

# Aesthetic Management Of Complicated Subgingival Fracture: A Case Report

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## Abstract

Complicated crown fractures most commonly affect maxillary anterior teeth, which raise significant aesthetic and psychological issues. The location and extent of these fracture significantly influence the available treatment options and their outcome. Restoring oblique crown fractures that extend below the gingival margin and the alveolar bone, can be challenging. In such cases exposing the fracture line into oral cavity would be desirable which can be done by gingival crown lengthening, orthodontic extrusion or surgical extrusion. With orthodontic extrusion there would be no loss periodontal support and aesthetics wouldn't be compromised either. The present case report demonstrates multidisciplinary management of subgingival oblique fracture, correction of cross bite through orthodontic extrusion, removal of coronal fragment, sealing the fracture line with MTA and aesthetic correction of maxillary anterior teeth with zirconia crowns and porcelain laminate veneers.

**Key Word:** Complicated crown fracture, Cross bite, Orthodontic extrusion, MTA, Porcelain laminate veneers.

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## I. Introduction

With a documented prevalence ranging from 2% to 13% of all dental injuries, complicated crown fractures involve enamel, dentine, and pulp.<sup>1</sup> They are typically brought on by direct trauma.<sup>2</sup> The maxillary anterior teeth are most frequently affected by these fractures, which raise significant aesthetic and psychological issues.<sup>3</sup>

A multidisciplinary approach may be necessary for the management of injured teeth in order to preserve the tooth structure and provide superior aesthetic outcomes.<sup>1</sup> Restoring oblique crown fractures that extend below the gingival margin and the alveolar bone, affecting enamel, dentine, and pulp, can be challenging. The functional root length may be jeopardized if alveolar re-contouring is the only method used to expose the fracture line. Furthermore, any attempt to use simple or sophisticated periodontal treatments to re-contour the labial tissues may result in poor aesthetics.<sup>4</sup>

Exposure of the fractured margin into the oral cavity is desirable. This may be achieved by 3 methods: (i) crown lengthening, (ii) surgical extrusion, and (iii) orthodontic extrusion.<sup>3</sup> There is no loss of periodontal support or adjacent teeth's bone tissue with orthodontic extrusion, making it a conservative operation with an excellent prognosis.<sup>2</sup>

Gingival characteristics can impact a natural smile design; therefore, aesthetics, treatment planning, and clinical care should be taken into consideration in accordance with the interrelationships between the teeth, gums, lips and face. The design of the smile should respect the symmetry and the harmonious arrangement of dento-facial parts because the main purpose of ceramic veneers is to improve aesthetics.<sup>5</sup> The more aesthetically acceptable alternative to ceramic and traditional porcelain bonded to metal crowns is porcelain laminate veneers (PLVs). In a quick, painless, and conservative approach, laminates can successfully alter smiles with long-lasting results. Laminates have good tissue response and a surface that is nearly identical to that of natural teeth when finished. Veneers naturally glow, and their absorption, reflection, and transmission of light are all exactly like that of real teeth.<sup>6</sup>

The present case report discusses management of complicated, subgingival fracture through orthodontic extrusion and smile enhancement with zirconia crowns and porcelain laminate veneers crowns.

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## II. Case Report

A 22 old female reported to the department with the chief complaint of broken and discoloured teeth in upper front tooth region. Patient gave history of fall few months back. She had an unremarkable medical history.

Intraoral clinical examination revealed complicated crown fracture that palatally extended sub gingival, with a crossbite in maxillary right lateral incisor, discoloured maxillary right central incisor and discoloured and unevenly arranged maxillary interior teeth (Figure 1a,1b). Radiographic examination showed oblique radiolucent fracture line extending below the alveolar crest in maxillary right lateral incisor and large periapical radiolucency in both maxillary right central and lateral incisor (Figure1c).

As the fractured extend 2- 3 below the alveolar crest orthodontic extrusion with endodontic treatment for maxillary right lateral incisor (Figure 2a,2b), endodontic treatment for right central incisor and aesthetic correction with porcelain laminate veneers were planned.

An informed consent was obtained after discussing the treatment protocol with the patient. Coronal fragment that was mobile was removed, pre- endodontic composite build-up followed by orthodontic extrusion and cross bite correction with bonded bracket and wire, was initiated for maxillary right lateral incisor. Endodontic treatment was started for both the teeth and double antibiotic paste was placed post chemo mechanical debridement and was left for a period of 4 weeks.

Extrusion of 2mm was achieved in 4 weeks. Post orthodontic extrusion, the orthodontic wire and brackets were removed, the fracture line was sealed with MTA in lateral incisor (Figure 3c). Obturation was completed and endodontic access were sealed with nanohybrid composite. Tooth preparation was done all ceramic crowns in central and lateral incisor and for ceramic veneers on other teeth (Figure 3a, 3b). Gingival retraction was done with impregnated cord and impression was recorded with putty and light body (Figure 4).

