

Attaching the detached Reattachment of fractured tooth segment- a series of two case reports

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Abstract

AIM- Management of Ellis Class III tooth fracture with reattachment of the fractured segment.

METHODS AND MATERIALS- Coronal fractures of the anterior teeth are common sequelae of dental trauma. In case of complicated fractures, where the fractured segment is available, root canal treatment followed by reattachment of the fractured segment with fiber post reinforcement is simple, aesthetic, economic and long lasting while maintain original morphology, colour and texture. Moreover, it needs less chair-side time as compared to many conventional methods This paper reports two such cases where complicated coronal tooth fracture was successfully managed using tooth fragment reattachment

CONCLUSION- Reattachment of fractured tooth segment is an aesthetic, functional and conservative treatment option for management of complicated crown fractures.

KEY WORDS- Ellis Class III, Fiber post, Fractured segment, Post and Core, Reattachment

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I. Introduction

The most common consequences of traumatic injuries that mainly occur in the anterior teeth are crown fractures, especially in the maxillary incisors.¹ One of the options for management of complicated crown fractures, involving enamel, dentin and pulp, when the tooth fragment is available with preservation and minimal violation biological width is the reattachment of the dental fragment.

Management of complicated crown fractures involves multidisciplinary approach process which is influenced by the location, length, extent and pattern of fracture (biological width violation, endodontic involvement, alveolar bone fracture), restorability of fractured tooth (associated root fracture), secondary injuries (soft tissue status), presence/absence of fractured tooth fragment and its condition for use (fit between fragment and the remaining tooth structure), occlusion, esthetics, finances, and prognosis.²

Reattachment of the fractured tooth fragment provides positive psychological response. Along with that aesthetic and functional rehabilitation for long run as the original anatomic form, colour, and surface texture of the tooth are maintained.

This paper is a case series of two cases of complicated crown fracture successfully managed by tooth fragment reattachment.

II. Case Report

CASE 1

A 28-year-old male patient reported to the Department of Conservative Dentistry and Endodontics with a broken tooth fragment along with a history of fall from bicycle 2 days back. (Figure-1A,B) The patient complained of pain and sensitivity in the upper anterior teeth.

On clinical examination no other hard or soft tissue injury was observed. Intraoral periapical radiograph revealed coronal fracture with a fully- formed apex without any peri- apical lesion or any sign of additional root fracture. So, a provisional diagnosis Ellis class III fracture (involvement of enamel and dentin compromising the pulp) with irreversible pulpitis of the maxillary right central incisor was made.

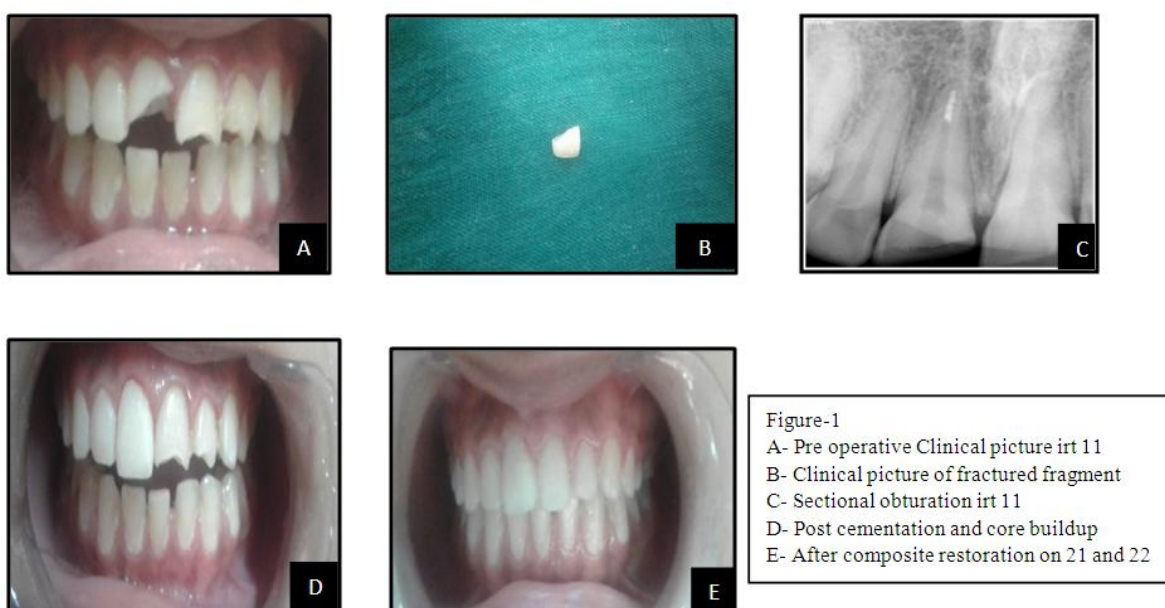
An immediate endodontic therapy followed by bonding the fractured segment to the crown was planned. Single visit endodontic therapy was performed for the fractured central incisor. After achieving profound anaesthesia (2% Lignocaine with 1:200000 epinephrine), an access cavity was prepared, working

length determined, and biomechanical preparation was carried out with the help of hand files using the step back technique.

The canal was dried with absorbent paper points and obturation was done by sectional method maintaining 5 mm of apical seal. After preparing the post space with Peeso Reamer, prefabricated glass fiber post was luted in the canal with dual cure resin cement (Paracore) [Figure-1C]. The separated fractured tooth fragment was disinfected with 5.25% sodium hypochlorite and then rinsed with water.

To seat the fractured fragment over the coronal portion of the fiber post a hole was prepared. An enamel bevel was prepared on the margins of the remaining tooth structure and fractured margin of the segment. Moreover, an additional internal dentinal groove was also prepared within the dentine of the fractured fragment part.

