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### RESEARCH ARTICLE

#### DELAYED REPLANTATION OF AVULSED TOOTH- A CASE REPORT

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#### Manuscript Info

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#### Abstract

##### Aim-

**Background-**Trauma to the oral region occurs frequently and comprise 5% of all injuries. Among all facial injuries, dental injuries are the most common of which avulsions occur in 1–16% of cases. Avulsion is defined as total displacement of the tooth out of its socket. An avulsed tooth can usually be retained by replantation; however, the prognosis depends on the extraoralduration, the condition of the avulsed tooth, patient's age and root development. In many cases, a replanted tooth survives only a matter of years, during this period it serves as a natural space maintainer whilst growth occurs, and also enables alveolar height to be preserved.

**Case Description-** This case report describes delayed replantation of an avulsed maxillary central incisor in an eleven year old child after trauma.

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#### Introduction:-

Trauma to the oral region occurs frequently and comprise 5% of all injuries for which people seek treatment. In preschool children the figure is as high as 18% of all injuries. Among all facial injuries, dental injuries are the most common of which avulsions occur in 1–16% of all dental injuries<sup>(1,2)</sup>. Permanent maxillary central incisor is the most commonly avulsed tooth.

Avulsion is defined as total displacement of the tooth out of its socket. Avulsions occur most commonly in the permanent dentition of 8- to 12 years old at a time when there is a loosely structured periodontal ligament surrounding erupting teeth that often exhibit short, incompletely formed roots. Treatment of avulsions is directed at avoiding or minimizing the effects of the 2 primary complications: (1) pulpal infection and (2) periodontal ligament attachment damage.

An avulsed tooth can usually be retained by replantation; however, the prognosis depends on the extraoral duration , the condition of the avulsed tooth, the patients age and root development. In avulsion, the periodontal membrane is separated; half is attached to the root and the other half to the alveolus. Vitality of the periodontal ligament is of great importance to the success of a replanted tooth.

Replantation of avulsed teeth can be divided into two categories: immediate replantation and delayed replantation<sup>3)</sup>

Clinical studies have shown that the prognosis is best for teeth replanted within 5 minutes after avulsion,<sup>(4,5,6)</sup> yet such optimal treatment is not always possible. As a treatment option, reimplantation restores occlusal function and esthetics shortly after injury. If the periodontal ligament left attached to the root surface does not dry out, the

consequences of tooth avulsion are usually minimal<sup>(7)</sup>. The hydrated periodontal ligament cells will maintain their viability, allowing them to reattach on replantation without causing any more than minimal destructive inflammation. The reattachment of periodontal fibers and the formation of Sharpey fibrils occur about 2 weeks after replantation. However, if excessive drying occurs before replantation, the damaged periodontal ligament cells will elicit a severe inflammatory response over a diffuse area on the root surface<sup>(8)</sup>. Nevertheless, if managed properly, avulsed teeth with avital periodontal ligament can be replanted and will remain functional for some years<sup>(9)</sup>.

This case report, describes delayed replantation of maxillary left central incisor of a patient after 12 hrs.

### Case Presentation

A 11 year old boy reported to the Department of conservative dentistry and endodontics with an avulsion injury to maxillary left central incisor while playing cricket (Fig.1). He reported 12 hours after the trauma, till then the tooth was stored in a clean, dry handkerchief. Patient's medical history was non-contributory and no signs of neurological injury.

Intraoral examination revealed missing left permanent central incisor (Fig.2). Laceration of the upper and lower lip were present. No other soft tissue or intraoral injuries were evident.

Radiographic Examination showed intact crown and completely formed roots and no signs of fracture or contusion of the alveolar socket (Fig.3).

Adjacent tooth showed positive response on electric pulp test. Various treatment modalities were considered and amongst them replantation of the avulsed tooth was considered most suitable. The treatment plan was explained to his parents. The tooth was examined for fractures and signs of contamination. No signs of fractures were visible, then the tooth was rinsed with normal saline until all the contaminants were removed (Fig.4).

