Case report

Cervical cutaneous fistula of odontogenic origin in a dog: Case Report

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ABSTRACT

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| Cutaneous odontogenic fistulas are pathological connections between the oral cavity and the animal's skin, caused by chronic dental infection. Due to their diverse cutaneous manifestations, they can be misdiagnosed or diagnosed late, which may lead to inadequate and unnecessary treatments. A dog with a history of draining cutaneous lesions underwent several unsuccessful surgical and dermatological interventions. During veterinary dental care, erythematous cutaneous lesions were observed in the mandibular region that extended to a draining fistula in the middle third of the neck, leading to the suspicion that it was a cutaneous odontogenic fistula despite its atypical location. The definitive diagnosis was reached by means of intraoral dental radiography, revealing a periapical abscess in a mandibular molar tooth, which had communication with the cervical fistula. The condition in the dog was completely resolved after tooth extraction, revealing the importance of considering odontogenic infections in the differential diagnosis of atypical skin lesions in the head and neck region. |

*Keywords: Cutaneous lesion; Periapical abscess; Tooth; Surgery;* *Veterinary dentistry.*

1. INTRODUCTION

Fistulas are pathological communications between organs, between cavities, or between an organ and the skin. They are abnormal openings created through a pathological process, trauma, surgical excisions, or congenital deformities [1]. Odontogenic fistulas can occur between the oral cavity and the skin or other adjacent anatomical structures, frequently resulting from dental infections or trauma [2]. This condition can manifest as skin lesions with varied presentation, which are often misinterpreted as dermatological disorders, leading to delays in diagnosis and appropriate dental treatment [3].

The odontogenic cutaneous fistula represents an uncommon condition in humans [4] and is frequently observed in domestic animals. In its pathogenesis, this fistula develops as a consequence of chronic periapical dental infection, which creates a fistulous tract that drains the inflammatory exudate through the skin, potentially resulting in facial edema or masticatory difficulties [5]. Other etiologies for this type of lesion include trauma, retained dental roots, neoplastic processes and iatrogenic injuries [3, 6]. Although common, this clinical condition presents significant diagnostic challenges due to its similarity to other cutaneous disorders [7].

Commonly located in the infraorbital region or via oronasal communication, fistulas may also occur sporadically in the mental or submandibular regions of animals [1, 3]. In addition to fistulous lesions caused by dental conditions, other clinical presentations may include abscesses, scars, cysts, and ulcers [3]. The similarity to dermatological conditions contributes to misdiagnosis, often resulting in inappropriate and ineffective treatments [8, 9].

Due to the absence of specific dental symptoms, affected patients initially seek general veterinary practitioners rather than professionals specialized in dentistry [10]. In this context, consultation with a veterinary specialist and dental radiography, particularly periapical imaging, play a fundamental role in the accurate identification of lesions, aiding in diagnostic confirmation and therapeutic planning [10].

Proper management of this type of lesion frequently requires surgical interventions such as tooth extraction, endodontic treatment, and abscess debridement [3]. Early diagnosis and targeted treatment are essential to prevent the inappropriate use of antibiotic therapies or unnecessary surgical procedures [4]. The differential diagnosis of odontogenic orocutaneous fistulas should encompass a broad range of conditions, including subcutaneous foreign bodies, facial osteomyelitis, congenital fistulas, deep fungal infections, and granulomatous disorders [2, 9].

Although there are reports of odontogenic fistulas in the infraorbital and submandibular regions [3, 10], there are no reports of odontogenic skin fistulas in the middle third of the cervical region in dogs and cats. Therefore, to the authors' knowledge, this study describes the first clinical case of an odontogenic orocuteneous fistula in the middle third of the cervical region in a canine patient. Initially referred to a general veterinary surgeon and subsequently to a veterinary dermatologist, the odontogenic fistula was only properly diagnosed and resolved following a specific dental approach.

