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Retrieval of Separated Instrument; Challenge in Endodontics: A Case Report

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Abstract: ***Intracanal separation of instruments usually prevents access to the apex and impedes thorough cleaning and shaping of the root canal, and thus may compromise the outcome of endodontic treatment and reduce the chances of successful retreatment.Hence every attempt should be made to bypass or retrieve the separated instrument.The main purpose of this article is to create awareness among the practicing dentist regarding the retrieval of broken instrument that may occur as a procedural problem while performing an endodontic treatment. Case report described here is about the successful retrieval of a separated H-file that may be tightly wedged in the root canal dentin of maxillary molar of the left side. The separation of instruments while performing root canal procedure is a troublesome event that may block access to the apical terminus.Retrieval of separated instruments by the use of simply k file to different retrieval kits along with dental magnification like dental loupes or dental operating microscopes makes the procedure of retrieval a more effective.However, prevention of the instrument separation is the best strategy to avoid any stress and anxiety associated with it. Prevention of file separation is always more desirable than attempted removal.***

Keywords: separated H-file, Distobuccal canal, K-file, Retreatment

1. Introduction

The fracture of endodontic instrument within the root canal is one of the most undesirable events during endodontic procedure, whose removal becomes time-consuming, risky and limited success[1].Broken, separated, or "disarticulated" instruments can occur during the day-to-day practice of endodontic. Many times, we come across separated file in the root canal treated patients that are left behind by the previous dentists as fond memories accidently, knowingly or unknowingly. Most of the dentists today frequently are challenged by problems of separated instruments or fractured posts inside the root canal system which may hinder intracanal cleaning and shaping procedures[2].

There are various reasons for instrument separation inside canal such as over instrumentation, increased speed with rotary instrument, loss of tactile sensation, anatomical variation such as curved canal, over use of same file[3].

When instrument separation occurs clinician has the choice (1) leaving the instrument in canal,(2) bypass the instrument and obturation of canal ,(3) retrieving the separated file either surgically or non-surgically.

As it affects the final outcome of the endodontic therapy[4].Hence an attempt to bypass or retrieve the instrument should be made before leaving it and obturating to the level of separation or embarking upon surgery.

Case Report

A 20-year-old female patient reported in the Department of conservative dentistry and Endodontics,School of dental sciences,KIMSDU, Karadwith a chief complaint of pain in relation to upper left back region of jaw. Patient gave history of incomplete root canal treatment initiated 3 yrs back. A clinical examination revealed the presence of access opening suggesting incomplete root canal treatment #26. There was no associated swelling in relation to involved tooth but was tender on percussion. Radiographic images were taken which reveled separated H file (hand instrument) in distobuccal canal (fig.1). non-surgical root canal retreatment was initiated using dental loupes as an adjunct.

Figure 1: Pre-operative radiographic image showing separated fragment

To achieve coronal access, high speed,friction grip burs were used which enlarged the access opening and created a straight line access to all canal orifices. Then modified Gates-Glidden drills were used circumferentially to create a telescopic preparation or tapering preparation from the canal orifice to the coronal end of the broken file. small stainless steel hand #10 K-file (size of the hand file is less than the size of the separated file fragment) was precurved and inserted inside the available canal space and adapted to it. NaOCl(3%) and chelating agent EDTA(17%) used as an irrigant during attempt of retrieval of separated fragment.in

order to engage the file segment inside the canalclock wise turn was given to # 10 K-File and file was pulled out.the file segment came out of the canal along with H-file(fig.2).The radiographic image was taken to confirm retrieval of fragment.(fig.3)

Figure 2: Broken fragment (file) retrieved

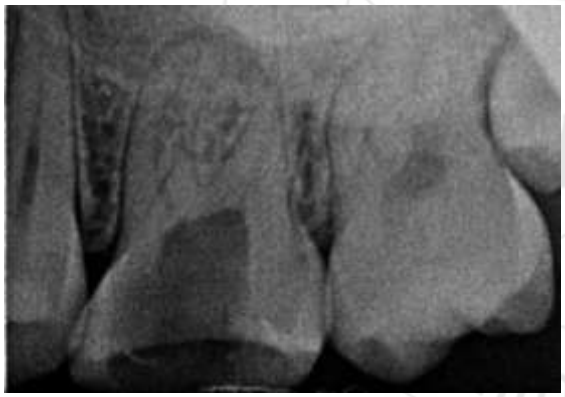

Figure 3: Post-operative radiographic image showing

Figure 4: Cleaning and shaping after file retrieval clear canal space after removal of separated fragment procedure

After retrieval Cleaning and shaping of all canals were done(fig.4) was done using hand file and an intra canal medicament was placed. After 1 week, obturation was done(fig 5) and post endodontic restoration was given.

