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Research Paper

Aesthetic Rehabilitation by Fracture Fragment Reattachment: A Case Report

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ABSTRACT: *Maxillary anterior teeth are the most affected teeth from dental trauma, presenting both functional and aesthetic problems to the patient. The immediate reattachment of natural tooth fragment is a good alternative option as an emergency treatment for the same. With the improvement of adhesive materials, reattachment of tooth fragment has become a more predictable technique with several advantages. This treatment offers a conservative, aesthetic, and cost-effective restorative option that has been shown to be an acceptable alternative to the restoration of the fractured area with composite resin or crown. While it is imperative to restore the biological, functional, and aesthetic form, adequate consideration must also be given to the patient's desire and his or her attitude towards treatment. In this case report we present a clinical technique of reattachment of coronal fragment of maxillary central incisor after trauma using glass fibre – reinforced composite post systems.*

KEYWORDS: *Dental trauma, Reattachment of tooth fragment, Aesthetic, Glass fibre – reinforced composite post systems*

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I. INTRODUCTION

Crown fractures of the anterior maxillary incisors are a common form due to their position in the oral cavity. Coronal fractures of permanent incisors represent 18-22% of all trauma to dental hard tissues, 28-44% being simple (enamel + dentin) and 11-15% complex (enamel + dentin + pulp), and 96% of these involve maxillary central incisors [1]. If the original tooth fragment is retained following fracture, it is possible to reattach the fractured natural tooth structure in place using adhesive systems. Chosack and Eidelman in 1964 first described the reattachment of a tooth fragment [2]. Later, in 1988, Tennery reported the reattachment of a fractured fragment using acid-etch technique [3]. Zorba and Ozcan, in 2007, further modified this technique by using a fibre reinforced post to increase retention of the reattached crown fragment [4]. Glass fibre posts were introduced in 1900 and they offer several advantages such as aesthetic, modulus of elasticity like that of dentin, and reinforcement of restored segments by the formation of monobloc [5,6].

The reattachment of the crown fragment to a fractured tooth helps to reinstate the natural shape, contour, surface texture, occlusal alignment and color of the fragment, thereby resulting in excellent aesthetic and functional results [2]. This treatment plan also elicits a more positive emotional and social response from the patient due to the preservation of natural tooth structure [7].

The present case report shows reattachment of the coronal fragment of maxillary central incisor after trauma by using glass fibre – reinforced composite post system.

II. CASE REPORT

A 52-year-old male patient reported to Dept. of Conservative Dentistry and Endodontics, Govt. Dental College & Hospital Aurangabad, with chief complaint of mobility and pain of his front tooth due to a fall a day before. There were no associated soft tissue injuries.

Clinical and radiographic examination (Figures 1,2,3) revealed that there was a horizontal fracture in the cervical region of crown of the maxillary right central (11) involving enamel and dentin with exposure of the pulp. The fractured fragment of 11 was loosely attached to the tooth & fracture line extent was subgingival on the labial aspect. Diagnosis was made as Ellis' class III fracture with tooth no. 11. The patient expressed his desire to retain his natural tooth. The treatment plan was explained to the patient and his written consent was obtained.

Figure-1 Pre-operative Labial view

Figure-2 Pre-operative Palatal view

Figure-3 Pre-operative radiograph

After administration of local anesthesia (1.0 cc of lidocaine 2% with 1 : 80,000 epinephrine), the mobile fragment was splinted in place with the adjacent sound teeth using orthodontic wire and composite so as to prolong its intraoral time (Figure 4).

Figure-4 Splinting of the mobile coronal fragment

The endodontic treatment of 11 was initiated (Figure 5). The root canal was enlarged to ISO size 60 at the apex. 2.5% Sodium hypochlorite & normal saline was used during the preparation for irrigation. The canal was dried using absorbent paper points & obturated using lateral condensation of gutta percha and resin sealer (Figure 6). The access cavity was sealed with a temporary cement (3M ESPE CAVIT-G).

Figure-5 Working length determined

Figure-6 Post-obturation radiograph

The following day, after completion of the endodontic treatment, the splint was removed, and the mobile fragment was extracted atraumatically under local anaesthesia (Figures 7). The fragment was stored in normal saline (Figure 8).

