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CASE REPORT

Retrieval of Separated Instrument: A Case Report series

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ABSTRACT

Instrument fracture is one of the most common procedural endodontic mishap during root canal therapy resulting in inadequate cleaning and shaping of root canals. Inadequate biomechanical preparation affects the outcome and prognosis of root canal treatment.

Therefore retrieval of the separated instrument should be considered. When an attempt to bypass such a fragment becomes difficult, it should be retrieved by mechanical devices. Various instrument retrieval kits and techniques are available for this purpose.

In the present case series report the separated rotary instruments were successfully retrieved from the MB canal of mandibular right and left molars using Masserann kit and ultrasonic tips and from maxillary central incisors with H file manually..

Introduction

Instrument separation is a troublesome incident during endodontic therapy, its occurrence ranges from 2% to 6% of the cases investigated.(1,2)

Though Ni-Ti instruments have various advantages like shape memory and super elasticity but the separation incidence is much higher (0.13% to 10 %) than stainless steel instruments (0.25% to 6%). The instrument separation is more common in molars (77% - 89%).(2)

Number of factors like sharp canal curvature, improper technique or overuse of instrument, too much apical pressure, no lubrication of the root canals, inadequate access, possibly manufacturing defects and clinician's neglect are few of the common reasons responsible for instrument separation. (2,3)

Masserann technique is one among many methods of removal of foreign objects from the root canal. The armamentarium used consists of long, crown- cutting diamonds (Shofu Preparation Kit, Japan); Gates-Glidden drills (Mani Inc., Japan); slow-speed, contra-angle hand piece (NSK, Japan); and Masserann kit (Micro Mega, France), which contains an assortment of color-coded, end-cutting trephan burs of increasing size which are rotated anticlockwise to create space around the coronal end of the fragment by cutting the surrounding root canal dentin. (1)

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The case reports presented here are about the successful retrieval of a separated file tightly wedged in the root canal dentin of a right and left mandibular first molars and maxillary central incisors.

Case report

Case I

A 37-year-old female patient reported to the Department of Conservative Dentistry and Endodontics with a dull pain in the right lower back region for the past 1 month.

Radiographic examination revealed coronal radiolucency involiving pulp in 46 and periapical radiolucency with 46. After elaborate history-taking and thorough clinical examination, 46 was diagnosed with pulp necrosis and chronic apical periodontitis. Root canal treatment was planned for 46.

Access opening was done under rubber dam in 46, Three canals were located in 46, Working length was determined. During cleaning and shaping, a 20- 4 NiTi rotary file was separated in mesiobuccal canal of 46. A radiograph was taken to confirm the level of separation of the instrument. The instrument was found to be separated at the middle third of the root canal.

Radicular access to the coronal end of the fragment was straightened by funneling the root canal with sequential use of Gates-Glidden drills. The remaining part of the separated instrument was examined, and the distance from the tip of the fractured file to D16 (12 mm) was measured and this value was subtracted from the original length, 16 mm, of the file. This gives the length of the separated fragment remaining in the canal (4mm). Now the tip diameter at the fractured level was calculated (0.20+0.16 = 0.36 mm)

The pre-selected trephan with a diameter of 1.2 mm was latched into contra-angle hand piece and run to create a trough around the coronal end of the fragment by ditching the dentin. The centering of the trephan over the fragment was ensured radiographically. Ultrasonic endodontic tips were used in anticlockwise direction to unscrew the fragment from the dentin and withdrawn to see the fragment retrieved.

The canals were enlarged using rotary neoendoflex files, followed by obturation with sure endo gutta-percha and zinc oxide eugenol sealer.

Case II

A 46-year-old female patient was referred to the Department of Conservative Dentistry and Endodontics with a dull pain in the left lower back region since past 1 month. She gave history of Root Canal treatment in private clinic 1 year back.

Radiographic examination revealed inadequate obturation of 36, and there were no periapical changes. Re root canal treatment was planned.

While removing gutta percha separated instrument were noticed in the MB canal of 36 at the junction of coronal and middle third. The efforts of bypassing the fragment went futile, Hence file retrival were planed with Masserann kit.

Radicular access to the coronal end of the fragment was straightened by funneling the root canal with sequential use of Gates-Glidden drills. The trephan with a diameter of 1.2 mm was latched into contra-angle hand piece and run to create a trough around the coronal end of the fragment by ditching the dentin. The centering of the trephan over the fragment was ensured radiographically. Ultrasonic endodontic tips were used in anticlockwise direction to unscrew the fragment from the dentin and withdrawn to see the fragment retrieved.

The canals were enlarged using rotary neoendoflex files, followed by obturation with sureendo gutta-percha and Angelus Bio-C Sealer.

