THE GENERAL DENTIST AND TIMELY REFERRAL TO THE ENDODONTIST

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The use of endodontic treatment to solve problems related to pulpal and periapical pathologies is extremely common throughout the world. Most of these procedures are performed by the general dentist. However, in more complex cases, a specialist will be needed to avoid complications and provide complete root canal treatment. Ideally, the patient should be referred to a specialist before treatment begins, since it is always more difficult for the specialist to treat a case in which problems have already occurred. This paper examines some of the difficulties that arise when the general dentist attempts to treat patients in situations where immediate referral would have been the better option. Comprehensive diagnosis using radiographs and magnification will help the general dentist decide whether consultation with a specialist is required.
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After an accurate diagnosis indicating endodontic treatment, the root canal system must be cleaned, shaped, and sealed. It is crucial to carry out both the mechanical and biologic objectives of endodontic treatment to achieve repair of the apical region.[1] The biologic objective consists of eliminating bacterial contamination and irritation, thus leaving the tooth free of organic content in the canals. The mechanical objective consists of giving the root canals a constant, uniform, and conical shape so they can be appropriately obturated.[2] Although the root canal system follows certain anatomical patterns, the position and shape of the canals vary from case to case, posing one of the main difficulties of endodontic therapy.[3]

According to the American Dental Association Principles of Ethics and Code of Professional Conduct,[4] dental professionals—both general dentists and specialists—must respect clinical standards of care, defined as cautious and competent. To properly safeguard the patient's welfare, referrals become important when a specialist's skills and experience are needed.

Failing to honor these principles not only shatters the trust bestowed on the dental profession, but also increases the risk of lawsuits. A patient who experiences dental problems as a result of not having been referred in time may lose his or her trust in the dentist. This may happen even if the dentist had the best intentions and it was the patient who insisted on having the endodontic procedure carried out. In addition, it is harder for the specialist to treat a patient after a complication. With a timely referral, on the other hand, the patient is protected, and the endodontist can carry out a procedure for which he or she has the experience, training, and knowledge, including the use of new materials and techniques.

Endodontics has made significant advances in recent years, allowing clinicians to provide highly reliable clinical outcomes and excellent prognoses based on new scientific developments. New techniques and materials available for both simple and complex cases have raised the standards of treatment higher than ever before. One such development is the regular use of magnification, which has been shown to be an excellent ally to achieve superior outcomes.[5–7]

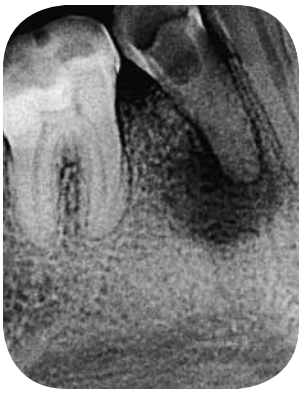


Fig 1 While searching for the canal, the general dentist created dangerous tooth wear in the mandibular right first premolar, which had an apical lesion.

Fig 2 With the use of magnification following referral, the canal was discovered, instrumented, and obturated.

Fig 3 One year later, repair of the lesion is evident.

Fig 4 In some cases, the general dentist will perform endodontic crown access, especially when observing wide canals such as those of the maxillary left lateral incisor. Unfortunately, this can lead to complications.

Fig 5 The specialist is better equipped to remove dental tissue accurately and delicately to avoid unnecessary wear of the tooth.

Figs 6 and 7 The root canal is successfully obturated.

In turn, dental clinicians now face greater demands by patients who have access to more information through media such as the Internet. Tools that are now used routinely in dental offices, such as magnification, electronic apex locators, ultrasonics, and mechanical instrumentation, create more pressure concerning the final outcome, because all root canals must be found, even those once considered calcified. The root canal must be fully instrumented, all posts must be removed, all fractured instruments must be bypassed or removed, and in teeth with large lesions, the dentist must create the proper conditions for healing.

This paper describes some of the clinical situations in which referral to a specialist is needed but often mishandled.

THE SEARCH FOR ROOT CANALS

To avoid complications, the general dentist must carefully search for root canals in maxillary teeth. The delicate search for a canal should include microscopy and ultrasonics to produce more accurate findings and to prevent excessive damage to the tooth. Unfortunately, the general dentist's search for the root canal can lead to unnecessary tooth wear. In such cases, more timely referral to a specialist would have led to superior results. Only after all canals have been located can true repair begin (Figs 1 to 7).

