

CASE REPORT

PRESERVING THE NATURAL SMILE BY IMMEDIATE RE-ATTACHMENT OF FRACTURED TOOTH: REPORT OF TWO CASES



Ramesh Bharti*MDS, **Anil Chandra***MDS, **Aseem Prakash Tikku***MDS,FICD, **Deeksha Arya****MDS

* Department of Conservative Dentistry and Endodontics, Faculty of Dental Sciences, King George's Medical University, Lucknow, Uttar Pradesh, India. ** Department of Prosthodontics, Faculty of Dental Sciences, King George's Medical University, Lucknow, Uttar Pradesh, India.

Address for correspondence: Dr Ramesh Bharti, Flat No.-805, Doctor's flat, T.G. Hostel Campus, Khadra, Sitapur Road, Lucknow - 226 003 Uttar Pradesh INDIA.

E-mail: r_bharti4@yahoo.com

Abstract : Traumatic injuries are most common in maxillary anterior teeth which mainly affect the esthetics and function. This article describes the immediate reattachment of fractured tooth fragment for the restoration of function and esthetics at the emergency visit. These case reports describe immediate treatment of oblique crown root fracture of maxillary right lateral incisor, and mandibular left central incisor. By reattaching the natural tooth fragment in the first case the root canal treatment was done then after fractured fragment was reattached with the titanium post. While in the second case the tooth was previously root canal treated, in which titanium post was used to reattach the fractured fragment. Successful pain management with immediate restoration of function, esthetics, and phonetics was the prime objective when treating these cases.

Keywords: esthetics, fractured tooth, re-attachment, resin cement, titanium post.

INTRODUCTION

Traumatic injury in the form of anterior crown fracture has been estimated one quarter of the population under the age of 18 (1,2). Ninety-six percent of these traumatic injuries involve maxillary incisors (80% central incisors and 16% lateral incisors (3). These injuries pose substantial challenge to dental team because patient often wants resolution of trauma during an emergency visit.

The difficulties of the restoration depends on the type of fracture(4) (according to Dean's classification)(5), extent of fracture (supragingival, sub gingival or may involve root), the type of occlusion and the involvement of soft tissue (6,7). Oblique fractures (Type B according to Dean's classification) are more difficult to treat than horizontal fractures. The conventional treatment of fractured anterior teeth include post and core and composite restoration followed by prosthetic restoration. But the reattachment of fractured

segment have several advantages over the other treatment because it maintains the original tooth contour, color, texture and translucency as the patients own incisal enamel appears more natural than any other restoration(3).

Case report -1

A 21 year old female consulted at the postgraduate clinic of the Department of Conservative Dentistry and Endodontics of CSM Medical University Lucknow (Erstwhile King George's Medical College). Her maxillary right lateral incisor was fractured during an outdoor activity accident 13 hours ago. The history of patient revealed no systemic disease. She did not have hemorrhage or swelling in the related area. The clinical and radiographic maxillofacial examination revealed that there was no fracture of the maxilla, mandible or any other facial bones. Intraorally the right maxillary lateral incisor tooth showed an oblique crown fracture. The fractured line was located 2 mm

supragingivally on the buccal aspect and at the level of the alveolar crest on the palatal aspect (Fig-1a&1b).

The fragment was extremely mobile and it was only retained by periodontal fibers on the palatal aspect. After removal of the coronal fragment, it was kept in physiological saline solution to prevent dehydration of that segment (Fig.1c). The root canal therapy was performed with the rubber dam. After cleaning and shaping, the root canal was filled with AH plus sealar (Dentsply) and gutta percha using warm vertical compaction technique. During entire procedure the homeostasis was achieved by locally placing adrenaline embedded cotton pellets. A Parapost XP (Coltene Whaledent) was selected as per the canal diameter and inserted into coronal 1/3 section of the root canal for retention (Fig-1d). A hole was drilled in the middle part of crown fragment (Fig-2a). RelyX U100 Self-Adhesive Resin Cement (3M ESPE) was applied to the adherent surfaces. The crown fragment was reattached to the root surface, and light cured for 40 seconds and allow to self cure. The remnants of the resin were removed from the interdental space and the tooth surfaces. Finishing and polishing of the restoration was carried out, and the occlusion was checked to assured that there is no contact (Fig-2b&2c).

One month later the clinical and radiographical examination revealed a stable reattachment of the crown fragment with no color change (Fig2d). At this time periodontal probing revealed a depth of 2mm on the mesial side, 2mm on the buccal side, 2.5 mm on the distal side and 1 mm on the palatal side. The patient was then scheduled on recall visits at each 6 months and the periodontal measurements were repeated at each visit. After 1 year, the clinical and radiographic findings presented no color change, no mobility, no periapical pathosis and the tooth had a healthy periodontium with no pocket formation or gingival recession.

