Case Report

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Identification of Fractured Root Tip Along with Foreign Bodies in an Immaturely Developed Central Incisor: A Case Report

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ABSTRACT

Background: A case is presented where a patient had pushed foreign objects in his traumatized maxillary central incisor with a wide open pulp chamber. Some foreign objects were also lodged in the periapical area which on surgical removal revealed a root tip like structure which had been pushed away from the main root. Histological examination of the root tip showed well organized root morphology- cementum with dentinal tubules surrounding the canal lumen. The main aim to report this case is to show the presence of a fractured root tip away from the main root in the periradicular area by introduction of foreign objects through the wide open pulp chamber.

Keywords: Foreign body in tooth, root tip, Traumatic injury, Open apex.

INTRODUCTION

Trauma to immature teeth is very common [(1)]. However, the discovery of a foreign object in the periradicular area of a tooth is quite uncommon. Some children have the habit of removing food plugs from the teeth with the help of foreign objects. These foreign objects may get lodged in the canal and may be further pushed in the periradicular tissue which acts as a potential source of infection. The chance of this foreign object getting impacted into the tooth is more when the pulp chamber is open either because of traumatic injury or large carious exposure. The following report describes a unique case where the root apex has been detached and pushed away from the main root due to traumatic injury and presence of foreign bodies in the root canal and periapical region.

CASE REPORT

A 10 year old healthy male patient reported to the Dept of Conservative Dentistry and Endodontics, Jamnagar with chief complain of discoloration of upper front tooth. Intraoral examination revealed fractured tooth 21 –Ellis class III(Fig 1) with a large open pulp chamber (Fig 2). A draining sinus tract opening in the facial vestibule was seen. The patient and his parents were unaware of any history of traumatic injury to his dentition.

Radiographic examination revealed a radiolucency associated with periradicular area of the tooth 21 and irregular shaped radio-opaque foreign objects with different radio-opacities (Fig 3). Lamina dura of adjacent teeth showed widening but on thermal testing, they were found to be vital and may still be developing. A provisional diagnosis of “pulp necrosis” with “Chronic Apical Abscess” was made. As a part of emergency treatment, proper access opening was initiated under rubber dam isolation. An attempt was made to remove the foreign bodies with a bent #15 K-file but it failed. Working length was determined and minimal filing was done. The canal was irrigated with 3% Sodium Hypochlorite (Vishal) and intra-canal dressing of calcium

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Fig 1: Discoloured tooth #21 with complicated crown fracture.

Fig 2: Tooth # 21 with large open pulp chamber.

Fig 3: Preoperative radiograph showing foreign objects in periradicular area

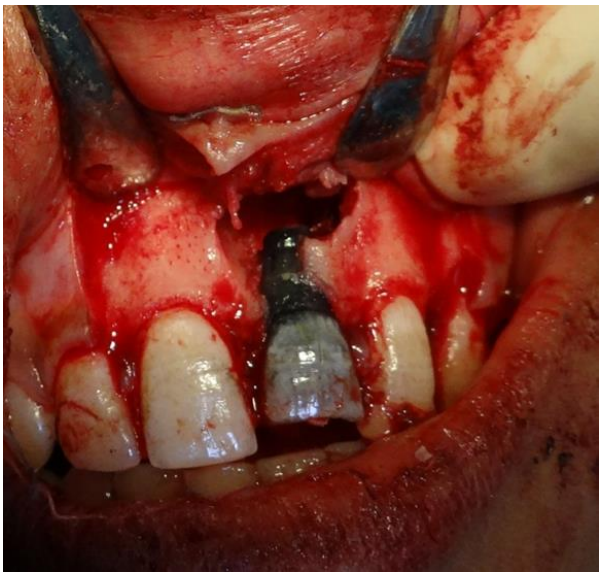

Fig 4: Intraoperative figure showing large bony cavity.

Fig 5: Figure showing various foreign bodies retrieved from PA area.

hydroxide mixed with distilled water was given. Access cavity was sealed with IRM (Dentsply) and patient was scheduled for surgical curettage two days later. Though periapical surgery should be deferred in a ten year old child the situation demanded surgical curettage.

Under antibiotic coverage and local anesthesia (2% Lignocaine with 1:100,000), a trapezoidal mucoperiostal flap was raised. The labial cortical plate was found to be missing and a large bony

Fig 6: Immediate post-operative radiograph.

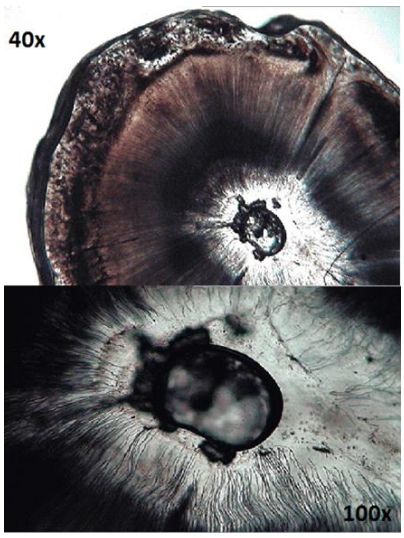

Fig 7: Ground section of root tip.

Fig 8: Recall radiograph at 3 months.

Fig 9: Radiograph showing apical 5-6 mm of MTA plug.

