

A Case Report of Root Resorption after Tooth Dislocation Replantation

Qian Fang

Yiwu Hangzhou Stomatological Hospital, Jinhua Zhejiang, 322000, China

Abstract: The complete dislocation of the right upper central incisor lasted for more than 2 hours. After 2 weeks of replantation, the ligature was removed. After 1.5 months of reexamination, it was found that the internal and external root absorption of the affected tooth could be slowed down through infection control in the root canal and apical barrier. Reexamination 2.5 months later showed increased bone density around the root of the affected tooth.

Keywords: Replantation of Tooth Dislocation; Root Resorption; Dental Treatment.

1. Introduction

Dental trauma includes periodontal membrane injury, hard tissue injury and tooth dislocation. They can occur alone or simultaneously. The meaning of tooth dislocation is that the tooth is removed from the socket by external force. According to the magnitude and direction of the external force, it can be divided into incomplete dislocation and total dislocation. Replantation of completely dislocated teeth within 30min can avoid root absorption by 90% [1]. When the tooth is reimplanted within 2 hours, the retention rate of the affected tooth is higher, but the follow-up treatment needs to be combined with the patient's age and time in vitro. The complications of dental trauma include pulp necrosis, root canal occlusion (calcification degeneration) and root resorption. Extracardiac resorption often occurs in dislocated and replanted teeth and can be divided into three types: surface resorption, inflammatory resorption and external alternative resorption [2]. External root resorption

occurred 2 months after replantation of the right upper and middle incisor tooth after complete dislocation, and the root canal was filled with bioceramics material to slow down external root resorption.

2. Typical Case

2.1. Patient Information

The boy, a 9-year-old, was found to have completely dislocated his right upper middle incisor tooth due to playing with a skateboard in February 2024. The dislocated tooth was placed in frozen yogurt and temporarily fixed in Shanghai Ninth People's Hospital more than two hours later. Elastic fixation was performed in the pediatric department of our hospital three days later, and the resin ligature was removed two weeks later. Deny any pain and other discomfort symptoms, refer to my office for follow-up treatment.

2.2. Clinical Examination

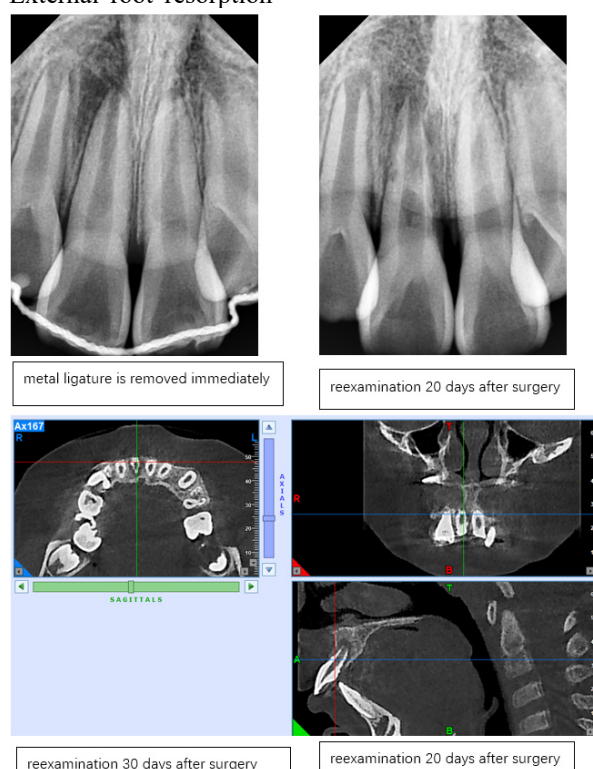


Fig 1. Dental examination CT

The clinical crown of right upper middle incisor tooth, which was 1mm shorter than the adjacent tooth, 11 probing (-), tapping (-), loosening I degree, no response to cold diagnosis, no obvious abnormality of the gum, no deep periodontal pocket was detected. CT showed that 11 apical foramina were not closed, there were obvious low-density shadow around the root, and the root surface of the tooth had insect erosion defects of different depths.

2.3. Diagnosis 11 Pathological Absorption

2.4. Treatment Process

The rubber barrier on upper right middle incisor tooth, the

pulp cavity was opened, and the root canal was rinsed with 1% sodium hypochlorite, the working length was 18mm (80# root tip had a gripping sensation), the incisal edge was taken as a guide, ultrasonic rinsed with 0.9% normal saline +17%EDTA solution for 2min, the paper tip was dried, the root canal was disinfected with calcium hydroxide paste, and GIC was temporarily sealed. After half a month, the apical 5mm barrier was performed with bioceramic material under the microscope. After 1 week, the hot dental glue was filled 1mm below the root canal and the nano-resin was filled. One and a half months later, the alveolar bone density around the root of 11 teeth increased, and the periodontal space was clear.

