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Tooth Fragment Reattachment Using Fiber Post: Preservation is Perfection

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Abstract

Background: Anterior coronal fractures are common sequelae of dental trauma in adolescents and young adults. Preserving natural tooth structure is paramount in such cases, as no restorative material can replicate the optical and morphological properties of enamel and dentin. Fragment reattachment, supported by fiber post reinforcement, offers a conservative, esthetic, and functionally reliable solution.

Case Report: A 16-year-old female patient presented with traumatic fractures of the maxillary anterior teeth following a road traffic accident. Tooth 22 exhibited an Ellis Class III fracture with a loosely attached coronal fragment, while tooth 11 showed an Ellis Class II fracture. Following clinical and radiographic evaluation, tooth 22 was managed with single-visit root canal treatment and fiber-post–assisted fragment reattachment using composite resin. The fiber post acted as an internal

splint, improving retention, reinforcing the coronal segment, and ensuring precise repositioning. Tooth 11 was restored with direct composite resin.

Conclusion: Fragment reattachment with fiber post reinforcement provides a minimally invasive, cost-effective, and esthetically superior treatment option for anterior tooth fractures, restoring natural anatomy, function, and patient confidence.

Keywords: Dental trauma, Fragment reattachment, Fiber post, Ellis fracture, Conservative dentistry, Esthetics.

Introduction

"Preserve the tooth, perfect the smile—strength, function, and beauty, naturally."

Preserving natural tooth structure safeguards enamel–dentin integrity, ensuring unmatched translucency, texture, and color. It optimizes stress distribution, reduces fracture risk, and maintains vital functions such as occlusion, proprioception, and speech. Minimally invasive, tissue-conserving techniques enhance longevity, comfort, and aesthetics—delivering lifelike results that inspire patient confidence, especially in the anterior region.

In today's appearance-driven society, where smiles shape self-image and confidence, preserving natural tooth structure delivers unparalleled aesthetic and psychological benefits. Beyond public figures, heightened awareness from social media and modern beauty standards makes natural dental anatomy essential for authentic, lifelike results—enhancing both emotional well-being and patient satisfaction.

Trauma to anterior teeth is a frequent occurrence, affecting nearly 17.5% of children and adolescents. The upper central incisors are most vulnerable, accounting for about 37% of cases. Among these, complicated crown fractures—extending through enamel, dentin, and pulp—represent a significant proportion. Such injuries demand prompt management, not only for functional restoration but also due to their profound psychological impact. While most dental injuries involve a single tooth, high-impact events such as automobile accidents and sports trauma often result in multiple tooth involvement.

Management of complicated crown fractures is inherently multifactorial, dictated by variables such as the extent and configuration of fracture (biological width violation, pulpal involvement, alveolar bone injury), the restorability of the tooth (including associated root fractures), and the presence or condition of the fractured fragment for reattachment. Additional determinants include secondary soft-tissue trauma, occlusal dynamics, esthetic considerations, financial feasibility, and overall prognosis.

Tooth fragment reattachment represents a conservative, esthetic, and cost-effective restorative option, widely accepted as an alternative to resin-based composites or full-coverage crowns. By preserving the tooth's natural anatomy, color, and surface texture, reattachment delivers superior esthetics, restores function, evokes positive psychological responses, and requires minimal sacrifice of remaining tooth structure. The procedure is relatively simple, time-efficient, and offers predictable long-term performance compared with direct composites.

In complicated fractures where segments approximate closely, root canal treatment (RCT) followed by fragment reattachment with fiber post reinforcement is a viable approach. Fiber posts luted with resin cement enhance retention, create a monoblock effect, and provide internal splinting of the coronal fragment. This not only strengthens the restoration but also enables precise repositioning, preserving occlusal harmony, contour, and long-term stability.

Case report

A 16-year-old female presented to the Department of Conservative Dentistry and Endodontics with a history of trauma sustained in a road traffic accident. The patient reported injuries to the maxillary left lateral incisor (tooth no. 22) and the maxillary right central incisor (tooth no. 11). She appeared anxious and panicked about her condition and primarily complained of severe pain in the affected region. On examination, the involved teeth were mildly tender to percussion.

Clinical findings

- **Tooth 22 (maxillary left lateral incisor):** Ellis Class III fracture in the coronal portion, extending from the cervical third of the crown on the labial aspect. The fractured line extend buccally from mesial to distal but not extended palatally, hence fragment was not completely detached.
- **Tooth 11 (maxillary right central incisor):** Ellis Class II fracture noted in the coronal portion.

No pulp vitality test was performed at the time of examination.

