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# Fractured segment reattachment-preserving the natural tooth

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**Type of Publication:** Case Report

**Conflicts of Interest:** Nil

## Abstract

The Maxillary Central Incisors are most commonly affected Anterior teeth because of their position in the arch. There have been a number of methods for reattaching tooth fragments documented, but the fragment bonding method has many different versions. When compared to conventional methods, tooth fragment reattachment has a number of benefits, the main one being that it keeps the enamel's original shape, colour, translucency, and surface texture. Additionally, in contrast to other restorations, the incisal margins of reattached fragments typically deteriorate at a pace close to that of nearby natural teeth. This method may also take less time and produce longer-lasting outcomes that are more predictable. While some studies advise employing dentin grooves, chamfers, and/or bevels to prepare the remaining tooth or fragment, others advise against doing so at all. Reattachment utilizing resin-based composites is now possible as a result of recent advancements in restorative materials, placement techniques, and adhesive protocols. This Article Reports a Case on Coronal Teeth Fracture that was successfully treated using Fragment Reattachment along with Post Insertion.

**Keywords**-Trauma, Tooth Fracture, Reattachment, Fibre Post.

## Introduction

A significant portion of all dental injuries are complex crown fractures involving the enamel, dentin, and pulp, which are particularly frequent in maxillary anterior teeth.[1,2] Before the age of 18, it is predicted that a quarter of the population would experience at least one coronal fracture of an anterior tooth, with falls, high-impact sports, and collisions with vehicles being the most prevalent causes.[3,4]

Complicated crown fracture management is a multifaceted process influenced by the degree 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 or absence of fractured tooth fragment and its condition for use (fit between fragment and remaining tooth structure), occlusion, aesthetics, finances, and prognosis.[5] Root canal therapy (RCT) followed by reattachment of the fractured segment with fibre post reinforcement is a practical alternative in cases with complex fractures when the fragmented segments are closely approaching.[5] According to certain theories, fibre post luted with resin cement improves segment retention and creates a Monoblock effect.[6]

**Case report**

- A 27-Year-old Male Patient reported to the Department of Conservative Dentistry and Endodontics with the Chief Complain of Pain and Fracture in Upper Front Teeth.
- Patient gave History of Sports Injury 24 hours ago.
- Patient gave No Significant Medical History or Known Drug Allergy.
- Clinical examination revealed a Complicated Crown Fracture IRT 11 and 21 with Fracture Line which was running obliquely from the Gingival third of the crown on the Labial aspect to Subgingival level Palatally.
- The Fractured Segment was held in place by the Gingival Attachment. Fractured fragment was having Grade III mobility in Labio-Palatal Direction and the Teeth were tender on percussion. (Fig1 and 2)

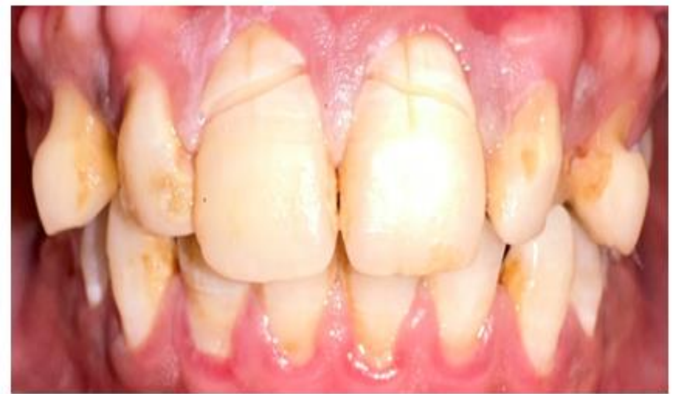

Fig.1

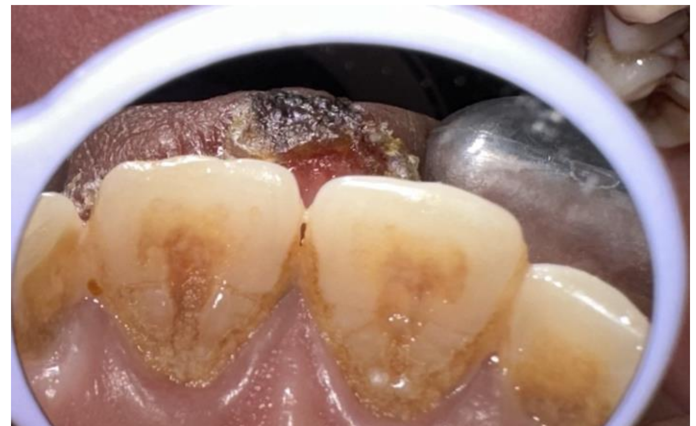

Fig. 2

**Radiographic Examination**

Periapical radiograph revealed Fracture of Crown at cervical level and an intact periodontal ligament space, complete root formation, and no root fracture in relation to both teeth and absence of Peri-Apical Radiolucency. (Fig 3)

**Treatment Plan**

It was planned to Perform Single Visit Root Canal Treatment (RCT) on 11and 21 followed by Re-Attachment with Fiber Post Reinforcement.



