Endo Esthetics – Rehabilitation of A Complicated Restorative Case - A Case Report

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ABSTRACT
The goal of endodontic and restorative dentistry is to retain natural teeth with maximum function and pleasing esthetics. Restoration of endodontically treated teeth replaces missing tooth structure, maintains function and esthetics, and protects against fracture and infection. Many, if not most endodontically treated teeth today are restored with adhesive materials. Adhesive materials provide an immediate seal and some immediate strengthening of the tooth. During the last decades or so, fiber-reinforced composite posts have gained popularities.

Keywords:-

Introduction:
The goal of endodontic and restorative dentistry is to retain natural teeth with maximum function and pleasing esthetics. Restoration of endodontically treated teeth replaces missing tooth structure, maintains function and esthetics, and protects against fracture and infection. Many, if not most endodontically treated teeth today are restored with adhesive materials. Adhesive materials provide an immediate seal and some immediate strengthening of the tooth. During the last decades or so, fiber-reinforced composite posts have gained popularities. The main advantage of fiber post is the uniform distribution of forces in the root, which results in fewer catastrophic failures than occur with metal posts if adequate ferrule is present. Along with its superior esthetics and good mechanical properties, these posts are commonly used in aesthetically demanding areas.

This article highlights a case reports where glass-fiber post is used for restoration of endodontically treated tooth

Case Report:
23 years old female patient was referred to the department of Conservative Dentistry and Endodontics with a chief complain of fracture maxillary right central incisor along with pain in that region. On clinical examination it was found her maxillary right central incisor had a fracture at the middle third of the crown, maxillary left central incisor was quiet larger than normal shape with irregular incisal margin. The patient had also a peg shaped lateral incisor along with a mesiodens. This mesiodens was causing problem for her proper occlusion
and hampering her facial profile. On palpation 21 was tender. Radiographic examination revealed Ellis Class III fracture on 21, 12 having periapical radiolucency with dense in dente and presence of a single mesiodens. Vitality test of 12 and 21 showed the tooth were non vital.

Management

It was decided to do the root canal treatment in 11 and 12 followed by extraction of the mesiodens. Later on the esthetic correction were planned accordingly with patient consent.

Local anesthesia was administered, and a rubber dam was applied. Endodontic access cavity was done on the palatal surface of 11 and 12 by using a no. 2 round bur and Endo Z bur (non end cutting tapered fissure; Dentsply Maillefer, Ballaigues, Switzerland). Pulp extirpation was performed by using a barbed broach (Dentsply Maillefer, Ballaigues, Switzerland) and K-files (Dentsply Maillefer, Ballaigues, Switzerland). The canal was thoroughly debrided with copious irrigation of sodium hypochlorite (5.2%), followed by saline (0.9%). Coronal flaring of the root canal was done by using Gates-Glidden drills no. 1 to 4 (Dentsply Maillefer, Ballaigues, Switzerland). In 12 the invagination is removed under the operating microscope using ultrasonic instruments. The working length was determined by using apex locator (Propex; Dentsply Maillefer) and confirmed radiographically Cleaning and shaping of the root canal system were completed by using a step-back technique (apical enlargement was done up to ISO no. 55 in 11 and 35 in 12. Canals were copiously irrigated with sodium hypochlorite (5.2%), followed by saline. The canal was dried with sterile paper points, calcium hydroxide (UltraCal XS; Ultradent, South Jordan, UT) was placed in the root canal, and the access cavity was temporized with Cavit G (3 M ESPE, Seefeld, Germany).

The patient was recalled after 1 week. After a week, the tooth was asymptomatic, and the root canal was obturated with gutta percha using AH PLUS as a sealer. The access cavity was then sealed with resin composite.

Mesiodens was extracted and the extraction site was allowed to heal for few weeks.

After healing of the extraction site the patient was recalled and it was decide to do esthetic rehabilitation of her anterior teeth. Glass-fiber post core restoration was planned as post obturation restoration in 11.

