Journal of Endodontics

Printed in U.S.A.
Vol. 27, No. 5, May 2001

CLINICAL AID

Elimination of Intracanal Metallic Obstructions by Abrasion Using an Operational Microscope and Ultrasonics

Walid B. Nehme, DDS, DESE

Intracanal metallic obstructions that block any further treatment often prevent the clinician from achieving total cleanliness of the root canal system. For the retrieval of these obstructions, most of the methods described suggest creating and enlarging a space around the obstruction to loosen it before its retrieval. This article describes a technique that consists of mechanical abrasion of the obstruction without altering canal walls by using an operational microscope and ultrasonic spreader.

Clinicians frequently encounter endodontically treated teeth that contain silver points or posts within their roots. If endodontic treatment is failing, the need arises to remove the metallic obstruction to facilitate successful nonsurgical retreatment. A large number of removal techniques exists including use of a variety of appropriate burs (1); specialized forceps (2); ultrasonic instruments in direct or indirect contact (3, 4); peripheral filing techniques in the presence of solvents, chelators, or irrigants (5); and microtube delivery using mechanical, adhesion techniques (6, 7). Fortunately most cases can be readily retreated using one, two, or perhaps three techniques. The technique proposed here evolved to address the removal of sectioned silver points, fractured intraradicular posts, or screw post made of soft metals that resist classic removal techniques.

MATERIALS AND METHODS

This technique uses an operational microscope that should be positioned for optimum vision with an intense light source setting. A powerful piezoelectric ultrasonic device such as P-Max by Satelec (Satelec, Merignac, France) and two ultrasonic tips are used. The ultrasonic spreader (SO4) by Satelec is recommended in the wider portions of root canals and whenever the cross-section of the metallic obstruction is large such as fractured posts and screw posts. The modified (SO4) that has a 0.2 to 0.25 diameter at its tip and a 0.2% taper (8) will allow deep access to apical and midroot levels. As in classical removal techniques adequate access is obligatory to expose the obstruction. When using a microscope, the access must be straight to constantly keep visual contact with the obstruction. The proper access is rapidly achieved in cases of broken posts. Under ×10 magnification, the (SO4) spreader is introduced until it reaches the obstruction. Then it is activated at full intensity with repeated and slow brushing movements. This will allow the clinician to actually cut and sculpt the obstructing metal. A Stropko three-way adapter (Obtura-Spartan Corporation; Fenton, MO) with the White Mac tip (Ultradent; Salt Lake City, UT) is used to keep visual contact while the ultrasonic spreader is activated. Frequent flushing with water is obligatory to cool the spreader and the tooth. This is particularly true when the obstruction has a large cross-section because it needs more time and consequently generates more heat. For sectioned silver points, which usually bind over a distance inside the root canal, the access must be developed meticulously by serial use of files and Gates-Gildden drills until the tip of the silver point is totally exposed. The exact measurement from the tip of the silver point to a reference point is calculated using a hand file and is then reproduced on the modified (SO4). The estimated length of the fragment (seen on the preoperative radiograph) is also added coronally on the spreader and marked with a different color. These marks will allow the clinician to be aware of the remaining length of the silver point while working. Under ×16 magnification the modified (SO4) is introduced and activated at low power intensity to prevent accidental breakage of the spreader or root canal perforations. Flushing with water is important to eliminate the eroded portions of the silver point. Drying is equally important because the reflection of light on water inside the root canal will misguide the operator. Peroperative radiographs are recommended to confirm the position and the remaining length of the obstruction, as well as the thickness of canal walls.

This technique has been used for almost 2 yr, and 27 clinical cases have been documented. In 15 cases of fractured silver points, this method was successful in 12 cases. In two cases root canals were perforated. These perforations occurred in a mesiobuccal canal of a second lower molar and in the mesiobuccal root of a maxillary first molar. Only once was the silver point left inside because it was snagged beyond the apex. In eight cases of broken screw posts, this technique was successful every time. In four cases of broken posts it failed only once when the post was of a

FIG. 1. Preoperative radiograph demonstrating a failing root canal treatment with a silver point in the palatal canal.

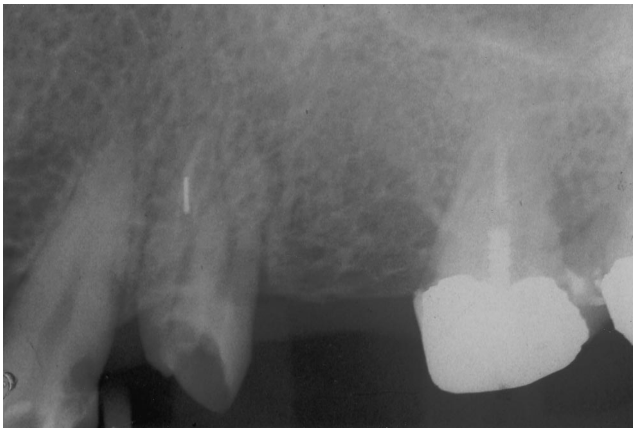

FIG. 2. Peroperative radiograph with 1.5 mm of the remaining silver point at the apical third.

nonprecious metal. A case report follows to show the elimination of a sectioned silver point.

