Esthetic Management of Fused Carious Teeth: A Case Report

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ABSTRACT

A rare case of a carious supernumerary tooth fused to the labial surface of a maxillary right central incisor is reported. Root canal therapy on the maxillary right central incisor was performed owing to the pulpal communication between the supernumerary tooth and the maxillary right central incisor after removing the carious supernumerary tooth structure. The defect was then restored with anterior resin composite and the esthetics reestablished.

CLINICAL SIGNIFICANCE

Clinical significance lies in identifying a rare case of fusion of supernumerary tooth to a permanent tooth and treating the anomaly in the most conservative way.

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A malformed tooth often is a challenge to the dentist. Pindborg defined *fusion* as the union between dentin and/or enamel of two or more separate developing teeth.[1] Fusion, an uncommon anomaly of the hard dental tissues, may cause clinical problems related to appearance, spacing, and periodontal conditions.

The incidence of fusion is < 1% in the Caucasian population.[2] Clinically, it is often difficult to differentiate between fusion and gemination. Pindborg describes *gemination* as the malformation of a single tooth bud, resulting in an anomalous tooth within the normal complement of teeth.[1] It is recognized as an attempt by a single tooth germ to divide, with a resultant large single tooth with a bifid crown and usually a common root and root canal. The degree of fusion depends on the stage of tooth development that has occurred at the time of fusion, with the union of dentin being the main criterion.

These anomalies may be unilateral or bilateral and may affect either dentition, although the deciduous teeth are more commonly affected. The etiology of fusion remains unknown. Shafer and colleagues have stated, "It has been thought that some physical force or pressure produces contact of the developing teeth and their subsequent fusion."[3] Spouge suggests that it is likely that the majority of such conditions (fusion and gemination) arise purely by chance.[4] Lowell and Solomon believe that fused teeth result from physical action that causes the young tooth germs to come in contact, thus producing a necrosis of the intervening tissues.[5] In addition, several authors also suggest that heredity is one of the etiologic factors.[3–5]

Fused teeth may contain separate pulp canals or share a common pulp canal. Fusion may occur between two normal teeth or between a normal tooth and a supernumerary

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tooth: in the latter case, differentiation from gemination may be difficult, if not possible.

Only one case has been reported in the literature in which a supernumerary tooth was fused to the labial surface of a maxillary central incisor.[6] The present case describes the endodontic and esthetic management of a carious supernumerary tooth fused to the labial surface of a maxillary right central incisor.

CASE REPORT

A 22-year-old male reported to the dental clinic because he was unhappy with his dental appearance. A clinical examination revealed a carious supernumerary tooth that was fused to the labial surface of the maxillary right central incisor (Figure 1). Medical and dental histories were noncontributory. There was no previous history of trauma or any hereditary conditions. There was no tenderness on palpation or percussion for either the central incisor or the carious supernumerary tooth. No mobility was seen in either tooth.

Radiographic examination showed a supernumerary tooth fused to the right maxillary central incisor with no periapical changes (Figure 2). It could not be determined whether there was pulpal communication between the fused teeth.

The supernumerary tooth was removed layer by layer using high-speed diamond abrasives with air and water coolants. After the complete removal of the carious supernumerary tooth, a pinpoint pulpal exposure with a pinkish hue was seen through the underlying thin dentin surface (Figure 3). The patient complained of mild pain, and the tooth was hyperreactive to an electric pulp tester (Parkell Electronics, Farmingdale, NY, USA) and a cold test (ice pencil); hence, root canal therapy was performed.

Local anesthesia was administered, and a rubber dam was applied. Ideal endodontic access cavity was done on the palatal surface using a no. 2 round bur and a straight fissure diamond point (no. G835-010 DIATEC AG, Dubendorf, Switzerland). Pulp extirpation was performed using a barbed broach (Dentsply-Maillefer, Ballaigues,

Figure 1. Preoperative view a carious supernumerary tooth that was fused to the labial surface of the maxillary right central incisor.

Figure 2. Preoperative radiograph showing the carious supernumerary tooth fused to the labial surface of the maxillary right central incisor.

Figure 3. Intraoral view of the maxillary right central incisor after the removal of the supernumerary tooth.

Switzerland) and K files (Mani, Inc., Tochigi-Ken, JAPAN). The canal was thoroughly débrided with a copious irrigation of sodium hypochlorite (2.5%) and saline (0.9%). Coronal flaring of the root canal was done using Gates Glidden drills nos. 1 to 4 (Mani, Inc.). The working length was determined using Ingle's method, and mesial and distal angulation radiographs were taken to confirm the presence of additional canals. Formocresol was used as the intracanal medicament. The access cavity was temporarily sealed using zinc oxide–eugenol cement. The defect on the labial surface was temporarily restored with a resin composite (Esthet-X, Dentsply/Caulk, Milford, DE, USA), and the patient was recalled after 2 days for cleaning and shaping of the root canal system.

