Case Report

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Retrieval of Overextruded Separated Instrument: An Approach with Ultrasonics

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ABSTRACT

Background

Instrument separation is a frequent procedural mishap that occurs with rotary instruments than hand instruments. Separated instrument beyond apical foramen is a major threat as it greatly influences the treatment outcome and leaves psychosocial impact on patient. Retrieval of overextruded instrument is necessary and can be done via both surgical and non-surgical approach. A conservative non-surgical approach is attempted first. Use of Ultrasonics in retrieval of separated instrument can be done effectively and safely. This is a case report of an 18 years old girl who was referred for retrieval of a separated instrument. The concern was in her upper central incisors which is an esthetically dominant focal point in dental composition. Non-surgical retrieval was planned with the use of ultrasonics and enhanced magnification. The case was successfully managed with retrieval of separated instrument and root canal obturation done in same visit. The patient was asymptomatic in one year follow up. Ultrasonics are simple and less invasive approach to be used for separated instrument retrieval. However, proper use of rotary instruments should always be encouraged to minimise the mishap.

Keywords: instrument separation; retrieval; ultrasonics.

INTRODUCTION

The advent of Nickel-Titanium rotary instruments have made a revolutionary change in biomechanical preparation of root canals. However, Ni-Ti rotary instruments fractures more easily than the hand instruments.[1] Instrument separation during treatment can cause distress to both clinician and patient. Attempts should be made to successfully manage the case without causing hindrance in treatment outcome. Endodontic instruments rarely separate beyond apical foramen. Strindberg found a statistically significant 19% higher failure frequency for cases in which there was instrument separation. Therefore, the best option in management of separated instrument is retrieval.[2] Ultrasonics are considered very effective for removal of separated instruments.[3-5]

CASE REPORT

An 18 years old girl was referred to Department of Conservative Dentistry and Endodontics for retrieval of a separated instrument in her upper right central incisor. She had history of incomplete root canal treatment done one day ago. Patient had no significant medical history and was undergoing orthodontic treatment since 6 months.

On clinical examination, there was an access cavity filled with a temporary filling material in her upper right central incisor which was sensitive to percussion. Radiographic examination revealed a separated instrument in the tooth 11 extending beyond the apex (Figure 1).

Figure 1. Preoperative radiograph with separated instrument.

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It was a case of previously initiated therapy with apical periodontitis in relation to tooth 11. The retrieval of separated instrument was planned and the patient was explained about the procedure in detail and an informed consent was obtained prior to commencement of the procedure.

Local anaesthesia (2% Lidocaine hydrochloride with 1:80,000 epinephrine) was administered and isolation was done with rubber dam. Under magnifying loupes (Eighteeth brilliance blue), access cavity was modified using Endo-Z bur to obtain a straight line access to the canal. A staging platform was created using a modified Gates Glidden drill (size 3). This was done to expose the file and the surrounding dentin to allow thinner ultrasonic tips to trough deeper around the file. Then, ET25 ultrasonic tip (Figure 2) was attached to the ultrasonic device and was activated. Following the activation, the separated instrument got loose and was removed out from the canal with the help of a hemostat. Fractured instrument was found to be approximately 12mm in length (Figure 3).

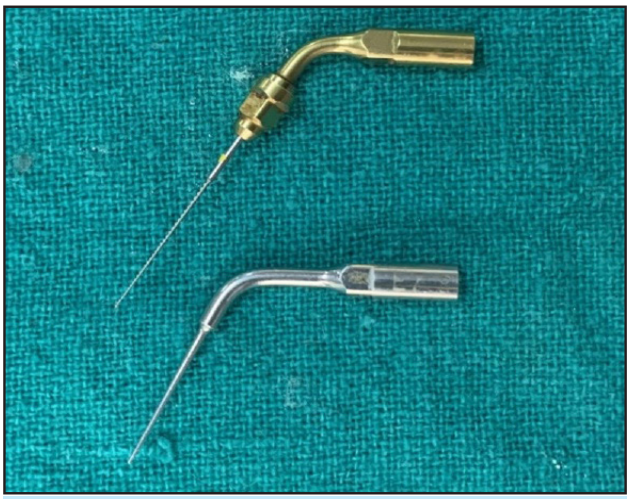

Figure 2. Ultrasonic tips used for retrieval.