2. PRESENTATION OF CASE

A six-year-old female Shih-Tzu dog, weighing 7 kg, was referred to the dentistry department of a private veterinary clinic. The main complaint reported by the owner was a chronic skin lesion located in the left cervical region, persisting for approximately 180 days. The lesion had been previously treated by two different professionals: a general veterinary surgeon, who performed debridement and surgical wound management, and a veterinary dermatologist, who implemented standard approaches for skin lesions. However, the treatments proved unsatisfactory, with frequent recurrences following each intervention.

During a specific physical examination, a trichotomy was performed in the animal’s cervical region, revealing external drainage of serosanguineous secretion in the left cervical area (**Figure** **1**), in addition to the presence of other erythematous skin lesions close to the fistula and enlargement of the left mandibular lymph node. No significant facial abnormalities were observed. A detailed inspection of the oral cavity identified gingival hyperemia in the region of the left mandibular first molar (309), with no signs of dental mobility, gingival recession, or periodontal pockets. In the absence of more significant clinical findings, a more rigorous diagnostic approach was recommended, targeting a presumptive diagnosis of an odontogenic orocutaneous fistula associated with tooth 309.

To assess overall oral health and investigate the possibility of an odontogenic fistula, intraoral dental radiography was elected. Given the need for anesthesia during the procedure and to evaluate the patient’s systemic health, cardiological examinations and blood sampling were requested for a complete blood count and assessment of renal and hepatic functions. Additionally, a broad-spectrum antibiotic (amoxicillin-clavulanate, 20 mg/kg, orally, BID) was administered for 10 days to control the cutaneous infection.

Following anesthetic induction and the start of the procedure, intraoral dental radiography of the left mandibular first molar (309) revealed a circumscribed radiolucent halo around the apex of the dental roots (**Figure** **2**), confirming a periapical abscess. As a therapeutic measure, extraction of the affected tooth was performed, followed by meticulous cleansing of the cervical fistula with saline solution and 2% chlorhexidine (1:10 ratio). The solution injected into the fistula reached the alveolus of the extracted tooth, confirming communication between these two points via its sinus tract and corroborating the clinical suspicion. One week post-intervention, a reduction in the volume of the left mandibular lymph node and complete wound healing were observed, with no evidence of recurrence.

3. discussion

Odontogenic orocutaneous fistulas commonly arise from periapical abscesses. These abscesses are primarily caused by pulpitis, resulting in pulpal necrosis and death due to trauma or, less frequently, the extension of periodontal infection, dental caries, anomalous teeth, or dental malformations [5]. Beyond odontogenic fistulous lesions, skin fistulas may also originate from osteomyelitis, actinomycosis, foreign bodies, local cutaneous infections, pyogenic granulomas, salivary gland or duct alterations, suppurative lymphadenitis, and various neoplastic conditions [2, 10]. These etiologies must be considered for appropriate veterinary treatment. In the reported case, diagnostic considerations also included localized cutaneous infection, pyogenic granuloma, and neoplastic lesions.

Small-breed dogs, such as Dachshunds and Poodles, are commonly affected by fistulas due to periodontal disease [11], as was the Shih-Tzu reported here. Despite the absence of facial edema or chew issues, radiographic examination of tooth 309 revealed a periapical abscess, with no visible changes in the medullary canal, dental malformation, or fractures exposing the pulp. Although no dental fractures were observed, the animal had a history of periodontal disease, requiring dental intervention for cleaning and calculus removal.

Periodontal diseases can extend to the dental pulp, causing gingival recession and apical delta infection, which is closely connected to the periodontal ligament. Without proper treatment, bacterial proliferation and inflammatory cell activity lead to periapical periodontitis, resulting in bone resorption and abscess formation. The abscess contents tend to accumulate and seek the pathway of least resistance, opening through a fistula, whether orocutaneous, oromaxillary, or oronasal [2, 5].

