

Modified Usage of the Masseran Kit for Removing Intracanal Broken Instruments

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Running Title: Usage of Masserann kit

Abstract

The Masserann kit is a hollow tube device specially designed for the removal of intracanal metallic objects. This report describes some modifications in the usage of this device for effective removal of tightly bound intracanal broken instruments whose diameter is relatively large at the coronal end. The techniques described are: 1) modification of the extractor to ensure gripping by creating a wider space inside the tube, and 2) combined use of the modified extractor with an ultrasonic device and a surgical operating microscope. A clinical case demonstrating that these modifications resulted in successful retrieval of firmly wedged instruments is presented.

Intracanal broken instruments impedes thorough cleaning and shaping of the root canal system and thus may compromise the outcome of endodontic treatment. However, orthograde removal of separated instruments is usually a significant challenge to practitioners. There is no standardized procedure, and a number of different removal techniques and devices have been reported (1).

The Masserann kit (Micromega, Besancon, France) is specially designed for the removal of metallic objects from root canals (2). 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. There are several reports in which effectiveness of the Masserann kit has been presented (2-4). However, limitations exist regarding the application of this technique. The trepan burs and extractors are rigid and relatively large, and thus establishment of straight-line access to the target object often requires ample removal of the root dentin potentially leading to failures such as root perforation (5).

The purpose of this article is to describe some modifications of the Masserann technique for removing tightly bound intracanal broken instruments whose diameter is relatively large at the coronal end. The modifications were effective in the removal of fragments that had been quite resistant to other techniques such as bypassing.

MATERIALS AND METHODS

The techniques proposed here consist of: 1) modification of the Masserann extractor to create a wider space inside the tube; and 2) combined use of the modified extractor with

an ultrasonic device (Enac III, Osada Electronic, Tokyo, Japan) and a surgical operating microscope (OPMI 99, Karl Zeiss, Germany).

The modification of the extractor was carried out to create a wider space between the tube and plunger. It was simply done by grinding the small extractor with a carborundum point, and consisted of 1) cutting off approximately 0.5 mm from the tip of the tube, and 2) sharpening the tip of the plunger (Fig. 1).

The ultrasonic device was used to 1) cut the dentin around intracanal metallic fragments under the microscope, and/or 2) loosen the fragment by transmitting ultrasonic energy either indirectly through the grasping extractor, or directly under the microscope.

CASE REPORT

This case was treated at the Clinic for Conservative Dentistry, Tokyo Medical and Dental University Dental Hospital.

A 41-year-old male patient was referred for removal of a broken #30 K file in the mesiobuccal canal of his mandibular left second molar. The referring dentist had pulpectomized the tooth 6 months earlier and root filled the canals except for the mesiobuccal canal in which the file had been separated accidentally. The tooth was sensitive to percussion and palpation. The preoperative radiogram revealed that the broken file extended from approximately 1 mm below the orifice to the radiographic apex (Fig. 2A).

Because an attempt to bypass the broken file with K files failed, a decision was made to remove the file with the Masserann kit with the aid of the surgical operating microscope. Under rubber dam isolation, a “guide groove”, approximately 2 mm deep and circumferential to the coronal end of the broken file (Fig. 2B), was prepared with the smallest trepan bur (1.1 mm in outer diameter). Then the dentin between the file and the groove was removed under the microscope with an ultrasonic spreader tip (ST21, Osada)

activated with the ultrasonic unit at the power setting of 5. With this procedure, the periphery of the file was successfully exposed (Fig. 2C) and was gripped with the modified extractor. However, the file was very tightly wedged into the dentin and efforts to loosen the file with manual pressure were unsuccessful. The ultrasonic tip was thus applied directly against the exposed end of the file and activated under the microscope. Alternate application of the ultrasonic vibration and counterclockwise rotation with the extractor finally resulted in the successful withdrawal of the file (Fig. 2D). The total time to retrieval was approximately 30 min.

DISCUSSION

The Masserann kit has been used for over 30 years as a device for removing intracanal broken instruments. The locking mechanism of the extractor provides considerable retention, which is a major advantage of this device. As recognized widely, however, it is in the removal of the dentin around the object where difficulty lies (5). Moreover, practitioners may encounter the frustrating situation in which a wedged object does not come out despite successful gripping of its coronal end. The modifications of the Masserann technique presented here ensured firm gripping and loosening of tightly wedge obstructions, and thus may be helpful in solving some cases with the above-mentioned difficulties.

In the present case, the diameter of the coronal end of the broken instrument was approximately 0.6 mm. As the caliber of the small tube is approximately 0.7 mm at the embossment, the space inside the small extractor was too narrow to firmly grip the instrument. Application of the large extractor to the mesial root of the mandibular second molar may be contraindicated because it requires too hazardous trepanation. However, the modification of the extractor resulted in increased retention without further removal of root

dentin and/or reducing the diameter of the exposed end of the fragment with circumferential grinding. Clinical experience suggests that the modified extractor is effective where the diameter of the coronal end of obstructions is approximately 0.45 to 0.6 mm.

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. The present case clearly demonstrated that the difficult task of exposing the periphery of the fragment could be readily performed with the aid of the surgical operating microscope: just enough dentin was successfully removed with the "guide groove" preparation and subsequent ultrasonic cutting under the magnified view.

In conclusion, the procedures presented here indicate that the classic Masserann technique may still be effective in selected cases, particularly those where tightly wedged broken instruments exist in a readily accessible position. Combined use of the Masserann technique with microscopes and ultrasonic instruments may solve some of extremely difficult cases.

References

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Figure Legends

Fig. 1. Modification of the Masserann extractor. Before modification (A), the space between the tube and plunger (P) is not sufficient to grip a broken file of relatively large cross-sectional diameter (BF). (B) Modified extractor in which the tip of the tube is cut off (arrow) and the tip of the plunger sharpened (double arrow). With this modification, the broken file is gripped without any additional dentin cutting.

Fig. 2. (A) Preoperative radiograph showing a broken #30 K file (arrows). (B and C) Views under the operating microscope, showing "guide groove" prepared with a trepan bur (B) and exposed end of the file (arrowhead) following ultrasonic cutting (C). (D) Removed file gripped by the modified extractor.

Fig. 1

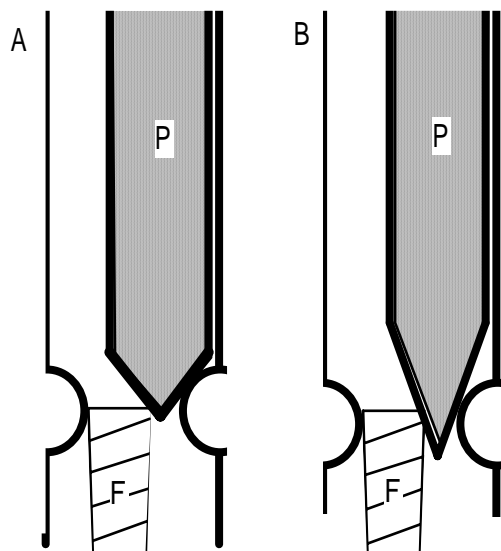


Fig. 2