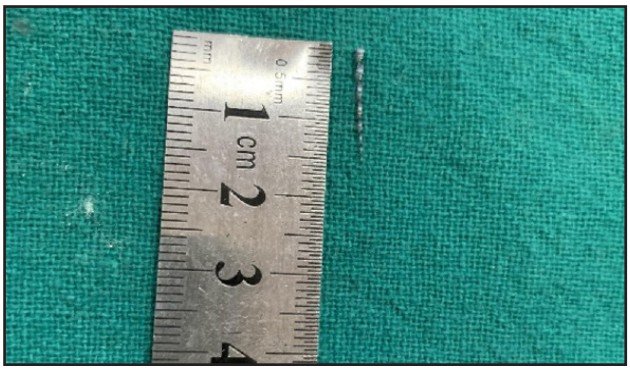

Figure 3. Retrieved instrument.

After radiographic confirmation of complete retrieval of separated instrument (Figure 4), working length was determined using electronic apex locator (Epex, Eighteeth Medical, Changzhou, Jiangsu, China) and radiograph (Figure 5). The root canals were cleaned and shaped using Protaper Gold Rotary files (Eighteeth Medical). The canal was irrigated with 2.5% sodium hypochlorite. After completion of biomechanical preparation, obturation was carried out by lateral compaction technique using gutta percha points and Bioceramic sealer (BioActive RCS, SafeEndo) and the access cavity was restored with composite (Figure 6). One year clinical and radiographic follow-up was taken and the tooth was asymptomatic (Figure 7).

Figure 4. Radiograph following separated instrument retrieval.

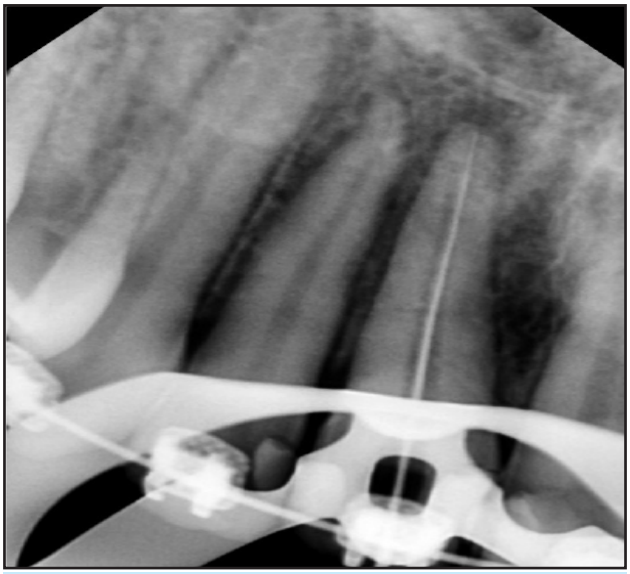

Figure 5. Working length determination.

Figure 6. Post obturation radiograph.

Figure 7. One year follow up.

DISCUSSION

The separated instrument during root canal therapy hinders further cleaning, shaping and successful treatment outcome.[6] Management of separated instruments includes nonsurgical or surgical approaches. In this case, as the separated instrument extended beyond the apex, it was deemed necessary to retrieve the instrument rather than instrument bypass. Considering the non-surgical endodontics being more conservative approach, the retrieval of instrument was attempted with ultrasonics. The use of ultrasonics when performed under enhanced magnification and illumination, enhances the safe removal of separated instruments.[7] The ultrasonic tip is placed on the staging platform between the exposed portion of the separated file and the canal wall, and vibrated around it in a counterclockwise direction, applying an unscrewing force to the separated file. However, separated NiTi files tend to fracture repeatedly when ultrasonics are applied to them in an attempt to retrieval.[8] Ultrasonic technique for retrieval is simpler, less invasive and is available in different lengths and sizes to be used in deeper parts of root canal. Nonetheless, an attempt to retrieval should not cause excessive removal of radicular dentin which could weaken the tooth structure and affect the long term prognosis.

CONCLUSIONS

Ultrasonics along with magnification is one of the most simple and effective non-surgical approach in retrieving the separated instrument beyond apex.

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