Management of Immature Mutilated Teeth To Restore Smile: A Case Series

Preetika Yadav

Senior Lecturer
Dept. of Pediatric & Preventive Dentistry
PDM Dental College & Research Institute
PDM University, Bahadurgarh
Haryana, India

Abstract

Management of immature root with a necrotic pulp and apical periodontitis is a challenging task. The infected root canal space cannot be disinfected with the standard protocol. Patient's concern regarding the aesthetics is prime in case of trauma to anterior tooth region.If the anteriors involved have an open apex with non-vital pulp then as dentists we should focus on closing the apex of the traumatized teeth which could be easily done on the first appointment using MTA, as the conventional methods will be tedious and require a longer duration for formation of apical barrier in this case series apexification was done using spinal tap needle which made the plug formation fast and precise size in small amount effective to be used in single sitting apexification procedure.

Keywords: Immature Teeth, Spinal Tap Needle, Apexification, Post Core, Zirconia Crown

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Corresponding Author

Dr Preetika Yadav
Senior Lecturer
Dept. of Pediatric & Preventive Dentistry
PDM Dental College & Research Institute,
PDM University, Bahadurgarh,
Haryana ,India

Introduction

Complete formation of the root and closure of the apical foramen continues for up to 3 years following eruption of the tooth. If the pulp of young permanent teeth is damaged before the closure of the apical foramen, pulp necrosis may occur. In immature teeth, dentinal tubules are wide and allow the penetration of bacteria and their irritants.[1] Hence, root resorption occurs instantly after trauma in these teeth. Root canal treatment should be done as soon as possible to inhibit the root resorption. The biggest problem in endodontic treatment of these teeth is obtaining an apical seal. The purpose of the apexification therapy used in nonvital immature teeth is to induce the formation of a hard tissue barrier at the root apex or the completion of apex. Some authors[11] suggest that the success of the apical plug formation method could be influenced by the intracanal delivery approach. Aminoshariae et al. obtained satisfactory adaptation of MTA by usage of hand instrumentation methods rather than by means of ultrasonic condensation, which turned out to be superior development.[2]

The unpredictable and often lengthy duration of this treatment modality presents challenges, along with the vulnerability of the temporary coronal filling with reinfection.[3] Moreover, this treatment needs great amount of patient's compliance. For these reasons, single visit apexification has been suggested. The aim of this case report is to treat the patient with fracture involving pulp of immature maxillary central incisors.

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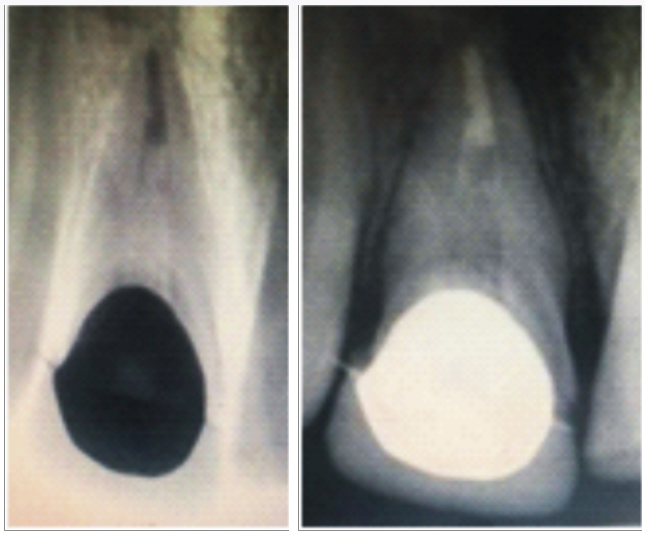
Case 1