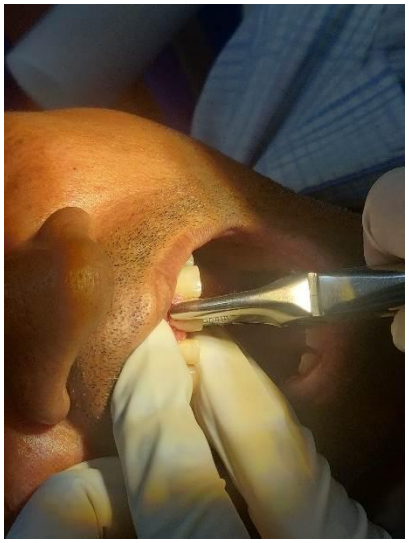

Figure-7 Atraumatic extraction of mobile coronal fragment

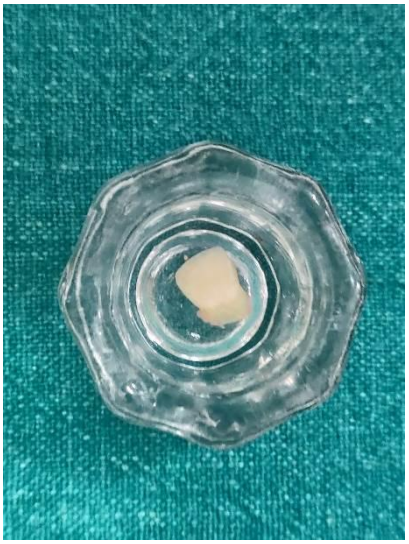

Figure-8 Fracture fragment stored in saline

The root canal was then prepared for the glass fibre post (MAILYARD FIBRE POST) placement by removing the gutta percha till the apical one-third of 11 using peeso reamers (Figure 9). Apical 5 mm of GP was left intact. The fibre post was tried for proper fit in the canal and adjusted to the desired length (Figure 10).

Figure-9 Gutta percha removed till apical one-third

Figure-10 Fibre post checked for fit

A slot was also prepared in the pulp chamber of the fractured crown fragment to receive the coronal portion of the post (Figure 11). The alignment of the coronal fragment with the post was checked and confirmed in situ.

Figure-11 Slot preparation in fracture fragment

The post was then luted in the canal using Dual cured resin luting cement (LUXA DUAL CURE RESIN). The inner portion of the coronal fragment was similarly luted into position to the tooth (Figures 12, 13, 14, 15, 16, 17).

Figure-12 Application of etchant to remaining crown portion

Figure-13 Application of bonding agent to remaining crown portion

Figure-14 Application of etchant to coronal fractured segment

Figure-15 Application of bonding agent to coronal fractured segment

Figure-16 Post-treatment labial view

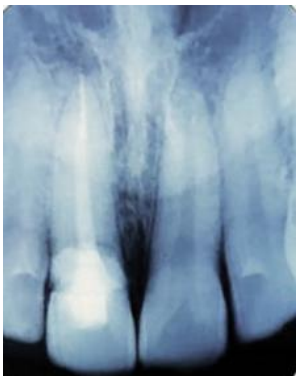

Figure-17 Post-treatment radiograph

Patient was recalled for follow up after 1 week and 1 month (Figure 18).

Figure-18 1 month follow-up

III. DISCUSSION

The fracture of a tooth can be one of the most traumatic incidents for a patient, having both physical as well as emotional and psychological effects. One in every six adolescents and one in every four adults have been known to suffer from a traumatic dental injury in their lifetime. Epidemiologic studies show that most dental injuries involve just one tooth, and that the majority of the affected teeth are maxillary central incisors [8].

There are several treatment options for the management of tooth fractures and several conditions must be taken into consideration to determine the ideal option, such as the location and extent of the fracture, the pulpal condition, the degree of tooth eruption, the degree of root formation and the patient's aesthetic demand

[9]. The preservation of the natural tooth structure has shown to elicit a more positive emotional and social response from the patient [7]. Reattachment of the fractured tooth fragment provides better aesthetics with achievement of natural translucency, has tooth wear rate similar to that of the adjacent teeth, requires lesser clinical time and is cost-efficient. This treatment modality also eliminates problems associated with other restorative techniques, like differential wear, unmatched shades and difficulty of contour and texture reproduction [3].

Successful reattachment is highly dependent upon the rapid retrieval of the fragment, which should be preserved in physiologic solution or saline in order to avoid any change in colour due to dehydration [2]. In this case, the fractured fragment was stored in normal saline until reattachment, and no discoloration was observed in the 1-month post treatment follow up examination. Fibre reinforced composite posts consists of resin matrix in which structural reinforcing quartz or glass fibres are embedded. Quality of fibre post depends on even distribution of the fibre in the organic matrix and presence of as dense as possible fibres in organic matrix. This structure results in high tensile and flexural strength of fibre post. Its advantages are aesthetics. It bonds to tooth structure and has modulus of elasticity similar to that of dentin [2]. Minimal preparation is required as it uses the undercuts and surface irregularities of dentin to increase the surface area for bonding [3]. In this case, glass fibre post was used to reinforce the pulp less teeth. Its monobloc effect with no inherent weak interlayer interface helps in distribution of stresses to the remaining radicular dentin, there is less chance of microleakage and good bond strength to tooth [10]. No complications were experienced during 1 month follow-up.

IV. CONCLUSION

Reattachment of the fractured tooth fragment is a simple, economical, and quick treatment option that should be considered when the fragment is available and in good condition. It offers aesthetically satisfactory and predictable results. By preserving the natural tooth structure, positive psychological feedback from the patient is also achieved. Further case reports with long term follow up are required to confirm the reliability of this treatment plan.

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