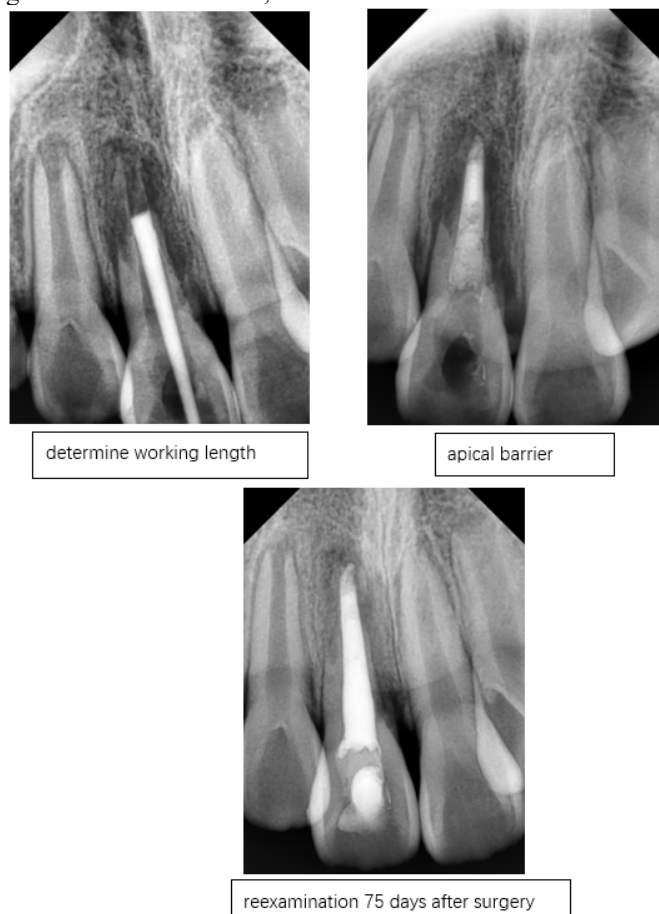


Fig 2. The treatment process of teeth CT scan

3. Discussion

3.1. Causes of Root Resorption

For completely dislocated teeth, replantation within 30 minutes can avoid root absorption by 90% [1]. Studies have shown that the survival rate of periodontal membrane is very low and it is easy to inflammatory absorption when the time of isolation exceeds 60 minutes [3-5]. Causes of inflammatory absorption in dislocated teeth: the tooth is preserved in a dry environment before replantation, or the pulp has died. Some studies have shown that the pulp and periodontal membrane cells have been necrotic for more than 2 hours after dislocation, and it is impossible to perform periodontal membrane reconstruction. It is recommended to complete root canal therapy, root surface and alveolar curettage in vitro, and then implant fixation. After total tooth dislocation, avulsion and rupture of blood vessels and nerves

at the root tip are easy to cause pulp necrosis, and the necrotic pulp promotes root resorption [6]. The patient was treated before the basic hospital, because the hospital doctor could not deal with it, drove to the superior unit, in vitro dislocation for more than 2 hours, and placed on ice yogurt storage, and was fixed in the superior hospital, what kind of treatment was done on the root surface was not clear. The causes of root adduction in affected teeth may be related to the following three aspects: First, the time in vitro was more than 2 hours. Second, improper selection of storage media. Third, the treatment method of root surface during replantation is not clear.

3.2. Time of Pulp Treatment

Pulp treatment of reimplanted teeth is related to the degree of root development: First, if the root is mature, the pulp should be removed immediately or at the first visit, and the root canal should be filled after the root canal is sealed with