Patient's expectations

The patient sought immediate pain relief and strongly expressed the desire to preserve and restore the fractured tooth, emphasizing the psychological importance of maintaining natural tooth structure.

Investigations

Radiographic Findings:

- Periapical radiographs revealed:
  - Intact periodontal ligament space in both teeth.
  - Complete root formation.
  - No evidence of root fracture.
  - Confirmation of Ellis Class III fracture with 22 and Ellis Class II fracture with 11.

Diagnosis

- **Tooth 22 (maxillary left lateral incisor):** Ellis Class III fracture with pulp involvement.
- **Tooth 11 (maxillary right central incisor):** Ellis Class II fracture (enamel and dentin, without pulp exposure).

Treatment Plan

Following a thorough clinical and radiographic evaluation, the treatment plan was as follows:

- **Tooth 22**:
  - Reattachment of fractured segment using composite resin.
  - Single-visit root canal treatment (RCT).
  - Fiber post reinforcement for retention and strength.
- **Tooth 11**:
  - Direct composite restoration.

Legends Figures

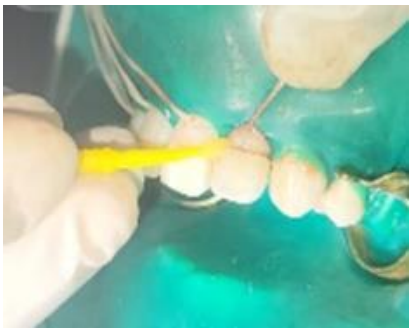
Elli's Class II Fracture w.r.t 11

Elli's Class III Fracture w.r.t 22

Occlusal view

Tooth 22 – partially detached coronal fragment, fracture line seen buccally but still attached palataly.

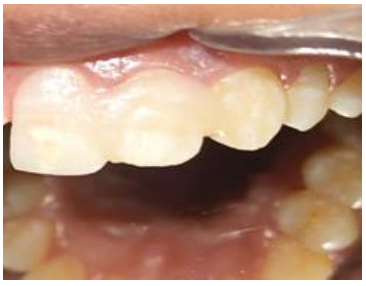
Tooth11- composite build up done.



Bond application with 22

Fragment re-attachment

Finishing



Splinting with adjacent teeth

Endo treatment done

Sectional obturation done with 22

Post selected

Fiber post placed w.r.t 22

Desirable esthetics achieved

Discussion

Traumatic dental injuries involving anterior teeth are common in adolescents, with a significant psychosocial impact owing to both functional impairment and esthetic

compromise. In this case, the patient, a 16-year-old female, presented with Ellis Class III fracture of tooth 22 and Ellis Class II fracture of tooth 11. The clinical management strategy was guided by the dual objectives of pain relief and preservation of the natural tooth structure, in line with both patient expectations and modern minimally invasive principles.

According to Ellis classification, Class III fractures involve pulp exposure and necessitate endodontic intervention for long-term tooth preservation. In the present case, tooth 22 required root canal treatment as pulp involvement was evident.

The chosen approach of tooth fragment reattachment (tooth 22) provides multiple advantages. Literature highlights that reattachment maintains the original anatomic form, translucency, surface texture, and color, achieving superior esthetic outcomes compared to artificial restorations. It also minimizes sacrifice of the remaining tooth structure, ensures functional integrity, and positively impacts patient psychology—especially in young individuals conscious of their appearance.

Fiber post reinforcement was employed to enhance retention and distribute functional stresses evenly, creating a monoblock effect that strengthens the coronal fragment. This technique is widely documented to improve fracture resistance and long-term prognosis, especially in structurally compromised anterior teeth.

For tooth 11, a direct composite restoration was considered sufficient given the absence of pulpal involvement. However, in the event of persistent pain, discoloration, discharge or any other symptom leads to root canal treatment followed by full-coverage crown remains a contingency plan to ensure functional stability.

This treatment plan aligns with the principles of "conservative management first, escalation only when indicated". Importantly, it respects the patient's strong preference for natural tooth preservation, ensuring both clinical success and psychological well-being.

Conclusion

The management of complicated anterior tooth fractures in adolescents requires a careful balance of esthetic, functional, and psychological considerations. In this case, conservative intervention through fragment reattachment, supported by single-visit endodontic therapy and fiber post reinforcement, provided an optimal outcome for tooth 22. Tooth 11 was managed with composite restoration, preserving vitality while maintaining esthetics. The treatment not only addressed the patient's immediate concerns of pain relief but also respected her desire to preserve natural tooth structure, reinforcing the importance of patient-centered care in dental trauma management.

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