

An Effective Approach to Remove a Fractured Endodontic Instrument

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Introduction

The fracture of an endodontic instrument in the root canals can create a stressful situation that the clinician can face in his daily practice.

These fractures often occur due to incorrect use of instruments. Operators can utilize incorrect movements during cleaning and shaping or use deformed instruments pushing them beyond their ability to absorb the workload. If failure has occurred the non-surgical retreatment is indicated at first.

This approach ensures that the root canal system and any communicating channels are thoroughly cleaned and that a good-quality root filling is placed under optimal asepsis in every canal [1].

In fact, from a clinical situation, we will evaluate and then indicate the endodontic reprocessing of a molar which presents a more or less satisfactory canal filling with a separated instrument. The following case aims to describe an effective approach in order to remove a fractured instrument using proven techniques and a set of instruments and equipment including manual fine ultrasonic inserts, small sized manual files and the Dental Operating Microscope (DOM) [2].

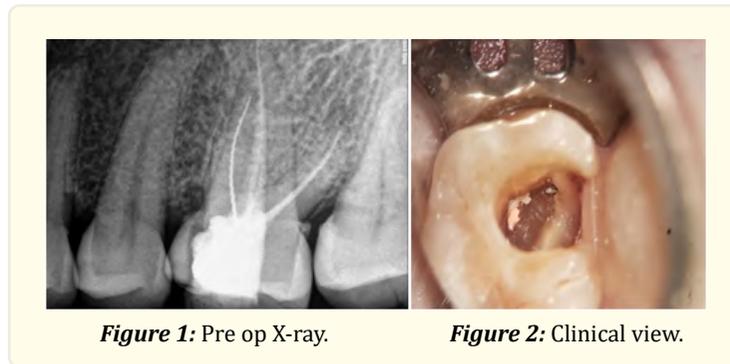
Clinical case

This is a 39-year-old patient, in good general condition and referred by a colleague for the management of a fractured endodontic instrument in the maxillary first molar. The patient developed discomfort after a period of time.

A pre-operative radiograph was taken and it was noted that a large portion of an endodontic instrument fractured inside the mesio-buccal root canal (Figure 1). The restoration was removed to expose the obturation material. Gutta-percha was eliminated from the palatal and disto-buccal canals. The Dental Operating Microscope (DOM) (CarlZeiss, Oberkochen, Germany) was used to obtain straight line access and visualize the fractured instrument (Figure 2). The root canal was flooded with 17% liquid EDTA and activated using ET25 tip of Endo Success TM Retreatment ultrasonic file in an effort to remove debris and inorganic matter and improve visualization of the fractured instrument. The tip was placed on the upper part of the separated instrument. Ultrasonic insert was used and moved in "push and pull" motions between the fractured instrument and the inner wall of the root canal (figure 3). A home-made retrieval system based on Hedstrom file 15 and a modified 27-gauge needle was used as a substitute for a canceller extractor.

This sequence was repeated 3 times to ensure having good taking of the upper part of the instrument (figure 4, 5).

The canal was dried and small K files were introduced in a gentle pecking motion with slight apical pressure in order to determine the working length (Figure 7) the optical aid was of great help to visualize the 4th MV2 channel, ultrasonic activation of NaOCL 3% and viscous 15% EDTA paste as well.



Shaping of all canals was completed using the ProTaper Universal system and root canals were irrigated in a similar technique as described above. The root canals were dried slightly using large paper points. Obturation was completed by Hydraulic condensation technique with Bioroot RCS (Septodont) (figure 8, 9).

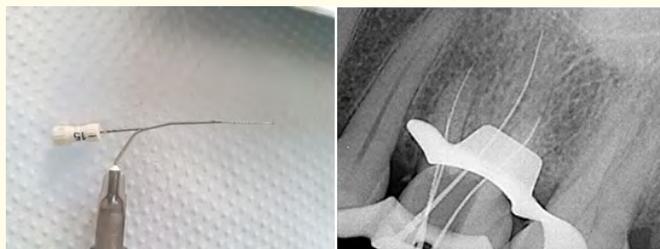


Figure 6: A large segment of a fractured instrument fixed on the tube of the needle after removal from the root canal.

Figure 7: Working length determination.



Figure 8: Cone fitting, MB1 MB2 is convergent type II according to Vertucci classification.

Figure 9: completed obturation with bioroot by hydraulic obturation condensation.

Discussion

Removal of the fractured instrument or bypass leads to successful nonsurgical treatment or retreatment, thus constituting a more conservative approach [2]. The removal of the fractured endodontic instrument depends not only on the diameter, length and section of the fragment, but also on the root curvature, the thickness of the root walls, the root canal morphology, the cutting action and finally on the location of the fragment. However, the best prognosis occurs after complete management of the obstructions [2].

In this case report, the ultrasonic insert was employed due to its interest in the management of fractured instruments, such as tissue saving, as well as a specific and compatible instrumentation design. Also, the employment of the home-made retrieval system was efficient to preserve radicular dentin tissue, the hedstrom file blocks the instrument and the needle is inserted on its totality to extract it without risk of losing it [3].

Conclusion

Appropriate knowledge of new techniques and adherence to root canal shaping principles and instructions for use of endodontic instrumentation can significantly reduce the incidence of instrumental fractures.

The fracture of endodontic instruments is a frequent event in our daily practice but not insignificant because of the complications that result. When this occurs, it can compromise the prognosis of the endodontic treatment and can lead to tooth avulsion. Removal of fractured instruments beyond curvatures where no direct vision is possible can be very challenging [1].

It is very important to note that the management of fractured instruments requires experience as well as a thorough understanding and proficiency in the use of the specific instrumentation. In the present case, an effective approach was followed for removal [4].

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