



ORIGINAL RESEARCH PAPER

Conservative Dentistry

FRAGMENT REATTACHMENT REINFORCED WITH A FIBER POST FOR A COMPLICATED CROWN FRACTURE WITH PALATAL SUBGINGIVAL EXTENSION: A CASE REPORT

KEY WORDS: Traumatic dental injury; Crown fracture; Tooth fragment reattachment; Biomimetic dentistry; Fiber post; Crown lengthening; Endodontic therapy

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ABSTRACT

Traumatic crown fractures of anterior teeth require prompt and conservative management to restore aesthetics and function. This case report describes the management of a complicated crown fracture of the maxillary right central incisor in a 56-year-old male patient using a biomimetic multidisciplinary approach. Following root canal treatment, palatal crown lengthening was performed to expose the subgingival fracture margin. A fiber post was placed, and the original tooth fragment was adhesively reattached. At the one-year follow-up, the tooth remained asymptomatic with satisfactory aesthetic, functional, periodontal, and radiographic outcomes. This case demonstrates that fiber-post-assisted fragment reattachment is a predictable and minimally invasive treatment option for complicated anterior crown fractures.

INTRODUCTION

Traumatic dental injuries commonly affect the maxillary anterior teeth due to their prominent position, with crown fractures being a frequent consequence. Management depends on the fracture pattern, pulpal and periodontal involvement, biologic width invasion, restorability, and availability of the fractured fragment.³

Reattachment of an intact fractured tooth fragment represents a conservative treatment approach that preserves the natural tooth structure, morphology, translucency, surface texture, and wear characteristics.⁴ Recent advances in adhesive dentistry and the introduction of fiber-reinforced posts have significantly enhanced the predictability and long-term success. Fragment reattachment combined with fiber post reinforcement is considered a minimally invasive, cost-effective and aesthetically superior treatment option.⁷

This case describes the multidisciplinary management of a complicated crown fracture with palatal subgingival extension using crown lengthening, endodontic therapy and fiber-post-assisted fragment reattachment, achieving favourable clinical and aesthetic outcomes after one year.

Case Report

A 56-year-old male presented with a traumatic complicated crown fracture of the maxillary right central incisor (11). The fractured fragment remained loosely attached with excellent adaptation to the remaining tooth structure. Radiographic examination confirmed an oblique cervical third crown fracture without root fracture, periapical pathology, or alveolar bone injury.

Following administration of local anaesthesia, the fractured fragment was gently detached and immediately stored in sterile. Nonsurgical root canal treatment was then performed using the Neo Endo rotary file system up to size 30/.06 under copious irrigation with 3.25% sodium hypochlorite and normal saline. After completion of canal preparation, sectional obturation was done using gutta-percha and resin-based sealer.

As the palatal fracture margin extended below the gingival level, crown lengthening was performed with electro cautery to expose the subgingival fracture line and facilitate proper isolation and restoration. Post space preparation was done and fiber post was selected, trial fitted and verified radiographically.

Access cavity was prepared in the fractured fragment and irrigated with sodium hypochlorite to remove all the pulpal remnants. The bonding surfaces of both the fractured fragment and the remaining tooth were conditioned with 37% phosphoric acid and rinsed. Universal adhesive was coated on the fragment surfaces. A dual-cure resin cement was used to lute the fiber post and the fractured fragment to the remaining tooth structure and light cured. A postoperative radiograph confirmed satisfactory adaptation of both the fiber post and reattached tooth fragment.

The patient was recalled the following day, during which the fracture line was reinforced and refined using composite resin, followed by finishing and polishing. Postoperative instructions were provided, including avoidance of biting directly on hard foods with restored tooth.

Periodic follow-up examinations demonstrated favourable periodontal healing, stable reattachment of the tooth fragment. At the one-year follow-up, the tooth remained asymptomatic with radiographic findings consistent with successful long-term treatment.

DISCUSSION

Fragment reattachment is a conservative and biologically sound treatment option for managing anterior crown fractures when the original tooth fragment is available and intact. By preserving the patient's natural enamel, dentin, surface texture, translucency and anatomical contours, this technique offers superior aesthetic integration compared with direct composite restorations or indirect prosthetic alternatives with minimal removal of healthy tooth structure.⁸

The long-term success of fragment reattachment depends on

several factors, including the location and configuration of the fracture line, pulpal and periodontal health, the quality of adhesive bonding, and appropriate handling of the fractured fragment. Maintaining fragment hydration before reattachment is particularly important, storing the fragment in sterile saline helps preserve its optical properties and contributes to improved aesthetic outcomes following reattachment.⁹

In the present case, the fracture extended subgingivally on the palatal aspect, making isolation and adhesive bonding challenging. Electrocautery was used to expose the palatal fracture margin, providing improved visibility and effective isolation.

A fiber post was used to reinforce the restored tooth because its modulus of elasticity closely resembles that of dentin, allowing more favourable stress distribution along the root. This biomechanical property reduces the risk of catastrophic root fracture while enhancing retention and stability of the reattached fragment.⁵

Favourable clinical and radiographic findings at the one-year follow-up indicate that a multidisciplinary approach combining endodontic therapy, electrocautery-assisted margin exposure, fiber post reinforcement and adhesive fragment reattachment.



Follow up



CONCLUSION

This case demonstrates a biomimetic approach for managing a complicated anterior crown fracture using endodontic treatment, crown lengthening, and fiber-post-assisted fragment reattachment. Preservation of the natural tooth structure achieved satisfactory aesthetics, function, and periodontal health. One-year follow-up confirmed stable clinical and radiographic outcomes, supporting fragment reattachment as a predictable, minimally invasive treatment option.

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