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NON-SURGICAL ENDODONTIC TREATMENT OF PREMOLAR WITH THREE ROOT CANALS: A CASE REPORT

Aishwarya Trivedi, Prateek Singh Asheesh Sawhny, Saurabh Sharma, Shweta Rai , Syed Manzoor ul haq Bukhari , Charoo lata

Rama Dental College Hospital and Research Centre, Rama University, Mandhana, Kanpur.

ABSTRACT

A successful root canal therapy requires a precise identification of the root canal system's morphology. According to certain reports, the Indian population possesses extremely few premolar teeth of any kind. Locating root canal orifices is made easier by diagnostic instruments like preoperative radiography and pulp chamber floor inspection. Successful endodontic therapy requires the use of magnification instruments, radiography exposed at two different horizontal angles, and their meticulous explanation. Three maxillary premolar teeth and one mandibular premolar tooth with three root canals each have had successful endodontic treatment, as shown in this case study.

Keywords: Endodontics; premolar teeth; root canal system.

INTRODUCTION

Understanding the structure and morphology of the root canal system is essential for performing endodontic therapy successfully. Unusualities that may have anatomical variances could cause the root canal system to fail because of inadequate three-dimensional obturation and inadequate instrumentation.[1,2] The endodontist needs precise radiographic evaluation from various horizontal angles in order to identify the roots and root canals. Furthermore, proper clinical placement of root canal orifices depends on examination of the anatomy of the pulp chamber during coronal access.[3]

Variations in root canal shape are linked to the high incidence of endodontic flare-ups and failures. The anatomic study may exhibit variations based on age, gender, race, and the type of study design (in vitro versus in vivo).[4] Magnification is a very useful tool for identifying and treating "extra" canals. Additionally, it has been discovered that the dental operating microscope (DOM) is quite beneficial. Advanced training is necessary for the effective utilization of the DOM. A magnification of 10× to 15× is commonly used for endodontic treatments, with some even requiring a magnification of 30×. When a DOM is used skillfully, it should be used throughout the entire process.

An endodontist who works in this manner needs to be very skilled in both ergonomics and vision.[5] The endodontic treatment of a 20-year-old patient's three-canalled maxillary premolar is described in this publication.

CASE REPORT

A 20-year-old male patient complained of pain in the posterior left maxillary region for the previous week and was sent to the department of endodontics at the Rama Dental College in Mandhna. He described experiencing sporadic pain in the same area for the previous three months. His medical background did not play a role. A carious left maxillary second premolar (#25) was discovered during clinical and radiographic examination; it was not sensitive to percussion (Figure 1A). The diagnosis of irreversible pulpitis with normal periodontium of the #25 necessitates endodontic therapy according on the clinical and radiographic evidence. Three roots in #25 had an atypical anatomy, according to the radiographic examination (Fig. 1a).

A rubber dam was used to isolate and sedate the tooth. Using a high-speed handpiece and a round diamond bur No. 2 and an Endo Z bur (Dentsply Maillefer), endodontic access was prepared. To get rid of microorganisms and debris, the pulp chamber was cleansed with 5% sodium hypochlorite (NaOCl). Straight-line access to each canal was made possible by the creation of separate conservative access apertures under magnification. Three separate orifices could be seen when the pulp room floor was examined. Canal patency was assessed using Dentsply's #10 K-file. An apex locator (ProPex Pixi, Dentsply Maillefer) was used to determine the working length, and radiography was used to confirm it (Fig. 1b).

It was determined that there were three distinct canals—two buccal and one palatal. Reciproc R25 instruments (VDW, Munich, Germany) were used for cleaning and shaping, employing a crown-down approach and frequent irrigation with a 5% NaOCl solution in a 5 mL syringe. For each canal, a final irrigation of 10 milliliters of 5% NaOCl solution was carried out. Paper points (Maillefer, Dentsply, Ballaigues, Switzerland) were used to dry the root canals, and a cold lateral compaction technique was used to obturate them using gutta-percha (Dentsply Maillefer) and a resin-based sealer (AH plus, Dentsply Maillefer) (Fig. 1c). Resin composite was used to reconstruct the coronal access cavity (3M ESPE, St Paul, MN, USA). One year after surgery, radiographic control showed a tooth that was asymptomatic and showed no indications of periapical periodontitis (Fig. 1d).