CASE REPORT

A 55-yr-old female was referred for retreatment of the maxillary right first bicuspid. Clinical examination revealed the presence of an old bridge completely loose. Radiographic examination showed one silver point in the palatal canal and a paste in the buccal (Fig. 1). The cement inside the pulp chamber was eliminated with a scaling tip (S10) by Satelec. After administering local anesthesia, the tooth was isolated using a rubber dam. Xylol and K-files (Maillefer, Ballaigues, Switzerland) were used to clean the buccal canal. In the palatal canal the same solvent and a #10 file were used to soften and eliminate the cement surrounding the silver point. The file failed to bypass the silver point totally, only 2 to 3 mm where exposed. While enlarging the pathway with a #15 file, the exposed part of the silver point was separated. At this point the microscope (Karl Kaps GmbH & Co., Asslar, Germany) was used to locate the fragment. A magnification of ×10 revealed that the remaining silver point was snagged inside canal walls. Ä magnification of ×25 showed that neither cement nor filling materials was surrounding the fragment. When files failed to go alongside the silver point, and because elemental silver is soft and it rapidly erodes during mechanical manipulation, we took advantage of the high magnification and cutting abilities of the ultrasonic spreader. Under ×16 magnification, the modified (SO4) was used directly on the silver point with brushing-cut movements as described previously. After a few strokes a radiograph was taken to calculate the remaining length of this fragment (Fig. 2). This procedure was repeated several times until the silver point was totally eliminated. Afterward normal root canal procedures were completed (Fig. 3).

DISCUSSION

The benefits of incorporating ultrasonics and microscope in endodontics exceeded expectation. The microscope gives the clinician light and illumination inside the canal and provides him with the ability to visualize the intraradicular obstruction and locate its position regarding the surrounding root canal walls. This will consequently eliminate the guesswork. The advantage of this technique compared with other methods using ultrasonics and microscope is that it minimizes dentin removal.

FIG. 3. Final obturation radiograph-mesial angulations. Note that no excessive enlargement was needed in the palatal canal using this technique.

Classically when a straight access is made to the obstruction this access should be enlarged enough to allow the insertion of the ultrasonic tip and retrieval of the remnant. Thus pathway produced is considerably larger than the one needed in this technique in which the fragment will come out as small particles as it is alroded. In this method, unlike others (9, 10) no buccal or lingual channels or spaces are created alongside the fractured post or the fractured silver point. The spreader is eroding only the obstruction and theoretically canal walls are not affected.

Comparing with methods used for the retrieval of fractured posts (9, 11) less effort and concentration are needed, because the clinician will focus on a large surface the post itself, and not the surrounding cement. This is not the case however when a fractured silver point is deep in the canal. Considering its small diameter, it is of primary importance to keep the modified (SO4) on the fragment and away from canal walls, and this is not very easy.

In previous methods (9, 11, 12) no time figures were stated. But considering our experience with other methods and comparing it with our clinical findings with this technique, it seems that this method may require more time than classical techniques. Working time is influenced by the nature of the obstruction, its diameter, and its location. Semiprecious metals take more time to be eliminated then precious metals. Large posts are time-consuming compared with narrow ones.

Working time increases as we proceed toward the apex. Depending on the factors previously discussed, we needed 1 to 3 min to erode each millimeter of a fractured silver point. For, broken posts the eroding time ranged between 3 to 5 min per millimeter.

This technique is inappropriate for the elimination of materials that are not eroded by ultrasonic tips, such as stainless steel instruments and posts made of nonprecious metals. As with all techniques using an operational microscope it should be limited to cases where the clinician has a straight access and visual contact with the obstruction. It should be considered as a primary method for the elimination of large broken posts whenever the clinician is concerned about the thickness of dentin walls, because it minimizes dentin loss. It could be considered as a last chance technique for broken silver points snagged in accessible areas that resist classical retrieval methods.

Dr. Nehme is an assistant, Endodontic Department, Saint Joseph University of Beirut, Beirut, Lebanon. Address requests for reprint to Dr. Walid B. Nehme, Space Center, New Jdeide St., Jdeide, Beirut, Lebanon.

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