

Management of Instrument Separation and Ledge Formation in Mandibular First Molar with Radix Entomolaris -

A Case Report

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Abstract

Every dental clinician may have encountered instrument separation and ledge formation during root canal treatment. Separation of endodontic instrument and ledge formation in the root canal affects accessibility to the apical foramen of root thus compromising cleaning and shaping, which ultimately affects success of treatment. The traditional methods to recover separated instruments often require removal of large amount of tooth structure, potentially leading to perforation and even root fracture. Today, these dangers can be minimized with innovations in technology like masserann kit.

The present case highlights on the successful retrieval of separated instruments from the apical third of the root

canal using masserann kit and ledge bypass in mandibular first molar with radix entomolaris.

Keywords: Instrument, Ledge, Masserann Kit, Retrieval, Separation.

Introduction

In endodontic practice, clinicians may come across with different procedural errors during any phase of endodontic treatment. Among these endodontic mishaps, separation of endodontic instruments and ledge formation within root canal is one of the most frustrating incidents [1]. Fractured root canal instruments may include endodontic files, lentulo spirals, gates glidden drills, tips of carrier-based obturators and spreaders [2]. The prognosis of such cases depends on many factors, such as root canal anatomy,

location of the separated instrument and ledge, root canal curvature, length and thickness of the separated instrument. The possible strategies to manage such type of cases include retrieval or bypassing of the separated instrument fragment, bypassing the ledge or leaving the fragment and ledge as true blockage [3].

Today, the use of both nickel-titanium (NiTi) hand files and rotary instruments has become very much popular because of their great flexibility as compared to their stainless steel counterparts. [4-6]. However, there is a potential risk of unexpected fracture with NiTi instruments. With the increased use of NiTi instruments, the incidence of instrument separation inside root canals has increased [7]. Such events during root canal treatment lead to obvious anxiety and frustration to the clinician [8]. The removal of separated instruments from root canals is very difficult with a reported success rate ranging from 55 to 79% [7, 8]. A few techniques for retrieval have been described in the literature with different success rates [9, 10].

In this case report, retrieval of separated instrument from root canal with the help of masserann kit and ledge bypass has been demonstrated.

Case Report

A 19 year old female patient reported to the Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital, Nagpur with chief complaint of pain in lower right back region of jaw since 3 days. She had history of incomplete root canal treatment 1 week before at a local dentist. Intraoral examination revealed access cavity preparation with tooth 46 and the tooth was tender on percussion. Intraoral periapical radiograph revealed separated instrument in the apical part extending beyond apex of the root canal in mesial root (**Fig.1**). The radiograph also revealed presence of extra root (radix entomolaris). The case was diagnosed as incomplete root

canal treatment with apical periodontitis in relation to tooth 46. Since the location of separated instrument was beyond apex, it was decided to retrieve the separated instrument.

In the first appointment, local anesthesia (Lignox 2% A, Indoco Remedies Ltd., India) was administered and tooth was isolated using rubber dam. Obstruction to canal was felt when k file No. 10 (Mani, Japan) was introduced into the mesiobuccal canal. Mesiobuccal canal orifice was enlarged using sequential Gates Glidden drills (Dentsply International).

Now, a pre-selected trepan was latched into contra-angle hand piece and run to create a trough around the coronal end of the fragment by ditching the dentin around it. A radiograph was taken to ensure the centering of the trepan over the fragment. An extractor tube was now slid into the trough to sleeve the fragment followed by placement of plunger rod in a clockwise direction to grasp the separated fragment. (Fig.2) The entire assembly was then rotated in an anticlockwise direction to unscrew the fragment from the canal and withdrawn. (Fig.3) Fractured instrument was found to be approximately 7mm in length (Fig.4).

Obstruction in mesiolingual canal was felt when k file No. 10 (Mani, Japan) was introduced into the canal. At the same time, the characteristic tactile sensation of the instrument while reaching the apical end of the root canal was lost. This feeling was supplanted by that of instrument hitting against a solid wall. Thus, a radiograph was taken while instrument being in the root canal which suggested formation of ledge in the mesiolingual canal (Fig.5). The ledge was bypassed by precurving k file No. 08 (Mani, Japan) apically and filing the canal in a watch-winding and gentle picking motion of short amplitude. Working length was determined using electronic apex locator (Root

ZX mini, J. Morita Corp., Kyoto, Japan) and confirmed radiographically (Fig.6).