calcium hydroxide, and the inflammatory absorption is stable. Second, for permanent teeth with immature roots, the pulp tissue is preferred to be preserved in the hope that the roots will continue to develop. If pulp necrosis is observed during follow-up, the pulp should be removed immediately and apical induced angioplasty or pulp revascularization should be performed. [7]. It is also necessary to consider the time of dislocation of the tooth. If the apical hole is less than 1mm and the dislocation time is greater than 45 minutes, preventive pulpotomy should be performed 2 weeks after replantation. If the dislocation time is less than 45 minutes, follow up closely after replantation, and if pulp necrosis occurs, endodontic treatment should be performed in time [6]. In this case, the patient's right upper middle incisor tooth was dislocated for more than 2 hours at the second visit, possibly due to the emergency at night, and the attending physician did not perform external root canal treatment, but directly performed replantation for temporary fixation. Three days later, the patient's family members moved to another place for re-fixation due to work reasons. After fixation, the looseness of the tooth was relieved, but the necrotic pulp of the tooth promoted the resorption of the root surface of the tooth, so the reexamination 1.5 months after replantation revealed serious resorption of the root surface. Due to the young age of the patient and no obvious loosening of the affected tooth, the first choice is to remove the infected pulp, and then choose apical barrier or pulp revascularization according to the situation of root resorption.

3.3. Choice of Treatment

The conventional treatment of young permanent teeth with open apical foramina includes pulp revascularization, apical induced plasty and apical barrier. Pulp revascularization is defined as the stimulation of apical bleeding to 4mm below the enamel cementum boundary, and the placement of bioceramic material above it, using the blood clot in the root canal as a scaffold, to promote pulp tissue repair and regeneration, so as to promote the continued development of the root. Some scholars have found that the main reasons for the failure of pulp revascularization are inadequate infection control and root absorption [8]. Due to the severe internal and external root absorption of the affected tooth, it is impossible to choose the revascularization program. Apical induction plasty is the permanent filling of the root canal after calcium hydroxide is used to promote root development and make the apical end close or form the apical barrier. However, studies have shown that only when the drugs in the root canal are in direct contact with the remaining pulp or dental papilla of the root tip, cementum deposition will occur and thus seal the root tip, otherwise a complete hard tissue barrier cannot be formed [9]. Apical barrier is defined as the use of bioceramics to form

an artificial barrier in the immature apical area and seal the root tip. The disadvantage is that it cannot promote the continued development of the root and the thickening of the root canal wall, and it is routinely used in older patients [10]. Due to the serious internal and external root absorption and the large area of low density projection outside the apical tip, apicoplasty may not be able to contain the root absorption. Apical barrier was selected to strengthen chemical preparation and calcium hydroxide sealing to control root canal infection, while bioceramic material was used to isolate the internal and external channels of root canal, hoping to slow down the progress of absorption. Reexamination 2.5 months after the operation showed that the bone density around the root increased and seemed to be progressing in a good direction. We expect the follow-up effect in 6 months and 1 year after the operation.

References

- [1] Ming wen Fan, Dentistry and Endodontics[M], 4th., Beijing: People's Medical Publishing House,2014.140-142.
- [2] JO Andreasen, FM Andreasen: Root resorption following traumatic dental injuries[J]. Proceedings of the Finnish Dental Society. 88(suppl 1):95-114,1992.
- [3] Barrett EJ, Kenny DJ, Tenenbaum HC, et al. Replantation of permanent incisors in children using Emdogain[J]. Dent Traumatol,2005,21(5): 269-275.
- [4] Boyd DH, Kinirons MJ, Gregg TA.A prospective study of factors affecting survival of replanted permanent incisors in children[J]. Int J Paediatr Dent,2000,10(3):200-205.
- [5] Trope M, Clinical management of the avulsed tooth: Present strategies and future directions[J]. Dent Traumatol, 2002, 18(1): 1-11.
- [6] Xuedong Zhou, Chuanbin Guo, Xinquan Jiang, Zuolin Wang, Stomatology[M], Beijing: People's Medical Publishing House, 2022, 185,31-32.
- [7] Xindi Ma, Lei Chen. Pulp and periodontal healing in replantation of completely dislocated teeth: from biological basis to guidelines for dental trauma [J]. International Journal of Stomatology,2020,47(3): 336-344.
- [8] Weiqiu Jin, Ying Liao, Fuhua Yan. The clinical effect of pulp revascularization in the treatment of pulp necrosis in young permanent teeth with or without periapical periodontitis [J]. Journal of Clinical Stomatology.2024,40(1)17-20.
- [9] Arruda MEF, Neves MAS, Diogenes A, et al .Infection contral in teeth with apical periodontitis using a triple antibiotic solution or calcium hydroxide with chlorhexidine: a randomized clinical trial[J].J Endod,2018,44(10):1474-1479.
- [10] Junqi Ling, Jiacheng Lin. Progress in the treatment of pulp revascularization [J], Stomatology 2019,39 (10): 865-872.