



MANAGEMENT OF A BROKEN INSTRUMENT BY FILE BYPASS TECHNIQUE IN A TAURODONT TOOTH: A CASE REPORT.

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ABSTRACT

Different devices and techniques have been developed to retrieve fractured instruments during the endodontic procedures. This case report describes the management of a broken instrument, which was accidentally broken during cleaning and shaping of the root canal in mandibular left second taurodont molar tooth. A # 15 stainless steel K-file was separated in lingual canal of the tooth. At first, a radiograph was taken to confirm the level of separation of the instrument. The instrument was found to be separated at the apical 3rd of the mesial canal and then file bypass technique was performed. Calcium hydroxide dressing was given followed by obturation with guttapercha cone done in lateral condensation technique. It can be concluded that bypass technique can be considered as simple and effective technique for the management of broken instrument into the root canal.

KEYWORDS : Bypassing, cold lateral condensation, fine file, obturation, separated instrument, taurodontism.

INTRODUCTION

The primary objectives of root canal treatment are proper cleaning, shaping and 3-D fluid tight sealing of the root canal system. These objectives will be made impossible if an instrument gets separated in the canal. The success of root canal treatment decline markedly if the clinician fail to achieve the above said primary objectives. Endodontics has developed over time with the introduction of CBCT in diagnosis, dental operating microscope, ultrasonics, surgical loupes etc. Even though root canal treatment is being done under much developed conditions, mishaps like instrument separation are inevitable. Evaluation of post endodontic radiographs shows that 2-6% of the cases have separated instruments.⁽¹⁾

The presence of a separated instrument in the root canal leads to failure of root canal treatment. The prognosis depends on the degree of contamination of canal at the moment of instrument separation. Proper assessment should be made whether the canal can be instrumented even in the presence of fractured instrument. If the canal cannot be instrumented decision should be made to remove the separated instrument.⁽²⁻⁴⁾ The probability of removing a separated instrument is directly related to visibility. i.e., whether the fragment can be visualised or not. Visibility depends on the location of separated instrument. When the fragment is inside or beyond the curvature, visibility requires straightening of root canal that may lead to unnecessary removal of dentin and thereby weakening the root structure.⁽⁵⁻⁸⁾

An alternative technique that does not require direct visibility to the fragment is "bypass", where a fine file is inserted between the fragment and root canal wall and thereby negotiating the canal to full working length and enable thorough instrumentation and obturation with the fragment remaining in situ. Incorporating the fragment in the root canal obturation material considerably improves the case prognosis.⁽⁹⁾

In this article I present a case report in which separated instrument was successfully bypassed with uneventful post operative period in a taurodont tooth.

CASE REPORT

A 17 year old female presented to the dept. Of Conservative Dentistry and Endodontics, AMC Dental College, Ahmedabad with the chief complaint of spontaneous pain in his lower left back tooth

for 2 weeks. The pain intensified by thermal stimuli and on mastication. History revealed intermittent pain in the same tooth with hot and cold stimuli for the past 1 month. The patient's medical history was non-contributory. Intra-oral examination revealed a carious mandibular left second molar which was tender to percussion. The tooth was not mobile. On vitality checking using heated gutta percha (Dentsply) and cold test (Endofrost, Roeko) an intense lingering pain was noticed, where as electronic pulp stimulation (Parkell pulp vitality tester) caused a premature response. A preoperative radiograph revealed distal radiolucency nearing the pulp with periodontal ligament space widening in lower second taurodont molar (Fig 1A). From clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis with symptomatic apical Periodontitis was made. Endodontic treatment was planned to save the tooth. A tooth was anesthetised with 1.8 ml 2% lignocaine containing 1:200,000 adrenaline followed by rubber dam isolation. An endodontic access cavity was established. While cleaning and shaping the canals, a 15 size K file was separated in the mesio-lingual canal (Fig 1B). On taking radiograph, it was found that the separated file was located below the curvature of the root. Since the fractured segment could not be visualised and was below the root curvature, bypassing was preferred over retrieval. The access cavity was filled with chelating agent - 17% EDTA (Avuprep) and a no.6 K file was introduced into the mesio-lingual canal for searching a way to bypass the instrument. After a few tries, it was able to get the 6K file past the instrument. Working length was confirmed radiographically (Fig 1C). During the shaping of canals, copious irrigation with 5 % sodium hypochlorite and saline was performed. Patency was kept with an 8 size K file between every instrument. Shaping of mesial canals were done up to 4% 25 Flex files and for distal canal up to F2 Protaper file. After shaping and cleaning, calcium hydroxide (Avucal) was placed in canals and the cavity was sealed with cotton pellet and a temporary restoration was given. After 2 weeks, patient reported for the second appointment. The tooth was again isolated and temporary restoration was removed. Calcium hydroxide was removed using sterile saline solution. Canals were dried using paper points. 25/4% gutta percha (Dentsply) was fitted in mesial canals and F2 gutta percha (Dentsply) was fitted in distal canal (Fig 1D). Obturation was done using cold lateral condensation technique. Post obturation radiograph was taken (Fig 1E). Recall visits were uneventful and the patient is still on follow up.

