Case Report

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Management of Separated Instrument In a Mandibular Second Molar with Apical Periodontitis Using A Non-Surgical Approach: A Case Report

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ABSTRACT

Background: Instrument fracture during root canal treatment is an unwanted and frustrating complication. Fracture of endodontic instrument often results from incorrect use or overuse. When a file breaks in the canal, bypassing or removal can be difficult and long term prognosis of the teeth may be compromised. Ultrasound is a favorable technique for removing broken files, although it may result in some complication. Sometimes surgery may be indicated for removal of broken segment. Fractured segment may hinder cleaning and shaping procedures with potential impact on prognosis of treatment. This report presents a specific approach in non-surgical removal of broken file from mesial canal of mandibular second molar which was partially over extended into the periapical lesion. Masserann kit along with gates glidden were used to remove the intracanal broken instrument.

Keywords: Broken instrument, files, Masserann kit.

INTRODUCTION

Nickel-titanium (NiTi) files are widely used in endodontics for cleaning and shaping of root canals. The ability of rotary NiTi files to create well-centered, smooth and minimally transported canals with minimal procedural errors has been reported in many studies [1, 2]. Despite these advantages, fracture of rotary NiTi files has become a real concern among endodontists because of high prevalence of files fracture within the root canals [3] and also vague sign of surface alteration in NiTi alloy. The composition and design of root canal instruments have been modified, with the aim of achieving better performance and fewer undesirable complications including instrument separation. Long-term prognosis of treatment subsequent to file fracture is influenced by many factors, including canal preparation stage, level of microbial contamination, and intracanal location of fractured file [4]. Every attempt should be made for removing the fragment or bypassing it followed by adequate cleaning and shaping and incorporating it into the final canal obturation [5-8]. Many techniques have been used for the retrieval of separated file [9], but there is no standardized procedure for successful fragment removal so far. Sufficient enlargement of the root canal coronal to the fragment is essential for successful retrieval. Maserann kit is one of many devices that have been proposed for removal of the fractured fragment. A Maserann kit (Micro-mega, Besancon, France) is a traditional hollow cutting end tube device with a diameter from 1.1-2.4 mm specifically designed for the removal of intracanal metallic objects. The following case describes the clinical scene of a broken intracanal instrument removal by means of maserann kit.

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Figure 1

Preoperative Radiograph

Figure 2

Radiograph after Fragment removal

Figure 3

Separated instrument removed

Figure 4

MTA placed in Distal Canal

Figure 5

Thermafil Obturation

Figure 6

post-obturation Radiograpgh

CASE REPORT

A 17 year old female was referred to us with a separated endodontic instrument in mesial canal of mandibular left second molar [37]. On clinical examination, it was found that mandibular left second molar [37] was grossly decayed and access cavity was left opened. Patient complains of a dull throbbing pain with [37] and vitality test of tooth [37] revealed no response. The tooth was tender on percussion. On radiographic examination, a separated instrument was found in middle third of mesio lingual canal (figure 1). Patient was informed about the instrument separation and removal of fragment was planned.

Masserann kit (micro-mega, Besancon, France) was used to retrieve the instrument. Initially gates glidden drill were used to cut a circumferential trough around a fragment. The metal tube was then fitted over 'freed' end of the fragment, to engage by it means of central stylus that was screwed in position. The instrument was then removed from the canal (figure 2-3).

After administration of local anesthesia using 2% lidocaine, access cavity was modified and rubber dam was applied. The working length was determined using root ZX apex locator (J. Morita USA). Instrumentation of the canals was performed using K-files (Mani, Tochigi, Japan) and gates glidden drills (Mani, Tochigi, Japan) with hybrid

preparation technique. Copious irrigation with 3% sodium hypochlorite was carried out. After irrigation with normal saline, final rinse was performed using 2% chlorhexidine gluconate. White ProRoot MTA (Dentsply, Tulsa) was mixed with distilled water according to manufacturer's instructions and was placed into the distal canal with fine tipped hand plugger (figure 4). MTA placement continues till it thickness reached almost 5mm. Back filling of the canal was done with thermafil obturation technique (figure 5). Both the mesial canals were obturated using 2% gutta percha cones and AH plus sealer with lateral condensation technique (figure 6). Access cavity was then sealed using hybrid composite (3M, ESPE). Patient was referred to the department of prosthodontics for final restoration.

DISCUSSION

Procedural errors in endodontics can occur during the process of root canal treatment that can be a result of factors over which the operator may or may not have control. Stainless steel instruments usually fail by excessive amounts of torque and NiTi instruments break due to combined action of torsional stress and cyclic loading. Instrument fracture may occur in narrow and curved canals, especially in mesial canals of mandibular molars and mesiobuccal canal of maxillary molars [10]. Because of limited accessibility, smaller dimensions, and root canal irregularities, the success rate in removing the fractured instruments in mandibular molars was only 46%, much lower than in maxillary teeth (67% of all maxillary cases). Guidelines for the management of fractured instruments have not been formulated. The trephine technique (by ultrasonics or trepan burs) combined with a grabbing technique, such as masserann exactor, the instrument removal system (Dentsply Tulsa), and the file removal system (dental cadre, santa Barbara, CA) [11, 12], have been widely used for the removal of separated instruments. In the present case report, we have made the use of masserann kit (Micro-Mega, Besancon, France) for the removal of fractured fragment. The masserann kit consists of 14 hollow cutting end trephine burs (sizes 11-24) ranging in diameter from 1.1-2.4 mm and 2 extractors (tubes into which a plunger can be advanced). The trephines (burs) are used in a counter clock wise fashion to prepare a groove (trough) around the coronal portion of the fragment. The uses of masserann instruments are largely restricted to the anterior teeth. However, by creating a wider space between the tube and plunger inside the tubular extractor, it can be used in the straight portion of the canals of posterior teeth [13]. This also increases retention while gripping the firmly wedged separated instrument. Masserann's technique is one of the most current methods for fragment removal, but this method requires vigorous reduction of dentinal walls of the root canal and weakens the root and therefore makes the root susceptible to fracture and root perforation. However, the skill and experience of the operator as well as anatomic factors may be more important for the successful retrieval or bypass of the fragment than the equipment used. Perforation is a possible complication during the removal of fractured files. The clinician should perform adequate preoperative assessment of the root canal morphology and the location of broken fragment. Based on the overall evaluation, the clinician must than choose to attempt to remove the fragment, to bypass it, or to leave the broken fragment inside the root canal.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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