Biomechanical preparation was completed by rotary files along with irrigation with 3% sodium hypochlorite (Prime Dental Products Pvt. Ltd., Pune, India). The canals were filled with Calcium hydroxide paste (RC Cal, Prime Dental products, Mumbai, India) and the patient was recalled for obturation after 1 week. Master cone was selected and checked radio graphically (Fig.7). The root canals were obturated by lateral condensation of gutta percha (Diadent Group International, Korea) and AH Plus root canal sealer (Fig.8). 6 months clinical and radiographic follow up was taken and the tooth is asymptomatic (Fig.9).

Discussion

Instrument separation and ledge formation is one of the most challenging and troublesome incidents in endodontics. For successful retrieval of separated instrument from root canal, a straight-line access is always mandatory [11]. Final prognosis of treatment after instrument separation and ledge formation depends on many factors like stage of root canal preparation, level of infection and intracanal site of separated instrument. An attempt to retrieve the separated instrument is considered as a more favourable option but it should not weaken the existing radicular tooth structure as it may lead to removal of excessive radicular dentin. Excessive destruction of root dentin may lead to root perforation and postoperative fracture, thereby reducing the long-term prognosis of the tooth [12].

To date, no standardized procedure for the safe retrieval of fractured instruments exists, although various techniques and devices have been suggested. [13] Masserann kit is very useful in retrieval of instruments from teeth having straight, thick roots. Moreover, considerable gripping and dislodgement of separated instrument which is tightly

wedged in the canal can be obtained by the locking mechanism of the extractor tube. [14]

Conclusion

Use of masserann kit is one of the most effective methods for retrieval of separated instruments. Adhering to the basic concepts and utilizing safe techniques during root canal treatment will eliminate the incidence of instrument separation.

