



Successful replantation and splinting of a maxillary segment fracture in the primary dentition

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The literature has few articles on primary anterior teeth replantation and splinting. Reports in the literature on avulsion and replantation primarily address the permanent dentition, perhaps because most complete avulsions occur between the ages of 7 and 11 years.¹ Recently a case was reported on the avulsion and successful replantation of two primary mandibular incisors in a 2-year-old patient.² A splint was not placed nor was root canal therapy performed because of the promptness of the replantation. After two years, the teeth showed no signs of pulpal necrosis and were stable. Generalizations concerning the success of replantation of primary teeth met with some resistance in follow-up letters.^{3, 4} One noted that the article had no photographs or radiographs to demonstrate the success of the case.³ Another letter pointed out that the case report should not imply a new standard of care for replanting primary anterior teeth, because it happened to meet all the ideal criteria for the replantation of primary anterior teeth (i.e., less than 30 min out of the alveolus, a suitable transport medium, a "clean" injury, and a child less than 2 years of age).⁴ Also, the teeth were not completely out of the oral cavity because of soft tissue attachment.

The success of replantation of primary anterior teeth is considered more uncertain than permanent anterior teeth. McDonald and Avery state that the replantation of primary teeth should take place only under favorable conditions (i.e., a clean injury without other injury or significant behavior problems) and within 30 min after the avulsion.⁵ Andreasen and Andreasen do not advise replanting avulsed primary anterior teeth because of the frequency of pulp necrosis and risk of injuring the permanent tooth germ caused by forcing the coagulum into the area of the developing follicle.⁶

If conditions are suitable for replanting a primary tooth, pulpal tissue extirpation and a resorbable filling material must be considered. A zinc-oxide and eugenol mixture has been recommended as a root canal filling in primary teeth because it slowly resorbs with the tooth.⁷ Jacobsen and Sangnes, on the other hand, suggest that pulp therapy be performed only if signs of pulpal necrosis become evident, since the open apex of primary teeth lend themselves to revascularization.⁸ Since the length of time from avulsion to replantation is critical, the root canal treatment can be delayed for 1

to 2 weeks after replantation to decrease the length of time the tooth is out of the alveolus and minimize tooth handling. Another consideration in treating avulsed or severely displaced permanent or primary anterior teeth is stabilization after replantation or alignment. The bonded archwire splint appears to be the most common of many methods used today. It has several advantages over other types of splints by meeting the criteria of Camp (easy to fabricate, done directly in oral cavity, allows approach for endodontic therapy, easy to remove, etc.).⁹

The purpose of this report is to present a case of successful segment realignment, tooth replantation, and splinting involving the primary dentition.

Case report

History and examination

A 6-year-old Caucasian male was seen in the emergency room at The Children's Hospital in Birmingham, Alabama. The chief complaint was displaced teeth and bleeding gums from falling off a swing.

The patient was in excellent health with an unremarkable past medical history except trauma to the maxillary right primary central incisor approximately 1 year previous from a skateboard accident (no dental treatment was rendered).

Clinical examination revealed a maxillary anterior segment fracture or split involving the primary incisors and the buccal alveolus, which was displaced about 5 mm from the original position (Fig 1). The previously injured tooth was discolored. The patient had a healthy dentition without caries or restorations. A panoramic and maxillary occlusal radiograph did not clearly show the segment fracture, but displacement of the teeth was apparent clinically. Calcification of the pulp canal of the tooth with previous trauma was evident. The radiographs did reveal a significant delay in the resorption of primary roots and the absence of root fractures.

Intravenous sedation was elected for the patient due to concerns about behavior and the extent of the procedure. After administering the local anesthetic, an attempt was made to reposition the fractured segment, but was unsuccessful because the maxillary right lateral and left primary central incisor were luxated. To remedy this problem, these two teeth were removed from the fractured segment and replanted into the re-

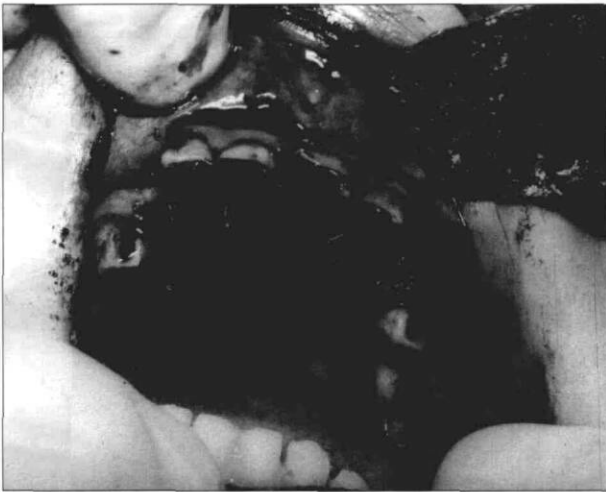


Fig 1. Maxillary anterior segment fracture.



