

Non-Surgical Endodontic Treatment of Extraoral Sinus Tract of Endodontic Origin

Endodontik Kaynaklı Ekstraoral Fistülün ve Periapikal Lezyonun Cerrahi Olmayan Endodontik Tedavisi

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ABSTRACT Cases with periapical lesions or extraoral sinus tracts have both aesthetic and functional problems. Non-surgical endodontic therapies to resolve these problems provide less traumatic solutions with higher cost-effectivity. A 14-year-old male patient was admitted to our clinic with complaints of swelling and skin lesion on the tip of his chin. Clinical and radiological examination revealed the cause of the extraoral sinus tract and periapical radiolucency as pulp necrosis associated with apical periodontitis in mandibular left incisors. Additionally, a radiopaque foreign object was detected in the middle third of the root canal of the mandibular left central incisor teeth. The foreign object was removed from the mandibular left central incisor and root canal fillings were performed for the mandibular left incisors teeth. Two weeks after the treatment, the extraoral sinus tract was completely healed and after 12 months the teeth were clinically asymptomatic and periapical tissue healing continued. The aim of this case report is to evaluate the success of the non-surgical endodontic treatment of the extraoral sinus tract and periapical lesion due to pulp necrosis and chronic apical periodontitis.

Keywords: Extraoral sinus tract; foreign bodies; periapical abscess

ÖZET Periapikal lezyon ve ekstraoral sinüs yolu olan olgularda hem estetik hem de fonksiyonel problemler ortaya çıkabilmektedir. Bu problemleri çözmek için cerrahi olmayan endodontik tedavilerin kullanımı daha az travmatik ve düşük maliyetli bir çözüm sunmaktadır. On dört yaşında erkek hasta, çenesinin ucunda şişlik ve cilt lezyonu şikayeti ile kliniğimize başvurmuştur. Klinik ve radyolojik muayenede, ekstraoral fistülün ve periapikal radyolüsenin nedeninin, mandibular sol keser dişlerdeki pulpa nekrozu sonucu gelişen kronik apikal periodontitis kaynaklı olduğu belirlenmiştir. Ayrıca, mandibular sol santral keser dişin kök kanalının orta üçlüsünde radyopak bir cisim gözlenmiştir. Mandibular sol santral keser dişteki yabancı cisim kök kanalından uzaklaştırılmış ve mandibular sol keser dişlerin kök kanal dolguları yapılmıştır. İki hafta içinde ekstraoral sinüs yolunun tamamen iyileştiği, 12 ay sonra dişlerin klinik olarak asemptomatik olduğu ve periapikal doku iyileşmesinin devam ettiği tespit edilmiştir. Bu olgu sunumunun amacı, pulpa nekrozu ve kronik apikal periodontitis sonucu gelişen ekstraoral sinüs yolunun ve periapikal lezyonun cerrahi olmayan endodontik tedavisinin başarısını değerlendirmektir.

Anahtar Kelimeler: Ekstraoral sinüs yolu; yabancı cisim; periapikal apse

The sinus tract is defined as the channel surrounded by epithelium due to chronic inflammation of an epithelial surface, mostly from a closed area.¹ The sinus tract with odontogenic origin is a pathological channel formation due to pulp necrosis.² The opening of the sinus tract into the intraoral or extraoral region depends on the location of the tooth, its relation to the muscle attachments and the localization of the perforation in the cortical bone by inflammation.³

In addition, odontogenic infections with drainages lead to misdiagnosis and sometimes mistakenly receive diagnosis of dermatological diseases. It may cause unnecessary treatment such as surgical interventions and long-term antibiotic treatment before the correct diagnosis can be made.⁴⁻⁸ Since there are no dental symptoms, patients first refer to dermatologists for the treatment of lesions. However, extraoral sinus tracts seen in the head and neck region usually develop due to endodontic infections.⁹⁻¹² In

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addition, it may occur due to traumatic injuries, osteomyelitis, actinomycosis, fractures and carcinomas.^{4,5}

Surgical or non-surgical endodontic treatments can be used to treat the extraoral sinus tract. In order to resolve periapical pathology in non-surgical endodontic treatment, it is necessary to remove the infected material in the root canals and the root canals must be sealed three dimensionally.^{6,8,12} Akpınar et al. reported that 80.4% of the teeth in the odontogenic sinus tract were treated with only root canal treatment, 12.8% were treated with root canal treatment and endodontic surgery and the remaining 6.8% were treated with tooth extraction.¹¹

Unfamiliar objects in root canals are often seen in children and usually detected by chance. Unlike non-metallic objects, metallic objects can be visualized on routine radiographs.¹³ These objects in the root canals are the focus of infection. In order to complete root canal treatment successfully, these objects need to be removed.¹⁴ For the removal of unfamiliar objects and broken tools in the duct; ultrasonic tools, Masserann kit, modified Castroviejo needle holders, Steglitz forceps were used.¹⁵

After removal of objects from root canals, medications are used for disinfection of root canals, and biocompatible materials, such as MTA, are used for root canal filling in large apex teeth with weak root dentin.¹⁶ These materials both prevent leakage in coronal regions and continue to repair and regeneration due to their bioactive property in the apical region.¹⁷

In this case report, non-surgical conservative endodontic treatment of extra-oral sinus tract with endodontic origin with the periapical lesion and unfamiliar objects in the canal is presented.

