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Restoration of Anterior Tooth Fracture Using Fibre Post And Fragment Reattachment Technique Followed By Esthetic Rehabilitation – A Case Report

Dr. Pradnya V. Bansode[1], Dr. Seema D. Pathak[2], Dr. M. B. Wavdhane[3], Dr. Priyanka B. Dongarjal[4]

1. Head of the Department, Professor, Department of Conservative Dentistry and Endodontics, GDC & Hospital, Aurangabad/ MUHS, India
2. Professor, Department of Conservative Dentistry and Endodontics, GDC & Hospital, Aurangabad/ MUHS, India
3. Associate Professor, Department of Conservative Dentistry and Endodontics, GDC & Hospital, Aurangabad/ MUHS, India
4. MDS student, Department of Conservative Dentistry and Endodontics, GDC & Hospital, Aurangabad/ MUHS, India
[*]Corresponding Author: Dr. Priyanka B. Dongarjal

Abstract
Maxillary anterior teeth are the most commonly affected teeth in case of a dental trauma. Emergency management of fractured fragment is necessary, for retaining its biological, functional and esthetic requirement. Various treatment modalities are available for treating a fractured case, such as – composite resin restoration, fractured fragment reattachment or extraction, followed by implant. Amongst all options, immediate agglutination of original fractured tooth fragment is a good alternative option in the scope of emergency treatment. In this case presentation, endodontic management followed by esthetic rehabilitation of a complicated crown fracture was done successfully with a favourable outcome.

Keywords: *Dental trauma, fractured fragment reattachment,endodontic management,esthetic rehabilitation.*

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I. Introduction

Traumatic dental injuries are most disruptive and distressing emergencies which occur in dental practice[1]. Amongst all dental traumas, in 96% of the cases, maxillary central incisors are involved[2]. Managing the dental trauma requires a comprehensive and accurate diagnosis and treatment plan[3]. Choosing a treatment option for a complicated crown fracture depends upon the level and position of fracture line, availability of displaced tooth fragments, type of occlusion and prognosis[4].

Reattachment can be done in cases where the fractured segment is closely approximating. Root canal treatment (RCT), followed by reattachment of the fractured segment with fibre post reinforcement is a feasible option[5]. It has been suggested that fibre post luted with resin cement increases the retention of the segment and also provides a monoblock effect.

This paper reports a case of complicated crown fracture successfully managed by tooth fracture reattachment.

II. Case Report

A 22 year old male patient referred to the Department of Conservative Dentistry and Endodontics, in GDC&H, Aurangabad with a chief complaint of fractured tooth in upper front region of jaw. On clinical examination, horizontal fracture line seen labially in cervical 1/3rd of 11(figure 1 and 2). Palatally, the fracture line was extending apical to the level of CEJ. On the basis of clinical and radiographical findings, provisional diagnosis was established as Ellis Class III fracture (complicated fracture) with 11.

Figure 1: Pre-operative intraoral photograph with 11

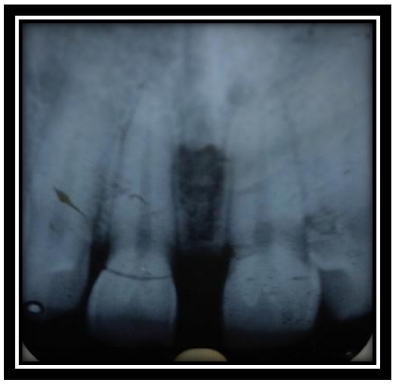

Figure 2: IOPA X-Ray with 11

To start with the treatment plan, various treatment modalities were explained to the patient and he preferred to reattachment of tooth fragment option. After administering local anaesthesia, the fractured fragment was removed atraumatically (figure 3 and 4) and stored in 25% dextrose (hypertonic solution compared to tooth) until the completion of root canal treatment and post space preparation (figure 5 and 6).

