Case Report

Retrieval of Separated Instruments: A Case Series Part II

Arunagiri D, Misra A, Singh A, Kapoor S

Abstract: Separation of endodontic instrument within the canal is a challenge even for the most astute and experienced clinician. The second part of this paper series highlights the management of separated endodontic instruments with case reports illustrating on other techniques for management i.e Bypassing the broken instrument and surgical management by peri-apical surgery.

Keywords: separated instrument, management techniques, complications, prevention

INTRODUCTION

Separation of an endodontic instrument within the root canal is a frequent and potentially avoidable mishap that causes frustration to even the most experienced and astute clinician and can lead to failure of the endodontic treatment. The first part of this paper highlighted the etiology of instrument fracture and techniques for retrieval. This part deals with other techniques for management of such a condition. Bypassing the instrument is a conservative technique while surgical management is a more radical technique which requires osteotomy and root resection.[1]

CASE REPORT 1: (Bypass)

A 38 year old female patient was referred to the department of Conservative dentistry and Endodontics with a complaint of pain in lower tooth following endodontic treatment. Clinical examination revealed access opening done elsewhere in mandibular left second molar with a full coverage crown on first molar. IOPA X Ray showed separated instrument in 37in the middle third of mesio-lingual canal (Fig 1).

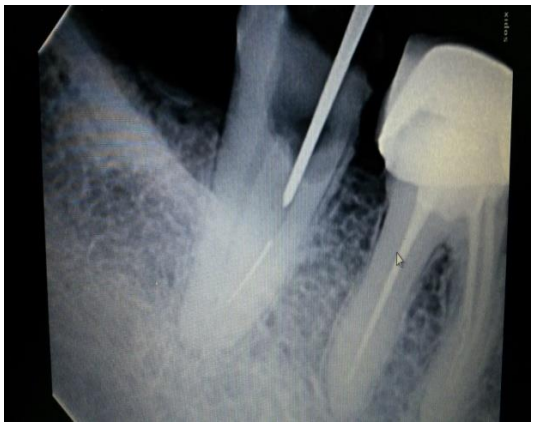

Figure 1: Pre Op IOPA showing broken file

The patient was informed about the situation and was given the choice for retrieval of the separated instrument or surgery or extraction. The instrument was visualized with the help of Operating Microscope. Bypass of the instrument was attempted successfully starting with a No8 K file followed by no 10, 15 and20 K files (Fig 2). Once No 20 K file was able to bypass the separated instrument, rest of the canal was prepared by using Pro Taper files (Fig 3). The tooth was obturated at a later appointment.

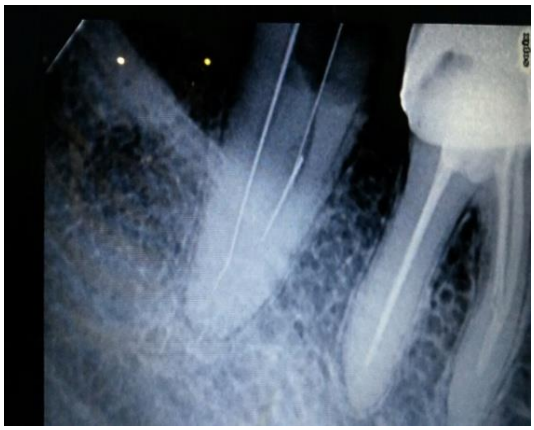

Figure 2: By passed file

CASE REPORT 2: (Surgery)

A 40 year old male patient was referred to the department of Conservative dentistry and Endodontics with a complaint of pain in upper tooth following endodontic treatment. Clinical examination revealed RCT done elsewhere in maxillary right first molar. IOPA X Ray showed separated instrument in 16 beyond the apex of the distobuccal canal (Fig 4). Obturation was judged to be satisfactory but

Figure 3: Final perparation with Pro Taper

there was pain on palpation in the overlying vestibule and there was tenderness on percussion in 16. So the patient was given the option of surgical management. A full thickness flap was elevated (Figure 5) and osteotomy was done to visualise the disto buccal root which was then resected (Fig 6). Post op IOPA was taken to verify the resection (Fig 7).

