

Esthetic Rehabilitation of Ellis Class VIII Fracture in 14 Year Old Patient- A Clinical Case Report

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Abstract: Aim: The aim of this article is to report a successful treatment of a Ellis class VIII fracture.

Background: Ellis class VIII fracture is the fracture of crown below the gingival attachment and its replacement. Treatment options include crown lengthening, orthodontic extrusion.

Case description: Here, a case of complicated crown fracture of tooth number 11 and 21 in a 14 year old boy is presented. Ellis class VIII fracture tooth was restored with conservative approach of root canal treatment followed by prosthetic treatment by post and core and Porcelain Fused to Metal crown. The patient was asymptomatic clinically and radiographically after 3 months follow up.

Conclusion: Rehabilitation of teeth using post and core followed by PFM crown is a successful treatment regime in crown en masse fracture. It is not always necessary to go for extraction in Ellis Class VIII fracture.

Clinical Significance: The management of complicated crown fracture with the materials available and techniques in a conservative approach can save the tooth and helps in maintaining the natural dentition.

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I. Background

Anterior tooth fractures are the most common dental traumatic injuries affecting the children and adolescents. They mostly occur during the growth and development period affecting the child's personality and quality of life. The incidence of maxillary anteriors, being injured, is 37% as they are most anteriorly placed in the arch and their protrusive eruptive pattern¹, followed by maxillary laterals (16%) and mandibular central incisors². The incidence of complicated crown fractures ranges from 2% to 13% of all dental injuries³. Anterior teeth play an important role in aesthetics, speech and also psychologically. Children participation in sports, violence, accidents, increased over-jet are some factors that are responsible for dental traumatic injuries.

Ellis class VIII fracture (Crown en masse) involves the fracture of crown below the gingival attachment and its replacement. Usually its treatment plan includes extraction followed by artificial prosthesis but in case of children and adolescent, fear of pain during extraction along with trauma of losing a tooth especially anterior may traumatize the psychological of the person⁴. After an injury, a correct, accurate and immediate treatment is important for a good prognosis of treated tooth.⁵

In cases of endodontically treated teeth with moderate loss of tooth structure (<50%), the dilemma is whether to opt for direct composite or full coverage restoration, depending on occlusal loading condition and location of tooth. Endodontically treated teeth with crack lines, high occlusal loading, mesial and distal caries or cervical abrasion, definitely require intraradicular posts for better retention of core and also to improve the fracture resistance of the tooth.

Anterior teeth with more than 50% tooth structure loss, post and core followed by porcelain fused to metal restoration is mandatory.

A wide variety of post systems are available ranging from traditional cast metal posts to newer fiber posts. The ease of use, less time consumption for fiber posts along with the available laboratory and clinical evidence validates the utilization of fiber posts as an alternative to metal posts.

The objective of this paper was to present a case of complicated crown fracture requiring endodontic treatment and the use of fiber post aimed at creating a central support stump to restore dental morphology followed by porcelain-fused metal crown to avoid the difficulties, including possible failure.

II. Case Description

A 14 years old Male patient accompanied by his mother reported to the Department of Pedodontics and Preventive Dentistry; Himachal Dental College, Sundernagar, Himachal Pradesh, with a chief complaint of broken anterior teeth following trauma since 1 week along with worn out teeth in mouth (fig 1 & fig. 2). Detailed history revealed that the patient had fallen from desk while playing during school hours and was associated with pain and swelling in the maxillary anterior region. Pain was dull and continuous in nature that subsided on taking medication whereas swelling was diffuse and limited to the upper front region of the lip. On clinical examination, his both maxillary central incisors(11, 21) were diagnosed as complicated crown fracture (WHO Classification)

Single visit root canal treatment was done under aseptic conditions, local anesthesia was administered using 2% lidocaine and 1: 80,000 epinephrine in the maxillary central incisor region.

