Calcified Canals—Are they Negotiable?

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Abstract

The importance of access cavity preparation in the success of endodontic treatment cannot be overemphasized. Orthograde obturation of a root canal that apparently looks calcified in the radiograph is a challenge to the operator. Proper knowledge of the tooth anatomy and very careful orientation of the bur are essential to uncover the remnant of a canal.

Two case reports, where previous unsuccessful attempts to locate the root canals were made, are presented. In both the cases, the apical direction of the access cavity preparation was at fault. A carefully directed long shank round carbide bur uncovered the calcified orifices and the canals were negotiated with the use of thin root-canal instruments moistened with an E.D.T.A. preparation.

Introduction

Partially or completed blocked canals are seen more often in posterior rather than anterior teeth. However, location of canal orifices is simpler in anterior teeth than in posterior teeth because of better accessibility to instrumentation. Many operators have failed to persevere sufficiently in the quest of the 'elusive canal' in anterior teeth for the simple reason that the periapical area is more accessible to surgical intervention (i.e. apicoectomy, curettage and retrograde filling) as compared to a posterior tooth. Selden¹ has reported that careful drilling with a round bur through dense calcified deposits in the pulp chamber may uncover a treatable apical remnant. The dental operating microscope (dentscope) is an invaluable aid for this.

Two cases are presented below where successful endodontic treatment was completed in cases where earlier attempts had failed to locate the canals.

Case 1

A 31-year old woman presented with the complaint of a discoloured upper anterior tooth. She gave the history of trauma 10 years ago and an attempted endodontic treatment 5 years ago.

On examination, 11 was discoloured but asymptomatic. Intra-oral peri-apical radiograph revealed a small peri-apical radiolucency and calcification of apical two-thirds of the canal. Cervical one-third of the canal was seen widened due to the previous attempted endodontic treatment. It was decided to attempt an orthograde access, rather than resort to surgery. The previous access cavity, as it progressed apically, was mesially oriented (Fig. 1 A). Using a long

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shank carbide bur at low speed, carefully aligning it parallel to the long axis of the tooth, the calcified orifice was uncovered (diagram 1). A No. 10 file was moistened with Soluset and gently teased into the narrow root canal and a diagnostic radiograph was taken as shown in Fig. 1 B. The canal was then further prepared in the conventional manner and obturated. Figure 1 C shows the obturated canal. The follow-up radiograph after two months (Fig. 1 D) shows periapical healing.

Case 2

A 19-year old girl who presented to the Department of Conservative Dentistry and Endodontics for routine dental examination was found to have a discoloured asymptomatic central incisor (i.e. 11). Oral examination revealed an amalgam restoration on the palatal aspect of the tooth in the cingulum area. (Fig. 2 A).

The patient gave a history of orthodontic treatment one and a half years ago, and noticed a gradual darkening of the tooth soon after. Six months later, an unsuccessful attempt was made to treat the tooth endodontically. As the canal could not be located, the patient had been informed accordingly with the instruction that surgical treatment would be necessary, should the tooth become symptomatic at a later date. The canal space looked to be obliterated up to the apical one-third of the root beyond which it appeared patent. A distinct periapical radiolucency in relation to the tooth warranted some definitive treatment.

To begin with, the access preparation which lay entirely in the cingulum area was modified, i.e. extended more incisally so as to gain a straight line access to the root canal. The floor of the pulp chamber was then penetrated using a long shank carbide bur as in the previous case. The canal orifice was located using a No. 08 file, smeared with Soluset. After thorough biomechanical preparation the root canal was successfully obturated as shown in Fig. 2 B.

Discussion

Proper knowledge of the morphology of the root canal system is an essential prerequisite to successful endodontic treatment. Both the cases presented here are the classic example of a faulty access being responsible for the failure in locating the canal. The difference in colour of the calcified areas from the surrounding dentin assist the location of canal orifices. Other aids in diagnosis are the use of fiberoptic illumination as well as radiography, using radio-opaque markers such as softened gutta-percha in the deepest area of penetration2. Chelating agents may be useful in the location of an orifice by sealing in the chamber between appointments3. Once located, these agents may be used to facilitate cleaning and shaping of the canal. An EDTA containing preparation, Soluset was used in the present cases to assist biomechanical preparation. Ram4 found in his scanning electron microscopic study that EDTA was the most effective agent in the instrumented group. EDTA affects partial demineralisation of dentin to a depth of 20% to 30% in 5 min.
Fig. 1A: Pre-operative radiograph showing previous access cavity preparation, which is directed mesially, and the calcified canal.

Fig. 1B: Diagnostic radiograph.

Fig. 1C: Post-obturation radiograph.

Fig. 1D: Follow up radiograph after two months showing periapical healing.

and will remain active in the canal for 5 days if not inactivated. The extent of demineralisation by EDTA is proportional to the exposure time. An inorganic solvent such as sodium
hypochlorite 2.5% to 5% may assist in the preparation by dissolving most of the predentin layer, thus exposing the globular appearance of the mineralising front to an inorganic solvent such as EDTA.

**Conclusion**

A proper access cavity preparation is one of the foundations on which the success of a root-canal treatment rests. In majority of cases where the radiograph shows a calcified canal, with certain amount of patience and thorough knowledge of anatomy, the canals are negotiable. Surgical endodontics should not be resorted to as a short cut in such cases.

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**References**