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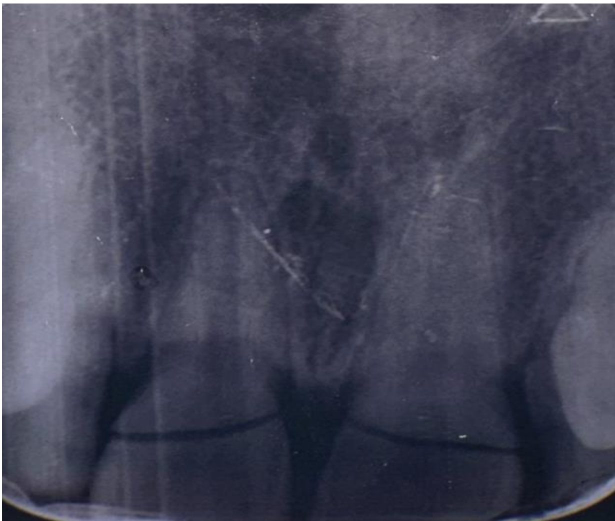

Fig. 3

**First appointment**

After taking written consent, Local anesthesia (Xicaine, ICPA Health Products LTD) was administered (1.0 cc of 2% of lidocaine with 1: 80,000 Epinephrine) and the fractured segment in relation to 11 and 21 was A traumatically removed. (Fig 4 and 5)

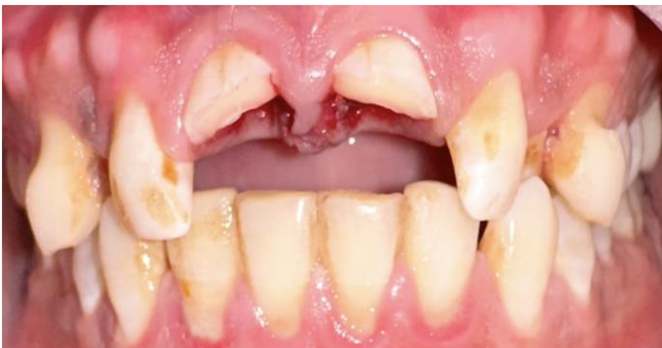

Fig. 4

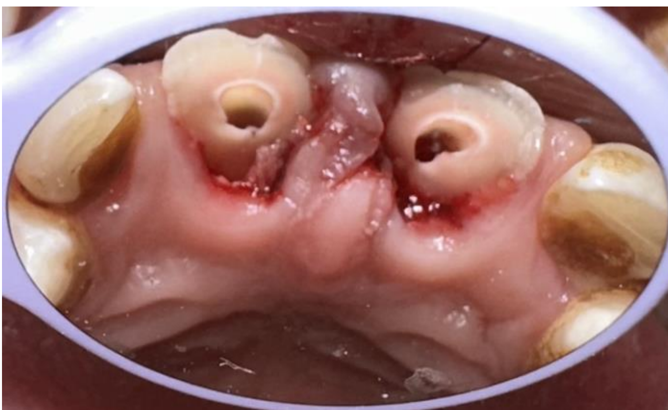

Fig. 5

Fractured Segment was then cleaned with 2% Chlorhexidine solution (Germicidal) and stored in 25% Dextrose (as hypertonic solution increases bond strength of reattached fragment) to prevent drying and desiccation. (Fig 6 and 7)

Fig. 6

Fig. 7

- Root Canal Therapy was Initiated.
- Canal patency was checked with a # 10 K-File (Mani, Inc-Japan) and Working Length was determined using Electronic Apex Locator (J.Morita) Intraoral Periapical Radiograph.(Fig-8)
- The canals were prepared by Crown-Down Technique using Rotary Files up to 40(6%) (Neo Endo Flex) IRT 11 and 21 along with copious irrigation using 3% Sodium Hypochlorite and 17% EDTA.
- Final Rinse was done using Normal Saline.



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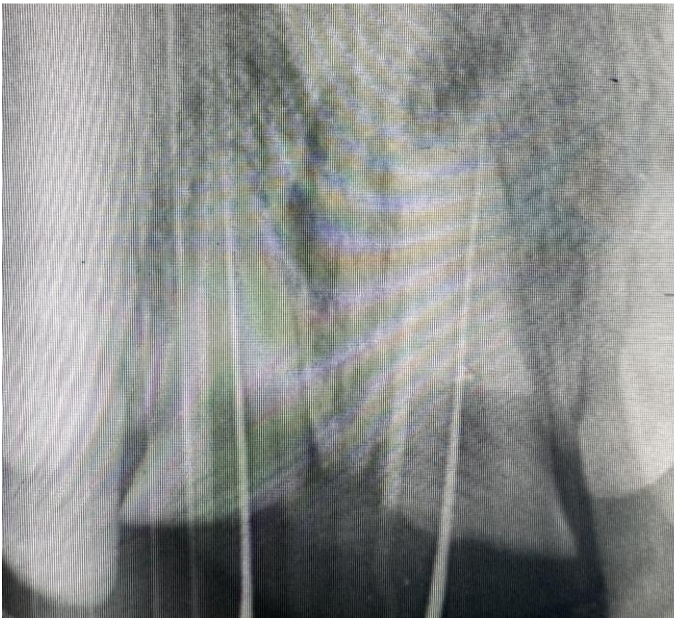

