CLINICAL DENTISTRY AND RESEARCH 2017; 41(1): 43-48 Case Report

ROOT CANAL TREATMENT OF A SUPERNUMERARY TOOTH FUSED WITH A MANDIBULAR PREMOLAR: A CASE REPORT

Hakan Aydın, DDS, PhD
Research Assistant, Department of Endodontics, Faculty of Dentistry, Akdeniz University, Antalya, Turkey
Kürsat Er, DDS, PhD
Professor, Department of Endodontics, Faculty of Dentistry, Akdeniz University, Antalya, Turkey
Alper Kustarci, DDS, PhD
Associate Professor, Department of Endodontics, Faculty of Dentistry, Akdeniz University, Antalya, Turkey
Öznur Tuncay, DDS, PhD
Assistant Professor, Department of Endodontics, Faculty of Dentistry, Akdeniz University, Antalya, Turkey

ABSTRACT

Fusion is an anomaly concerning the hard tissues of teeth, and results in a distorted, amorphous shape in the involved tooth. Supernumerary tooth is an additional one to the normal series of teeth. In this case report, root canal treatment of a supernumerary tooth fused to mandibular right permanent premolar was successfully reported. As a result of a detailed clinical and radiographic examination, the tooth responsible for pathology was diagnosed as supernumerary one and root canal treatment was performed only for this part. Teeth were observed to be clinically and radiographically healthy in 3 and 12 month recalls of the patient. The patient had no complaints. It was observed that vitality of mandibular right permanent premolar was continued in thermal and electrical pulp tests.

Correspondence
Kürsat Er, DDS, PhD
Department of Endodontics, Faculty of Dentistry, Akdeniz University, Antalya, Turkey.
Phone +90 242 3106995
Fax. +90 242 3106967
E-mail. kursater@akdeniz.edu.tr

Clin Dent Res 2017: 41(1): 43-48

Keywords: Endodontic Treatment, Fusion, Supernumerary Tooth

Submitted for Publication: 05.27.2016
Accepted for Publication : 09.09.2016

CLINICAL DENTISTRY AND RESEARCH 2017; 41(1): 43-48 Olgu Bildirimi

MANDİBULAR PREMOLAR DİŞ İLE KAYNAŞMIŞ BİR SÜPERNÜMERE DİŞİN KÖK KANAL TEDAVİSİ: BİR OLGU SUNUMU

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

Kürsat Er, DDS, PhD
Prof. Dr., Akdeniz Üniversitesi, Diş Hekimliği Fakültesi, Endodonti Anabilim Dalı, Antalya, Türkiye

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

Öznur Tuncay
Yar. Doç. Dr., Akdeniz Üniversitesi, Diş Hekimliği Fakültesi, Endodonti Anabilim Dalı, Antalya, Türkiye

ÖZ

Füzyon (kaynaşma) dişin sert dokularını ilgilendiren bir anomalidir ve etkilediği dişte çarpık amorf bir şekil ile sonuçlanır. Süpernümere diş, normal diş dizinine ilave olarak sürmüş bir diştir. Bu olgu sunumunda, sağ mandibular premolar diş ile kaynaşmış olan süpernümere bir dişin kök kanal tedavisinin başarılı olduğu bildirilmiştir. Detaylı klinik ve radyografik muayene sonucunda, patolojiden sorumlu diş süpernümere diş olarak tespit edildi ve sadece bu dişe kök kanal tedavisi uygulandı. Dişlerin 3 ve 12 aylık kontrol süreçlerinde klinik ve radyolojik olarak sağlıklı olduğu ve hastanın şikayeti olmadığı gözlendi. Sağ mandibular premolar dişin canlılığının yapılan termal ve elektrik pulpa testleri ile devam ettiği gözlendi.

Sorumlu Yazar
Kürsat Er,
Akdeniz Üniversitesi,
Diş Hekimliği Fakültesi,
Endodonti Anabilim Dalı, Antalya, Türkiye
Telefon: +90 242 3106995
Faks: +90 242 3106967
E-mail. kursater@akdeniz.edu.tr

