric, lamellar layers. The lack of cellularity and organisation of the lamellae was interpreted as a concretion of salivary proteins and mucin, consistent with a sialolith (Fig. 3).

The cat recovered uneventfully from general anesthesia. Supportive treatment with meloxicam (0.05 mg/kg, PO, q 24 h, for 5 days) and buprenorphine (0.02 mg/kg PO q12h for 2 days) was prescribed. The owner was instructed to feed a soft diet for 14 days post-surgery. Follow-up at two weeks revealed complete healing of the surgical site, resolution of halitosis and the owner reporting no halitosis, improved appetite and activity levels were also improved within days post-surgery.

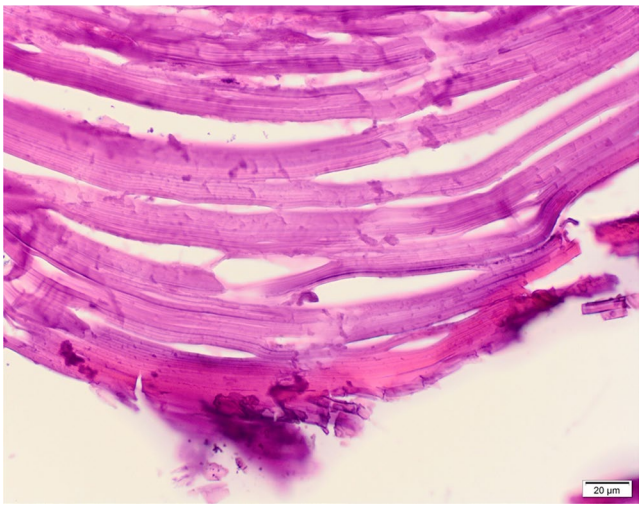
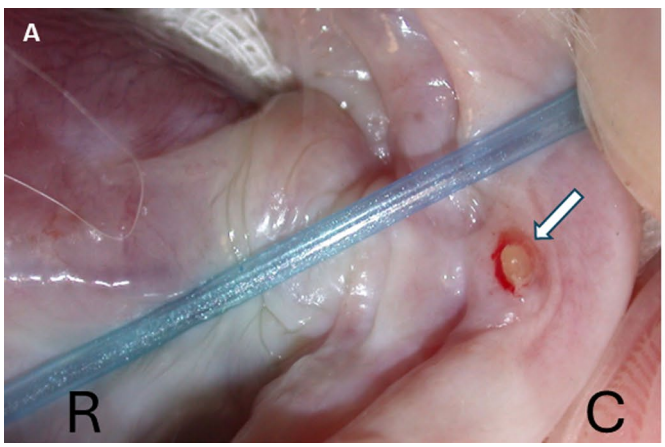


Fig. 3 Histopathological image of the structure following decalcification showing lamellar amphophilic material in concentric layers with no associated cellularity. The material represents mucins and protein from saliva that had mineralized to form the sialolith. Hematoxylin and Eosin, original magnification 60X

Discussion

This report emphasizes the value of intraoral radiography and histopathological analysis in in cases of oral calcifications in felines. Sialolithiasis is a rare condition in both dogs and cats, primarily associated with the parotid duct or the other major salivary glands (parotid, mandibular, sublingual and zygomatic glands) (Spangler and Culbertson 1991; Dunning 2003; Termote 2003; Ryan et al. 2008). Additionally, cats have a pair of well-developed molar salivary glands located caudal to the lateral commissure of the lip and ventral to the facial vein, which are not present in dog (Kilduff-Taylor et