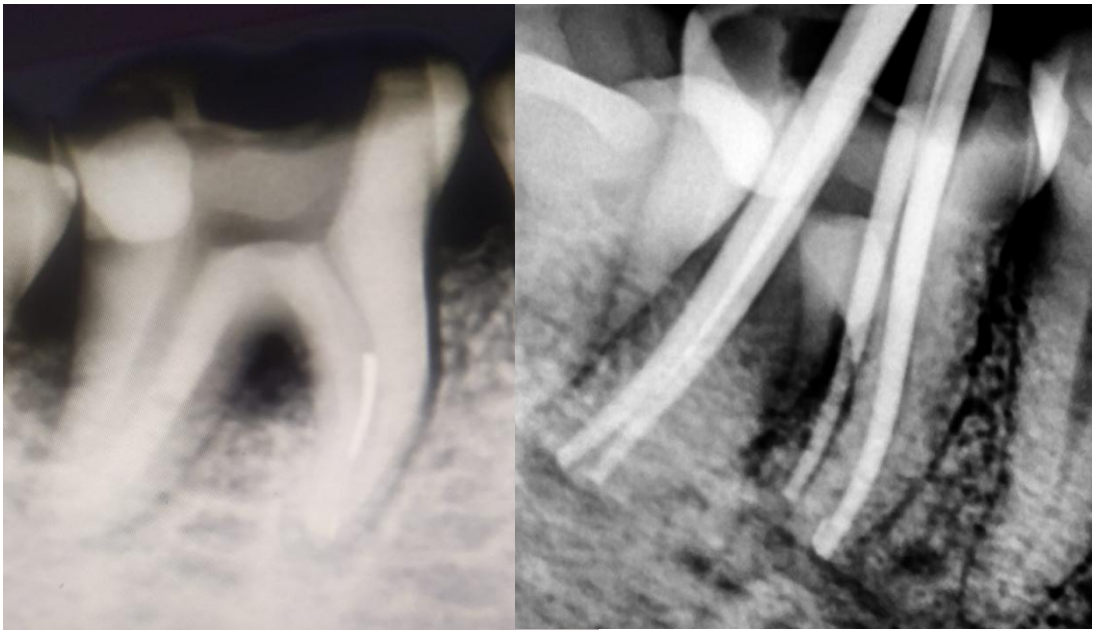
Case III

A 14-year-old male patient was referred to the Department of Conservative Dentistry and Endodontics with a continuous throbbing pain in the upper front region for the past 1 month. Patient narrated history of incomplete root canal treatment with 11 21, 4 years back in private clinic.

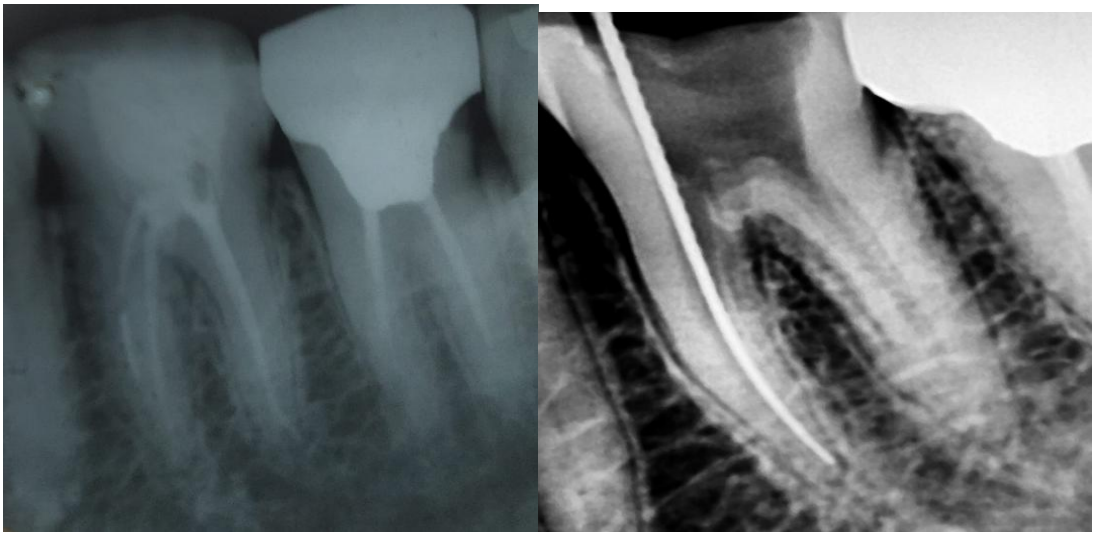
Radiographic examination revealed radiopaque root canal filling with 11 and 21 with periapical changes. Re root canal treatment was planned.

While removing gutta percha separated instrument were noticed in both 11 and 21. Broken file was bypassed by using the smaller no K files starting from no: 10 and advanced till file no: 15 where the tactile sensation was attained and the broken file was successfully bypassed. Working length were measured with apex locater and canals were prepared upto 45 K file Then using the H file (Hedstrom files) the broken file was engaged and with the slow upward motion retrieval was achieved.