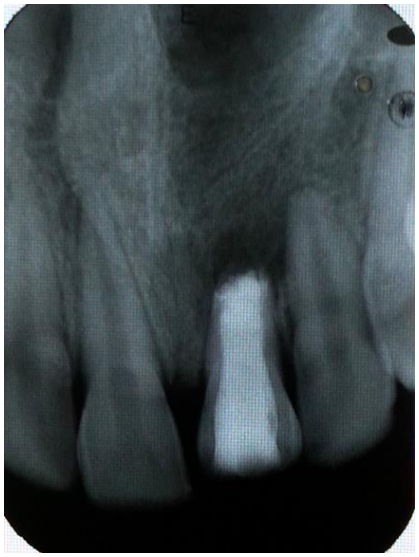

Fig 10: Radiograph with post in situ.

defect containing various foreign objects was explored (Fig 4). Curettage was performed and objects like pencil lead, match stick and stone like structure were retrieved (Fig 5). Simultaneously coronal access was re-established and the canal was irrigated with normal saline. Retrograde apical plug of MTA (ProRoot) was placed, flap was repositioned and sutured. The coronal access was sealed with IRM. Patient was recalled on the next day to disinfect the root canal which was then filled with Metapex (Biomed). A post-operative radiograph taken immediately showed extrusion of Metapex in the periapical area suggesting that the apical MTA plug was not leak proof (Fig 6).

The stone like structure retrieved from the periapical area was carefully examined which seemed to be larger than the canal diameter. Under magnification with surgical loupes it appeared to be an apical root tip with a small canal orifice. It was then sent to the Oral Pathology department for histological examination. The ground section results of the same clearly showed well organized root cross section with cementum like structure at the periphery and dentinal tubules surrounding an empty cavity (Fig 7).

Patient was recalled at 1, 3 and 6 months. Recall radiograph at 3 months showed bone regeneration in the periradicular area indicating healing of the lesion (Fig 8). Recall radiograph at 6 months showed complete healing of the periapical lesion with bone regeneration. The intracanal dressing of Metapex was removed and canal was irrigated with Sodium hypochlorite. As the previous MTA apical plug was not found to be leak proof another apical 3-4 mm of MTA plug was added on top of previous plug to achieve a total of 5-6 mm of apical seal and confirmed with radiograph (Fig 9).The patient was scheduled the next day for final restoration.

At the later appointment, the root canal was conditioned with 37% phosphoric acid and a FRC post size 3 was luted with self curing resin based luting agent (Multilink N). Radiograph was taken (Fig 10). A Porcelain fused to metal crown was given as a final restoration.

DISCUSSION

Embedment (impaction) of foreign objects in the oral cavity is one common habit among children.[2] However, these foreign objects may be, sometime, inserted into the wide root canals of teeth with pulps exposed to the oral cavity with a potential of complete block of the root canal system. These foreign objects become a potent focus of infection. [3, 4] Other complication is that the foreign objects may act as obstructions for the smooth passage of endodontic instruments.

As such there is no specific technique to manage foreign objects into root canals. However, the foreign objects into root canal need high skills and advanced techniques to remove from the root canal, in this case we used stainless steel files to retrieve the foreign objects without damaging the internal tooth structure. Other special techniques of retrieving separated endodontic instruments can be used to remove the foreign objects from the root canal. Foreign objects can be easily retrieved if located within the chamber, but once pushed apically, retrieval is difficult. Various techniques employed to retrieve foreign objects are barbed broaches, H-files, Stieglitz forceps, Masseran kit, ultrasonic devices, periradicular surgery, intentional reimplantation and extraction when prognosis is poor. (5, 6)

Foreign objects can be easily retrieved if located within the chamber, but once pushed apically, retrieval without surgery is difficult(5) . In this particular case, as the foreign objects and the fractured segment of a developing root tip were pushed apically periradicular surgery has been planned. It is preferable to use strong restorative material as temporary filling that can seal the access cavity for acceptable period such as reinforced zinc oxide eugenol as intermediate restorative material (Dentsply). Metapex was used as a intracanal medicament after removing the foreign object and cleaning the root canal due to its dentine regenerative and reparative property and to achieve a three dimensional hermetic seal. [7] The success of retrieving foreign objects influenced by different factors: technical aspects, anatomical factors and skills of the operator. (8,9,10] Calcium hydroxide was used as intracanal medicament because of the known fact that Immature teeth exhibiting pulp necrosis or teeth with open apex traditionally when treated with calcium hydroxide established an apical barrier (apexification) before obturation to prevent extrusion of materials into the periradicular tissues. [11]

Variety of materials can be used for reinforcing root canal like fibre reinforced composite and MTA. MTA has been used in this case because of its tissue biocompatibility, bioactivity, promoting root repair and bone healing. It is has been successfully employed as an apical barrier material before obturation. [12] In this case the apical foramen was open and a canal is large. Therefore we need to reinforce the radicular dentine to enable the transformation of the masticatory forces delivered to the tooth which was achieved with fibre-post. [13,14] This treatment was followed by porcelain

fused to metal crown was planned to re-establish tooth integrity and to reinforce a brittle tooth capable for its normal function including aesthetic considerations. Post surgically, histological examination of root tip like structure was mandatory to confirm the fracture of the immaturely developed root apex which is pushed away from the root. Presence of the root tip at the periradicular area confirms the severity of the force and aggressive placement of the foreign bodies in the pulp chamber of the tooth.

CONCLUSION

Foreign bodies may be lodged in the root canal because of self inflicted injury and this can lead to complications at a later date. Many of the patients do not seek treatment as long as the tooth is asymptomatic. Proper counselling is required to ensure that dental treatment is provided at the earliest and that it is completed so that such untoward incidents may be avoided. This technique sensitive and challenging procedure requires patience and skill that may be helpful for conservation of as such grossly damaged tooth along with its proper rehabilitation.

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CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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