Clin Dent Res 2017: 41(1): 43-48

Anahtar Kelimeler: Endodontik Tedavi, Füzyon, Süpernümere Diş

Yayın Başvuru Tarihi : 27.05.2016

Yayına Kabul Tarihi : 09.09.2016

INTRODUCTION

Fusion (synodontia) is a developmental anomaly concerning the hard tissues of a tooth, and it is a 'double' tooth occurring a result of the union of 2 adjacent tooth germs. Contrary to other dental anomalies, it is observed more frequently in primary than permanent dentition.[1] In the mandible, fusion is commonly seen in the premolar dentition.[2] Depending on the developmental stages of teeth in which fusion takes place, the tooth and the supernumerary one may share their dentinal or dentin and pulpal tissues. The root spaces of the combined teeth may be shared or separated. The contact causes a single large bulk with union of teeth when it occurs in early periods of odontogenesis before the calcification stage. On the contrary an incomplete fusion is formed at root level if it occurs after the formation of their crowns in later periods of odontogenesis. Even though fusion's etiology is not exactly understood, factors such as genetic predisposition, racial variations, trauma, and inflammatory reasons are suspected.[3] Fused teeth may display serious problems related to esthetics and malocclusion.[4] Treatment of fused teeth may be difficult because they have complicated root and/or abnormal crown morphology. Every detail of dental morphology should be examined in order to increase the quality of treatment, and the use of support tools.[3,5,6]

Supernumerary teeth which may occur in every quadrant in human dentition may be demonstrated as single, multiple, unilaterally or bilaterally to the normal dentition.[6] They are observed more often in permanent than primary dentition, and their prevalence rate varies between 0.15-3.8%.[4] Formation of 2 equal or 1 normal and 1 dysmorphic tooth occurs depending on the separation of the dental tooth bud into 2 equal or 2 unequal parts. Accordingly, the result may be rudimentary and miniature due to its abnormal shape and reduced size. The most frequent supernumerary is a mesiodens that occurs between anterior teeth in the maxilla.[5] In a study[2] approximately 14% of the supermumary teeth were localized to the palatal/lingual side. More rarely, these teeth may be found fused to normal teeth. It can be difficult clinically to differentiate this situation from gemination. Gemination occurs when this tooth bud fails to occur. Fusion of supernumerary tooth to a normal tooth may cause undesirable results such as esthetic problems, orthodontic disorders, occlusial malocclusion, development of tooth caries, pulpal pathosis, food impaction, and the susceptibility to periodontal disease.[4,7-9] Endodontic treatment of these teeth may be complex, as a result multidisciplinary approach may be required to resolve esthetic and periodontal problems.[5] If there is an incomplete fusion and no connection between root canal systems, only a non-surgical root canal treatment of the pathologically involved tooth may be indicated, while the adjoined tooth would remain vital and untreated.[9,10]

Successful root canal treatment of pulpitis associated with caries on a supernumerary tooth fused to a right mandibular first premolar which was confined to the buccal area was presented in this case report. Cone-beam computed tomography (CBCT) image examination revealed that there was no connection between the 2 canal systems; therefore, root canal treatment was performed only to the supernumerary tooth.

CASE REPORT

A 33-year-old male patient was referred to the Department of Endodontics Clinic, Faculty of Dentistry, Akdeniz University by a private dentist. The dentist referred the patient with the chief complaint of pain in the right mandibular premolar area. The patient did not have any systemic disorders. Clinically, a supernumerary tooth which was fused to the mandibular right first premolar, had a smaller size than a normal first premolar, and the supernumerary tooth was in the shape of a canine tooth. In his dental history, the patient complained of spontaneous pain that localized to the lower right part of mandibula for several weeks. He stated that the pain level was increased by hot, cold, and sweet stimuli. In the intraoral examination a carious lesion was determined on the surface of the supernumerary tooth (Figure 1A). While mandibular right first premolar did not have percussion sensitivity, the supernumerary tooth did. Mobility was within normal limits for both teeth. While the supernumerary tooth demonstrated extreme sensitivity to electric pulp and thermal tests, other adjacent teeth responded normally. In radiographic examination (Figure 1B, C and D), caries was observed on the supernumerary tooth, but no periradicular lesion was noted. Anatomy of the fused teeth was not fully understood because they were over-lapped in the dental radiograph. Therefore, the patient was asked to have CBCT imaging to help make a diagnosis of tooth pathology and for a better understanding of whether or not there was a connection between the pulps of the two fused teeth. In CBCT imaging (Figure 1D), it was observed that the teeth were fused along their entire lengths, but there was no connection between their pulp

