Dental Traumatology

Dental Traumatology 2008; **24**: e34–e37; doi: 10.1111/j.1600-9657.2008.00635.x

Endodontic and orthodontic treatment of fused maxillary central incisors: a case report

CASE REPORT

Serife Ozdemir Ozalp[1], Burcu Baloş Tuncer[2], Ozlem Tulunoglu[1], Sevil Akkaya[2]

[1]Department of Paediatric Dentistry, Faculty of Dentistry, University of Gazi; [2]Department of Orthodontics, Faculty of Dentistry, University of Gazi, Ankara, Turkey

Correspondence to: Burcu Baloş Tuncer, DDS, PhD, Department of Orthodontics, Faculty of Dentistry, University of Gazi, 06510 Emek, Ankara, Turkey
Tel.: + 90-312-212 62 20/335
Fax: + 90-312-212 16 46
e-mail: burcubalostuncer@yahoo.com; burcu@gazi.edu.tr

Accepted 21 June, 2007

Abstract – The purpose of this case report was to describe combined endodontic and orthodontic treatment of a patient who had permanent maxillary central incisors fused with supernumerary teeth. A severe esthetic problem and crowding in the maxillary arch were present clinically. Radiographic examination demonstrated two separate crowns, roots and pulpal canals on each side. The therapy was initiated with endodontic treatment. Six months after the completion of endodontic therapy, mesio-distal trimming was performed and the defects were restored with anterior resin composites in order to re-establish the esthetics. Orthodontic treatment was performed for the alignment of the upper arch. Follow-up at 4 years demonstrated that the teeth were asymptomatic and neither root nor alveolar bone resorption was found. In conclusion, instead of extracting the supernumerary teeth, the anomaly was treated successfully in a conservative way.

Excessive mesio-distal width of a clinical crown might indicate a dental fusion or gemination (1). Dental fusion is characterized by the partial or complete union of the dentine and/or the enamel of two or more separate teeth at some stage during development (2). Fusion may occur between teeth of the same dentition or between supernumerary teeth. Clinically, a broad crown with a vertical groove extending toward the gingival sulcus is seen. The pulp chamber and the root canals can be joined or separated (3). Although the etiology is not clear, trauma, diseases or genetics have been suggested as possible causes (4).

An enlarged clinical crown may also be gemination, which is a single root with one root canal and a bifid crown (3). Although from a classification point of view it is important to distinguish between fusion and gemination, which are similar dental anomalies, however, with regards to treatment, an exact differentiation between fusion and gemination might not be critically important. The problems associated with these anomalies include esthetics, possible loss of arch length, caries along the line of demarcation, periodontal problems, eruption abnormalities and (rarely) sensitivity. Previous reports revealed that, multidisciplinary treatments are required to preserve health and restore esthetics (5, 6). The present case report describes a case with a bilateral fusion of permanent maxillary central incisors with supernumerary teeth in the mixed dentition.

Case report

A 10-year-old boy was referred with a complaint of his extremely large front teeth. There was no history of any dental anomalies in the family. However, his medical history revealed that he had fallen from the stairs at about 2 years of age. Clinical examination revealed fusion of both maxillary central incisors and crowding in the upper jaw (Fig. 1a). The upper right lateral incisor was positioned palatally and as a result of this, a crossbite was present (Fig. 1b). The upper arch discrepancy was 8 mm while no discrepancy was present in the lower arch. The mesio-distal width of the right fused tooth was 16 mm and of the left one was 13.5 mm. The vertical grooves in the crown part separated the teeth unequally. There was a diastema of 1.5 mm between the fused incisors. Dental hygiene was very poor. Radiographic examination demonstrated that the upper incisors fused with supernumerary teeth and there were two separate crowns, roots and pulpal canals (Fig. 2). Lateral cephalometric radiographs revealed skeletal class I (ANB = 4°) relationship with a normal mandibular plane angle (SN-GoGn = 32°). The treatment alternatives included hemisection, extraction or trimming. In the present case there was a good Angle of Class I occlusion and a straight profile. If extraction or hemisection would have been applied, excessive retrusion of upper incisors would have been needed in order not to destroy the Class I relation. As a result the upper lip

