



Aesthetic Remodelling of Fractured Tooth with Supernumerary Neighbours in Midst of Fluorosis – A Case Report

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ABSTRACT

Restoration of a fractured central incisor supplemented by supernumerary teeth is always challenging task at hand. This situation becomes even more difficult in the presence of fluorosis. This possesses a task and also an opportunity for the clinician to establish the form and function along with utmost aesthetics. It requires a multidisciplinary approach. In this case a central incisor showing a complicated crown fracture with discoloration in conjugation with two supernumerary central incisors with mild to moderate fluorosis was treated endodontically after the extraction of the supernumerary counterparts and was restored post-endodontically by 3D composite layering technique in order to provide a more conservative and as minimally invasive treatment modality as possible with par acceptable aesthetics. This showed that composite restoration with 3D layering can provide aesthetically enticing restorative options keep more invasive options like crowns, veneers or laminates on standby even when time and monetary constraints are imposed.

Keywords: Apexification, Non Vital Bleaching, Supernumerary Teeth, Three Dimensional Layering.

1. INTRODUCTION

Supernumerary teeth can be defined as those teeth which are in excess when compared to the normal series.¹ The reported prevalence of supernumerary teeth ranges from 0.3% to 0.8% in the primary dentition, and from 0.1% to 3.8% in the permanent dentition, with a male to female ratio of 2:1.² More than 90% of all supernumeraries occur in the maxilla with a strong predilection for the premaxilla. Maxillary anterior supernumerary may erupt into the oral cavity or remain unerupted. It is found that approximately 25% are erupted, while rests are unerupted.^{3,4} Supernumeraries are classified according to the morphology as conical, tuberculate, supplemental and odontomes.⁵ and according to location as mesiodens, paramolar, distomolar and preparamolar.¹ They are also responsible for complications like a delayed eruption, rotation, crowding, displacement, root resorption etc.¹ Treatment of supernumerary teeth includes several controversies and varied opinions among authors, particularly with regard to the timing of removal. Rotberg recommended removal of the supernumerary as soon as it has been discovered and ideally before the age of 5 years so that root formation of the associated permanent incisors is incomplete. However, Koch stated that immediate removal of supernumeraries is not necessary if no pathology is present.⁶ These supernumerary teeth associated with maxillary central incisor possess a grave aesthetic problem. This problem is however doubled with the presence of fluorosis.

Dental fluorosis is a condition of enamel hypomineralization due to the effects of excessive fluoride on ameloblasts during enamel formation. Interactions between developing enamel mineral, matrix and ameloblasts lead to the subsequent changes. The poor interlocking of crystals caused by peri-prismatic gaps and greater intercrystalline spaces occupied by water and protein account for the increased porosity of fluorosed enamel, and the subsequent optical and physical changes. In its mildest forms, enamel fluorosis appears as loss of marginal translucency, poorly demarcated opacities, faint white flecks, spots or striations. The white striations reflect accentuated striae of Retzius and von Ebner lines. With increasing severity, white flecks or striations enlarge and may merge. The classical appearance of fluorosis is characterized by banding following the developmental lines of enamel and by substantial symmetry on homologous teeth. In severely fluorosed teeth, hypomineralization extends towards the dentinal-enamel junction and may be subject to extensive post-eruptive surface breakdown (PEB) and post-eruptive dark brown to black staining.⁷

In India, fluorosis was identified in 1937 in Nellore of Andhra Pradesh. Endemic fluorosis also continues to be a challenging national health problem, particularly in other states as Andhra Pradesh, Punjab, Haryana, Uttar Pradesh, Rajasthan, Gujarat, and Maharashtra.⁸ An appropriate treatment plan may be selected depending on the severity of the fluorosis. In the mild cases of dental fluorosis, clinical appearance is characterized by opaque white areas presenting as horizontal lines and cloudy patches on the enamel surface. Bleaching and microabrasion have been recommended for these forms of fluorosis. In the moderate-to-severe level of fluorosis, all tooth surfaces are affected by white opacities. Brown stains also present in the involved teeth. Some pits and wear area may be observed on the surfaces as a result of damage to the poorly mineralized enamel. Treatments include bleaching with or without microabrasion, direct composite restorations or combination of both methods. In some instances, aesthetic veneers or crowns may be necessary for the same patients.⁹

