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Case Report | Olgu Sunumu

Treatment For Type II Dens Invaginatus In A Mandibular Lateral Incisor: A Report Of Rare Case

Tip II Dens Invajinatus Bulunan Mandibular Lateral Keser Dişin Tedavisi: Nadir Görülen Bir Vaka Raporu

ABSTRACT

Dens invaginatus is one of the developmental anomalies of the tooth which occurs with an invagination of the enamel organ into the dental papilla during tooth development. This anomaly presents a wide spectrum of morphological variations. According to Oehlers classification, in dens invaginatus type II the invagination invades above the cemento-enamel junction, connecting to the pulp; however, there is no connection with the periodontal ligament. This abnormity presents significant challenge when root canal treatment is necessary. The most frequently affected teeth are permanent maxillary lateral incisors, followed by permanent maxillary central incisors. There are limited case reports of mandibulary central incisors; however, there is no publication of mandibular lateral incisors with dens invaginatus type II. This case report aimed to present cone-beam computed tomography aided diagnosis and treatment for type II dens invaginatus in a mandibular lateral incisor with a talon cusp and a large periapical lesion

Conclusion: This case report aimed to present cone-beam computed tomography aided diagnosis and treatment for Type II Dens Invaginatus in a mandibular lateral incisor with a talon cusp and a large periapical lesion

Key Words: Acute Apical Abscess, Dens Invaginatus, Mineral Trioxide Aggregate, Root Canal Treatment, Talon Cusp.

ÖZ

Dens invaginatus, diş gelişimi esnasında mine organının dental papillaya doğru invajine olması ile ortaya çıkan dişin gelişimsel anomalilerinden biridir. Bu anomaliye sahip dişler çeşitli morfolojik varyasyonlara sahip olabilmektedirler. Oehler'in sınıflamasına göre, dens invaginatus tip II'de invajinasyon mine-sement birleşimini geçer, pulpaya bağlanır; ancak periodontal ligaman ile herhangi bir bağlantı bulundurmaz. Bu anomali, kök kanal tedavisinin gerekli olduğu durumlarda sıklıkla önemli bir zorluk teşkil eder. En sık etkilenen dişler daimî üst lateral kesici dişlerdir ve bunu daimî üst santral kesici dişler takip etmektedir. Mandibular santral kesici dişlerle ilgili sınırlı sayıda vaka raporu mevcuttur; ancak dens invaginatus tip II'ye sahip mandibular lateral kesici dişlere ilişkin yayın bulunmamaktadır.

Sonuç: Bu vaka raporunda, talon tüberkül bulunan ve büyük periapikal lezyonu olan dens invaginatus Tip II'ye sahip mandibular lateral kesici dişin konik ışınlı bilgisayarlı tomografi desteği ile tanı ve tedavisinin sunulması amaçlandı.

Anahtar Kelimeler: Akut Apikal Apse, Dens İnvaginatus, Mineral Trioksit Agregat, Kök Kanal Tedavisi, Talon Tüberkülü.

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INTRODUCTION

Dens invaginatus (DI) is one of the developmental abnormities of the tooth, presents a wide spectrum of morphological variations. A commonly accepted etiologic theory is an invagination of the enamel organ into the dental papilla during tooth development (1). The invagination begins in the crown and may sometimes extend into the root (2). This situation creates an enamel-lined sac into the tooth, which may be blind-ended, or in some cases, may be connected to the main pulp or the periodontal ligament (PDL) (3). The possible connection between oral environment and pulp may lead to bacterial contamination; therefore, pulpal, or periapical pathology may occur without any caries or trauma (1,4,5).