Figure 4: Broken file in 16

DISCUSSION

Endodontic therapy is aimed at prevention and treatment of apical periodontitis. It consists of a triad of chemo mechanical preparation, disinfection and obturation of the entire canal system. However the later two procedures i.e. disinfection and obturation are highly dependent upon the first i.e. chemo mechanical preparation which in turn depends heavily upon the instruments used for shaping the canals.[2]

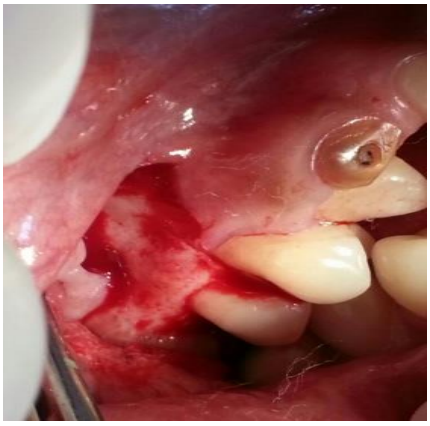

Figure 5: Flap raised

Figure 6: Resected root end

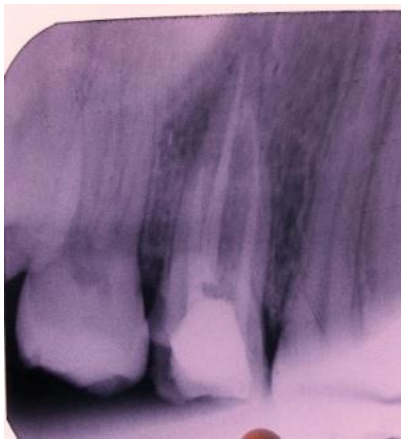

Figure 7:Post op IOPA

The best antidote for a broken file is prevention. Adhering to proven concepts, integrating best strategies and utilizing safe techniques during root canal preparation

procedures will virtually eliminate the broken instrument procedural accident. Prevention may also be greatly facilitated by thinking of negotiating and shaping instruments as disposable items. However, on occasion, the broken file segment may not be able to be retrieved. In these instances, and in the presence of clinical symptoms and/or radiographic pathology, surgery or extraction may be the best.

If retrieval of the instrument fails the next conservative technique is bypassing the instrument which is the technique of going around a separated instrument with another instrument, usually a smaller one, in order to prepare and disinfect the canal for obturation.

Magnification is helpful in visualizing the separated part and chelating agents like EDTA are helpful in softening of dentin to facilitate bypass. Small sized stainless steel K files like no 6,8,10 and 15 are very helpful in going around the fractured part. New files should be used and changed as soon as they show signs of damage. NiTi files should not be used for bypassing as they tend to buckle under load. Copious irrigation with NaOCl helps in removal of debris and provides a clear visual field.[3]

If both bypass and retrieval fail then surgical option is used where a part of the root or the entire root may be removed to retrieve the instrument. Surgical techniques are reserved and depend on various factors like:[4,7]

1. Location of the file- files broken near or beyond the apex or beyond a curve are better managed by surgery.
2. Anatomy of the tooth- files broken in dilacerated teeth are better managed by surgery.
3. Location of the tooth- anterior teeth is easier managed by surgery. More posterior a tooth, difficult is the surgical option.
4. Adjacent anatomical structures- teeth close to vital structures like major nerves, blood vessels, sinus etc are difficult to manage surgically.
5. Medical condition- patients with medically compromised status like uncontrolled diabetes and hypertension, bleeding disorders etc may not be suitable for surgery.
6. Training of the dentist- surgery should be taken up by a trained surgeon with sufficient in such cases
7. Armamentarium- special equipment as discussed in the first part of this article is required.

Other techniques are also available and can be used as per the condition of the patient and discretion of the dentist: [5,10]

- Hemisection- The involved root is separated from the tooth and extracted leaving the unaffected part in the mouth and the remaining tooth is then restored
- Intentional reimplantation - In this technique the tooth is extracted, prepared, retro filling is done and reimplanted in its socket and splinted.
- Leave *in situ*- Indicates that canal is prepared till the length to which it is practically possible and after using intra canal medicaments, obturation is done and patient is kept on follow up.

