CLINICAL DENTISTRY AND RESEARCH 2017; 41(2): 89-94 Case Report

DIAGNOSIS AND TREATMENT OF EXTRAORAL SINUS TRACT OF ENDODONTIC ORIGIN: A CASE REPORT

Hakan Aydın, DDS, PhD
Research Assistant, Department of Endodontics, Faculty of Dentistry, Akdeniz University, Antalya, Turkey

Alper Kustarcı, DDS, PhD
Associate Professor, Department of Endodontics, Faculty of Dentistry, Akdeniz University, Antalya, Turkey

Kürşat Er, DDS, PhD
Professor, Department of Endodontics, Faculty of Dentistry, Akdeniz University, Antalya, Turkey

ABSTRACT

This case report presents the successful endodontic management of an odontogenic infection drained extraorally originated via a maxillary molar tooth. An infection that led to mucosal swelling in the right maxillary region two months ago became acute once again because the necessary treatments could not be performed, and the patient was referred to an emergency room of a hospital as the infection was drained extraorally to buccal area. Severe soft tissue injury was found due to the wound debridement, wound dressing, abscess, and haematoma drainage performed in fistula area. Root canal treatment of the right maxillary first molar tooth diagnosed as the source of infection was performed in our endodontic clinic, and the repair of the defective region was performed with a full-thickness skin graft via a plastic surgery operation. As a result, extraoral sinus tracts of endodontic origin can be conservatively healed with root canal treatment, whereas a delayed diagnosis or misdiagnosis may lead to more complicated cases.

Correspondence
Kürşat Er DDS, PhD
Department of Endodontics, Faculty of Dentistry, Akdeniz University, Antalya, Turkey.
Phone: +90 242 310 69 95
Fax: +90 242 310 69 67
E-mail: kursater@akdeniz.edu.tr

Clin Dent Res 2017: 41(2): 89-94

Keywords: Endodontic Treatment, Odontogenic Infection, Sinus Tract.

Submitted for Publication: 05.27.2016
Accepted for Publication : 06.19.2017

CLINICAL DENTISTRY AND RESEARCH 2017; 41(2): 89-94 Olgu Bildirimi

ENDODONTİK KÖKENLİ BİR EKSTRAORAL FİSTÜLÜN TEŞHİS VE TEDAVİSİ: BİR OLGU SUNUMU

Hakan Aydın
Arş. Gör., Akdeniz Üniversitesi, Diş Hekimliği Fakültesi, Endodonti Anabilim Dalı, Antalya, Türkiye

Alper Kustarcı
Doç. Dr., Akdeniz Üniversitesi, Diş Hekimliği Fakültesi, Endodonti Anabilim Dalı, Antalya, Türkiye

Kürşat Er
Prof. Dr. Akdeniz Üniversitesi, Diş Hekimliği Fakültesi, Endodonti Anabilim Dalı, Antalya, Türkiye

ÖZ

Bu olgu raporunda, bir üst çene büyükazı dişinden kaynaklı ekstraoral olarak drene olan bir odontojenik enfeksiyonun başarılı endodontik tedavisi sunulmuştur. İki ay önce bir enfeksiyon sağ üst çene bölgesinde mukozal şişliğe yol açmış ve gerekli tedaviler yapılmadığı için akutlaşmış ve hasta, apse bukkal alandan ekstraoral olarak drene olmaya başladığında bir hastanenin acil servisine başvurmuş. Fistül alanında gerçekleştirilen yara debridmanı, yara pansumanı, apse ve hematom drenajı nedeni ile aşırı yumuşak doku hasarı vardı. Enfeksiyon kaynağı olarak tanısı konulan sağ üst çene birinci büyükazı dişine endodonti kliniğimizde kök kanal tedavisi yapıldı ve yumuşak doku defekti bulunan yanak bölgesi plastik cerrahi operasyonu ile tam kalınlıklı deri grefti ile tamir edildi. Sonuç olarak, endodontik kökenli ekstra oral fistül vakaları konservatif olarak kök kanal tedavisi ile iyileşebilir. Ancak, gecikmiş veya yanlış tanılar daha komplike vakalara neden olabilir.