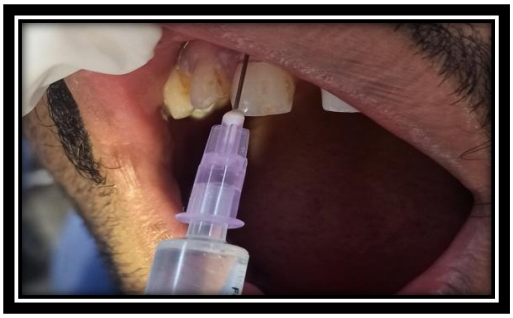

Figure 3: Tooth anaesthetized before fragment removal

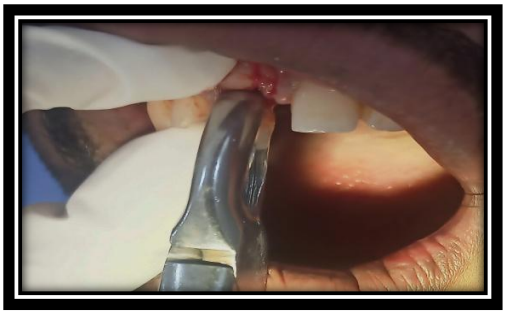

Figure 4: Mobile fragment removed atraumatically using anterior tooth forcep

Figure 5: Extracted anterior oblique tooth fragment with palatal extension apical to CEJ

Figure 6: Fractured fragment stored in 25% dextrose solution

Figure 7 and 8 shows labial and palatal view after extraction of the mobile fragment.

Figure : 7

Figure : 8

Single visit root canal treatment was completed and post space preparation done. Gutta percha filling removed from 2/3rd of the canal using peeso reamers (no. 4, 3, and 2 used sequentially), retaining 4-5 mm of gutta percha apically (figure 9-A,B,C,D).

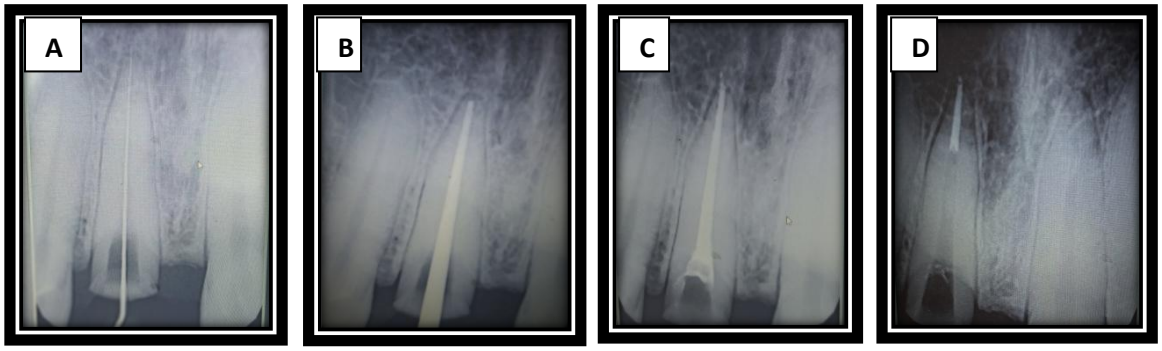

Figure 9: (A) Access cavity preparation and determination of working length, (B) Master cone IOPA X-Ray with 11, (C) Post Obturation IOPA X-Ray with 11, (D) Post space preparation with 5mm GP in apical 1/3rd

Coronal portion of the fibre post was trimmed using a straight fissure carbide bur to accommodate upto middle 1/3rd of 11 as compared to adjacent 21. The fit of fibre post was evaluated radiographically and luted into the canal using **luxacure dual cure resin.** Etching, bonding and curing of the canal followed by bonding and curing of the fibre post was done prior to the placement of the post.