2. CASE REPORT

A 27 year old male patient reported to the department of conservative dentistry & endodontics, K. M. Shah Dental College & Hospital, Sumandeep Vidyapeeth with a chief complaint of discoloured and fractured upper front tooth since one year. The patient met with a road traffic accident a year ago, which was the primary cause of the trauma and patient reported discoloration of the same tooth since past four months thus reporting with the complaint. Patient's medical history was non-contributory but the intraoral examination revealed Ellis class IV fracture and discoloration with 21 as the pulp testing gave a negative response and Ellis class II fracture with 22. It also presented two supplemental supernumerary incisors on the palatal side. (Fig 1A) This had led to the proclination of the concerned tooth out of the arch, probably making it susceptible to the trauma. There was no tenderness to percussion and patient had angles class I molar relation with proclined 21 with increased overjet. The patient also had generalised mild to moderate fluorosis. Radiographic examination revealed periapical radiolucency with 21. Hence the diagnosis being pulp necrosis with asymptomatic apical periodontitis. (Fig 2A & 2B) The patient also demanded aesthetic corrections as the tooth was in the aesthetic zone. There are different treatment options available but the most conservative modalities were chosen for the same. Extraction with supernumerary teeth, followed by root canal treatment with intracoronal bleaching and aesthetic composite build up with 21 and composite restoration with 22 were planned. The informed consent was obtained from the patient. Pre-operative photographs were taken prior to the commencement of the treatment. Extraction of the two supernumerary teeth was done under local anesthesia with adrenaline (1:800000) in the department of oral and maxillofacial surgery, KMSDCH, initially, seven days later root canal treatment with 21 was performed. (Fig 1B) Cleaning and shaping were done under rubber dam with stepback technique keeping #90 K file as the master apical size with 3% sodium hypochlorite and 17% EDTA (Prime dental products) 23 G needle as irrigant and calcium hydroxide (RC Cal- Prime dental products) was given as inter-appointment medicament. (Fig 2C) After 14 days, the canal was thoroughly rinsed with 3% sodium hypochlorite (Prime dental products) and saline (0.9%) in conjugation with ultrasonic agitation and single step Apexification was done with gray MTA (MTA Angelus) under a dental operating microscope (Labomed) 1.6x magnification. Backfill with gutta percha (Dia Dent) was done after 24 hours ending, below the level of CEJ. (Fig 2D) As the apical size was more than 90# k file so it was difficult to achieve an adequate seal with gutta percha at the apex. The obturation was sealed with crescent shaped GIC (GC) barrier followed by intracoronal walking bleach technique with sodium perborate and 15% hydrogen peroxide. (Fig 2E) Two weeks post bleaching when the shade of affected tooth became equal to an adjacent tooth, (Fig 1C) the impressions were made with alginate (3M ESPE), casts were poured and the putty index was fabricated using addition silicone material (Honigum). Shade selection was done by Vitapan classical shade guide. Post endodontic build up was done with nanohybrid composite (Filtek Z350) with 3D layering technique using selective etching in the pulp chamber and total etching on the labial surface of 21 and was brought into the arch alignment to protect from further trauma in future. Class IV composite restoration was also done with 22. (Fig 2F) Characterisation for fluorosis was done using color tints in both 21 and 22. Post-operative adjustment and initial finishing & polishing were done with supersnap (Shofu). The patient was recalled after 24 hours of delayed polishing after which post-operative instructions were given and post-operative photographs were taken. (Fig 1D)



Figure 1

Figure 1: A-Preoperative photograph, B-After Extraction of Supernumerary teeth, C-After Walking Bleach, D-3D Layering Composite restoration