Fig 2. Maxillary anterior segment repositioned and splinted.

maintaining alveolus in the nonfractured part of the bone. This allowed for correct placement of the fractured segment with the remaining alveolus. Next, the maxillary primary first molars, canines, and four incisors were acid etched and a 0.0175 braided wire was bonded with a composite restorative material to these teeth (Fig 2). The gingival lacerations were sutured with 4-0 chromic gut sutures. The patient was placed on 125 mg potassium penicillin four times a day for 7 days. A soft diet was recommended and his parents were given instructions on proper oral hygiene.

Three days after the injury, healing appeared to be proceeding normally and there were no complaints of pain or discomfort associated with the injury. The child was seen again 10 days later for splint removal. Soft tissue was healing well and there was no swelling or tooth discoloration noted except for the maxillary right primary central incisor. At a 3-month follow-up visit, no signs of clinical nor radiographic pathology were detected. Another radiograph was exposed at 6 months, which did not reveal abscess, resorption, or other pul-



Fig 3. Radiograph of maxillary anterior teeth at 6 months followup.

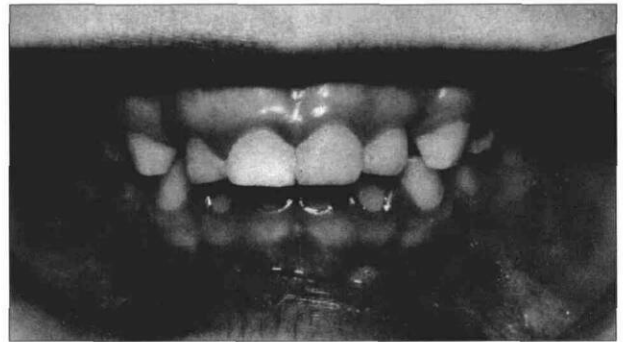


Fig 4. Six months after injury.

pal pathology (Figs 3 and 4). The teeth were examined again 1 year later and the maxillary segment and teeth were stable without any indications of failure (Fig 5). Since the discolored tooth was not causing any problems and the child's mother was not concerned about the appearance, nothing was done. Treatment was considered successful at this time; however, the mother was instructed on what signs to look for in case problems arose at a later time. The patient was placed on regular recall.

Discussion

Primary teeth replantation and splinting is controversial among clinicians.¹⁰ Some feel strongly that the replantation of primary teeth is contraindicated because of the frequency of pulp necrosis and possible damage to the developing tooth germ.⁶ In a small child, it is often difficult to justify putting the patient through a long and tedious procedure when extraction or leaving the tooth out may be less traumatic. In addition, the primary tooth will eventually be replaced with a permanent successor. The success of replantation cannot be guaranteed and further treatment and possibly extraction may be needed later. If parents are concerned about the child's appearance, they may insist on trying

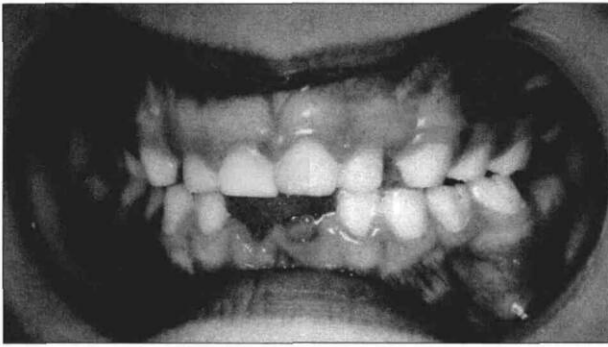


Fig 5. One year after injury.

to save the avulsed tooth and may be willing to take the risk. In most cases, replantation of primary teeth is probably not a good option, and the parents should be convinced.

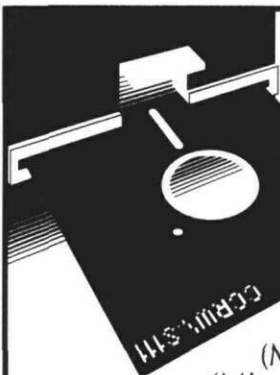
One of the most important criteria for successfully replanting avulsed teeth is the length of time the tooth has been out of the socket. Ideally, the tooth should be replanted within 30 min after the avulsion.⁵ Other important factors are the extent of contamination, (a "clean" injury, for example, would have a better prognosis than a severely contaminated injury), the extent of root resorption, and the presence of oral habits. A tooth with advanced root resorption or a child with a thumbsucking habit would not indicate replantation.

Treatment options offered to the parents included reducing and fixing the fracture segment or removing the segment along with the primary incisors. A full explanation of all possible consequences of each treatment option was explained. For example, removing the fractured segment with the teeth would leave a large bony defect, and also there would be an extended

period of edentulousness until the permanent incisors emerged. Reduction and fixation, on the other hand, had a questionable prognosis, and the teeth could require later pulp therapy should pulp necrosis ensue. Ankylosis of the primary incisors was also a possibility with reduction and fixation. After presenting these and other facts to the parents, they chose reduction and fixation.

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