Fig 8 *(left)* Patient had acute pain in the maxillary right first molar, but the general dentist was unable to detect the canal openings and referred the patient to a specialist.

Fig 9 *(right)* Upon examination of the chamber, a large pulp stone blocking the canal opening was observed and then eliminated with ultrasonic tips.

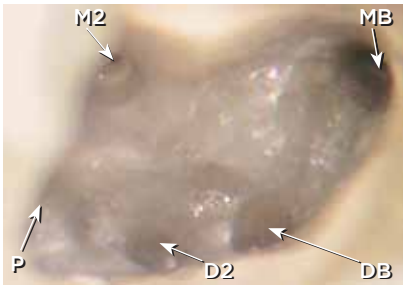


Fig 10 Using new techniques with the microscope, it was found that the molar had five canals: two mesial (M2, MB), two distal (D2, DB), and one palatal (P).

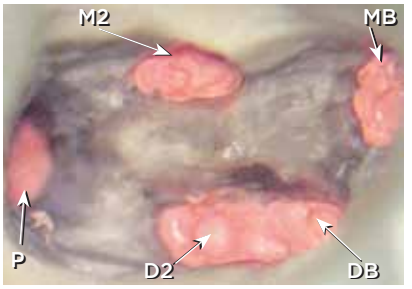


Fig 11 The pulp chamber following endodontic obturation. See Fig 10 for abbreviations.

Fig 12 Final result showing the curvature of the mesial canals and the junction of the distal canals.

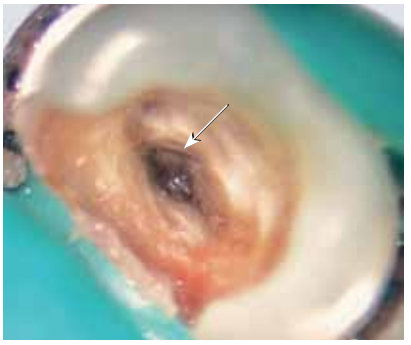


Fig 13 *(left)* The general dentist attempted endodontic treatment of the maxillary left second premolar, which had an apical lesion.

Fig 14 *(right)* Only the buccal canal *(arrow)* was discovered upon entering the pulp chamber.

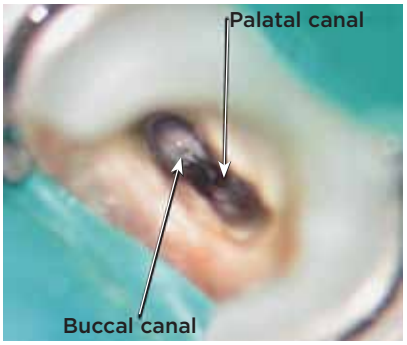
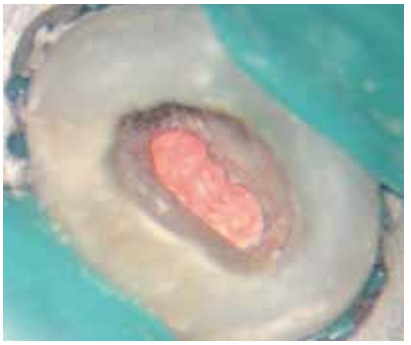


Fig 15 After removing dentin with ultrasonic fine tips, both canals were located and instrumented.



Figs 16 and 17 Final result after obturation of the pulp chamber.

Fig 18 The dentist attempted endodontic treatment of the mandibular right first molar but improperly handled the canal curvature and fractured a file in the mesial root.

Fig 19 The roof of the chamber was not eliminated, which generated stress on the file and a fracture in the apical third.

Fig 20 After eliminating the roof of the pulp chamber, the root canals are clearly visible, and the file can be used freely.

Fig 21 Final result of endodontic treatment, in which instrumentation and obturation were carried out while bypassing the fractured instrument.

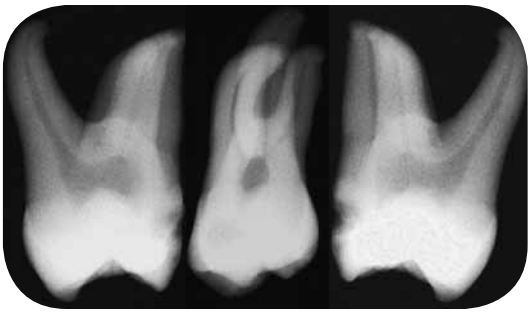


Fig 22 It is recommended to take three radiographs prior to root canal treatment. These will be especially useful should referral to a specialist be necessary.

