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**Gülşah Uslu**

Ondokuz Mayıs University,  
Faculty of Dentistry,  
Department of Endodontics,  
Samsun, Turkey

**Taha Özyürek**

Ondokuz Mayıs University,  
Faculty of Dentistry,  
Department of Endodontics,  
Samsun, Turkey

## **Endodontic management of geminated maxillary lateral incisor: A case report**

**Gülşah Uslu and Taha Özyürek**

### **Abstract**

The aim of this case report was to present the non-surgical root canal treatment of the geminated maxillary anterior lateral incisor tooth. A 50-year-old female patient was referred for endodontic treatment of her maxillary right lateral incisor. In the clinical examination, a large crown was observed in the right maxillary incisor region when compared with the left maxillary lateral incisor. There was a groove in the center of the crown extending from the buccal to the palatal region. The radiographic examination revealed that the morphology of the tooth's root canal was Type II (2-1 canals) according to the Vertucci's classification. In the light of the clinical and radiographic examination, the tooth was diagnosed as irreversible pulpitis and one-visit root canal treatment was achieved. At the one-year follow-up, clinical and radiographic examination revealed that there was no periapical or periodontal pathological findings related to the tooth and the tooth was fully asymptomatic.

**Keywords:** Developmental anomalies, gemination, endodontic treatment, maxillary lateral incisor

### **1. Introduction**

Dental developmental anomalies are not often encountered in the clinical practice. Dental anomaly cases are difficult to manage because they have mostly malocclusion and aesthetic problems. Dental anomalies originate from the embryological and developmental stages and affect usually only one dental germ. Dental anomalies may be classified according to the characteristics regarding volume, number, shape and position. As the dental germ may be affected in different stages of the development, the emerging dental anomaly may have various clinical and radiographic appearances [1].

Fusion and gemination regarding their extraordinary anatomic features, which are rarely seen in the clinical practice, belong to the developmental disorders of the dental hard tissue. The terms, fusion and gemination are used in order to describe "double teeth" cases and they are often confused with each other. It is usually accepted that in case of the fusion, two separate dental buds are merged and in case of the gemination, a single dental bud attempts to split in two parts. Usually a fused tooth has two root canals and a geminated tooth has one large root canal in a single root [2]. The geminated teeth are encountered mostly in the maxilla, and fused teeth in the mandibula. Besides this, neither increase nor decrease was observed in the total number of the teeth in arch with geminated tooth. But in the arch with fused teeth, the total number of the teeth is decreased. According to the literature, the incidence of these anomalies is below 1% [3, 4]. Although the etiological causes are not known, environmental factors, trauma, vitamin deficiencies, systemic diseases and genetic disposition are regarded as the probable causes of the germination [5]. Geminated teeth are usually asymptomatic, but because of poor aesthetic outlook, periodontal destruction and caries, which may cause pulp necrosis, a necessity for the treatment may occur [6].

The aim of this case report was to present the non-surgical root canal treatment of the geminated maxillary anterior lateral incisor tooth with the irreversible pulpitis.

### **2. Case Report**

A 50-year-old female patient complaining of the pain in the right upper anterior region referred to our clinic. Her medical history revealed that she had no systemic disease. Intraoral examination showed that the crown of the upper lateral tooth on the right side was bigger than the symmetrical upper lateral tooth on the left side.

**Correspondence**

**Taha Özyürek**

Ondokuz Mayıs University,  
Faculty of Dentistry,  
Department of Endodontics,  
Samsun, Turkey

It was also detected that there was a groove in the center of the crown extending from the buccal to the palatal region (Figure 1). We did not detect any missing or extra tooth in the dental arch. Caries was observed on the distal side of the upper right lateral tooth. The tooth was not sensitive to palpation and percussion. The result of the electric pulp test with this tooth was positive and similar with the symmetrical tooth. In the periodontal examination, the probing of the relevant tooth was within the normal limits. Radiographic examination showed that the crown of the tooth was not completely separated and it had only one root (Figure 2). There were no pathological findings in the periapical tissues. In the light of the clinical and radiographic examination, the tooth was diagnosed as irreversible pulpitis and root canal treatment was planned.