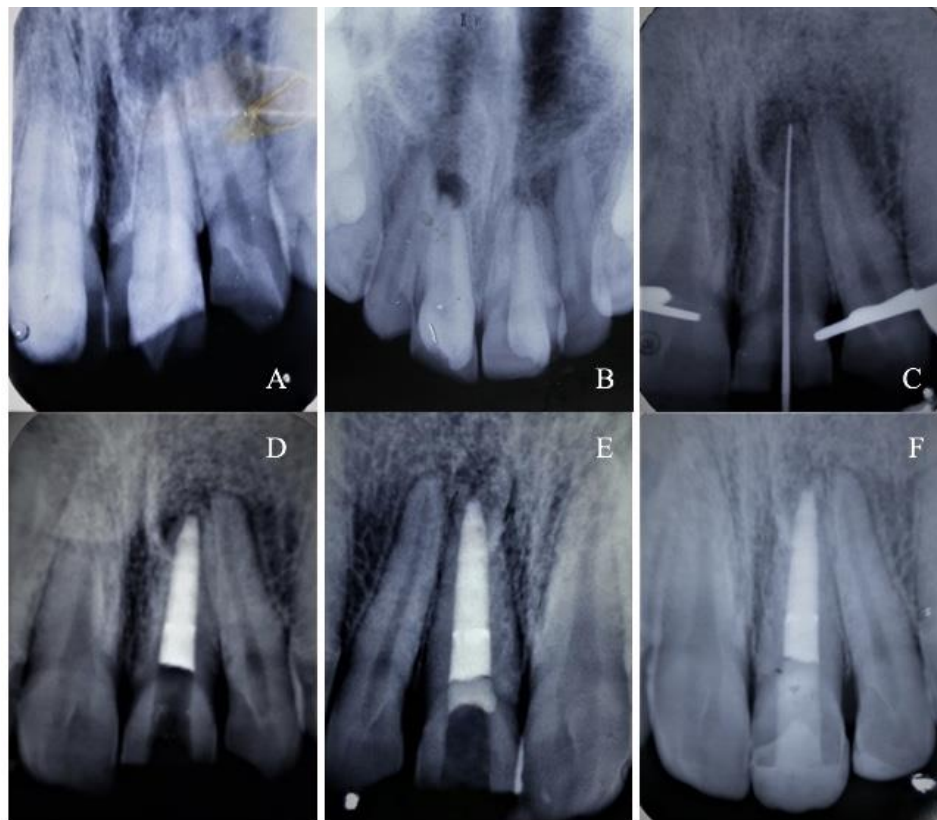


Figure 2

Figure 2: A-Preoperative intraoral periapical, B-Preoperative Occlusal Radiograph, C-Working Length Determination, D-MTA Apexification and Obturation, E-GIC Barrier, F-Postoperative intraoral periapical

3. DISCUSSION

Treatment of a fractured tooth in relation to the supernumerary teeth in a zone of aesthetic is a great challenge. It requires a multidisciplinary approach & incorporation of various aspects of endodontics, conservative & aesthetic dentistry. Thorough clinical & radiological diagnosis suggested a non-vital central incisor to be treated endodontically & corrected aesthetically. Extraction of the supernumerary teeth was done prior to endodontic treatment in order to prevent food lodgement & further carious development and presence of supernumerary teeth made access opening of affected tooth difficult. Also, the presence of supernumerary teeth leads to malocclusion and unaesthetic appearance.¹⁰ Endodontic treatment of the central incisor with multi visit approach with calcium hydroxide dressing as the lesion was a chronic one due to the long standing history of trauma which resulted in better healing due to the bactericidal properties of calcium hydroxide.¹¹ As the apical size was excessive due to the resorptive lesion, single step apexification was the method of choice for apical seal followed by backfill with gutta percha below the level of CEJ. There is an increasing popularity with one visit apexification technique as a good alternative treatment option for these type of cases. Taking all these factors into consideration, it was decided to perform apexification using MTA plug, which will allow immediate apical closure, promotes apical healing, strengthens the root dentin.¹² Non-vital bleaching was planned for improvement of the shade & GIC base over the obturation was applied in a crescent shape to prevent the progress of bleaching agent into the periradicular tissue. Various authors suggested that the bleaching procedures and chemicals should be confined to the supragingival chamber. Lado et al also suggested that the dentinal tubules near the gingival attachment be protected by the base. Base thickness of two mm is usually recommended, but one stereomicroscopic study recommended at least four mm base thickness to prevent the percolation of bleaching agent.¹³ After endodontic therapy, the final step was the aesthetic correction using composite with 3D layering technique but it was performed after two weeks because bleached dentin affect the bonding of composite.¹⁴ Smith and Schumann provided a guideline for the restoration of the endodontically treated tooth, based on the remaining sound tooth structure. In this case, an indirect ceramic crown was deferred due to time and monetary concern and the composite resin is the most recommended direct restorative material due to its conservative technique and preservation of healthy tooth structure.¹⁵

A thorough diagnosis, a meticulous treatment planning followed by a skilful operator are the key elements to provide satisfactory results in such cases. However, using modern advancement in material science and technology par excellent result can be achieved which should be eventually the goal in the future.

4. CONCLUSION

Composite build up with 3D layering technique for the fractured teeth in the presence of supernumerary teeth and fluorosis along with the use of color tints is an extremely efficient and minimally invasive technique for aesthetic re-establishment.

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