REATTACHMENT OF FRACTURED TOOTH FRAGMENT: A CONSERVATIVE MANAGEMENT OF UNCOMPLICATED CROWN FRACTURE OF AN ANTERIOR TOOTH.

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Abstract

Dental injuries are considered emergency situations that require immediate care. Traumatic dental injury (TDI) is a common concern among children worldwide. If a tooth fragment is available, it can be bonded to the tooth. Appropriate management of anterior tooth fracture not only restores the function and esthetics but also provides a positive psychological impact for the patient. One of the most conservative approaches for such a restoration is reattachment, if fracture fragment is available. This case report describes the management of Ellis Class II fracture by reattachment. Reattachment of fractured fragment is indeed a cost-effective conservative treatment.

Key words*: Crown fracture, Dental trauma, Uncomplicated fracture, reattachment, tooth fragment*

Introduction

Children and adolescents experience mild or severe dental trauma from various causes, such as unsafe playing and fall on playground at schools, accidents or violence.[1] Uncomplicated crown fractures, those involving only enamel and dentin represent about 28%-44% of traumatized teeth in children.[2] The treatment of an uncomplicated coronal fracture is quite challenging for the dentist because of the necessity to obtain an aesthetic result that nears itself to the natural tooth form and dimension, mimicking the opacity and translucency, the fluorescence and opalescence of the original tooth.[3]

Treatment of uncomplicated traumatized tooth normally ranges from a composite resin restoration to dental fragment bonding. When the tooth fragment is present, the best option will be fragment reattachment, which restores the morphological, functional, and esthetic aspects of a fractured tooth.[4]

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Bonding depends on how viable the tooth fragment is and on how well it will adapt to the remaining tooth to ultimately improve the prognosis.[2] This technique has been reported as satisfactory or very satisfactory by patients, parents, or legal guardians, because it is able to totally restore the patient's esthetics.

Case report

A 10 year old female patient accompanied by her father reported to the department of Pediatric and Preventive Dentistry at Educare Institute of Dental Sciences with the chief complaint of fractured upper anterior tooth. Patient gave a history of fall at her house the previous day and had preserved the tooth fragment in water.

On clinical examination, lacerations was noticed on the right side of the upper lip. Hard tissue examination revealed horizontal fracture (uncomplicated Ellis class II) in the incisal third of the crown of the maxillary right central incisor (11) with a little dentine involvement

Figure 1: (a) Preoperative labial view (b) Palatal view of the fractured tooth

On probing patient experienced mild sensitivity where the dentine was exposed. The tooth was non tender, non mobile and asymptomatic. Oral hygiene was satisfactory. Patient's medical history was noncontributory. 0n IOPA radiographic examination, no relevant findings except for the fracture involvement was observed.

The fracture fragment was in good condition and adapted reasonably well on the labial aspect with little gap in the marginal area on the palatal aspect of 11. Reattachment of the fractured fragment to the remaining tooth was planned and parent's consent was obtained. The fractured fragment was washed thoroughly under running water and kept in normal saline until reattachment procedure**.**

Figure 2: Fractured tooth fragment

Minimal preparation was done on 11 to achieve optimal adaptation of the fragment. Bevelling was done on both the labial and palatal surface and retentive grooves were created on labial aspect of 11 to increase retention. The tooth was air dried but not desiccated. For pulpal protection, a thin layer of calcium hydroxide lining and glass ionomer cement base was given covering only the exposed dentine. Excess cement was carefully removed, without touching the margins of the fracture line, in an attempt to obtain an adequate seating of the fragment to the tooth remnant. Etching was done for 15 seconds using 37% orthophosphoric acid gel, washed and air dried followed by application of bonding agent and curing. Simultaneously fracture fragment was also etched, air dried and bonding agent was applied and cured. Flowable composite was used for reattachment. A layer of flowable B2 shade composite (SmartCem2, Dentsply Maillefer, USA) was applied on the fractured incisal edge of the tooth and the fragment. The fragment was positioned accurately and photopolymerized for 20 seconds each, from the labial and palatal sides. During curing, firm and stable finger pressure was applied to the coronal fragment to closely oppose it to the tooth. After curing, excess composite was removed with a diamond finishing bur and polished. After successful completion of the reattachment procedure, occlusion was checked and postoperative instructions were given. Child was recalled after 1 week and at 3 months interval later.

