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Case Report

REATTACHMENT OF FRACTURED TEETH- A PREFERRED TECHNIQUE. REPORT OF TWO CASES

Jain Shweta^{1*}, Saleem DM², Thakur Sophia³, Jain Shikha⁴

¹Department of Conservative Dentistry and Endodontics, ESIC Dental College and Hospital, Rohini, New Delhi, 110085, India

²Department of Conservative Dentistry and Endodontics, Maratha Mandal NGH of Dental Sciences, Belgaum, Karnataka, India.

³Department of Conservative Dentistry and Endodontics, Bapuji Dental College and Hospital Davangere, Karnataka. 577004, India.

⁴Department of Othodontics, Peoples Dental College and Hospital Bhopal, India

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*Corresponding Author: **Dr. Shweta Jain**

BDS, MDS Lecturer ESIC Dental College and Hospital Rohini, New Delhi, 110085, India

E-mail: drshweta6@yahoo.co.in, Contact No.: 09911791150, Mailing Address: Flat No 105, Plot No 41, Sec 9, Vasudha Apartment, Rohini, New Delhi 110085

ABSTRACT

Coronal fractures of dentition are the most frequent types of dental injury. If the fractured fragment of tooth is retained following trauma, the natural tooth can be reattached using adhesive protocols. It allows the immediate restoration of original tooth contour, colour and aesthetics along with wear resistance. These case reports will address the treatment regimen for reattachment of fractured fragments using ultraconservative techniques which offer advantages of simplicity, immediate esthetics and conservation of tooth structure.

Keywords: Coronal fracture, Reattachment, adhesives, fiber post.

INTRODUCTION

It has been reported that prevalence of trauma involving upper central incisors is about 37%¹. These teeth are most susceptible to fractures caused by direct trauma. This might be attributed to rise in road traffic accidents and sports activities. Present generation is very conscious about esthetics and demand for immediate treatment and esthetic rehabilitation. Re-attachment of fractured fragment should be considered as an option for restoring fractured teeth, rather than going for composite restorations. There are several advantages in this treatment such as obtaining esthetics in a single appointment, being more conservative, obtaining healthy periodontal attachment and maintaining the original tooth contour and translucence as the patient's own with no post operative complaints².

It is advisable to use a precise technique, and material for particular type of fracture³. The following case reports describe the reattachment of a fractured crown fragment of anterior teeth after trauma by utilizing different clinical approach.

CASE 1

A 21 years old female patient reported to out patient department of Bapuji Dental College and Hospital Davangere. Sustaining the complicated crown fracture of maxillary central incisors as a result of direct hit on the central incisors. Clinically the fractured fragment was intact palatally (Fig. 1a) with 22. With Elli's and Davey's class II fracture with 11, 21.

Radiographic examination with 22 revealed fracture line extending from labial to palatal side apically involving pulp chamber.

The fractured fragment with 22 was positioned in place to check the stability and marginal accuracy. The endodontic treatment was completed with 22. The entrance of root canal was sealed with glass ionomer plug. After probing on palatal side, the margins were found to be subgingival and were attached to connective tissue. The fragment was not completely detached so as to provide guiding point for positioning of fragment palatally. The operating field was isolated with rubber dam to ensure moisture control.

The chamfer was placed on the labial surface of tooth with fine needle taper diamond points and internal groove placed in coronal part of fractured fragment with round diamond points (Fig. 1b). The enamel and dentin fragments and tooth structure were etched with 37% phosphoric acid gel, rinsed and coated with adhesive system (Adper single bond, 3M ESPE). Flowable composite (Esthet- X flow, Densply) was flowed in palatal side between fragment and tooth structure, in the dentin groove. Fragment was then repositioned using guidance provided by attached part in palatal tissue, the chamfer line was filled with composite resin (Filtek Z350 3M ESPE) material and light cured for 40 seconds. Margins were finished with diamond polishing kit and soflex polishing kit (3M ESPE). 1 week follow up revealed satisfactory results. (Fig. 1c)



Figure 1a



Figure: 1b



Figure 1c

using drill recommended by the manufacturer (PARA POST) and the fiber post try in was done (Fig. 2c).

The full thickness mucoperiosteal flap was raised with intrasulcular incision, with two vertical releasing incisions. The flap was then retracted and a fractured fragment was separated (Fig. 2d). All the debris on the fractured fragments was washed away with sterile saline. The canal was dried and glass fiber post was cemented within the root canal using adhesive resin. The self etch primer was then applied onto the fractured tooth fragments for 20 secs. Volatile ingredients were evaporated with mild air streams. Clearfil SE bonding agent was applied to primed surfaces of the fragments and light cured for 10 secs. The fragments were reattached with flowable composite resin (Esthet X flow, 3M ESPE). The excess resin was removed and crown was light cured for 40 secs from both buccal and palatal aspects. The final polishing of the fragments interface was made with ultrafine diamond burs and soflex polishing disks (3M ESPE).

After all flap was repositioned and sutured. One week later, the sutures were removed and clinical examination revealed satisfactory healing (Fig. 2e). Radiograph revealed approximation of the fragments.



