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Hemisection : A Saviour for Tooth with Broken Instrument

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Abstract

The purpose of this article is to present a case of hemisection of transported, fractured endodontic instrument into the canal wall of mandibular first molar. The potential for instrument breakage is always present during root canal preparation. Fracture usually takes place as a result of excessive or improper use of an instrument, Reported prevalence of broken instruments ranges from 0.5% to 5%. The best option in the management is always be attempt for retrieval and if retrieval is not possible bypass should be tried. Several techniques and devices have been used for the removal of broken instruments. Instrument retrieval and by-pass also being tried. As vigorous reduction of the dentinal walls of the root canal space might cause perforation of the canal wall. This can adversely affect the prognosis of teeth even after the instrument is retrieved. It was concluded that resection of the concerned root was the best treatment option for this tooth.

Keywords: Fractured Instrument, File Breakage, Hemisection.

Introduction

Fracture of root canal instruments is one of the most troublesome incidents in endodontic therapy. The potential for instrument breakage is always present during root canal preparation. Fracture usually takes place as a result of excessive or improper use of an instrument. Reported prevalence of broken instruments ranges from 0.5% to 5%. When instrument breakage occurs, it leads to anxiety of the clinician as well as patient and may block the access to the apical terminus impeding adequate cleaning of the canal beyond the obstruction, which might adversely affect the prognosis.[1,2,3,4]

When an instrument fracture occurs during root canal preparation, the clinician has to evaluate the treatment options with consideration of anatomy of the root canal, position, type & size of the fractured instrument. The best option in the management is always be attempt for retrieval and if retrieval is not possible bypass should be tried. Several techniques and devices have been used for the removal of broken instruments. Difficult cases are occasionally encountered in which the separated file neither retrieved nor bypass from the canal.[2,3,5,6]

In addition, vigorous reduction of the dentinal walls of the root canal space might cause perforation of the canal wall. This can adversely affect the prognosis of teeth even after the instrument is retrieved. If the fractured instrument is transported, it is always accompanied with bacteria and might cause inflammation. If the fractured instrument is related to the apex it should be removed by the apical surgery.[7,8,9,10]

Case report

A 8 -year-old Indian female patient reported to the Department of Paediatric & Preventive dentistry at our institute with a complaint of severe pain in the lower right and left posterior region. On clinical examination, it was diagnosed as a case of chronic irreversible pulpitis due to a deep carious lesion w.r.t – 36, 46 and it was indicated for root canal treatment. Medical history was unremarkable. On radiographic examination, a separated endodontic instrument was found in middle third of the root canal which was transported into PDL (Fig 1). Then patient was asked about the previous dental treatment. It was revealed that the patient had already been treated for these teeth with root canal treatment. Patient was informed about the instrument separation and removal of the fragment was chosen as the treatment plan.

Fig. 1: Pre- operative radiograph

Treatment plan

Masseran kit which is being routinely used for file retrieval could not be used in this case as the file was transported and tightly engaged in dentin which may cause root perforation. Then an attempt was made to bypass the file but the file was transported at the same site (Fig. 2). Another treatment option of surgical approach also could not be considered since the file was directed into the mesial inter-dental bone and the removal of this bone could lead to poor prognosis as the tooth was already mobile. It was concluded that resection of the concerned root was the best treatment option for this tooth.

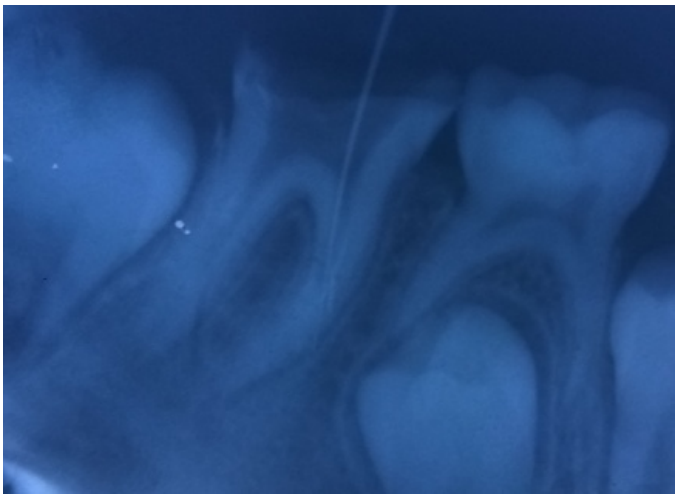

Fig. 2: By-pass attempt

Procedure

The procedure was performed under local anesthesia 2% lignocaine with 1:200000 adrenaline. Full thickness flaps were elevated on the buccal and lingual aspects of the involved tooth. A low speed surgical length fissure carbide bur was used under saline irrigation to make vertical cut toward the furcation area. A fine probe was passed through the cut to ensure separation. After completion of the sectioning, the root was elevated from its socket using a periosteal elevator and removed. The socket was irrigated adequately with sterile normal saline and pressure pack was given for 45 minutes. Immediate postoperative radiograph showed the well retained distal root (Fig. 3).

