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Reattachment of fractured tooth fragment: A case report.

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Abstract

Coronal fracture of anterior teeth is a common form of dental trauma that mainly affects the children and adolescent. One of the options for managing coronal teeth fracture when the tooth fragment is available is the reattachment at dental fragment. Tooth fragment reattachment provides conservative, safe, aesthetically pleasing results and also restores tooth's original anatomy, form, color, surface texture and provides a positive psychological response of the patient. This article discusses dental fragment reattachment technique and presents clinical case of coronal fracture involving enamel, dentin and pulp exposure.

Keywords – Coronal fracture, Dental fragment reattachment, Dental trauma. Dentin bonding

Introduction

Traumatic dental injuries generally comprises of injury to the teeth and its supporting structures. Fracture of the permanent teeth is the most common outcome of such injuries, with maxillary central incisors being the most commonly involved tooth[1]. Such injuries may lead to coronal fracture, with or without pulp exposure. Coronal fracture with pulp exposure accounts for 18-20% of the traumatic dental injuries, with majority of injuries being sustained by the young permanent teeth [2]. Number of techniques has been developed to restore coronal fracture. Earlier techniques include stainless steel crowns, basket crowns, orthodontic bands, pin retained resin, porcelain bonded crown or composite resin [3].

Another treatment approach includes crown reattachment technique. In 1964 Chosak and Eidelman [4] published first case report on reattachment of fractured incisor in which complicated tooth fracture was managed by endodontic treatment. Tennery[5] was the first who used acid-etch technique for reattachment of fractured tooth fragment. Reattachment of the dental fragment has only become possible with the improvement in adhesive technique and restorative material. It becomes especially useful for young patients or in mixed dentition age where delaying prosthetic restoration of tooth is required until eruption and tooth position have stabilized[6].

It is the most conservative treatment, thus it maintains the original contour and incisal translucency. In addition, less chair time is required and reduces the cost of the treatment[7].

In crown fractures accompanied by a pulp exposure, it is important to consider the treatment options related to pulp therapy as per the requirement, it is important to plan the ideal procedure not only to achieve better bonding of the fragment but also to minimize the pulpal pathosis or its sequelae.[8]

The purpose of this article is to discuss the considerations for dental fragment reattachment technique and to present a clinical case report of fracture involving enamel, dentin and pulp exposure.

Case report

A 11 year old patient reported to the Department of Paedodontics and Preventive Dentistry, Peoples College of Dental Sciences and Research Centre, Bhopal, following trauma to permanent maxillary right central incisor (Fig. 1). Trauma had occurred due to fall while playing 2 hours ago. The patient brought the crown fragments along with her, the fragment was intact (Fig. 2) and the tooth was having obvious clinical pulp exposure.

Patient's medical and dental history were non contributory. Clinical and radiographic examination revealed an oblique fracture of coronal portion of maxillary right central incisor extending from middle third of the crown to the incisal third, involving enamel, dentine and exposing pulp (Fig. 3). No mobility of the concerned teeth was recorded and the surrounding tissues were healthy. The tooth fragment was immediately maintained in normal saline to prevent it from dehydration. Considering the pulp exposure, root closure and patients age, root canal treatment followed by crown fracture reattachment was planned.

After achieving proper isolation, single visit root canal treatment (Fig. 4) followed by post endodontic restoration with glass ionomer cement was done, care was taken not to interfere with the margins of the fracture line. The tooth fragment and the interface surface of the tooth was acid etched using 37% phosphoric acid for 30 seconds (Gluma etch 35 gel). The acid was removed by rinsing with copious water and drying with gentle air. Bonding agent (Gluma bond 5, Haeresus Kulzer) was applied gently over both surfaces with applicator tip, allowed to set for 15 seconds under gentle air stream and cured for 20 seconds. After bonding, composite resin (Charishma Flow A2 shade, Haeresus Kulzer, Gemany) was used to reattach the fragment to the remaining teeth. Flowable resin was light cured for 20 seconds each from the labial and palatal directions. The fragment was kept into its position by slight digital pressure. The involved tooth was then polished with polishing disc (Fig. 5). After wards occlusion was checked and post operative instructions to the patient were given which included instructions to deter from loading the anterior teeth

