

Challenges in Management of Severely Fractured Anterior Teeth – A Case Report

Dr. Ashok Kumar, Dr. Sadaf Tamanna, Dr. Sana shadab

Professor and chairman, junior resident, junior resident

Department of Conservative Dentistry and Endodontics, Dr. Ziauddin Ahmad Dental College, AMU, Aligarh

Corresponding Author: Dr. Sadaf Tamanna

Date of Submission: 28-01-2019

Date of acceptance: 11-02-2019

I. Introduction

Reconstruction of severely fractured teeth is a great challenge in restorative dentistry especially in esthetic zone. Since, the tooth crown is usually totally or partially lost by caries, erosion, abrasion, previous restorations, trauma or endodontic access. If more than half of the coronal structure has been lost, a root canal post is required to provide retention for the restoration (1). Traumatized tooth usually requires a followup of 3 to 6 weeks for assessment of pulpal status, but grossly fractured tooth generally requires immediate endodontic treatment followed by proper restoration. The treatment becomes more challenging if there is open apex in a traumatized tooth. The goal of treatment planning now shifts toward the proper seal of apical region keeping in mind the potential for physiologic Apexogenesis or Apexification procedures. The tooth to be restored should exhibit a good apical seal when evaluating the radiograph, and also exhibit no sensitivity to percussion or palpation, no exudates, no fistula, no apical sensitivity, and no active inflammation (2). Apart from proper apical seal, fractured tooth requires good treatment planning for post endodontic restoration requiring a post placement followed by core retention. A restoration lacking resistance form is not likely to be a long-term success, regardless of the retentiveness of the post (3, 4). Fiber posts have revolutionized the field of restoration of endodontically treated teeth (5). Technological advancement gave an ample opportunity to offer better esthetic and mechanical properties along with radiographically detectable quality in order to balance the advantages possessed by metallic cast posts (6-8). Although fiber system was introduced in 1990, a long-term study was begun in 1988 when Friedriksson et al. (8) studied 236 teeth restored with posts.

II. Case Report

A 28 year old male patient reported in the OPD of the Department of Conservative Dentistry and Endodontics of our institute with chief complaint of removal of prosthesis in upper front tooth region. On clinical examination maxillary central incisor found to be fractured with faulty prosthesis. (Fig 1) Patient give the history of treatment in upper front tooth region followed by post and core in private clinic three years back. On radiographic examination there was post placed in the canal without endodontic intervention with an open apex.

CLINICAL PROCEDURES

The faulty prosthesis (Figure 1) was removed and it revealed a grossly decayed coronal portion of tooth with thin coronal dentin. First, the endodontic treatment was carried out, and the radiographs were taken (Figures 2, 3 and 4). The access cavity was entered using an Endo access bur (Dentsply). Working length was determined at 19 mm for the apex. Bio Mechanical Preparation (BMP) was done using Glyde (Dentsply) as a chelating agent and irrigation was alternated using Sodium Hypochlorite (NaOCl 3%) and normal saline. Chlorhexidine (Dentachlor 2%) was used as a final rinse. Calcium hydroxide paste (RC Cal) was used as an intracanal medicament and the cavity was closed with Zinc Oxide Eugenol (ZnOE) temporary cement. Antibiotics and analgesics were prescribed to manage the pain. Patient was recalled after ten days for further follow up. Patient was totally asymptomatic on the second visit. Since, the apex was open and considering the age of patient and the time issues, Mineral Trioxide Aggregate (MTA) apexification was planned in spite of calcium hydroxide apexification. In spite of sealing 5mm of apex, half of the root length was filled with MTA (Dentsply Tulsa Dental, Tulsa, OK) without going for conventional Gutta percha obturation and post insertion was planned. The tooth had great loss of coronal tooth structure, and was judged to be a candidate for post-and-core restoration. After the setting of MTA was confirmed, post length was determined and fiber post was selected and modified according to canal. Considering thin dentinal walls, a fiber post was selected to be anatomically modified without further post space preparation. Then the foundation restoration was completed

with composite resin. Usual tooth preparation was carried out to fabricate metal-ceramic crowns in the endodontically treated teeth (Figures 5-6).
Fig.



