

Replantation of Avulsed Permanent Maxillary Central Incisors in an 11-year-old Boy: A Case Report

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Abstract

Tooth avulsion is a traumatic dental injury which leads to displacement of the tooth from its socket. This case report highlights the successful management of avulsed permanent maxillary central incisors with an extra-oral dry time of 60 min. An 11-year-old male patient arrived with a severe dental injury to his maxillary anterior region, which had been caused by an accidental self-fall. On clinical examination, it was discovered that teeth 11 and 21 were avulsed. These teeth were replanted according to the criteria of the International Association of Dental Traumatology and stabilized by splinting. One week after the replantation, root canal therapy was started which was completed in subsequent visits. The patient was completely asymptomatic clinically and no signs of resorption were observed on radiographic examination. Follow-up examinations were performed at 1, 3, 6, and 12-month intervals.

Keywords: Avulsion, Extra-oral time, Replantation, Traumatic dental injury.

INTRODUCTION

Traumatic dental injuries (TDIs) occur frequently in children and young adults, comprising 5% of all injuries.^[1] Avulsion of permanent teeth is seen in 0.5–16% of all dental injuries.^[2] One such severe traumatic dental injury is an avulsion, which is defined as the complete displacement of the tooth from its alveolar bone socket. The teeth that are most frequently avulsed are the maxillary central incisors due to their prominent position in the arch.^[3] For the therapy of tooth avulsion, immediate replantation is the main objective of treatment. In certain circumstances, including as high caries index, periodontitis, severe heart conditions, immunosuppressive illnesses, or cautious people, this procedure is not advised. A retrospective study conducted on children has verified that the replantation method has a long-term survival rate (79.3%) when in compliance with the International Association of Dental Traumatology (IADT) treatment guidelines.^[4] The patient's overall health, the root apex's maturity, the storage medium, and the extraoral period all influence how well the replanting surgery goes.^[5] The purpose of the present article is to report on successful management of avulsed maxillary central incisors in an 11-year-old boy with one 1-year follow-up.

CASE REPORT

An 11-year-old boy reported to the Department of Pediatric and Preventive Dentistry with the chief complaint of loss of upper front teeth following a self-fall an hour back. On soft-tissue examination, edema of the upper lip was noted. On intraoral examination, clinically missing 11, 21 teeth were noted, grade-2 mobility in relation to tooth 12 and grade-1 mobility in relation to 22 was noted (Figure 1a). Following trauma, the tooth was wrapped in a tissue paper and presented at the outpatient department by the parent within 1 h of avulsion. The patient's medical history was not contributory. Debris and visible contaminants were removed and the tooth was placed in saline solution during clinical and radiographic examination of the patient. Intraoral periapical radiograph (IOPAR) was taken which confirmed avulsion in relation to 11, 21 teeth and subluxation in relation to 12, 22 teeth (Figure 1b). After taking parent's consent, immediate replantation of avulsed teeth was planned.

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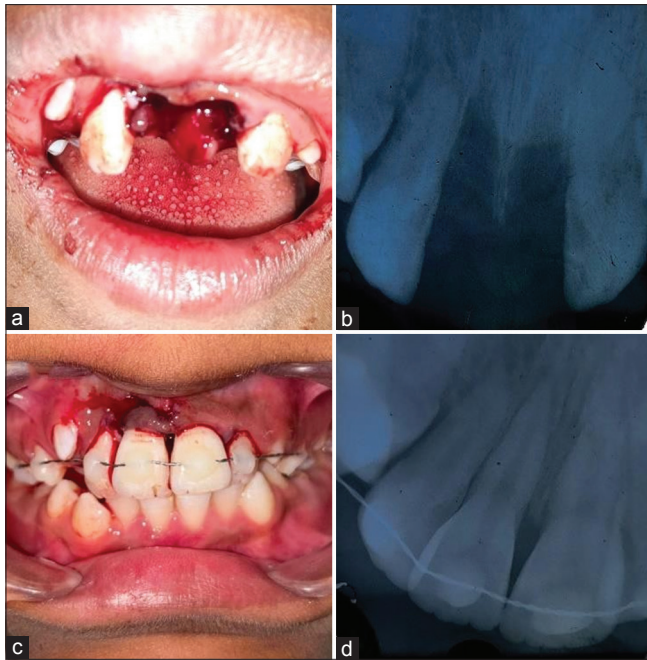


Figure 1: Pre-operative: (a) Clinical, and (b) radiographic images showing avulsed teeth 11 and 21. Immediate post-operative: (c) Clinical, and (d) radiographic images showing replantation and splinting of teeth 11 and 21

Following administration of local anesthesia (2% lignocaine with 1:100,000 adrenaline), the socket was irrigated with sterile saline. The coagulum was removed and both teeth were replanted with slight digital pressure. The position of the teeth was confirmed with an IOPAR followed by splinting with a flexible wire splint bonded with composite resin extending from 15 to 25 teeth (Figure 1c and d). The splint was retained for 2 weeks. The patient was given post-operative instructions which included soft diet and chlorhexidine mouth wash (0.12%) for 2 weeks. Tetanus booster dose was administered. Systemic antibiotics and analgesics were advised for 5 days.