Complications:[10,11,12]

There can be complications while managing a broken instrument. Most common are:

1. Severe loss of tooth structure leading to weakening of the root.
2. Perforation of the tooth due to injudicious use of instruments.
3. Ledging of the canal due to injudicious use of instruments.
4. Fracture of the retrieving instrument.
5. Pain, swelling and damage to the adjacent structures

Prevention of instrument separation:[8,13]

- Ensure straight line access, good finger rests, create a glide path and maintain patency.
- Use a crown-down technique with stiffer, larger, and a stronger files (such as orifice shapers) to create

coronal shape before using the narrower more fragile instruments in the apical regions.

- Use a light touch and retract (pecking) motion.
- Avoid rapid jerking movements of instruments.
- Replace files sooner after use in very narrow and much curved canals.
- Examine files regularly during use, preferably with magnification.
- Keep the instruments moving in a chamber flooded with sodium hypochlorite.
- Avoid keeping the files in one spot, particularly in curved canals, and with larger and greater taper instruments.
- Practice is essential when learning new techniques and new instruments

CONCLUSION: The fracture of an instrument is a surgical accident. Curved and narrow canals have a higher risk for instrument fracture than straight and wide canals. Care has to be taken during negotiation and instrumentation of narrow, curved root canals. Various techniques and treatment modalities are available for fractured instrument management

Author affiliations: 1. Dr. Doraiswamy Aruna Giri, MDS, Principal, Professor & Head, 2. Dr. Abhinav Misra,MDS Reader, 3. Dr. Anu Singh,MDS Senior Lecturer, 4. Dr. Shreya Kapoor, BDS PG student, Department of Conserative and Endodontics, Rama Dental College Hospital and Research Centre, Kanpur, Uttar Pradesh.

References:

1. James H. Scott A. Thomas J. Cyclic Fatigue of Three rotary NiTi Files: J.Endodod. Jan 2006;32(1):55-57.
2. Uae Ming Li Chin Shih Chun Pin Cyclic Fatigue of Endodontic NiTi Rotary Instruments in Static and Dynamic Tests: J. Endodod Jun 2002; 26(6):448-451.
3. Berutti e Negro A. Lendini M. Influence of Manual Pre flaring on Failure Rate of Pro Taper rotary Instruments: J.Endodod Apr 2004; 30(4):228-230.
4. Ennio S.John O. David J. Torsional Testing of LSX NiTi instruments: J Endodod Dec 1996;22(12):681-685.
5. John P. David J. David L. Cyclic fatigue Testing of NiTi Endodontic Instruments: J .Endodod Feb 1997;23(2):77-85.
6. Cheryl J. Ove A Peters Effect of Cyclic Fatigue on static Fracture Loads in Pro Taper NiTi Rotary instruments: J.Endodod Mar 2005; 31(3):183-186.
7. Marta C. Maria G. Vicente T. Fatigue resistance of Engine driven Rotary NiTi Endodontic Instruments: J.Endodod Nov 2002; 28(11):765-769.
8. Margot E. John W H. Peter P. Fracture resistance of Electropolished Rotary NiTi Instruments: J.Endodod Oct 2007; 33(10):1212-1221.
9. Gregory K. Bruno T. Laurance J. Influence of Structure on NiTi Endodontic Instrument Failure: J.Endodod Aug 2001; 27(8):516-20.
10. Ya Shen. Gary S. Zhuan B. Bin P. Comparison of Defects in Profile and ProTaper Systems after Clinical Use: J.Endodod Jan 2006; 32(1):61-65.
11. American Association of Endodontics: www.aae.org/rootcanalsafety/
12. Rober S Roda, Bradley H Gentleman. Pathways of the Pulp: Chapter 25. 10th edition. Elsevier. Pg 890-952.

Corresponding Author:
Dr Abhinav Misra,
Reader,
Dept. of Conserative and Endodontics,
Rama Dental College Hospital and Research Centre,
Kanpur, Uttar Pradesh.
Contact no-9359500356
EmailID- abhinavm_06@rediffmail.com

How to cite this article: Arunagiri D, Misra A, Singh A, Kapoor S. Retrieval of Separated Instruments: A Case Series Part II. Rama Univ J Dent Sci 2015 June;2(2):31-34.

Sources of support: Nil **Conflict of Interest**: None declared