Figure: 3 Immediate post-operative image

Figure 4: 3 months post-operative follow up image

After 1 week, lip laceration was healed completely and restored 11 was asymptomatic. No sensitivity was experienced by the patient. Both the child and parent were happy. Oral hygiene instructions and post reattachment instructions were reinforced.

Clinical examination along with pulp sensibility test were performed at 3 month follow up. Tooth showed similar response to the contralateral teeth and the tooth remained normal in esthetics and function.

DISCUSSION

The uncomplicated crown fracture of anterior teeth is the most common traumatic injury of permanent dentition.[5] Wide variety of treatment protocols is available for reattachment procedures. Some techniques of fragment reattachment include a bonding procedure without any type of preparation of the remaining tooth or tooth fragment surfaces. This technique is called simple reattachment. According to a systematic review by Poubel et al., simple reattachment can be considered as the currently preferred technique when there is complete fragment adaptation, compared with other reattachment techniques using over-contouring and dentinal groove preparation.[2]

However, some authors prefer tooth preparation in the form of external chamfering, over contouring or internal dentinal groove before bonding to aid in retention.[2,4] In this case report, minimal tooth preparation like beveling and grooves were prepared to allow adequate adaptation of the fragments and to increase the bond strength of the fragment. An increase in the bond strength between tooth fragment and dentin was observed when an intermediate material was used and both the fragments had complete adaptation.[2]

The inflammation of pulp in cases of coronal fractures with minor dentin involvement is transitory, since the vascular supply of the pulp remains intact and bacterial invasion can be prevented.

The vascular supply depends fundamentally on the impact of trauma occurred, however,bacterial invasion can be prevented by immediate dentin sealing.[3] In the present case calcium hydroxide base was used as immediate dentin sealing and for pulpal protection.

Preserving the fractured fragment also plays an important role in the success of reattachment procedure. In this case, patient visited the department very next day after trauma occured for treatment and had preserved the fracture fragment in water which prevented dehydration and discoloration.

Hence it is always better to create awareness on how to preserve the fracture tooth fragment in a suitable storage media and the chance for reattachment among the school children, parents, care givers and teachers and to report for treatment at the earliest.

There are many techniques for reattaching the fragment; however, studies show that the original mechanical strength of the tooth cannot be restored to its full.[6]

Nevertheless; it is possible to retain a reattached tooth for a long period of time with some mechanical resistance. Once a broken tooth fragment is bonded back in place, preventive measures should be adopted to avoid further trauma to the tooth.[7] It is always better to reinforce the post reattachment instructions on every recall visit.

The use of fractured fragment (natural tooth substance) clearly eliminated problems of differential wear of restorative material, unmatched shades and difficulty of contour and texture reproduction associated with other restorative techniques.[3] It will not only maintain the shape, contour, texture, color, and alignment of natural teeth but also will be a fast, cost-effective solution and also creates a positive psychological response in the patient.[4]

In this case child and the parent came with anxiety and child had a sad face. Immediately after the reattachment procedure we could see the happiness in her face and showed a positive psychological response. The patient is under follow up to check any change in form, in function, color change and vitality.

CONCLUSION

The restoration of a fractured crown using the adhesive reattachment is the optimal treatment for an uncomplicated enamel-dentin fracture when the tooth fragment is available, intact and well preserved. When compared to more aggressive prosthetic techniques like crowns and veneers, the reattachment technique is both conservative and aesthetic and faster. Thus it can be concluded that tooth fragment reattachment can be considered as a best option.

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Conflict of Interest: ***None Declared***