10.5937/bjdm2601044O

BALKAN JOURNAL OF DENTAL MEDICINE ISSN 2335-0245

Conservative Endodontic Treatment of a Fused Maxillary Central and Supernumerary Tooth Associated with Acute Apical Abscess: A Case Report with Three-Year Follow-Up

SUMMARY

Introduction: *Dental fusion is a rare developmental anomaly caused by the union of two adjacent tooth germs, resulting in an enlarged tooth structure. It can occur in both primary and permanent dentitions and may predispose affected teeth to esthetic problems, malocclusion, periodontal, and endodontic complications. Accurate diagnosis—is critical for selecting an appropriate, often conservative, treatment strategy.* ***Case report:*** *A 55-year-old male presented with pain and swelling in the anterior maxilla. Clinical and radiographic examinations revealed complete fusion of the right maxillary central incisor with a supernumerary tooth, associated with an acute apical abscess and a periapical radiolucency. The tooth was managed conservatively with nonsurgical endodontic treatment, followed by definitive coronal restoration to ensure an adequate seal and functional rehabilitation. Follow-up evaluations at 6 months, 18 months, and 3 years confirmed clinical success, evidenced by the resolution of symptoms and absence of swelling. Simultaneously, radiographic assessment via serial images demonstrated a progressive reduction of periapical radiolucency, consistent with ongoing periapical osseous healing.* ***Conclusions:*** *This report demonstrates that even complex and rare developmental anomalies such as complete fusion with a supernumerary tooth can be successfully managed using a nonsurgical endodontic approach when diagnosis and treatment planning are guided by careful radiographic evaluation. Long-term follow-up supported sustained clinical success and radiographic healing, underscoring the value of accurate morphologic assessment and treatment planning in achieving predictable outcomes.*

Keywords: dental anomalies, fusion, supernumerary tooth, apical abscess.

Emine Odabaşı Tezer, Bade Sonat, Cansu Yavuz

Department of Endodontics, Faculty of Dentistry, Ankara University, Ankara, Turkey

CASE REPORT (CR)
Balk J Dent Med, 2026;44-48

Introduction

Developmental dental anomalies affecting tooth number, morphology, and structure result from complex genetic and environmental interactions during odontogenesis[1-3]. According to Vinjolli et al., prevalence varies widely, from 5.5% to 74.7%, depending on population and diagnostic methods[4].

Double teeth are morphological dental anomalies classified as either fusion or gemination, which share similar clinical appearances but differ in etiology[2]. Gemination results from incomplete division of a single dental germ, producing a bifid crown and usually a single root canal[2,5]. Conversely, fusion refers to the developmental union of two independent tooth germs, potentially affecting both enamel and dentin[6,7]. Differentiation is generally based on tooth count within the arch, yet this approach is unreliable when a supernumerary tooth participates in the fusion[8].

Fusion is associated with genetic and environmental factors, local pressure during development, and syndromes such as achondroplasia[2,9]. It may be partial

or complete, affecting both crowns and roots, with root canal systems varying from a common pulp chamber. to separate canals[10-12]. Despite its low prevalence, approximately 0.5% in the primary dentition and 0.1% in the permanent dentition, fusion often presents clinical challenges by altering tooth morphology and occlusion, thereby predisposing the affected area to plaque accumulation, caries, and periodontal pathology[2,4,13,14].

This report presents the endodontic management and long-term follow-up of a maxillary central incisor fused with a supernumerary tooth associated with a periapical abscess, emphasizing the diagnostic value of cone-beam computed tomography (CBCT).

Case Report

A 55-year-old male presented with pain and swelling around the right maxillary central incisor (Figure 1a). The patient was medically healthy, had no history of dental trauma, and reported nocturnal clenching suggestive of possible bruxismno.

Figure 1: Preoperative intraoral photographs (a) Swelling in the periapical region of the right maxillary central incisor, (b) Buccal aspect of the overall dentition, (c) Palatal view of the anterior maxillary region.

