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CASE REPORT

The Successful Management of Non-healing Extraoral Draining Sinus of Odontogenic Origin: A Report of Two Cases

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ABSTRACT

Extraoral draining sinus of odontogenic origin usually lacks intraoral symptoms, thus it may be diagnosed as a cutaneous lesion. It is rare and may be confused with a wide variety of diseases for example furuncle, pericoronitis in relation to the mandibular third molars, parotid fistula, preauricular sinuses, periapical and periodontal pathology, and many more. Patients might seek treatment from their physician as they are not aware of its odontogenic origin and these cases usually are misdiagnosed and leading to inappropriate treatment. Objective: To discuss the detailed management of two cases of extraoral draining sinus that were successfully treated. Case Reports: The first case was referred by the Department of Oral and Maxillofacial Surgery, for management of extraoral draining sinus originating from tooth 36. In the second case, the extraoral draining sinus is caused by pulpal necrosis of several mandibular anterior teeth. Intra-radicular microorganisms in infected root canals primarily obligate anaerobes have been the aetiologic cause of apical periodontitis if left untreated may cause these types of symptoms. Conclusion: As it is uncommon and the absence of any dental symptoms, thus, it’s paramount important to diagnose these types of cases to treat the disease and to avoid unnecessary treatments such as prolonged prescription of antibiotics. Therefore, the dental cause should be ruled out for any cutaneous sinus tract so that a correct diagnosis can be ascertained, and proper management can be delivered to the patient.

Key words: extraoral draining sinus, non-surgical root canal treatment, pulp necrosis

INTRODUCTION

The extraoral sinus tract of odontogenic origin usually presents as an erythematous, smooth and non-tender nodule with crusting and repeated pus drainage mixed with blood for which the patient tends to seek treatment from a physician or dermatologist. Misdiagnosis often leads to ineffective and inappropriate management of the lesion, such as antibiotic therapy, surgical excision and even radiotherapy. However, thoroughly and correctly understanding the patient history and performing a clinical examination could aid in the accurate diagnosis of an extraoral sinus tract. The endodontic origin must always be considered as part of the differential diagnosis when a draining lesion is observed on the facial skin. Nevertheless, extraoral draining lesions can pose diagnostic challenges as their clinical appearance may be similar to that of other facial lesions. The common differential diagnoses that clinically resemble extraoral draining lesions include pustule, actinomycoses, osteomyelitis, orocutaneous fistula, neoplasms, localized skin infections, pyogenic granuloma, chronic tuberculosis and gumma of tertiary syphilis. Precise diagnosis can be achieved...
with correct intraoral examinations, such as visual inspection, percussion, palpation, probing, mobility, bite test, pulp sensibility test and radiographic examination. Radiographic tests, such as periapical and panoramic radiographs, can aid in assessing bone loss in the periapical area and facilitate diagnosis. However, if the radiograph is unable to locate the tooth involved, the sinus tract could be traced with a size 30 gutta-percha or similar radiopaque material to locate the source of infection.\(^4\)

The purulent exudate resulting from the odontogenic infection will move towards the trail of the least resistance from the periapical area. The sinus tract exits as an intraoral or extraoral sinus once the cortical plate has been penetrated, depending on the relationship among the apices of teeth, muscle attachments and fascial sheaths.\(^2\) Virulence of the microorganisms and the resistance offered by the patient’s body are a few other factors.\(^6\) The most frequent extraoral sinus tract presentation of dental origin is caused by mandibular teeth with purulent drainage within the mental area, submental area, or the angle of the mandible.\(^6,7\)

The management of an extraoral draining sinus tract involves eliminating the origin of infection either via endodontic treatment or tooth extraction if the tooth is not restorable. The sinus tract tends to progressively heal within 2 weeks.\(^3,8\) Endodontic treatment of the affected tooth has been effectively proven to result in a satisfactory outcome as these types of extraoral tracts are lined with granulation tissue; hence, surgical intervention is not necessary.

**CASE REPORT**

**Case 1**

A 21-year-old Chinese patient was referred from the Department of Oral and Maxillofacial Surgery, Universiti Kebangsaan Malaysia Medical Centre, for a non-healing cutaneous sinus tract 3 cm above the inferior border of the left mandible. Extraoral swelling with pus discharge and occasional bleeding was noted in the past 6 months. The swelling had recurred in the previous month, and a physician in a private clinic had performed extraoral incision drainage. However, the sinus tract was not resolved. The patient was medically fit and healthy and did not have any known drug allergy. Upon extraoral examination, no abnormality was detected. The patient maintained fair oral hygiene. Intraoral examination revealed that tooth 36 presented a large disto-occlusal composite restoration. The tooth was tender to percussion, with a pain score of 2/10 on the visual analogue scale.

