Unusual Morphology of Permanent Tooth Related to Traumatic Injury: A Case Report

Minji Kang, DDS, and Euiseong Kim, DDS, MSD, PhD*†*

Abstract

Introduction: Root duplication, or multiple roots, is a very rare anatomy of the maxillary central incisor. **Methods:** This case report describes a permanent central incisor having 2 distinct roots as an assumed sequela of the avulsion and replantation of a primary incisor. **Results:** The permanent successor might have had a disturbance of development because of the traumatic injury and discontinuity in the treatment after replantation. Conventional endodontic treatment followed by esthetic restoration was performed on the tooth. **Conclusions:** Clinicians should consider the potential prognoses and complications of traumatic injuries to primary teeth. *(J Endod 2014;40:1698–1701)*

Key Words

Maxillary central incisor, traumatic injury, unusual morphology

From the *Department of Conservative Dentistry and †Microscope Center, Department of Conservative Dentistry and Oral Science Research Center, College of Dentistry, Yonsei University, Seoul, South Korea.

Address requests for reprints to Dr Euiseong Kim, Microscope Center, Department of Conservative Dentistry and Oral Science Research Center, College of Dentistry, Yonsei University, 50 Yonsei-Ro, Seodaemun-Gu, Seoul, 120-752, South Korea. E-mail address: andyendo@yuhs.ac

0099-2399/$ - see front matter

http://dx.doi.org/10.1016/j.joen.2014.06.006

It is well-known that traumatic injuries of the primary dentition may interfere with the development of permanent teeth. Developmental disturbances in the permanent dentition after an injury to the primary dentition were reported in 12%–69% of cases in various clinical studies (1–5). Possible morphologic variations include the discoloration of the enamel, enamel hypoplasia, odontomalike malformations, crown or root dilacerations, root duplications, and partial or complete cessation of the root formation (2).

Root duplication or multiple roots of the upper central incisors are very rare because the root canal anatomy of the maxillary central incisor usually has 1 root and 1 radicular canal system (6, 7). One case report (8) described root duplication of a permanent incisor as a result of an intrusive luxation of the primary teeth. The author speculated that the intrusion of the deciduous tooth into the follicle of the developing tooth germ caused an acute tilting of the permanent tooth germ and the formation of second root.

The avulsion and replantation of a primary tooth has been mentioned in some clinical reports as a cause of damage to permanent teeth (2, 9, 10). Sakai et al (10) reported root dilacerations of a permanent tooth as a result of this type of traumatic injury. However, there is no report of a case describing the second root formation of a permanent incisor appearing after the avulsion of a primary tooth. The aims of this case report were to describe a permanent central incisor having 2 distinct roots as an assumed sequela of the avulsion and replantation of a primary incisor and to discuss the correlation between the trauma of primary teeth and the developmental anomaly of the permanent tooth.

Case Report

A 14-year-old girl attended the Department of Conservative Dentistry of the Yonsei University Dental Hospital, Seoul, South Korea, with a chief complaint of a sinus tract on the upper front buccal gingiva. There was no contributable medical history. According to her parents, she fell forward and bumped her face on the table when she was 2 years old. Her right maxillary primary incisor was avulsed and replanted after 30 minutes at an emergency care center. Afterward, she did not attend the dental clinic, and no further follow-up of the primary incisor was done. The right maxillary central incisor was partially erupted and discolored, so it was treated with a tooth-colored restoration at a local clinic 5 years ago.

An intraoral examination revealed a sinus tract close to the upper right central incisor, which was tilted distally with partial eruption (Fig. 1). There was a tooth-colored restoration composing most of the crown. The tooth was not sensitive to palpation or percussion, but the probing depth on the mesial side was 6 mm. A radiographic examination, including cone-beam computed tomographic imaging, showed that it had 2 distinct roots: the mesial root surrounded by a radiolucency and the distal root positioned at the palatal side (Fig. 2*A*–*C*). When gutta-percha was probed into the sinus tract, it indicated the origin was a radiolucency of the mesial root. After clinical and radiographic examinations, the tooth was diagnosed with pulp necrosis and a chronic apical abscess. The treatment plan was a conventional root canal treatment followed by the replacement of the coronal restoration.