Fig. 8

- Master Cone IOPA Radiograph was taken (Fig-9)
- The canals were dried using absorbent paper points and obturation was done using 40(6%) Gutta Percha cones (Neo Endo) IRT 11 and 21 using Grossman's sealer.
- The Obturation was done using Single Cone technique.
- Post Obturation radiograph was taken. (Fig-10)

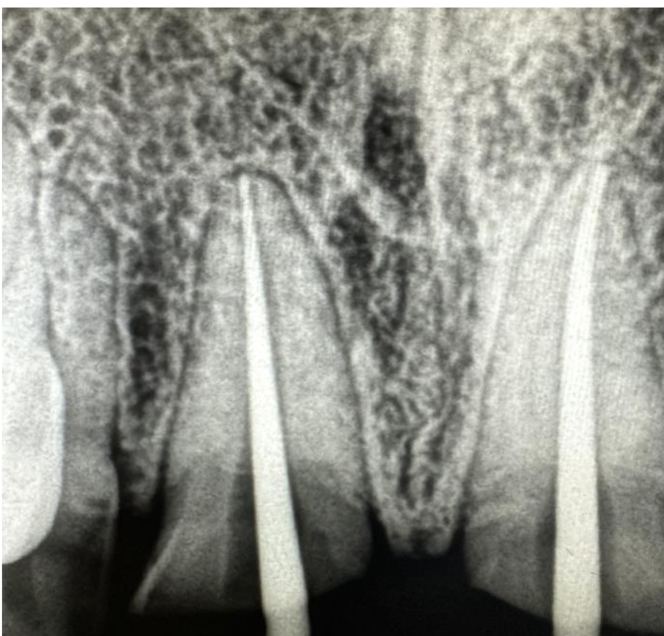

Fig. 9

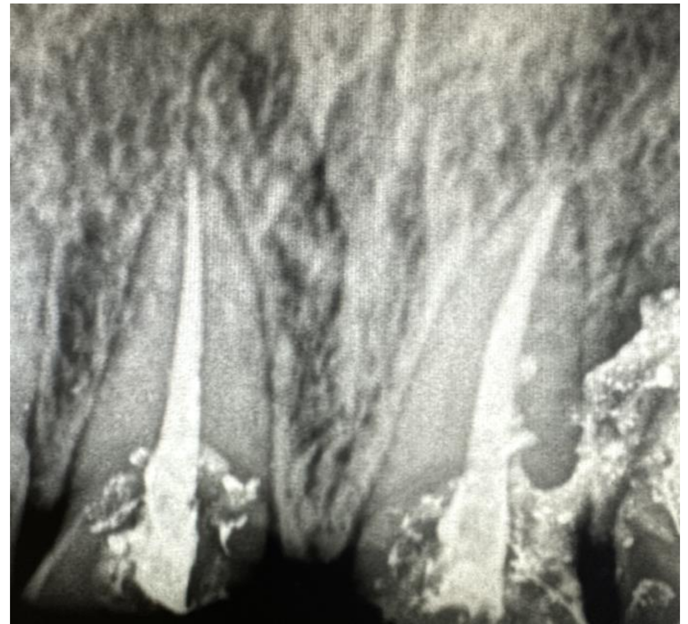

Fig. 10

- Post Space Preparation was done Using Peso-Reamer till No #2. (Fig-11)
- Assessment of Post (Self Post, Medicept) was done radiographically. (Fig-12)