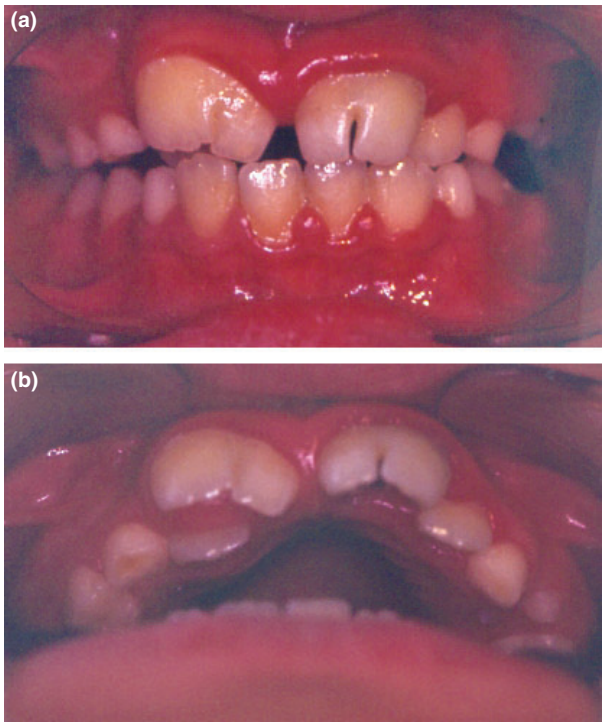

Fig. 1. Intraoral view of the patient presented for treatment.

Fig. 2. Pretreatment panoramic radiograph.

might have been retruded and an unpleasing profile might have occurred. Therefore, the aims of the current treatment included endodontic and orthodontic treatment and trimming of the fused teeth to gain space. Composite restorations were planned for better esthetics afterwards. The treatment options were discussed with the parents and it was decided to retain the fused teeth instead of any surgical procedures. Root canal therapy of the left fused tooth was performed initially. An access opening could not be made for the right fused tooth because of the position of the right maxillary lateral incisor. In order to move the lateral incisor to its ideal position, the maxillary right deciduous canine was extracted and a removable appliance with a posterior bite-raising plate and a mesio-distal spring on the right lateral incisor was prepared. After using the appliance for 6 months, the endodontic treatment was started. The pulps were extirpated and the pulp chambers were irrigated with sodium hypochlorite (2%). The master

