



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research  
Vol. 8, Issue, 9, pp. 19812-19814, September, 2017

**International Journal of  
Recent Scientific  
Research**

DOI: 10.24327/IJRSR

## Case Report

### INSTRUMENT RETRIEVAL - AN ENDODONTIC CHALLENGE: A CASE REPORT

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DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0809.0764>

#### ARTICLE INFO

##### Article History:

Received 18<sup>th</sup> June, 2017

Received in revised form 10<sup>th</sup>  
July, 2017

Accepted 06<sup>th</sup> August, 2017

Published online 28<sup>th</sup> September, 2017

##### Key Words:

Instrument separation, Canal obliteration,  
Masserann technique, Modified gates,  
Ultrasonics

#### ABSTRACT

Canal preparation in obliterated canals is always a great challenge for the operator, which may lead to inadvertent errors such as instrument separation. The prognosis of leaving a separated instrument inside incompletely cleaned root canals remains a concern as the microbial control is compromised. Masserann kit is a specially designed kit for the orthograde removal of metallic objects from the root canals. This case report describes an effective method for retrieval of a tightly bound separated K-file from apical 3<sup>rd</sup> root canal dentin of a calcified maxillary lateral incisor using masserann kit combined with the use of modified gates glidden drills and ultrasonic tips under dental operating microscope. It was demonstrated that although use of Masserann kit can be a time consuming procedure, but it can be considered as an effective tool in instrument retrieval especially in thick, straight roots of anterior teeth.

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#### INTRODUCTION

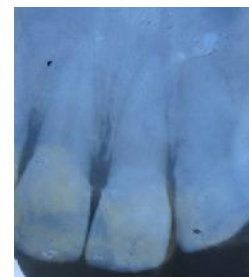
Aggressive movements with endodontic instruments for penetrating the canal rapidly or forcing an instrument to an arbitrary length in a canal with limited access can lead to instrument fracture that may compromise the outcome of endodontic treatment.<sup>[1,2]</sup> This is even more significant in a non-vital tooth associated with periapical pathosis. Hence an attempt to bypass or retrieve the instrument should be made before leaving the instrument in the canal and obturating to the level of separation or planning for surgery.<sup>[3]</sup> However, orthograde removal of separated instruments is usually a significant challenge as there is no standardized procedure, and a number of different removal techniques have been reported.<sup>[2]</sup>

This case report is about the successful retrieval of a separated file tightly wedged in the apical 3<sup>rd</sup> root canal dentin of a maxillary left later incisor using masserannkit (Micromega, Besancon, France) and ultrasonic tips aided with dental operating microscope.

#### CASE REPORT

A 32 year female patient reported with a chief complaint of pain in left maxillary lateral incisor since 2 days. Patient gave history of trauma in upper front tooth region 5 years back.

During oral examination, the patient's tooth was tender to percussion. Radiograph indicated calcified canal with slight periapical radiolucency (Figure 1).



**Fig 1** preoperative radiograph showing calcification

Irreversible pulpitis with symptomatic apical periodontitis was diagnosed and root canal therapy was decided as the treatment of choice. After the administration of local anaesthesia, access opening was performed with a No.1 endo access bur and canal was located. Initial exploration of the canal was performed using No. 10 K-File and working length radiograph was recorded (Figure 2). Upon removal of No. 10 K-file, approximately 5 mm of the instrument got separated in the apical third of the canal that was confirmed radiographically (Figure 3). Since the efforts of bypassing the fragment

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went futile, Masserann technique was planned for instrument retrieval.



Fig 2 working length determination

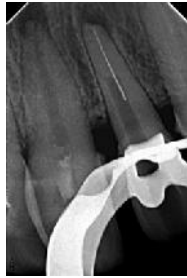


Fig 3 fractured instrument

A pre-selected trepan with a diameter of 1.2mm was latched into contra angle hand piece and run in an anticlockwise direction to create a trough around the coronal end of the fragment by ditching the dentin under a microscopic field (16X, OPMI dental operating microscope; Carl Zeiss Meditec AG, Jena, Germany). Centering of the trepan over the fragment was ensured radiographically (Figure 4). The extractor tube was slid into the trough and following radiographic confirmation of this, the plunger rod was turned manually, inside the extractor tube in a clockwise direction to grip the fragment against its wall.



