Journal of Dental Sciences 20 (2025) 2564–2566

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journal homepage: www.e-jds.com

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Managing an extensive, complicated crown fracture through direct fragment reattachment

KEYWORDS
Post and core;
Dental restoration;
Root canal treated teeth;
Reattachment;
Tooth fragment;
Incisor

Dental trauma involving the maxillary central incisors is frequently encountered in clinical practice, particularly among young adults engaged in sports activities.[1] Fracture of the anterior tooth crown poses a significant aesthetic and functional challenge, often prompting restorative solutions that may compromise natural tooth structure. Fragment reattachment has gained favor as a minimally invasive, cost-effective approach when the fractured segment remains intact.[2] This method preserves natural aesthetics and function, offering advantages over full-coverage crowns or prosthetic replacements.[3] We presented a case demonstrating successful management of a complicated crown fracture in a root canal-treated tooth using direct fragment reattachment with a prefabricated post.

A 26-year-old male presented one day following a sports-related injury with a fractured maxillary right central incisor. Extraoral examination was unremarkable. Intraorally, a large, non-adherent segment of the buccal and incisal crown remained in position but extended subgingivally. The fragment included approximately 60 % of the clinical crown. A previous composite restoration on the lingual surface and prior root canal treatment were noted. Periapical radiography revealed an intact root structure with no signs of periapical pathology or root fracture (Fig. 1A). Periodontal probing depths were normal, and physiologic mobility within normal limits was observed. The tooth was diagnosed with a complicated crown fracture (Ellis Class III), without root involvement. After discussing treatment options, the patient consented to a conservative reattachment of the natural fragment.

The fragment was carefully detached (Fig. 1B–F). Existing composite material on the tooth was removed, and a post space was prepared using Gates Glidden drills (Fig. 1G–I). A prefabricated post was cemented with Fuji II glass ionomer (Fig. 1J). The internal surface of the fragment and the remaining tooth were etched with 37 % phosphoric acid (Fig. 1K–M). A universal adhesive was applied (Fig. 1N and O), followed by a layer of flowable composite resin on the tooth surface (Fig. 1P). The fragment was repositioned precisely under gentle pressure (Fig. 1Q). Additional Class III restorations were placed to repair small mesial and distal defects (Fig. 1R). Final finishing and polishing were completed (Fig. 1S). Immediate postoperative outcomes were favorable, with excellent aesthetic integration and functional stability (Fig. 1T and U). The patient was advised to avoid excessive occlusal forces and scheduled for follow-up.

At the 12-month evaluation, the reattached tooth remained fully functional, with no signs of inflammation,