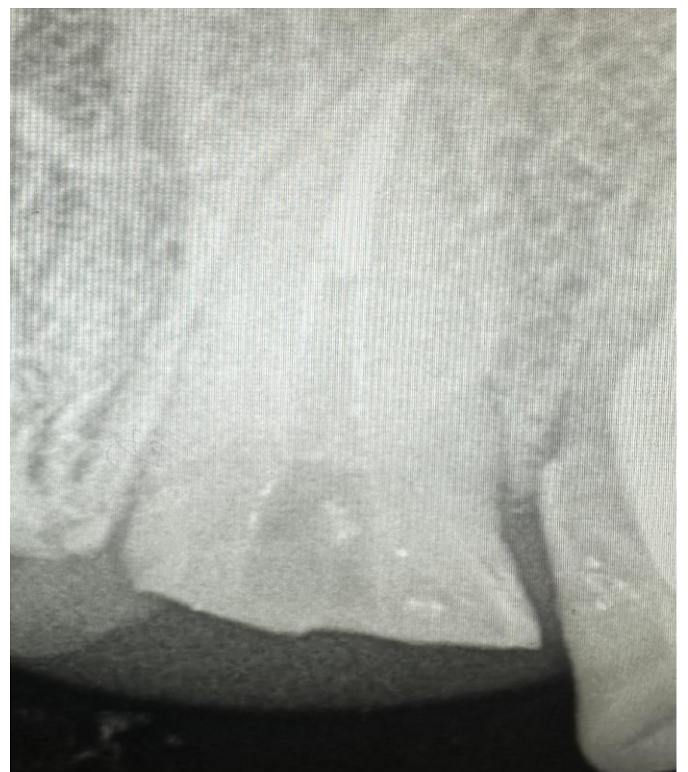

Fig.11



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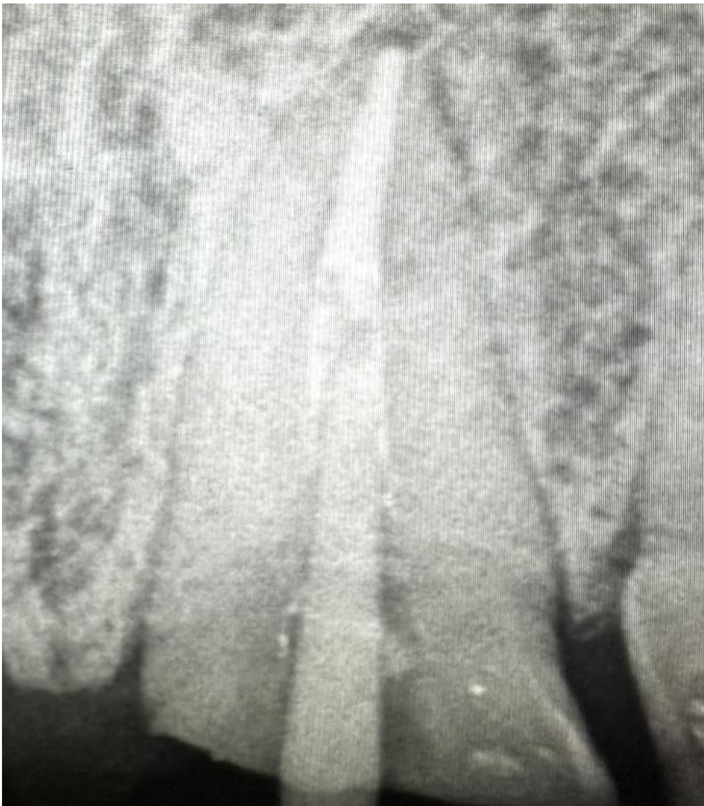

Fig.12

The prepared Post Space was Etched for 15 seconds using 37% Phosphoric Acid (D-Tech Gel Etchant). (Fig-13) It was then rinsed thoroughly with water and excess water was removed with a cotton pellet. Next the Bonding Agent (Gluma Bond 5, Kulzer) was applied on the etched surface as well as the post. (Fig-14) The adhesive was air thinned and light- cured for 20 seconds (Fig-15)

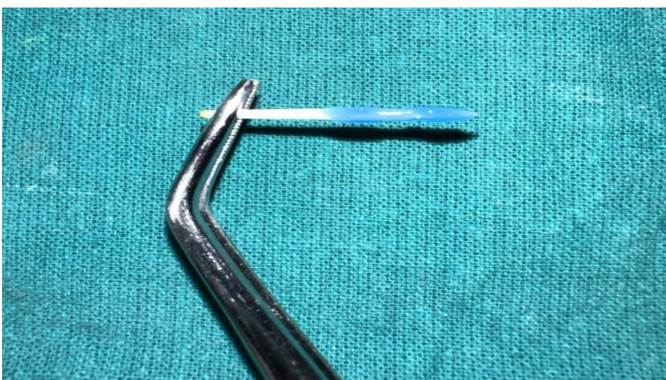

Fig.13

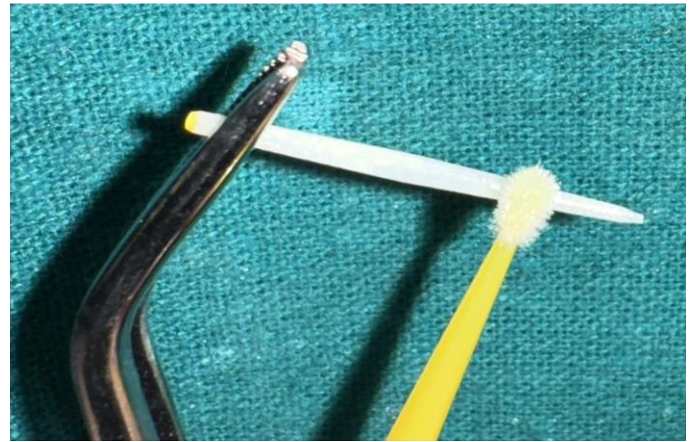

Fig.14

Fig.15

- NO. 1 Fiber Post was then luted with Dual Cure Resin Cement. (Calibra Universal, Dentsply Sirona) (Fig-16)
- A Slot was prepared onto the Fractured Segment to receive the part of the post. (Fig-17)

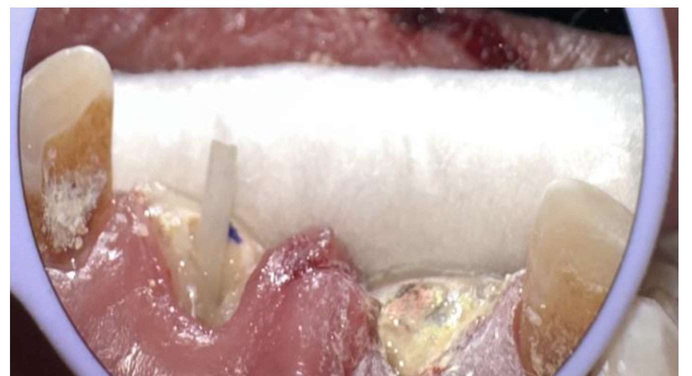

Fig.16



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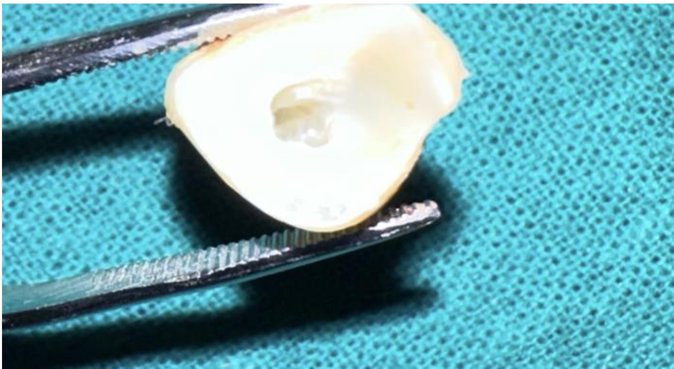