Case report-2

A 28 year old female patient reported to the Department of Conservative Dentistry and Endodontics of CSM Medical University Lucknow (erstwhile King George's Medical College) following trauma to mandibular left central incisor. A day before of her visit she was eating corn maize, resulting in fracture of mandibular left central incisor. The fragment was mobile, but still in place (Fig.3a). Clinical examination revealed oblique fracture. The fracture line was present on the coronal portion extending from lingual to labial aspect subgingivally. The margin on labial surface located 2 mm below the free gingival margin and could be

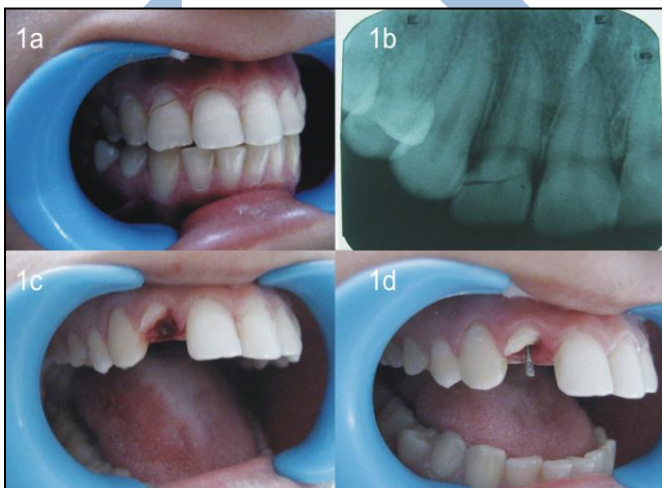


Fig 1a. Photograph showing fracture maxillary lateral incisor. **1b.** Radiograph showing fracture line in maxillary lateral incisor. **1c.** Clinical view after the removal of the fractured fragment. **1d.** Post positioning to accommodate the fracture fragment.



Fig 2a. Fractured crown after removal and preparation. **2b.** Labial view after sealing. **2c.** Radiograph after sealing the fractured fragment. **2d** Photograph after one month of the treatment.

probed easily with a periodontal probe. Clinical and radiographic examination revealed that tooth was root canal treated (Fig 3b). The patient was very apprehensive about her fractured teeth. She was assured and the condition was explained to the patient. Of the various treatment options explained to the patient, she preferred to retain the fractured fragment. The fractured fragment of the mandibular left central incisor was removed and stored in physiological saline, to be used at a later stage. Isolation was achieved using cheek retractor, cotton rolls, and saliva ejector. Gelatin sponge (Ab Gel; Sri Gopal Krishna Labs, Mumbai, India) was packed on labial surface in the subgingival area to control any bleeding from that area. The post space was prepared. Parapost white fibre (Coltene Whaledent) was tried in the canal and cut at the desired length. The fractured fragment was removed from the physiological saline and tried on the cut end of the fiber post. A groove was made on the fractured fragment until it fitted comfortably on the post. Care was taken not to remove excess dentin, because it can alter the final esthetic appearance of the tooth.

Adhesive Resin Cement (3M ESPE). Any excess cement oozing out of canal was removed so that it will not compromise the fit of the coronal fragment. Gelatin sponge was then removed and the exposed root surface and fractured fragment were acid etched simultaneously. Groove in the fractured fragment was filled with resin cement, and the exposed post was also luted with the same resin. The fragment was repositioned. Because the fracture line was visible on the lingual surface, a groove was made along the fracture line. It was then restored with Nanocomposite (Filtek Z 350 Universal Restorative; 3M Espe, St. Paul, MN). Finishing and polishing was done using Sof-Lex polishing system (Sof-Lex Extra Thin Contouring and Polishing Discs; 3M ESPE) and a radiograph was also taken (Fig.3c&3d).

After 8 week there was no mobility of any of the fragments, and the periodontal status in relation to both central and lateral incisors was satisfactory (no periodontal pockets, normally contoured palatal gingiva). Radiographic examination revealed satisfactory healing of both central and lateral incisors, and no discoloration was evident on clinical examination.

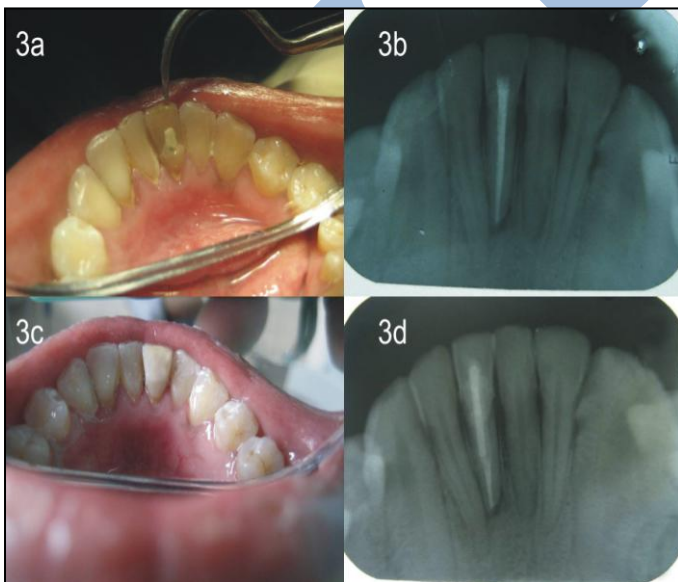


Fig 3aClinical view of fractured mandibular left central incisor.**3b**.Radiograph showing fracture line and tooth was root canal treated.**3c**.Clinical view after completion of treatment.**3d**.Radiograph after sealing the crown fragment.