Legend Figures



Fig. 1: Preoperative radiograph

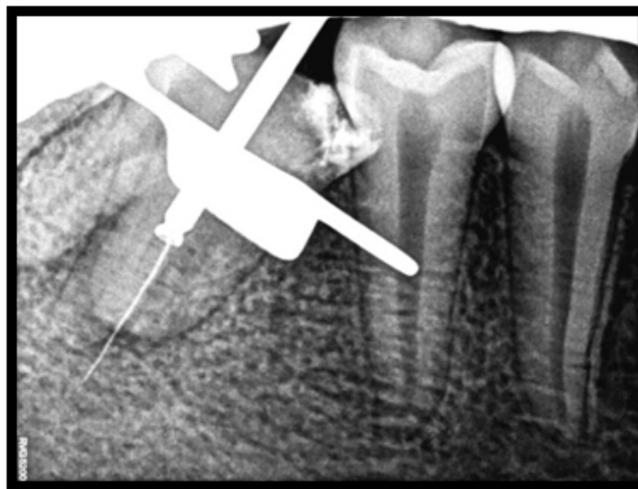


Fig.2 : Masserann assembly in mesiobuccal canal



Fig.3: Instrument retrieved



Fig.4: Length of retrieved instrument

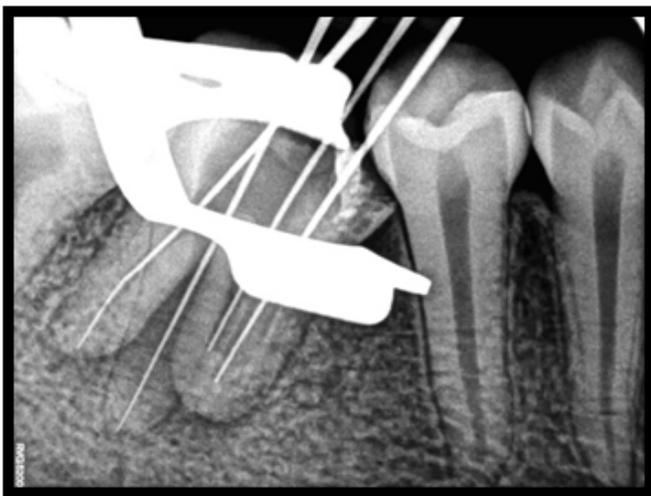


Fig.5: Ledge in mesiolingual canal

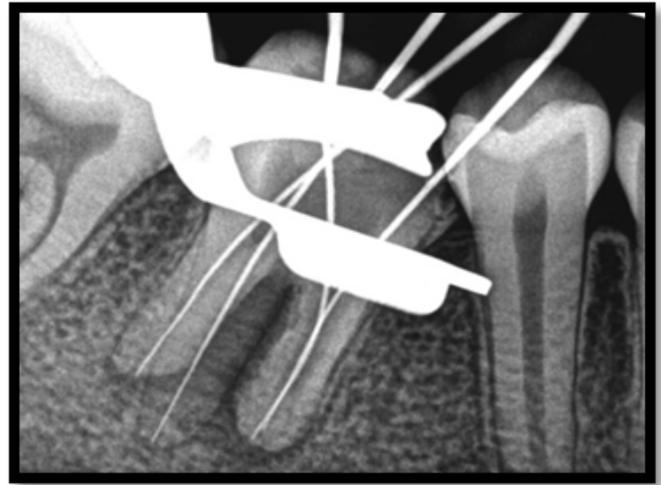


Fig.6: Ledge bypassed and working length determination

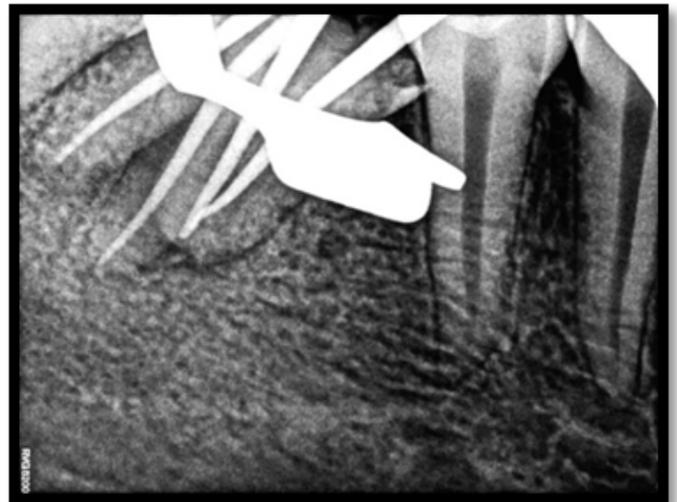


Fig.7: Master cone radiograph



Fig.8.: Postoperative radiograph



Fig. 9: 6 months follow up radiograph

References

1. Hülsmann M. Removal of silver cones and fractured instruments using the canal finder system. *J Endod* 1990;16:596–600.
2. Fors UG, Berg JO. Endodontic treatment of root canals obstructed by foreign objects. *IntEndod J* 1986;19:2–10.
3. Steven J. Cohen Rips, Strips and Broken Tips. Handling the Endodontic Mishap Part I: the separated instrument. *Endodontics Oral health* 2005:10-17.
4. Bonaccorso A, Cantatore G, Condorelli GG, Schäfer E, Tripi TR. Shaping ability of four nickel-titanium rotary instruments in simulated S-shaped canals. *J Endod* 2009;35:883–6.
5. Carvalho LA, Bonetti I, Borges MA. A comparison of molar root canal preparation using stainless-steel and Nickel-Titanium instruments. *J Endod* 1999;25:807–10.
6. Sattapan B, Nervo GT, Palamara JE, Messer HH. Defects in rotary nickel-titanium files after clinical use. *J Endod.* 2000;26:161–5.
7. Hülsmann M, Schinkel I. Influence of several factors on the success or failure of removal of fractured instruments from the root canal. *Endod Dent Traumatol* 1999;15:252–8.
8. Thompson SA. An overview of nickel-titanium alloys used in dentistry. *IntEndod J* 2000;33:297–310.
9. Plotino G, Pameijer CH, Grande NM, Somma F. Ultrasonics in endodontics: a review of the literature. *J Endod* 2007;33:81–95.
10. Cujé J, Bargholz C, Hülsmann M. The outcome of retained instrument removal in a specialist practice. *IntEndod J* 2010;43:545–54.
11. Ward JR, Parashos P, Messer HH. Evaluation of an ultrasonic technique to remove fractured rotary nickel-titanium endodontic instruments from root canals: An experimental study. *J Endod* 2003;29:756-63.
12. Masserann J. Removal of metal fragments from the root canal. *J Br EndodSoc* 1971;5:55-9.
13. Shen Y, Peng B, Cheung GS. Factors associated with the removal of fractured NiTi instruments from root canal systems. *Oral Surg Oral Med Oral Pathol Oral RadiolEndod* 2004;98:605–10.
14. Abbot PV. Incidence of root fractures and methods used for post removal. *Int Endod J.* 2002;35:63–7.