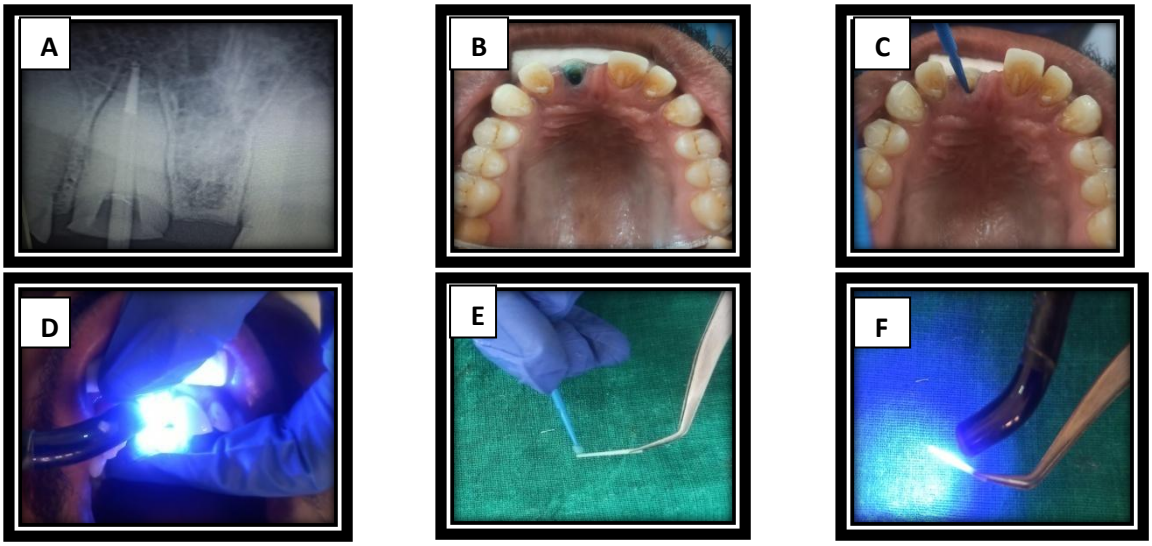

Figure 10: (A) Evaluating the fit of fibre post, (B, C, D) Etching, bonding and curing of post space (E, F) Bonding and curing of fibre post

Figure 11 shows dispension of luxacure dual cure resin on a paper pad and figure 12 shows cementation of fibre post after trimming the coronal part of fibre post.

Figure : 11

Figure : 12

Slot was prepared inside the tooth fragment which was removed earlier to accommodate the coronol portion of the fibre post.

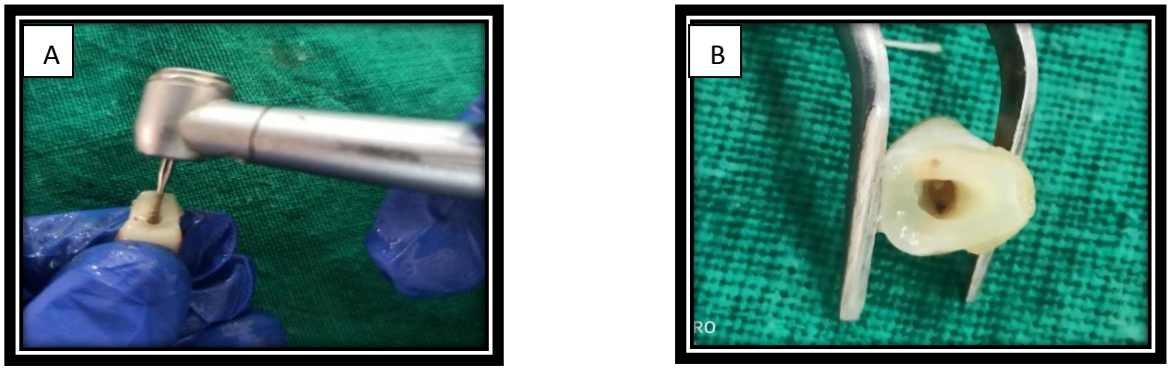

Figure 13: (A) Preparing slot inside the tooth fragment which was removed earlier (B) Image showing completed slot preparation

As the fracture line extended apical to CEJ palatally, surgical intervention needed for reattaching the fractured fragment palatally. Local anaesthesia given for raising the palatal flap (figure 14-A and B). Palatal flap elevated by giving **crevicular incision** (figure 14-C and D).

