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REVIEW ARTICLE

Re-Implantation of Avulsed Tooth

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Abstract

Management of tooth avulsion of the permanent one is often a challenging task as it involves serious injury to dental and supportive tissues and it mostly occurs in maxillary incisors. The most common complications after avulsions are necrosis of the pulp and root resorp- tion. Treatment of avulsed tooth is often complex, time consuming and expensive and re- quires multidisciplinary approaches. Successful treatment outcome of such an injury is dependent on the survival of the viable periodontal ligament cells attached to the tooth root surface. The viability of the periodontal ligament cells is best preserved either when the tooth is immediately replanted into its socket or if it is stored in an appropriate storage /transport medium till a time, the tooth can be replanted into its socket. (2019, Vol. 03; Issue 01: Page 13 - 16)

Key Words: Avulsion, Hank's Balanced Salt Solution, Injury, Milk, Tooth.

Introduction

Tooth avulsion (exarticulation, total luxa- tion) can be defined as the total displace- ment of tooth out of the socket and it ac- counts for approximately 0.5- to 3% of all dental traumatic injuries to permanent teeth. Tooth avulsion mainly occurs dur- ing sports, physical violence, road traffic accidents, fall and other physical impacts. The peak age for avulsion is between 7 to 9 years and mainly involves maxillary an- teriors (1). Losing an anterior tooth at a young age may have severe psychological consequences. The immediate replanta- tion of a permanent avulsed tooth is es- sential to restore the function and esthet- ics. It is critical for long term success of the treatment also. Avulsion presents a challenge with regard to its proper emer- gency management. The principal chal- lenge is to maintain the vitality of perio- dontal cells, as prognosis of a replanted tooth is directly proportional to the viable periodontal cells. Use of physiological stor- age media like milk, saliva or saline is crit- ical to maintain the viability of periodontal cells until professional help is obtained (2).

Storage Medium

A storage medium may be defined as a physiological solution that closely repli-

cates the oral environment to help pre- serve the viability of periodontal ligament (PDL) cells following avulsion (3).

The ideal requirements for a storage me- dium are (4)

a. It should have antimicrobial character- istics

b. It should maintain the viability of peri- odontal fibres for an acceptable period of time

c. It should favour proliferative capacity of the cells (clonogenic and mitogenic capac- ity)

d. It should have the same osmolarity as that of body fluids (290-300 mosmol/ kg) and pH balanced (7.2 – 7.4)

e. It should be unreactive with body fluids

f. It should not produce any antigen-anti- body reactions

g. It should reduce the risk of post-replan- tation root resorption or ankylosis

h. It should have a good shelf life

i. It should be effective in different climates and under different conditions

j. It should wash off extraneous materials and toxic waste products

k. It should aid in reconstitution of de- pleted cellular metabolites

l. Use of such a storage media has been associated with favourable healing out- comes

The various commonly used storage media include - Hank's Balanced Salt Solution (HBSS),Viaspan, Milk, Coconut Water, Normal Saline and Saliva. There is not a single product or solution that possesses all the characteristics required to be indi- cated as the ideal storage medium for avulsed teeth. Milk is anisotonic liquid with a physiologically compatible pH and osmolality (fluid pressure) with the root- surface adhered PDL cells, has low or no bacterial content, contains growth factors and essential nutrients for cells, in addi- tion to being highly available mostly eve- rywhere and having a low cost. Taking to- gether the characteristics, efficacy and availability and accessibility, milk appears as the best indication of a temporary stor- age medium for avulsed teeth before re- plantation (5).

Treatment of Avulsed Tooth

At the site of accident-

If the patient reports over a telephone call the patient or any adult may be instructed to immediately replant the tooth to reduce the extra-alveolar time period. If dirty, the tooth can be cleaned by simply rinsing it under running cold tap water for 10 sec- onds and placing it immediately in the socket. After reimplantation en route to the dental operatory, patient may be in- structed to bite the tooth with a handker- chief or simply hold it with finger pressure. If reimplantation can not be performed the tooth may be stored in the patient's buccal vestibule or any physiologic storage me- dium (1).

At the clinic-

A proper clinical history regarding the time of injury and the extra-oral period should be taken as early as possible. It is suggested that if there is no suspected fracture of the alveolar socket pre- opera- tive radiograph need not be taken as it only lengthens the extra-oral time. Factors to be considered for reimplanting the tooth (1, 6) -

a. The avulsed tooth should be without ad- vanced periodontal disease

b. The alveolar socket should be reasona- bly intact in order to provide a seat for the avulsed tooth

c. The extra alveolar period should be con- sidered

d. The stage of root development should also be taken into account

If the reimplantation is to be done for an avulsed tooth with extra-alveolar time of less than 60 minutes following steps are to be performed. Tooth is placed in saline and visible dirts from the root surface are removed by steaming saline from a sy- ringe. The alveolus is also rinsed with sa- line to remove the contaminated rem- nants. In case of mature tooth with closed apex, the tooth may be reimplanted. But in case of tooth with open apex, pre-treat- ment with tetracycline powder or solution is recommended to increase the chances of revascularisation. Socket examination is carried out; if there is evidence of bone fracture, repositioning and modelling of the bone should be done. Local anaesthe- sia is preferred if there is evidence of gin- gival lacerations or bone remodelling de- mands the need for suture placement. The tooth should be positioned with light digi- tal pressure; in case of any resistance the alveolus should be inspected and in the mean time the tooth should be placed in normal saline. After placement, reim- planted tooth is splinted for 7-10 days by acid-etch/resin splint. While removing the splint, the reimplanted tooth should be supported and endodontic treatment if re- quired (closed apex cases) should be done before removing splint. Antibiotic supple- ments are given once the splinting is done (7).

However for prolonged extra-alveolar pe-

riod it is suggested to clean the root sur- face followed by treatment with 2.4% So- dium fluoride phosphate acidulate at pH

5.5 for 20 minutes prior to reimplantation as it reduces the chances of root resorp- tion. After the sodium fluoride treatment, the tooth is washed with normal saline and splinted for 6 weeks. Extra-oral Root Canal Treatment may be performed in this case followed by proper obturation.

Radiograph should be taken in the follow up period at an interval of 2 weeks, 3 weeks, 3 months, 6 months, 9 months. If no resorption is present in the first two years after injury, chances of root resorp- tion is reduced but may occur (8).

Prognosis of the Reimplanted Avulsed Tooth

The prognosis of the reimplanted tooth de- pends significantly on the pulp and perio- dontal healing. Reimplantation is often considered as a temporary procedure as the tooth is said to suffer evidently from root resorption (1, 9).

Possible Outcomes

There may be pulpal necrosis and delayed endodontic intervention also faclititates the inflammatory resorption process. Root resorption is always evident (surface re- sorption) which may be repaired with ce- mentum. In case of replacement resorp- tion the tooth gets ankylosed and in case of inflammatory resorption root surface is progressively lost. Prolonged extraoral storage time along with the storage media used plays a significant role in the success of the reimplantation procedure. In case, the reimplantation fails completely ortho- dontic space closure or prosthetic rehabil- itation is indicated (1, 10).

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