

THE INTERNATIONAL JOURNAL OF SCIENCE & TECHNOLEDGE

Reattachment of Fractured Tooth Fragment: A Case Report

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Abstract:

Fracture of anterior teeth due to trauma is highly prevalent. If the fractured fragment is available fragment reattachment is a conservative treatment option that can establish functional and aesthetic harmony. This procedure is a more biologic method to restore the natural shape, contour, occlusal alignment and colour. Besides aesthetics this technique brings about wear similar to that of the adjacent teeth unlike other materials It also provides a positive psychological response. This article reports on a coronal tooth fracture case that was successfully treated using tooth fragment reattachment.

Keywords: Anterior crown fracture, Reattachment, Fiber post, Resin cements

1. Introduction

Fracture¹ of anterior teeth due to trauma is highly prevalent. Rehabilitating immediate aesthetics and function bear positive psychological effects on the patient. Common² causes of fracture of anterior teeth are due to falls, automobile accidents, violence and sports and they involve multiple teeth fractures. With³ the advent of adhesive restorative materials better services is being provided to patients.

Fragment reattachment is a conservative option that can establish functional and aesthetic harmony. This procedure is a more biologic method to restore the natural shape, contour, occlusal alignment and colour. Besides aesthetics this technique brings about wear similar to that of the adjacent teeth unlike other materials.

In this case endodontic therapy was followed by reattachment of the fractured fragment using fibre post and dual cure resin cement.

2. Case Report

A 29-year-old male patient reported to the department of Conservative dentistry and Endodontics with a chief complaint of broken upper front teeth with history of trauma one day before. He had no relevant medical history.

Clinical examination (Fig.1, 2) revealed Ellis class III fracture in relation to maxillary left central and lateral incisor, Ellis class II fracture in relation to maxillary right central incisor. There was no soft tissue injury. The fractured fragment in relation to the lateral incisor was still attached palatally to the tooth.

The patient wanted immediate aesthetic rehabilitation, hence reattachment of the fragment in relation to the maxillary left lateral incisor, fiber post placement followed by crown in relation to maxillary left central incisor and a composite restoration in relation to right maxillary central incisor were planned.

For the maxillary left lateral incisor adaptation of the fractured fragment was checked (Fig.3). Root canal preparation, obturation followed by post space preparation were performed. A slot was prepared in the fragment to accommodate the head of the post (Fig .4).

Acid etching with 37% phosphoric acid was carried out on the root canal wall and the fractured fragment for 20 seconds (Fig.5). After drying dentin bonding agent (Adper Single Bond 2, 3M ESPE) was applied with a micro brush and cured for 20 seconds. Dual cure resin cement (Relyx ARC, 3M ESPE) was then applied to the canal walls, the post and the fractured fragment.

Fibre post (Angelus) was placed and cured in the canal with dual cure resin cement (Fig.6). The fragment was then placed over the post and aligned according to occlusion and cured. Polymerization was done for 40 seconds Excess cement was trimmed.

For the maxillary left central incisor canal preparation and obturation were done followed by post space preparation. Fibre post(Angelus) was placed in the root canal and composite core build up followed by crown preparation were done(Fig.7). The maxillary right central incisor was restored with composite

3. Discussion

Dental injuries are most commonly seen in the maxillary anterior teeth by virtue of their position in the arch. Many^{5,6} factors should be taken into consideration when treating coronal fractures such as the position and extent of fracture, associated alveolar fracture and soft tissue injuries, condition of the tooth fragment, its adaptation to the remaining tooth.

Reattachment⁷ is a good treatment approach as it is a conservative technique, with little removal of the remaining tooth structure. The¹ form, contour, texture and tooth alignment are similar to that of natural dentition. It⁸ also has a favourable psychological effect on the patient in terms of immediate aesthetics and retaining the natural tooth structure. Further⁹ the restoration will show similar wear rate to that of the remaining dentition as the anterior occlusal guidance is maintained. Use of adhesive restorative materials has made this technique more predictable.

