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Aesthetic rehabilitation of Ellis class III fracture: A case report

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Abstract---Trauma to anterior teeth has a significant impact on social well being of patient especially in teenagers. A fractured anterior tooth needs immediate clinical attention. If it is left untreated it causes damage to dentition and affects the aesthetic of patient. It even has a psychological impact on the patient. Because of the position in the arch the majority of dental injuries involve the anterior teeth, especially the maxillary incisors. In this case the broken fragment was not preserved by the patient. Thus firstly endodontic treatment is done followed by placement of post. Composite build up was done. Permanent restoration with porcelain fused metal (PFM) is opted to overcome the problem of esthetics and functional durability.

Keywords---aesthetics rehabilitation, Ellis class III fracture, fiber post, PFM.

Introduction

Beautiful smile is a key to confidence. Trauma to anterior teeth has a significant impact on social well being of patient especially in teenagers. A fractured anterior tooth needs immediate clinical attention. If it is left untreated it causes damage to dentition and affects the aesthetic of patient. It even has a psychological impact on the patient.¹ Most tooth fractures are located in crown region and therefore are easy to diagnose. As soon as the crown fractures it additionally affects dentin and pulp, increased temperature sensitivity is observed.² Dental treatment should aim at giving maximum functional and aesthetic restoration with minimum complications and longevity.³ The severity of fracture decides the treatment plan. It can involve simple to complex restorative procedures. The present case report describes management of a Ellis class III fracture in maxillary left central incisor. It is treated endodontically followed by placement of fiber post and PFM crown.

Case report

A 17-year-old male patient reported in my private clinic with a chief complaint of broken upper front tooth. Patient revealed in the history that he had an minor accident and had a blow on upper jaw resulting in fractured maxillary left central incisor (21) 3 days ago.[fig.1]. Intraoral examination revealed that the maxillary right lateral incisor was fractured. No associated root fracture was seen in IOPA radiograph. The alveolar bone and the periapical tissues appeared normal. A diagnosis of complicated crown fracture (involving the pulp chamber) – Ellis Class III w.r.t 21 was made. Noticing the severity of fracture and patient's pain, a decision of single-visit endodontic treatment was taken.

Local anesthesia was administered. Access was gained labially through the fractured region. The coronal pulp tissue was removed followed by chamber irrigation with 5.25% sodium hypochlorite and normal saline. Initially the root canal was negotiated with a no. 10 k-file. An initial working length radiograph was taken. The root canal was cleaned with 17% EDTA and 5.25% sodium hypochlorite and shaped with hand protaper files. The root canal was dried with absorbent paper points. Canal was obturated with 2% gutta percha points and ZOE sealer. Post-obturation IOPA radiograph was taken and root canal filling was found to be satisfactory.

Composite build up

To fully evaluate the case a visual assessment was performed and the patient's occlusion was analysed. Shade matching was done and B2 shade was selected for the case. After getting proper isolation on tooth, it was thoroughly cleaned and scrubbed. The surface was etched for 40 seconds. Tooth was washed and dried using air-water syringe. The bonding agent was then applied to the prepared surface and light cured for 20 seconds. A thin layer of composite not more than 1mm in thickness was placed on the right central incisor which covers from facial to lingual preparation. Once the composite placement process was done in accurate and precise position the material was cured for 40 seconds on each surface. Similarly 4 more layers of composite were applied and cured stepwise to give the patient an aesthetic view up till next visit. [fig. 2]

Fibre post placement and PFM cementation

About 10mm of gutta percha was removed using gates glidden bur. Following that the pulpal wall of root was etched with 37% phosphoric acid (3M ESPE; Scotchbond™) and then bonded with dual-cure resin (3M ESPE; Rely X™ U200, Germany) under visible light. The occlusal clearance was evaluated and post instructions were given. The patient was recalled after a week. The tooth was prepared for full coverage crown (PFM). The crown was cemented after 2 days using glass ionomer luting cement (3M ESPE; Ketac™ Cem Radiopaque, Germany). [fig. 3,4,5]

Discussion

The worldwide prevalence of traumatic dental injuries ranges between 6%-37%. The treatment of dental trauma is sometimes neglected although it might lead to pain, difficulty in articulation and mastication additionally having considerable negative effects on patient's esthetics⁴. Because of the position in the arch the majority of dental injuries involves the anterior teeth, especially the maxillary incisors. Whereas the mandibular central incisors and the maxillary lateral incisors are less frequently involved.⁵ Treatment of anterior teeth is a very challenging job for dentist as it should be functionally as well as aesthetically efficient. It lays a psychosocial impact on patient.

In this case the broken fragment was not preserved by the patient therefore the missing portion was restored by composite resin. No additional tooth preparation was made once the RCT is done. Goenka P⁶ in his study said that the simple reattachment technique was not satisfactory to retain the restoration in function for a longer period of time. Also the results suggested that the technique employed for reattachment is more important than the association of the material while Reis⁷ concluded that by the overcontouring technique and by the placement of an internal dentinal groove, the composite buildup provided fracture strength comparable to those of sound teeth.

In such case in which pulp is involved, firstly endodontic treatment is done followed by placement of post. It gives mechanical support for the fractured segment which is capable of resisting occlusal loads. This simplifies and shortens the length of clinical procedure. Fiber-reinforced posts have more advantageous over metal posts. Their advantages are as following:

- They are passive,
- Tooth colored,
- More flexible than metal posts and
- Have modulus of elasticity close to dentin.

They need minimum preparation as resin cement uses the surface irregularities for adhesion. Surface irregularities help in increasing the surface area for adhesion⁸. While a study conducted by Olaide⁹ displayed no significant difference in the clinical behavior between in fiber and metal post during the 6 month study period. Both glass fiber and metallic posts had equally good clinical performance within the observational period. The factors affecting the retention of fiber post

into root canal are endodontic treatment, method of cement application, and post pretreatment. Especially in the case when cemented with regular resin cement mainly. Self-adhesive resin cements were found to be less technique-sensitive to luting procedures as compared with regular resin cements.¹⁰

Various techniques applied to achieve aesthetic dental reconstructions are (i) free-hand direct insertion and the layering of composite resin or anatomical technique (ii) direct fragment reattachment technique (iii) direct restoration by composite build-up using a reference silicone guide.² Reattachment technique can be used only when intact tooth fragment is available and close repositioning between fragments is possible. In present case the fragment was not available. Thus composite build up was preferred. Over the period of time the tooth buildup with composite resins takes up stains from food and beverages that a patient consumes. Thus the esthetic of patient is compromised. Permanent restoration with porcelain fused metal (PFM) is opted to overcome the problem of esthetics and functional durability. Combined techniques can be used in the management of complicated anterior crown fracture. This has been proved better in prognosis, functions, esthetics. Most importantly satisfaction of patient is achieved.

Conclusion

Present case report displays multidisciplinary approach of management of a complicated tooth fracture i.e. Ellis class III fracture. This provides patient with preservation of original tooth structure followed by permanent restoration. This gives full functionality to tooth.

Declaration of interest

The authors have no conflicts of interest to declare.

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Figures



Figure 1. preoperative photograph with fracture irt 21



Figure 2. Composite build up following the root canal treatment



Figure 3. Fibre post placement



Figure 4. Tooth preparation irt 21



Figure 5. PFM crown cemented