Sorumlu Yazar
Kürsat Er
Akdeniz Üniversitesi, Diş Hekimliği Fakültesi, Endodonti Anabilim Dalı, Antalya, Türkiye
Telefon: +90 242 310 69 95
Faks: +90 242 310 69 67
E-mail: kursater@akdeniz.edu.tr

Clin Dent Res 2017: 41(2): 89-94

Anahtar Kelimeler: Endodontic Tedavi, Odontojenik Enfeksiyon, Fistül

Yayın Başvuru Tarihi : 27.05.2016

Yayına Kabul Tarihi : 19.06.2017

INTRODUCTION

Odontogenic infections comprise the majority of maxillofacial infections. Periapical abscesses develop due to pulp necrosis, and subsequently, the infection of the root canals spreads to the periradicular region. This inflammatory process leads to bone resorption and progress from the place where minimum resistance is felt. Anatomic structures are complicated in the neck and face regions, and different compartments formed with muscles and fascias provide various ways in which infection can spread.[1]

The sinus tract (ST) is defined as the channel forming through the opening of inflammation from an enclosed region to an epithelial surface, and it is a drainage duct for suppuration that an abscess produces. The rate of patients who had STs among those who applied for endodontic treatment was approximately 10% of all cases. Almost all of these sinuses are localized intraorally, and cutaneous STs are very rare.[2,3] The intraoral mucosal drainage or extraoral cutaneous drainage of periapical infections depends on factors such as the fact that the exudate travels through tissue and structures of less resistance, bone thickness, the location of the perforation on the cortical plate via the inflammation process and their connection with facial-muscle attachment, the proximity of the tooth apex to the external bone cortex, and the slope and root length.[4] Extraoral STs of odontogenic origin are seen mostly in the chin but may exist in every region of the neck and face, such as the submental area, cheek, mandibular angle, and paranasal area.[5,6]

Odontogenic infections, which drain extraorally, may be confused with dermatological diseases by leading to misdiagnosis, and they may result in unnecessary treatments, which could harm patients, such as the removal of cutaneous lesions through surgical interventions[7] and the repeated use of antibiotics.[8] Because the prevalence of an extraoral ST is rare, and because patients have no dental symptoms, patients may initially be referred to dermatologists and plastic surgeons for the treatment of these lesions. Extraoral STs developing on the head and neck may develop due to endodontic infections[4,7,9] or for various other reasons, such as vertical root fractures, traumatic injuries, osteomyelitis, actinomycosis, furuncles, and carcinomas.[6] The location of a cutaneous lesion is mostly close to the causative tooth.[6] However, it was shown that the infection originating from the mandibular second molar with apical periodontitis caused the extraoral ST in the submental region.[9] Therefore, all possible scenarios should be evaluated through a careful examination to make the correct diagnosis. Furthermore, an extraoral ST case, which was misdiagnosed as an endodontic lesion and was difficult to diagnose accurately, was also reported.[8]

Cutaneous STs may lead to impairments in the aesthetic appearances of patients in addition to discomfort that the repetitive drainage on the face and neck causes.[4] Although root canal treatments (RCTs)[4] and the extraction[8] of the offending tooth depending on the causative factor provide that the ST is closed by eliminating the infection and interrupting the drainage, with scar tissue, healing may result in permanent marks.

In this case report, an infection that occurred as a result of the extraoral drainage of an odontogenic abscess associated with the right maxillary first molar is presented. The drainage was from the buccal level of the related tooth. The debridement of necrotic tissues in the emergency room had caused severe tissue injury. RCT and plastic surgery operation was performed.

CASE REPORT

A 24-year-old female with a low socioeconomic status who did not have any systemic disease had swelling in the right maxillary region two months ago, and a general dentist prescribed antibiotics for her. After using antibiotics, the patient's complaints were relieved, and the patient did not go to the general dentist again. Therefore, necessary treatments were not performed. After two months, repetitive swelling and erythema occurred in the same region, and the patient's body temperature rose. The swelling was drained extraorally within 1-2 day(s) from the level of the right maxillary first molar tooth (Figure 1A). The patient went to an emergency room due to a necrotic, malodorous, purulent, dark-brown-coloured, discharging extraoral ST and was hospitalized with the diagnosis of a soft tissue infection. Routine blood tests were done for the patient. Wound debridement, wound dressing, and abscess and haematoma drainage were performed; computed tomography scans (Figure 1B, 1C) were taken; and department of infectious diseases and plastic and reconstructive surgery consultations were conducted. The appearance of density in the soft tissue filling, the subcutaneous fatty tissue of the right buccal region, and attenuation increase in the fatty tissue were observed in the scans. No problem was found on the maxillary sinus walls, but the scans showed the minimal mucosal thickness increasing in the bilateral maxillary sinuses.