1. Pre-operative IOPAR



2. working length IOPAR



3. MTA Apexification



4. Anatomically modified fiber post in the canal



5. Core build up with composite and tooth preparation



6. Definitive restoration

III. Discussion

In the present case report, restoration of grossly mutilated central incisors was performed but the main challenge here was the presence of open apex with thin dentinal walls. Pre-fabricated fiber post had been customized to mimic root canal morphology and core build up with composite was done. The result of various studies have confirmed the longevity of fiber post (9, 10). Flexural properties of fiber posts render them responsible for prevention of root fracture (11). Anatomic post, individualized according to canal space anatomy, offers a great advantage in relation to retention without compromising other advantages of fiber-post (12). Posts which have modulus of elasticity similar to that of the dentin are chosen over others for relatively uniform pattern of stress distribution, dropping the risk of root fracture (13). Many laboratory researches show that carbon and glass fiber posts have modulus of elasticity (about 20 GPa) similar to that of dentin (about 18 GPa) (14, 15). Similar modulus of elasticity thus provides with a similar physical properties of fiber post to that of the natural dentin.

The teeth restored with fiber post showed favorable and repairable fractures on the contrary, those restored with titanium and zirconia's posts demonstrated catastrophic fractures (16). Also many of the fiber post failure have been limited to the post dislodgment rather than tooth fracture in case of the fiber post restored teeth.

References

- [1]. Schwartz RS, Robbins JW. Post placement and restoration of endodontically treated teeth: a literature review. *J Endod* 2004;30: 289–301.
- [2]. Kaira LS et al. Carbon Fiber Post to Reinforce Esthetics. *Journal of Dental and Allied Sciences*. 2013; 2(1):39-42.
- [3]. Isidor F, Brondum K, Ravnholt G (1999) The influence of post length and crown ferrule length on the resistance to cyclic loading to bovine teeth with prefabricated titanium post. *Int J Prosthodont* 12: 78-82.
- [4]. Lambjerg-Hansen H, Asmussen E (1997) Mechanical properties of endodontic posts. *J Oral Rehabil* 24: 882-887.
- [5]. Qaltrough AJ, Chandler NP, Purton DG. A comparison of the retention of tooth-colored posts. *Quintessence Int* 2003;34:199–201.
- [6]. Asmussen E, Peutzfeldt A, Heitmann T (1999) Stiffness, elastic limit and strength of newer types of endodontic posts. *J Dent* 27: 275-278.
- [7]. Drummond JL, Topke RS, King TJ (1999) Thermal and cyclic loading of endodontic posts. *Eur J Oral Sci* 107: 220-224.
- [8]. Friedriksson M, Astback J, Pamenius M, Avidson K (1998) A retrospective study on 236 patients with teeth restored by carbon-fiber reinforced epoxy resin posts. *J Prosthet Dent* 80: 151-157.
- [9]. Bateman G, Ricketts DN, Saunders WP. Fibre-based post systems: a review. *Br Dent J*. 2003;195:43-48.
- [10]. Lassila LV, Tanner J, Le Bell AM, Narva K, Vallittu PK. Flexural properties of fiber reinforced root canal posts. *Dent Mater*. 2004;20:29–36.
- [11]. Novais VR, Quagliatto PS, Bona AD, Correr-Sobrinho L, Soares CJ. Flexural modulus, flexural strength, and stiffness of fiber-reinforced posts. *Indian J Dent Res*. 2009;20:277–281.
- [12]. Akkayan B, Gülmez T. Resistance to fracture of endodontically treated teeth restored with different post systems. *J Prosthet Dent*. 2002;87:431–437.

Dr. Sadaf Tamanna. "Challenges in Management of Severely Fractured Anterior Teeth – A Case Report." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 2, 2019, pp56-58.