FAILURE TO DETECT A ROOT CANAL

Endodontic anatomy is highly variable, so it is difficult to know exactly where all root canals are located. Extensive clinical experience, regular use of magnification, and new localization techniques[8] are key tools for detecting all root canals. In complex cases, the specialist is better equipped to locate the canals and provide safe, predictable treatment (Figs 8 to 17).

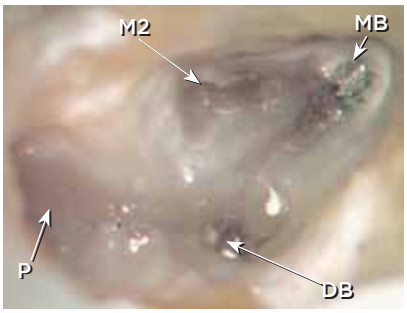
DETECTION OF ROOT CANALS WITH RADIOGRAPHS

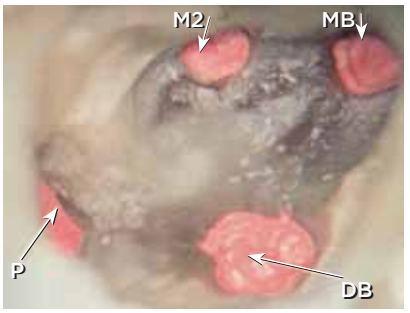
Radiographs are crucial for the diagnosis and treatment planning of endodontic cases and to detect root canal configurations. However, radiographs show only a two-dimensional image of reality. Many root canals are curved in a buccolingual or palatal direction and thus cannot be detected with radiographs. Unfortunately, these canals are often only detected after instrument fracture. In such cases, a specialist is needed to either remove or bypass the separated instrument and complete the initial endodontic treatment (Figs 18 to 21).

SUGGESTIONS FOR GENERAL DENTISTS

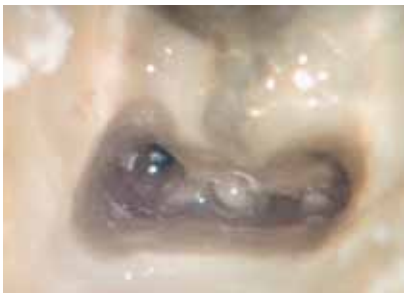
The following suggestions are offered to general dentists when treating a patient in need of endodontic therapy:

- Take three radiographs prior to each root canal therapy. These will provide better assessment criteria and make it easier to detect suspicious canal configurations (Fig 22).
- Use some form of magnification—ideally a microscope—to examine and treat patients. Regular use of magnification is especially useful for complex cases.

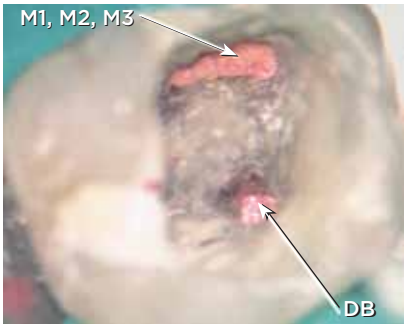




Figs 23 and 24 Four root canals in maxillary molars.



Figs 25 and 26 Three mesial canals in mandibular first molars.



Figs 27 and 28 Three mesial canals in maxillary first molars.

- Have a complete understanding of typical root canal anatomy. There are some anatomic variations that must always be considered. For example, maxillary first molars have four root canals in more than 90% of cases, and maxillary second molars have four root canals in more than 50%.[9] Mandibular first molars must be searched for three mesial canals, and mandibular incisors and premolars should be searched for more than one (Figs 23 to 28).
- When in doubt, send radiographs to a specialist for consultation. It is even possible to quickly and easily take a digital photograph of a radiograph in a light source (eg, a window) and send it to the specialist via email.
- If possible, refer the patient to a specialist before treatment has been initiated. An exhaustive tooth analysis should indicate before treatment whether a specialist's experience will be needed.

CONCLUSIONS

General dentists are capable of carrying out endodontic treatment of simple teeth; however, great caution must be exercised when analyzing the case for details that may lead to complications. It is easier to refer patients to a specialist before treatment than it is to refer them after a problem has already occurred. Comprehensive diagnostic radiographs and the use of magnification will help to ensure proper diagnosis and treatment planning of even the most challenging endodontic cases.

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