After this extraoral endodontic treatment was initiated, Access cavity preparation was done and thorough biomechanical preparation was done with hand K-files along with continuous irrigation with 2.5% sodium hypochlorite and normal saline. The tooth was then kept in 2.4% sodium fluoride solution for 20 mins (Fig 5). After this the tooth was rinsed with normal saline, canal was dried with absorbent paper points and obturated with gutta-percha points and AH plus sealer and temporary dressing was given. The socket was inspected and irrigated with normal saline, the crown of the avulsed tooth was grasped with the forcep and partially replanted in the socket and with gentle finger pressure replantation was completed (Fig.6). Splinting was done immediately with acid-etch composite resin (Fig.7). Postoperative instructions were given to the patient. Postoperative radiograph was taken after replantation (Fig.8). Splinting was removed after 2 weeks (Fig.9).

Patient was recalled after 6 months, on examination, tooth was not mobile, no tenderness to percussion was seen. Radiographic examination showed, periodontal ligament space and no signs of root resorption were evident (Fig.10).

### Discussion:-

Following replantation of teeth two main complications may occur. Severe damage to the Periodontal ligament by the trauma itself, by unphysiologic storage conditions or by inadequate handling and will result in ankylosis and replacement resorption when infection does not establish. In all mature replanted teeth and in most teeth with an immature root stage pulp necrosis will occur, get infected and may cause Internal root resorption. So, endodontic treatment should be carried out prior to replantation. immediately (extraorally) to prevent microorganisms from entering the root canal or may be postponed for several days.

In the case presented here, the avulsed incisor had a closed apex and had been air-dried for a prolonged period, so it was anticipated that the chance of pulpal and periodontal healing would be extremely low. As a result, the management of this case differed from the accepted replantation protocol. The treatment objective was to retain the avulsed incisor to maintain esthetic appearance and occlusal function, to prevent inflammatory root resorption and to achieve periodontal healing with replacement root resorption.

If excessive drying occurs before replantation, the damaged periodontal ligament cells will elicit a severe inflammatory response over a diffuse area on the root surface, here a large area of root surface is affected meaning that must be repaired by new tissue. The slower moving cementoblasts cannot cover the entire root surface in time

and pulpal necrosis always occurs after an avulsion injury. While the necrotic pulp itself is of no consequence, the necrotic tissue is extremely susceptible to bacterial contamination. If revascularization does not occur or effective endodontic therapy is not carried out, the pulp space will inevitably become infected. The combination of bacteria in the root canal and cemental damage on the external surface of the root results in an external inflammatory resorption that can be very serious and lead to the rapid loss of the tooth<sup>(8)</sup>. Thus, the effects experienced after tooth avulsion has occurred, appear directly related to the severity and surface area of the inflammation on the root surface, and the resultant damaged root surface that should be treated.

In cases of avulsed teeth with avital periodontal ligament treatment with various agents such as tetracycline before replantation have been suggested in the hope of slowing down the resorption process<sup>(10)</sup>. Also, every attempt should be made to preserve the periodontal fibres. This can be done by preserving the tooth in various storage media. Suggested storage media in order of preference are; milk, saliva, either in the vestibule of the mouth or in a container into which the patient spits, physiologic saline or water<sup>(11)</sup>. Water is the least desirable storage medium because the hypotonic environment causes rapid cell lysis and increased inflammation on replantation<sup>(12)</sup>. Cell culture media in specialized transport containers, such as Hank's Balanced Salt Solution (HBSS) or ViaSpanA, have shown superior ability in maintaining the viability of the periodontal ligament fibers for extended periods<sup>(13)</sup>.

In this case, the avulsed tooth was soaked in sodium fluoride solution before replantation. Andreasen and Andreasen recommended that, after planing of the root to remove necrotic periodontal tissue, such teeth be soaked in 2.4% acidulated sodium fluoride solution (pH 5.5) for 20 minutes before extraoral root filling and replantation<sup>(1)</sup>.