Figure 5: Obturation done

Discussion

Intracanal separation of instruments usually prevents access to the apex and impedes thorough cleaning and shaping of the root canal, and thus may compromise the outcome of endodontic treatment and reduce the chances of successful retreatment[5-6].In such cases, prognosis following an endodontic therapy depends on the condition of the root canal (vital or nonvital), tooth (symptomatic or asymptomatic, with or without periapical pathology), level of cleaning and shaping at the time of separation, the level of separation in the canal; and is generally lower than that with normal endodontic treatment[7]. Hence every attempt should be made to bypass or retrieve the separated instrument. The orthograde retrieval depends on cross-sectional diameter, length, curvature of the canal; dentin thickness and morphology of the root; composition, cutting action (clockwise or counter clockwise) of the instrument; length, location, and amount of binding or impaction of the fragment in the canal[5].

Prior to managing retrieval efforts, special attention is paid toward preoperative radiographs and films taken during the procedure to better appreciate the thickness of the dentinal walls Prior to managing retrieval efforts, special attention is paid toward preoperative radiographs and films taken during the procedure to better appreciate the thickness of the dentinal walls.

One of the most important factors to be considered prior to instrument retrieval by this system is to obtain a straight line access to the coronal end of the separated instrument by the use of modified Gates-Glidden drills, #1 and #2 but may lead to loss of considerable amount of radicular dentin or iatrogenic perforation. Hence, it is advisable to do under dental loups or operating microscope[8].

Retrieval was attempted using dental loupes as the dental loups allows clinicians to visualize most broken instruments and greatly increases the chances for retrieval .Attempting to remove a fragment without adequate visualization highly risks perforation as root curvatures, even though not radiographically visible can easily mislead clinician to

remove dentin where it will have little benefit toward file removal[9].

The loss of dentine increases the chances of teeth to fracture. Excessive instrumentation of the root canal and dehydration of dentine may lead to fracture of the teeth. Hence, when an attempt is made to remove a fractured instrument, the potential loss of dentine must be taken into consideration[10].The presence of separated files inside the root canal system may block the accessibility to apical terminus hence impeding cleaning and shaping procedure. Hence to avoid such situations, it is always better to prevent the separation of files[11].

Successful management of separated fragment is removal or complete bypassing the fragment without creating a perforation. In this case attempt has been made to bypass the instrument using #10 K-file which bypassed successfully. While rotating it in clockwise direction along with slight apical pressure it got engaged in the flutes of H-file and was pulled out along with separated instrument.

The best antidote for separated instrument is prevention which can be done by constant monitoring of the usage of file[11].Prevention can be best achieved by thinking of negotiating and shaping instruments as disposable items. It is advisable simply to discard all over used instruments after the completion of each endodontic case which will reduce breakage, lost clinical time and anxiety[12]. The condition of files should be monitored before usage and when evidence of unwinding is seen discard the file immediate. The files should never run dry, instead they should be kept in a moist environment ethylenediaminetetra acetic acid (NaOCl or EDTA) while performing biomechanical preparation and shaping. At the beginning, coat the file with lubricant (EDTA). The lubricant will help the file function in a smooth manner and will emulsify the tissue in the canal. Forcing it to "work" will only result in fracture. Hence, one should be gentle and takes his time while preparing root canal system. The creation of straight-line access and a glide path will help files to perform at maximum capability. Incomplete access will increase the stress on the file and causes files breakage.

Conclusion

To avoid detrimental outcome of endodontic treatment due file breakage clinicians should contemplate canal anatomy, glide path, straight line access, avoiding overuse of instrument for canal preparation. Prevention of file separation is always more desirable than attempted removal. Adhering to proven concepts, integrating best strategies, and utilizing safe techniques during root canal preparation procedures will virtually eliminate the broken instrument procedural accident.

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