Fig. 17

Etchant (D-Tech Gel Etchant) was applied to the fragment (Fig-18) and the remaining tooth structure using micro applicator tip. It was then rinsed thoroughly with water and excess water was removed with a cotton pellet. Next the bonding agent (Gluma Bond 5, Kulzer) was applied. (Fig-19) The adhesive was air thinned and light-cured for 20 seconds. (Fig-20)

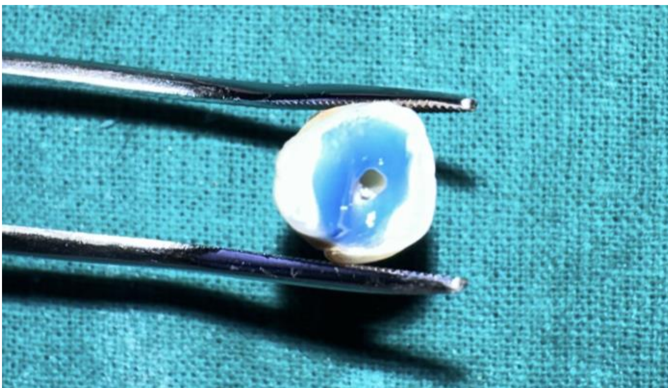

Fig.18

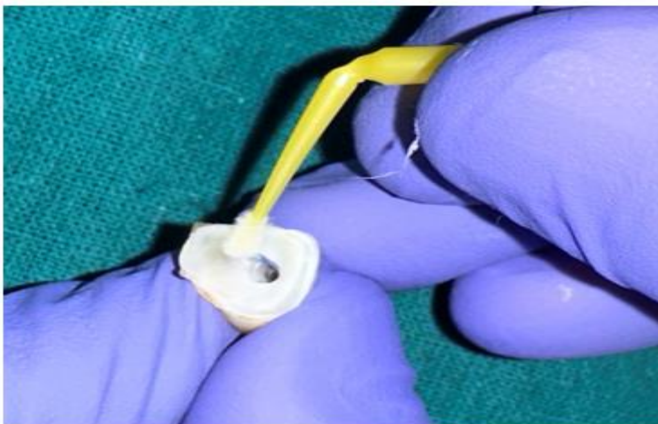

Fig.19

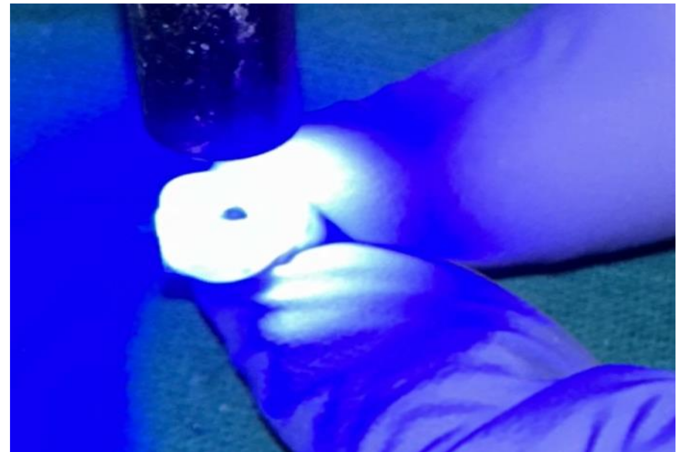

Fig. 20

- The Fractured Fragment IRT 21 was cemented using Dual-Cure Composite Resin Cement. (Calibra Universal, Dentsply Sirona)
- Similarly, Fiber Post was luted IRT 11 (Fig-21)

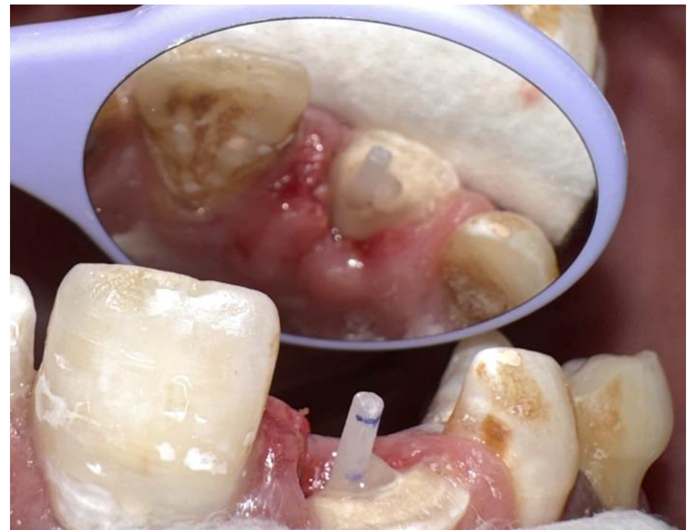

Fig. 21

Similar procedure was carried out for tooth 11 i.e Post Space Preparation. (Fig-22)



