

A CASE OF THE REPLANTATION OF UPPER DECIDUOUS CENTRAL INCISORS UNDER THE DIFFERENT CONDITIONS OF EXTRA-ALVEOLAR PERIOD

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Introduction

On the guideline of International Association of Dental Traumatology (IADT)¹, it has not been recommended to replant avulsed deciduous tooth. However, on the review of the Japanese Journal of Pediatric Dentistry (JJPD) titled the Traumatic Dental Injuries of Primary and Immature Permanent Teeth², avulsed deciduous tooth under the good condition should be replanted. We present here the case that avulsed upper deciduous central incisors were replanted under the different conditions of extra-alveolar period.

Case report ~ Patient ~

Age: 3 years and 4 months old
Gender: Female
Medical History: Nothing Particular
Dental History: Nothing Particular
Circumstances of Accident:

She fell down a step at the window, and hit her upper incisors against a wooden sash of the window at around three o'clock PM. Both upper deciduous central incisors were avulsed. Just after the exfoliation, her grandmother found the left incisor and wrapped it by a food wrapping plastic film.

The patient came to our clinic approximately one hour later.

Case report ~ Initial Treatment ~

On examination the patient did not show any neurological symptom and extra oral injury. The alveolar sockets of avulsed central incisors were filled with blood clots (Fig.1a). No other oral injury was detected by both inspection and the radiograph (Fig.1b).

The examination of the left incisor revealed that although the incisal edge was chipped, the other part of the tooth was intact and the root surface was covered with moist remnants of periodontal tissue. The left incisor was dipped into the saline with Heparin and Ampicillin.

We explained the benefit and risk of the available treatment options to her mother and grandmother and they decided a replantation. Her grandmother went home in search of the right incisor and brought back with it to the clinic. The right incisor under dry condition for about two hours was rinsed with the same solution just before the replantation.

We replanted both incisors without endodontic treatments and fixed them using twisted 0.4mm orthodontic ligature wire and *Super-Bond*® (Sun Medical, Japan)(Fig.2a). Another radiograph was obtained to confirm proper positioning of the replanted incisors (Fig.2b). Postoperative drugs (Amoxicillin, Acetaminophen and Povidone Iodine liquid) were prescribed.

Case report ~ Course ~

At the next visit two weeks later, marginal gingiva of central incisors became a little red and the discoloration of right incisor was observed (Fig.3a,b). The radiograph seemed to be almost normal aspect of anatomical structures (Fig.3c). At one month after the replantation, the fixed resin on the right canine and lateral incisor was detached and re-bonded. Two months after, the fixation was removed. On the radiograph the periodontal space of right central incisor became unclear (Fig.4).

Four months after, the incisal edge line of labially inclined right incisor became higher than that of left incisor (Fig.5a). The Periodontal spaces of both incisors were unclear. the ankylosis of both incisors was suspected by the percussion test and the radiograph (Fig.5b). Six months after, the discoloration of the right incisor disappeared, the internal root resorption of the left incisor at lower one-third was observed (Fig.6a,b). Eleven months after, the internal and apical root resorption progressed on the left incisor (Fig.7).

Fourteen months after, the sound of percussion test that suspected ankylosis was lost on the left incisor (Fig.8a,b,c). Twenty months after, same sound was also lost on the right incisor, grade I tooth mobility was observed on both incisors (Fig.9).

Two years after, grade II tooth mobility was observed on both central incisors (Fig.10). Two years and three months after, the replanted teeth were still in almost original places without any pain and inflammation, and both the growth and eruptive movement of their successors seemed to go well (Fig.11).

Discussion

The main reason why the replantation of avulsed deciduous tooth should not be recommended is the risk that poor prognosis might induce the partial hypoplasia or hypo-mineralization of it's successor, sometimes a delay of eruptive movement of it. In case of the replantation of avulsed deciduous tooth, Miyashin³ pointed out some requirements as follows: (a) replantation within three hours after injury, (b) the root surface of avulsed tooth is under moist condition during extra-alveolar period, (c) enough alveolar bone for avulsed tooth to replant to the original position, (d) enough adjacent teeth to fix avulsed tooth, (e) after careful explanation of the risk and benefit of replantation of deciduous tooth and other treatment options, the caretaker understand the explanation and can decide the plan.