Splinting teeth to each other allows weakened teeth to gain support from neighbouring ones. When used to connect periodontally compromised teeth, splinting can increase patient comfort during chewing. The simplest way to connect teeth to each other is the classic bonding method. The enamel surface of the tooth is etched, most commonly with a 37% solution of phosphoric acid. Composite resin can then be bonded to the etched surface and used to rigidly connect the teeth to each other. The composite-resin splint can be strengthened by adding fibres to the splint or by using a fibre meshwork (e.g., Ribbond, Ribbond Inc., Seattle, WA) to reinforce the material<sup>(14)</sup>. The replanted tooth should be splinted flexibly to the adjacent teeth for 7 to 10 days to enhance periodontal healing<sup>(15)</sup>.

Although in many cases a replanted tooth survives only a matter of years, during this period it serves as a natural space maintainer whilst growth occurs, and also enables alveolar height to be preserved. It is therefore very crucial to replant teeth even if the long term prognosis is poor. If the tooth can be maintained until the child reaches 16 years, alveolar bone is preserved<sup>(15)</sup>.



**Fig.1:-** Preoperative photograph of the patient.



**Fig.2:-** Intraoral photograph showing avulsed maxillary left central incisor.



**Fig. 3:-** Preoperative radiograph showing missing left central incisor.



**Fig. 4:-** Avused maxillary incisor kept in normal saline.



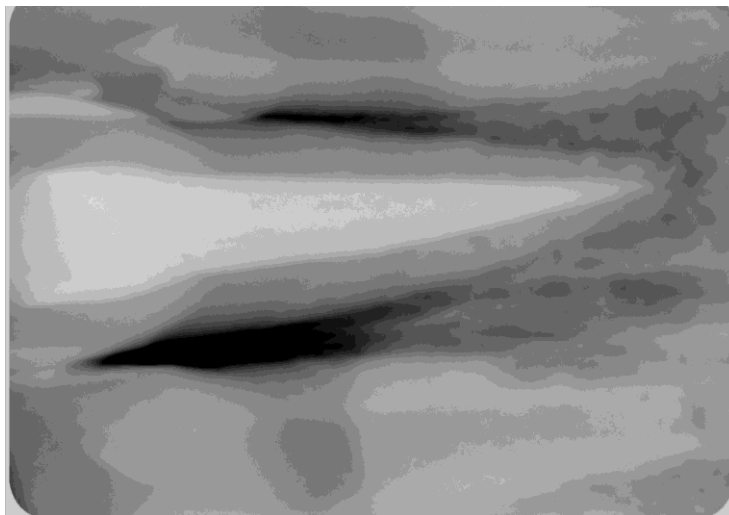
**Fig. 5:-** Avulsed tooth soaked in sodium fluoride solution.



**Fig. 6:-** postoperative photograph immediately after replantation.



**Fig. 7:-** Splinting done with acid-etch resin composite.



**Fig. 8:-** Periapical radiograph immediately after replantation.



Fig 9:- postoperative photograph after removal of splint.

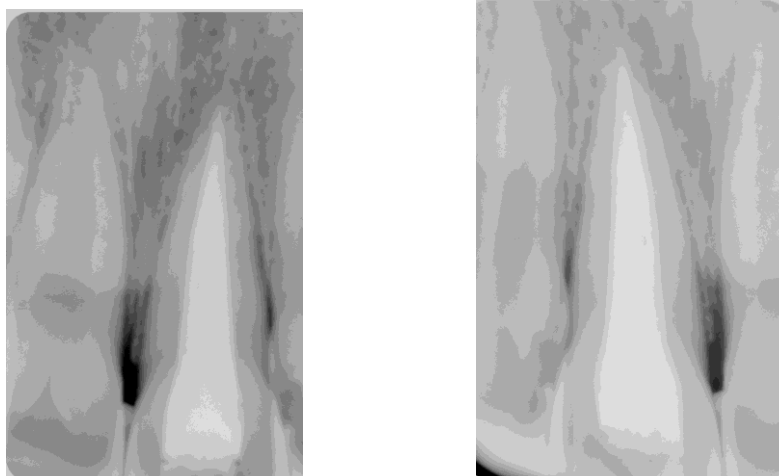


Fig. 10:- postoperative radiograph 6 months recall.

### Conclusion:-

Although risk of progressive resorption and subsequent tooth loss is high, replantation can restore the patients aesthetic appearance and occlusal function shortly after injury and the replanted teeth can remain functional for some years

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