Once the desired fit was confirmed, it was again stored in physiological saline. The post was cemented with the help of RelyX U100 Self-

DISCUSSION

With the advancement in dental bonding technology, it is now possible to achieve excellent results with reattachment of fractured tooth fragments. The use of natural tooth substance clearly eliminates the problems of differential wear of restorative material, unmatched shades and difficulty of contour and texture reproduction associated with other techniques. Treatment plan can be made after evaluation of the periodontal, endodontic, coronal and occlusal status (8). Other factors that might influence the choice of technique include the need for endodontic therapy, extension of fracture line and the fracture pattern.

Resin cements applied in this technique have added advantages over the other cements because of decreased chances of microleakage(9). The resin luting cements exhibits good bond strength to the tooth, easy to use and predictable. The resin based root canal sealers are used to obturate such teeth, which are planned to seal post with resin cement, as

the eugenol based root canal sealers inhibit the setting of resin cements (10). An additional chamfer preparation was also given on labial surface along the fracture line that was filled with microhybrid composite in case one after reattachment to increase the fracture resistance(11).

If the fracture line is supragingival, the procedure for reattachment will be straightforward. However when the fracture line is subgingival or intraosseous, orthodontic extrusion with a post-retained crown may be necessary. Alternatively, surgical techniques such as electrosurgery, elevation of tissue flap, clinical crown lengthening surgery with removal of alveolar bone and removal of gingival overgrowth for access the fractured site are viable methods for bonding fractured components. It has been suggested that whenever the fracture site invades the biological width, surgery should be performed with minimum osteotomy and osteoplasty [Barteiri et al, 1990] (12). However in cases with minimal biological width invasion the operator is able to restore the biological width by providing adequate plaque control and satisfactory esthetics and function, without conventional flap surgery but requiring long term follow up. The success rate of reattached fragments has been seen to be 90% depending upon the periodontal and pulpal condition (13). The prognosis of the reattached teeth would also depend on the fitness, contour and surface finishing of the subgingival restoration.

CONCLUSION

Reattachment of fractured tooth segment is a conservative, effective and immediate treatment approach for the maintenance of esthetic and function as compared to ceramic crown fabrication but long term follow up of such cases is very important for such cases. Periodontal status should be checked during the follow up visits.

REFERENCES

1. Murchison DF, Burke FJ, Worthington RB. (1999) Incisal edge reattachment: indications for use and clinical technique. *Br Dent J* 186:614–619.

2. Petti S, Tarsitani G. (1996) Traumatic injuries to anterior teeth in Italian schoolchildren: prevalence and risk factors. *Dent Traumatol* 12:294–297.
3. Arhun N, Ungor M. (2007) Re-attachment of a fractured tooth: a case report. *Dent Traumatol* 23:322.
4. Trshkowsky RD. (1998) Esthetic, biologic and restorative considerations in coronal segment reattachment for fractured tooth: a clinical report. *J Prosthetic Dent* 79:115-119.
5. Dean JA, Avery DR, Swartz ML. (1986) Attachment of anterior fragments. *Pediatric Dent* 8:139-143.
6. Lery RLRG, Aps JKM, Raes FM, Martens LC, DeBoever JA. (2000) A multidisciplinary treatment approach to a complicated maxillary dental trauma: a case report. *Dent Traumatol* 16:138-142.
7. Qulis CJ, Berdouses ED. (1996) Dental injuries of permanent teeth treated in private practice in Athens. *Dent Traumatol* 12:60-65.
8. Chu FCS, Yim TM, Wei SHY. (2000) Clinical considerations for reattachment of fractured tooth fragments. *Quintessence Int* 31:385-91.
9. Andreasen JO. (2001) Adhesive dentistry applied to the treatment of traumatic dental injuries. *Oper Dent* 26:328-335.
10. Demarco FF, Fay RM, Pinzom LM, Powers JM. (2004) Fracture resistance of reattached coronal fragments-Influence of different adhesive materials and bevel preparation. *Dent Traumatol* 20:157-163
11. Reis A et al. (2002) Reattachment of anterior fractured teeth: Fracture strength using different materials. *Oper Dent* 27:621-627.
12. Barateiri LN, Monteiro S jr, Cardodso AC, de Melo Filho JC. (1993) Coronal fracture with invasion of biologic width: A case report. *Quintessence Int* 24:85-89
13. Yilmaz Y, Zehir C, Eyuboglu O, Belduz N. (2008) Evaluation of success in the reattachment of coronal fractures, *Dent Traumatol* 24 :151-15