https://doi.org/10.1016/j.jds.2025.05.020

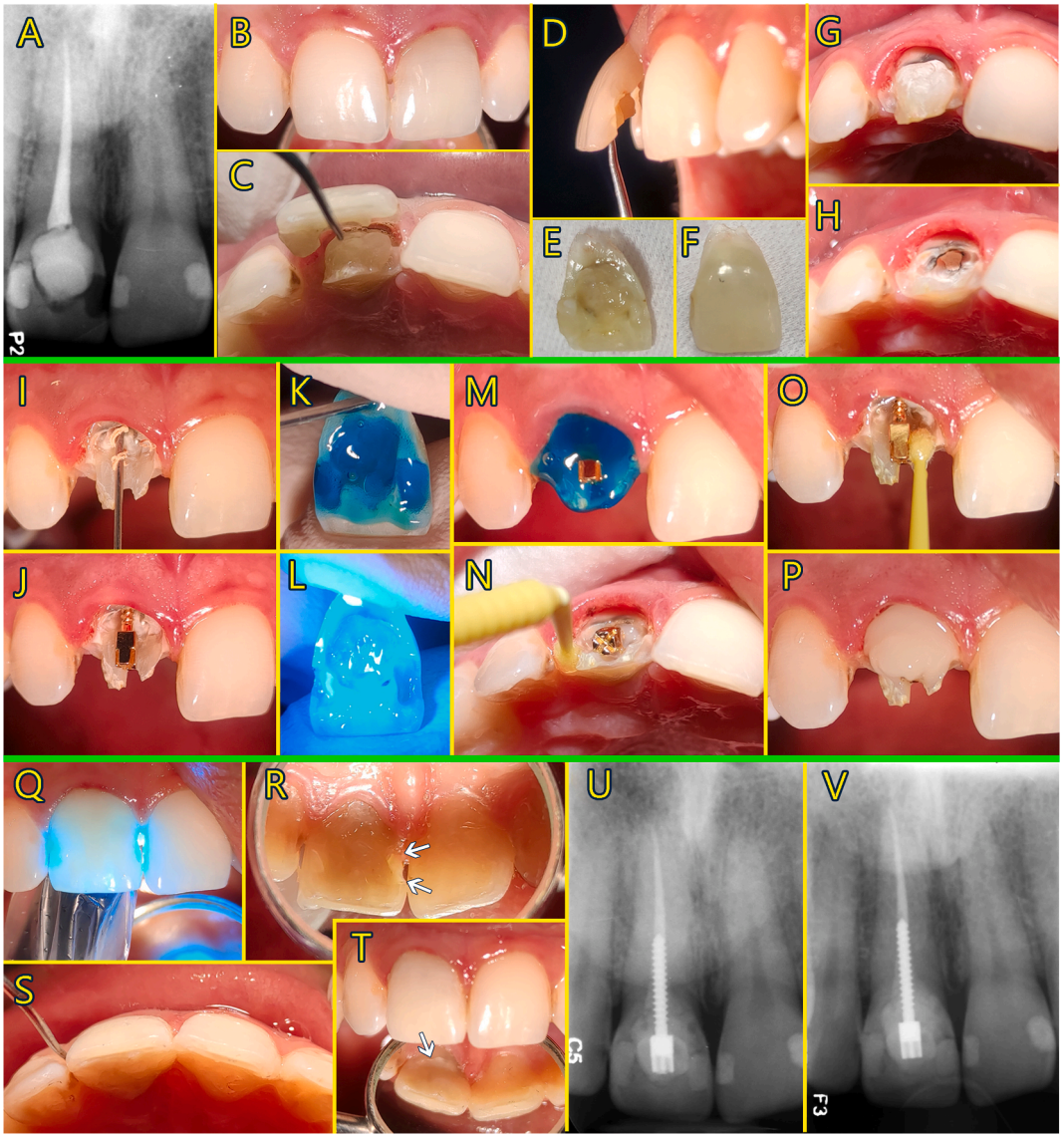

Figure 1 Clinical and radiographic documentation of the fractured maxillary right central incisor. (A) Initial periapical radiograph demonstrating intact root structure, absence of periapical pathology, and no visible fracture lines. (B) Buccal clinical photograph showing the tooth with no apparent fracture; mild erythema of the free gingiva is noted. (C) After applying gentle force with an explorer, occlusal view reveals an extensive crown fracture involving the buccal and incisal segments. (D) Mesial clinical photograph after fracture exposure, showing detachment of the entire buccal portion of the crown and low gingival attachment (arrow). (E and F) Extraoral photographs of the detached crown fragment from the lingual and buccal perspectives, illustrating the fracture pattern and clean separation, respectively. This confirms its integrity for reattachment. (G) The previously placed composite restoration is visible on the lingual aspect of the tooth. (H) The composite filling is easily separated from the tooth structure, and the remaining tooth structure is sufficient for reattachment of the separated part. (I) Removal of gutta-percha from the coronal third of the canal using Gates Glidden burs (#2–4) to create post space. (J) Trial fitting and subsequent cementation of a prefabricated post using glass ionomer cement. (K and L) Acid etching of the internal surfaces of the fractured crown fragment to enhance bonding. (M, N and O) Acid etching of all remaining tooth structure to ensure bonding compatibility. (P) Application of flowable composite resin to the prepared remaining tooth surface before fragment repositioning to facilitate bonding of the crown fragment. (Q) Clinical view showing the Fractured crown fragment accurately repositioned and bonded to the remaining tooth structure. (R) Class III cavities on the mesial and distal aspects are identified and then restored to ensure complete rehabilitation. (S and T) Immediate postoperative photographs showing successful reattachment with acceptable esthetics; the fracture line on the palatal aspect remains faintly visible (arrow). (U) Postoperative periapical radiograph confirming proper post placement, secure fragment adaptation, and absence of cement excess. (V) The 12-month follow-up radiograph showing the stable periodontal health, intact reattachment, and no periapical pathology, corroborating the long-term clinical success.

discoloration, or detachment. Radiographic assessment confirmed proper post-adaption and absence of periapical changes (Fig. 1V). The patient expressed high satisfaction, particularly with the treatment's aesthetic outcome and conservative nature. This case reaffirms that fragment reattachment offers a durable and biologically favorable solution when executed with meticulous bonding techniques and appropriate reinforcement.

Fragment reattachment should be considered the first-line approach when managing anterior crown fractures with retrievable fragments.[4] It aligns with minimally invasive principles and meets patient expectations for natural appearance and affordability. The long-term success is dependent on the fragment integrity, precise adhesive protocols, and regular follow-up. This technique deserves broader clinical adoption, especially in cases where biological width is preserved and root integrity is uncompromised.

Declaration of competing interest

The author has no conflicts of interest relevant to this report.

Acknowledgements

NA.

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Received 17 May 2025
Final revision received 19 May 2025
Available online 29 May 2025