At the second visit, canal preparation was completed using a step-back technique (apical enlargement was done up to International Standards Organization, no. 40 and the coronal flaring up to no. 70). Canals were copiously irrigated with sodium hypochlorite and saline. Then access cavity was temporized with zinc oxide–eugenol cement. The patient was recalled after 1 week for obturation.

At the third visit, the tooth was asymptomatic and the root canal was obturated using gutta-percha cones by combination of lateral and vertical condensation techniques (Figure 4). Zinc oxide–eugenol was used as a sealer; then the access cavity was sealed with resin composite.

After 2 weeks the patient was recalled for esthetic management. The temporary restoration, which had been placed on the labial surface, was removed. Shade selection was done according to the Esthet-X shade guide; the B2 shade was selected. A rubber dam was then placed, and a full veneer without incisal lapping (ie, window preparation) was installed, using diamond abrasives (Dentsply-Maillefer) with high speed. A total-etch technique was employed using 37% phosphoric acid gel applied with a syringe for 15 seconds. Two coats of a dentin-bonding agent, Prime and Bond NT (Dentsply/Caulk), were applied, and each layer was cured for 20 seconds using quartz-tungsten-halogen lamp (Dentsply/Caulk). Initially to mask the hue of

Figure 4. Radiograph showing the root canal obturation.

the gutta-percha, a masking agent of a universal shade (3M ESPE, St. Paul, MN, USA) was applied. Then the body shade (B2) was placed, and finally the enamel shade (CE) was applied using a pistol-grip syringe with a preloaded composite compule, and composite-placing hand instruments (Dispodent). Each layer of composite was cured for 60 seconds. Finishing of the composite veneer was accomplished with Sof-Lex disks (3M ESPE) and composite finishing burs (Shofu Inc, Kyoto, Japan). Polishing rubber cups and prisma glass composite polishing paste (Dentsply/Caulk) were then used (Figure 5).

Thus, a conservative approach was used for the restoration of the tooth.

DISCUSSION

Fused teeth afford a striking clinical manifestation of the differentiable and morphogenetic processes of tooth development. The challenge is to define the origin of the teeth and restore them to acceptable function and appearance. Clinically, it may be difficult to differentiate between fusion and gemination when a supernumerary tooth is fused with a permanent tooth. Fusion between supernumerary and permanent teeth occurs less frequently than fusion between other types of teeth. Yuzawa and colleagues reported that the frequency of the fusion between supernumerary and permanent teeth is 0.1%.[7] In this case the fusion took place between a carious supernumerary tooth and the maxillary right central incisor. Only one such case has been reported previously.[6]

The differential diagnosis of this case included the following:

- Gemination. In gemination, the resultant structure would have two completely or incompletely separated crowns with a single root or root canal. The incidence of this in deciduous dentition is 0.1 to 3.7%, and it is very rare in permanent dentition (0.8%). Although in this case gemination is a possible diagnosis, the occurrence of gemination labiolingually appears very unlikely. No such case has been reported until now in the literature.
- Facial talon's cusp. Talon's cusp generally occurs on the lingual

Figure 5. Postoperative intraoral view of the maxillary right central incisor.

surfaces of maxillary or mandibular lateral incisors. However, a few cases have been reported in which talon's cusp occurred on the facial aspect. Talon's cusp consists of enamel, dentin, and a horn of pulpal tissue. Considering the fact that the suspected labial supernumerary tooth was not very well differentiated and that the removal of the carious tooth structure exposed the pulpal horn, facial talon's cusp may be a differential diagnosis for this case.

- Dens evaginatus. This developmental anomaly appears clinically as an accessory cusp or globule, which generally occurs on the premolars and is very rare on the incisors.
- Localized enamel disturbance. This case could also represent a localized enamel disturbance as the lesion is localized to the tooth. Trauma is one of the most common causes for such localized disturbance, but in this case the patient did not give any history of trauma.

In this case the supernumerary tooth was carious and required esthetic treatment. Since there was pain and pulpal communication between the fused teeth, root canal treatment was considered to prevent future complications.

For esthetic appearance the tooth treated with a root canal was restored with a light-cured anterior composite with a window preparation. The window preparation was used as the patient has an edge-to-edge bite in the anterior region; moreover, the incisal edge of the maxillary right central incisor was not discolored and was intact. There were no pathologic findings seen on the radiograph at the 1-year recall, and the patient was pleased with the esthetics.

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