



IMMEDIATE REATTACHMENT OF ANTERIOR TEETH FRAGMENTS USING PREFABRICATED POST AND COMPOSITE: A CONSERVATIVE APPROACH

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ABSTRACT

Due to increased road accident, contact sports or other accidents, Coronal fractures of the anterior teeth are a common form of dental trauma that mainly affects children and adolescents. Along with the pain, the esthetics of the patient is also compromised to a large extent due to fracture of anterior upper teeth. Esthetics is always the first concern of the reporting patient. Reattachment of the fractured fragment is possible when patient seeks immediate dental treatment along with the fractured fragment. Reattachment of fractured tooth fragments can provide good and long-lasting esthetics (because the tooth's original anatomic form, color, and surface texture are maintained). It also restores function, provides a positive psychological response, and is a relatively simple procedure. This clinical case report describes the treatment of a complex crown fracture of maxillary central incisor using fractured fragment along with prefabricated post. The fragment was attached using composite.

Clinical Significance

Reattachment of fractured tooth fragments offers a viable restorative option for the clinician because it restores tooth function and esthetics with the use of a very conservative and cost-effective approach.

KEYWORDS : Maxillary tooth fracture, Anterior crown fracture, Reattachment, Post, Composite

Introduction

The most common form of dental trauma that mainly affects children and adolescents is the coronal fracture of the anterior teeth (1,2). The majority of dental injuries involves the anterior teeth, especially the maxillary incisors (because of its position in the arch), whereas the mandibular central incisors and the maxillary lateral incisors are less frequently involved (3). The factors which influence the management of coronal tooth fractures are, extent of fracture (biological width violation, endodontic involvement, alveolar bone fracture), pattern of fracture and restorability of fractured tooth (associated root fracture), secondary trauma injuries (soft tissue status), presence/absence of fractured tooth fragment and its condition for use (fit between fragment and the remaining tooth structure), occlusion, esthetics, finances, and prognosis (4-6).

Understanding the limitations of the treatment and patient cooperation is of utmost importance for good prognosis. One of the options for managing coronal tooth fractures, especially when there is no or minimal violation of the biological width, is the reattachment of the dental fragment when it is available (7). Tooth fragment reattachment offers a conservative, esthetic, and cost effective restorative option that has been shown to be an acceptable alternative to the restoration of the fractured tooth with resin-based composite or full-coverage crown (6,8-10)

Reattachment of a fragment to the fractured tooth can provide good and long-lasting esthetics (because the tooth's original anatomic form, color, and surface texture are maintained), can restore function, can result in a positive psychological response, and is a reasonably simple procedure (11). Furthermore, this technique is

less time-consuming and provides a more predictable long-term wear than when direct composite is used (12).

Clinical trials and long-term follow-up have reported that reattachment using modern dentin bonding agents or adhesive luting systems may achieve functional and esthetic success (6,13). The most concerns about reattachment techniques have been directed toward the fracture strength of the restored tooth (5,14).

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 colleagues (5) 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 (15,16).

This case report presents an emergency situation of a male patient who presented with complicated crown fracture. In this case, endodontic therapy was followed by reattachment of the fractured fragment using prefabricated post and composite.

Case Report

A 24 year old male patient reported to the department of

Conservative Dentistry and Endodontics, having fractured anterior teeth and pain as chief complaint. Patient had a history of fall 1 hour before. There was complicated crown fracture with right maxillary central incisors. On examination, there was no soft tissue injury or swelling. The Tooth was tender. The coronal fragments were brought by the patient. The fracture line was straight extending mesial to distal, from middle to middle third respectively (Figure 1,2).



Figure 1 – Preoperative View Buccally



Figure 2 – Preoperative View Palatally

Upon examination, the treatment options were presented to the patient, including (1) no treatment, (2) post and- core and crown, (3) crown buildup restoration with a resin based composite, and (4) reattachment of the tooth fragment. After some deliberation about the advantages, disadvantages, prognosis, and cost of every treatment option, the patient opted to have the tooth fragment reattached. It is important to note that the reattachment option was presented only after confirming that the fragment was in good condition and that it fit reasonably well on the fractured tooth.

Under local anesthesia the fragments were removed with a forceps without damage. The operating field was isolated with a rubber dam (GDC.India) to ensure moisture control. Root canal treatment was initiated. The pulpal tissue remnants were extirpated from the canals using Kfile no.10 & no.15 (Dentsply Maillefer, Switzerland). Coronal flaring was accomplished with Gates Glidden drills (DentsplyMaillefer, Switzerland). Working length was determined using an apex locator (Root ZX, Morita,Tokyo, Japan). The radiograph was taken to verify the working length (Figure 3).