The periapical radiograph indicated that the composite restoration extended towards the inner third of the dentine and approached the distal pulp horn of tooth 36. Two roots exhibited periapical radiolucency (Figure 1). Furthermore, a negative response to pulp sensibility testing was observed.

Pulp necrosis and chronic apical abscess associated with extraoral draining sinus were noted in the tooth. Following pulpectomy, which is the first-line treatment in non-surgical endodontics, the extraoral draining sinus resolved immediately (Figure 2-3). Successful treatment depends on the identification of the offending tooth correctly and eradicating the source of infection, which is the pulpal pathology.

Inferior alveolar nerve block was performed using 2% mepivacaine hydrochloride (Scandonest containing 1:100 000 epinephrine), and tooth 36 was isolated using a dental dam. Upon examination under the dental operating microscope, three canals were located.
Working lengths were determined using an electronic apex locator (Root ZX Mini, J Morita Corp, Tokyo, Japan) and verified radiographically. Protaper Next (PTN) (Dentsply Maillefer, Ballaigues, Switzerland) rotary files were used for the chemo-mechanical preparation of canals with the X-smart motor (Dentsply Maillefer, Ballaigues, Switzerland) in a crown-down manner. Root canal irrigation was performed with 5.25% sodium hypochlorite (NaOCl) using the Endo-Eze 1″ irrigator tip (Ultradent, South Jordan, UT, USA). The mesio-buccal and mesio-lingual canals were prepared using PTN X1 and X2 files, whereas the distal canal was prepared using PTN X1, X2 and X3 files. Ethylenediaminetetraacetic acid (17%) was used as an adjunct irrigation solution to dissolve the smear layer as well as to augment dentine permeability by opening the dentinal tubules (chelator). Sonic activation of the irrigation solution was performed using the Endoactivator (Dentsply Maillefer, Ballaigues, Switzerland) with a medium-sized tip for 20 secs, which enhanced the disinfection efficacy.

A non-setting calcium hydroxide dressing (Calasept® Plus) was placed in the canals using a Lentulo spiral, and the access cavity was double sealed with Cavit G (3M ESPE, Germany) and IRM (Dentsply Caulk, Milford, DE, USA) in between appointments. On the third visit, the tooth was asymptomatic and all canals were obturated using the warm vertical compaction technique with gutta–percha and AH Plus sealer (Dentsply Maillefer, Ballaigues, Switzerland) (Figure 4). Subsequently, a porcelain-fused-to-metal crown was constructed and cemented for the patient. At the 1-year follow-up examination, the tooth remained clinically asymptomatic and not tender to percussion, with no abnormal mobility, and periodontal probing depths were within normal limits. Radiographic examination revealed a reduction in the size of the apical radiolucency.

Case 2
A 31-year-old Malay man visited the Faculty of Dentistry, UiTM, Sungai Buloh, with chief complaint of localized gum discomfort on his lower jaw. Recurrent swelling was present, and some pus discharge on his chin at the submental area was noted. When obtaining the history, the patient reported that the lesion was first noticed more than 5 years ago. He had undergone several treatments at a general clinic and was prescribed topical medication, but the lesion persisted. The patient stated that the pus discharge was mixed with blood. He experienced intermittent throbbing pain around the gingival tissue of his lower jaw but not to the extent of disturbing his sleep or mastication function.

Extraoral examination showed evidence of a single well-circumscribed erythematous nodule at the submental area, which was indicative of a submental extraoral draining sinus tract. When the lymph nodes were palpated, the submental lymph node was soft, palpable, mobile and tender. Intraoral examination of teeth 32, 31, 41 and 42 revealed tenderness upon palpation, percussion and bite test. An electric pulp test was performed, during which teeth 32, 31 and 41 responded negatively and tooth 42 showed a delayed reading. Dental charting showed that the involved teeth were sound, with mild signs of attrition (Figure 5). The patient had an anterior crossbite that involved teeth 21, 31 and 32.

The preoperative radiograph demonstrated a well-defined unilocular radiolucency with discontinuity of the lamina dura in the periapical area of teeth 32–41 (Figure 5).

