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Successful Retrieval of Broken Endodontic Instrument: A Case Report

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Abstract

The separation of an endodontic instrument during a root canal procedure is one of the most common endodontic mishaps. Separation of endodontic instruments may block access to the apical portion of the root and hamper the disinfection process. The separation of the rotary files is seen occasionally due to improper use, multiple use, cyclic fatigue, canal curvature, ledges and lack of technique, which results in improper cleaning and shaping of the root canals, compromising the treatment outcome. However, due to the advancements in the methods and armamentarium, file bypass and the effective retrieval of a separated instrument (SI) from the root canal has become possible. The current case series underscored the management of separated instruments, where files were successfully removed after being separated intracanal at different levels in three cases.

Keywords: Endodontics, File retrieval, Case Report

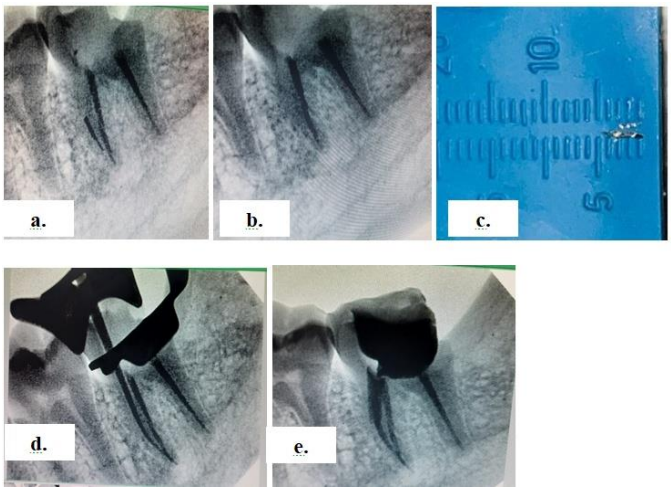
Introduction

Fractures occurring within the root canal during root canal treatment represent an undesirable and vexing complication. Such fractures typically arise from improper usage or excessive application of an endodontic instrument [1]. Separation of endodontic

instruments may block access to the apical portion of the root and hamper the disinfection process [2]. The utilization of technological advancements like the dental operating microscope (DOM) and ultrasonics has facilitated improved visualization of the operating field and simplified manipulation of the root canal. These advancements empower clinicians to effectively access fractured instruments, potentially resulting in high success rates in instrument fragment removal, as documented by Cuje et al. [3]. The separation of the rotary files is seen occasionally due to improper use, multiple use, cyclic fatigue, canal curvature, ledges and lack of technique, which results in improper cleaning and shaping of the root canals, compromising the treatment outcome. However, due to the advancements in the methods and armamentarium, file bypass and the effective retrieval of a separated instrument (SI) from the root canal has become possible.[4] The current case series underscored the management of separated instruments, where files were successfully removed after being separated intracanal at different levels in three cases.[5] The instruments were separated intracanal at various levels in the apical third of mandibular premolar, molar and coronal third of maxillary molar. The level of separation was located, staging performed, and SI was removed using an ultrasonic device under magnification. followed by obturation till the entire working length and subsequent post-endodontic restoration. This supports the use of a convenient, reliable, and cost-effective approach to managing fractured endodontic instruments without costly equipment or specific retrieval kits to maintain the tooth integrity. [6]

Case 1: 45-Year-old female patient with a non-contributory medical history reported to the department of conservative and endodontics ACPM Dental College Dhule, with a chief complaint of pain in the lower left mandibular first molar (tooth #37) following a separated rotary file. The pain was mild in intensity, intermittent in nature, aggravated on chewing food, and was relieved on taking medication. The patient gave a past dental history of attempted root canal treatment at a private dental clinic 5 months back and has had pain since then. After the clinical examination. The tooth was tender to vertical percussion and showed no response to the electric pulp testing (Digitest, Parkell Inc, Usa) and cold test (endo-frost, Coltene Whaledent, switzerland). There were two separated files were noted in same canal on radiographic examination at the apical portion of the mesiobuccal root, while the mesiolingual and distal canal were already obturated [figure1 a]. Based on the clinical and radiographic observations, a diagnosis of previously initiated root canal treatment with symptomatic apical periodontitis was made, and retreatment was planned to retrieve the separated instrument. informed consent was obtained from the patient after explaining the treatment plan local anaesthesia was given. Rubber dam was applied, access cavity preparation was modified under a surgical operating microscope (Labomed). Modified gates glidden drill no. 3 (Dentsply maillefer, ballaigues, switzerland) was used at a speed of 800 rpm to prepare a staging platform Gates Glidden drill was modified by cutting it perpendicular to its long axis at its greatest diameter. The fractured instrument was visible under the operating microscope at this stage. Ultrasonic tip e1(woodpecker) was attached to U-file (Mani, India) and positioned between the canal wall and fractured instrument and activated at the lowest power setting by moving it in the counter clockwise direction in dry conditions. Followed by irrigation with saline and liquid edta, canal dried with paper points. Edible oil was introduced in the canal for lubrication of the file. The

instrument was loosened in the canal and moved in the coronal direction; other canals were blocked by pressing a Teflon tape to prevent the file from getting lodged in in other canals. Once the file popped out it was carefully removed with tweezer. Once the file segment was removed, each canal was re-negotiated with a #10 k-file to the apical foramen. The working length was estimated using an apex locator and confirmed using a radiograph. Coronal flaring was done using Protaper sx rotary instrument, canal preparation was then completed using protaper gold (dentsply maillefer) to an apical size of 35/.04. All prepared canals were obturated using gutta percha and AH26 sealer using a lateral condensation technique. A 3 and 6-month follow-up revealed that the tooth was asymptomatic with a significant reduction in the periapical radiolucency associated with the distal root.



