



Reattachment of a fractured maxillary central incisor: A conservative approach

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ABSTRACT:

Trauma to the anterior teeth is a relatively common occurrence in children and young adults, and dentists are frequently faced with treatment management on a regular basis. Though not a novel approach, reattaching a fractured fragment is gaining popularity as a treatment option. Its advantages over other procedures and improvements in adhesive dentistry contribute to this. The following case report details the management of a complicated fracture of the maxillary left central incisor that was treated endodontically, followed by reattachment of the same fragment. Reattachment of fractured tooth fragments offers a viable restorative alternative and immediately restores tooth function and esthetics using a very conservative and cost-effective approach.

Key words: complicated crown fracture, Trauma, Reattachment

I. INTRODUCTION

Complicated crown fractures involving the enamel, dentin, and pulp constitute a major share of all dental injuries and are most common in maxillary central incisors. The prevalence of trauma to the maxillary central incisors is reported to be 37%. Dental injuries usually affect only a single tooth; however, certain trauma types such as automobile accidents and sports injuries involve multiple tooth injuries

Tooth fragment reattachment has been shown to be an acceptable alternative to the restoration of the fractured tooth with resin-based composite as full coverage crown. It is a conservative technique combining minimal tooth loss with the financial advantages of a one-visit treatment. A better esthetic result can be obtained in less time, i.e., the original shape, color, translucency, brightness, surface texture and occlusal contacts are maintained. In addition, the incisal edge wears at a similar rate to adjacent teeth, whereas a composite restoration will wear more rapidly. (Konstantinos) Reattachment of tooth fragment after trauma was described for the first

time in 1964 by Chosack and Eildeman. Tennery was the first to report the reattachment of a fractured fragment using acid-etch technique. (1) Subsequently, Starkey and Simonsen have reported similar cases. (2,3)

Due to advancements and improvements in adhesive techniques and restorative materials, it is now possible to reattach a fractured segment. (4) The following case report details the endodontic treatment of a complicated fracture of the maxillary left central incisor, followed by reattachment of the same fragment.

II. CASE REPORT

A 18 year old female patient reported to the Department of Conservative Dentistry and Endodontics, Government Dental College, Trivandrum after sustaining a complicated crown fracture to her maxillary left central incisor due to fall at home about 24hrs ago. The intact fractured tooth fragment was recovered at the site of injury and kept folded in paper by the patient. To avoid dehydration and discoloration, the fragment was carefully washed under running water and preserved in sterile normal saline.

There was an associated soft tissue injury involving the labial mucosa of upper lip. Clinical examination revealed fracture of the incisal half of the maxillary left central incisor (fig 1) and the fractured fragment of the tooth was intact with some unsupported enamel. Periapical radiographs revealed an intact periodontal ligament space, complete root formation, and no root fracture.

Local anesthesia was administered and working length was determined electronically and radiographically. Single visit root canal treatment was completed using cold lateral condensation technique. Following endodontic therapy, the treatment options were presented to the patient and to her legal guardian, including (1) no treatment, (2) crown buildup restoration with a resin-based composite, and (3) reattachment of the tooth fragment. The patient and her mother decided to have the tooth fragment reattached after



considering the benefits, drawbacks, prognosis, and cost of each treatment option.

In order to achieve superior moisture control a rubber dam was placed on all the maxillary anteriors after proper shade selection before the field was isolated, as dehydrated enamel whitens considerably. The tooth fragment was analysed and juxtaposition of the fragment with the tooth showed that the margins of each fitted well against each other and no interfragmentary space was present. However there were unsupported enamel found on the labial and palatal aspect of the fractured fragment and also to avoid the potentially unesthetic area that results from the band of composite resin on the labial surface, conventional bevel preparation (45° bevel) was done on the tooth as well as the fractured segment (fig 2).

All the beveled enamel area was etched for 60 seconds with 37% phosphoric acid. The adhesive system was applied to the fragment and the tooth and air thinned before light curing for 40 secs. A flowable composite resin was placed in a thin layer across the fractured surface of the tooth and the excess material oozing from the fracture line was removed. To closely oppose the coronal fragment to the tooth, firm and stable finger pressure was applied while curing. The restorations were reinforced using composite resin material across the beveled labial and palatal surfaces of the affected teeth and contoured using Teflon coated composite instruments and composite wetting resin using a small brush. The restorations were given a final finish and polish, labially, palatally and proximally, using finishing diamonds, Soflex discs (3M) and EVDiacomp polishing kit (fig 3).

The immediate postoperative view showed adequate esthetic results with restored functionality. The patient was kept on periodic review (1, 3 and 6 months) and it was observed that both endodontic and restorative treatments remained clinically acceptable through each visit (fig 4 & 5).

III. DISCUSSION

Any patient, particularly children, will find a tooth fracture to be a distressing experience. However, preservation of natural tooth structure has been demonstrated to elicit a positive emotional and social reaction from the patient.

According to an increasing number of case reports in the literature, reattachment of a fractured tooth fragment is a viable technique for the treatment of coronal fracture of anterior teeth when the fractured segment is available (5). When reattachment is being planned, a variety of factors

must be taken into account. First, the extent of dehydration plays a crucial role in fracture resistance and esthetics of the reattached fragment. The longer the fragment remains dehydrated, poorer the tooth's strength will be. This could be due to collapse of the collagen fibers and obstruction of adequate resin monomer penetration, leading to a poor adhesion between dentin and composite material. This is overcome by fragment rehydration with saline (6). Secondly, the mode of preparation influences the fracture resistance of reattached fragments (7). Different types of tooth preparation like beveling, chamfers, notching and over contouring of the fractured fragment are advocated prior to reattachment, but clinical trials and long-term follow-ups have reported that reattachment using modern dentin-bonding agents or adhesive luting systems achieve better functional and esthetic success (8,9). The conventional bevel preparation was used in the present case to remove unsupported enamel and to avoid the fracture line from being evident.

Other factors including the extent of fracture, alveolar bone fracture, pattern of restorability of fractured tooth, secondary traumatic injuries, the fit between the fragment and remaining tooth, occlusion, esthetics, finances and prognosis should be considered (8). In addition to the above said factors, the proper use of bonding protocol and materials is the key for achieving success in adhesive dentistry.

The fact that all alternative procedures such as direct adhesive resin reconstruction, veneers, and crowns can be performed in case of failure overcomes the limitations of the unpredictability of longevity and doubtful aesthetics in the long run (10).

IV. CONCLUSION

With the materials available today in conjunction with an appropriate technique, esthetic results can be achieved with predictable outcomes. As a result, reattachment of fractured tooth fragment is a potential treatment for restoring function and appearance with a minimally invasive approach.

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Fig 1 : Tooth 21 with complicated crown fracture



Fig 2 : Fractured fragment checked for correct positioning



Fig 3 : Immediate post operative view after finishing and polishing



Fig 5 :Follow up radiograph



Fig 4 : Tooth at 6 months review