Figure 2a



Figure 2b



Figure 2c

CASE 2

A 32 yrs healthy male patient reported to department of conservative dentistry and endodontics, Bapuji dental college and hospital, Davangere, with fractured left maxillary central incisor because of biting on hard food stuff. Patient had habit of chewing betel nuts since 3-4 years, due to which there were presence of craze lines on the entire dentition.

He reported pain during eating due to mobility of fractured fragments. The clinical examination showed oblique crown fracture in maxillary left central incisor involving cemento-dentinal junction extending from the distobuccal aspect to mesiopalatal aspect subgingivally (Fig. 2a). The radiographic examination showed thin radiolucent line indicative of fracture line (Fig. 2b), with internal resorptive defect in the root canal. The tooth fragment was stabilized temporarily with composite. The root canal treatment was initiated and canal preparation was performed using standard step down method. The prepared tooth was dried with paper points and filled with thermoplasticized gutta percha and AH plus sealer using elements obtura (SYBRON ENDO) to fill the resorptive defect. The gutta percha was then removed coronal to the internal resorptive defect using peeso no 3, leaving 5mm of gutta percha at apex to maintain good seal, and simultaneously preparing post space. The post space was then further prepared



Figure 2d



Figure 2e



Figure 2f



Figure 2g

DISCUSSION

For years reattachment was regarded with caution and viewed at its best as a transitional or interim restoration. However, laboratory studies conducted by Andreasen and colleagues altered our thinking on the longevity of such restorations⁴.

The present case reports describes the fractured fragment reattachment as an alternative to composite resin build-up or crown in severe cases, for restoring esthetics and function of obliquely fractured teeth. Different approaches can be used for the treatment of fractured teeth depending on the location of the fracture line.

There are various techniques described in literature for the reattachment of the fractured fragments, each with their own

advantages and disadvantages⁵. Like enamel beveling of the fragment and the remaining crown⁶, V-shaped internal enamel and dentinal groove^{7,8}. These techniques present a common drawback. Since they require enamel and/or dentin preparation prior to bonding, the precise fit between the segments may be lost. This may explain why Franco and Davis, Roth and Levi suggested reattachment of the fragment prior to placing an external chamfer in the fracture line by means of a diamond round bur, especially when the region corresponding to the fracture line is still evident after one week^{9,11}. Another less commonly reported technique in literature is overcontour technique. After bonding the fragment, a superficial preparation (about 0.3-mm deep) is placed on the buccal surface using a cylindrical diamond-finishing bur extending about 2.5 mm coronally and apically from the fracture line. This area is then treated with a thin composite layer¹⁰. This technique is useful when the fracture line is still evident after reattachment. More recently, with improvements in hydrophilic adhesives, some authors have attempted to reattach fragments using no additional preparation or simple reattachment¹¹.

To date, few studies have attempted to evaluate the fracture strength of the reported techniques and their results vary considerably among researcher centers. The amount of strength required to keep the fragment in position for long term is not known. Fracture strength as low as 50% to 60% of intact tooth is sufficient compared to healthy tooth. It have been shown that the simple reattachment recovered 37%, buccal chamfer 60.6%, internal groove 90.5%, over contouring 96% of intact tooth fracture resistance. However combination of techniques will provide the necessary strength in close to natural tooth and esthetics⁵.

The techniques used were the over contouring with internal dentin groove in case 1, and the chamfer on labial surface with internal dentin groove.

The type of the fracture also plays an important role. 80% of traumatized incisors fracture in oblique direction. If the line of fracture is oblique and directed apically from labial surface to lingual surface it will not resist the labial forces. If fracture line is reverse i.e. from lingual to labial side the fragment provide resistance to labial forces due to presence of lingual tooth structure⁵.

The kind of adhesive system used alters the fracture strength of reattached teeth. The choice of adhesive depends upon the clinician's experience, technique sensitivity and adhesive with good results. Sole use of adhesive system or combination with flowable composite resin, or resin composite, or resin cement have similar result but increase in fracture strength have found when combined with composite mechanical properties.

Resin based restorative materials are frequently used in restoration of the fractured teeth. Because of the poor mechanical resistance of these materials, different approaches developed to strengthening resistance of composite resin, such as fiber posts¹². Contemporary resin adhesives and resin post systems are available that allow strong durable bonds to dentin.

In this case report 2, a resin fiber post was used to retain the coronal segment and reduce the stress on the Luting material.

The post interlocks the two separate fragments and minimizes the stress on the remaining tooth structure¹³.

The re-attachment of a tooth fragment is a viable technique that restores function and esthetics with a very conservative approach, but each trauma case should be attempted to restore on an individual basis^{14,15}.

CONCLUSION

In this era of conservative, esthetic dentistry, the reattachment of fractured tooth segments has established itself as a realistic treatment option in the restoration of fractured teeth in order to obtain the more longevity of reattached part. It permits rapid restoration of original tooth contours and overall esthetics with greatly reduced chair time for both the patient and operator.

It is therefore advice for the clinicians to prefer on the reattachment procedure with precise technique, keeping in mind the type of fracture, strength required and the material of choice.

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