Management of the fused permanent upper lateral incisor: a case report
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Background. Fusion is the embryologic union of normally discrete structures. The treatment of this anomaly usually requires a multidisciplinary approach. Cone-beam computerized tomography (CBCT) is more common in dentistry and provides valuable information on fused teeth, allowing us to confirm its 3-dimensional structure and precise 3-dimensional cutting-plane line, which is very important to prevent pulp exposure in the conserved tooth.

Study design. An 8-year-old boy presented with a permanent maxillary left lateral incisor fused with a supernumerary tooth. Hemisection was delayed until the pulp chamber separated. We used CBCT to decide the separation time and a precise 3-dimensional cutting plane to avoid pulp exposure. The abnormally positioned lateral incisor and canine biologically moved to normal positions without orthodontic treatment.

Results. At 1-year follow-up, there was no esthetic problem, hypersensitivity, periapical pathosis, or external resorption.

Conclusions. Hemisection could be selected as an appropriate treatment alternative and more recommended procedure in cases where a permanent tooth is fused with a supernumerary tooth. (Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2011;111:649-652)

Fusion is the embryologic union of normally discrete structures. If it occurs early, 2 developing teeth could unite to form a single tooth of almost normal size. If, however, it occurs very late, 1 tooth almost twice the normal size would develop. Fused teeth are uncommon in the permanent dentition compared with the primary dentition. The incidence of this anomaly is ~0.1% in the permanent and 0.5% in the primary dentition.1,3 The etiology of this anomaly is still unknown; some authors suggest that this anomaly is caused by the influence of pressure of physical forces producing close contact,4 necrosis of the intervening tissue between 2 closed tooth germs,5 or genetic determination.6 These fused teeth can cause various problems, such as caries, periodontal disease, abnormal eruption, impaction, and ectopic eruption of an adjacent tooth.7 Fused teeth in anterior regions cause severe esthetic problems. Therefore, in the dental literature, various treatment considerations have been recommended to achieve ideal esthetics and occlusion, which usually require a multidisciplinary approach.8

The present case report presents the hemisection of a maxillary lateral incisor fused with a supernumerary tooth. Hemisection was delayed until the pulp chamber was separated. We used cone-beam computerized tomography (CBCT) to decide the separation time and a precise 3-dimensional cutting-plane line to avoid pulp exposure. The abnormally positioned lateral incisor and canine biologically moved to normal positions without orthodontic treatment in the 1-year recall after hemisection was performed.

CASE REPORT
An 8-year-old boy was referred to the Department of Pediatric Dentistry, Kyung Hee Dental Hospital, Seoul, Korea, with a chief complaint of the presence of a large and abnormal anterior tooth. There was no significant medical history and no family history of dental anomalies. Intraoral examination revealed that a permanent maxillary left lateral incisor was fused with a supernumerary tooth. The fused
tooth had a broad crown separated by grooves extended into the gingival sulcus on the buccal and palatal side (Fig. 1, a). The patient was in the mixed dentition with class I molar relationship.

Radiographic examination indicated that the maxillary left lateral incisor had 2 root canals and 2 separate underdeveloped roots (Fig. 1, b) and there was a possibility of disturbance of normal canine eruption. For an exact examination of pulp separation and canine eruption path, CBCT was taken. The CBCT examination revealed a connected pulp chamber at the middle third of the root and an overlapped canine path with the root of supernumerary tooth.

The treatment plan was as follows: 1) periodic follow-up check for pulp separation and canine eruption path; 2) if there was no connection between pulp chambers and abnormal root resorption by the time of the canine eruption, a plan for a surgical hemisection and extraction of the fused supernumerary tooth; and 3) orthodontic and/or prosthodontic treatment considered.

