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Multidisciplinary management of crown fractures: A comprehensive approach to immediate reattachment

KEYWORDS

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Dental trauma affecting anterior teeth is a common phenomenon, especially among individuals engaged in sports activities. Crown fractures of the anterior teeth, particularly the maxillary incisors, are frequently observed due to their vulnerable position in the dental arch. Complicated crown fractures, which involve pulp exposure, often necessitate root canal treatment and various restorative techniques such as composite/ceramic restorations, and intra-radicular posts with crown placement. The practice of fragment reattachment, initially introduced in 1964,¹ underwent further refinement with the acid-etching procedure in 1978.² Retaining the natural tooth fragment after a fracture and reattaching it through adhesive procedures not only provides a conservative/biological restorative treatment,³ and aesthetically favorable outcome⁴ but also elicits positive functional and psychological responses.

A 20-year-old female presented at our dental clinic after a sports-related falling accident. Intraoral examination revealed complicated crown fractures in the left central and lateral maxillary incisors; the tooth 21 had undergone root canal treatment, and tooth 22 was vital with a visible dental pulp exposure (Fig. 1A and D). Radiographic assessment confirmed acceptable previous root canal therapy in tooth 21 and a composite filling in the coronal one-third of its canal, along with pulp exposure in tooth 22 (Fig. 1B). The adjacent teeth were intact and normal. The fractured

fragments were kept in dry conditions (Fig. 1C). After explaining treatment options, informed consent was obtained.

The fractured portions were cleaned with 2.5 % NaOCl, rinsed with distilled water, and immersed in distilled water for reattachment (for >15 min). Managing tooth 22 involved local anesthesia with 2 % lidocaine containing adrenaline of 1:80,000, cotton roll isolation, pulp exposure rinsing, a precise partial pulpotomy (Fig. 1E), hemostasis, and coverage of the pulp wound with calcium-enriched mixture (CEM) cement (BioniqueDent, Tehran, Iran; Fig. 1F). For tooth 21, the composite root filling was removed, a fiber-glass post was inserted in the prepared canal, and the fractured segments were then reattached using 37 % phosphoric acid etching for 10 s, followed by water rinsing for 10 s. Bonding with a related dental adhesive (light cured for 10 s) and a flowable composite (3M Filtek Flow, 3M-ESPE, Seefeld, Germany) was performed, followed by light curing for 20 s. Final finishing and polishing of the teeth were carried out (Fig. 1G). Immediate postoperative periapical radiograph confirmed successful reattachment (Fig. 1H).

The multidisciplinary approaches presented showcase benefits in reduced treatment time, enhanced cost-effectiveness, improved aesthetics, minimally invasive procedures, and a predilection for vital pulp therapy over

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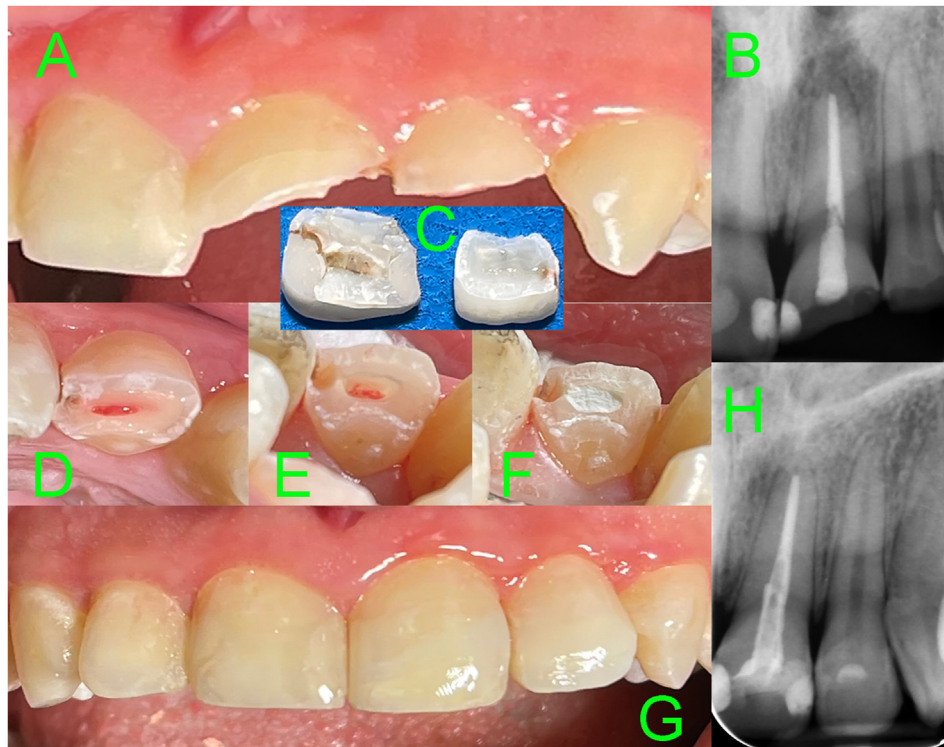


Fig. 1 Clinical photographs and periapical radiographs of our case; (A) Clinical photograph presenting a 20-year-old female patient with the crown-root fractures in teeth 21 and 22 following a sports-related falling accident. (B) Periapical radiograph revealing the acceptable root canal therapy in the tooth 21, with a composite filling in the coronal one-third of the canal, and a dental pulp exposure in the tooth 22. (C) Fractured tooth segments preserved in a dry condition. (D) A visible dental pulp exposure in the tooth 22. (E) Partial pulpotomy was performed on the tooth 22, with subsequent achievement of hemostasis. (F) Complete coverage of pulp exposure in the tooth 22 using the calcium-enriched mixture (CEM) cement. (G) Clinical photograph showing the reattachment of fractured crown segments using a multidisciplinary approach, including acid etching, bonding, and composite resin restoration. (H) Immediate postoperative radiographic assessment confirming successful reattachment.

root canal treatment. Patient cooperation and awareness regarding the treatment are pivotal for a positive prognosis. Moreover, the rehydration of fragments in distilled water has demonstrated superior resin tag penetration compared to alternative techniques, with composites exhibiting heightened fracture resistance in contrast to fragments bonded with light-cured glass ionomer cement.⁵ This case illustrates the successful treatment of complicated crown fractures through a comprehensive multidisciplinary approach, emphasizing the advantages of immediate reattachment for functional and aesthetic restoration. The presented treatment strategies underscore the efficacy of timely intervention, cost-effectiveness, and vital pulp preservation, supporting their integration into routine clinical practice.

Declaration of competing interest

The authors have no conflicts of interest relevant to this paper.

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NA.

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