

Case Report

An Esthetic Endeavour For Compromised Anterior Teeth - A Case Report

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Abstract:

This paper highlights the fact that many anterior teeth requiring restoration are severely weakened, having wide flared canal spaces and thin dentinal walls, and are at a high risk of getting fractured. An 20 year old female patient reported with the complaint of unesthetic smile due to fracture and discolored tooth. She gave a history of trauma around 4-5 years back. This case was managed by the customization of fiber reinforced posts which has made a great impact on esthetics and redistribution of stresses along the radicular space and dentin tissue conservation. Thus modern techniques reflect a change from what was once considered prosthodontic procedure to one which marries endodontic principles with sound understanding of mechanical objectives.

Introduction

In clinical practice endodontically treated teeth often have significant coronal and radicular compromise of tooth structure.¹ Weakened tooth with flared canals, arising as a result of carious extension, trauma to immature tooth, pulpal pathosis, iatrogenic or endodontic misadventures or idiopathic causes can cause problem to the practicing dentist.² The post endodontic restoration of such teeth is commonly accomplished using intra - radicular restorations or post and core, to retain the coronal portion of the tooth.³

In the last few years introduction of fiber posts has made a great impact on the restoration of endodontically treated teeth.⁴ Taking advantage of advances in restorative technology favorable clinical results with resin reinforcement with dowel and core in structurally weakened teeth have been reported by clinicians.⁵ According to Boudrias et al post adaptation to the canal walls represents an important element in the biomechanical performance of the prosthetic restoration.⁶ A significant improvement in fiber post adaptation and retention can be achieved with the customized post. In this way the fiber post reproduces the root canal morphology with best-produced esthetics⁴

Following is a case report, which describes the step-by-step procedure of customized fiber post and core restoration of a maxillary lateral incisor with weakened root

Case Report

A 20-year-old girl reported with the chief complaint of unaesthetic smile due to fracture and discolored upper front tooth. Patient presented with a history of trauma in relation to her front teeth 4-5 years ago causing fracture of upper right lateral incisor. Medical history was non-contributory

Clinical examination showed Ellis class III fracture with 12 and discoloration with the same. Other findings include Occlusal caries with 16 and 36 and mild generalised gingival hyperpigmentation. Radiographic examination by intraoral periapical radiograph (IOPA) revealed periapical radiolucency in relation to upper right lateral incisor. Flared canal and lateral shift of the root was observed with 12. X-ray with a different angulation was taken to confirm the extent of the lesion and other associated features. Lesion measuring 1.5 cm x 1.5 cm with well defined boundaries were observed. Pulp vitality tests were performed using thermal and electric tests in which the right upper lateral incisor gave a negative response.

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On the basis of clinical, radiographical examination and pulp vitality tests, provisional diagnosis of Chronic Periapical Granuloma/ Cyst was given. Endodontic treatment of 12 was carried out, periapical surgery was done and apical seal established using Mineral Trioxide Aggregate (ProRoot; Dentsply Maillefer, Ballaigues, Switzerland) and bone graft was placed in the defect. A definitive diagnosis of "Periapical Cyst" on the basis of histopathological results was given.

After 8 weeks of follow up, post-endodontic restoration was planned. Since the remaining dentinal thickness was less, it was decided that the tooth would require a reinforcement by customization. The tooth was a lateral incisor so it was prudent to select an esthetic post. Fiber reinforced post (Glassix- glass fiber composite posts, Nordin, Swiss Dental Products) was selected as it fulfills both the objectives.