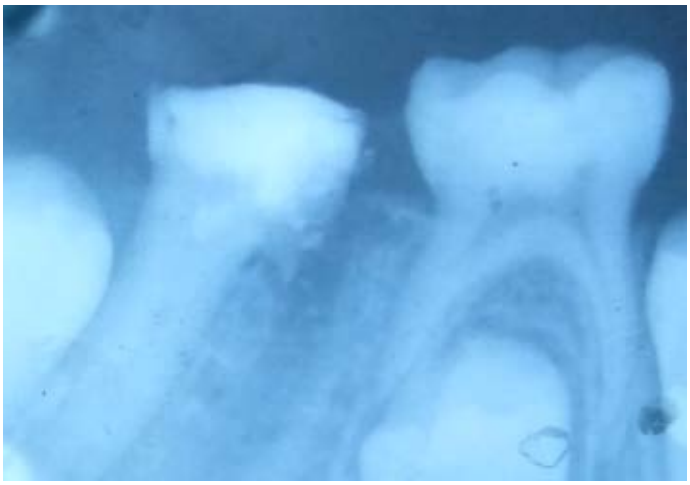

Fig. 3 : Well retained distal root

At 3- days recall visit, obturation was performed of distal root (Fig. 4) after that crown was prepared and restored with polycarbonate temporary crown (Fig. 5).

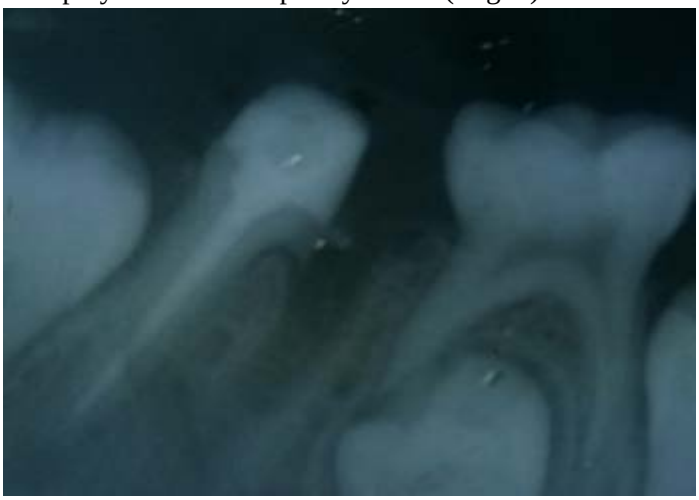

Fig. 4: Obturated distal root

Fig. 4: Restored with temporary crown

At 1 month recall visit, healing was found to be satisfactory, while mobility was absent. Tooth preparation of the mesial portion of the first permanent molar and second molar was performed followed by porcelain fused to metal prosthesis.

Discussion

The region for hemisection in this case is discussed previously. Loss of posterior teeth may result in several undesirable sequelae such as mesial drifting, loss of arch length, and loss of masticatory function. In the present case, all possible treatment options were explained to the patient, including extraction. Since the patient was young, she was reluctant to lose her tooth. In addition, her financial conditions made her to reject the option of extraction followed by dental implant.[11,12]

The hemisection is a useful alternative treatment to extraction to save the multi-rooted teeth by endodontic approach, which includes the root canal treatment of the remaining roots and restoring them with suitable restorative material. The main concern is the space after hemisection, which might be cause mesial tilting of distal root. For prevention splinting it with the adjacent tooth to decrease the risk of displacement followed by a fixed prosthodontic prosthesis to maintain the occlusal balance. But in this case only 1-1.5 mm space is remaining which might be accommodate after eruption of premolars.[11,12,13] Buhler (1988) observed 32% failure rate in hemisection cases attributed to endodontic pathology and root fracture while other authors (0-9%) have shown a greater success in hemisection cases in the long-term studies. In the present case, good prognosis was observed with proper occlusion, absence of mobility and healthy periodontal condition up to 6 months of follow-up. Concurring with previous reports, hemisection is a valid treatment option for the molar teeth's in young children, which otherwise have to be extracted due to any reason.[12,13,14]

Conclusion

Conservative management of such cases in young patients can not only preserve the tooth but also reduce the financial burden, psychological trauma and occlusal dysfunction associated with tooth loss.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent. In the consent form the patient(s) has/have given his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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