Reattachment of Fractured Tooth Segment in Minimally Invasive Way - A Case Report

Dr. Madhubala More, [1] Dr. Arvind Jain, [2] Dr. Neelam Vijaywargiya, [3] Dr. Anisha Kulkarni, [4] Dr. Nilima Pagare,[5] Dr. Gaurav Rawat [6]

1. **Dr. Madhubala More**
   Department of Conservative Dentistry and Endodontics, Government College of Dentistry, Indore, Madhya Pradesh
2. **Dr. Arvind Jain**
   Department of Conservative Dentistry and Endodontics, Government College of Dentistry, Indore, Madhya Pradesh
3. **Dr. Neelam Vijaywargiya**
   Department of Conservative Dentistry and Endodontics, Government College of Dentistry, Indore, Madhya Pradesh
4. **Dr. Anisha Kulkarni**
   Department of Conservative Dentistry and Endodontics, Government College of Dentistry, Indore, Madhya Pradesh
5. **Dr. Nilima Pagare**
   Department of Conservative Dentistry and Endodontics, Government College of Dentistry, Indore, Madhya Pradesh
6. **Dr. Gaurav Rawat**
   Department of Conservative Dentistry and Endodontics, Government College of Dentistry, Indore, Madhya Pradesh

CORRESPONDING AUTHOR
Dr. Madhubala More
Department of Conservative Dentistry and Endodontics,
Government College of Dentistry,
Indore, Madhya Pradesh - 452001
Mobile: 9301842197
Email - dr.madhubalamore@gmail.com

Abstract

Dental trauma frequently results in coronal fractures of the front teeth. Root canal therapy followed by reattaching the fractured segment with fiber post reinforcement is a viable alternative in cases of complex fractures where the fractured segment is present and there is close approximation of the segment to the intact tooth.

Reattaching a fractured piece is a quicker, less involved process that offers immediate relief, better aesthetics, and function restoration. Because it is inexpensive, aesthetic, and preserves dental structure, reattaching a tooth fragment is a better option than using traditional techniques. For a positive prognosis, patient cooperation and awareness of the treatment's limitations are important.

Keywords: Case Report, Fractured tooth, Reattachment, Fiber post, Composite

INTRODUCTION

The anterior teeth are relatively vulnerable to trauma. According to reports, 37% of trauma cases include the upper central incisors [1]Traumatic injuries most frequently affect the upper and lower lateral incisors, as well as the upper canines, after maxillary incisors.[2–4]

Dental trauma that affects both primary and permanent teeth frequently takes the form of anterior tooth coronal fractures. It significantly affects a patient's social and psychological well- being.[5]

Tooth fragment bonding has become more and more popular because of its numerous advantages, including anatomical qualities, color, and surface appearance. It can deliver enduring aesthetics and a positive psychological reaction.[6]The following are some factors that affect how coronal tooth fractures are treated:[7–9]The size of the fracture (biological width, endodontic involvement, alveolar bone fracture).

- The tooth's fracture pattern and ability to be repaired (associated root fracture).
- Traumatic secondary injuries (soft tissue status).
- The existence or absence of a broken tooth piece and its suitability for usage (fit between fragment and the remaining tooth structure).
- Occlusion, appearance, economic state, and prognosis.

CLINICAL ASSESSMENT

Periodontal Assessment

Clinical examination for pulpal exposure, vitality tests and periapical radiographs should Under local anesthesia, gentle probing around the periodontal tissues of the broken tooth will help assess the degree of the fracture as well as the presence of a vertical root fracture.[10]If the fracture line is supragingival the procedure for reattachment will be straightforward. However, when the fracture site is subgingival or intraosseous, surgical or orthodontic extrusion of the apical portion for restoration

Endodontic Assessment

In addition to be used to evaluate the pulp's health and the stage of apex maturation.

Coronal Assessment

After testing the restoration in the mouth, it could be required to join the pieces using resin composite if there are several fragments present.

Occlusal Assessment

Assess whether the occlusion is traumatic or not. Disoccluding the teeth is indicated in cases of traumatic occlusion.

The objective of this case report is to show a conservative technique for the treatment of coronal tooth fractures using an original tooth fragment and a glass-fiber-reinforced composite post to produce a functional and aesthetically attractive outcome.

CASE DESCRIPTIONS

A male patient, age 28, who had been in an accident 3 days prior, presented with excruciating pain and a shattered front tooth. The detached tooth piece that had fragmented due to trauma was also presented by the patient.22 of the teeth underwent clinical evaluation and were found to have a class III fracture. (Fig. 2) The surrounding teeth did not exhibit any other fractures or injuries, and a radiograph revealed complete root formation, a closed apex, and no periapical radiolucency. (Fig. 1) The creation of a treatment strategy that included urgent endodontic therapy for tooth 22 and reattachment of the fractured crown segment Access is made using a local anaesthetic of 2% lidocaine and 1:80,000 adrenaline. Working length was established. With the help of the ProTaper Universal Rotary File System, cleaning and shaping was done (Dentsply). During the preparation, an irrigant consisting of 5.25% sodium hypochlorite and normal saline was employed. Sectional obturation done with, gutta-percha and Endo seal after being dried with paper points. (Fig. 3) Post space was prepared using pieso reamers. The fiber post 1.4 mm diameter (BMD) was tried in the canal and adjusted to the desired length (Fig. 4) After cleaning the tooth fragment with sodium hypochlorite solution, it was thoroughly rinsed with water. The coronal fractured tooth fragment was then given a hole so that it could be placed over the coronal portion of the fiber post.Using a cotton pellet, extra water was wiped away. Both were subjected to a 15-second etching process using a 37% phosphoric acid etchant (Eco-Etch Ivoclar vivadent) on the enamel and dentin Then, using a

fully saturated applicator, 2-3 coats of the bonding agent (3M ESPE Adper Single Bond Plus) were applied in quick succession to the dentin and enamel that had been etched. After applying the bonding agent for 15 seconds while gently agitating it and evaporating solvents with gentle air thinning for 5 seconds, the light curing process was then applied for 10 seconds, Dual-cure resin cement (Fusion ultra D/C Prevestdenpro) was used to lute the prefabricated glass fiber post in the canal. (Fig.5)