In cases presenting with a supragingival fracture without pulpal involvement reattachment of the fragment can be carried out with the use of adhesive restorative materials. In cases presenting with supragingival fractures with minute pulp exposure, direct pulp capping with biomimetic materials followed by reattachment can be done in order to preserve the vitality of the tooth. Cases with supragingival fractures with pulp exposure, endodontic therapy followed by reattachment can be done. If there is extensive loss of tooth structure a fibre post can be used for retention of the fractured fragment.

If¹⁰ there is a subgingival fracture with violation of biologic width surgical procedures should be initiated. These include elevation of flap, alveoloplasty to gain access to the site of fracture

Another¹¹ factor to be considered is the dehydration status of the tooth. If the fragment has been in an extra oral environment without any storage media the more it gets dehydrated. Dehydrated tooth fragments show poor resin infiltration due to collapse of collagen network. Also they are not so aesthetic in appearance as there is reduced translucency compared to the natural dentition.

Adaptation¹² of the fractured fragment will also influence the treatment plan. If there is poor adaptation of the fragment the technique becomes more complex and in those cases presenting with multiple fractures the bonding procedure becomes even more cumbersome. How long the restoration lasts is not predictable, although some clinical studies have shown that they can last upto 7 years.

In¹³ a study done by Andreasen et al 330 tooth fragment reattachment cases were reviewed and retention rates of 50% at the end of 2.5 years and 25% at the end of 7 years were reported. On the contrary there are some authors who consider reattachment procedure to be a temporary procedure. Liew¹⁴ et al believe that tooth reattachment should be a temporary procedure. Despite the differences regarding the reattachment procedure the best part of reattachment procedure is that other restorative options such as direct composite restorations, veneers and crowns can still be carried out.

There are different views regarding the placement of bevels and chamfers during the reattachment procedures. Some¹⁵ authors are of the view that placing a bevel does not bring about an increase in the fracture strength of the restoration. Dean¹⁶ et al studied the effect of bevels on the fracture resistance of the reattached teeth and found no difference in fracture resistance with and without bevels. In¹⁷ another study done by Worthington et al there was no improvement in the fracture resistance when internal and external bevels were placed.

4. Conclusion

Reattachment procedure is a good choice of restorative technique for reinstating immediate esthetics and function. With the advent of adhesive restorative materials this technique has evolved into a predictable treatment option. However, taking into consideration the long term studies reported in literature the patient should be kept informed about the possible provisional nature of the treatment



Figure 1: Pre-operative view

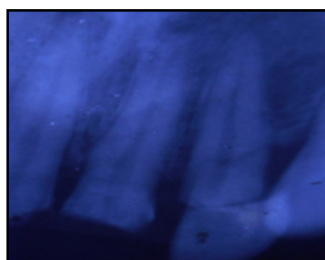


Figure 2: Preoperative radiograph



Figure 3: Adaptation of the fragment was checked

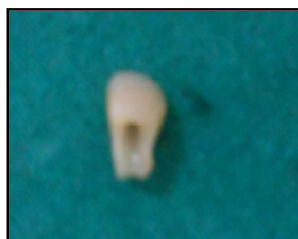


Figure 4: Slot was prepared in the fragment to receive the post

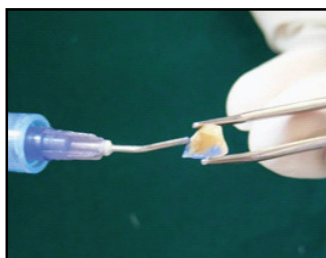


Figure 5: Acid etching of the fragment



Figure 6: Post placement in the lateral incisor



Figure 7: Reattached left lateral incisor, fibre post placement and crown preparation on left central incisor and composite restoration on right central incisor



Figure 8: Post-operative view

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