Fig 4 centring of trepan drill over the fragment

However, the file was very tightly wedged into the dentin and efforts to loosen the file with manual pressure were unsuccessful. A circumferential staging platform was made around the coronal end of the fragment with the help of modified gateslidden drills. A long thin CPR #8 titanium ultrasonic tip (Obtura Spartan, Fenton, MO) was then applied directly against the exposed end of the file and activated at a low power setting of 5W. A slow, careful removal of circumferential dentin was done with intermittent water and air coolant (Figure 5). Alternate application of the ultrasonic vibration and counter-clockwise rotation with the extractor finally resulted in the successful withdrawal of the file. The total time for retrieval was approximately 60 minutes.



Fig 5 loosening of the fragment after staging platform and use of ultrasonics

The canal was thoroughly cleaned and prepared up to the working length (Figure 6) with rotary protaper universal files till F3. A corresponding master cone was placed to obturate the canal below the level of the staging platform and sealed off at that level.



Fig 6 working length after instrument retrieval

The remaining portion of the canal was back-filled with warm thermoplasticized gutta-percha using Obtura II (Obtura-Spartan Corp., Fenton, MO) to a level 1 mm below the canal orifice (Figure 7). In the subsequent recall visit, post endodontic restoration was performed with composite.



Fig 7 obturation

## DISCUSSION

Pulp canal obliteration can occur due to several reasons such as aging, trauma, or long-term irritation to the tooth.<sup>[4]</sup> Negotiating such obliterated canals is quite challenging and may lead to iatrogenic errors such as perforation or instrument separation.<sup>[5]</sup> Smaller endodontic instruments are more prone to distortion as a result of stressing on small cross-section, especially in cases where the canal anatomy is unusual.<sup>[6]</sup>

Masserann technique is one among many methods of orthograde instrument retrieval from the root canal. However its use in posterior teeth is limited due to poor accessibility and visibility that may lead to excessive dentin removal, increasing the risk of perforation. Thus, this technique is best suited for anterior teeth having thick, straight roots.<sup>[3]</sup>

Masserann kit consists of a series of trepan burs that are used to prepare a space around the most coronal part of an obstructing object, and two sizes (1.2 and 1.5 mm in outer diameter) of extractors which are inserted into the created space and mechanically grips the object. The extractor consists of a tube in which a plunger can be screwed down. By tightening the screw, the free part of the object is locked between the plunger and the internal embossment just short of the apical end of the tube.<sup>[2]</sup>

Solid dentin often remains around intracanal broken instruments even following repeated cutting with trepan burs. The remaining dentin hampers gripping with the extractor and is thus a major reason for failures of the Masserann technique.<sup>[2]</sup>In the present case, a staging platform was prepared around the coronal aspect of the instrument with modified gates glidden drills and subsequent ultrasonic cutting was done under the magnified view of operating microscope so as to loosen the instrument within the canal.

Ruddle *et al*<sup>[7]</sup> suggested that a staging platform can be made by selecting a GG drill whose maximum cross sectional diameter is slightly larger than the visualized instrument. The bud of the GG drill is altered by cutting it perpendicular to its long axis at its maximum cross sectional diameter. This staging platform facilitated the introduction of ultrasonic instruments for safe cutting of the peripheral dentin around the exposed fragment that helped in better gripping of the instrument with the extractor, allowing for its retrieval.

Ward *et al*<sup>[8]</sup> stated that a stainless steel fragment are easier to remove with ultrasonics than Ni-Ti instruments as they absorb the ultrasonic energy bodily, and will loosen early as compared to the nickel titanium fragment which absorbs energy mainly at the point of contact with the ultrasonic tip and can result in the fragment gradually getting smaller as the flutes are worn away. Within the clinical limitations, this case report demonstrated a successful retrieval of a fractured instrument from the apical third of a maxillary left lateral incisor with the help of Masserann kit aided with dental operating microscope and ultrasonic tips.

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### How to cite this article:

Sana Ali .2017, Instrument Retrieval - An Endodontic Challenge: A Case Report. *Int J Recent Sci Res.* 8(9), pp. 19812-19814. DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0809.0764>

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