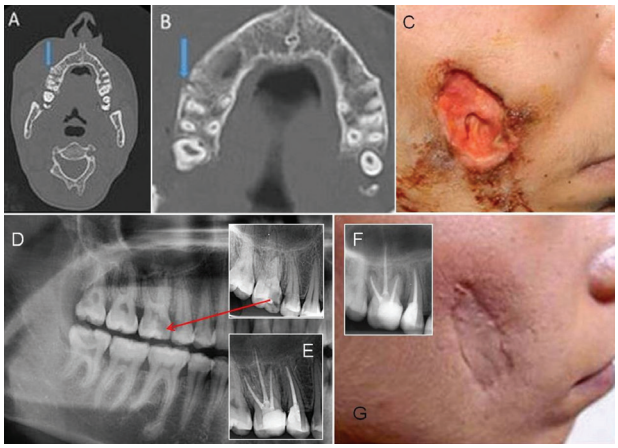


Figure 1. (A) an image of extraoral buccal area, where infection was drained; (B, C) osseous degradation (blue arrow) on right buccal space due to soft tissue injury; (D) periapical and panoramic pre-treatment radiogarphs; (E) radiograph after root canal filling; (F) six-month follow-up radiograph; (G) repair of defective area through full-thickness skin graft.

The patient was hospitalized in the department of infectious diseases. Her routine tests (blood, urine e.g.) were done. After a pus smear test, an antibiotherapy was started through the administration of Tazocin (piperacillin sodium, tazobactam sodium, 3x4.5 gr, IV) and Klindan (clindamycin hydrochloride, 4x600 mg, IV). Gram-positive cocci were observed in a new pus smear test, and the administration of Tazocin was terminated on the second day due to the rapid progression of the picture, and the use of Meronem (Meropenem trihydrate, 3x1 gr, IV) was initiated. During the patient's hospitalization, her blood urea nitrogen, creatine, aspartate aminotransferase, alanine aminotransferase, electrolyte, hemogram, sedimentation, and C-reactive protein were followed up. Then, the patient was referred to our clinic for dental treatment.

In an intraoral examination, profund caries lesions on teeth 15, 16, 18, and 48 and dentin caries lesions on teeth 14, 44, 45, 46, and 47 were determined on the right jaw side of the patient. A large number of cervical lesions were also observed in the patient who had an acidic dietary habit. It was noted that the patient's oral care habit was insufficient. In a radiographic examination, a periradicular lesion was observed on tooth 16 (Figure 1D). Although tooth 16 was sensitive to percussion, the other teeth responded at normal levels. When electrical and thermal pulp tests were used, a negative response was received from tooth 16, and positive responses were received from the other adjacent teeth. Consequently, it was decided that the causative tooth was tooth 16, and RCT was planned on this tooth.

After local anaesthesia and rubber dam isolation, root canals were cleaned and shaped with ProTaper Universal NiTi files (Dentsply Maillefer, Ballaigues, Switzerland) until a file size of F2 was reached. The canals were copiously irrigated with 2.5% NaOCl during instrumentation, 2% chlorhexidine digluconate (CHX) was used as the final rinse, and calcium hydroxide (CH) was placed for intracanal medication. Soft tissues were repaired with a full-thickness skin graft in the department of plastic and reconstructive surgery prior to the patient's second visit.

The patient did not come to her following visits. The patient applied to our clinic after approximately five months and requested the continuation of her treatments. In an intraoral examination, sensitivity to percussion and the presence of a long-term-pain response to thermal and sweet stimuli were noted for tooth 15. In the same visit, the root canal dressing of tooth 16 was performed, the RCT of tooth 15 was initiated, and CH was placed in the root canals of both teeth. After one week, both teeth were asymptomatic, and no problem was found in ST region. The canals were copiously irrigated with 2.5% NaOCl, saline, and 17% ethylene dioxide tetra acetic acid (EDTA). A CanalBrush (Coltene Whaledent Co. KG, Langenau, Germany) was used to remove the CH. Final irrigation was completed with 2% CHX. After that, the root canals were dried with sterile paper points and filled with gutta-percha (Diadent, Chongchong, Korea) and AH Plus sealer (Dentsply DeTrey, Konstanz, Germany) using a lateral compaction technique. Glass ionomer cement (Ketac-Molar Easymix; 3M ESPE, Seefeld, Germany) was placed over the gutta-percha, and restoration of the tooth was completed with composite resin (Z250 3M ESPE, St. Paul, MN, USA) (Figure 1E).