After the application of local anesthesia with lidocaine hydrochloride (2% with epinephrine 1:100,000), the tooth was isolated with a rubber dam. The access opening was started from the palatal side of the coronal restoration with a high-speed no. 2

Figure 1. A preoperative photograph of the maxillary right central incisor with a sinus tract.

round bur, and the buccal side of the restoration was preserved. The mesial canal was easily detected. After pulp extirpation with K-files, the canal was debrided with 2.5% sodium hypochlorite. However, finding a distal canal was difficult because of its position. During the canal location, the cervical dentin under the coronal restoration was perforated. A resin-modified glass ionomer (Fuji II LC; GC Corporation, Tokyo, Japan) was used to repair the perforation site. After identifying the distal canal, extirpation and irrigation of the canal were performed in the same manner. The working length was determined with an apex locater (RootZX, Morita, Japan) and a periapical radiograph. Canals were prepared using the crown-down technique with the Profile System (Dentsply Maillefer, Ballaigues, Switzerland) up to file number 40/.06 for the mesial and 35/.06 for the distal canal system. The canals were dried with sterile paper points, and calcium hydroxide paste was placed in the root canals. The access cavity was sealed with a temporary sealing material (Caviton, GC Corporation). After a week, the tooth was asymptomatic, and the root canals were filled using a thermoplastic obturation technique (SuperEndo Alpha and Beta; B&L Biotech, Ansan, Korea) and Sealapex (SybronEndo, Orange, CA) as a sealer. After the canal filling, the coronal restoration was removed completely, including the perforation site of the cervical dentin. A composite resin endocrown was delivered to the tooth as a final restoration (Fig. 3*A* and *B*).

The patient was followed-up at 3 months, 6 months, and 1 year through clinical and radiographic examinations (Fig. 4). The tooth remained asymptomatic, and the probing depth was improved to normal.

Discussion

Andreasen and Ravn (9) reported developmental disturbances in 41% of 213 injured teeth. The lower the age at the time of an injury the higher the incidence of disturbances observed in permanent teeth is because the tooth germ is sensitive during early developmental stages. Intrusive luxation and avulsion appeared to be the types of injuries most often associated with disturbances in tooth development. The specific pathogenesis of the avulsion of primary teeth is responsible for this high frequency of disturbances (4). The slight rotating movement during an avulsion because of the root curvature may injure the hard or soft tissues separating the primary tooth from the developing permanent tooth germ.

Textbooks and review articles about traumatic injuries of primary teeth have traditionally rejected the idea of replantation (11). The argument against replantation of primary incisors notes the risk of damage to the permanent tooth germ, which is in the process of development. The coagulum forced into the area of the follicle during replantation may impair the permanent successor (10–13). There were case reports describing impaction with a radicular cyst or dilacerations of a permanent incisor after the replantation of primary incisors (10, 12). Nevertheless, some clinicians perform replantation based on a few case reports that support this procedure (14, 15). According to the clinical opinion, the main benefit of the treatment is the maintenance of anterior dentition, an esthetic zone. Other reasons for replantation are the prevention of occlusion problems, space maintenance, and preservation of bone (15). After the replantation of

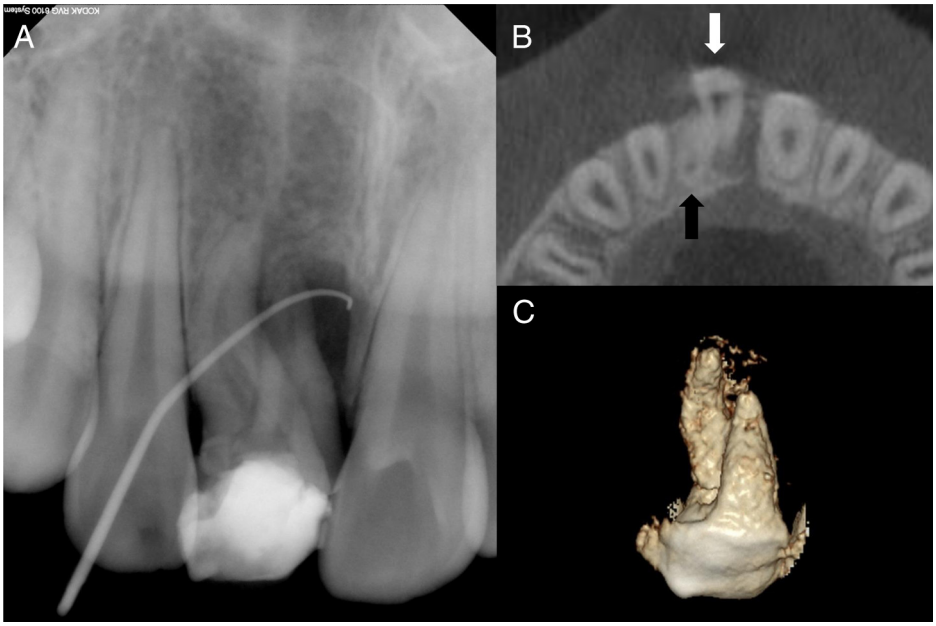

Figure 2. (*A*) A periapical radiograph of the maxillary right central incisor with gutta-percha tracing. (*B*) A reformatted axial view of the cone-beam computed tomographic scan of the maxillary right central incisor. The *white arrow* indicates the mesial root of the tooth, and the *black arrow* indicates the distal root of the tooth. (*C*) Three-dimensional reconstruction of the tooth.