

Restoring Esthetic Smile in a Complicated Crown Root Fracture by Conservative Approach



Dental Science

KEYWORDS : Dental trauma; Teeth fractures; Glass Fibre post; Resin composite; Fracture Fragment reattachment.

Dr. Swapnil S Khivansara

Assistant Professor, Department Of Conservative Dentistry, Government Dental College And Hospital, Mumbai, Maharashtra ,India

Dr.M.M.Warhadpande

PROFESSOR AND HOD, Department Of Conservative Dentistry, Government Dental College And Hospital, Nagpur, Maharashtra ,India

ABSTRACT

The treatment of complicated crown- root fractures that are well below gingival margin or bone in many cases is compromised. In this respect a wide range of treatment options advocated and reattachment is one of them. This case report presents with uncomplicated fractured anterior tooth. 12 month clinical & radiological follow up revealed favorable prognosis.

INTRODUCTION:

Esthetics is a beauty dealing with its art, its creative sources, its forms and its effects. Esthetic errors or failures may have been inadequate, incomplete or inaccurate. Conservative restoration of fractured anterior teeth provides one such challenge. In this respect, a wide range of treatment options have been advocated for traumatic permanent teeth including Orthodontic extrusion¹, Osteotomy / osteoplasty², Intentional replantation³, Re-attachment of fragments⁴ and Extraction⁴.

A number of techniques have been developed to restore the fractured crown. Early techniques include stainless steel crowns, basket crowns, orthodontic bands, pin retained resin, and porcelain bonded crown and composite resin. Chosack and Eidelman reported first case of fracture fragment reattachment⁵. Baratieri et al reported the re-attachment of a fractured fragment using acid-etch technique⁶. Subsequently Fidel et al also reported similar cases⁷. Re-attachment of a tooth fragment should be preferable to restoring fractured teeth. There are several advantages in this treatment such as obtaining esthetic in a single appointment, being more conservative procedure, obtaining healthy periodontal attachment and it maintains the original tooth contours and translucence as the patient's own. Also positive emotional and social response from the patient for preservation of natural tooth structure is obtained. The present case report describes the reattachment of an original tooth fragment using a glass fiber post in an endodontically treated maxillary right central incisor (FDI Notation11).

CASE REPORT

A 24-year-old male patient visited to Department of Conservative Dentistry & Endodontics with the complaint of a fractured 11 due to trauma. The patient's medical history was non-contributory. The patient reported pain and bleeding during normal movements of jaw in the region of line of fracture. The clinical and radiographic examinations showed Andreasen class VI type of injury where an oblique crown-root fracture in 11 involving the enamel-dentin junction and extending from buccal to the palatal aspect with the pulp involvement² (fig 1. a & b). (Figure 1, 2)

After discussing the various treatment options and consent from the patient, reattachment of fracture fragment treatment was planned. After administration of infra-orbital block local anesthesia, mobile coronal tooth fragment was removed and stored in 2% Normal Saline (fig 1. c & d). (Figure 3, 4) Pulp extirpation and canal preparation was performed using the standard step-back method. The prepared teeth were dried with paper-points (Dentsply Maillefer, Tulsa, OK) and filled with laterally condensed

gutta-percha (Dentsply Maillefer, Tulsa, OK) & AH plus root canal sealer (Dentsply Maillefer, Tulsa, OK) (fig 1. e). Figure 5

Full thickness buccolingual mucoperiosteal flap was elevated with an intrasulcular incision. The gutta-percha was partially removed from the root canal using Peeso reamer (Mani Inc. Tochigi, Japan) leaving 5 mm of the filling material at the apex to maintain a good sealing. A glass fiber post (FKG fibre post) was cemented within root canal with dual adhesive cement (Relyx, 3M ESPE) (fig 1 f) Figure 6. After removing all the debris on root canal surface widening of pulp chamber of fragment was done to accommodate post. Acid etching was done followed by application of bonding agent (Prime n Bond NT Dentsply) on to the surfaces of the fragments and light cured for 20 seconds. Volatile ingredients were evaporated with mild air stream. The fragments were reattached with a dual cure flowable composite resin (3M ESPE) and excess resin was removed with an excavator and light cured for 40 seconds from both buccal and palatal aspects (fig 1. g) Figure 7.

