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Dual Approach To File Retrieval: Braiding Technique And Ultrasonics For Successful Endodontic Management: Case Report

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Abstract
Instrument separation is among the most frequently encountered complications in endodontic therapy, often impacting the prognosis and long-term success of root canal treatment. The presence of a fractured instrument within the canal hinders adequate cleaning, shaping, and irrigation of the root canal system, particularly in segments apical to the obstruction. When attempts to bypass the retained fragment are unsuccessful, mechanical retrieval is advocated to re-establish canal patency. This case report details the clinical application of three distinct techniques for the retrieval of separated instruments within the root canal.

Keywords: *Braiding technique, Instrument retrieval, Instrument separation.*

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I. Introduction

File separation inside the root canal has become a common error in endodontics. The separated instrument, particularly a broken file, leads to the root canal obstruction and prevents thorough cleaning and shaping procedures. There can be continuous pain or discomfort in the involved tooth if the broken instrument is not removed or bypassed.(1)

There are various reasons for instrument separation inside the canal, such as over-instrumentation, improper filing techniques, increased speed with rotary instrument, loss of tactile sensation, anatomical variations like curved canals, and accessory canals.(2) When instrument separation occurs, the clinician has the choice of (1) leaving the instrument in the canal, (2) bypassing and obturating the canal, or (3) retrieving the file segment either surgically or nonsurgically.

The success of file retrieval depends on the canal anatomy, metallurgy of the broken file segment, location of the fragment inside the canal, the plane in which the canal curves, the length of the separated fragment, and the diameter of the canal itself.(3) There are various nonsurgical methods to retrieve a broken file segment, like the use of ultrasonic tips (ProUltra tips, Dentsply), Masserann Kit, Gates Gliden drills for coronal enlargement, etc.(4) In this case report, the various treatment modalities are discussed when there was file separation inside the canal.

II. Case Reports

Case 1

A 24-year-old male patient reported to the postgraduate clinic of the Department of Conservative Dentistry and Endodontics at our institute with the chief complaint of pain in the upper anterior region. The patient had undergone root canal treatment in the same teeth two months earlier and had been experiencing pain for the past three days. Clinical examination revealed no associated swelling, but the involved tooth was tender on percussion. The surrounding gingival tissues appeared inflamed, although probing depths were within normal

limits. An intraoral periapical (IOPA) radiograph showed a separated instrument (SI) in the maxillary left central incisor. (Fig. 1)

In this case, the "braiding file technique" was employed to retrieve the separated instrument under rubber dam. The location of the fractured file segment was coronal to the apical third. Magnification loupes were used for enhanced visibility. The fragment was first bypassed up to size 20/04, followed by removal of the lingual shoulder using an Endo-Z bur. Three H-files were then introduced—one mesial, one distal and the other buccally—and intertwined in a clockwise direction to engage the fragment within the canal. After a controlled clockwise turn,the files were withdrawn together, successfully removing the fractured segment along with them. (Fig 2 to 3).

Fig 1: Preoperative radiograph (Case 1)

