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DELAYED REPLANTATION AFTER EXTENDED DRY STORAGE: TWO YEAR FOLLOW UP OF AN AVULSED PERMANENT INCISOR

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ABSTRACT

Avulsion of permanent teeth is the most serious of all dental injuries. Replantation is the treatment of choice, but cannot always be carried out immediately. There is consensus in the literature that the shorter this period, the higher will be the possibility of pulp revascularization and reattachment of periodontal ligament fibers. The need of maintenance of the avulsed tooth in an adequate medium is also known. The present study reports a case of complex replantation after avulsion, in which the care was provided 48 hours after the trauma and the tooth was kept dry by the patient. Even though the conditions for replantation were unfavorable and contraindicated with poor prognosis, late replantation maybe a viable option provided proper protocol is followed.

KEYWORDS: Avulsion; delayed replantation, doxycycline solution, mineral trioxide aggregate (MTA), permanent right central incisor, root canal treatment

INTRODUCTION

Among all facial injuries, dental injuries are the most common of which avulsions occur in 1-16% of all dental injuries.^[1,2] According to the World Health Organization (WHO) classification for traumatized teeth, avulsion, or exarticulation is the complete displacement of a tooth from its alveolar socket due to traumatic injury.^[3] This injury involves the supporting tissues (cementum, periodontal ligament {PDL}, bone) and dental pulp. The prognosis depends on the measures

taken at the place of accident or the time immediately after the avulsion. Replantation is the treatment of choice, but cannot always be carried out immediately.^[1] As the time between avulsion to reimplantation increases, the danger of replacement resorption increases, and revascularization decreases (in teeth with an open apex).^[4] The present study reports a case of complex replantation after avulsion, in which the care was provided 48 hours after the trauma and the tooth was kept dry by the patient.

CASE REPORT

A 13 year old boy had an avulsion of the upper right central incisor that occurred two days before he had visited the Department of Pedodontics and Preventive Dentistry. He had a fall on the floor of his terrace while running (this history helps to assess the contamination). There were no associated symptoms like amnesia, unconsciousness, drowsiness, vomiting and headache. The tooth was kept completely dry inside the cupboard for two days and later brought to the hospital wrapped in a sheet of paper. The patient presented good general status, without fracture of the alveolar bone or history of previous lesions. No extra oral injury was detected. Clinical examination showed the loss of right maxillary permanent central incisor and laceration of gingiva on the labial aspect. The intra oral radiograph showed the loss of the maxillary right central incisor with a normal socket, and no evidence of jaw fracture was found (Fig. 1). The patient and his caretaker were informed about the procedure and the possible results and consent obtained for accomplishment of replantation. On examination of avulsed tooth, it appeared completely dry. Hence, after careful



Fig. 1: Preoperative periapical radiograph showing the loss of the maxillary right central incisor with a normal socket walls



Fig. 2: Postoperative periapical radiograph after replantation and splinting with a 0.018 × 0.025 inch semi rigid arch wire and bonded with composite



Fig. 3a: Follow up 6 months



Fig. 3b: Follow up 12 months



Fig. 3c: Follow up 24 months

cleaning of the tooth with gauze soaked in saline, the tooth was placed in Doxycycline solution (1mg of Doxycycline in 20 ml of saline) for hydration and antibacterial action until coronal opening and instrumentation. The root canal was instrumented by holding the coronal portion of the tooth and then obturated extraorally using mineral trioxide aggregate (MTA). Local anesthetic was administered and the socket was curetted gently and the blood clot was removed; preparing the socket for replantation. The tooth was placed gently, removed and then MTA placed at the apex of the tooth and reimplemented into the socket with the help of light finger pressure. Immediate post operative intraoral periapical radiograph was taken to evaluate proper positioning of tooth into the socket. The

teeth were splinted with a 0.018 × 0.025 inch semi rigid arch wire and bonded with composite. Intra oral periapical radiograph was repeated again after splinting (Fig. 2). The lacerated gingival on the labial aspect of the avulsed tooth was sutured using silk suture. Postoperative drugs (amoxicillin and paracetamol) were prescribed and patient was instructed about oral hygiene, intake of soft diet and quitting acidic beverage consumption. When the patient was seen after a month, his clinical examination revealed no problems. After 7 weeks, the retainer was carefully removed and another periapical radiograph was taken, revealing normal aspect of the anatomical structures. The patient attended eight follow-up sessions in the subsequent months. During the following observation periods

of 6, 12 and 18 months the tooth did not exhibit any endodontic lesions, discoloration, gum abscesses, pain or any inflammatory root resorption symptoms. Healing continued, and at the 24 month follow up, there was no clinical or radiographic signs of root resorption, and complete bone deposition was also observed on all aspects of the root (Fig. 3)

DISCUSSION

In the present case, the time elapsed from the occurrence of trauma up to emergency care was 48 hours, worsened by the dry storage of the tooth, conditions reported in the scientific literature as unfavorable for a good prognosis. However, despite the unsatisfactory conditions, replantation was the treatment option due to the young age of the patient, and the family was informed on the risk of failure. Even teeth kept dry for long periods should be replanted. In the case of late replantation, careful cleaning with gauze soaked in saline is recommended to remove the necrotic periodontal ligament fibers. The same procedure was followed in the present case. In the present case, the tooth was placed in Doxycycline solution to inhibit bacteria from pulpal lumen due to its antibacterial action and reduces bacterial invasion of the PDL space. Furthermore, this treatment lowered the frequency of inflammatory root resorption to 30% vs. 66% in the control group and the frequency of ankylosis to 48% vs. 68% in the control group. Tetracycline is an antibiotic with a wide antibacterial range, including anaerobic and facultative bacteria. Its mechanism of action involves the prevention of protein synthesis in the bacterial cell.^[5] In addition to its antibacterial action, tetracycline can minimize the damage of the inflammatory process by delaying the action of the enzyme matrix metalloproteinase (MMP), a collagenase that breaks down collagen in connective tissue. Tetracycline encourages the action of fibroblasts and the healing of connective tissue, which contributes to the recovery of the PDL after injury.^[6,7] After the placement of the tooth in Doxycycline solution, MTA was placed at the apex of the tooth and reimplanted. MTA was used due to the cell inductive potential and antimicrobial property related to the release of hydroxyl ions which increases the pH (pH of 12.5 similar to calcium hydroxide) creating an unfavorable environment for the bacteria to

