

# Retrieval of Separated Instrument: A Case Report

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## Abstract

Instrument fracture is one of the most common endodontic mishap during root canal therapy. Separated instrument results in inadequate cleaning and shaping of root canals. Inadequate biomechanical preparation affects the outcome and prognosis of root canal treatment. Hence retrieval of the separated instrument should be considered as an option. Various instrument retrieval kits and techniques are available for this purpose. In the present case report a separated rotary instrument was successfully retrieved from the distal canal of mandibular second molar using Masserann kit and file braiding technique.

**Key Words:** Separated instrument, instrument retrieval, braiding technique, Masserann kit

## Introduction

During endodontic procedures various procedural errors like perforations, ledge formation, instrument separation etc weakens the success of the case. Instrument separation being the most common one ranging between 1.83% to 8.2%.<sup>1-3</sup>

Though Ni-Ti instruments have various advantages like shape memory and super elasticity but the separation incidence is much higher (0.13% to 10 %) than stainless steel instruments (0.25% to 6%).<sup>2,4</sup> The instrument separation is more common in molars (77% - 89%).<sup>3,5</sup>

Various factors like sharp canal curvature, improper technique or overuse of instrument, too much apical pressure, no lubrication of the root canals and clinician's neglect are few of the common reasons responsible for instrument separation.

Various specialized instrument retrieval kits are available such as the Masserann Kit, Cancellier Kit, IRS Kit, Canal Finder, Endo rescue, and Mini forceps, ultrasonics, wire and loop and file braiding technique.<sup>6</sup>

Some of these kits are not easily available, costly too and would need to trephine more of dentin around the fractured fragment.

## Case Report

A 33-year-old female patient came to the department of conservative dentistry and endodontics with the chief complaint of pain in lower back tooth region. Preoperative radiograph revealed occlusal caries involving pulp with periodontal widening and periapical radiolucency in mandibular second molar. (Figure 1)



Fig 1-Preoperative radiograph showing occlusal caries

Root canal therapy was initiated. Access opening was done under local anesthesia. Working length was recorded with an electronic apex locator and confirmed radiographically. During biomechanical preparation, a

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25 (0.06) instrument (Edge Endo) got separated in the distal canal, confirmed with a radiograph (12-14 mm in length) (Fig 2)



**Fig 2-Separated instrument in distal canal**  
**On radiographic examination approximately 1mm instrument**

was beyond the apex. Instrument retrieval was attempted with Masserann kit and file braiding. The dentine around the distal canal was troughed with a tapered bur to make space and loosen the fractured fragment.

The selected trepan a diameter 1.1mm was inserted in the canal and rotated in anti-clockwise direction creating space around the separated fragment. The use of Masserann's technique resulted in loosening of the separated instrument but could not help retrieve the separated instrument. Hence file braiding technique was employed in adjunct to the above system.

Three new H files (15,20, 25) were used to engage the separated instrument as deep as possible. The files were rotated anti-clockwise with a short outward pull resulting in the removal of instrument from the canal. (Fig 3,4,5)



**Fig 3-After instrument retrieval Fig 4-Separated instrument**



**Fig 5-File Braiding technique**

The canal was irrigated with 2.5% sodium hypochlorite and normal saline. A calcium hydroxide dressing was given as an inter-appointment dressing. The patient was recalled after a week. The canals were irrigated and dried with paper points. The distal canal was obturated with cold lateral compaction using AH plus sealer and single cone obturation in mesial canals.

The access cavity was restored with composite. The patient was asymptomatic during the follow up period.



**Fig 6-Post obturation**

## Discussion

The fractured fragment blocks the apical end of the root canal resulting in inadequate chemo-mechanical preparation of the root canals, thus affecting the prognosis of the treatment outcome.<sup>7</sup> Various factors are related to fracture of rotary instruments like experience of operator, speed and torque of the instrument, canal curvature, instrument design and technique, manufacturing process, and inadequate glide path.<sup>8</sup>

There are two options for management of separated instrument: it can be bypassed or retrieved.<sup>9</sup> Retrieval was attempted in the present case where 12-14 mm of instrument was retrieved from the distal canal. The separated instrument was 1mm beyond the apical foramen, hence was impossible to bypass. As a result, instrument retrieval was considered as an option.

Masserann's kit was used for instrument retrieval with a success rate reported of 73% and 44% respectively in anterior and posterior region.<sup>10</sup> It consists of 14 hollow cutting-end trephine burs (sizes 11-24) ranging in diameter 1.1-2.4mm and 2 extractors. The trephine is used in anti-clockwise direction to remove dentine around the separated instrument.<sup>11</sup> The main advantage with Masserann's kit is that the separated instrument is removed quickly without heating or pushing the fragment further apically. It allows the loosening of the broken instrument around its periphery.<sup>11,12</sup>

In this case, Masserann's kit was used freeing the fractured segment from its surrounding dentine. But the fractured segment could not be grasped, hence, file braiding technique was employed with different sizes of three new Hfiles (15,20,25) that were braided with a short outward stroke that retrieved the fragment.

The first Hedstrom file was wedged alongside the fractured segment into the canal gripping the fractured segment. The other two Hedstrom files were gently inserted into the canal. The three files were rotated anti-clockwise and withdrawn together. The fractured segment was engaged and removed.<sup>13</sup>

The distal canal of the mandibular molar was obturated by cold lateral compaction technique as the diameter of the canal was increased due to the troughing procedure. The obturation of mesial canals was done using single cone obturation technique.

The chances of successful removal of separated instrument also depends on various factors presence of gap between the fragment and root canal wall, the length, diameter, curvature of canal, radicular dentine thickness and presence of concavities.<sup>7,14</sup> The type of material causing an obstruction is another important factor to be considered. Nickel titanium instruments separate more often due to torsional failure.<sup>7</sup>

However, retrieval of instrument is time consuming, increases patient's anxiety level, can lead to further complications. It should be avoided by following a straight-line access with adequate glide path, using the Ni-Ti rotary files at recommended torque and speed, avoiding over use of instruments.<sup>6</sup>

## Conclusion

The Ni-Ti rotary instrument was successfully removed from the distal canal of mandibular second molar using the file braiding technique and Masserann's kit. Comprehensive treatment plan for any case mostly always guarantees success.

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