(a) Preoperative RVG of mandibular left Second molar (tooth #37). two separated files were noted in same canal at the apical portion of the mesio-buccal root, where the coronal portion of the instrument is 2- 2.5 mm below the orifice and 1 mm short of the apex. b) removal of the separated instrument c) Broken file fragment d) Radiograph shows the proper fit of the master cone e) Canals were obturated using the lateral condensation technique.

Discussion

When instruments separate within the root canal, it typically hinders reaching the apex, obstructs effective cleaning and shaping of the canal, potentially compromising the success of endodontic treatment and diminishing the prospects for successful retreatment.The successful retrieval of separated instruments in endodontics relies on various factors, including the cross-sectional diameter, length, and curvature of the canal, as well as the thickness and morphology of the dentin and root structure.[7] Additionally, the composition and cutting action (clockwise or counterclockwise) of the instrument, along with factors such as the length, location, and degree of binding or impaction of the fragment within the canal, all play crucial roles. Masseran technique is a technique sensitive and time consuming yet by tactful applicability, within its clinical limitations, coupled by the skill of the operator, separated files were retrieved from maxillary lateral incisor, maxillary and mandibular molar.[8] Nevertheless, use of ultra sonics, coupled with the dental operating microscope, makes it more effective in selected cases. Fors and Berg propose a treatment plan for managing broken instruments based primarily on their location within the root canal. Instruments located in the coronal third can typically be removed by grasping them with a file extractor or small pliers. Those in the middle third are best left in place to avoid risking excessive canal enlargement, weakening the tooth, or causing perforation.[9] However, if necrotic pulp tissue remains apical to the fragment and bypassing is not feasible, removal procedures should be considered. Instruments in the apical third should generally be left in situ, while the canal portion coronal to the fragment is cleaned, shaped, and filled as usual. Attempting to remove or bypass apical fragments could lead to root

perforation, further compromising the tooth's prognosis. If additional treatment is necessary, options such as apical surgery, intentional replantation, or extraction are recommended. [9] The technique employed can also significantly influence the success of the removal procedure, albeit it may not hold as much significance as anatomical factors. Over recent years, there has been considerable advocacy for ultrasonic devices in the extraction of broken instruments. This is due to their capability to reach deep within the root canal system using ultrasonic tips or endosonic files.

Conclusion

The successful retrieval of broken endodontic files is a critical aspect of endodontic practice, influenced by both anatomical considerations and the technique employed. Advances in technology, such as ultrasonic devices, have demonstrated effectiveness in navigating complex root canal systems and facilitating the extraction of fractured instruments. Through careful case management and selection of appropriate techniques, clinicians can achieve favorable outcomes in file retrieval procedures, ultimately contributing to improved patient care and treatment success in endodontics. Continued research and refinement of techniques will further enhance our ability to manage and overcome challenges associated with broken instrument retrieval in clinical practice.

References

1. Rahimi M, Parashos P. A novel technique for the removal of fractured instruments in the apical third of curved root canals. International endodontic journal. 2009 Mar;42(3):264-70.
2. Terauchi Y, O'Leary L, Kikuchi I, Asanagi M, Yoshioka T, Kobayashi C, Suda H. Evaluation of the efficiency of a new file removal system in comparison with two conventional systems. Journal of endodontics. 2007 May 1;33(5):585-8.
3. Cujé J, Bargholz C, Huelsmann M. The outcome of retained instrument removal in a specialist practice. International endodontic journal. 2010 Jul;43(7):545-54.
4. Ward JR, Parashos P, Messer HH. Evaluation of an ultrasonic technique to remove fractured rotary nickel-titanium endodontic instruments from root canals: clinical cases. Journal of Endodontics. 2003 Nov 1;29(11):764-7.
5. Souter NJ, Messer HH. Complications associated with fractured file removal using an ultrasonic technique. Journal of endodontics. 2005 Jun 1;31(6):450-2.
6. Nevares G, Cunha RS, Zuolo ML, da SilveiraBueno CE. Success rates for removing or bypassing fractured instruments: a prospective clinical study. Journal of endodontics. 2012 Apr 1;38(4):442-4.
7. Shen Y, Peng B, Cheung GS. Factors associated with the removal of fractured NiTi instruments from root canal systems. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2004 Nov 1;98(5):605-10.
8. Ward JR, Parashos P, Messer HH. Evaluation of an ultrasonic technique to remove fractured rotary nickel-titanium endodontic instruments from root canals: clinical cases. Journal of Endodontics. 2003 Nov 1;29(11):764-7.
9. Gencoglu N, Helvacioglu D. Comparison of the different techniques to remove fractured endodontic instruments from root canal systems. European journal of dentistry. 2009 Apr;3(02):90-5.