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REATTACHMENT OF FRACTURED TOOTH FRAGMENT: A CASE REPORT.

Dental Science

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ABSTRACT

Children and adolescents are commonly affected by traumatic dental injuries that mainly include coronal fractures of anterior teeth. One of the alternative for managing such tooth fractures is the reattachment of the dental fragment when the tooth fragment is available and there is no or minimal violation of the biological width. Fractured tooth fragments reattachment can provide good and long-lasting esthetics. It restores function and provides a positive psychological response as tooth's original anatomic form, colour, and surface texture are maintained and is a relatively simple procedure. Prognosis of the case highly depends on patient cooperation and understanding of the limitations of the treatment. This article reports highlights treatment of a coronal tooth fracture case that was successfully treated using tooth fragment reattachment.

KEYWORDS

Fragment Re-attachment, Dental Trauma, Children, Adolescents

INTRODUCTION

Coronal fractures of the anterior teeth are a common form of dental injuries that mainly affects children and adolescents.[1,2] Most frequent form of dental trauma involves the anterior teeth, especially the coronal fracture of maxillary incisors because of its position in the arch, whereas the maxillary lateral incisors and the mandibular central incisors are less commonly involved. Boys are usually more affected than girls (boys to girls ratio was 1.83: 1 or nearly 2:1) in case of anterior tooth trauma.[3]

The most common cause of dental trauma in this study was due to falls (71.1%) followed by bicycle accidents (11.1%), collisions (8.9%), violence (6.7%) and bike accidents (2.2%).[4]

Usually only a single tooth is involved in dental injuries; however, various traumas such as sports injuries and automobile accidents involve multiple tooth injuries[5]

Various factors effects the treatment plan of coronal tooth fractures, including extent of fracture line (alveolar bone fracture, biological width violation, endodontic involvement), restorability of fractured tooth and pattern of fracture (associated root fracture), secondary trauma injuries (soft tissue status), availability of fractured tooth fragment and its condition (fit between fragment and the remaining tooth structure), , occlusion, esthetics, finances, and prognosis.[6-8]

Understanding of the limitations of the treatment and patient cooperation is of utmost importance for good prognosis. In case when there is minimal or no violation of the biological width, one of the option for managing coronal tooth fractures is the reattachment of the fractured dental fragment.[9] Tooth fragment reattachment not only offers cost effective but also provides a conservative, esthetic restorative option.This technique has been shown to be a good option to restore the fractured tooth with resin based composite or full-coverage crown.8,10-–12 Attached fragment provide original anatomic form, colour and surface texture, this helps in maintenance of long-lasting esthetics.[11] This technique also restore function as well as result in a positive psychological response, and is a reasonably simple procedure.[13] additionally, this technique is comparatively less time-consuming and gives more predictable long-term wear than when direct resin composite is used.[14] Clinical trials and follow-up have stated that reattachment using contemporary adhesive luting systems and dentin bonding agents may achieve functional and esthetic success.[8,15]

The choice of a reattachment technique is govern by several aspects. Studies have reported that the primary cause of fragment loss is new dental trauma or the non physiological use of the restored tooth.[6] Therefore, most concerns about reattachment techniques have been directed toward the fracture strength of the restored tooth.[7,16]

Clinicians have employed an assortment of bevel designs, chamfers, dentinal and enamel grooves, and choices of resin composite materials and techniques for the reattachment of tooth fragments. Reis and colleagues7 have shown that a simple reattachment with no further preparation of the fragment or tooth was able to restore only 37.1% of the intact tooth's fracture resistance, whereas a buccal chamfer recovered 60.6% of that fracture resistance; bonding with an overcontour and placement of an internal groove nearly restored the intact tooth fracture strength, recovering 97.2 and 90.5% of it, respectively.

In cases of complicated fractures, when endodontic therapy is required, the space provided by the pulp chamber can be used as an inner reinforcement,thus avoiding further preparation of the fractured tooth.[17,18] However, in such cases, esthetics may become an important issue as pulpless teeth lose part of their translucency and brightness.

This article reports on coronal tooth fracture case that was successfully treated using tooth fragment reattachment.

CASE REPORTS

A 13-year-old patient reported at the OPD at the department of pediatric and preventive dentistry after sustaining a complicated crown fracture to his maxillary right central incisor during sports activities (Figures 1 and 2).