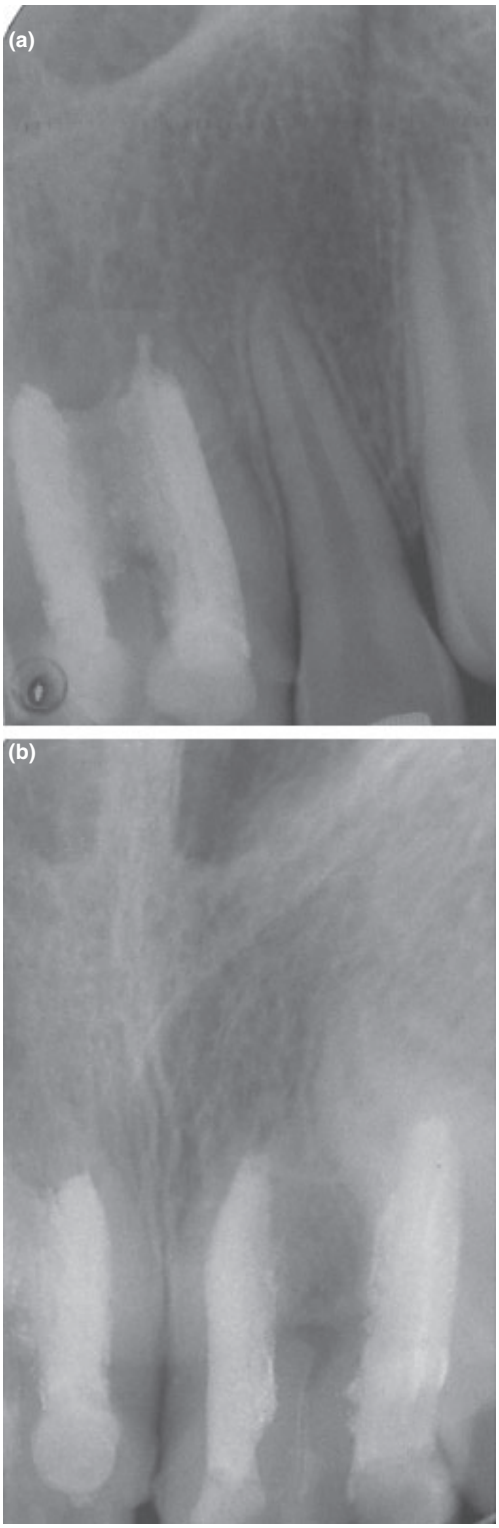

Fig. 3. Radiographical view immediately after obturation of root canals: (a) fused left maxillary central incisor, (b) fused right maxillary central incisor.

apical file in both canals was ISO size 40. The roots were obturated using the lateral condensation technique with gutta-percha and AH-26 as sealer (Dentsplay, Konstanz, Germany) (Fig. 3a,b). Crowns were restored with Venus

Fig. 4. Intraoral frontal view after several months during orthodontic treatment.

Fig. 5. Panoramic radiograph after 4 years of observation.

Resin Composite (Heraaus Kulzer- Hanau, Germany). The result of the treatment and the eruption of permanent teeth were followed for 6 months. Mesio-distal reduction of fused teeth was performed followed by the insertion of the fixed appliances and alignment of the right lateral incisor was started. The upper arch was bonded when all permanent teeth were erupted after 8 months. Sentalloy rectangular arch wire (0.16′0.16) was placed after the initial alignment and a medium elastic thread was used between the fused teeth to close the diastema. The maxillary arch was well aligned with the canines and molars in class I relationship. However, the oral hygiene was inadequate in spite of the warnings (Fig. 4). The orthodontic treatment was discontinued as the patient did not attend the regular monthly controls. However, after 4 years the patient decided to continue the treatment. The fused teeth remained in good condition which was confirmed clinically and radiographically (Fig. 5).

Discussion

Treatment of fusion includes extraction, partial coronectomy, endodontic treatment, selective grinding and orthodontic treatment (7, 9, 10). The most important challenges of fused teeth are the mid-root connections between the root canals and the impact of fusion on the developing dentition. Although hemisection is the most common treatment option, conservative approaches might also give successful results. In this report, endodontic and orthodontic treatment of a bilateral fusion of maxillary central incisors is presented. The history of trauma, which was reported to have occurred at 2 years of age, might have caused this developmental anomaly. As no genetic or other etiologic factors contributing to this anomaly have been detected, fusion was thought to be related to the trauma. There are reports recommending hemisection as the treatment of choice (2, 11, 12). However, in this case we decided to minimize the need for surgical treatment and not to traumatize the tissues. Therefore, endodontic treatment and trimming of the oversized crowns and orthodontic treatment have been planned. Conservative methods such as recontouring of the crowns have been performed in few studies, consistent with our case (7, 13). Peyrano et al. (7) stated that endodontic treatment was necessary when there were connections between root canals. The prognosis of keeping pulp vitality without root treatment was stated to be poor in such cases (7, 8). In this case, there was a risk of pulpal infection which might develop from the periodontium or the connections between the root canals because of poor oral hygiene. Therefore, we decided to perform root canal treatment before trimming.

The patient was evaluated after 4 years and the teeth were asymptomatic and no radiolucency around the apical regions or root resorption was detected. Tsurumachi & Kuno (14) extracted the fused tooth and replanted the mesial part. Three years after the replantation, ankylotic symptoms were seen. Gazit & Lieberman (15) presented a report in which the smaller segment of the fused tooth was removed but follow up was not mentioned. David et al. (9) revealed the results of a case in which root resection without endodontic treatment was applied and the exposed pulp chambers were allowed to heal. The fused tooth remained asymptomatic after 12 years.

We have achieved satisfactory results by root canal therapy and trimming instead of extracting the supernumerary teeth. The functional and esthetic objectives were achieved after 4 years by re-starting the orthodontic treatment and a successful endodontic therapy.

In conclusion, the decision of extracting or retaining the fused tooth depends on the arch discrepancy, esthetic needs and the degree of patient cooperation. Future studies with long-term follow up will be helpful in evaluating long-term results of different treatment options.

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