The patient was asymptomatic in her six-month follow-up appointment, and no radiological and clinical problems were noted (Figure 1F, 1G). However, the necessary clinical and radiological control visits could not be performed because the patient did not come to her further control examination visits and could not be contacted.

DISCUSSION

Odontogenic infections may lead to local complications, such as abscess formation and cellulite, and systemic complications, such as septicemia, endocarditis, brain abscess, and spondilitis, along with hospitalization, may be needed for more invasive treatment of these infection complications.[10] Although periapical abscesses can be

treated successfully in dental clinics, they may result in serious consequences that require hospitalization in the event that treatments are not administered. Despite the self-limiting and localized characteristics of dentoalveolar infections, they may progress into destructive polymicrobial infections and may rapidly spread into fascial spaces.[11] Although a fascial layer prevents the spread of inflammation, the muscle may transfer the inflammation to adjacent tissues when it spreads to the intramuscular area beyond the fascia. Infections associated with the maxillary teeth tend to spread buccally rather than palatally because the bone layer between the root apex and alveolar cortical plate is thinner in the buccal region buccal side,[12] and therefore, STs related to these infections mostly have labial/buccal openings. In a study,[11] maxillary molar teeth were the most common factor after mandibular molar teeth in patients hospitalized due to the spreading of odontogenic infection. The first molar teeth are the most common cause of odontogenic infection among all maxillary teeth.[12] Infection originating from maxillary molar teeth that have long roots involves the buccinator muscle and then spreads to the buccal space.[12] The most common complaints of patients with spreading odontogenic infection are physical pain, psychological discomfort, and psychological and social disability.[11]

In the present case, it was reported that repetitive infection proceeded in a destructive manner, reached the buccal space, and was drained extraorally because the patient, who reported the development of an abscess on tooth 16 a few months ago, could not undergo the necessary treatments and neglected the therapy. As the infection progressed rapidly and caused systemic symptoms, the patient was hospitalized, and intravenous antibiotherapy was started. Before the patient was referred to our clinic, a large soft tissue injury was found in the affected area due to the wound debridement, wound dressing, and abscess and hematoma drainage performed in the emergency room, and the patient was physically in a bad condition. As a result of the clinical examination, tooth 16 was found to be devitalized, and a radiolucent lesion view that led to bone resorption was observed in the radiography. When the causative factor is not certain in an odontogenic cutaneous opening case, it is recommended to track the ST with a gutta-percha point or with a similar radio-opaque tracer routinely to find out whether it is of pulpal origin by using pulp vitality tests.[8] In the present case, a gutta-percha point was not placed in the ST opening because the patient's dental history and clinical indicators were sufficient for determining a causative tooth. Also, a serious cutaneous soft tissue injury was found, and to prevent this area from becoming infected with external irritants, the first session of RCT was started, and CH was placed in the canal after the chemomechanical debridement of the infected dentin.

Although it was thought in the past that the ST was covered with epithelium, today, the agreed-upon opinion is that it is covered with granulation tissue rather than epithelium.[9] This means that healing will be achieved when the infection source is eliminated; therefore, it requires no special treatment.[4] Winstock[13] suggested the excision of sinuses and STs in the treatment of external facial sinuses of odontogenic origin. Today, due to the mostly good aesthetic results after dental treatments,[5] it is accepted to wait for the dental treatment of a primary odontogenic causative factor, follow up on whether the scar after healing will affect the aesthetic appearance,[4] and undergo a cosmetic surgical procedure if the healing results in cutaneous retraction or dimpling.[14] In the present case, severe damage occurred in the related area because it was curetted in the emergency room due to a purulent, dark-brown discharge and necrotic tissues. Although it may be a more suitable treatment approach to perform the treatment of the associated tooth before curettage and to wait for the drainage area to heal spontaneously, the defect of the patient had to be repaired with a full-thickness skin graft in the plastic surgery clinic.