Figure 3 – Working Length Determination



The canals were cleaned and shaped using K file upto a size of 70 (Dentsply Maillefer, Switzerland) in a crown down manner and irrigated using 3% sodiumhypochlorite and 2% chlorhexidine solutions. The obturation was carried out by selecting matched gutta-percha (Dentsply Maillefer, Brazil) master cones, AH Plus sealer (Dentsply De Trey, Konstanz, Germany) and lateral compaction method (Figure 4).



Figure 4 - Obturation

Following the obturation, GuttaPercha from the canal was removed leaving apical 5 mm with the help of peeso reamers (Dentsply Maillefer, Switzerland). Prefabricated FRC Postec Plus post (Ivoclar vivadent AF) was selected (Figure 5,6).



Figure 5,6 – Post Space Preparation & Fiber Post

Using a no. 4 round bur (Mani), retention box was prepared in the fragment to accommodate the head of the post (Figure 7).



Figure 7 – Retention box prepared

Both the fragments and teeth were etched (N etch Gel, Ivoclar vivadent AF). Bonding agent (Tetric N Bond, Ivoclar vivadent AF) was applied using disposable brush. Fragments were reattached using composite(Tetric N Ceram, Ivoclar Vivadent AF). When the original position had been reestablished, excess resin was removed and the area was lightcured for 40 seconds on each surface, making sure that no displacement of the fragment occurred before adhesive/resin polymerization was complete (Figure 8).



Figure 8 – Fragment in position

The margins were properly finished with diamond burs and polished with a series of Sof-Lex disks (3M ESPE) and diamond polishing paste (Figure 9).



Figure 9 – Post Operative

Contact was relieved in all the protrusive, lateral movements and teeth were allowed to have protected occlusion. The patient was dismissed after receiving instructions to avoid exerting heavy function on this tooth and to follow regular home care procedures relative to oral hygiene. The patient returned for 1 week, 1 month follow ups and it was observed that both endodontic and restorative treatments remained clinically acceptable for the entire time. Patient was very satisfied with the results

Discussion

The techniques described in these case reports are reasonably simple, while restoring function and esthetics with a very conservative approach. However, the professional has to keep in mind that a dry and clean working field and the proper use of bonding protocol and materials is the key for achieving success in adhesive dentistry. Important factors for tooth reattachment are: the degree of the fragment's adaptation to the remaining structure; fragment retention; fracture location; and pattern. The quality of fit between the segments is clinically important factor for the longevity of the reattached crown. Use of prefabricated post provides the increased retention as well as the distribution of forces along the root. According to the amount of the restoration, screw posts, cast posts or dentin pins could be used for supporting the fragment (17).

Cavaller (18) et al reported that reattachment of the crown fragment appeared to have a better longterm prognosis than composite resin restoration. During the procedure the fragment must be stored in sterile saline or distilled water to avoid dehydration (5). A lasting dehydration of tooth's fragment can cause disturbance of the esthetics as the longer dehydration of the fragment is, the greater probability for not matching the original tooth's color will be. In most cases dehydrated fragment is lighter than the remained after the fracture remnant. Return of the natural color may need time or may never occur (19). Assessment of occlusion after reattachment is essential as occlusal forces, generated at protrusive movements of the mandible are extremely destructive to the relation tooth fragment – bonding agent (20). The possible afterwards complications include discoloration of the attached fragment and fractured reattached teeth show a high degree of failure to labial horizontal forces with new trauma. Regular follow-up is necessary. Fabrication of a mouth guard and patient education about treatment limitations may enhance clinical success as reattachment failures may occur with new trauma or parafunctional habits (6). With the materials available today, in conjunction with an appropriate technique, esthetic results can be achieved with predictable outcomes. Thus, the reattachment of a tooth fragment is a viable technique that restores function and esthetics with a very conservative approach, and it should be considered when treating patients with coronal fractures of the anterior teeth, especially younger patients.

Conclusion

Dental injuries could have improved outcomes if the public were aware of first-aid measures and the need to seek immediate treatment. Fragment reattachment is a conservative and economical approach in crown fracture cases compared to other options such as ceramic crowns and composite build up.

Disclosure

The authors do not have any financial interest in the companies whose products are included in this article.

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