Many classifications are suggested for describing different forms of DI. Most commonly used is proposed by Oehlers (6), which classifying according to the depth of invagination. Type I is the mildest form; the invagination is confined within the crown and does not extend beyond the cementoenamel junction (CEJ). In type II, the invagination invades above the CEJ, connecting to the pulp; however, there is no connection with the periodontal ligament (PDL). In type III, invagination penetrates through the root and PDL. The treatment options for a tooth with DI depend upon the severity of the abnormality, the pulp, and periradicular condition, including a prophylactic fissure sealing, restorative, nonsurgical/surgical endodontic treatment, or extraction (7). Pulp necrosis may occur before root-end closure, so maturity is also crucial for deciding the treatment plan. There are many detected cases of maxillary incisors with DI (5,8,9); however, no case of mandibular lateral incisor with DI type II had been reported to the best of our knowledge. This case report presented CBCT aided diagnosis and treatment for type II dens invaginatus in a mandibular lateral incisor with a talon cusp and a large periapical lesion.

CASE REPORT

A 10-year-old male patient was referred to the Department of Pedodontics, complaining of pain and swelling in the mandibular right anterior region. A detailed medical history was taken from the patient's family, and no significant condition was recorded. Extraoral examination revealed acute swelling, which was warm and tendered to palpation. Clinical examination revealed that he was in mixed dentition and had poor oral hygiene. The different morphological aspect was noticed in mandibular right lateral incisor. There were an increased mesiodistal diameter of the crown, notching on the incisal edge, a lingual prominent talon cusp, and a deep lingual pit (Fig. 1). The tooth was tender to percussion. Intraoral and panoramic radiography was obtained, and an internal dens structure beyond the CEJ consistent with Oehler's type II DI was observed. There was a large periapical radiolucency associated with the tooth. Cone-beam computed tomography (CBCT) was revealed for examination of complex root canal (RC) morphology. According to CBCT imaging, a complete invaginated structure had extended beyond the crown and centrally along with the RC to the apical third as a septum down to the apex (Fig. 2).

Figure 1. Extraoral swelling of the region (A), preoperative intraoral view of tooth 42 (B).

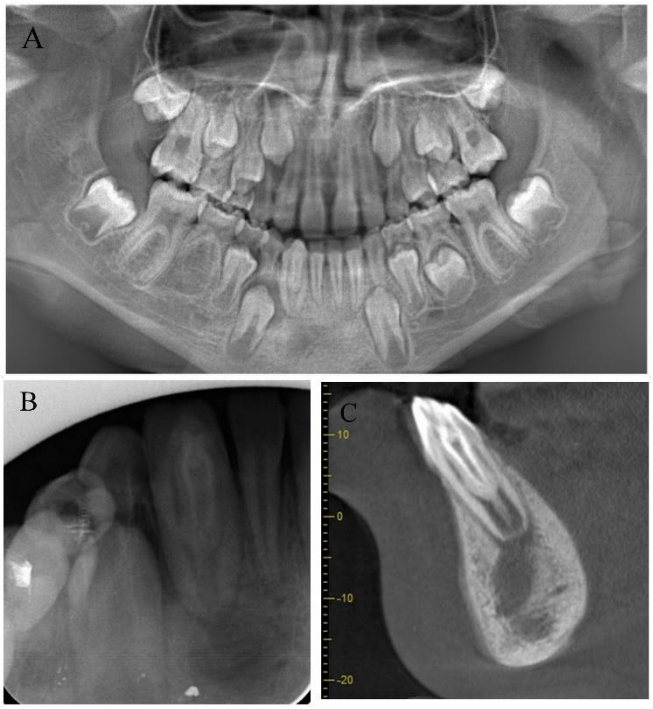

Figure 2. Panoramic radiography of the patient (A), periapical radiography of tooth 42 (B), sagittal slice of CBCT (C).

