

Management and Long-term Follow-up of a Case in a Child with Traumatically Avulsed Maxillary Incisor Accompanied by Mesiodens

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Abstract: Dental trauma in childhood requires emergency treatment that might range from a simple repositioning, through replantation, to root as well as pulp treatment and apexification depending on severity of the injury. The trauma may be complicated with the existence of supernumerary teeth, and orthodontic treatment other than the management of trauma may be needed either for complication of the traumatized teeth or already existed occlusion problems. We report the management and long-term follow-up of a rare case in a child with traumatically avulsed maxillary incisor accompanied by mesiodens. The patient had a severe trauma to the face, which resulted in avulsion of the maxillary central incisor. Immediate replantation within 30 min after the trauma was performed. Radiographic examination also showed the mesiodens. Since external resorption started during follow-up, and electric pulp testing indicated negative response, we performed root treatment and apexification by calcium hydroxide. The mesiodens was extracted after the stabilization of the patient, followed by orthodontic treatment for the maxillary protraction. Although ankylosis occurred in long-term follow-up, no discomfort in the daily life with good prognosis was noticed.

Introduction

Emergency treatment ranging from a simple restoration, coronal pulp treatment and apexification, to root treatment and splinting is necessary in childhood dental trauma. These traumatic injuries to permanent teeth with complete or incomplete root formation are commonly seen during childhood and include coronal and root fractures, luxations, and avulsions. A recent study of Japanese children showed that 5% of injured teeth with immature root development exhibited tooth avulsion (1). The preferable management for the avulsed tooth is the immediate replantation within 20-30 min after injury or keeping it in a wet suitable medium until the intervention (2).

A mesiodens is a supernumerary tooth located in the maxillary central incisor region. Mesiodens can occur individually or as multiples and can significantly impair both occlusion and appearance by altering the eruption pathway and the location of the permanent incisors.

Here we report the management and follow-up of a traumatically avulsed maxillary left central incisor in a child with supernumerary tooth.

Case Report

A 9-year-old child was referred to the emergency department of Kyushu Dental College Hospital due to severe trauma to the face. Initial diagnosis demonstrated the avulsion of the maxillary left central incisor and subluxation of the next lateral incisor. The patient was admitted to the hospital within 30 minutes after the trauma. The avulsed tooth was kept in oral cavity of the patient to prevent drying and preserve its survival. Complete avulsion and an impacted mesiodens were diagnosed by radiographic assessment.

At the initial treatment, the alveolar area and peri-gingival tissues were washed and disinfected, and avulsed tooth was immediately replanted and fixed by using wire splints. To prevent infection and relieve pain, antibiotics, analgesics and gargle were prescribed to the patient. The treatment of impacted mesiodens was canceled until stabilization of the traumatic teeth. The splint was removed 1 month later, and the tooth was immobile and stable at that time

and at the control 2 months after the replantation.

Because we noticed malocclusion at 4 months after the trauma, the supernumerary tooth was extracted. Since regular follow-up visits showed gradual protraction of the mandible in clinical examination, negative response in electric pulp testing and external root resorption in radiographic assessment, we started orthodontic treatment, followed by the root canal treatment of the traumatized incisor. At 5 and 10 years' regular follow-up, ankylosis and bony replacement of the incisor was noticed. The orthodontic treatment relieved the protraction of the mandible. Although discoloration of the tooth was shown in these periods, no discomfort or trouble in the daily life was observed, indicating the successful replantation of the tooth.

Discussion

Avulsion is a severe injury affecting the pulp, periodontal ligament and the alveolar bone. Although avulsed permanent teeth can survive following replantation, replacement root resorption, which often leads to loss of the tooth, occurs when periodontal cells, cementum and alveolar periosteum are severely damaged. The prognosis of an avulsed tooth is affected by the time out of the socket, the dry storage time, storage media and the treatment methods for the replantation. Especially early replantation of the tooth within 30 min after the trauma and its proper preservation in a wet storage are important for the prognosis.

In the current case, the patient was admitted into the hospital within 30 minutes and the avulsed tooth was carried in the oral cavity, which are good predictive signs for the prognosis. However, the periodontal tissues and alveolar periosteum are severely injured in an avulsed tooth and the vitality of the pulp and the periosteum should be carefully examined during follow-up visits. If any sign of the loss of pulp vitality is detected either by electric pulp testing or clinico-radiological assessments, root canal treatment should be performed at earliest time when the clinical situation is available to prevent ankylosis and replacement resorption of the root. In our case, since the follow-up examination showed loss of the pulp vitality by electric pulp testing and external resorption by x-ray at about half year after the trauma, we applied canal treatment

and apexification by calcium hydroxide agent.

The supernumerary teeth are rarely seen and 90% of them occur in the maxilla (3). When an impacted supernumerary tooth is detected in a traumatically injured incisor, its management should be done as soon as possible after the patient's situation is stable. In our case, we didn't extract the mesiodens immediately after the trauma to prevent further injury to the periodontal tissues and the permanent teeth.

Ankylosis is an important complication of the traumatically injured teeth. It occurs especially in the cases with damage to alveolar periosteum and is diagnosed by a typical metallic sound, limitation of normal tooth mobility, and absence of periodontal space by radiographic assessment. In our case, ankylosis of the incisor occurred after a long-period follow-up about 2 and half years after the trauma. The orthodontic treatment was started half year later for the maxillary protraction. Though it would be difficult to improve the protraction due to ankylosis of the incisor, a satisfactory improvement was acquired with good long-term

prognosis.

In conclusion, we report an extremely rare case of a traumatically avulsed maxillary incisor accompanied by a supernumerary tooth in a 9-year-old child. Early intervention and replantation rescued the tooth, though the resorption and ankylosis of the tooth occurred during follow-up probably due to severe damage to the periodontal tissues and alveolar membrane. However, by applying the proper root canal and orthodontic treatments, the patient did not suffer any discomfort in the daily life at 10 years after the trauma.

References

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