Clinical examination revealed an enlarged crown with deep fissures on both the buccal (Figures 1a, 1b) and palatal surfaces (Figure 1c). Generalized wear facets consistent with bruxism were also observed on the dentition (Figure 1b). The tooth was tender to percussion and palpation. Cold testing using a refrigerant spray (Pulp Spray, Cerkamed, Poland) and electric pulp testing using an electric pulp tester (C-Pulse Pulp Tester, Coxo, China) both yielded negative responses. Periapical radiographic examination revealed two root canals converging in the middle third, accompanied by a well-defined apical radiolucency (Figure 2a). The panoramic image confirmed a full complement of permanent teeth, supporting a diagnosis of fusion with a supernumerary tooth rather than gemination or hypodontia (Figure 2b). Based on these clinical and radiographic findings, a diagnosis of acute apical abscess associated with complete fusion was established.

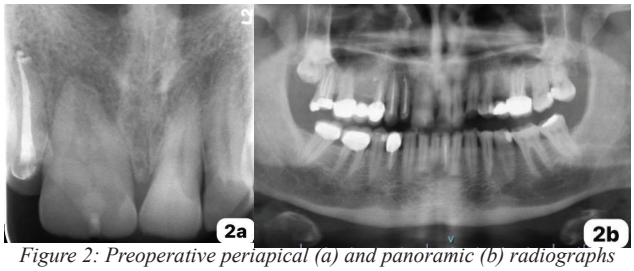

Figure 2: Preoperative periapical (a) and panoramic (b) radiographs

To evaluate root canal morphology, CBCT imaging was performed, revealing two independent pulp chambers merging into one canal in the middle third of the root (Figure 3a). The scan provided essential information for designing dual-access cavities and understanding the extent of the lesion (Figure 3b).

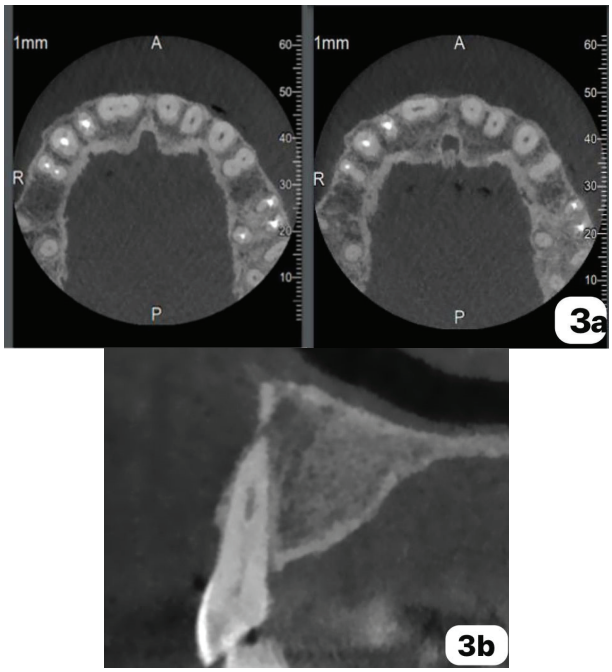

Figure 3 (a) Cone-beam computed tomography imaging (CBCT) of an axial section at 2 different levels, (b) CBCT imaging of a sagittal section showing periapical radiolucency

Written informed consent was obtained from the patient prior to treatment, nonsurgical root canal therapy was initiated under local anesthesia (1.8 mL Ultracain DS forte, Sanofi Aventis, Istanbul, Türkiye) with rubber dam isolation. Based on CBCT findings, two separate palatal access cavities were prepared (Figure 4).

The root canals were explored with #10 K-files (Dentsply Maillefer, Switzerland). Working lengths were

