Dental trauma, in which the fracture line evolves in the crown portion of the tooth, extends apically into the root in an oblique direction is referred to as crown-root fracture. Depending on whether or not the pulp is involved, such fractures are further divided as complicated or uncomplicated. About 5% of all dental traumas is found to be associated with crown-root fractures.

Subgingival fracture of a tooth presents a challenging restorative problem and requires effective assessment for treatment. A fractured tooth presents a multifaceted problem which warrants a multidisciplinary treatment. There are handful options for the management.

a. Extraction
b. Crown lengthening
c. Surgical extrusion and
d. Orthodontic extrusion.[2]

With the advent of dental implants, extraction persists the common treatment modality. However, it should be considered as the last option in order to preserve the tooth. Surgical crown lengthening may expose the roots and can produce an unesthetic result. To overcome the drawbacks of the above said treatment modalities, an option of lingual orthodontic extrusion was sought after in regard with the present case.

Here, we present a case of complicated crown-root fracture of the anterior tooth and its management using multidisciplinary approach while maintaining the esthetics.

**ABSTRACT**

Dental trauma is one of the most common and significant problems met in all dental offices almost every day. In particular, injury to the anterior teeth is more vulnerable as it may affect the psychosocial behavior, severe emotional complications can occur leading to disturbances in their mental attitude. Cosmetic (lingual) orthodontics is the recent development in the field of dentistry in the last few decades. Patients are more concerned about their appearance during the treatment and are affected by psychosocial issues because of labially placed brackets, thus leading to the evolution of lingual orthodontic appliances. In this article, we are sharing our clinical experience treating a complicated crown-root fracture using the lingual orthodontic technique.

**KEY WORDS:** Complicated crown-root fracture, orthodontic extrusion, subgingival fracture
Case Report

A 24-year-old female patient reported with a chief complaint of fractured upper right lateral incisor (#12). Patient revealed an alleged history of fall from two-wheeler on the previous day. The medical history revealed no systemic disease. Maxillofacial examination revealed no fractures. On clinical examination, there was a horizontal fracture at the cervical third of crown with the fracture line extending 2 mm subgingivally on palatal aspect. On radiographic examination, it was found that the fractured tooth was root canal treated and obturation was satisfactory with the intact lamina dura [Figure 1]. A definitive treatment of orthodontic extrusion followed by a crown with a dowel and core was planned and explained to the patient.

Full mouth prophylaxis cleaning was done prior to orthodontic extrusion. Obliging to patient’s request, orthodontic extrusion was designed with the invisible approach (lingual orthodontics) so that the brackets are not exposed.

The lingual brackets (combi brackets) were placed on the upper cast, and a transfer tray made from glue gun was fabricated [Figure 2]. Brackets were bonded onto the lingual surface of the teeth whereby the bracket was positioned more gingivally (2 mm) on the tooth to be extruded [Figure 3]. The 0.012” Ni-Ti was loosely knotted to the bracket of 12 in the 1st month, and then placed in the bracket slot in the 2nd month. A slow extrusive force of 0.2–0.3 N was used. The patient was recalled once weekly to assess the amount of extrusion. The desired extrusion (3 mm) to regain the lost biologic width had been attained in a period of 3 months which was very evident on the radiograph [Figure 4].

About 2 mm of the crown was exposed in relation to 12 using crown lengthening procedure without encroaching the biologic width [Figure 5]. Esthetics was taken care of by carrying out gingival depigmentation in the upper anterior region on the labial side using a soft tissue laser [Figure 6].

The orthodontic appliance was left passive for 2 months for stabilization of achieved extrusion. The patient was called after 2 months for de-bonding of the appliance. Postspace was prepared for dowel and core. A direct wax pattern was made for a post and core and was transferred to the laboratory for construction. Fabricated cast post and core were cemented with resin cement. A provisional porcelain fused to the metal crown was given in 12. Good esthetics was achieved [Figure 7].

Discussion

It is estimated that majority of population sustain traumatic injuries to anterior teeth because of its forward position and proclination which could result in esthetic and psychiatric problems. Reports have shown that the incidence of complicated crown fractures was 18–20% of all tooth injuries in a permanent dentition\(^1\) in which oblique fractures contribute to 85% of traumatized incisor fractures from labial to palatal aspect in the apical direction.\(^2\)

A comprehensive diagnosis and meticulous treatment planning are essential for the management of complicated crown-root fractures which could be attempted by extraction followed...
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Extraction should not be the first choice because every attempt should be made to preserve the natural teeth. Surgical extrusion is a simple, less consuming procedure but the main drawback is the risk of root resorption because of the damage to the periodontal ligament.

Literature shows that orthodontic extrusion has proven excellent results. Heda et al. in 2006 have done an orthodontic extrusion in relation to maxillary central incisor with the successful clinical outcome.\(^5\)

Orthodontic extrusion or forced eruption was put forwarded by Heithersay for the treatment of horizontal root fractures. Extrusion is one of the easiest orthodontic movements to achieve because it closely simulates natural tooth eruption. It is a conservative procedure that permits retention of a tooth without loss of bone or periodontal support.\(^6\)

An adult might ignore the entire plan of the treatment because of the placement of brackets on the labial surface which makes them feel unesthetic. White spots will appear on the labial surfaces surrounding the orthodontic attachments may be detected after the removal of appliance leading to unesthetic appearance.

Lingual orthodontics is the most esthetic treatment modality and is the prime treatment choice for adult patients as the brackets are invisible.\(^7\)

Poi et al. 2007 carried out a similar case of lingual orthodontic extrusion of maxillary central incisor which is on par with our present study.\(^8\)

At the end of this procedure, there was some discrepancy with the gingival margin which was corrected using the periodontal procedure. Good esthetic results were obtained with the use of fiber post and porcelain crown.

**Conclusion**

Restoration of subgingival crown-root fractures is always challenging for a dentist. The combined use of other branches of dentistry such as orthodontics, prosthodontics, periodontics is a promising way to achieve best results. In this case, we have achieved extrusion without compromising the esthetics which ensures psychological comfort to the patient.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.
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