The patient was recalled after 1 week, and endodontic treatment was initiated, access opening and bio-mechanical preparation was done and calcium hydroxide intracanal medicament was placed. Following 2 weeks, splint was removed. The patient was recalled at 2 weeks follow-up and the calcium hydroxide dressing was replaced. Following which obturation was done in relation to teeth 11, 21 as patient was completely asymptomatic (Figure 2a and b). The patient was then recalled for follow-ups at 3 months (Figure 2c and d), 6 months (Figure 3a and b), and 12 months (Figure 3c and d) during which he was clinically asymptomatic and did not show any radiographic signs of root resorption. Since patient had crowding in maxillary anterior region, he was referred to orthodontist for the needful. The patient was happy with the treatment done and he will be followed up annually for the next 4 years.

DISCUSSION

An avulsed permanent tooth is a serious TDI, which preferably should be dealt with immediately. The prognosis is mostly

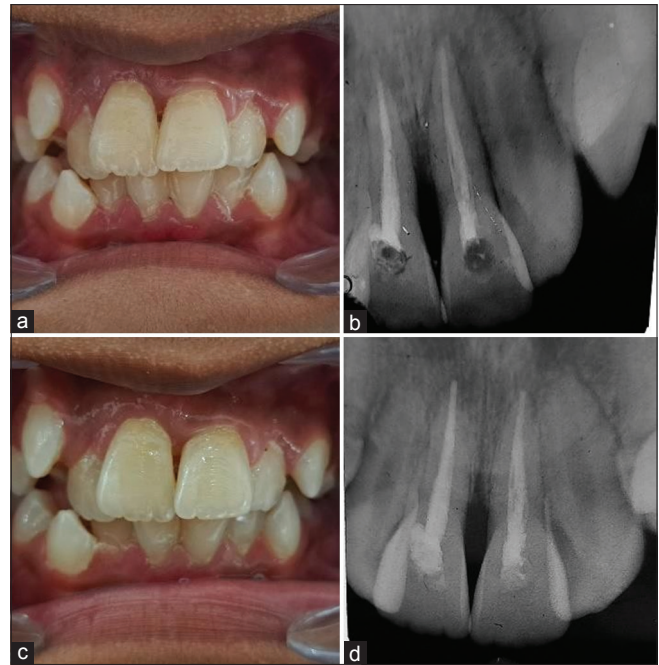


Figure 2: One-month post-operative follow-up: (a) Clinical, and (b) radiographic images. Three months post-operative follow-up: (c) Clinical, and (d) radiographic images



Figure 3: Six-month post-operative follow-up: (a) Clinical, and (b) radiographic images. Twelve-month post-operative follow-up: (c) Clinical, and (d) radiographic image

determined at the scene of the event and in the moments following the avulsion.^[1] In the present case, the tooth was reimplanted within 1 h of avulsion. Replantation of the avulsed tooth helps to maintain alveolar bone volume and morphology which at a later date provides more rehabilitation options such as decoronation, auto-transplantation, a resin-retained bridge,

a removable partial denture, or orthodontic space closure with or without composite resin modification.^[2,6] Apart from that, retention of the patient's tooth by replantation or interim prosthesis offers psychological benefit to the patients that his/her tooth was put back rather than an artificial tooth.^[7] This was evident in the present case as well, the replanted teeth provided immense psychological benefit to the patient who was aged 11 years.

Replanting teeth immediately improves periodontal ligament (PDL) repair and greatly lowers the risk of root resorption. As a result, minimizing the amount of time between trauma and tooth replantation while maintaining the extracted tooth in an appropriate transport medium can both significantly improve the prognosis and diminish the detrimental impact of the extraoral period on the root surface.^[8] In the present case, the avulsed tooth was carried in a tissue paper suggesting an extraoral dry time of 60 min. Most teeth can be successfully replanted if the extraoral dry time is <30 min; after this period, the survival probability of the tooth diminishes – the PDL cells are irreversibly damaged after 30–60 min.^[9] Although some of the replanted teeth have low probability of long-term survival and may be lost or condemned to extraction at a later stage, not replanting a tooth is an irreversible decision and therefore saving it should be attempted.^[2]

Current evidence supports short-term, passive, and flexible splints for stabilization of replanted teeth. Studies have shown that periodontal and pulp healing are promoted if the replanted tooth is subjected to slight mobility and function.^[2,10] There are various materials and techniques available for splinting, but IADT recommends the use of stainless steel wire up to a diameter of 0.016" or 0.4 mm or with nylon fishing line (0.13–0.25 mm), and bonded to the teeth with composite resin.^[2] In the present case, S.S wire of diameter 0.4 mm was used for the purpose of semi-rigid splinting for a period of 2 weeks.

Endodontic treatment was initiated within 2 weeks of reimplantation. Calcium hydroxide dressing was placed for a period of 1 month by changing it once in 2 weeks, following which gutta-percha obturation was performed. This was done in accordance to the IADT guidelines.^[2] The patient was followed up at 1, 3, 6, and 12 months. The patient was happy with the treatment done and he will be followed up annually for the next 4 years.

CONCLUSION

The preferred course of treatment for tooth avulsion is immediate replantation. In addition to meeting the patient's functional and esthetic needs, it also supports the preservation of the surrounding bone for prosthetic rehabilitation in the event that replantation is unsuccessful. Replanting an avulsed tooth can result in a favorable outcome even with a longer extraoral recovery period if all recommended guidelines and protocols are followed.

CONFLICTS OF INTEREST

None.

SOURCES OF SUPPORT

None.

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