survive.^[8] The persistence of acute or chronic inflammation for long periods leads to the establishment of a favorable tissue environment that may stimulate the inflammatory resorption. Therefore, when replanting the tooth, simultaneous prescription of wide spectrum antibiotic therapy is recommended for two weeks.^[9] These are effective in preventing bacterial invasion of the necrotic pulp and, therefore, subsequent inflammatory resorption. The bacterial content of the sulcus should also be controlled during the healing phase. In addition to stressing the need for adequate oral hygiene to the patient, the use of chlorhexidine rinses for 7-10 days may also be useful.^[5] Follow-up of the replanted tooth comprised every 3 months radiographic and clinical examination to evaluate the presence of any mobility, discoloration, inflammatory resorption and periapical lesion. After 24 months, the tooth clinically exhibited normal aspect with slight discoloration, and the radiographic examination revealed bone formation at the apical portion of the root.

CONCLUSION

The present study reports a case of complex replantation after avulsion, in which the care was provided 48 hours after the trauma and the tooth was kept dry by the patient. Even though the conditions for replantation were unfavorable and contraindicated with poor prognosis, late replantation maybe a viable option provided proper protocol is followed.

CONFLICT OF INTEREST & SOURCE OF FUNDING

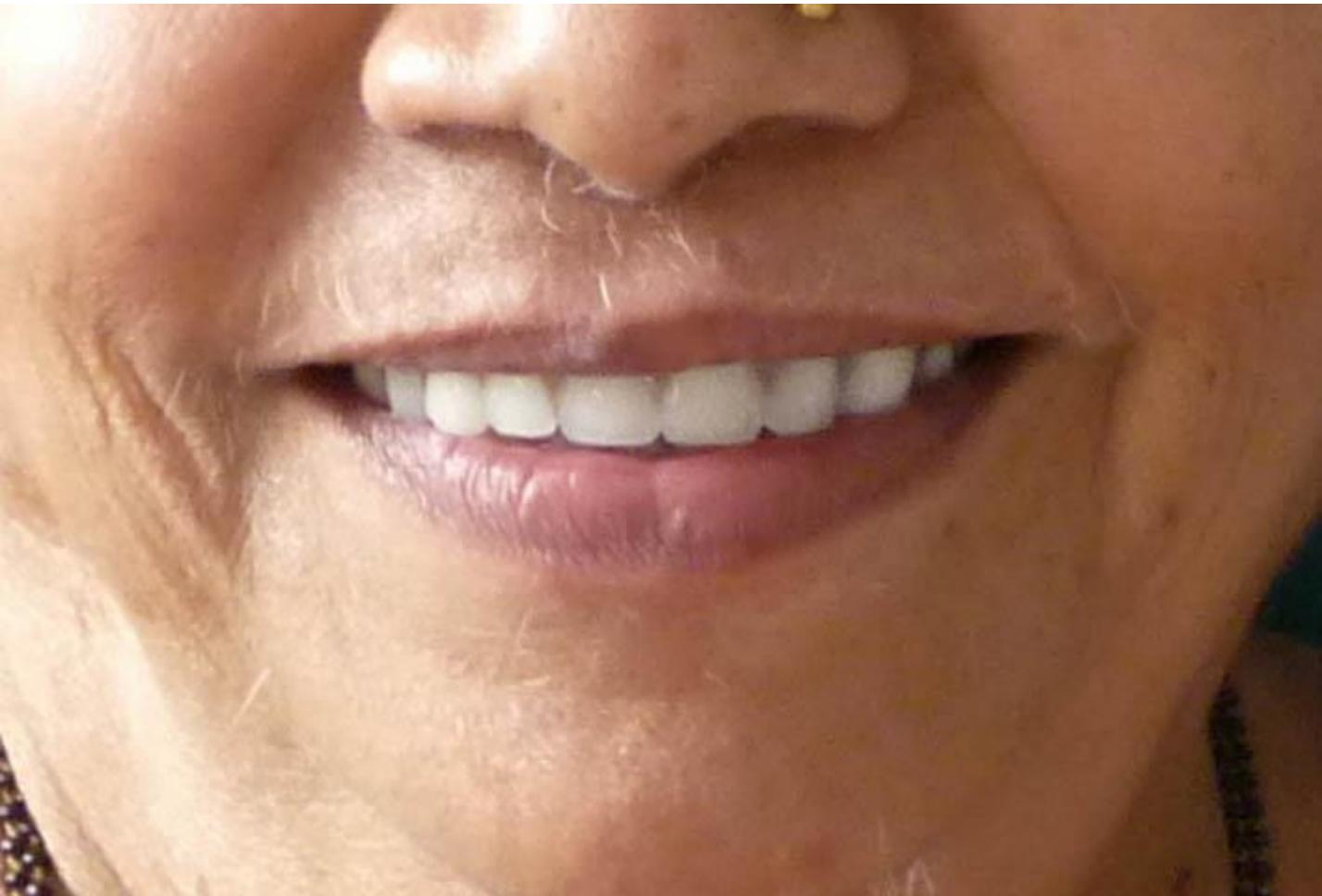
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