

Ultrasonic Technique to Retrieve a Rotary File from the Root Canal of a Mandibular Molar: A Case Report

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Abstract –

Introduction – The most common problem arising in a dental office is a broken file during endodontic treatment. This not only compromises the healing process but also create a chance for contamination.. This report explains how to remove broken files using ultrasonic instruments.

Case Report – A 29-yearold male patient had incomplete root canal treatment at the lower right first molar 1 week ago. There was the presence of broken files in the 2/3 of distal root. The retrieval started by making a staging platform with an ET20 ultrasonic tip.

Conclusion – It is possible to successfully remove broken files from the root canal using ultrasonic instruments

Keywords – Retreatment, Retrieval, Ultrasonics

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INTRODUCTION

With evolution of time nickel-titanium rotary instruments has found a major place in endodontics. The most commonly occurring issue while performing a root canal treatment is the breakage of an instrument in the root canal. The invention of nickel-titanium (Ni-Ti) alloy by Walia in 1988 transformed the way of root canals treatment.[1] Despite its wide acceptance, these files tend to fracture. The separation rates of chrome steel instruments are reported to range between 0.25% and 6% compared thereto of Ni-Ti rotary instruments, which are between 1.3% and 10.0%.[2] During instrument separation, dentist has the choice to leave the instrument in the canal, bypassing and obturating the canal, or retrieving the file fragment by the use of surgical or non-surgical technique.[3] Various techniques to remove these instruments from root canal are braiding of endodontic files,

Ultrasonics, Masserann system, IRS system, Terauchi file retrieval system.[4] This case report explains the way to remove broken files using ultrasonic instruments.

CASE REPORT

A male patient of 29 year of age visited the Santosh Dental College with the chief complaint of pain in lower right back region. Patient had a history of ongoing RCT from previous dentist few weeks back. Intraoral examination revealed an access opened lower right first molar (#46) filled with a temporary restoration. The vitality was negative and positive percussion. Pre-operative radiograph (fig 1) showed radiolucency involving enamel, dentine and pulp with widening of periodontal ligament and radiolucency in the periapical region of mandibular first molar with a

broken instrument in the middle third of the distal root. (fig 2)Diagnosis was made Based on the subjective symptoms, objective symptoms and radiographic examination as symptomatic apical periodontitis of right mandibular molar, with a separated file in the distal root. The patient was informed about the instrument inside the canal and adverse effects of keeping it untouched. Different techniques with which an attempt can be made to remove the instrument was also explained in details with advantage and disadvantage. The mouth of the patient was rinsed using 0.2% solution of chlorhexidine, after administration of local an aesthetic rubber dam was used for isolation.

Preparation of root canal was done by the use of ProTaper Next (Dentsply Maillefer, -Switzerland) in the mesial root. It was carried till obtaining the master apical file. Irrigation of the canal was done simultaneously, paper point and cotton were used to seal the orifices of 2 root canals to prevent the entry of broken file pieces. Retrieval was set up in the distal root using 4.5x loupes (Carl Zeiss). Satelec ET20 (Satelec Acteon, France) was used to prepare a staging platform using ultrasonic tip until 2 to 3mm of the broken file was visible. The process was carried for loosening the file fragment from the wall of the canal of the dentin which provides a passage to retrieve the instrument. After this ultrasonic file was circulated between file tip and the wall of root canal in anticlockwise direction. This can help loosen the file and which will provide space between it and the wall of the root canal. The broken file fragment on the canal wall was loosened using the Satelec ET25 (Satelec Acteon, France) ultrasonic tip. Irrigation was carried out with the help of 2.5% NaOCl and 17% EDTA, EndoActivator (Dentsply Maillefer, Switzerland) was use in activation. Application of ultrasonic vibration separated the developed space between the instrument and the canal wall, and moved in "push and pull" to force the fragmaent out of the canal. After which radiograph was taken for confirmation of retrieval of the file fragment.(fig 2). ProTaper Next was used in preparing distal up to X3/16.5mm and the master gutta-percha cone was confirmed by radiograph. (Fig3 & 4) Calcium hydroxide paste (Calcipex®, Nippon Shika-Yakuin, Shimonoseki, Japan) was placed as an intracanal medicament and temporary restorative material was placed. Continuous wave compaction was used after 2 weeks to fill the root canal with gutta-percha (ProTaper Next® Gutta Percha, Dentsply Tulsa Dental, Switzerland) with an MTA Fillapex sealer and closed with RMGIC (Fuji II LC, GC, Japan) temporary restoration application was done (Cavition, GC Corporation, Japan). (Fig 5)



Fig 1: pre-operative radiograph showing file in the canal



Fig2: radiograph showing file has been retrieved from the canal



Fig 3: Working length determination



Fig 4: Mastercone radiograph



Fig 5: post-operative radiograph

DISCUSSION

Breakage of an endodontic instrument during root canal treatment affects the cleaning and shaping of the root canal system causing difficulty in cleaning and shaping of the canal which effects the prognosis.[5] In breakage of file, the result depends on several factors like vitality of the canal, canal configuration, pathology of pulp, periapical status, degree of shaping procedure while separation, and the extent and type of the instrument fractured within the canal. The prognosis of these teeth has been reported to be lower than the tooth with normal endodontic treatment.[6]

Non-surgical management of separated instrument are affected by the length, position of the instrument within a canal and diameter. When 1/3rd of the overall length is exposed the instrument is usually removed. Separated fragments that remain in the straight part of the canals can many a times be retrieved.[7] Sometimes instruments are separated at the apical of the curvature of the canal. In these scenarios, an easy access to the site of separation may not be achieved. Then the retrieval of the separated instrument is typically impossible and surgery or extraction are going to be needed sometimes in presence of adverse signs and symptoms. Another important factor to be considered

is the type of material causing an obstruction. Stainless steel files do not fracture further during removal process and they have a tendency for easier removal.[8] It is also important to understand whether the file was rotating clockwise or anticlockwise just before separation as this factor will influence the right ultrasonic removal technique. In the present case report ultrasonic technique accompanied by a magnifying loupe was used for increased visibility and ease of treatment, better working posture and increased referral. The ultrasonic endodontic device is highly effective in instrument retrieval as it can be used in any retreatment case irrespective of the position of the separated file fragment in the tooth involved. Another factor that helps in successful instrument removal is combining the best of the presently developed and proven technologies.[9] The primary take away message of the case report is use of minimal, cost effective and simple technique for file retrieval. The treatment was successful with a favourable prognosis because the broken file was completely removed followed by three dimensional sealing of the root canal.

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