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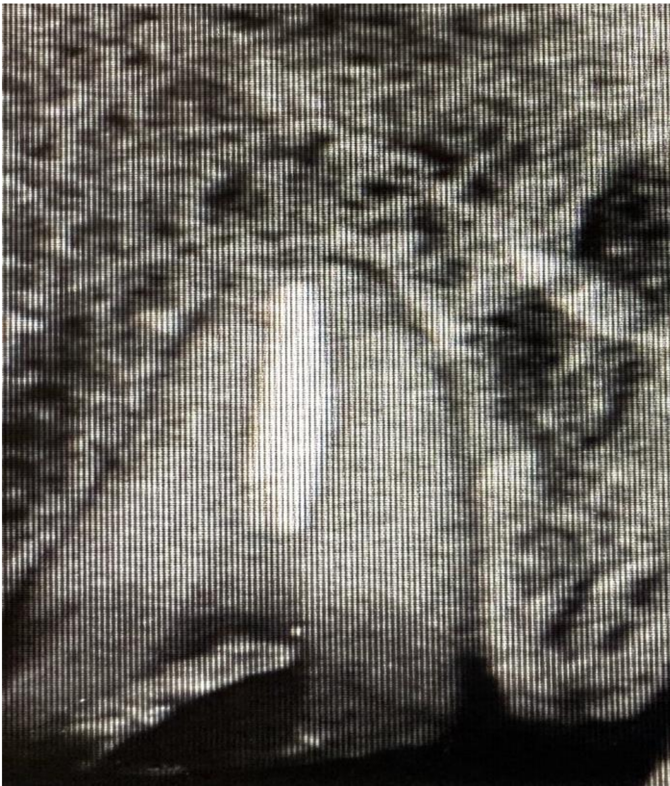

Fig. 22

Post Fit IOPA Radiograph (Fig-23)

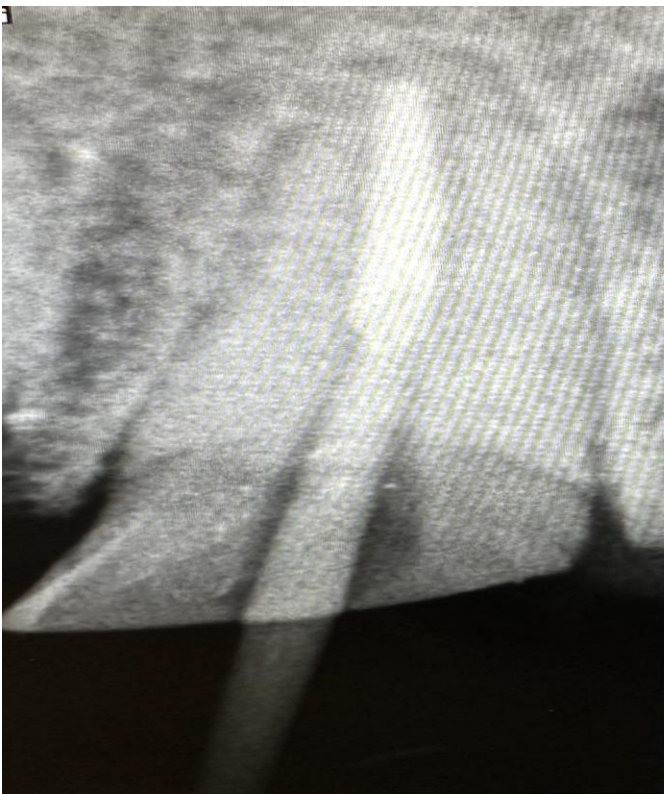

Fig. 23

Etching of fractured tooth with 37% phosphoric acid. (D-Tech Gel Etchant) (Fig-24,25)

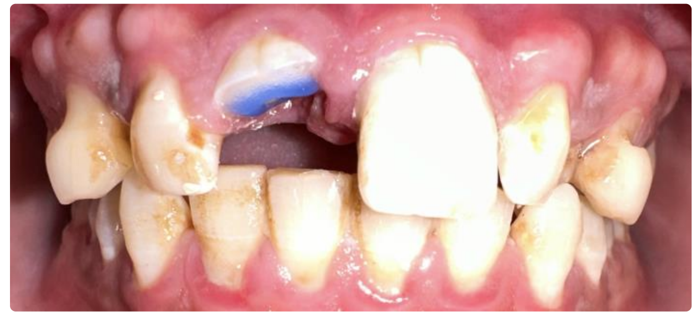

Fig.24

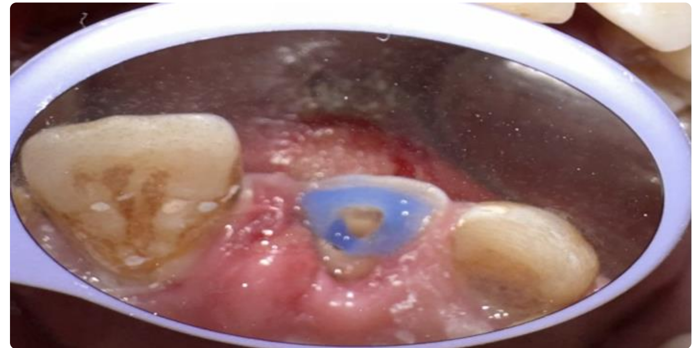

Fig.25

Bonding Agent Application on Fractured Tooth (Gluma Bond 5, Kulzer) (Fig-26) and Visible Light Cure. (Fig-27)