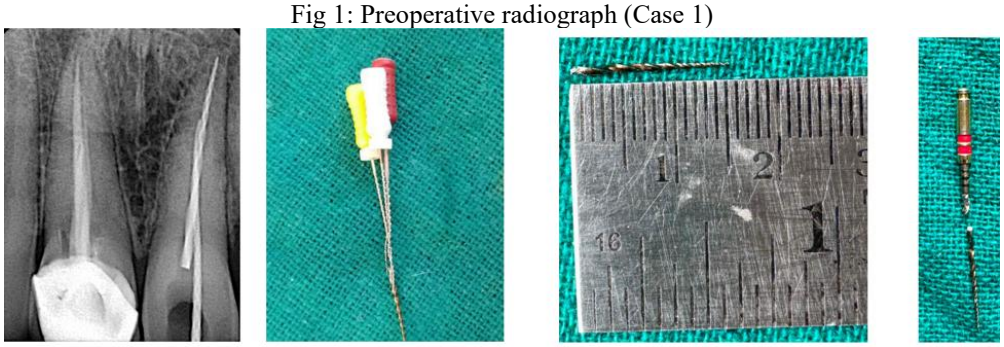

Fig 2: H-file braiding technique and retrieved SI

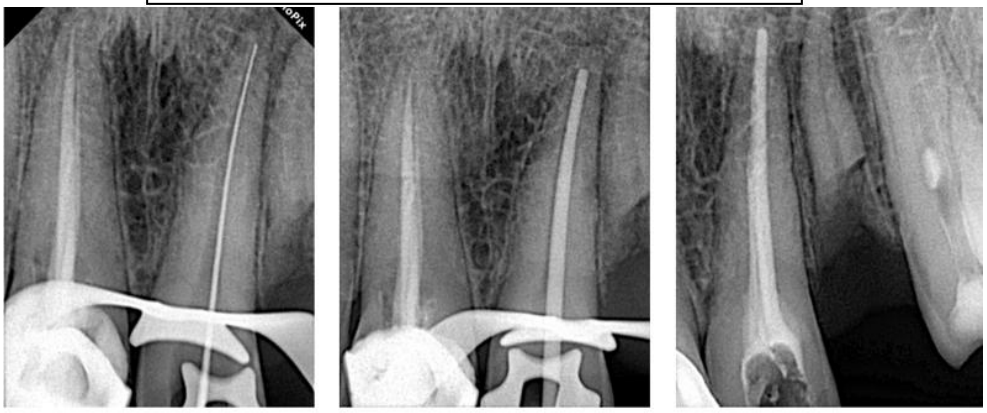

Fig 3: Radiograph of cleared 21, master cone and obturation

Case 2

A 30-year-old male patient, referred by a general dentist, presented with mild, intermittent pain of two weeks' duration, which was aggravated on mastication. The patient reported that dental treatment had been initiated one month earlier.

Intraoral examination revealed a large occlusal cavity in the left maxillary first molar (26), which was tender on percussion. An intraoral periapical (IOPA) radiograph showed a separated instrument (SI) in the second mesiobuccal canal along with significant periapical pathology. (Fig. 4) Based on clinical and radiographic findings, a diagnosis of *Previously Initiated Therapy* was established, and nonsurgical retreatment was planned.

The canal orifice was enlarged using an orifice opener (ProTaper Gold, Dentsply). The separated fragment was bypassed (Fig. 5) and prepared up to size 20/02. Straight-line access to the SI was then achieved with an ultrasonic tip (Woodpecker), enabling visualization of the coronal portion of the fragment under a dental operating microscope (Labomed). The SI was successfully retrieved using the ultrasonic tip. Following removal, the canals were thoroughly debrided and medicated with calcium hydroxide paste. At a 21-day recall visit, obturation was completed, followed by post-endodontic restoration. (Fig 6)

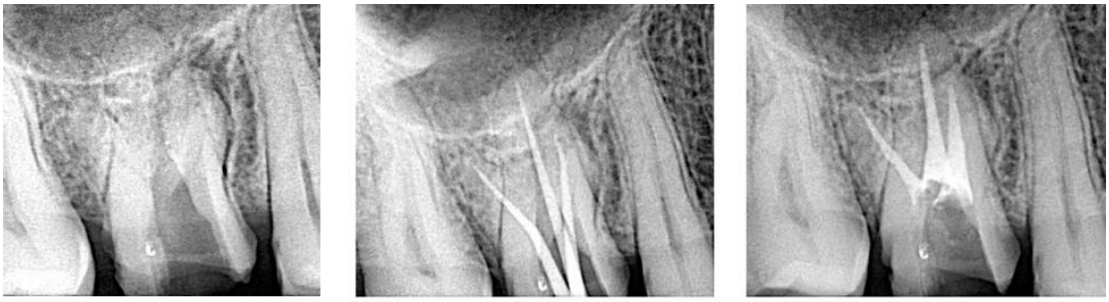

Fig 6: Radiograph showing clear mesiobuccal canals, master cone and obturation

Fig 4: Preoperative Radiograph (Case 2)

Fig 5: K-file approaching the apex of both Mesiobuccal canals

III. Discussion

Retrieval of broken file segment has become a challenging part of root canal therapy. Various attempts can be made to remove the broken file to increase the longevity of the treatment option. Several methods are described to remove broken instruments or objects within root canals. The evaluation of fractured instrument removal systems and techniques, such as the Masserann Kit, Endo Extractor (Brasseler USA Inc.), wire loop technique, the Canal Finder System, and ultrasonic devices.(5) The limitations of these devices include excessive removal of root canal dentin, ledging, perforation, limited application in narrow and curved roots, and extrusion of the fractured portion through the apex. In the present case reports, we used a conservative approach to remove the file segment and to cause less harm to the tooth, by preserving the root canal dentin. In the first case, a suction device was used to pull up the file segment by creating a negative pressure. In the second case, an H-file braiding technique was used. One of the most important factors to be considered prior to instrument retrieval is to obtain a straight line access to the coronal end of the separated instrument by the use of modified Gates Gliden drills.(6) However, this leads to removal of a considerable amount of radicular dentin and can cause iatrogenic damage like perforation.(7) A close inspection of preop erative radiographs and knowledge of root anatomy is imperative before attempting the removal procedure in any tooth to ascertain the relative amount of surrounding dentin and the risk of perforation.(8) File removal generally results in ledge formation and therefore a possible stress concentration point. When the file is located in the middle or apical third of the root, removal procedure significantly reduces the root strength. (9)

IV. Conclusion

This case report demonstrates the successful management of separated instruments using two retrieval techniques: the braiding file method and use of ultrasonic tips. Both approaches were efficient, economical, and conservative of tooth structure. The favorable outcome emphasizes that with proper case selection, magnification, and meticulous sealing of the root canal system, predictable long-term prognosis can be achieved.

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