According to symptoms and examination, the diagnosis for tooth 42 was pulp necrosis and acute apical abscess. The treatment plan included RC treatment with removing the DI and a follow-up for the prognosis. The complex anatomy of the tooth, possible long-term outcome, and treatment plan were told to the patient's family. Parents read the information and gave consent for the treatment plan. First appointment: Following anaesthesia, through the deep lingual pit, an entrance to

the invaginatus was obtained. After the access cavity preparation, the hard tissue inside the RC system was removed by using gates-glidden (Dentsply Maillefer, Ballaigues, Switzerland), piezo burs (W&H, Bürmoos, Austria), and H-file instrumentation (Dentsply Maillefer, Ballaigues-Switzerland), respectively, with an electronic apex locator (Root ZX Mini, J. Morita, Tokyo, Japan) aid and radiographically confirming. Electronic apex locator and periapical radiography were used to determine the working length. The necrotic pulp tissue remnant was removed by instrumentation and 2,5% sodium hypochlorite (NaOCl) irrigation. There was no drainage from the canal. Therefore, the canal was dried with sterile paper points. The tooth was dressed with calcium hydroxide ($Ca(OH)_2$, (Metapaste; Meta Biomed Co, Ltd, Chungbuk, Korea) (Fig. 3).

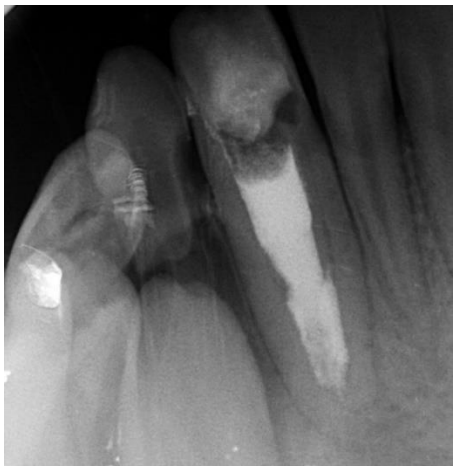

Figure 3. Ca $(OH)_2$ dressing radiography.

The access cavity was sealed with resin-modified glass ionomer (Fuji II LC, GC International Corp, Tokyo, Japan). A second appointment was scheduled for two weeks later. Second appointment: The tooth was asymptomatic until the further appointment. The temporary filling and $Ca(OH)_2$ were removed using hand files, followed by 17% EDTA. The final flush was performed with 2.5% NaOCl. Sonic activation was performed using EDDY (6000 Hz, size 25.04, VDW, Munich, Germany) with three activation cycles of 30s for each solution. The RC was dried, and white MTA (Angelus, Londrina, PR, Brazil) was set approximately 4-mm thickness at the WL. Following confirmation radiographically, a wet cotton pellet was placed for two days. Third appointment: The cotton pellet was removed, and empty canal space above the MTA was irrigated with 2 ml 2.5% NaOCl. Following drying the space, the RC was coated with syringe-mix epoxy-amine-based resin sealer (AH Plus Jet®, Dentsply DeTrey, Konstanz, Germany) by appropriate size of paper points. According to the manufacturer's instructions, after being thermo-plasticized using an obturator oven (Thermaprep 2, Dentsply Maillefer, Ballaigues, Switzerland), the canal was obturated with GuttaCore® (Dentsply DeTrey, Konstanz, Germany) obturator. The filling material was bent, the excessive gutta-percha was removed at the CEJ and compacted with a heated plugger (Fig. 4A). After selective etching to the enamel, a bonding agent (OptiBond™ All-In-One, Kerr Corporation, Orange, CA, USA) was applied. Restoration was done with with composite resin (Estelite Sigma Quick, Tokuyama Dental, Japan). No clinical symptoms were found at the first month follow-up (Fig. 5). Then the patient was scheduled for 3-6 months and annual as a long-term follow-up (Fig. 4B-E).