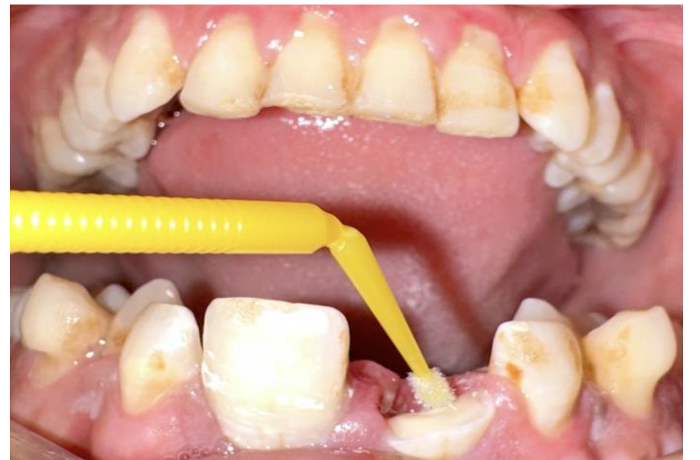

Fig. 26

Fig.27



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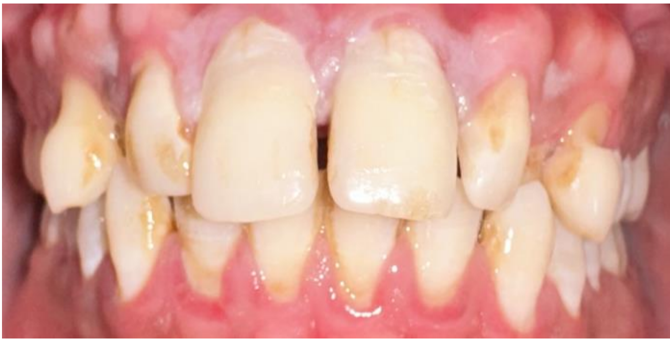

Fig. 28: labial view

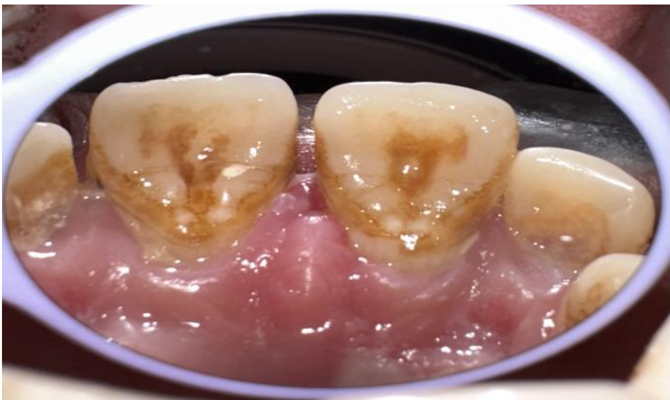

Fig. 29: Palatal view

Post operative photograph

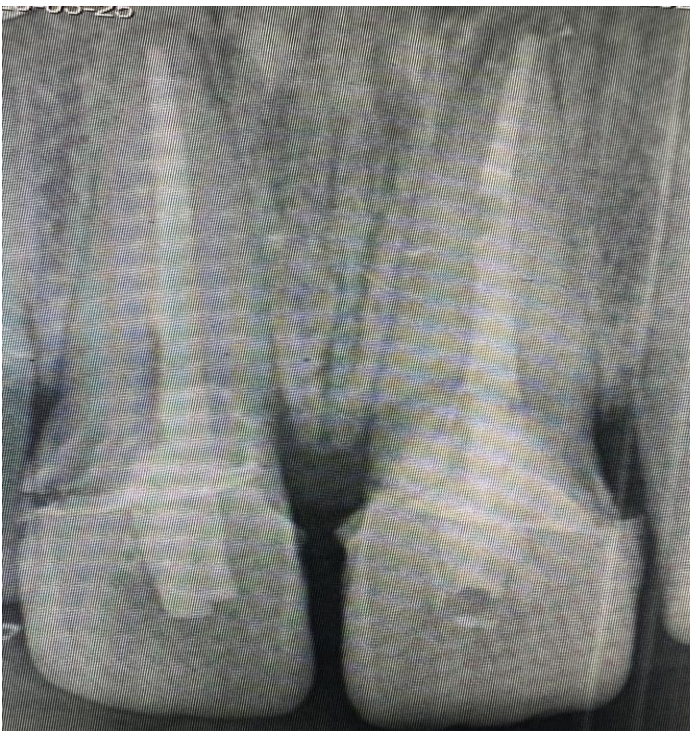

Fig. 30: Post operative IOPA radiograph

**Discussion**

Traditional methods for restoring broken teeth include laminate veneers, composite resins, partial and full coverage crowns, all of which are time-consuming, expensive, and unconservative. [2] The restoration of fractured teeth utilizing dental fragments was first explained by Chosack and Eidelman in 1964. [7] It gives a fine approach to restore the natural shape, contour, surface roughness, occlusal alignment, and color of the fragment.