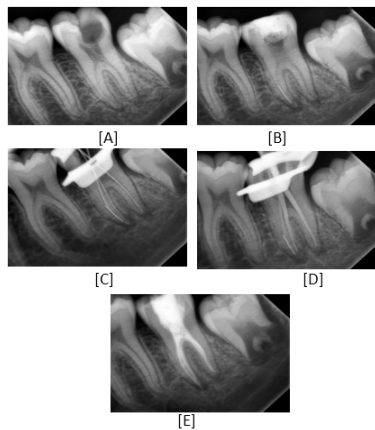


Figure 1: Radiological photographs of treatment with bypass technique followed by root canal obturation: [A] Pre operative, [B] Instrument fractured, [C] Instrument bypassed, [D] Master cone check, [E] Obturation

DISCUSSION

Intracanal separation of instruments usually compromise the outcome of endodontic treatment and reduce the chances of successful treatment.^(10,11) In such cases, prognosis is better when separation of a large instrument occurs in the later stages of preparation close to the working length. Prognosis is inferior for teeth with un-debrided canals in which a small instrument is separated short of the apex or beyond the apical foramen.^(10,11) Although various techniques and devices for retrieving the fragment have been attempted, no standardized procedure for the successful removal of broken instrument in the root canal exists.^(10,12)

From an endodontist's view, taurodontism presents a challenge during negotiation, instrumentation and obturation in root canal therapy. Furthermore, due to instrument separation, this tooth presented here in case report became a challenge for cleaning and shaping.

Among the various methods used for broken instrument retrieval, a chemical method has been suggested.⁽¹¹⁾ In this technique, a chemical agents like iodine trichloride, nitric acid, hydrochloride acid and sulfuric acid were used to achieve intentional corrosion of the metal objects. But it may irritate to the periapical tissues when extruded through the apical foramen. Although chemical method has been used for over 30 years as a device for removing broken instruments, and a success rate of 73 and 44% has been reported regarding its use in anterior and posterior teeth respectively.⁽¹¹⁾ There is a high-risk of perforation in apical part of root canal.⁽¹¹⁾ Furthermore, they have limited application in teeth with thin roots, curved roots or in retrieving instruments which fractured apically. Moreover, the use of relatively large and rigid trephans leads to removal of considerable amount of root dentin thus weakening of the teeth or risk of perforation.⁽¹³⁾

In the present case, the performance of instrument fragment bypass technique by using endodontic file along with copious irrigation was attempted because of location of fractured segment and complexity of root canal anatomy. It was found that this technique is simple and less invasive. Previous study has indicated that with bypass technique, there is a chance of the fragment to be pushed out of the root apex that may cause peri-apical irritation and pathology.⁽⁵⁾ However, in the present case, the fragment was bypassed and there was no apical pushing of the broken instrument and the treatment was performed with a minimal damage to the tooth and supporting tissues. Furthermore, if the patient remains symptomatic or there is a subsequent failure, the tooth can be treated surgically. Therefore, despite the concern of both patient and dentist, the prognosis of broken instrument with bypass technique appears favorable.

CONCLUSION

Fracture instrument bypass technique is an alternative method to chemical and surgical treatment.

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