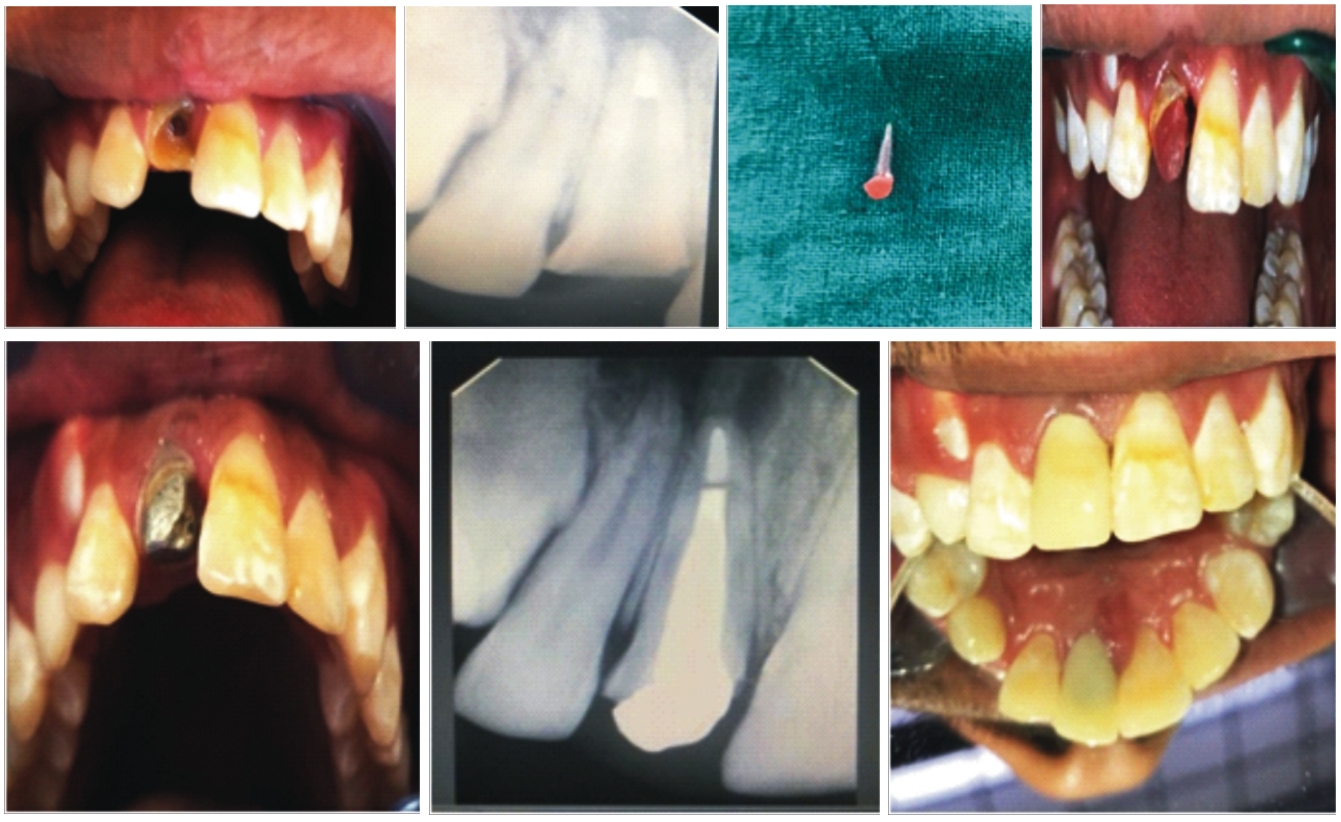
An 11 year old male patient reported with Ellis class 3 fracture of 11 and Ellis class 2 fracture of 21. The history of trauma was from 6 months back and a fractured segment from the palatal aspect of 11 was removed before debridement of necrotic pulp. The access opening was done after proper isolation and anesthesia which was followed by debridement of necrotic pulp tissue and working length was determined. A barbed broach file was used for pulp removal and the working length was kept 2 mm short to prevent injury to the periapical tissue. Gentle circumferential filing was done with minimal dentin removal to facilitate disinfection of the canal with sodium hypochlorite irrigation. Mineral trioxide aggregate was used to form a 5 mm plug at the apex.

Spinal tap needle was used for this in order to avoid any material sticking to the canal walls. After barrier formation a fibre post was selected and checked for fit. The fibre post was cemented using type 1 GIC. Core was build up using light cure composite (Magma NT kit) followed by crown preparation and ferrule formation. The impression was made. Zirconia crown was cemented to restore aesthetics and functions of the mutilated teeth. Patients were recalled for follow up after 15 days.