This case was managed by an undergraduate student under the close supervision of an endodontist. Non-surgical root canal treatment was planned and
completed in multiple visits for teeth 32, 31 and 41. Tooth 42 was monitored owing to the positive reading in the pulp sensibility testing. Teeth 32, 31 and 41 were isolated with a dental dam under local anaesthesia using 2% lidocaine hydrochloride (Septodont, Canada, containing 1:100 000 epinephrine). Access cavity and pulpectomy were performed. After copious irrigation using 5.25% NaOCl, non-setting Ca(OH)$_2$ (Calcipex, Morita, Japan) was placed inside the canal as an intracanal medicament and the tooth was temporized. Clinical examination showed that the extraoral sinus tract stoma had healed with a scar. The patient confirmed that it had not drained since the first treatment visit. After verifying the absence of signs and symptoms intra-orally, endodontic treatment was administered for teeth 32, 31 and 41. The working length was determined using an apex locator (Apex ID, Kerr SybronEndo, Switzerland), and the corrected length was reconfirmed with a periapical radiograph. Cleaning and shaping were performed using K-Files (Dentsply Maillefer, Ballaigues, Switzerland), and 5.25% NaOCl was used as an irrigation solution. The teeth were obturated using the lateral compaction technique with gutta–percha and resin-based root canal sealer (Dentsply AH Plus). The obturating material was removed 2 mm below the level of the cemento-enamel junction and lined with bulk-fill flowable composite (Smart Dentine Replacement, Dentsply Sirona). Finally, the tooth was restored with a composite radicular core.

Approximately 6 months after the completion of the root canal treatment, the patient was called for a follow-up. When an intraoral examination was performed, he complained of tenderness upon percussion, with a scale of 5/10, on teeth 42. The pain was described as a dull pain. However, there were no abnormal findings in other investigations. The electric pulp test on tooth 42 showed further delayed reading when compared with tooth 12, which acted as a control. The patient was internally referred to an endodontist for root canal treatment for tooth 42, which was performed according to the above-mentioned steps. A periapical radiograph was acquired 1-year post-obturation, which showed an obvious reduction in the size of the periapical radiolucency (Figure 7). Thus, a successful non-surgical root canal treatment was done to treat the extraoral draining sinus.

**DISCUSSION**

Extraoral draining sinus caused by an odontogenic infection is relatively rare. However, odontogenic causes account for approximately 80% of the reported cases of cutaneous sinuses in the cervicofacial region. Therefore, endodontic causes should be considered as one of the differential diagnoses in case of extraoral cutaneous draining sinuses around the facial or cervical region. Other aetiologies for extraoral draining sinus include periodontal pathology, pericoronitis of third molars, infected fractures of the mandible, furuncles, osteomyelitis, tuberculosis, and sialolith. Intraradicular infection originating from dental caries or tooth trauma leads to apical periodontitis. As this chronic infection progresses, it invades the cancellous bone following the path of least resistance and emerges extra-orally to form the draining sinus. The position of the sinus opening is determined by the location of muscle attachment and fascial sheaths. The probability for the occurrence of extraoral sinuses is higher than that for intraoral sinuses when the apices of the maxillary teeth are superior to the muscle attachment or when the apices of mandibular teeth are inferior to the muscle attachment. Tracing the sinus tract with a gutta–percha point can aid in determining the aetiology of the extraoral draining sinus. In this case, it was an incidental finding from cone beam computed tomography, which showed a perforation in the buccal cortical bone adjacent to the lower first left molar tooth, and the tooth was non-responsive to pulp sensibility testing.

Eliminating the source of infection is of utmost importance in extraoral draining sinuses. Non-surgical root canal treatment is the first-line treatment and is the most conservative approach. This method is sometimes complemented with endodontic surgery or, as the last option, dental extraction. In the discussed case, the obvious reduction in the abscess after non-surgical root canal treatment proved that odontogenic infection was the cause for the skin lesion. Spontaneous closure of the sinus tract was noted 3 months after...
commencing non-surgical root canal treatment. In cases of persistent extraradicular infection, surgical endodontic intervention might be indicated. Certain microorganisms, for example *Actinomyces* spp. that cause actinomycosis, can establish extraradicularly and perpetuate the inflammation at the periapex even after orthograde root canal treatment. If the fistula does not heal, surgical excision of root apices is necessary to eliminate the inflammatory tissue completely, including root debridement, apicoectomy and fistula debridement. The clinicians tend to get confused because dental symptoms do not regularly occur. Insignificant treatment and failure of the sinus to heal can be attributed to the misdiagnosis of an odontogenic cause. Therefore, accurate diagnosis, appropriate treatment, and elimination of the source of infection are of great importance. Our treatment could be deemed successful as there were no signs or symptoms at the 1-year follow-up and improvement in the lesion was noted radiographically. To enhance the success rate, a full-coverage crown was also constructed for the patient.

**CONCLUSION**

Odontogenic causes of a cutaneous sinus are rare and are often misdiagnosed and inappropriately treated. Therefore, proper identification of the aetiology, which is the necrotic tooth, is crucial in treating these cases.

**CONFLICT OF INTEREST**

The authors declare that there are no conflicts of interest related to this case report.

**REFERENCES**


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