Gutta-percha from the canal was removed carefully using peesoreamer without disturbing the apical third of the filling. A radiograph was taken to ensure the adequacy of the canal preparation. A 35 no K file was used as a core to make an impression of canal space with elastomeric impression material. Cast model was poured. Separating media or Vaseline was applied in the canal space. Appropriate fiber post was selected, etched with 9% HF acid and silanized with silane coupling agent (Ultradent Products). Multicore dual core build up material (Multicore Flow, Ivoclar Vivadent) was used to customize the fiber post on the plaster model and light cured for 20 secs. The post was removed and recured for any residual polymerization. Canal as well as the customized post was etched with 37% phosphoric acid & bonded with bonding agent (Adper, Single bond 2,3M ESPE). Cementation was done with Variolink dual cure cement (Variolink II Ivoclar Vivadent Inc.). Core build up was done with composite resin (Solitaire, Heraeus Kulzer, Wehrheim, Germany) and tooth preparation was done. Rubber base impression was made and provisional restoration was given. After a week permanent restoration with porcelain fused to metal crown was given. Follow up was done after 3 and 6 months and proper periapical healing was seen

Discussion

Failure in endodontically treated teeth is more likely due to restorative failure than the endodontic treat-

ment itself. Thus, it is important to plan the treatment with respect to the endodontic technique and the feasibility of successful restoration.³ For flared canal use of cast post and core can concentrate wedging forces.² Positive defects in casting are peculiar to custom cast system and a disadvantage of this technique is it produce wedging forces⁷ Another treatment of choice is prefabricated post and core. For a weakened root, prefabricated metal posts entail the obturation of large defects with the cementing medium, thus creating a weak link between the entire post-core-crown-tooth complex.³ Its use has declined as they lead to unsalvageable fractures.⁸ Thus, for a flared canal, it is important that lost dentin is rebuilt with a strong substitute³ Esthetic considerations have influenced the management of even the compromised tooth to a certain extent. Metallic grey color of metal poses an esthetic problem in all ceramic restoration, particularly when high lip line or broad smile reveals the entire restoration⁹

An essential goal of treatment is long-term stability of the results and to achieve the integrity of the tooth. Endodontic surgery is performed to resolve inflammatory process that cannot be successfully treated by conventional techniques The use of MTA as a root end filling material has been proved to seal off pathways of communication between the root canal system and the external surface.

The treatment options for the management of such compromised roots include customization by a light transmitting post to build the composites in layers (Layered adhesion technique, Freedman & others, 1994.⁸ Other option is the use of bondable reinforcement fiber to be the alternative to conventional post materials because of its esthetic qualities, mechanical properties, and the neutral color of the reinforcing material.¹⁰

In the present case, the prognosis of weakened tooth was improved by the use of fiber post and composite resin using technique recommended by Velmurugan A & Parameswaram 2004⁸ Andreas Savi et al 2008.⁴ Since the anatomical post fits the root canal shape perfectly, a thin and uniform layer of resin cement is simply required. This layer creates higher level of uniformity in distribution of occlusal forces transmitted to the tooth, reduces the effect of polymerization contraction of the resin material as well as the no. and dimensions of bubbles within the cement itself.⁴

Thus this technique is an attempt to customize the fiber reinforced post which is time saving, esthetically compatible, bonded to the root dentin, eliminating the number of composite interfaces that occur during layered adhesion technique, resulting in a single monobloc that helps in better stress distribution.⁹

Conclusion

From a clinical point of view, introduction of cus-

tomized fiber post allows the adhesive system to be used even when the commercial posts do not perfectly fit the root canal shape. In particular when the root canal shape is modified as a result of endodontic treatment and the root is thin. The complete adhesive technique contributes to achieve a homogenous restoration that should increase the resistance of residual dentinal tissue