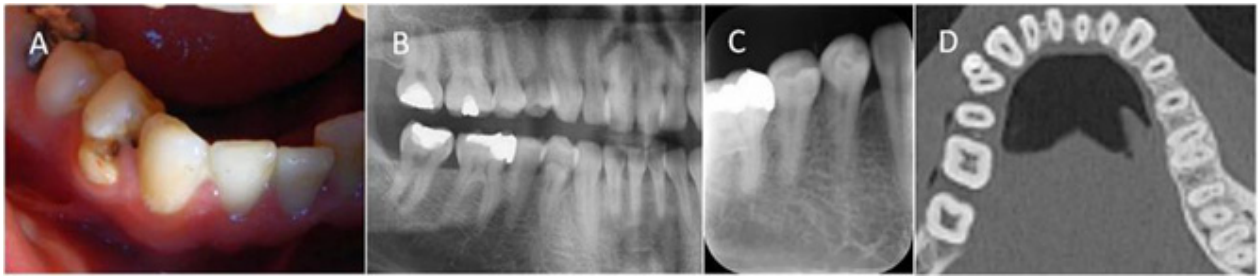


Figure 1. (A) an intraoral image, (B) a panoramic image, (C) a periapical image, (D) a CBCT image of the patient taken for diagnosis.

spaces, however, there was dentin shared between the two teeth. It was decided to restore cervical caries with composite resin only on mandibular right first premolar, thus keeping its pulp vital and to perform root canal treatment only on the supernumerary tooth.

The teeth were isolated with a rubber dam after administration of a local anesthetic. Following the removal of the caries on the supernumerary tooth, an access cavity was prepared with a #2 round and a conical diamond bur (Figure 2A). The working length was determined by using an electronic apex locator (ApexID; SybronEndo, Orange, CA, USA) and verified radiographically. Instrumentation was performed by using ProTaper Universal (Dentsply Maillefer, Ballagues, Switzerland) rotary files. Canals were irrigated with copious 2.5% NaOCl during instrumentation. Patency was checked regularly with #10 K-type hand file (MicroMega, Besançon, France), and cleaning and shaping were completed after reaching a size of ProTaper F2 file. The supernumerary tooth was copiously irrigated again with NaOCl, saline, and 17% EDTA. Final irrigation was completed with 2% chlorhexidine digluconate, and the canal was dried with sterile paper points. The root canal space was filled with an F2 ProTaper gutta percha cone and 2-Seal root canal sealer (VDW, Endodontic Synergy, Munchen, Germany) at the same visit (Figure 2D). An access cavity was sealed with light polymerizing flowable composite resin (Clearfil Majesty Flow; Kuraray, Okayama, Japan), and the cervical restoration of mandibular right first premolar was performed during the same visit.

Teeth were observed to be clinically and radiographically healthy in 3 and 12 month recalls (Figure 2E and 2F), and the patient reported no complaints. In addition, normal responses to thermal and electric pulp tests of mandibular right first premolar was observed.

DISCUSSION

Supernumerary teeth occur commonly in human dentition, but fusion of these teeth to permanent teeth is observed more rarely than fusions that occur between permanent teeth. The extent of a fusion may include pulp tissues or dental pulps might be separate depending on the odontogenesis stage in which the fusion was occurred.

In cases for which supernumeraries were fused with normal teeth, undesirable problems such as crowding, esthetic maladies, abnormal tooth morphologies, excess mesiodistal width, and malocclusion could be observed.[6,8] Treatment of fused teeth may be complex and include different treatment protocols.[7] In order to acquire optimum results during treatment it may be necessary for the endodontist, prosthodontist, oral surgeon, and the orthodontist to work in concert to form a proper treatment plan.[8] While making the treatment plan, it is important to know whether the root canal systems of the involved teeth are separate or connected. An endodontic treatment procedure is an appropriate approach to both teeth if they share any part of their pulp spaces. In endodontic pathology of incomplete fusion cases in which there was no connection between the two pulps, the pathologic pulp should be diagnosed via a detailed clinical and radiographic examination.[10] If both parts were endodontically problematic, endodontic treatment of both parts would be appropriate approach.[11] Kocak & Kocak[11] reported that a successful nonsurgical endodontic treatment was performed to both fused supernumerary and maxillary central teeth. In the case of only one pulp being pathologic it is appropriate to only treat endodontically this diseased pulp and to preserve the other fused tooth's pulp vital.[9,10] Song et al.[10] reported that a pathosis caused by a supernumerary tooth fused to a maxillary first molar was healed by means of root canal treatment of only supernumerary part and the pathosis in periapical area of



Figure 2. (A) access cavity, (B) a radiography with a file, (C) after root canal filling, (D,E) control radiographs after 3-month follow-up, (F) 12-month follow-up.

supernumerary tooth was healed and vitality of molar tooth was continued during 1-year follow up. Similarly, in case report of Cunha et al.[9] nonsurgical endodontic treatment was performed to a supernumerary teeth with apical periodontitis which was fused to a maxillary lateral tooth on the palatal side. The treatment was performed only to supernumerary tooth. Healing was observed in the apical region, and the lateral incisor maintained its vitality in a 12 month recall. In current case, as a result of a detailed clinical examination it was diagnosed that the patient's complaints originated from a supernumerary tooth, and endodontic treatment was performed only on the supernumerary tooth. Neither clinical nor radiographic problems were observed in 3, 6, and 12 month recalls. The mandibular right first premolar was recorded vital during subsequent pulp tests.