determined as 22 mm using an electronic apex locator (Root ZX mini, Morita, Tokyo, Japan) and verified radiographically (Gendex Dental Systems, Hatfield, PA, USA) (Figure 5a). Canals were prepared with NiTi rotary files (MG3 Gold, Perfect Medical Instruments Co., Shenzhen, China) up to size #35.04, using 5% sodium hypochlorite (NaOCl) (Werax, Izmir, Türkiye) as an irrigant. To facilitate the penetration of the intracanal medicament into the dentinal tubules, the smear layer was removed using 17% EDTA for 1 minute, followed by a final rinse with saline to neutralize the canal environment. Calcium hydroxide ($Ca(OH)_2$) (Kalsin, Spot, Türkiye) was placed asan intracanal medicament, and the access cavities were temporarily sealed (Cavit, 3M ESPE, Seefeld, Germany). At the 10-day recall, the patient was asymptomatic. The canals were re-irrigated with 5% NaOCl, 17% EDTA (Werax, Izmir, Türkiye), saline, and 2% chlorhexidine (Chlorhex, Drogsan, Ankara, Türkiye), each activated ultrasonically (NSK Varios 750, Nakanishi, Tochigi, Japan) using a #20 U-file (MANI, Inc., Tochigi, Japan). The canals were dried with sterile paper points and obturated using gutta-percha (#35.02) and AH Plus sealer (Dentsply Detrey GmbH, Konstanz, Germany) by cold lateral condensation (Figure 5b, 5c). The root canal orifices were sealed with light-cured glass ionomer (Voco Ionoseal, Cuxhaven, Germany), and the cavities were restored using Clearfil SE Bond (Kuraray Noritake Dental Inc., Tokyo, Japan) and Clearfil Majesty Esthetic composite (Kuraray Noritake Dental Inc., Tokyo, Japan). The existing defective buccal composite restoration was removed and replaced.

Follow-up examinations at 6 months (Figure 6a), 18 months (Figure 6b), and 3 years (Figure 6c) showed complete healing of the periapical radiolucency and healthy periodontal conditions (Figure 7). The patient remained asymptomatic, with stable function and satisfactory esthetics throughout the follow-up period.

Figure 4: View of the access cavity of the fused maxillary central tooth

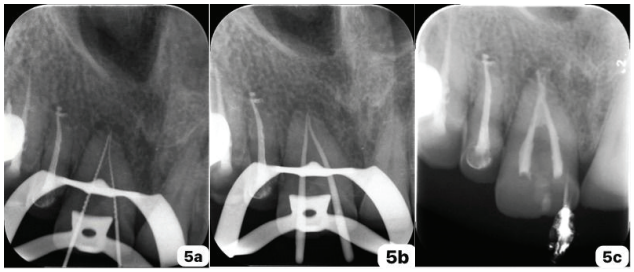

Figure 5 Intraoperative periapical radiographs of the working length determination (a), Master cone fit (b), and immediate post-op view (c).

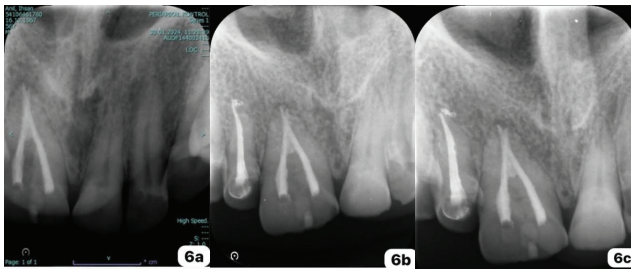

Figure 6 Follow-up radiographs: (a) 6-month, (b) 18-month, and (c) 3-year follow-up.

Figure 7 Intraoral photograph at the 3-year follow-up demonstrating a healthy gingival condition and a stable clinical outcome

Discussion

Fusion is a rare dental anomaly involving the union of two adjacent tooth germs before calcification, often producing complex root canal anatomy that challenges diagnosis and treatment[15]. The etiology is multifactorial and primarily linked to developmental disturbances during odontogenesis. The anomaly generally arises when adjacent tooth germs come into early contact, leading to variable degrees of structural integration before mineralization[11]. Both genetic and environmental factors have been implicated, including local mechanical pressure, trauma, or spatial restriction during dental

development[3,14,16]. A hereditary influence has also been proposed, as studies have reported associations between congenital dental anomalies and consanguineous marriages[17,18]. Consistent with these reports, the patient in this case had a parental history of consanguinity, supporting a possible genetic contribution to the fusion anomaly.