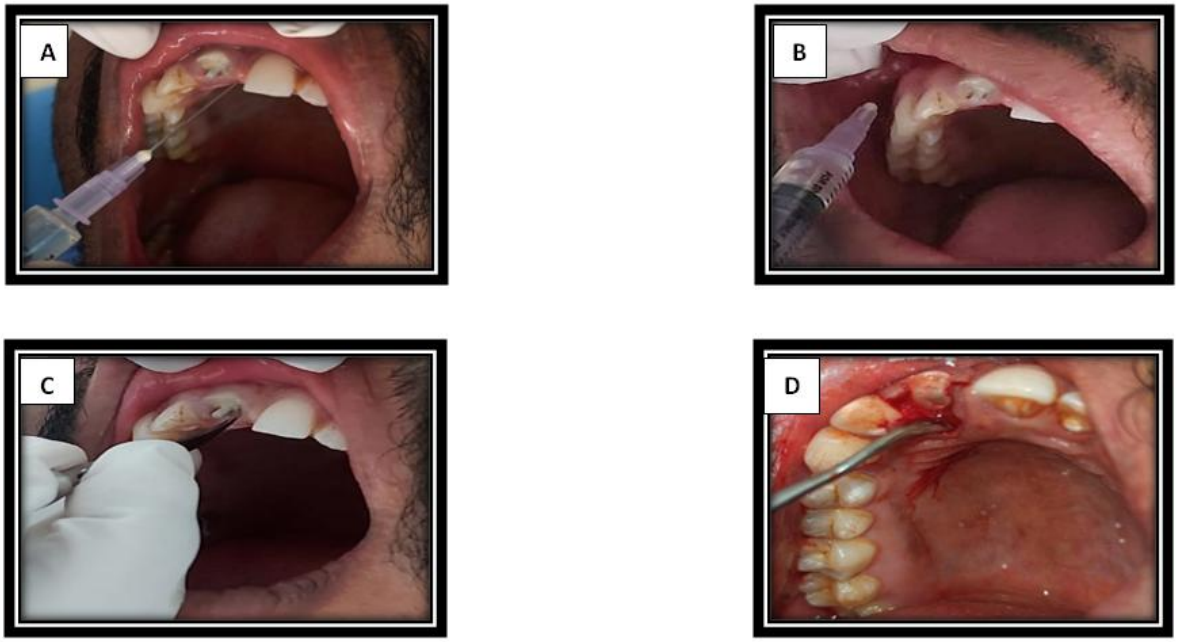

Figure 14: (A) Incisive nerve block, (B) Infra orbital nerve block, (C) Crevicular incision given palatally, (D) Palatal flap elevated.

Both, extracted coronal fragment and retained tooth portion in oral cavity were etched for 20 seconds and then rinsed, bonding agent applied with a disposable brush and then light cured with curing light for 20 seconds.

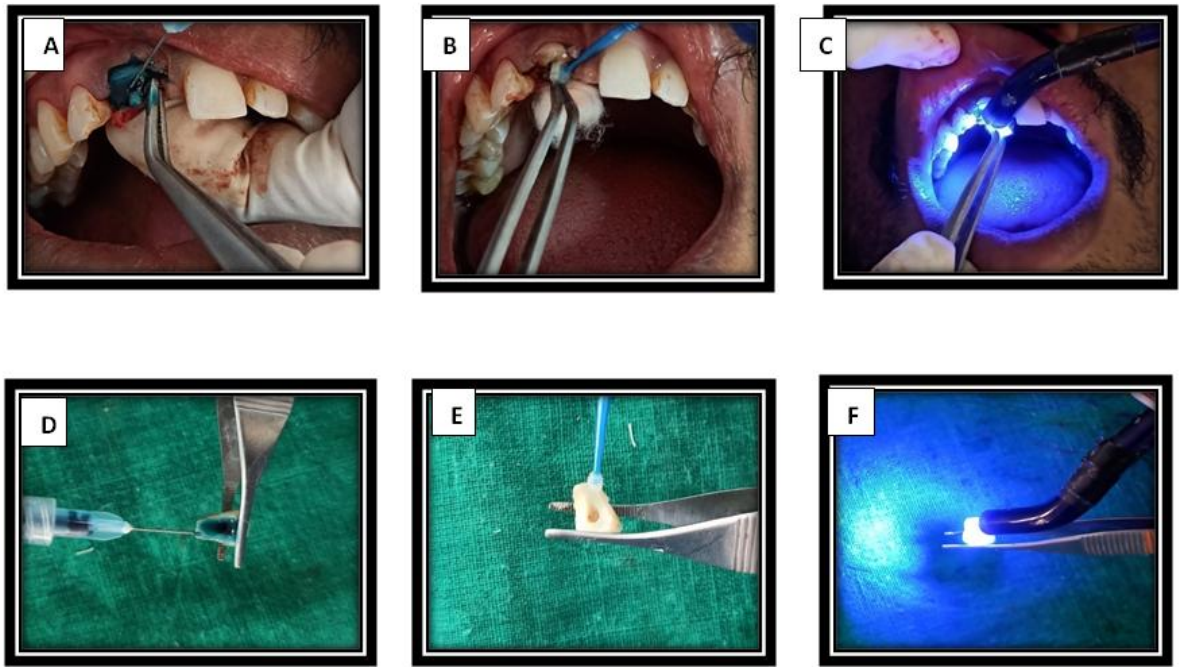

Figure 15: (A, B and C) Etching, bonding and curing of fractured tooth portion
(D, E and F) Etching, bonding and curing of fractured tooth fragment