One of the difficulties encountered in these teeth is that root canal system anomalies are quite different.[6] Specific treatment need may arise in orthograde cleaning, shaping, and filling procedures. Having information about anatomy of root canal system before starting endodontic treatment is one of prerequisites for a successful treatment. Although periapical, occlusal, and panoramic films are significant endodontic diagnostic tools which are frequently used, they do not provide enough information about the degree and localization of the fusion due to 2D imaging and superimposition of these teeth. Diagnostic methods such as computerized tomography (CT), spiral computed tomography, CBCT and a dental-operating microscope were used for detailed anatomic and morphologic information.[6,7,9,10] Understanding the canal morphology may change management and prognosis of treatment beginning from access cavity preparation.[6] As easy access can be provided with a single access cavity into canal system, also separate access cavities may be prepared in order to protect the dentin.

Today, CBCT and CT imaging systems are used in such cases.[9,10] CBCT is a diagnostic tool which has lower cost, superior image quality regarding dental tissues, and lower ratio of exposure to ionized radiation compared to conventional CT. CBCT is frequently used for imaging hard tissues and adjacent anatomical structures in dentistry and increasingly draws attention in endodontics. Additionally, a relationship between root canals were more clearly understood by examining the morphology of the teeth in three dimentions with CBCT which is present also in our clinic. It was found that fusion continued from the cementoenamel junction to the apices. A dentinal septum was present between canal systems, and there was no connection between the two pulps. The treatment plan was made based on this imagery, and a successful result was obtained.

Even though fusion of a supernumerary tooth to a permanent tooth is rarely seen, dentists may have difficulty when root canal treatment is required for these teeth. Before treatment,it is important to diagnose if or not there is a plural connection between the two teeth and whether one or both tooth's pulp is pathologic. In this manner it may be possible to preserve the vitality of one of the teeth, if in fact, the pulp spaces are continuously separate.

CONFLICTS OF INTEREST

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

REFERENCES

1. Duncan WK, Helpin ML. Bilateral fusion and gemination: a literature analysis and case report. Oral Surg Oral Med Oral Pathol 1987; 64: 82-87.

2. O'Reilly PM. A structural and ultrastructural study of a fused tooth. J Endod 1989; 15: 442-446.

3. Hattab FN. Double talon cusps on supernumerary tooth fused to maxillary central incisor: Review of literature and report of case. J Clin Exp Dent 2014; 6: e400-407.

4. Hagiwara Y, Uehara T, Narita T, Tsutsumi H, Nakabayashi S, Araki M. Prevalence and distribution of anomalies of permanent dentition in 9584 Japanese high school students. Odontology 2016; 104: 380-389.

5. Ballal S, Sachdeva GS, Kandaswamy D. Endodontic management of a fused mandibular second molar and paramolar with the aid of spiral computed tomography: a case report. J Endod 2007; 33: 1247-1251.

6. Rajab LD, Hamdan MA. Supernumerary teeth: review of the literature and a survey of 152 cases. Int J Paediatr Dent 2002; 12: 244-254.

7. Rani AK, Metgud S, Yakub SS, Pai U, Toshniwal NG, Bawaskar N. Endodontic and esthetic management of maxillary lateral incisor fused to a supernumerary tooth associated with a talon cusp by using spiral computed tomography as a diagnostic aid: a case report. J Endod 2010; 36: 345-349.

8. Steinbock N, Wigler R, Kaufman AY, Lin S, Abu-El Naaj I, Aizenbud D. Fusion of central incisors with supernumerary teeth: a 10-year follow-up of multidisciplinary treatment. J Endod 2014; 40: 1020-1024.

9. Cunha RS, Junaid A, Mello I. Unilateral fusion of a supernumerary tooth to a maxillary permanent lateral incisor: a report of a rare case. J Endod 2015; 41: 420-423.

10. Song CK, Chang HS, Min KS. Endodontic management of supernumerary tooth fused with maxillary first molar by using cone-beam computed tomography. J Endod 2010; 36: 1901-1904.

11. Kocak S, Kocak MM. Endodontic and esthetic treatment of fused teeth: case report. Turkiye Klinikleri J Dental Sci 2012; 18: 114-117.