Following isolation with rubber dam, Access opening was carried out using no. 4 round bur (dentsply, maillefer) and canal orifices were located along with working length determination with Apex locator (Propex, Dentsply) with respect to 11 and 21 (fig. 3) and pulp was extirpated. The shaping of the canal was done using modified crown down technique with nickel titanium rotary files - Pro Taper Gold. The orifices and the coronal parts are prepared with S_x files, coronal and middle third of canals were shaped with shaping files S₁ and S₂, and the apical portion of the canal with F₁ and F₂ files. The solution of 1% NaOCL in combination with 17% EDTA was used for rinsing. After finishing the preparation and drying the canal, obturation was done using lateral condensation technique with F₂ gutta-percha cone with respect to 11 and 21 (Fig. 4) followed by composite buildup (Fig. 5). After 1 week, the post space was prepared in 11 and 21 using Gates Glidden drills (no. 3), leaving 4-6 mm of gutta-percha at the apical third of both teeth (Fig. 6&7). Fibre post (Tenax, ParaPost) was then trimmed according to adequate length. It was used to strengthen the teeth, as they are more aesthetic and lessens the chances of teeth fracture. The dual core resin (Coltene, ParaCore) was used to cement the post and core build up. Crown preparation was done with respect to 11 and 21(Fig. 8) and Impression was made in putty and Porcelain Fused to Metal crowns were given. (Fig. 9).



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig.6



Fig. 7



Fig. 8



Fig. 9



Pre operative



Post operative

III. Discussion

The range of crown fracture are less than those not involving the pulps 2-13%. Crown fracture involving enamel, dentin, and pulp are called “complicated crown fractures”⁷. Fracture in maxillary anterior teeth occurs frequently in case of young patients (Andreasen, 1981). Fractures at the cervical region occasionally result in loss of coronal part of tooth, which creates esthetic problems for patients. Restoration of such tooth is a better option as compared to extraction of remaining tooth fragment (Goldson et al., 1981).

Preservation of a tooth with complicated crown fracture is a challenging task, because of various factors that need to be considered. These factors include retention of restoration, amount of remaining tooth structure, masticatory forces, prevention of micro-leakage and esthetics. In the present case endodontic treatment was performed in maxillary central incisors. Endodontically treated teeth often require a substantial buildup, with varying post and core foundation materials to retain a complete crown. Traditionally cast posts have been used for long time to restore fractured tooth. Depending upon developments in adhesive dentistry, fiber posts have been used in the restoration of anterior teeth. Fiber posts show similar hardness to dentin and exhibits greater durability than metal posts. Elastic modulus of fiber posts is similar to dentin that strengthens the remaining tooth structure and increases the resistance to tooth fracture. Because of all these advantages, fiber posts were used in this case to restore the fractured tooth. **RoshanUthappa, Deepika Mod et al** conducted a study to compare fiber post and metal post in the endodontically treated teeth restoration and concluded less chance of failure was seen with fiber post retained restored teeth than that of metal post.

SumanKaushik et al did 2 cases of anterior tooth fracture. In the first case, an easy and ultraconservative technique without any tooth preparation is used which involves intraradicular support, i.e., fiber post and core. In the second case, an interdisciplinary approach is used to treat the root fracture where biological width was encroached. The flap was raised to expose the fractured root with a small amount of osteoplasty so that the segments could be checked for exact fit and bonding can be done with proper isolation of the operating field. In our present case there was no need for osteoplasty as there was no root fracture.

A. SumathiFelicita did the similar case of 21 year old patient with ellis class VIII fracture of the maxillary right lateral incisor. Root canal treatment followed by a fiber reinforced composite post was placed and core build up was done. A metal button was bonded to the tooth. Begg brackets were placed from the second premolar on one side to the second premolar on the opposite side. 0.016’’x 0.025 stainless steel was placed in ribbon mode. The ligature wire was placed as a sling shot from the button on the fractured tooth to the two adjacent teeth. 4 mm of extrusion was achieved but in present study there was no need for orthodontic extrusion of the teeth as there was sufficient tooth structure present for esthetic restoration.

Functional, esthetic and biologic restoration of fractured incisor is an intimidating challenge for a clinician. Conventional composite resin restoration may result in less than ideal contours, color match and incisal translucency. The longevity of this procedure is not predictable and tooth build up with composite resins tends to take up stains from food and beverages that a patient consumes over a period of time and thus the esthetic is compromised. Hence, to overcome such problem, porcelain fused metal crown was selected as a permanent restoration.

IV. Conclusion

Untreated dental injury has a negative impact on quality of life regarding social, functional and emotional aspects. However, treated injured teeth appear to improve social and emotional aspects of school children, whereas functional limitations may continue because of pulpal and periodontal effect of the injury. This case report presents the comprehensive and conservative approach for the complicated crown fracture treatment followed by the permanent restoration.

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