Unlike a non-fistulated abscess, chronic purulent drainage through the sinus tract prevents pressure buildup, edema, and pain, which, combined with the lack of clinical complaints noted by the owner, complicates the identification of dental issues [3]. Additionally, when misdiagnosed, odontogenic skin fistulas may lead to ineffective veterinary treatment [3]. Factors such as the absence of dental clinical signs, the significant distance between the cutaneous fistula and its odontogenic origin, or the varied cutaneous manifestations of fistulas (nodular, cystic, or ulcerated lesions) further hinder appropriate referral to the correct professional and effective treatment [3, 4].

As documented in veterinary literature, the location of the fistula in the middle third of the cervical region contributed to delayed diagnosis and inadequate therapy, subjecting the animal to surgical procedures and dermatological protocols before a proper clinical-dental diagnosis was achieved. In addition to the need to seek proper dental care, the patient’s history—as provided by the owner—and the radiographic examination were essential in establishing a definitive diagnosis. [1].

Inappropriate treatments, such as repetitive dermatological surgeries or prolonged antibiotic therapy, fail to address the underlying cause of the lesion [4]. Surgical debridement or lesion closure is clinically ineffective if the abscess source remains unidentified and untreated. While antibiotic therapy may provide temporary relief and apparent healing, it does not eliminate the underlying infection, masking the animal’s true condition and leading to sinus tract recurrence after therapy cessation [3].

Eliminating the infection source typically results in complete resolution, leading to the closure of the odontogenic orocutaneous fistula. Following endodontic treatment or extraction of the affected tooth, lesion resolution is observed within 5 to 14 days [3]. In the presented case, the therapeutic approach—consisting of tooth extraction, fistula tract cleaning, and antibiotic administration—achieved clinical success, with complete healing and no recurrence within seven days post-procedure.

Periodontal diseases cause pain and discomfort in animals, leading to complications such as periapical abscesses and fistulas. Owner awareness is crucial for prevention, early diagnosis, and appropriate treatment [12]. Thus, dental brushing and routine veterinary consultations with a specialized veterinary professional are the most effective means of preventing oral complications in these animals [1, 13].

Veterinarians should be aware of the possibility that cutaneous lesions on the face and neck may have an odontogenic origin, thereby underscoring the importance of considering a specialized evaluation in veterinary dentistry [10]. Despite diagnostic challenges, odontogenic orocutaneous fistulas are treatable with an effective approach and offer a favorable prognosis. This report also highlights the diagnostic value of intraoral radiographs, which prove indispensable in identifying these conditions [5, 9].

4. Conclusion

Odontogenic orocutaneous fistulas are an uncommon clinical condition with a favorable prognosis and straightforward diagnosis when managed by a veterinary dentist. When located in submandibular, infraorbital, and particularly cervical regions, they are often mistaken for dermatological conditions, delaying proper diagnosis and treatment. Veterinary professionals should consider that skin lesions on the face or neck may have an odontogenic origin, making the input of a specialist in this field essential. Diagnosis relies on clinical suspicion and the animal’s history. Clinical dental examination and the use of intraoral dental radiography are indispensable for an accurate diagnosis.

Appropriate therapeutic management should involve endodontic treatment or surgical excision of the affected tooth. Extraction of the compromised tooth, combined with thorough cleansing of the affected area, results in complete clinical resolution, demonstrating the efficacy of a therapeutic approach based on precise diagnosis. Furthermore, multidisciplinary collaboration among veterinarians of different specialties establishes an effective communication network, which is fundamental for the successful management of complex cases.

**DISCLAIMER (ARTIFICIAL INTELLIGENCE)**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

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**Figure 1.** Left cervical region. Erythematous cutaneous lesions are observed along the entire course of the fistulous tract, with a draining fistula evident in the middle third region (\*).



**Figure 2.** Intraoral radiograph of the left mandibular first molar (309). A radiolucent halo is observed at the apices of the distal and mesial roots, extending to the furcation region.