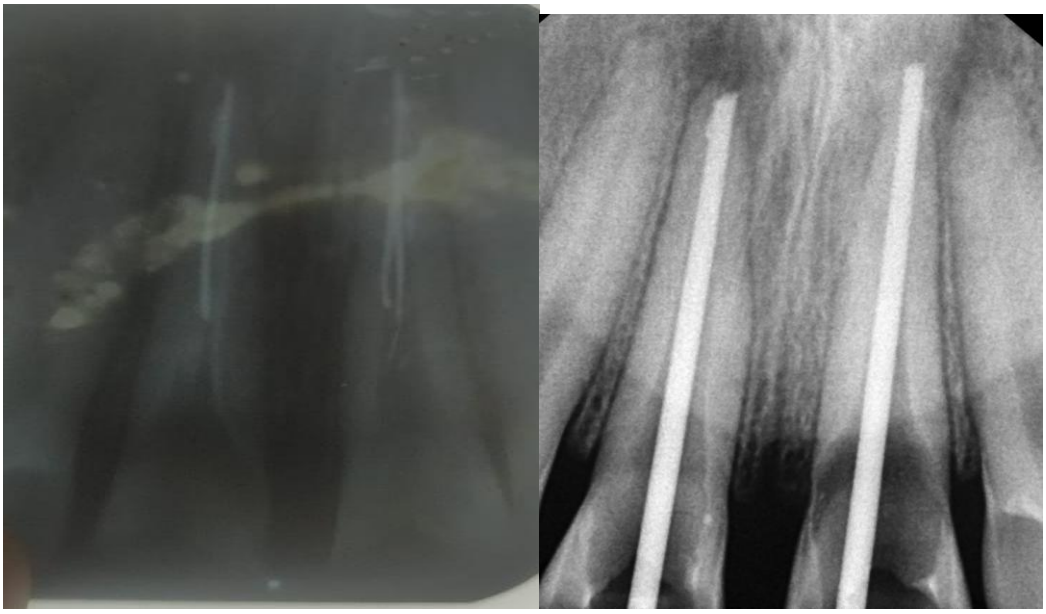
In the subsequent appointment biomechanical preparation and obturation was achieved and cast



Case 1 : a) Separated Instrument with MB canal of 46 b) Master apical cone after file Retrieval



Case 2 : a) Separated Instrument with MB canal of 36 b) Master apical file with MB canal after file Retrieval



Case 3 : a) Separated Instrument with 11 and 21 b) Master apical cone after file Retrieval

post with crown was planned.

Discussion

Intracanal separation of instruments prevents access to the apex, impedes thorough cleaning and shaping, and thus compromise the outcome of endodontic treatment.[1]

Various factors are related to fracture of rotary instruments like experience of operator, speed and torque of the instrument, canal curvature, instrument design and technique, manufacturing process, and inadequate glide path.[2]

Non surgical and surgical are the two approaches for management separated instruments. Non-surgical method comprises bypassing, Retrieval of the instrument, or preparation of the canal and obturation to the level of the fractured instrument. [3]

Various retrieval techniques and devices have been described, including drills, extractors, ultrasonic tips, dental operating microscopes, and electrochemical processes.[3]

In the present case report Masserann kit and ultrasonic tips were used in 1st and 2nd cases and H files were used in the 3rd case after bypassing the files due various advantages and disadvantages of both the techniques.

Retrieval was attempted in the present cases 1 and 2 where 4-5 mm of instrument was separated in the middle 3rd of MB canal of 46 and 36. The instrument separation were occurred in 1st case beacause of very narrow canal, hence was difficult to bypass. As a result, instrument retrieval was considered as an option.

Masserann's kit was used for instrument retrieval with a success rate reported of 73% and 44% respectively in anterior and posterior region. It consists of 14 hollow cutting-end trephine burs (sizes 11-24) ranging in diameter 1.1-2.4mm and 2 extractors. The trephine is used in anti-clockwise direction to remove dentine around the separated instrument. The main advantage with Masserann's kit is that the separated instrument is removed quickly without heating or pushing the fragment further apically. It allows the loosening of the broken instrument around its periphery. In this case, Masserann's kit was used freeing the fractured segment from its surrounding dentine. But the fractured segment could not be grasped, hence, ultrasonic tips were employed to further loosen the instrument and get retrived with irrigant.[2] The use of ultrasonics tips made Masserann kit more effective in selected cases.[1]

Conclusion

The seperated instrument were successfully removed from the MB canals of mandibular right and left molar using Masserann's kit and ultrasonic tips and with H file with 11 and 21. Comprehensive treatment plan for any case mostly always guarantees success.

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