



CASE REPORT

Multidisciplinary approach to a subgingivally fractured incisor tooth: A case report



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Abstract This case report describes a multidisciplinary approach using orthodontic forced eruption to facilitate prosthetic restoration of a subgingivally fractured maxillary permanent central incisor. A 14-year-old male patient presented at the pediatric dental clinic due to unesthetic appearance and for management of a fractured maxillary right central incisor tooth. Intraoral examination revealed that the maxillary right central incisor had sustained a crown-root fracture with pulp exposure. We treated the tooth endodontically and performed orthodontic root extrusion with a modified Hawley appliance prior to prosthetic rehabilitation. Approximately 2–3 mm of extrusion of the tooth was obtained within 8 weeks. A fiber post was then inserted into the root canal, and final restoration was completed with an all-ceramic crown. Follow-up 18 months after treatment revealed good periodontal health, esthetics and normal function.

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Introduction

Crown-root fractures comprise 5% of injuries affecting the permanent dentition and are usually caused by direct

trauma to the anterior teeth. These dental injuries extend below the cemento-enamel junction and involve enamel, dentine, and cementum, with or without pulpal involvement.¹

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The treatment strategy for a crown-root fracture is complex and providing an esthetic result is an important criterion of success.² The literature reports several different treatments for crown-root fractures: fragment removal and restoration³; gingivectomy and osteotomy (crown lengthening)^{1,3,4}; orthodontic extrusion with/without gingivoplasty^{1,3-7}; surgical extrusion^{1,3,4,8}; vital root submergence^{3,9}; and extraction followed by surgical implants^{3,4} or fixed partial dentures.¹⁰ The choice of treatment depends on the extent of the subgingival lesion, the morphology of the lesion, the length and the morphology of the root, and the appearance in this esthetically sensitive region.³

Orthodontic extrusion is a conservative procedure according to extraction that allows retention of a tooth without the disadvantages of fixed partial dentures, and it does not involve loss of bone or periodontal support. Moreover, crown-lengthening techniques involve additional resection of bone or periodontal tissues and cause reduction of residual bone support.¹¹ Orthodontic root extrusion alters the relation between a nonrestorable tooth and its attachment apparatus, by elevating sound tooth material within the alveolar socket. Extrusion of such teeth raises the fracture line above the epithelial attachment so the proper finishing margins can be prepared.⁷

This case report describes a multidisciplinary approach using orthodontic forced eruption to facilitate the prosthetic restoration of a subgingivally fractured maxillary permanent central incisor.

Case presentation

A 14-year-old male patient presented at the pediatric dental clinic due to unesthetic appearance and for management of fractured maxillary right central incisor tooth. His medical history was noncontributory. He had reportedly had a schoolyard accident some 48 hours prior to his attendance. The general dental practitioner carried out clinical and radiographical examination but performed no treatment before referring the child to our clinic.

Intraoral examination revealed that the maxillary right central incisor sustained an oblique crown-root fracture with pulp exposure. The fracture line extended below the gingival level at the palatal surface of the tooth. The missing tooth fragment had been left at the accident site.

The adjacent teeth showed no sign of mobility, and electric pulp responses gave positive readings (Fig. 1). Periapical radiographs taken from different angles revealed an oblique crown-root fracture. Also, the absence of radiographic findings in the neighboring teeth confirmed the clinical diagnosis.

We decided to initiate orthodontic extrusion of the traumatically injured root to facilitate placement of a coronal restoration. The patient and his mother were informed about the advantages and possible complications of the treatment plan. Even though a full arch orthodontic treatment had been decided to solve confusion about orthodontic extrusion, this approach was eventually rejected by the patient for social and economical reasons. After the patient and his parents approved the orthodontic extrusion, electrosurgery was used to re-establish the gingival margin and to convert the subgingival fracture site to a supragingival site. The pulpal tissue was then extirpated and calcium hydroxide paste applied following preparation and cleaning of the root canal. The exposed root cavity was filled with glass-ionomer cement (Fuji IX; GC Corporation, Tokyo, Japan) to prevent the new gingival margin. On a subsequent visit, we then obturated the canal with gutta-percha points and Sealapex (SybronEndo; Sybron Dental Specialties, Glendora, CA, USA; Fig. 2). Then, orthodontic root extrusion was performed with a modified Hawley appliance prior to prosthetic rehabilitation. After bending a hook with the shoulder at the level of the right central incisor, 3.2 mm medium elastic was used between the hook and a metal button bonded on the vestibule enamel surface of the right central incisor. In this way, an extrusive force of approximately 50 g was applied along the long axis of the tooth. The patient was told to use the appliance full time and to change the elastics once a day. In three months, 2 mm of extrusion was produced and application of force was ended. For retention, 3.2 mm light elastic was maintained for another 4 weeks (Fig. 3). The level of force was 10–20 g during this period. After extrusion was completed, the fracture level had risen 2 mm beyond the gingival margin (Fig. 4).

Following the orthodontic extrusion, proper fiber post was selected to restore the fractured tooth. The gutta-percha was partially removed leaving the apical 4 mm of the filling to maintain a good seal. A post hole was prepared within the root and coronal fragment using a drill. A glass fiber post (Cytec blanco glass fiber; Hahnenkratt,

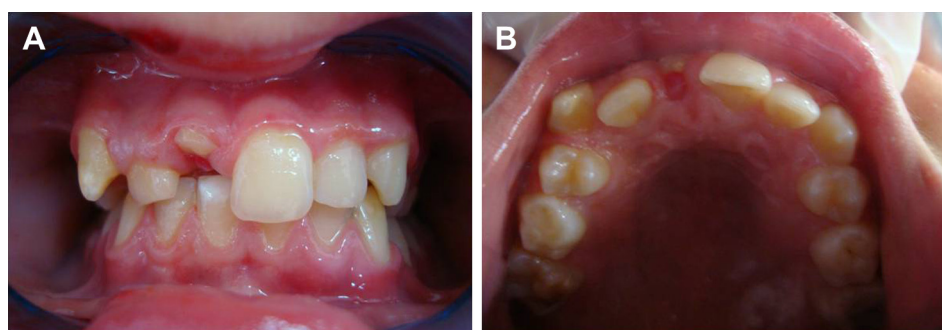


Figure 1 (A) Frontal view of fractured maxillary right central incisor. (B) Occlusal view of fractured maxillary right central incisor.

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