A CASE REPORT ON CORONAL TOOTH FRACTURES

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ABSTRACT

Coronal fractures of the anterior teeth are a common form of dental trauma that mainly affects children and adolescents. One of the options for managing coronal tooth fractures when the tooth fragment is available and there is no or minimal violation of the biological width is the reattachment of the dental fragment. Reattachment of fractured tooth fragments can provide good and long-lasting esthetics (because the tooth’s original anatomic form, colour, and surface texture are maintained). It also restores function, provides a positive psychological response, and is a relatively simple procedure. Patient cooperation and understanding of the limitations of the treatment is of utmost importance for good prognosis. This article reports on coronal tooth fracture cases treated successfully using tooth fragment reattachment with dual cure resin. With the advent of adhesive dentistry the process of fragment reattachment has become simplified and more reliable.

KEYWORDS: Dental Trauma, Fragment Reattachment, Multilink Speed Resin Cement

INTRODUCTION

Anterior teeth with coronal fractures are a common form of dental trauma that mainly affects children and adolescents.[1,2]. The majority of dental injuries involves the anterior teeth, especially the maxillary incisors, whereas the mandibular central incisors and the maxillary lateral incisors are less frequently involved. Dental injuries usually affect only a single tooth; however, certain trauma types such as automobile accidents and sports injuries involve multiple tooth injuries.[3]

Numerous factors influence the management of coronal tooth fractures, including extent of fracture, pattern of fracture and restorability of fractured tooth (associated root fracture), secondary trauma injuries, presence/absence of fractured tooth fragment and its condition for use (fit between fragment and the remaining tooth structure), occlusion, aesthetics, finances, and prognosis.[4–6]. Patient cooperation and understanding of the limitations of the treatment is of utmost importance for better treatment outcome. When there is a substantial associated periodontal injury or invasion of the biological width, the restorative management of the coronal fracture should follow the proper management of those associated issues. Coronal fractures must be approached in a systematic way to gain a successful restoration.

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, colour, and surface texture are maintained),[9] can restore function, can result in a positive psychological response, and
is a reasonably simple procedure. [11]. In addition, tooth fragment 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 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 dual cure adhesive luting systems may achieve functional and esthetic success.[6,13].

Several aspects may govern the choice of a reattachment technique. Studies have reported that the primary cause of fragment loss is new dental trauma or the nonphysiological use of the restored tooth.[6]. Therefore, 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]. 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 cases treated successfully using tooth fragment reattachment with dual cure resin.

CASE REPORT
Chief Complaints

A 28 year old male patient was referred to the department of Conservative Dentistry and Endodontics with the chief complaint of fractured maxillary left central incisor as a result of sports injury.

Clinical and Radiographic Examination

Clinical and radiographic examination revealed an oblique crown fracture.(Figure no.1,2,3).

Upon examination, the treatment options were presented to the patient and to his legal guardian, including

- No treatment,
- Post and- core and crown,
- Crown buildup restoration with a resin based composite, and
- 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.(Figure no.4,5).
TREATMENT: STEP BY STEP PROCEDURE

After administration of anesthesia, the operating field was isolated with a rubber dam in order to prevent saliva or gingival fluids that negatively affect the adhesive procedures. (Figure no.6)

The root canal treatment for radicular portion of the tooth was performed. Working length determination was done (Figure no.7) and biomechanical preparation was performed (Figure no.8). Then the canal was obturated with gutta percha and AH-Plus sealer and the entrance of the root canal was sealed with glass ionomer cement. (Figure no.9)

Dual cure resin was applied to the fractured fragment and tooth surfaces. The fractured segment was then accurately placed on the tooth, paying special attention to the fit between the segments (Figure no.14).

When the original position had been re-established, excess resin was removed and the area was light cured for 30 seconds on each surface, making sure that no displacement of the fragment occurred before adhesive/resin polymerization was complete.

The margins were properly finished with diamond burs and polished with a series of disks and polishing paste. (Figure no.15).

After the completion of the procedure the rubber dam was removed. (Figure no.16, 17, 18).

The occlusion was carefully checked and adjusted, and the patient was dismissed.

POST-OPERATIVE INSTRUCTIONS

The patient was instructed to avoid exerting heavy function on this tooth and to follow regular home care procedures relative to oral hygiene. The patient was informed that the reattachment line might be visible, and, if necessary, this could be managed in future visits.

PERIODIC FOLLOW-UP

The patient has undergone 3 and 8-month follow-ups (Figure no.19, 20), 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.

DISCUSSIONS

The present case report described that the reattachment of tooth fragment is an alternative to composite resin build-up for restoring esthetics and function of fractured teeth. Coronal fracture by trauma is the most frequent type of dental injury in the permanent dentition.

A majority of the studies agree that:

- The most common injuries are uncomplicated crown fractures;
- Children and teenagers are most affected, with boys being the highest risk groups;
- Upper central incisors are most affected and
Traffic accidents and “at risk” athletic activities are usually the most common causes of dental trauma.

Reattachment of a tooth fragment is the first choice for restoring fractured teeth, whether or not the technique is combined with resin composites. This treatment may offer several advantages over conventional acid-etch composite restoration.

Improved esthetics is obtained since enamel’s original shape, color; brightness and surface texture are maintained. In addition, the incisal edge will wear at a similar rate to adjacent teeth, whereas a composite restoration will likely wear more rapidly. Furthermore, this technique can be less time consuming and provide more predictable long-term appearance.

Despite the fact that this technique is less than ideal, the advantages associated with the shortcomings of composite buildup have also led some clinicians to use tooth fragments from extracted teeth when the original is not available (Gabrielli & others, 1981; Santos & Bianchi, 1991; Busato & others, 1998).[17].

Different reattachment techniques involved are Enamel Beveling; V-shaped Internal Enamel Groove; Internal Dentin Groove; External Chamfer; Overcontour; Simple reattachment etc. [18].

Esthetic, biologic and restorative problems may occur as a result of the fracture extending subgingivally and impinging on the biologic width. The treatment options depend on the relationship of the fracture to the alveolar crest, degree of pulpal involvement, amount of eruption, apex format ion and esthetic requirement of the patient. Treatment alternatives include crown lengthening to restore the biologic width, flap surgery and ostectomy/osteoplasty to restore biologic width, followed by crown reattachment and rapid orthodontic extrusion possibly in conjunction with fiberotomy. [19].

CONCLUSIONS

Reports and clinical experience indicate that the reattachment of fractured coronal fragments results in successful short- and medium-term outcomes.[10,12,13].

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].

Reattachment of a tooth fragment is a viable technique that restores function and esthetics with a very conservative approach. Esthetic result can be obtained with a minimal number of procedures and cost to the patient.

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.

REFERENCES