In our case, the replantation of the left central incisor met all these requirements, but that of the right incisor did not met one of the requirements (b).

Two years and three months after the replantation (5 years and 7 months old), both deciduous avulsed incisors still remained in the oral cavity without any negative clinical symptom. Furthermore, the radiograph showed the influence of the replantation against the eruptive movement of their successors might be little. Still there is the risk of hypo-mineralization of their successors such as a white spot or a yellow spot, we must observe the prognosis of this case carefully until the eruptions of successors.

Because of the difficulty in root filling technique or materials of deciduous



Fig.1 Before replantation
a. Labial view b. Radiograph
Both central incisors were avulsed and blood clots filled the sockets.



Fig.2 After replantation
a. Labial view b. Radiograph
Incisors were replanted to the correct positions and fixed.



Fig.3 2 weeks after
a. Labial view b. Palatal view c. Radiograph
The discoloration of right central incisor was observed.



Fig.4 2 months after
The periodontal space of right incisor became unclear.



Fig.5 4 months after
a. Labial view b. Radiograph
Periodontal spaces of both central incisors were unclear.



Fig.6 6 months after
a. Labial view b. Radiograph
The internal root resorption of left incisor was observed



Fig.7 11 months after
The internal and apical root resorption progressed on left incisor

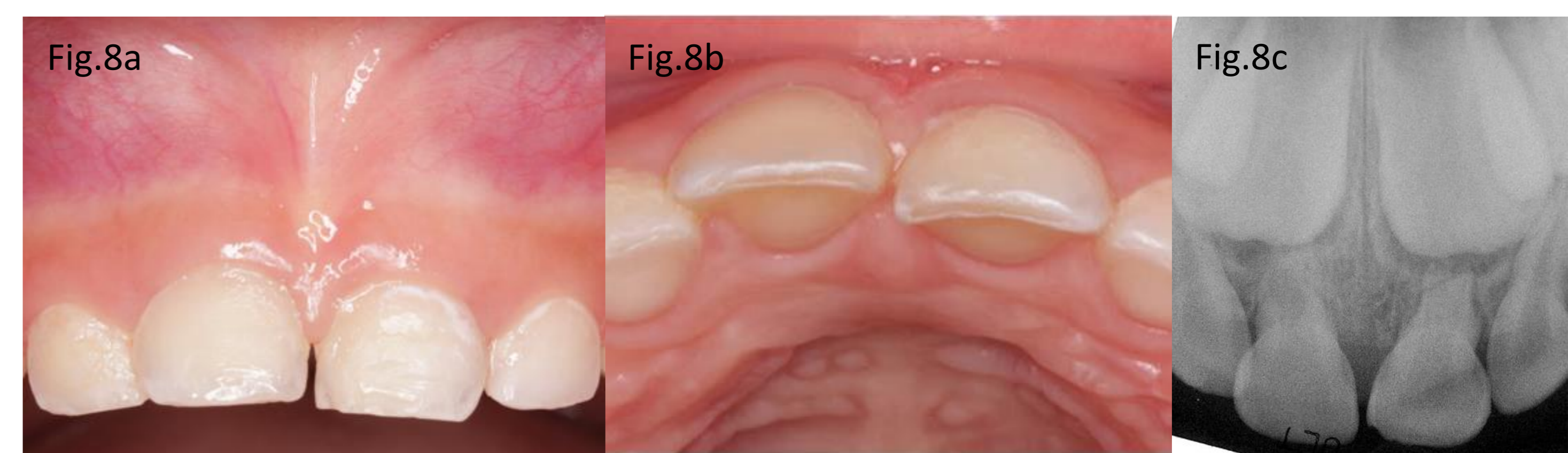


Fig.8 14 months after
a. Labial view b. Occlusal view c. Radiograph
The sound of percussion test that suspected ankylosis was lost on the left incisor