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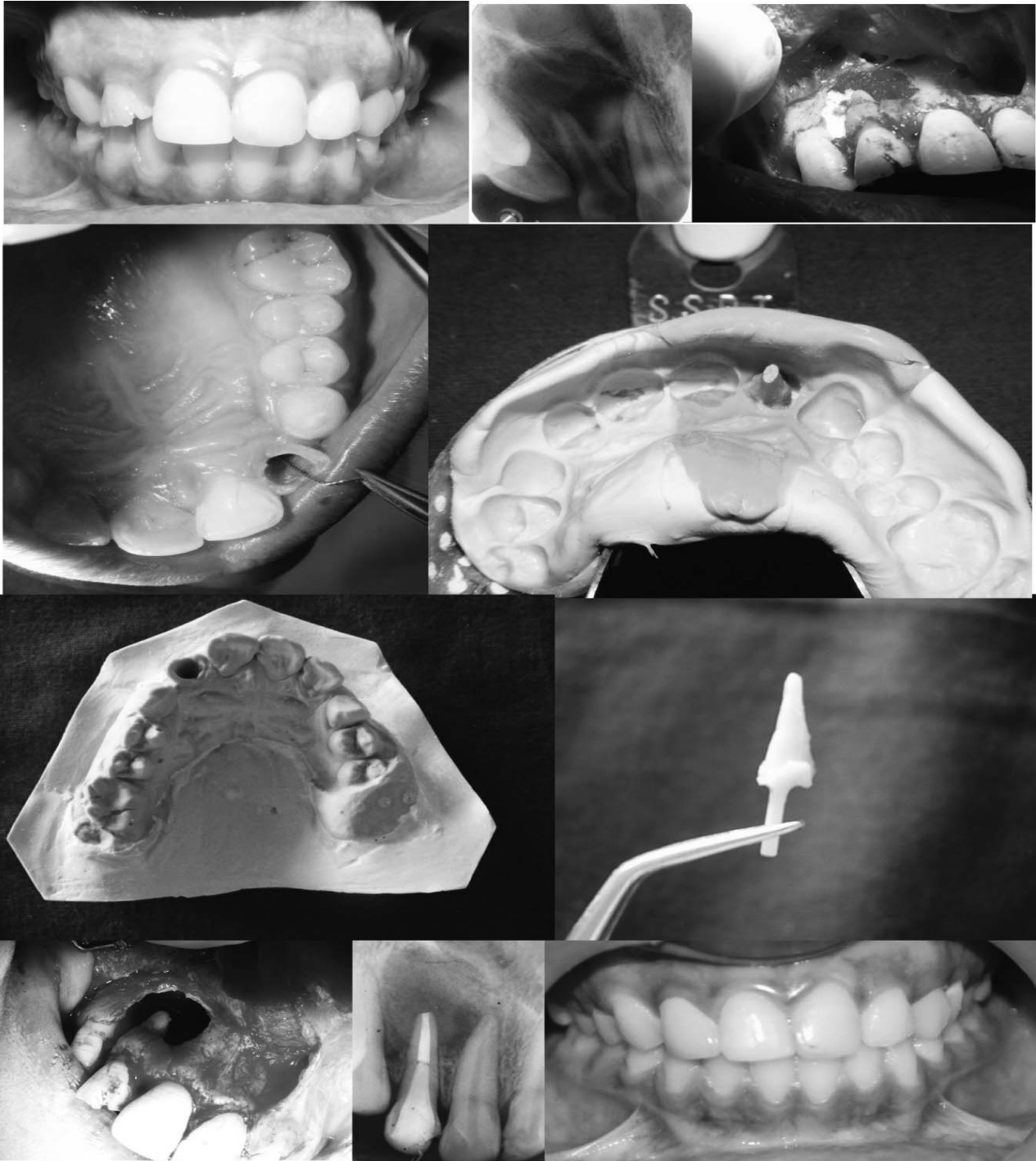


Figure Legends

- Figure 1 : Pre-operative frontal view of teeth showing unesthetic smile due to fracture and discoloration of permanent right lateral*
- Figure 2 : IOPA Radiograph revealed a periapical radiolucency in relation to 12 and flared canal spaces with thin dentinal wall*
- Figure 3 : Periapical defect in relation to lateral incisor during surgical procedure*
- Figure 4 : Rubber base impression of the canal space with the help of no. 35 K file*
- Figure 5 : Customised glass fiber post prepared by indirect method with the help of plater model*
- Figure 6 : Postoperative radiograrh after cementation of customised fiber post*
- Figure 7 : Postoperative frontal view showing reinforced lateral incisor finally restored to esthetics and function with porcelain fused to metal crown*