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# Two-year follow-up of a mandibular second premolar with a fractured irrigation needle extending beyond the apex: A case report

**KEYWORDS**
Endodontic instrument fracture;
Irrigation needle;
Mandibular premolar;
Root canal treatment

Endodontic instrument fracture can occur during the root canal procedure, with the most commonly fractured tools being stainless steel endodontic files and nickel-titanium (NiTi) rotary instruments.[1–5] The incidence of irrigation needle fracture is relatively rare. This article reports an incident where an irrigation needle fractured and extended beyond the apex during a root canal treatment. Over a two-year follow-up, the patient remained asymptomatic.

A 41-year-old female patient was referred for the treatment of her right lower second premolar. The patient experienced chewing pain in her right lower second premolar for almost a month. She visited a local dental clinic for treatment. The tooth was accessed, and the root canal was left open for drainage for a week. However, the chewing pain persisted without relief from antibiotics or painkillers. Clinical examination showed moderate tenderness to percussion and a composite resin restoration on the distal occlusal surface without secondary caries. Periodontal probing was within normal limits. A pre-operative radiograph revealed a periapical lesion in the tooth #45 (Fig. 1A). The diagnosis was previously initiated and symptomatic apical periodontitis. The treatment plan included root canal treatment followed by a post-and-core supported full crown restoration.

The tooth was isolated with a rubber dam. The chamber was irrigated with 3 % sodium hypochlorite (NaOCl) solution, and a #15 K-file was used to negotiate the root canal. The working length was measured with an electronic apex locator. The canal was shaped to #25/.06 using NiTi rotary system, with alternating irrigation using a 31G/27 mm double side-vented irrigation needle with 3 % NaOCl and 17 % ethylenediaminetetraacetic acid (EDTA) solution. Calcium hydroxide paste was introduced into the canal, and the access cavity was sealed with a temporary filling material. One week later, the patient returned. The tooth was re-isolated, and the temporary filling removed. The canals were rinsed with a 31G/27 mm double side-vented irrigation needle and 3 % NaOCl solution. A trial fitting of the master gutta-percha cone revealed a radiopaque fragment in the apex (Fig. 1B). The shape suggested it was the tip of the irrigation needle, confirming an instrument fracture (Fig. 1C). The patient was informed of the fracture and presented with two options: complete the root canal treatment without removing the fractured instrument or opt for surgical intervention. Choosing the former, the canal was soaked in 3 % NaOCl solution and underwent three 20-s ultrasonic irrigation sessions with an ultrasonic tip followed by 17 % EDTA solution. The root canal filling was completed using the continuous wave obturation technique, and a periapical radiograph was taken to confirm good apical sealing (Fig. 1D), and the canal was backfilled with gutta-percha. The restoration was completed with a light-cured composite resin. The patient was advised to observe for two weeks before proceeding with the post-and-core supported full crown restoration. At

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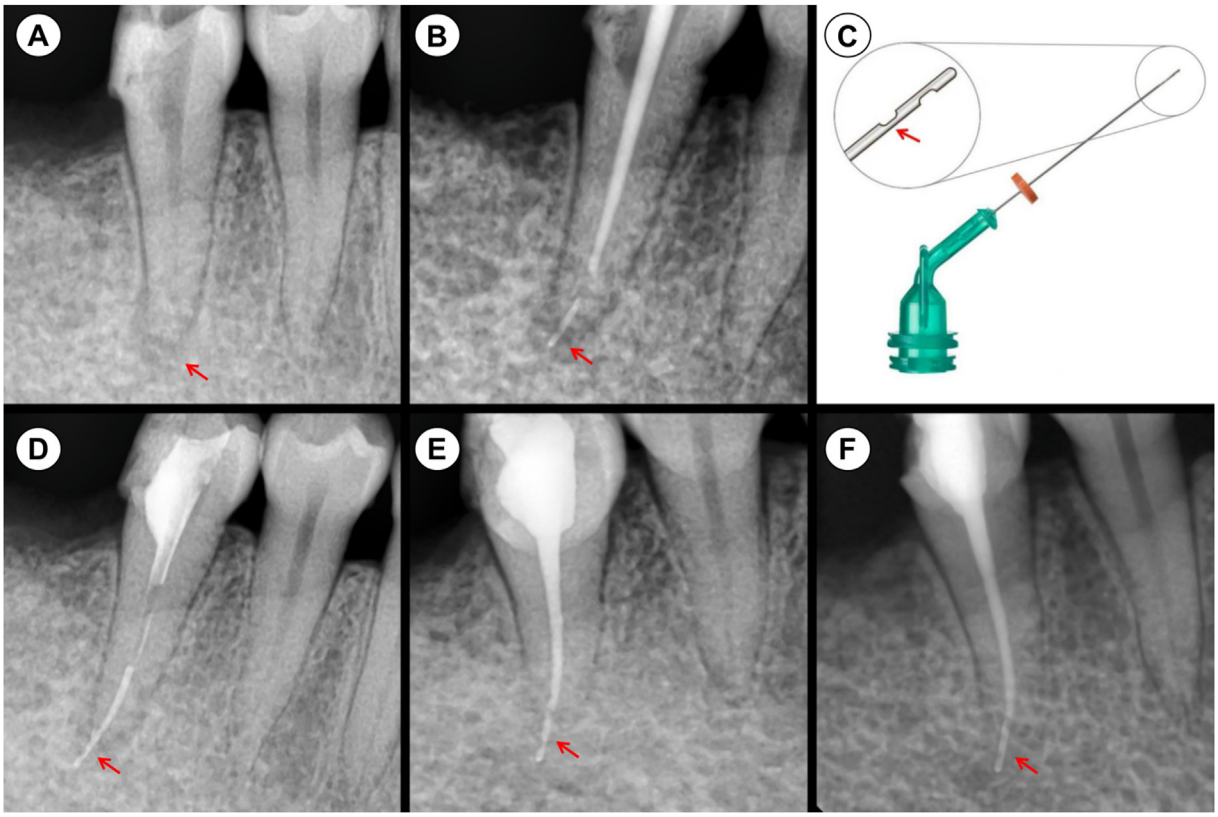


**Figure 1** Periapical radiographs of our case of the mandibular second premolar and schematic diagram of the double side-vented irrigation needle. (A) Pre-operative radiograph showing a periapical lesion of the tooth #45 (red arrow). (B) Radiograph of master gutta-percha cone fitting revealing a radiopaque fragment (red arrow) in the root apex. (C) Schematic diagram of a 31G/27 mm double side-vented irrigation needle. The red arrow indicates the needle's weak point and the location of the fracture. (D) Periapical radiograph demonstrating good apical sealing of the fractured irrigation needle fragment (red arrow). (E) Six-month follow-up radiograph revealing complete healing of the periapical lesion of the tooth #45 (red arrow). (F) Two-year follow-up radiograph displaying normal lamina dura around the root apex of the tooth #45 (red arrow).

the 6-month follow-up, the tooth remained asymptomatic. A periapical radiograph showed complete healing of the periapical lesion (Fig. 1E). At the two-year follow-up, the tooth was still asymptomatic, and a radiograph showed normal lamina dura around the apex (Fig. 1F).

## Declaration of competing interest

The authors have no conflicts of interest relevant to this article to declare.

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