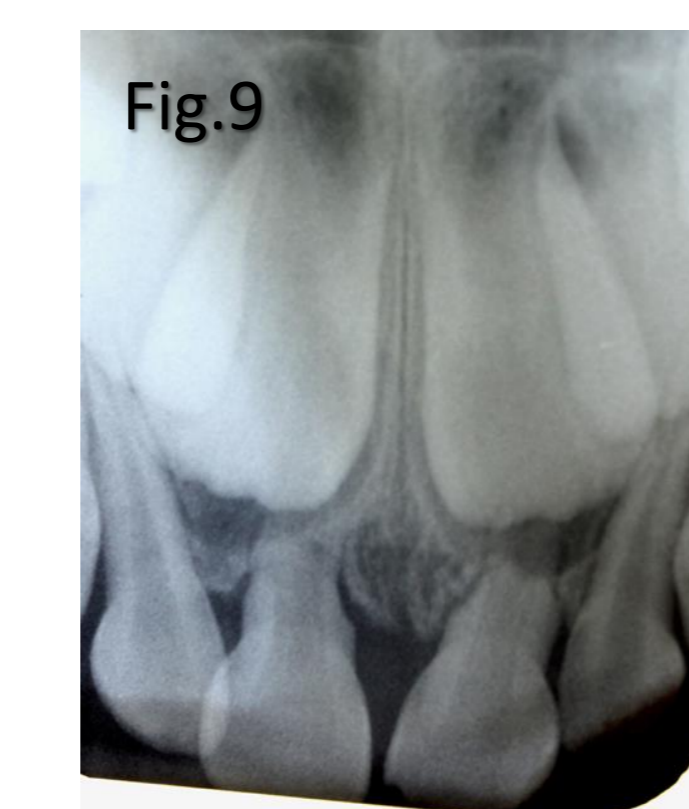


Fig.9 20 months after
Grade I tooth mobility was observed on both incisors



Fig.10 2 years after
a. Labial view b. Radiograph
Grade II tooth mobility was observed on both incisors



Fig.11 27 months after
a. Labial view b. Radiograph
Both successors seemed to grow and develop normally

tooth, we didn't do any endodontic treatment before the replantation. Although the times of devitalization of the pulp tissues were obscure, both replanted teeth remained normal color until the last visit except temporary discoloration of the right incisor without any sign of pulp inflammation. In case of the internal root resorption after replanting avulsed permanent tooth, early endodontic treatment is recommended. In our case, the position of root resorption was not cervical but lower one-third, we took a wait-and-see approach.

From four months after the replantation, the ankylosis of both teeth was suspected both on the radiograph and percussion test and suggested the failure of periodontal ligament revitalization. Suspected causes of the ankylosis in this case seemed to be the dry conditions at extra-alveolar times, the longer period of fixation (two months) and immersing the avulsed teeth into the heparin-added saline solution.

The earlier starting time of ankylosis and more labial inclination might due to the two hours dry condition during extra-alveolar period of right incisor. On the assumption that the smaller and shorter root of deciduous incisor needed more longer fixation period than that of permanent incisor, the two months fixation period seemed still too long. Even though the heparin was blended into the saline in expectation of the recirculation of the pulp, immersing avulsed tooth into the saline seemed to be the negative factor for existence of periodontal ligament tissue.

Conclusion

Recent years, the replantation of avulsed deciduous tooth under the good extra-alveolar condition is suggested contrary to the guideline of IADT. This case report showed the progress of the replantation of avulsed upper deciduous central incisors under the different conditions of extra-alveolar period. Although the revitalization of both pulp and periodontal ligament tissue was not observed, both deciduous incisors remained in the almost original positions without any negative clinical symptom two years and three months after the replantation and their successors seemed to grow and develop normally.

References

1. B. Malmgren, J.O. Andreasen, M.T. Flores, et al., International association of dental traumatology guidelines for the management of traumatic dental injuries: 3/ Injuries in the primary dentition. *Dental Traumatology*, 28: 174-181, 2012
2. M. Kato. On the traumatic dental injuries of primary and immature permanent teeth - The treatments with guidelines for the management of traumatic dental injuries - , *Japanese Journal of Pediatric Dentistry*, 49(3): 215-230, 2011 (in Japanese)
3. M. Miyashin. Long-term prognosis of replanted primary teeth after traumatic avulsion, Additional volume the Quintessence YEAR BOOK 2012: 193-199, 2012 (in Japanese)