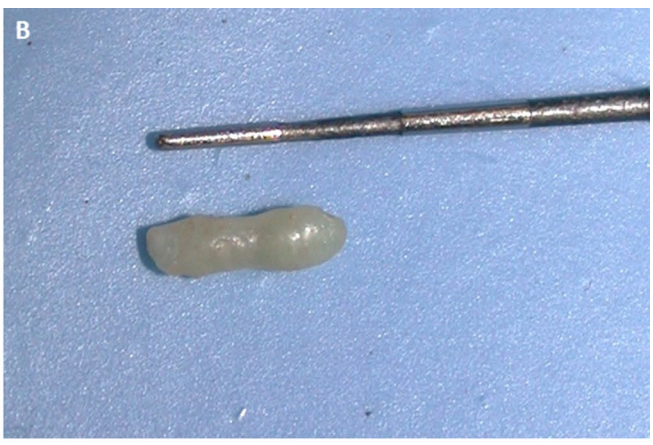


Fig. 2 (**A**) Photograph of caudal view of the left mandibular bone, showing the tip of the sialolith in the mandibular labial mucosa (sialolith, histopathologically confirmed), adjacent to the mandibular molar tooth area, after dissection with a 15-scalpel blade (white arrow). R = rostral, C = caudal. (**B**) Photograph of the macroscopic detail of the hard, non-adherent sialolith that measured 4-mm in length; shown with a Marquis periodontal probe (3-6-9–12 mm)

al. 2021). When sialoliths obstruct the salivary duct, they can cause fluctuating, variably painful facial swelling or sialocele, often characterized by episodes of regression and recurrence (de la Puerta and Emmerson 2020).

Several treatment approaches have been reported, including marsupialization of the dilated duct into the oral cavity, duct ligation, gland and duct resection, or removal with primary duct repair. The choice of treatment depends on factors such as the location of the obstruction, the presence of fibrosis, and stricture formation (Knecht 1998; Dunning 2003; Ryan et al. 2008; Vallefuoco et al. 2011; Swert and Van Goethem 2021).

The etiology of sialolithiasis in cats remains poorly understood; chronic inflammatory processes, altered salivary flow, mineral imbalances, retrograde infection, and microcalculi secretion have been proposed as contributing factors (Brown 1989; Grases et al. 2003; Reiter and Gracis 2018; de la Puerta and Emmerson 2020). If chronic inflammation is a predisposing factor, then this cat's severe periodontal disease may have promoted sialolith formation. Sialoliths represent an acellular concretion of saliva-derived proteins and mucins with mineral deposition (de la Puerta and Emmerson 2020; Bell and Soukup 2015). The mineral composition is variable and may include calcium, magnesium carbonate, and ammonium as oxalate. Histopathological analysis requires decalcification of the sialolith, which removes all mineral content (de la Puerta and Emmerson 2020; Bell and Soukup 2015).

Differential diagnosis is critical as ectopic dental tissue and other mineralized lesions may present similarly (Spangler and Culbertson 1991; de la Puerta and Emmerson 2020). Accurate diagnosis and localisation of zygomatic sialolithiasis in dogs depend on a combination of radiography, ultrasonography, computed tomography (CT), and histopathological examination (Lee et al. 2014). Sialolithiasis in cats may be underreported if clinicians do not submit the mineralised structures for evaluation or even realize that histopathology can be performed on sialoliths (Lee et al. 2014; Ryan et al. 2008). In this case, the possibility of ectopic dental tissue was considered, but the submitted material was acellular with concentric lamellar organization rather than fine tubules as expected for dentin or parallel rods as expected for enamel. Sialolith was the final diagnosis based on histopathology along with the location and overall clinical and radiologic features.

Although histopathological confirmation of the sialolith was obtained, this is a single case report, which limits the generalisability of the observations. Further research in the form of larger case series and multicentre studies is needed to estimate the true incidence and to elucidate potential aetiologies and predisposing factors in felines. Furthermore, it is not possible to establish causal relationships between concurrent oral conditions and sialolith formation based on a single case.

Conclusions

This case report contributes to the feline dental literature by documenting a case of minor salivary gland sialolithiasis. It also supports the use of intraoral dental radiography and histopathological assessment for accurate diagnosis and appropriate management. Further studies evaluating the incidence and risk factors of sialoliths in the minor salivary glands are essential in veterinary dentistry.

Author contributions MFR, JC, CAR and CN: Writing – original draft, Conceptualization, Investigation, Methodology, Validation, Visualization, Writing– review & editing. CB: Conceptualization, Investigation, Methodology, Resources, Supervision, Validation, Visualization, Writing – review & editing.

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Data availability No datasets were generated or analysed during the current study.

Declarations

Animal ethics The owner has provided consent for the necessary surgical intervention at the Veterinary Hospital and for the publication of his pet's data. No approval of research ethics committees was required.

Competing interests The authors declare no competing interests.

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