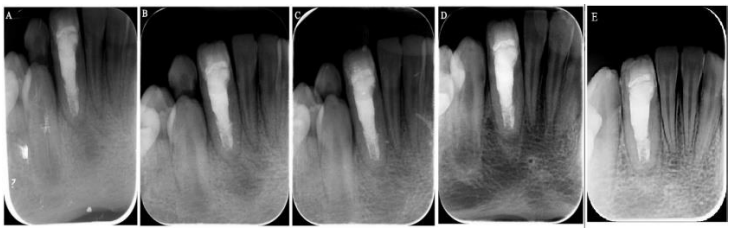

Figure 4. Periapical radiography of obturation(A), 1st month radiography (B), 3rd month radiography (C), 10th month radiography (D), 20th month radiography (E).

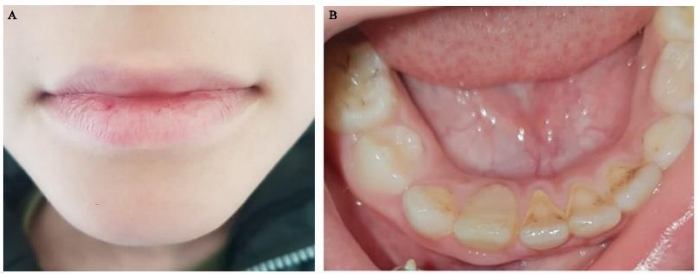

Figure 5. Extraoral view at 1st month control (A), intraoral view in 1st month (B).

DISCUSSION

DI is a rare anomaly that reported a prevalence of between 0.04-10% (10), and the problem is observed at a rate of 0.25-26.1% (5). The most frequently affected teeth are permanent maxillary lateral incisors (8), followed by the permanent maxillary central incisors, premolars, canines, and molars that may rarely be affected (2). It is known that DI mainly affects permanent teeth; however, it was reported in primary dentition (11,12). DI may be isolated or co-occur with other dental anomalies such as microdontia, macrodontia, or talon cusp (6,13,14). Many studies evaluated the presence, characteristics, and types of dens invaginatus in the Turkish population (15). According to the patients' examination included for the mentioned studies, there was no DI structure in the mandibular incisors, interestingly. Similar results were encountered

in studies conducted of different populations (16,17). Limited case reports were published of mandibular incisors (18,19), however, to the best of our knowledge, this presentation is the first reported type II DI case of a permanent mandibular lateral incisor tooth in the literature. The anatomical variations associated with DI cause difficulties for management. Due to the complex RC morphology, especially in type II and III, a 3-dimensional radiographic examination is recommended (2,20). Only for the tooth with relevant signs and symptoms is indicated endodontic treatment (21). In some DI type II cases, it was suggested that only the invaginated canal treatment might be sufficient if there was no periapical pathology and connection between the canals (3). According to the CBCT imaging of this case, pulp connection is not monitored; however, there was a large periapical radiolucency and an extraoral abscess. Therefore, the treatment plan included removing the DI structure.

$Ca(OH)_2$ dressing as an intracanal medication is well documented. It certainly reduces the bacterial counts and helps the tissues to recover and heal (22). Regression of the symptoms is also a positive indicator that the treatment plan was efficient. Mechanical preparation produces a layer called smear that may contain bacteria and their by-products (23). For removing the smear layer, an irrigation procedure comprises NaOCl followed by EDTA. Irrigation activation was proposed to increase the effects of solutions to improve canal cleanliness after mechanical preparation (24). Therefore, to remove the smear layer and improve disinfection in complex RC anatomy, sonic activation was used with final irrigation procedures, including EDTA and NaOCl flushing. Although the tooth was mature, the apical region was plugged with MTA due to the wide canal. After the apical plug, the warm obturation technique was applied using a thermoplastic core carrier system for tight seal filling. In last control visit at 20th month, the periapical radiography revealed continuing of healing and lamina dura forming. The patient was asymptomatic, and the tooth was intact (Fig. 4E). Periodic long-term follow-up plays an essential role in prognosis, and patient follow-up continues.The diagnosis and treatment of DI require a challenging approach. Oral health care professionals need adequate knowledge and understanding of the anomaly to help diagnose and treat the patients with DI.

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