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Retrieval of a broken instrument using ultrasonics under magnification: A case report

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ABSTRACT

Many procedural errors may occur during endodontic treatment. One of the most common procedural mishaps is separated instrument. Instrument can separate at any location inside the canals or even past it. Broken files affect proper cleaning, shaping and filling of the root canals. This case report describes retrieval of a broken file in the apical third of the root canal using ultrasonics.

Keywords: procedural errors, ultrasonics, separated instrument.

INTRODUCTION

Proper cleaning and shaping of canals is the most important factor in the success of endodontic treatment. Broken instruments may interfere in proper cleaning of canals and thus may affect the outcome of endodontic treatment [1]. Various predisposing factors that lead to fracture of files include morphology of canals, instrument design and dynamics, the manufacturing process, sterilization, skill of the operator and usage frequency [2, 3]. The incidence of broken files for hand instruments and for rotary instruments have been reported to be 0.25%and 1.68%-2.4% respectively [4]. Separated instruments can be managed by: bypassing the broken fragment, cleaning and filling at the level of separation and removal of the separated instrument. Various techniques employed in retrieving the separated instrument includes use of ultrasonics, Masserann kit and instrument removal system. This report describes the management of broken file in maxillary incisor by using ultrasonics and with the assistance of a microscope.

CASE REPORT

A 40-year-old female patient reported to the Department of Conservative Dentistry and Endodontics, Post Graduate Institute of Dental Sciences, Rohtak with the chief complaint of pain in upper front right tooth region. She gave a history of root canal treatment with the same tooth at a private clinic, 9 months back. Clinical examination access opened 12 and 11 with open canals. The tooth was tender on percussion. Intraoral periapical (IOPA) revealed a fractured instrument at the apical third of 12with unobturated canal (Fig 1). A big periapical radiolucency was observed in relation to 11 and 12.

Fig. 1: Pre-op radiograph with fractured file at apical third

Instrument retrieval was planned after the patient was explained about the treatment plan and consent obtained. Peeso reamers were used to prepare a staging platform, and coronal part of the broken instrument was exposed by removing the surrounding dentine. Ultrasonic tip ET25 (Satelec Acteon, France) was used to trephine around the fragment. The procedure was carried out under an operating microscope at 2.5X magnification. The ultrasonic tip ET25 was activated at a power setting 6 to trephine dentin around the broken fragment. Canal was irrigated with normal saline intermittently to flush out the debris from the canal. The file loosened and was retrieved. IOPA was taken to confirm the removal of the separated instrument (Fig. 2). Working length was then determined, and cleaning and shaping of the root canal system were performed using stainless steel hand files. Obturation was done and the tooth was restored with composite restoration (Te-Econom, Ivoclar Vivadent). A radiograph was taken (Fig. 3).

Fig. 2: Radiograph after removal of file

Fig. 3: Radiograph after cleaning, shaping and obturation.

DISCUSSION

Fracture of an endodontic instrument during endodontic treatment hinders adversely affects cleaning and shaping of the root canal system. Inability to further clean and shape the root canal system can compromise the outcome of the treatment. The prognosis in these cases depends on the pulpal vitality, canal anatomy, periapical status, degree of cleaning and shaping attained at the time of separation, the level of file separation in the canal and type of fractured instrument. The prognosis of these teeth is generally lower than that of a tooth with normal endodontic treatment [5]. The use of ultrasonics along-with a microscope is a conservative method of removing a broken file compared to other alternatives [6,7]. It removes the dentine conservatively and is less likely to damage the root structure and periodontal tissue [7]. For this reason, ultrasonic retrieval was attempted in this case.

Material of fractured instrument is an important factor to be considered during its removal. The SS files do not fracture upon removal with ultrasonics, while NiTi instruments may undergo further fracture due to heat build-up when ultrasonic devices are used for their removal. The SS fragments will show early movement as they absorb the ultrasonic energy bodily, while in case of NiTi fragments, only the point of contact with the tip absorbs the energy. In this case a stainless-steel hand file was separated.

Due to various advantages of ultrasonics in instrument retrieval such as minimal dentin damage and compatible tip designs, which can reach the apical third of the canal, ultrasonic retrieval was attempted in our case.

CONCLUSION

Ultrasonic tips along- with microscope was useful in retrieval of fractured instrument.

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