

Retrieval Of An Overextending, Separated Instrument From The Canal Of A Lower Molar – A Case Report

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Abstract

A fractured instrument inside a root canal can affect the outcome of an endodontic treatment. One of the orthograde approaches recommended to manage a separated instrument is its removal from the root canal. However, orthograde removal of a separated instrument is reported to be difficult in most cases. A Masserann kit is a hollow tube device specially designed for the removal of intracanal metallic objects from the root canal. It is said to be less successful in posteriors than in anteriors. Further, the use of a Masserann kit to retrieve a periapically overextending separated instrument from the root canal of a posterior tooth is not frequently reported. This case report illustrates using Masserann technique to successfully retrieve an overextending, separated instrument from the root canal of lower first molar.

Key Words:

Fragment, instrument removal, masserann kit, separated instrument.

INTRODUCTION:

A fractured instrument is said to create an obstacle to mechanical and chemical treatment of an infected root canal system and negatively impact the endodontic treatment outcome.¹ Although the overall endodontic prognosis following instrument separation is likely to depend on the stage and degree of canal preparation and disinfection at the time of instrument fracture, the main prognostic factor in such cases is reported to be the existence or nonexistence of a pre-operative periradicular pathosis.^{2,3,4}

The management of a case with a broken instrument may involve an orthograde or a surgical approach. The orthograde approach consists of an attempt to bypass the instrument, to remove the instrument, or to prepare and obturate to the fractured fragment.⁵ It is reported that the removal of separated instruments from the root canal in most cases is difficult and at times impossible with a success rate ranging from 55 to 87%.⁶

A Masserann kit is a hollow tube device specially designed for the removal of intracanal metallic objects such as broken files, silver points and posts with a reported success rate of 55%. It 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 tubular extractors, which are inserted into the created space and mechanically grip 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.^{7,8,9}

Masserann kit has been used for over 40 years as an instrument removal device. It is said to be more successful in anteriors with a success rate of 73%. However, it is found to be less applicable in posteriors with a reported success rate of only 44%.^{7,10} Further, cases employing a Masserann

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kit to retrieve a separated instrument lying in the entire canal and overextending into the periapical area of a posterior tooth are not frequently reported in the endodontic literature.

This case report illustrates using Masserann technique to successfully retrieve an overextending, separated instrument from the root canal of lower first molar.

Case Report:

A 17 year old female patient reported with a chief complaint of severe pain in the lower left molar area while chewing. Clinical examination revealed gross and deep occlusal caries in mandibular left first molar (tooth 36). The tooth 36 was sensitive to percussion. Periapical radiographic examination of tooth 36 showed the close proximity of caries to the pulp space with remnants of temporary cement and apical widening of the periodontal ligament space of the mesial root (Figure 1).



Figure 1: Preoperative periapical radiograph of tooth 36 showing the extensive caries with remnants of temporary cement and apical widening of the mesial root periodontal ligament space.

Since thermal and electric pulp testing gave negative response, a diagnosis of pulp necrosis with acute apical periodontitis was made and root canal treatment was suggested in tooth 36. Following access refinement and working length determination in tooth 36, canal cleaning and shaping was initiated in a crown down manner using rotary Nickel-Titanium files (ProTaper, Dentsply Maillefer, Ballaigues, Switzerland). However, during cleaning and shaping, size F1 file was separated in the mesio-buccal canal.

Clinically, the separated fragment of the file was found tightly wedged into the canal with minimal extension into the pulp chamber. A periapical radiograph of tooth #36 revealed that the separated fragment was occupying the entire length of the canal and overextending periapically by around 1.5 mm (Figure 2).



Figure 2: Periapical radiograph of tooth 36 showing the separated instrument lying in the entire canal and overextending periapically.

Since the fragment could not be bypassed nor be grasped coronally, a decision was taken to use ultrasonic vibrations for retrieval. A C6 ultrasonic tip (NSK, Japan) vibrating at a low power output was kept against the fragment and run in a counter-clockwise direction. Although this appeared to partially loosen the fragment, the fragment could not be removed as it was overextending periapically. Therefore, a Masserann kit (Micro Mega, Besancon, France) was employed to grip and retrieve the fragment. Since there was some space between the coronal end of the fragment and root canal wall, the kit was used without trephining or cutting the dentin. The remaining external portion of the separated file was used as a guide to select an extractor tube. The extractor tube with a diameter of 1.5 mm was found suitable to grip the fragment. The tube was slid into the coronal space to encircle the fragment and the plunger rod was inserted into the tube and turned in a clockwise direction to lock the coronal end of the fragment against the wall of the tube. The tube with the locked fragment was gently rotated in an anticlockwise direction to retrieve the fragment (Figure 3).