After obtaining the informed consent form, we performed infiltration anesthesia in the region of the upper right lateral incisor tooth with 2 ml articaine solution containing 1/100000 epinephrine (Ultracain DS Forte; Aventis, Turkey). Following the anesthesia, the tooth was isolated with a rubber dam and the decayed tissue was removed. In order to preserve the sulcus on the palatal side, two separate access cavities were prepared on the mesial and distal part on the palatal side. The working length was determined with the electronic apex locator (Root ZX mini; J. Morita Corp., Kyoto, Japan) and was confirmed radiographically (Figure 3). The morphology of the tooth's root canal was Type II (2-1 canals) according to the

Vertucci's classification [6]. The shaping of the root canals was completed with the ProTaper Next (Dentsply Maillefer, Ballaigues, Switzerland) nickel-titanium rotary instrument system using the files X1, X2, X3 and X4 respectively. During the root canal shaping procedure, the canals were irrigated with 2 ml of 5.25% sodium hypochlorite solution (NaOCl; Wizard, Rehber Kimya, İstanbul, Turkey) between every file change. Afterwards, the 5.25% NaOCl in the canals was activated three times with ultrasound for 20 seconds. In every stage of the activation, the canals were irrigated with 2 ml of 5.25% NaOCl. In the final irrigation, in order to remove the smear layer, the canals were irrigated with 3 ml 17% EDTA (Werax, İzmir, Turkey) for 2 minutes and finally with 2 ml 5.25% NaOCl respectively. Canals were dried with sterile paper points (Dentsply Maillefer, Ballaigues, Switzerland). Thereafter, the root canals were obturated with the warm vertical compaction technique using AH Plus (Dentsply DeTrey, Konstanz, Germany) canal sealer and gutta-percha (Dentsply Maillefer, Ballaigues, Switzerland). The tooth was restored with the light-cured resin composite (Gradia Anterior; GC, Tokyo, Japan). As the patient did not have any request in term of aesthetics, we did not plan any advanced restorative intervention with this geminated tooth.

In the one-year clinical and radiographic follow-up, there were no periapical or periodontal pathological findings related to the tooth and the tooth was fully asymptomatic (Figure 4).



**Fig 1:** (A) Clinical view of buccal groove of geminated maxillary lateral incisor. (B) Clinical view of palatal groove of geminated maxillary lateral incisor.



**Fig 2:** Intra-oral pre-op radiograph of geminated maxillary lateral incisor.



**Fig 3:** Vertucci Type II (2-1 canals) canal morphology.



**Fig 4:** One-year follow-up radiograph

### 3. Discussion

Gemination is a rarely encountered malformation and clinicians may encounter with an extraordinary pulp chamber and canal anatomy during the root canal treatment [7]. In a retrospective study conducted by Kazancı *et al.* [8] in 3165 patients, they encountered gemination only in 1 patient (0.1%) and they reported that the maxillary lateral tooth is the most common tooth with gemination. Ataç *et al.* [9] conducted a study with 3043 patients and detected only 2 geminated teeth (0.7%) in these patients. In another study conducted by Hamasha and Al-Khateeb, [10] the gemination incidence was 0.22% and they reported that the most affected tooth group was maxillary central incisor teeth (3.6%). Distinguishing fusion from gemination is rather difficult especially in the presence of the supernumerary teeth. This clinical similarity may be quite confusing. Brook and Winter [11] pointed out this confusion and in order to prevent it proposed the term “double teeth”. In the present case, as the pre-operative radiography displayed a Type II (1-2 canals) according to the Vertucci [6] classification and the patient had neither hyperdontia nor hypodontia, thus the diagnosis was made as gemination. As in the previous gemination and fusion case reports, in order to protect as much as teeth structure, the access cavity was prepared with two separate coronal access [11-14].

Conducted studies showed that the obturation of the root canals with warm gutta-percha technique provided a more homogenous root canal obturation compared to the single cone or lateral compaction techniques [15, 16]. Thus, in the present case, we obturated the root canals of the geminated tooth, which had complex root canal system, with warm vertical compaction technique. As the patient did not have any aesthetic expectation, no advanced restoration for the related tooth was planned. The patient was warned against the possible periodontal problems, which may emerge due to the sulcus in the buccal and palatal side and she was particularly motivated regarding the hygienic care of this region.

### 4. Conclusion

Successful endodontic treatment of geminated maxillary lateral incisor was presented. Clinicians should pay attention of clinical and radiographic examination in tooth with anomaly. Because of their complex root canal anatomy, endodontic treatment of geminated tooth requires special attention.

### 5. Acknowledgement

The authors deny any conflict of interest related to this study.

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