It is now possible to get excellent outcomes with the reattachment of a broken tooth fragment given that the biological aspects, materials, and techniques are logically examined and managed. The development of adhesive material opens new perspectives in the repair of fractured teeth.

When a fracture fragment is accessible, reattachment should be the first course of action. The benefits of this alternative treatment include restoring the color and size of the original tooth, wearing away in proportion to the next teeth, providing the patient a pleasant psychological reaction, and being reasonably priced.[8]

Hydration of the broken segment when it is outside the mouth cavity is one of the elements that affect reattachment success. This is essential to preserve a tooth's vitality and natural appearance while also ensuring adequate bondstrength.[2]

The restorative care of the coronal fracture should consider the rehabilitation of those afflicted tissues when there is a significant concomitant periodontal injury and/or invasion of the biological width.[9]

Reattached crown fragments appear to have a better long-term outlook than composite resin restorations, according to Cavalleri and Zerman's findings.[10]

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.[11]

Advantages of reattachment Include-[12]

1. Wear comparable to opposing or adjacent teeth.



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2. Similar color match.
3. The incisal translucency is preserved.
4. Preservation of the original tooth contours.
5. More durable restoration than a Class IV resin restoration alone.
6. Preservation of identical occlusal contacts.
7. Colour stability of the enamel.
8. Positive emotional and social response from patients.
9. Economical.

Disadvantages of reattachment Include-

- If the tooth fragment is left to dehydrate, it will have a less than ideal aesthetics.
- The attached fragment's color changes.
- The need for ongoing follow-up.
- Unknown duration.
- The ultimate separation of the repair can be "predicted" because the bonded interface will gradually deteriorate.

An adhesive, a dual-curing luting composite system, a glass-fiber-reinforced composite root canal post, and the original crown fragment were all utilized in this case. This method boosts the obtained segment's durability and survivability by providing reinforcement.

**Conclusion**

A tooth fragment reattachment method gives a very conservative, safe, quick, and attractive result when the fractured segment is available.[13]

Depending on the circumstances, several treatment options have been suggested for coronal tooth fractures, each with pros and cons. These options include immediate reattachment, surgical exposure, crown, and root recontouring, and fragment reattachment, using splints or without radicular anchorage.

The most conservative and ideal treatment option for anterior teeth may be the reattachment of a fractured crown fragment since it offers an immediate return to the natural appearance following reattachment of the original tooth fragment.

**References**


1. N. B. P. S. Kumari, V. Sujana, C. H. R. Sunil, and P. S. Reddy, ―Reattachment of complicated tooth fracture: an alternative approach, ‖ Contemporary Clinical Dentistry, vol. 3, no. 2, pp. 242–244, 2012.
2. U. Is ̧eri, Z. Ozkurt, and E. Kazazo ̈glu, ―Clinical management of ̆ a fractured anterior tooth with reattachment technique: a case report with an 8-year follow up, ‖ Dental Traumatology, vol. 27, no. 5, pp. 399–403, 2011.
3. Andreason JO(1970) Etiology and pathogenesis of traumatic injuries. A clinical study of 1,298 casesscandanavian Journal of Dental Research78(1-4) Andreason
4. Andreasen JO, Andreasen FM, & Andersson L (2007) Textbook and Color Atlas of Traumatic Injuries to the Teeth Blackwell, Oxford, UK.
5. Macedo G. V., Diaz P. I., De O. Fernandes C. A., Ritter A. V. Reattachment of anterior teeth fragments: a conservative approach. Journal of Esthetic and Restorative Dentistry. 2008;**20**(1):5–18. Doi: 10.1111/j.1708-8240.2008. 00142.x
6. Tay F. R., Pashley D. H. Monoblocks in root canals: a hypothetical or a tangible goal. Journal of Endodontics. 2007;**33**(4):391–398. Doi: 10.1016/j.joen.2006.10.009.
7. E. A. V. Maia, L. N. Baratieri, M. A. C. De Andrada, S. Monteiro Jr., and E. M. De Araújo Jr.-Tooth fragment reattachment: fundamentals of the technique and two case reports,‖ Quintessence International, vol. 34.




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8. Macedo GV, Diaz PI, Augusto C. Reattachment of anterior teeth fragments: a conservative approach.J estheticrestor Dent 2008;2013:5–20.
9. Caliskan MK, Turkun M.Clinical investigation of traumatic injuries of permanent incisors in Izmir, Turkey. Endod Dent Traumatol 1995; 2013:210–13.
10. Cavalleri G, Zerman N. Traumatic crown fractures in permanent incisors with immature roots: a follow-up study. Endod Dent Traumatol 1995;2013:294–6.
11. Naudi AB, Fung DE. Tooth fragment reattachment in multiple complicated permanent incisor crown-root fractures—a report of two cases. Dent Traumatol 2008;2013:248–52.
12. Murchison DF, Burke FJ, Worthington RB. Incisal edge reattachment: indications for use and clinical technique. Br Dent J 1999;2013:614–19.
13. Pradnya v Bansode & Vidya M Patil TOOTH FRAGMENT REATTACHMENT: An Aesthetic Alternative -A Case Report Research & Reviews 2019.



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