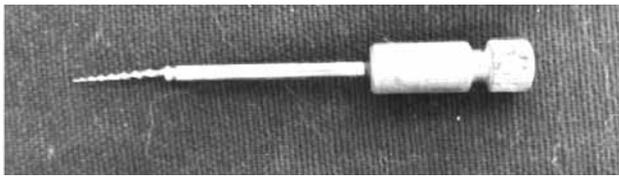


Figure 3: Clinical image of the separated instrument locked and retrieved by the extractor.

The time taken for the retrieval was less than 30 minutes. The retrieval of the fragment was radiographically confirmed (Figure 4).



Figure 4: Periapical radiograph confirming the retrieval of the metallic obstruction from the root canal of tooth 36.

In the subsequent visits, canal cleaning and shaping was completed and obturation was carried out using gutta percha (ProTaper, Dentsply Maillefer) master cones and AH26 sealer (De Trey Dentsply, Konstanz, Germany) (Figure 5).



Figure 5: Periapical radiograph following the obturation of 36. The access opening was restored and tooth was cemented with full crown. In the follow up visit, the tooth was found asymptomatic without any significant radiographic changes (Figure 6).



Figure 6: Follow up radiograph of tooth 36 showing no significant radiographic changes.

DISCUSSION:

The orthograde approach to remove separated instruments can employ a hemostat, Steiglitz forceps, modified Castroviejos needle holder, Perry plier, spoon excavator or a Caulfield retriever to either grasp or engage and retrieve them. Other recommended modalities to remove separated instruments are based on using ultrasonics, Masserann kit, Endo Safety System, Endo Extractor, Cancelliers kit, Instrument Removal System (IRS), wire loop, spinal tap needle-and-Hedstrom file, Tube-and-Hedstrom file, the blunt needle and core paste, and file braiding techniques.⁶

However, selection of a technique and retrieval of a separated instrument is said to depend factors such as skill and experience of the operator, type of tooth, the canal anatomy, canal curvature, degree of curvature, the location of the separated instrument, and the size of the fragment.⁶ In the present case, Masserann kit was employed as the fragment could not be grasped by any other aids in the pulp chamber.

Although Masserann kit is specially designed for the removal of metallic objects from root canals, it is said to be effective only in selected cases, especially those where broken instruments exist in a readily accessible position. It is useful in removing metal obstructions from anterior teeth having thick, straight roots. However, the use of relatively large and rigid trephans leads to removal of considerable amount of root dentin and weakening of the teeth or risk of perforation, especially in thin and curved canals.^{6,7} Therefore,

it has limited application in posterior teeth and contraindicated in apical third and teeth with thin or curved roots.^{7, 9, 10} It is also found to be least effective in apical third of both curved and straight canals.¹⁰ To overcome the risks associated with this technique, frequent radiographic monitoring and a well controlled use with ample convenience form are suggested⁷.

Despite the above limitations, Masserann technique was successful in the present case in retrieving the fragment. Though the fragment overextended periapically and found tightly stuck beyond the curvature of a moderately curved canal of a first molar tooth, the technique was successful as the coronal end of the fragment was accessible for locking and gripping by the extractor. Further, the retrieval was achieved without the need for cutting of the surrounding dentin thus averting the risk of perforation or weakening of the root.

Masseran kit is considered to be inferior to ultrasonics^{7, 10}. In this case, ultrasonics was not effective as the fragment was firmly wedged into the apical third of the canal and overextended.

It is recommended that removal attempts of fractured instruments from root canals should not exceed 45 to 60 minutes because the success rates may drop with increased treatment time. He suggested that the lowered success rate could be because of operator fatigue or from over enlargement of the canal, which compromises the integrity of the tooth and increase the risk of perforation. Masserann technique is reported to take more time, ranging from 20 minutes to several hours, to remove a fragment when compared to ultrasonic techniques which take a time varying from 3 to 40 minutes⁶. In the present case, as the coronal end of the fragment was accessible without the need for trephining, the fragment was removed in a shorter time than generally observed.

The major advantage of Masserann kit lies in the locking mechanism and considerable retention provided by the extractor⁹. The Masserann kit can also be modified by grinding and altering the extractor and plunger rod to minimize dentine cutting and widen the space to grip

larger size fragment. Additionally, it can be used in combination with ultrasonics and surgical operating microscope for increased efficiency^{7, 9}.

CONCLUSION:

Masserann kit with proper case selection is effective for retrieving an overextended, separated instrument from the curved canal of a molar, provided the coronal end of the instrument is accessible for locking. Further, in such a case the retrieval can be attempted without cutting dentin to minimize risks associated with the kit.

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