During a 2-year follow-up period, the radiographic examination showed a normal tooth formation of fused left lateral incisor and supernumerary tooth (Fig. 2, a and b). On the CBCT taken at 2 years, it was shown that the pulp chamber was discrete and the left upper canine was erupted at slightly in the high position (Fig. 2, c and d). Surgical hemisection was scheduled, and the plan was explained to the patient and his family. Under local anesthesia, a mucoperiosteal flap was raised and the furcation area was exposed (Fig. 3, a). Before the hemisection, the diameter of the right lateral incisor (8.2 mm) was estimated. Hemisection was carefully performed by using a diamond bur to be similar size and shape of right lateral incisor, and the sectioned supernumerary tooth was extracted (Fig. 3, b).
For esthetic and sensitivity reasons, the exposed distal coronal area of the lateral incisor was restored by composite resin (Charisma OD+ A2; Heraeus, Germany; Fig. 3, c). We decided to hold off other orthodontic and prosthodontic treatment and follow-up, because the exposed coronal area was restored esthetically enough by composite resin and the extracted space could be closed by biologic movement of the originally lingual positioned lateral incisor and highly positioned canine.

At the 1-year recall, the maxillary left lateral incisor showed no specific signs of periapical pathosis and responded positively to electrical pulp testing. The extracted space was closed by biologic movement, and the restored area showed an esthetic result (Fig. 4). At the time of writing, we were waiting for the biologic closure of the remaining space between the lateral incisor and canine.

**DISCUSSION**

Dental fusion is the union of 2 dental germs and is characterized by an enlarged crown and 1 less tooth in the total arch count. Fusion with a normal tooth may lead to diastema, whereas fusion with a supernumerary tooth may lead to crowding. Both of them can cause serious esthetic problems, malocclusions, and psychologic problems, especially in children and adolescents.

Many different multidisciplinary approaches for the treatment of fused teeth have been suggested because of the considerations of the endodontic, esthetic, orthodontic, periodontal, and functional problems. The most common treatment alternatives are the following: extraction, separation into 2 single teeth, hemisection and extraction of one-half, autotransplantation after hemisection, and reshaping the crown.

An endodontic consideration is the prerequisite for these treatment alternatives. In the treatment of fused teeth, the necessity of endodontic treatment depends on the fusion aspect of the 2 teeth: location of fusion, whether having connection of pulp chamber or not, whether having independent 2 roots canals or not, etc. Several papers have reported the need of endodontic treatment before surgical intervention of fused teeth, and a number of studies that performed the separation of fused teeth and extracted the supernumerary tooth while maintaining the vitality of the remaining tooth successfully have been reported. Endodontic treatment might be performed before or after hemisection if the chambers of the 2 fused teeth are connected and there is communication between the 2
root canals, whereas there seems be little reason for endodontic treatment if 2 chambers and 2 root canals exist independently.

In the present case, the treatment plan of extracting the supernumerary tooth without endodontic treatment of the remaining tooth could be decided based on CBCT findings. CBCT is becoming a more common and powerful tool in dental diagnosis and provided valuable information on the fused tooth in this case, allowing us to confirm its 3-dimensional structure. Moreover, CBCT provided a precise 3-dimensional cutting-plane line, which was very important to prevent pulp exposure in the remaining tooth.

The importance of the present case report is that the treatment of fused tooth became simple without need of endodontic treatment, and the prognosis became much better because of a 3-year wait-and-see period. This observation time allowing the full development of the fused teeth was thought to enable the pulp chamber and 2 roots to be separated and to make treatment easy. We postponed the orthodontic treatment and had a 1-year wait-and-see period after hemisection and extraction of the supernumerary tooth to allow the extracted space to be closed by physiologic tooth movement. At 1-year follow-up, the extracted space decreased to a satisfactory level considering the patient’s age, and there were not any esthetic problems, hypersensitivity, periapical pathosis, or external resorption.

Although the separation between the 2 root canals appeared evident in CBCT findings in the present case, if contamination of pulp happens through the exposure of possible remaining vascular canals which had existed between the 2 root canals,³ pulp pathosis can occur in a hemisection case in the future. Also, cementum could be little or absent in the sectioned root surface, which can cause a problem of periodontal ligament attachment. Periodic examination of pulpal and periodontic states will be needed to keep this treatment of fused teeth successful.

CONCLUSIONS

In the present case, we accurately examined the fused tooth and predicted the precise cutting-plane line by CBCT. Thus, vital hemisection could be selected as an appropriate treatment alternative and more recommended procedure in cases where a permanent tooth is fused with a supernumerary tooth.

REFERENCES


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