CASE REPORT

A 14-year-old male patient was admitted to our clinic with complaints of swelling and skin lesions at the tip of his chin. In his dental history, it was learned that swelling developed in the same area three months ago and was controlled with antibiotics, but then the patient did not recourse to the dentist for treatment. In the clinical examination, crown fracture was detected

in the teeth 31 and 32, with swelling at the jaw end and extra oral sinus tract. In the radiological examination, it was determined that the cause of extraoral sinus tract and periapical radiolucency was caused by chronic apical periodontitis due to pulp necrosis of mandibular left incisor teeth. In addition, a radiopaque body was detected in the middle triad of root canal of tooth 31 (Figure 1). When the patient was questioned again, it was learned that when patient had severe pain, the needle was inserted into the root canal of the tooth and the needle was broken. In the same session, root canal treatment was started. Before treatment, patient and their relatives were informed about the treatment process. After the informed consent form was signed, the photos were taken.

The entry cavity of tooth 32 was opened and the working length was determined using electronic apex finder (Propex pixi, Dentsply, US) and periapical radiograph. The shaping of the root canals was completed with using, ProTaper Next (Dentsply Maillefer, Ballaigues, Switzerland) X1 (17/04), X2 (25/06) and X3 (30/07) respectively, using X-smart endodontic motor (Dentsply Maillefer). Two ml 5% NaOCl was used after each file, during forming and expansion. The root canals were dried with the ProTaper Next rotary file system compatible with the paper point (Dentsply Maillefer, Ballaigues, Switzerland), and calcium hydroxide was arranged into the root canals. The cavity was sealed with temporary filling material Cavit G (3M ESPE, Germany). The patient was prescribed analgesic (Brufen 400 mg, 3 * 1). In the next session, the needle inside the tooth 31 was bypassed using a 10 K-type file. Then the endodontic ultrasonic tip 10Watt mounted on the ultra-

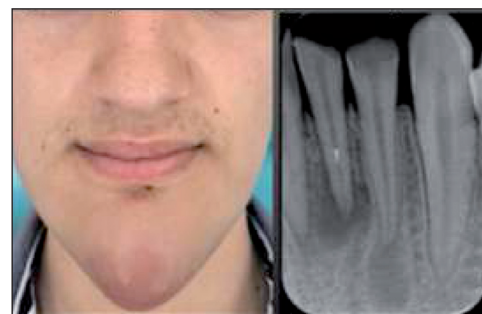


FIGURE 1: Preoperative photography and diagnostic radiograph.

sonic device (Newtron P5, Satelec Corp.) was released by using the counter clockwise direction under 10 ml/min sterile saline cooling at 800Mhz power. The moving needle was removed using Hedstrom files (Dentsply Maillefer, Ballaigues, Switzerland). Calcium hydroxide was placed again in the root canals. On the control visit on day 10, it was observed that the swelling at the chin end was healed and the sinus tract was closed. In the same session, the temporary filling and calcium hydroxide were removed. Five mL of 17% EDTA and 5 ml of 5.25% NaOCl were used respectively for final irrigation. The root canal filling of the tooth 32 was completed by using MTA Fillapex (MTA Fillapex; Angelus, Londrina, Brazil) root canal sealer with lateral condensation technique. The root canal filling of the tooth 31 was completed orthographically by using MTA (ProRoot MTA, Dentsply, TN, US) because of its wide apical opening (Figure 2). The teeth were restored with a composite (G-aenial-anterior-A2, GC). In the follow-up examination after 12 months, there was no clinical symptom and the extra oral sinus tract was healed with a slight scar. The periapical lesion was diminished (Figure 3).

DISCUSSION

The sinus tract seen in the face and neck region can be treated with correct diagnosis and correct treatment selection.⁹ Differential diagnosis of sinus tracts include suppurative apical periodontitis, osteomyelitis, pyogenic granuloma, congenital fistula, salivary gland fistula, infected cyst and deep mycotic infection.^{4,5} It is expected that the sinus path will close within 7-14 days following the correct diagnosis treatment.^{2-4,8}



FIGURE 2: Preoperative photography and radiograph.