Fractured fragment was reattached to the tooth using luxacure dual cure resin which was applied around the post and in the prepared slot of the tooth. Excess material along the margin was wiped out and light cured for 20 seconds. The fracture line was examined and masked using flowable composite resin restoration. Sutures were placed mesially and distally after reattaching the fragment. Coe pak given and patient recalled after 7 days.

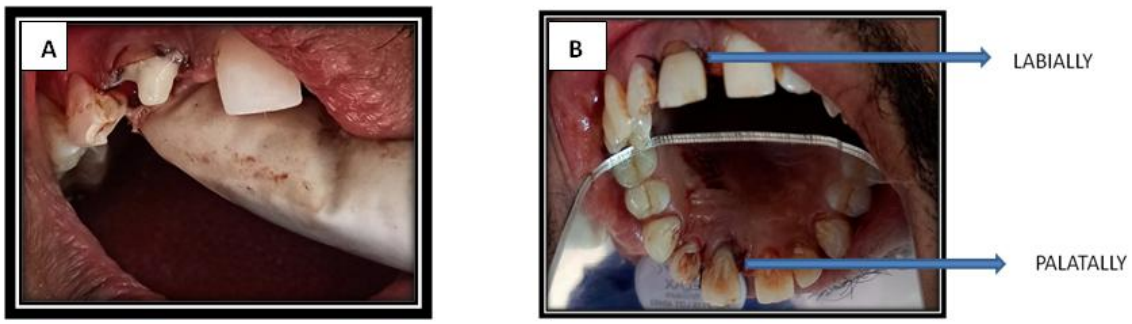

Figure 16: (A) Luting with dual cure composite resin, (B) Reattachment of the fractured fragment

Figure 17: (A) Sutures placed mesially and distally around 11, (B) Coe pak given

Figure 18 shows follow up images after 7 days with 11

Figure 18: (A) Post operative IOPA X-Ray with 11
(B, C) 7 days post operative follow-up photograph after removal of coe pak

Figure 19 shows post operative view after scaling, polishing, cervical contouring and finishing of composite restoration done with 11

Figure 19

Patient was esthetically concerned and wanted to close his diastema, therefore reshaping of interdental papilla was done using **electrocautery** (figure 20).

Figure 20

Figure 21 shows final post operative view after diastema closure using SPECTRUM - microhybrid composite kit from Dentsply.

Figure 21

COMPARATIVE PHOTOGRAPHS

Pre operative

Intra operative

Intra operative

Intra operative

Post operative

III. Discussion

Protection of mechanical and functional integrity is the most prioritized aspect in the restoration of traumatized teeth. There are many different treatment modalities available for restoration of such teeth, fracture reattachment being the most desired one.

With advances in adhesive dentistry, the process of fracture reattachment has become simplified and more reliable. The technique has several advantages like maintainance of original enamel translucency, similar wear resistance as that of adjacent teeth and minimal chairside time.

Further, recent improvements in availability of tooth coloured fibre post makes the procedure more easier because of its several advantages like suitable elastic modulus, esthetics, good bonding between post and cement and lower chair side time[7]. The use of fibre post with fractured teeth signifies as it interlocks the two fragments well and minimizes the load on reattached tooth fragment.

The use of luxacure dual cure resin is important because of its improved bond strength, esthetics and ensuring its complete curing while reattaching the fragment. This paper signifies a successful esthetic management of an complicated oblique coronal tooth fracture by restoring the original tooth and reattaching using fibre supported post system which is an effective and conservative treatment option that provides regain in esthetics and functional completeness for the patient.

IV. Conclusion

Complex coronary fractures require a specialized interdisciplinary treatment and must be carefully assessed by the dental clinician to achieve the best possible outcome[8]. Bearing in mind that it is a simple, fast, affordable and esthetically predictable technique, tooth fragment reattachment method should always be the treatment of choice when the fragment is present and is in good condition, even if a perfect adaptation is not observable.

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