Under rubber dam isolation the access cavity was opened and all restorative materials and remnants’ of root canal filling are removed from the access cavity. The gutta percha is removed with pesos reamer rotating in a reduction gear handpiece from the root canal leaving the apical 5 mm. Apical gutta percha is checked with a radiograph. It is then well condensed with a hand plugger. The canal is cleaned again with copious irrigation and all remnants’ are removed using small micro-brushes with alcohol. The post is selected that passively fits
into the available canal space. The post is then immersed in 24% of H202 for 10 minutes. The post surface is then acid etched with 37% phosphoric acid, rinsed and air-dried. A silane is applied over the post surface and kept aside. The tooth along with the canal is then acid-etched with 37% phosphoric acid for 15 seconds. It is then rinsed and dried. A dual-cure dentin bonding agent is applied with small micro-brush throughout the etched surface. Dual cure resin cement is then placed in the post space using a needle tube thus minimizing the voids formation. The post is the inserted into the post canal filled with resin cement. It is the light cured. Additional composite is applied over the newly placed post for the purpose of core. It is the contoured and light cured. Excess portion of post is removed with a diamond wheel in a straight handpiece. Excess composite is also removed with fine finishing burs. A porcelain to fused metal crown was planned on 11.

21 was corrected esthetically with composite and little incisal grinding.

It was also decide to do porcelain to fused metal crown on 12 as the coronal tooth structure is minimum.

Crown deduction was done on 11 and 21 for porcelain to fused metal crown with proper shade selection with Vita Shade Guide. Impression was taken with additional silicon impression paste and send to laboratory. A temporary restoration was given. The patient was recalled after 5 days and the crowns were cemented using resin cement. Excess cement was removed and finally the occlusion was checked in protrusion and in lateral excursions. Maintenance instructions were given to the patient.

Discussion:
In the restoration of traumatized anterior teeth, both esthetic and mechanical considerations should be taken into account. Teeth that have been endodontically treated often have little coronal tooth tissue remaining and as such require a post to retain the core and restoration. It was thought that the dentin in endodontically treated was more brittle because of water loss [1] and loss of collagen cross linking [2]. Huang et al. [3] compared the physical and mechanical properties of dentin specimens from teeth with and without endodontic treatment at different levels of hydration. They concluded that neither dehydration nor endodontic treatment caused degradation of the physical or mechanical properties of dentin. These and other studies support the interpretation that it is the loss of structural integrity associate with access preparation, that lead to a higher occurrence of fractures in endodontically treated teeth compared with “vital” teeth [4]. Access preparation results in increased cuspal deflection during function [5] and increase the possibility of cusp fracture and microleakage at the margins of restoration.

Currently composite resin is most popular core material and has characteristics of an ideal buildup material. It has high tensile strength and the tooth can be prepared for a crown immediately after polymerization. Some authors showed that composite cores have fracture resistance comparable to amalgam and cast posts and cores [6].
In cases where the remaining dentin thickness after endodontic treatment is critically less, placement of intracanal posts become necessary before full coverage restoration. Recent years various types of fiber reinforcement have come into widespread use as an alternative to cast or pre-fabricated metal posts in a restoration of endodontically treated teeth. The advantages of using fiber post to construct an intracanal post include resin composite crown reinforcement, translucency, and relative ease of manipulation [7]. Teeth restored with fiber posts, which have a modulus of elasticity close to dentin, resist fracture better than teeth restored with metallic posts [8]. Fiber posts also provide retention to the core and support it against occlusal forces [9].

In the present case, the tooth was classified as having dens invaginatus Type 1, according to Oehlers' classification [10]. Depending on the type of malformation and the communication of the invagination with the pulp tissue, the clinician may confine the endodontic therapy to the invaginated portion and, as a result, preserve pulp vitality. However, in most cases, the endodontic treatment must include both the invagination and the root canals. This can become even more challenging, considering the multiple anatomical variations that a dens invaginatus may present within the root canal system. Complete debridement of the root canal system can be compromised by limited access and as a result some areas may remain uninstrumented when a conventional technique is used. In order to overcome these limitations, Alani A, Bishop K (2009) [11] have suggested that the invagination is removed under the operating microscope. In the present case, the access to the canals was gained through the in the palatal aspect of the main tooth and the invaginated portion if removed. If nonsurgical endodontic therapy fails, a combined approach with apical surgery may be indicated.

Multidisciplinary management of a dental trauma, leading to conservation of the tooth and its permanent restoration is often needed. The use of glassfibre-reinforced composite root canal posts and composite materials can be a simple and efficient procedure for the treatment of anterior traumatized teeth with excellent esthetic and functional results.

References


FIGURE LEGENDS

Figure 1: PRE-OPERATIVE EXTRA-ORAL VIEW

Figure 2: PRE-OPERATIVE INTRA-ORAL VIEW
Figure 3: Pre-Operative Intra-Oral Periapical Radiograph.

Figure 4: Post-Obturation Radiograph

Figure 5: Radiograph after removal of mesiodens and showing post space preparation

Figure 6: Post-operative intra-oral view

Figure 7: Post-operative extra-oral view