Discussion

In young patient, fracture of anterior teeth is a common traumatic condition. One of the options for managing coronal tooth fracture specially, when there is no or minimal violation of the biological width, is the reattachment of the dental fragment when it is available. With remarkable advancements of adhesive system and resin composite has made reattachment of tooth fragment or procedure that is no longer a provisional restoration, but rather a restorative treatment offering a favorable prognosis. Reattachment of fractured fragment restores tooth's original form, contour, color and surface texture. Moreover it is easy to practice, less time consuming, single visit procedure thus economical on the patients perspective and has the potential to assume incisal strength during tooth functioning. The method ensures increased wearing steadiness creating better function[9] and psychological comfort to the patient.[10]

Diagnosis of pulpal lesion becomes extremely important when restoration of fractured anterior teeth is considered. So in the present case patient reported to clinic with obvious pulpal exposure

so it was decided to perform single visit endodontic treatment prior to reattachment. In the present case, reattachment of the fractured fragment was possible because the fractured fragment was intact and due to the use of dentin bonding technology. The use of 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.

The successful reattachment depends on fragment's extend of dehydration. The longer the fragment remains dehydrated the lesser will be the fracture strength of teeth, however the strength can be reinitiated by hydrating the fragment, also a lasting dehydration of fragment can cause disturbance of the esthetics, as the longer the dehydration of the fragment is, the greater probability for not matching the original tooth's color [11,12]. Improvement of tooth's resistance and shade can be achieved by fragment rehydration. So in the present case the fragment was immediately immersed in normal saline. In a contemporary study, Capp et al. showed that fragment rehydration is necessary for the proper functioning of the adhesives and is more critical for the dentin than for the enamel. They also reported that the fragment rehydration for 30 minutes can restore the lost shear bond strength of the fragment[13]. Reconstruction with resin can be a better therapeutic decision when there isn't good adaptation between the fragment/fragments and the remaining tooth.[14]

Another factor is the patients age, as most of the patients belong to 7-11 years age group, according to Basuttil and Fung, when the child's age shows immature development of the fractured tooth's gingival margins, the application of more conservative methods for reconstruction, as reattachment are desirable also patient cooperation is necessary for successful reconstruction of crown fractures by fragment reattachment.[15]

In the present case for reattachment of fractured fragment combination of adhesive and composite was used. Andreasen FM et al.[16] stated that material with comparatively high mechanical properties such as composite resin should be used in combination with adhesives to outstand the functional loading. Farik et al concluded that the fifth generation bonding system increases the fracture resistance of the reattached crown fragments to the most, when used in combination with resin.[12]

With the evaluation of adhesive system offering excellent bonding to reattachment of dental fragment has shown to be a non invasive treatment offering good results even when performed under challenging conditions.

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Figure legends :

Figure 1: Pre operative image presenting Ellis class III fracture wrt 11
Figure 2: Intact tooth fragment
Figure 3: Pre operative IOPA showing extension of fracture exposing pulp.
Figure 4: Post operative radiograph, after single sitting root canal treatment.
Figure 5: Post operative image, after fragment reattachment procedure

Figure 1

Figure 2

Figure 3

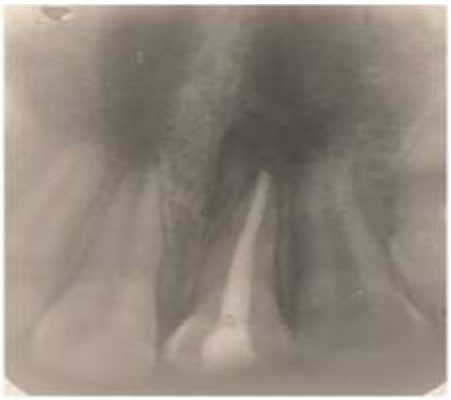

Figure 4

Figure 5