Acid etching of the access cavity and the approximating surfaces of the two segments were carried out with 37% phosphoric acid. Bonding agent was subsequently applied and light cured for 20 s. Resin cement was mixed and both the fragments were reapproximated with cement and light cured for 40 s each from the buccal and lingual aspects of the tooth. Finally, flowable composite was light cured over the bevel all around the tooth followed by finishing and polishing of the tooth. (Figure-1D)



CASE 2

A 27-year-old female patient injured in a road traffic accident came to the Department of Conservative Dentistry and Endodontics. Clinical and radiographic examination revealed an oblique crown fracture on 11 (Figure-2A). Periapical radiographs revealed an intact periodontal ligament space, complete root formation, and no root fracture in relation to both teeth. Medical history was non-contributory.

Local anaesthesia was administered and splinting was performed with composite and 0.04mm ligature wire (Figure -2B).

The tooth was isolated and single visit root canal therapy was performed and obturation was done with Gutta-Percha and sealapex sealer with lateral compaction obturation technique. After RCT and post space preparation was done with peeso reamer, an esthetic post (Paracore) was selected and luted with dual cure resin cement. (Figure-2E)

The patient was kept on periodic recall and the clinical pictures after 1 year revealed favourable healing along with acceptable endodontic, periodontic and restorative conditions. (Figure-2F)

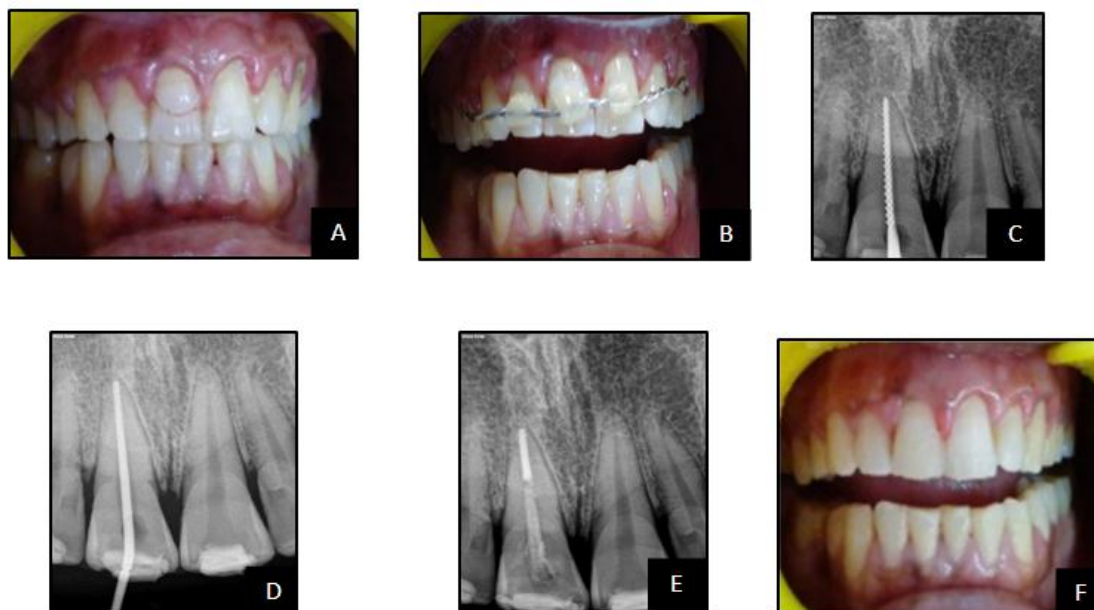


Figure-2
A-Pre operative clinical picture
B- Clinical picture after splinting
C- Working length determination radiograph
D- Master cone fit radiograph
E- Radiograph after obturation and post cementation
F- 1 year Follow-up

III. Discussion

With advancement in dental bonding technology, it is now possible to achieve excellent results with reattachment of the dislocated tooth fragments provided that the biologic factors, materials, and techniques are logically assessed and managed.

Badami et al. have shown neither the bevel nor the material used could obtain the original fracture resistance of the tooth.³ Specimens prepared with chamfer and bonded had a fracture resistance of 40%–60%, with internal dentin groove, and over contour, it reached around 90%.

Amir et al. showed that the space provided by pulp chamber may be used as an inner reinforcement, thus avoiding any excess preparation of teeth.⁴ The direction of the fracture line is an important aspect in restorability and prognosis of teeth.⁵ The fracture line was in a favourable direction in the cases undertaken. Extensive damage of the tooth structure and missing fragment warrants reinforcement using fiber posts followed by crown. However, in our case reports, the fractured fragment was in sound condition and exhibited good fit over the radicular portion, so reattachment using fiber post was considered to be the best treatment option.

Tooth coloured fiber posts have several advantages. They are more esthetic, bonded to tooth tissue, modulus of elasticity similar to that of dentin, and have less chances of fracture. Using glass fiber post with composite core and with recent advances in adhesive techniques and materials, one can create a monoblock, a multilayered structure with no inherent weak interlayer interfaces. The unique advantage of this system is that it reinforces the teeth structure through this concept. Therefore, the integrity of the final endodontic restorative continuum monoblock approaches that of the original healthy tooth itself.⁶

In apical areas light cured luting resin cement may result in incomplete polymerization; hence, dual curing systems prove to be the most suitable material as they would allow polymerization even in those areas which would otherwise have left uncured due to the inability of light to reach in deeper areas.⁷

IV. Conclusion

For traumatized patients with broken teeth, pain relief and immediate esthetic restoration fragment reattachment fulfil the treatment goal. The cases presented in this paper suggest that, with the materials available today along with appropriate clinical technique, reattachment of tooth fragment is a viable and conservative treatment option for fractured incisors.

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