After this procedure, the flap was sutured. One week later, the sutures were removed and clinical examination revealed proper healing. A groove was made on fracture line and filled with composite resin to mask the fracture line. Final polishing of the crown root interface was made with ultra-fine diamond burs and polishing disks (Shofu Inc. Kyoto, Japan) (fig 1. h) Figure 8. At one and twelve month follow up clinical and radiographic examinations revealed a stable reattachment of the crown fragment, good aesthetics and periodontal health (fig 1. I & J). Figure 9, 10



Discussion

Factors which were taken into consideration before reattachment procedure were reattachment techniques, need of endodontic therapy, extension of fracture, quality of fit between segments, fracture pattern and material of choice for reattachment^{4, 7-12}.

The present case report described that tooth fragment reattachment is an alternative to composite resin build-up for restoring esthetic and function of obliquely fractured teeth. Till date, a lot of different approaches were proposed for treatment of fractured teeth depending on location of the fracture. One of the options for managing coronal tooth fractures is the reattachment of the dental fragment. Reattachment of fragments offers a good esthetic, less time-consuming and cost-effective restorative option. Contemporary resin adhesives and resin post systems that allow strong durable bonds to dentin enhance this option. A glass 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 structure. The re-attachment of a tooth fragment is a viable technique that restores function and esthetics with a very conservative approach, but for each trauma case should be attempted to restore on an individual basis.

Conclusions

Several aspects govern the choice of a technique or the association of materials for fragment reattachment. However, the literature indicates that if the material or a combination of materials chosen has proven to be effective in *in vitro* studies and there is no incompatibility between them, the kind of material used for the reattachment of fractured teeth is less important. The authors do not advise clinicians to perform the simple reattachment of fractured teeth without additional preparation since this technique may not be able to restore even half of the fracture strength of intact teeth. Thus, clinicians should attempt to choose one of the reinforcement techniques related in this review in order to improve the fracture strength of the reattachment technique. This case presents the progress in adhesive technology. Fiber reinforced resins allow not only creation esthetic restoration but also for the preservation and reinforcement to tooth structure. At the 1-year follow-up, the result was acceptable to the patient. However, before recommending a similar treatment on a regular basis, a longer follow-up period is required.

References

1. Bondemark L, Kurol J, Hallonsten AL, Andreasen JO. Attractive magnets for orthodontic extrusion of crown root fractured teeth. *American Journal of Orthodontics and Dentofacial Orthopaedics* 1997; 112:187-193
2. Andreasen JO, Andreasen FM. Essentials of traumatic injuries to the teeth, 1st ed.. Copenhagen Munksgaard; 1991: 47-62
3. Wang Z, Heffernan M, Vann WF Jr. Management of a complicated crown-root fracture in a Young permanent incisor using intentional replantation. *Dent Traumatology* 2008; 24:100-103
4. Reis A, Loguercio AD, Kraul A, Matson E. Reattachment of fractured teeth: a review of literature regarding techniques and materials. *Operative Dentistry* 2004; 29(2):226-33
5. Chosack A and Eidelman E. Rehabilitation of fractured incisor using the patient's natural crown, Case Report: *Journal of Dentistry for Children* 1964; 31(1): 19-21
6. Baratieri LN, Monteiro S, De Andrada MAC. Tooth fracture reattachment: case report. *Quintessence Int* 1990; 21(4):261-270
7. Baratieri LN, Monteiro S Jr, de Albuquerque FM, Vieira LC, de Andrada MA, de Melo Filho TC. Reattachment of a tooth fragment with a new adhesive system: a case report. *Quintessence International* 1994;25(2); 91-96
8. Dean JA, Avery DR & Swartz ML Attachment of anterior tooth frag-

ments *Pediatric Dentistry* 1986; 8(3):139-143

9. De Santis R, Prisco D, Nazhat SN, Riccitiello F, Ambrosio L, Rengo S & Nicolas L Mechanical strength of tooth fragment reattachment *Journal of Biomedical Materials Research* 2001; 55(4):629-636
10. Zorba YO, Ozcan E. Reattachment of coronal fragment using fiber-reinforced post: a case report. *European Journal of Dentistry* 2007; 1:174-178
11. Andreasen FM, Noren JG, Andreasen JO, et al. Long term survival of fragment bonding in the treatment of fractured crowns. *Quintessence Int* 1995; 26(10):669-81
12. Reis A, Francci C, Loguercio AD, Carrilho MR and Rodrigues Filho LE. Re-attachment of anterior fractured teeth: fracture strength using different techniques. *Operative Dentistry* 2001; 26(3):287-94