If the diagnosis is correct and appropriate treatments for the elimination of the infection source are administered, the spontaneous closure of the sinus tract is expected within 7-14 days.[8] In restorable cases, the first preference would be endodontic treatment[7] or root canal treatment + apicoectomy,[5] whereas in the nonrestorable cases, the infection source can be eliminated by extracting the tooth.[9] It is important to provide the elimination of the microorganisms from the root canal system for the successful RCT of teeth with necrotic pulp and apical periodontitis, and the chance of the treatment success is higher in teeth in which a negative microbiological culture is obtained prior to root canal filling. To achieve this, biomechanical instrumentation should be combined with irrigation solutions and intracanal medications between appointments. In addition to its wide-spectrum antimicrobial activity, NaOCl is considered the main irrigation solution in endodontics also due to its ability to dissolve organic tissues. The use of CHX as the final rinse

and the placement of CH in the root canals were reported to provide a significant decrease in the bacterial load. In the literature, the teeth that had extraoral STs were treated with copious NaOCl irrigation, and final rinse with CHX was reported to be successfully treated.[4,7,9,15]

In conclusion, extraoral STs of endodontic origin can be conservatively healed with RCT, whereas a delayed diagnosis or misdiagnosis may lead to more complicated cases.

CONFLICTS OF INTEREST:

The authors have no declared financial interests in any company manufacturing the types of products mentioned in this article.

REFERENCES

1. Unal GC, Ureyen Kaya B. Endodontic treatment of large periradicular lesions with and without cutaneous sinus tract: report of two cases and review. SDÜ Sağlık Bilimleri Enstitüsü Dergisi 2011; 2: 89-100.

2. Gupta R, Hasselgren G. Prevalence of odontogenic sinus tracts in patients referred for endodontic therapy. J Endod 2003; 29: 798-800.

3. Akpınar KE, Er K, Kuştarcı A, Özan Ü. Odontojenik fistüllerin prevalansı ve tedavi sonuçları. Cumhuriyet Üniversitesi Dişhekimliği Fakültesi Dergisi 2004; 7: 6-10.

4. Soares JA, de Carvalho FB, Pappen FG, Araujo GS, de Pontes Lima RK, Rodrigues VM et al. Conservative treatment of patients with periapical lesions associated with extraoral sinus tracts. Aust Endod J 2007; 33: 131-135.

5. Bodner L, Manor E, Joshua BZ, Barabas J, Szabo G. Cutaneous sinus tract of dental origin in children-a report of 28 new cases. Pediatric Dermatology 2012; 29: 421-425.

6. Guevara-Gutierrez E, Riera-Leal L, Gomez-Martinez M, Amezcua-Rosas G, Chavez-Vaca CL, Tlacuilo-Parra A. Odontogenic cutaneous fistulas: clinical and epidemiologic characteristics of 75 cases. Int J Dermatol 2015; 54: 50-55.

7. Pasternak-Junior B, Teixeira CS, Silva-Sousa YT, Sousa-Neto MD. Diagnosis and treatment of odontogenic cutaneous sinus tracts of endodontic origin: three case studies. Int Endod J 2009; 42: 271-276.

8. Cohenca N, Karni S, Rotstein I. Extraoral sinus tract misdiagnosed as an endodontic lesion. J Endod 2003; 29: 841-843.

9. Bai J, Ji AP, Huang MW. Submental cutaneous sinus tract of mandibular second molar origin. Int Endod J 2014; 47: 1185-1191.

10. Jiménez Y, Bagán JV, Murillo J, Poveda R. Odontogenıc infections, complications. systemic manifestations. Med Oral Patol Oral Cır Bucal 2004; 9 Suppl: 139-147.

11. Boffano P, Roccia F, Pittoni D, Di Dio D, Forni P, Gallesio C. Management of 112 hospitalized patients with spreading odontogenic infections: correlation with DMFT and oral health impact profile 14 indexes. Oral Surg Oral Med Oral Pathol Oral Radiol 2012; 113: 207-213.

12. Obayashi N, Ariji Y, Goto M, Izumi M, Naitoh M, Kurita K et al. Spread of odontogenic infection originating in the maxillary teeth: computerized tomographic assessment. Oral Surg Oral Med Oral Pathol Oral Radiol 2004; 98: 223-231.

13. Winstock D. Four cases of external facial sinuses of dental origin. J R Soc Med 1959; 52: 749-751.

14. Abdelmoumen E, Skhiri SZ, Boughzela A. Nonsurgical management of cutaneous sinus tract of odontogenic origin: a case report. J Dent Oral Hyg 2014; 6: 30-35.

15. Qazi SS, Manzoor MA, Qureshi R, Arjumand B, Hussain SM, Afridi Z. Nonsurgical endodontic management of cutaneously draining odontogenic sinus. J Ayub Med Coll Abbottabad 2006; 18:88-89.