Flowable composite resin (Prime Dental Restorative Flow Viscous) was used to restore the fragment to the tooth with fiber post. The original fragment was accurately placed and photo polymerised for 40 second (Fig.6) removed excess composite and polished with composite polishing kit (Shofu) final restoration shown in (Fig.7) follow up taken for 1 year to check the restorative margin discoloration and mobility.(Fig.9)

Fig. 1- Preoperative radiograph

Fig. 2 Preoperative clinical

Fig. 3 - Fractured tooth segment

Fig. 4 - Sectional Obturation

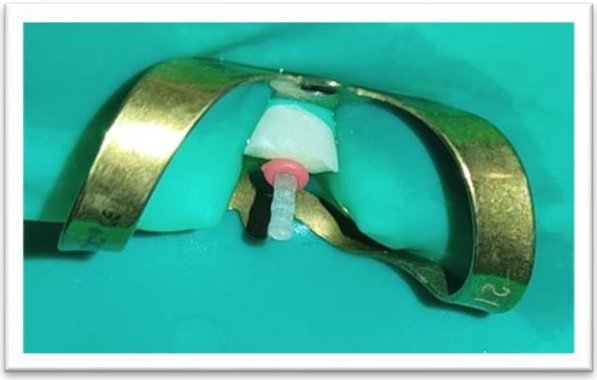

Fig. 5 - A dual cure luting system and a glass-fiber post reinforced composite post placed after post space preparation.

Fig. 6 Fiber post curing

Fig. 7 Postoperative image with reattached tooth fragment in 21

Fig. 8 Postoperative clinical

Fig. 9 Postoperative radiograph

Fig. 10 Postoperative clinical after 12 month follow up

DISCUSSION

It is now possible to achieve excellent results with the reattachment of a broken tooth fragment provided that the biological factors, materials, and techniques are logically assessed and managed. This new perspective on the reconstruction of fractured teeth is made possible by the development of adhesive material. When a fracture segment is present, reattachment need to be the first choice of treatment.

The issues of uneven wear of restorative material, mismatched hues, and difficulties in reproducing shape and texture that are related to other procedures are obviously eliminated by the use of natural tooth substance. Evaluation of the periodontal, endodontic, coronal, and occlusal state might lead to the formulation of a treatment strategy.[10]

The highest fracture resistance was attained by chemically cured composite, followed by light cured resin, and the lowest by just dentin bonding agent.[8]

According to Cavalleri and Zerman reattached crown fragments appear to have a better long-term prognosis than composite resin restorations.[11] If the extra-oral time of the fractured fragment increases, dehydration of the fragment can occur. Therefore, it is advised that the fragment be stored in a medium such physiologic saline to avoid this condition. The majority of resin cements and resin-based composite core materials can be joined with fiber-reinforced posts through fabrication.[12-13.]

The location of the fracture, the size of the fracture remnants, the patient's periodontal health, pulpal involvement, the maturity of root formation, biological width invasion, occlusion, and time are all factors that might affect the scope and viability of such restorations. Post-placement serves to hold the coronal section via a friction bond and aid in preventing dislodgment non-axial forces in addition to bonding.[13–15]

The process for reattachment will be simple if the fracture line is supragingival. However, orthodontic extrusion with a post retained crown may be

required if the fracture location is subgingival or intraosseous. As an alternative, bonding shattered components may be accomplished with the use of surgical procedures such electrosurgery, elevation of tissue flaps, clinical crown lengthening surgery with alveolar bone removal, and gingival overgrowth removal. It has been recommended that minimal osteotomy and osteoplasty be used anytime the fracture site invades the biologic width.[16]Coronal tooth fractures have a variety of treatment options depending on the situation, such as quick reattachment.[17]Fracture reattachment, crown and root recontouring, and surgical exposure[18] using splints[19], and without radicular anchorage[20], each having its advantages and disadvantages. The only choice when a tooth cannot be saved at all is extraction, which results in the loss of nearby bone and precludes the use of implants in the future.[21]

Advantages Disadvantages of reattachment are shown below.[22]

Advantages of reattachment

- Conservatism.
- Wear similar to adjacent/opposed teeth.
- Color match to the remaining crown portion.
- Preservation of incisal translucency/good aesthetics.
- Maintenance of original tooth contours.
- More durable restoration than a Class IV resin restoration alone.
- Preservation of 'identical' occlusal contacts.
- Color stability of the enamel.
- Positive emotional and social response from patients.

Disadvantages of reattachment

- Less than ideal aesthetics if the tooth fragment is allowed to dehydrate.
- Color changes of the bonded fragment.
- Necessity for continuous monitoring.
- Unknown longevity.
- 'Predicted' eventual separation of the repair due to progressive breakdown of the bonded junction.

CONCLUSION

The case described in this research demonstrate that reattaching a tooth fragment is a practical and conservative treatment option for fractured incisors using current materials and the right clinical procedure. This study is intended to add to the information that supports the viability of reattaching the fractured fragment of the anterior tooth when it is strengthened by appropriate restorations. In order to strengthen the evidence supporting this treatment option, future investigations may need to concentrate on reporting longer follow up.

DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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