The present case demonstrated a periapical lesion that was likely attributable to multiple contributing factors, including chronic occlusal trauma, parafunctional habits, and the presence of a pre-existing restoration. Malocclusion related to the enlarged fused crown probably generated excessive occlusal forces and microstructural stress in the tooth and surrounding tissues[19]. Deep fissures at the fusion line, combined with a defective restoration and severe bruxism, may have facilitated plaque accumulation, microleakage, and bacterial penetration, predisposing the pulp to inflammation[20,21]. Over time, these factors likely led to partial debonding at the crown interface, allowing bacterial invasion and resulting in an acute apical abscess.

Fusion with supernumerary teeth often causes malocclusion and esthetic concerns due to their abnormal crown morphology, frequently requiring multidisciplinary management[4]. Interestingly, despite the large crown size, no crowding was observed in this case, possibly due to microdontia of the adjacent upper right lateral incisor.

A thorough understanding of root canal morphology is crucial for successful endodontic treatment, especially in teeth with significant anatomical anomalies, as undetected anatomical variations may lead to treatment failure. While conventional radiography provides valuable information, CBCT offers superior 3D visualization and should be considered particularly valuable in such complex cases[10,22,23]. In this case, CBCT confirmed two distinct canals merging in the middle third, guiding access design and ensuring complete disinfection.

Various treatment modalities have been reported for fused teeth, including conservative, surgical, orthodontic, and endodontic interventions, as discussed by Steinbock et al.[24]. When root canal systems are connected, as in the present report, surgical separation of the fused teeth is not recommended due to the possible risk of pulpal and periodontal damage[10,24]. Therefore, nonsurgical endodontic therapy was preferred and proved to be highly successful, as evidenced by the resolution of periapical radiolucency and the restoration of periapical bone tissues observed during the three-year follow-up period.

Finally, the defective buccal composite restoration was replaced to prevent microleakage and ensure coronal sealing. Although additional esthetic treatment could have been considered, the patient was satisfied with the clinical result and declined further intervention.

Conclusion

In conclusion, fused teeth with complex canal morphology pose significant diagnostic and therapeutic challenges for clinicians. Accurate diagnosis, aided by cone-beam computed tomography, enables detailed assessment of canal configuration and facilitates effective treatment planning. This case also demonstrates that, even in the absence of caries, parafunctional habits and defective restorations may contribute to pulpal pathology in fused teeth. Early diagnosis, comprehensive radiographic evaluation, and a tailored multidisciplinary approach are essential for optimizing clinical outcomes in developmental dental anomalies.

Acknowledgments. During the preparation of this work, the author(s) utilized ChatGPT (OpenAI, San Francisco, CA, USA) to improve the grammar, language clarity, and overall readability of the manuscript. The tool was not used for data generation, analysis, or interpretation. After carefully reviewing and editing the text, the authors take full responsibility for the accuracy and integrity of the content. This incorporation of AI tool were used solely for linguistic and stylistic refinement.

References

1. Guttal KS, Naikmasur VG, Bhargava P, Bathi RJ. Frequency of developmental dental anomalies in the Indian population. Eur J Dent. 2010;4(3):263-9.
2. Akitomo T, Kusaka S, Usuda M, Kametani M, Kaneki A, Nishimura T, et al. Fusion of a tooth with a supernumerary tooth: a case report and literature review of 35 cases. Children (Basel). 2023;11(1).
3. Brook AH. Multilevel complex interactions between genetic, epigenetic and environmental factors in the aetiology of anomalies of dental development. Arch Oral Biol. 2009;54 Suppl 1:S3-17.
4. Vinjolli F, Zeqaj M, Dragusha E, Malara A, Danesi C, Laganà G. Dental anomalies in an Albanian orthodontic sample: a retrospective study. BMC Oral Health. 2023;23(1):47.
5. Ballal NV, Kundabala M, Acharya S. Esthetic management of fused carious teeth: a case report. J Esthet Restor Dent. 2006;18(1):13-7; discussion 18.
6. Cetinbas T, Halil S, Akcam MO, Sari S, Cetiner S. Hemisection of a fused tooth. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2007;104(4):e120-4.
7. Ghogre P, Gurav S. Non-invasive endodontic management of fused mandibular second molar and a paramolar, using cone beam computed tomography as an adjunctive diagnostic aid: a case report. J Conserv Dent. 2014;17(5):483-6.
8. Sachdeva GS, Malhotra D, Sachdeva LT, Sharma N, Negi A. Endodontic management of mandibular central incisor fused to a supernumerary tooth associated with a talon cusp: a case report. Int Endod J. 2012;45(6):590-6.