Fig. 1 Pre operative clinical pictures of fractured tooth front view

Fig. 2 Pre operative clinical pictures- occlusal and lingual view

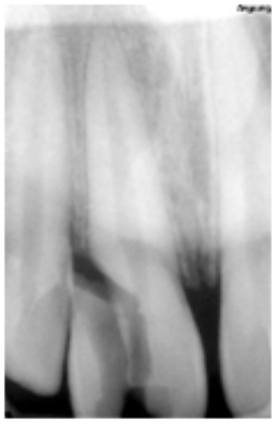

Fig. 3 Pre clinical Radio graphic image of the fracture d tooth.

The fractured tooth fragment was attached with the surrounding soft tissue. The loose fragement tooth was carefully removed (Figure-4) and washed with saline and kept in a dapen dish with 5% NaOCl for disinfection.

Fig. 4 Clinical picture after removal of fractured tooth fragement.

Clinical and radiographic examination revealed a complicated oblique crown fracture that extended subgingivally on the distolabial and distopalatal are as with involvement of pulp (Figures 1,2 and 3).

After examination, endodontic therapy was done (Figure 5).

Fig. 5 Radiographic image of the root canal treatment.

For post endo restoration, the treatment options were given to the patient and to his parents which involves crown build up restoration with a resin based composite, post and core followed by full coverage restoration and reattachment of the tooth fragment. The reattachment option was given only after ensuring that the fragment was in good condition and fit reasonably well on the fractured tooth.

After discussion about the advantages, disadvantages, prognosis, and cost of every treatment option, the patient and the patient's mother opted to have the tooth fragment reattached.

One important complication of this case was the subgingival extension of the fractured margin on the distolabial and distopalatal area involved. The gingival aspect of the fractured site revealed a shallow, knife-edge subgingival fracture margin. Upon probing this area during the clinical examination, it was determined that the biological width was only minimally invaded and that bone recontouring via crown lengthening would not be indicated or required as long as the restorative margin were placed at or above the level of the cementoenamel junction.

The tooth fragment comprised one piece, fragment corresponding to the gingival aspect of the fracture site. The fragement was carefully reattached with flowable composite after using retraction gingival cord which aided in proper fit of the margins. The tooth was properly restored and margins were finished with diamond burs and polished with a series of Sof-Lex disks (3M ESPE). (Figure-6)

figure- 6 Immediate post-operative clinical and radio graphic image

The occlusion was carefully checked and adjusted, and the patient was discharged after receiving instructions to avoid exerting heavy function on this tooth and to follow regular home care procedures relative to oral hygiene. The patient and the patient's mother were informed that the reattachment line might be visible, and, if necessary, this could be managed in future visits.

The patient returned for regular follow-ups at 1, 6, 12 and 14 months (Figures 7,8), and it was observed that both endodontic and restorative treatments remained clinically acceptable for the entire time. Although the reattachment line can be noted in a close-up view, the patient was very satisfied with the results and opted not to have the line masked with a partial composite veneer.

figure- 7 follow up- 6 months

figure- 8 follow up - fourteen-months

DISCUSSION AND CONCLUSION

The techniques described in this case report is relatively simple and very conservative approach and have several advantages such as favourable aesthetics, resulting from enamel's natural surface smoothness, anatomic contouring and colour match, functional and masticatory effectiveness, preservation of sound tooth structure, prevention of the physiological wear and no need for complex material resources. However, dental professional should recognize that the proper use of bonding protocol, materials and a dry and clean working field are the keys for achieving success in adhesive dentistry. Several case reports suggested short- and medium-term outcomes in cases of reattachment of fractured coronal fragments success. [12,14,15]

In addition, tooth fracture reattachment allows restoration of the tooth with minimal sacrifice of the remaining tooth structure. Furthermore, this technique is less time consuming and provides a more predictable long-term outcome than when direct composite is used. [19]

With the materials available today, in conjunction with an appropriate technique, esthetic results can be achieved with predictable outcomes. Thus, the reattachment of a coronal tooth fragment is a feasible technique that re-establish function and esthetics with a very conservative approach, and this technique should be considered when managing patients with coronal fractures of the anterior teeth, especially younger patients.

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