For the diagnosis, the vitality of the teeth should be examined in the clinical examination and the teeth should be evaluated in terms of caries, fractures and coloration.² Radiographically, the presence of periapical pathology and placing gutta-percha on the sinus tract should be controlled in relation to the periapical pathology.^{4,8,9} In this case, periapical radiograph revealed a radiopaque object within the root canal in the middle third.

Patients may insert and broke unfamiliar objects in the root canals which are opened after trauma for drainage of suppurative material.¹³ Objects such as pencil tips, knitting needles, metal screws, beads, wooden pieces and staples were encountered as unfamiliar objects. These objects cause obstruction of the root canals and prevent instrumentation and treatment to be completed in root canal treatment.^{14,15} In this case report, the patient, whose pulp chamber was opened as a result of crown fracture, broke the needle by inserting it into the root canals.

Unfamiliar objects can be removed when they are in the coronal and middle third of the root canals. However, it may not be possible to remove it when it is in the apical third. In such cases, apical surgical pro-

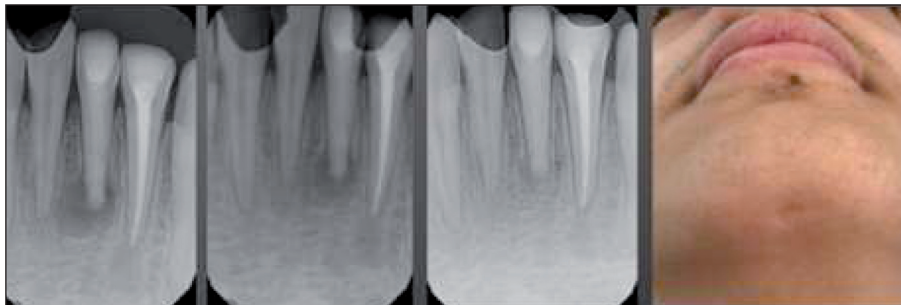


FIGURE 3: Radiography and photograph on months 1,3 and 12 healed sinus tract area on the cheek.

cedures may be required.¹⁵ In the studies, ultrasonic technique shows high success rate and instrument removal from the canal.^{15,18} In this study, ultrasonic tips were used to remove the unfamiliar object.¹³

To resolve the periapical pathology, which is responsible for the formation of the extraoral sinus tract, microorganisms in the necrotic pulp tissue should be removed.¹² One of the most effective medicament to achieve this is calcium hydroxide. It has been reported that the use of calcium hydroxide, as a medicament in canal treatment, supports the rapid and successful recovery of the sinus tract.^{1,5}

With disinfection, the root canal cavity should be filled sufficiently and impermeably in order to achieve periapical healing. Periapical healing may be successful when the nutrition of the bacteria is prevented and their living areas are eliminated.¹⁷ The use of MTA can neutralize the bacteria infected area as well as minimizing leakage and voids in filling the root canals. In addition, MTA has been reported to increase the fracture resistance of the teeth.^{17,19,20} MTA was used in this case because of the weakening of the tooth structures and the wide apical area. Additionally, MTA is a bio-inductive material that allows cementum development and restructuring in periodontal ligament cells. It also has the advantages of sealing ability, alkalinity, biocompatibility, antibacterial effect and it can be set up in the presence of blood.²⁰⁻²²

As a result, it should be taken into consideration that extraoral sinus paths in the face and neck area may be caused by teeth and a careful clinical and radiological examination should be performed. It can be successfully treated with a conservative approach. Thus, unnecessary surgical intervention and unnecessary use of antibiotics are prevented.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Esin Özlek; **Design:** Esin Özlek; **Control/Supervision:** Esin Özlek, Elif Akkol; **Data Collection and/or Processing:** Elif Akkol, Hüseyin Gündüz; **Analysis and/or Interpretation:** Esin Özlek, Hüseyin Gündüz; **Literature Review:** Hüseyin Gündüz; **Writing the Article:** Esin Özlek, Hüseyin Gündüz; **Critical Review:** Esin Özlek, Hüseyin Gündüz; **References and Fundings:** Elif Akkol; **Materials:** Elif Akkol.