9. Kavadella A, Papavasileiou I, Salamouri MA, Papavasileiou I, Emmanouil-Nikoloussi EN. Fusion, gemination or a morphological variation? A case report on a diagnostically challenging mandibular molar. Oral. 2025;5(2):38.
10. Sato M, Garcia-Sanchez A, Sanchez S, Chen IP. Use of 3D-printed guide in hemisection and autotransplantation of a fusion tooth: a case report. J Endod. 2021;47(3):526-31.
11. Chen F, Wang S, Bai N, Li X, Wang L, Xia X, et al. Management of fused anterior teeth: review and clinical report. J Prosthodont. 2022;31(4):282-8.
12. Rudagi K, Rudagi BM, Metgud S, Wagle R. Endodontic management of mandibular second molar fused to a supernumerary tooth, using spiral computed tomography as a diagnostic aid: a case report. Case Rep Dent. 2012;2012:614129.
13. Aydinbelge M, Sekerci A, Caliskan S, Gumus H, Sisman Y, Cantekin K. Clinical and radiographic evaluation of double teeth in primary dentition and associated anomalies in the permanent successors. Niger J Clin Pract. 2017;20(7):847-51.
14. 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(10):1247-51.
15. Tsesis I, Steinbock N, Rosenberg E, Kaufman AY. Endodontic treatment of developmental anomalies in posterior teeth: treatment of geminated/fused teeth - report of two cases. Int Endod J. 2003;36(5):372-9.
16. Bailleul-Forestier I, Berdal A, Vinckier F, de Ravel T, Fryns JP, Verloes A. The genetic basis of inherited anomalies of the teeth. Part 2: syndromes with significant dental involvement. Eur J Med Genet. 2008;51(5):383-408.
17. Abbas B, Abbas S, Malik SM, Rahim M, Umair M, Khurshid Z. Consanguineous marriages and dental anomalies: a cross-sectional analytical study. Int J Dent. 2022;2022:9750460.
18. Bağcı N, Pamukçu U, Altunkaynak B, Peker İ. Dental anomalies in consanguineous marriage: a clinical-radiological study. Int Dent J. 2022;72(1):133-40.
19. Lempel E, Lovász BV, Bihari E, Krajczár K, Jeges S, Tóth Á, et al. Long-term clinical evaluation of direct resin composite restorations in vital vs endodontically treated posterior teeth - retrospective study up to 13 years. Dent Mater. 2019;35(9):1308-18.
20. Yilmaz F, Dorterler OC. Effect of bruxism on the clinical success of posterior composite restorations in endodontically treated teeth: a cross-sectional, case-control study. J Esthet Restor Dent. 2025;37(10):2180-92.
21. Shalaby MS, El Shahawy OI. Management of fused primary anterior teeth: a case series. Case Rep Dent. 2025;2025:6187804.
22. Şeker Ç, İçen M, Geduk G. Prevalence of dental anomalies: cone-beam computed tomography study. J Int Dent Sci. 2023;9(1):34-9.
23. Aydemir S, Ozel E, Arukaslan G, Tekce N. Clinical management of a fused mandibular lateral incisor with supernumerary tooth: a case report. Dent Res J (Isfahan). 2016;13(1):80-4.
24. 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(7):1020-4.

Received on January 18, 2026
Revised on February 18, 2026
Accepted on February 23, 2026

Patient Consent Written informed consent was obtained from the patient for publication of this case report and accompanying images. Also, the study was performed in conformance with the Declaration of Helsinki ethical guidelines.

Ethical Approval According to institutional policies, single case reports do not require ethical approval.

Conflict of Interest The authors declare no conflict of interest.

Funding This research received no external funding. Corresponding author

Corresponding author

Cansu Yavuz
Department of Endodontics, Faculty of Dentistry, Ankara University, 06500 Ankara, Turkey
Email: yavuzc@ankara.edu.tr