Unconventional Endodontics for the Aesthetic Rehabilitation of Fractured, Discolored and Rotated Maxillary Central Incisor

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Abstract:

Management of traumatic injuries to the teeth is a challenge to the practicing dentist. It has no prescriptive method for occurring, possesses no significant predictable pattern of intensity or extensiveness and occurring at times when dentists are least prepared for it. Ninety-two percent of traumatic injuries results in fracture of maxillary permanent central incisors because of its protrusive and anterior positioning. The young permanent maxillary central incisor root canal chamber is large and tapered. This case report describes the management of Ellis Class III fractured tooth in a young permanent maxillary central incisor by an innovative clinical procedure.

Keywords: tooth fracture, cast post core, trauma, metal ceramic

Introduction:

Various international studies it has been reported that males experiences more dental trauma as compared to females¹. The prevalence of traumatic dental injuries varies from 13.8-15.1%². The most common cause for traumatic dental injury is falls and collision³. The maxillary central incisors are the most common teeth affected during trauma⁴. Some articles have reported that 25% of patient population under 18 years old, sustained dental injuries in the form of crown fractures in maxillary incisors⁵. Subsequently, anterior crown fractures lead to discomfort and serious psychological, aesthetic, functional and phonetic problems that

can affect social relationship⁶. Orthodontics is always the first choice treatment for aesthetic and functional rehabilitation of malaligned teeth but in some exceptionally rare cases, the unwillingness of the patient for orthodontic correction poses a tough challenge to the dentist. In such cases, the only other option for aesthetic restoration is the change in angulations with custom cast post and core followed by the placement of an aesthetic crown⁷. This article highlights the management of Ellis Class III fracture in young permanent maxillary central incisors with custom made cast post.

Case Report:

A 27-year-old male patient reported to the Department of Conservative Dentistry & Endodontics, C.K.S.Theja Institute of Dental Sciences & Research, Tirupathi, for the aesthetic restoration of a fractured, discolored and proclined maxillary right central incisor tooth due to fall

from bike accident. Past medical history and dental history was reviewed and there were no significant findings. A written informed consent form was obtained from the patient for treatment and further publication of the case. Clinical examination revealed crown fracture in maxillary left central incisor and the tooth was discolored and rotated (Fig. 1a).

Figure 1a: Labial view of fractured, discolored

Figure 1b. Half of the coronal structure remove and rotated maxillary right central incisor after randomized controlled trial.

Intraoral periapical radiographic investigation revealed loss of half of coronal tooth structure with complete apex formation. Pulp vitality of the left incisors was checked using an electric pulp tester (Parkell, inc., NY, USA). The maxillary left central incisor showed negative response to test. The two possible treatment options presented to the patient for the aesthetic and functional rehabilitation of discolored malaligned tooth were the correction of the malalignment by orthodontic treatment followed by placement of porcelain laminate veneer, all ceramic or porcelain fused

metal (PFM) crown and the second option was to correct the coronal alignment by the fabrication of post-core followed by PFM or Zirconia crown. The patient chose the second option because of his unwillingness for orthodontic treatment. The length of the post was determined from the intraoral periapical X-ray taken after chopping half of the coronal tooth structure (figure 1b) and after the root canal treatment.

A 5 mm portion of the guttapercha was left to maintain the apical seal and rest was removed with peeso reamers (Mani.inc.) to prepare the post

space. Ferrule was given and the remaining tooth structure was prepared with shoulder finish line. Lubricate the canal, chamber, margin and gums surrounding the tooth with a petroleum jelly. Post pattern was made by using inlay wax medium (GC

India Dental Pvt Ltd) up to the determined post space and the core was fabricated with same material. The core was properly prepared, like a natural tooth (figure 2a). Finally the whole post-core pattern was cast (figure 2b).

Figure 2a: Post and core pattern prepared like a natural tooth.

Figure 2b: cast post-core

The fit of the cast post and core was first assessed and then it was luted with glass ionomer cement (figures 3a and 3b). Figures 3a and 3b also show the drastic change in mesiodistal and labiopalatal inclination created by custom cast post and core without orthodontic consideration. Figure 4 shows the aesthetic restoration by placement of PFM crown over the cast core.

Figure 3a: Incisal view of change in inclination

Figure 3b: Labial view of change in angulation

OUTCOME AND FOLLOW-UP: The maxillary discolored central incisor was aesthetically and functionally restored with change in angulation with custom cast post and core followed by cementation of porcelain fused to metal crown. The patient reported no discomfort on 7months follow-up.

Discussion:

Orthodontic therapy is the first choice treatment for the aesthetic correction of proclined or rotated teeth but in some rare cases where patients are not ready for any orthodontic treatment, the only other option for the satisfactory aesthetic restoration of such teeth is the change in angulation of the coronal portion of the tooth with post and core followed by the placement of aesthetic crown⁸. Custom cast post and core is usually preferred for the change in mesiodistal and labiopalatal angulation of the proclined or rotated teeth as compared with the prefabricated post. Custom cast post and core is a single assembly in which core can be shaped until satisfactory aesthetic is achieved⁹ although the core might not be in the same axis as the post or the root. But in prefabricated post–core system, the core is build around the post after post cementation¹⁰ in the prepared canal so that if tooth is rotated or more labially inclined, the post will remain in the direction of the long axis of that tooth. So any change in angulation, performed by shaping of the core around the prefabricated post, usually results in loss of coronal extended post during preparation resulting in unsupported core. The functional loading of the crown might result in fracture of the unsupported core making the treatment complicated. So only the treatment option in such cases is the change in angulation with custom cast

post and core followed by fabrication of PFM or Zirconia-based crown.

LEARNING POINTS:

- ▶ Aesthetic rehabilitation of the discolored, rotated tooth poses tough challenge to the dentist.
- ▶ Orthodontic therapy is the first choice treatment but in some rare cases, due to unwillingness of the patient for orthodontic treatment, the only other option is the correction of alignment with custom cast post and core followed by placement of an aesthetic crown.

Conclusion:

The number of endodontic procedures has increased steadily in the past decade with highly predictable results. Therefore, restoration of teeth after endodontic treatment is becoming an integral part of the restorative practice in dentistry. Proper restoration of endodontically treated teeth begins with a good understanding of their physical and biomechanical properties, anatomy, and a sound knowledge of the endodontic, periodontal, restorative and occlusal principles. Although many new restorative materials have become available over the past several years, some basic concepts in restoring endodontically treated teeth remain the same.

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