REFERENCES

- Cohenca N, Karni S, Rotstein I. Extraoral sinus tract misdiagnosed as an endodontic lesion. *J Endod.* 2003;29(12):841-3. [[Crossref](#)] [[PubMed](#)]
- Assery M, Al Shamranit S. Cutaneous facial sinus tract of dental origin: a clinical case report. *Saudi Dent J.* 2011;13(1):37-9.
- Sammur S, Malden N, Lopes V. Facial cutaneous sinuses of dental origin-a diagnostic challenge. *Br Dent J.* 2013;215(11):555-8. [[Crossref](#)] [[PubMed](#)]
- Brown RS, Jones R, Feimster T, Sam FE. Cutaneous sinus tracts (or emerging sinus tracts) of odontogenic origin: a report of 3 cases. *Clin Cosmet Investig Dent.* 2010;2:63-7. [[Crossref](#)] [[PubMed](#)] [[PMC](#)]
- Pasternak-Júnior 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(3):271-6. [[Crossref](#)] [[PubMed](#)]
- Dincol ME, Yılmaz B, Ersev H, Mert Gündüz V, Arslanoglu B, Yalcin TY, et al. Treatment of extraoral cutaneous sinus tracts with non-surgical endodontic intervention: report of six cases. *J Istanbul Univ Fac Dent.* 2015;49(2):35-40. [[Crossref](#)] [[PubMed](#)] [[PMC](#)]
- Lee SH, Yun SJ. Odontogenic cutaneous sinus tract presenting as a growing cheek mass in the emergency department. *Am J Emerg Med.* 2016;35(5):808.e5-7. [[Crossref](#)] [[PubMed](#)]
- Rjeb Haifa B, Ines K, Walid L, Nabiha D. Treatment of odontogenic cutaneous sinus tract misdiagnosed for 6 years. *Dental, Oral and Craniofacial Research.* 2017;3(2):1-4. [[Crossref](#)]
- Varol A, Gülses A. An unusual odontogenic cutaneous sinus tract to the cervical region: a case report. *OHDMBSC.* 2009;8(3):43-5.
- Aydın H, Kustarcı A, Er K. Diagnosis and treatment of extraoral sinus tract of endodontic origin: a case report. *Clinical Dentistry And Research.* 2017;41(2):89-94.
- Akpınar KE, Kuştarçı A, Er K, Özcan Ü. [Odontojenik fistüllerin prevalansı ve tedavi sonuçları]. *Cumhuriyet Üniversitesi Diş Hekimliği Fakültesi Dergisi.* 2004;7(2):6-10.
- Goomer P, Jain RL. Non-surgical endodontic treatment of extraoral sinus with triple antibiotic paste and mineral trioxide aggregate obturation. *Indian J Oral Sci.* 2013;4(2):95-8. [[Crossref](#)]

13. Chand K, Joesph S, Varughese JM, Nair MG, Prasanth S. Endodontic management of an unusual foreign body in a maxillary central incisor. *J Conserv Dent*. 2013;16(5):474-6. [[Crossref](#)] [[PubMed](#)] [[PMC](#)]
14. Rangeeth BN, Moses J, Reddy VN. Self-injurious behavior and foreign body entrapment in the root canal of a mandibular lateral incisor. *J Indian Soc Pedod Prev Dent*. 2011;29(6 Suppl 2):S95-8. [[Crossref](#)] [[PubMed](#)]
15. Prabhakar AR, Namineni S, Subhadra HN. Foreign body in the apical portion of a root canal in a tooth with an immature apex: a case report. *Int Endod J*. 2008;41(10):920-7. [[Crossref](#)] [[PubMed](#)]
16. Bose R, Nummikoski P, Hargreaves K. A retrospective evaluation of radiographic outcomes in immature teeth with necrotic root canal systems treated with regenerative endodontic procedures. *J Endod*. 2009;35(10): 1343-9. [[Crossref](#)] [[PubMed](#)]
17. Bogen G, Kuttler S. Mineral trioxide aggregate obturation: a review and case series. *J Endod*. 2009;35(6):777-90. [[Crossref](#)] [[PubMed](#)]
18. Fu M, Zhang Z, Hou B. Removal of broken files from root canals by using ultrasonic techniques combined with dental microscope: a retrospective analysis of treatment outcome. *J Endod*. 2011;37(5):619-22. [[Crossref](#)] [[PubMed](#)]
19. Bortoluzzi EA, Souza EM, Reis JM, Esberard RM, Tanomaru-Filho M. Fracture strength of bovine incisors after intra-radicular treatment with MTA in an experimental immature tooth model. *Int Endod J*. 2007;40(9):684-91. [[Crossref](#)] [[PubMed](#)]
20. Özlek E, Ak B, Akkol E. Five year follow-up of a delayed reimplanted avulsed tooth: case report. *East J Med*. 2018;23(4):350-4. [[Crossref](#)]
21. Purra AR, Ahangar FA, Chadgal S, Farooq R. Mineral trioxide aggregate apexification: a novel approach. *J Conserv Dent*. 2016;19(4): 377-80. [[Crossref](#)] [[PubMed](#)] [[PMC](#)]
22. Pace R, Giuliani V, Nieri M, Di Nasso L, Pagavino G. Mineral trioxide aggregate as apical plug in teeth with necrotic pulp and immature apices: a 10-year case series. *J Endod*. 2014;40(8):1250-4. [[Crossref](#)] [[PubMed](#)]