Case 2

15 year old male patient came with a history of trauma wrt 11 that dated 5 years back .patient come with misplaced post and core from 1 yr back. due to which the lateral incisor had a slight mesial shift leading to space loss. Upon radiographic examination the dentinal walls appeared thin due to over preparation which could have been the reason for prior treatment failure. Working length was estimated ans a 4 mm MTA plug was made using spinal tap needle. after which intracanal impression was made using inlay was for that fabrication of custom made post and core. Once it was fabricated the fit was checked and luting GIC was used to cement it and then impression was made for zirconia crown preparation and finally zirconia crown was cemented using type 1 GIC.



Case 3

Female pat of 14 years with a history of trauma from 4 yeras back came with an abscess draining sinus and fractured (class 2) and discolored tooth in upper front tooth region tooth was anesthetized, isolated with rubber dam, access opening done, and working length was determined. Canal was cleaned and debrided up to 70 no. K file, copious amount of irrigation was done with 3% sodium hypochlorite and calcium hydroxide dressing was given and canal sealed with Cavit G. On second visit tooth was examined for tenderness on percussion and paper points no. 70 were introduced into the canal and upon confirmation of the dry canal same steps as in case 1 were followed to create apical plug of 4 mm using 22 gauge spinal tap needle and apical plug was confirmed with periapical radiograph. Followed by backfill obturation using Calamus 3-D technique later followed by porcelain crown placement

Discussion

Tooth trauma has been and continues to be a common occurrence that every pediatric dentist must be prepared to assess and treat when necessary. It has no predictable pattern of intensity or extensiveness and has the uncanny knack of accruing at times when the dentists are least prepared. The maxillary central incisors are most often injured in the accidents.

An immature permanent incisor tooth is defined as one where the apex can be considered to be open. Root end closure is required in such cases which is a complete calcific barrier at the apex of the tooth against which a guttapercha filling can be condensed so that the sealant does not pass through the apex into the periapical tissues.[4] Apexification is a method by which artificial barrier in the root apex is formed in such a way that obturating material can be filled in the canal space. Calcium hydroxide has been extensively used to accomplish apical closure due to its ability to induce hard tissue formation, but it is more time consuming.[5]

MTA has been developed by Torabinejad and co workers in 1990 at Loma Linda University. MTA offers the barrier at the end of the root canal in teeth with necrotic pulps and open apices. MTA has shown good sealing abilities and biocompatibility to the periradicular tissue. MTA has been successfully used as an apical barrier.[6]

Patients reporting with trauma to teeth with pulp exposure and incomplete rhizogenesis can be managed with single-visit apexification using MTA. This is a clinically viable method that provides an excellent seal and barrier at the apex. This is followed by obturation with suitable endodontic material like conventional gutta percha or posts (custom made/prefabricated) that varies according to the treatment plan and need. The easy handling properties of MTA cement like setting in the presence of moisture makes the procedure very efficient for the clinician as well as the patient. Using spinal tap needle is an accurate, economical, and convenient method for placement of MTA. When MTA is placed using spinal tap needle following the calculation based on formula described earlier it is possible to place the exact amount of material to form the plug without voids and chances of extruding out material is also negligible.[7] Once this is done the patient can be given a temporary crown for aesthetics till the final crown cementation is done to reduce the psychological impact of trauma on the patient. Temporization can be done using acrylic teeth and self cure resin. Good biocompatibility and sealing properties of MTA makes it a go to material to be delivered at the apex and can be used for the immediate management of mutilated teeth during the first dental visit.

Conclusion:

Patient's concern regarding the aesthetics is prime in case of trauma to anterior tooth region. If the anteriors involved have an open apex with non-vital pulp then as dentists we should focus on closing the apex of the traumatized teeth which could be easily done on the first appointment using MTA, as the conventional methods will be tedious and require a longer duration for formation of apical barrier and many follow ups will be needed. The early setting property of MTA allows us to obturate the canal on the same visit and hence reduce the entire treatment time.

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