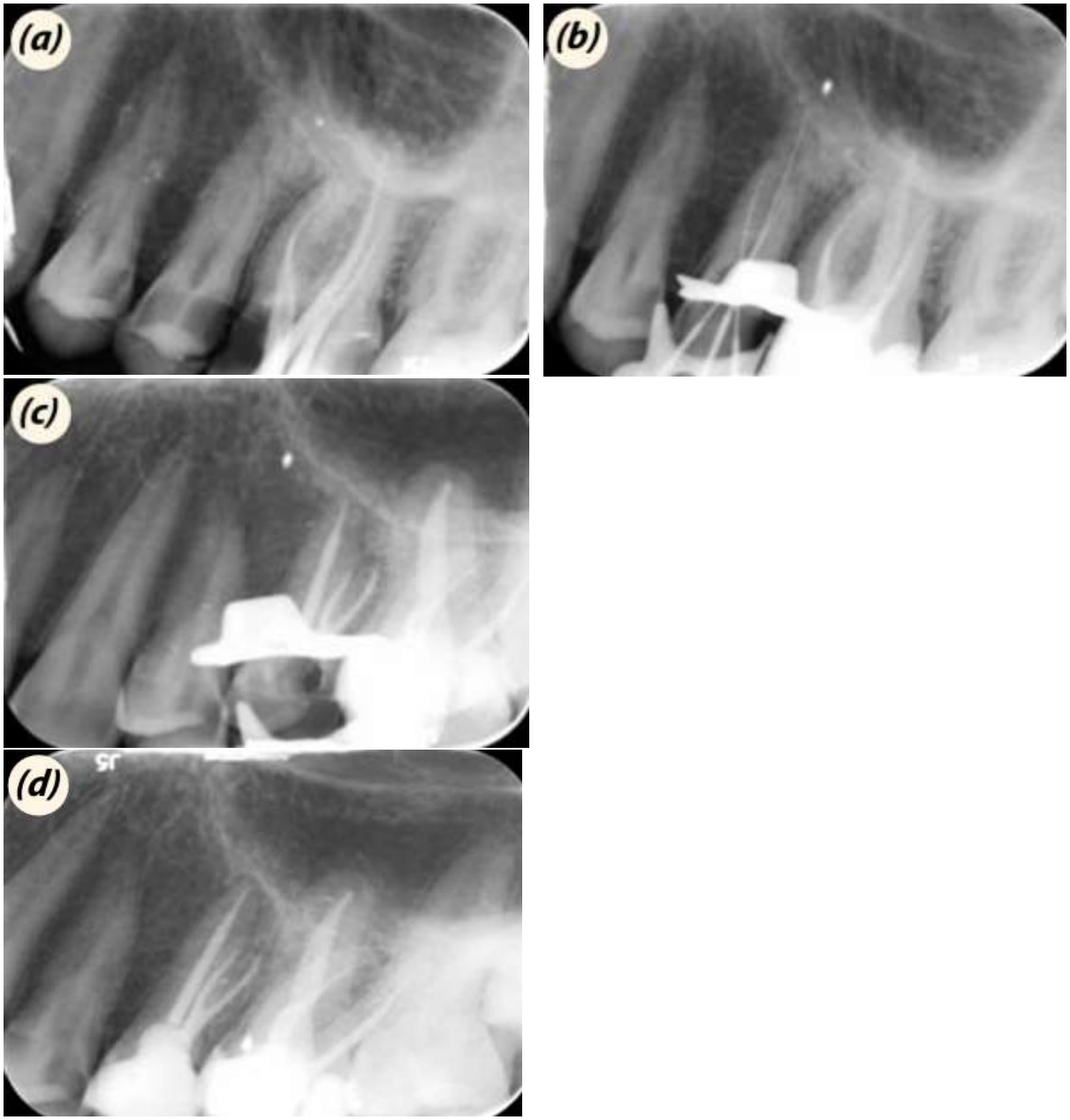

Fig. 1. Preoperative radiography (a). Length-determination radiography demonstrating three instrumented root canals (b). Radiographic control fol lowing definite obturation three root canals (c). One year follow-up radiographic control (d).

DISCUSSION

It is difficult to precisely determine in three dimensions the form, quantity, and internal anatomy of teeth in a clinical setting. Because of the great degree of variety in the root canal system, every endodontic treatment is distinct.[6] Teeth that are maxillary premolars often have one or two canals. When the pulp chamber does not appear to be aligned in the typical buccopalatal connection, a clinical suspicion of a third canal should be raised. Multiple root

canals should be considered if the pulp chamber appears to differ from its typical shape and appears to be either trapezoidal in shape or too big in a mesiodistal plane.[9]

The endodontic treatment of three cases of three-canalled maxillary premolars in different patients and the endodontic treatment of one case of three-canalled mandibular pre molar in a different patient were presented in this paper. Preoperative radiographs are used to identify anatomical alterations of the root canal system. The analysis of the anatomical aspects of pulp chamber roof can also help in identifying these internal variations thus, facilitating the proper location of all root canals. [8,10–12]. To accurately diagnose more than one root or root canal system, at least two radiographs are needed: one at a straight angle and the other at a 15° to 20° angle mesial or distal from the horizontal long axis of the root.[7] In order to locate the root canals in these situations more easily, angled radiographies were taken. When identifying a three-rooted maxillary premolar on a straight-on preoperative radiograph, a typical rule of thumb is that the tooth most likely has three canals if the mesial-distal width of the mid-root image seems to be equal to or greater than the mesial-distal width of the crown image. While not rigid, this rule serves as a useful visual cue.

In teeth with complex architecture, the canal orifice must be located with a slight alteration of the access chamber.[13] In maxillary premolars with three roots, it is advised to locate the root canal orifices using a T-shaped contour for the access cavity. Although it is uncommon for complicated root canal anatomy to develop bilaterally, we should always check for abnormalities in adjacent teeth in the same patient. The bilateral existence of the anomaly in this case was also caused by the discovery of three roots in the right maxillary second premolar on the radiograph of the right maxillary posterior area.[14] The field of endodontics has undergone a complete transformation with the advent of DOMs and magnification loupes.

Enhanced visualization of root canal abnormalities allows the practitioner to more thoroughly examine the root canal system and to clean and shape it more effectively. This is one of the benefits of employing DOM for conventional endodontics.[9] In the scenarios that were given, using DOM was recommended for these reasons. It is imperative that the access cavity be opened as much as possible. When placing scouting files (hand K-files #6, 8, or 10) in the main canal for the first time, an impediment can be met halfway through, causing the file to deviate to the buccal or lingual before continuing. This might point to a split in the canal.

After that, when interacting with the DOM, it's critical to hone your tactile feel and direction by using specially precurved scouting files to identify the bi/trifurcation. Additionally, the presence of hypochlorite is shown by the bubbling of the substance in the additional canal (champaign bubbling test). Dye or transillumination can occasionally be useful in identifying more canals.[15] In summary While it is uncommon for maxillary and mandibular premolar teeth to have three root canals, every case needs to be carefully evaluated to rule out root canals on a clinical and radiographic level.

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