During try in, veneers were checked for marginal adaptation, shape, contour, shade. On satisfactory results, final glazing was done. Teeth were then isolated; crowns and veneers were bonded with dual cure resin. (Figure 5a,5b,5c). At 6 month follow up patient was asymptomatic and was satisfied with aesthetics of the teeth.



Figure 1a, 1b, 1c



Figure 2a, 2b



Figure 3a, 3b, 3c



**Figure 4**



**Figure 5a,5b, 5c**



**Figure 6a, 6b, 6c1 and 6c2**

Figure 1: 1a, Preoperative, frontal view showing Ellis's class III fracture in maxillary right lateral incisor, discoloured maxillary right central incisor and un-aesthetic maxillary anterior teeth. 1b, Palatal view showing, fracture line extending sub gingivally. 1c, Preoperative periapical radiograph showing Ellis's class III fracture in maxillary right lateral incisor and periapical radiolucency in maxillary right central and lateral incisor.

Figure 2: 2a, 2b Preoperative clinical and radiographic composite build-up and orthodontic extrusion with orthodontic wire and brackets in maxillary lateral incisor.

Figure 3a: Frontal view of teeth preparation to receive zirconia crowns in maxillary right central, lateral incisor and porcelain laminate veneers in maxillary right canine, maxillary left central incisor, lateral incisor and canine. 3b, Palatal view of teeth preparation and sealing of fracture line with MTA. 3c, Periapical radiograph showing radio-opaque material (MTA) along the neck of the maxillary right lateral incisor.

Figure 4: Impression made with putty and light body impression material.

Figure 5: 5a, 5b Immediate post cementation of zirconia crowns and porcelain laminate veneers. 5c, Immediate post operative intra-oral radiograph post cementation of crowns in maxillary right lateral and central incisor.

Figure 6: 6a, 6b Six month follow up, frontal and palatal view shows superior aesthetics, proper shade matching and well contoured zirconia crowns and porcelain laminate veneers. 6c1 and 6c2 Periapical radiograph showing healing of periapical lesion in maxillary right central and lateral incisor

### **III. Discussion**

When a young patient loses the coronal portion of a permanent incisor, it can lead to functional and cosmetic issues, which can exacerbate emotional concerns.<sup>7</sup> Coronal rehabilitation is a challenge when dealing with subgingival crown fractures. The prognosis and available treatment options for fractured teeth are influenced by the position of the fracture line.<sup>2</sup>

Tooth shade and transparency, gingival colour, contour, and margin levels are important and difficult to control in anterior area, especially over time. Orthodontic, endodontic, periodontal, and prosthetic therapy are frequently needed in a multidisciplinary manner for the successful care of such situations. Extraction of the coronal fragment has been suggested prior to orthodontic or surgical extrusion of the apical fragment because of poor prognosis of root fractures at the cervical margin.<sup>8</sup>

To preserve soft tissues and increase vertical bone height, orthodontic extrusion is a highly predictable, safe, and minimally intrusive treatment option.<sup>2</sup> Several orthodontic strategies, including fixed appliances, detachable appliances, and temporary anchorage devices like mini-screws, can be used to achieve orthodontic

extrusion.<sup>9</sup> When sub gingival ferrule exposure is required, as in the present case, rapid orthodontic extrusion approach is suggested for the treatment of subgingival fractures. In the present case 2mm of extrusion was achieved over a period of one month. During this period double antibiotic paste was placed as intracanal medication, to neutralize microbes, their products and prevent invasion of new microbes.

The patient had mild discoloration, unevenly arranged teeth and was willing for aesthetic correction, hence porcelain laminate veneers were considered. The advantages of employing these restorations include their strong resistance against abrasion, stability, reduced chance of generating irritation or sensitivity, less cytotoxicity, and biological acceptability to the body due to their higher chemical stability.<sup>7</sup>

At six month follow up, patient was free of sensitivity, pain and tenderness. Radiograph revealed healing of periapical lesion with bone formation in central and lateral incisor. Patient was satisfied with shape and aesthetics of the prosthesis (Figure 6a,6b,6c1 and 6c2).

#### **IV. Conclusions**

Management of complicated crown fractures extending sub gingivally, pose problems to the clinician. Short clinical crowns require orthodontic extrusion or crown lengthening to enhance retentive features of the crowns. Also, exposure of the fracture line would be a desirable management option. A combination of orthodontic extrusion and crown restoration may be considered for the treatment of subgingival crown fractures.

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