

Problem solving endodontics

John Rhodes presents interactive practical and problem solving solutions in endodontics. This month, he looks at locating canal orifices



Figure 1: Maxillary first molar proved difficult to treat as the sclerosed canals could not be located

Modern preparation techniques provide a very efficient means of rapidly tapering the primary root canals prior to disinfection, but in practice, the first hurdle is often being able to actually find the orifices. An infected, missed canal could result in a persistent inflammatory response and failure of treatment.

This article describes how to decode the pulp floor map in order to locate difficult to find canal orifices.

Decoding the pulp floor map

The maxillary first molar in Figure 1 proved difficult to root treat as the sclerosed canals could not be located.

The following steps demonstrate how to make the process more achievable.

Good access

The access cavity must be located correctly and provide sufficient space to allow adequate visualisation of the pulp floor. This means removing tooth substance conservatively, but not compromising the ability to work efficiently during mechanical preparation.

By removing the entire restoration in this case, orientation and visualisation of the pulp floor was maximised. The same is true if the operator has created an oversized access in a previous attempt at root treatment; this can be used to advantage without affecting the integrity of the tooth.

Magnification and illumination

Magnification and illumination are essential. A microscope provides the best operating field and this is why endodontists routinely use them. Being able to see where you are working is a massive advantage and many of the instruments require direct vision in order to be used safely.

The pulp floor

The pulp floor tends to be darker than the walls of the access cavity, but when irritation dentine is present in the pulp chamber this can be difficult to interpret. Calcified material needs to be removed with either ultrasonic instruments or a

bur such as the Tungsten Carbide LN bur (Dentsply).

To prevent perforation of the pulp floor, an estimation of safe depth can be made from the preoperative radiograph, and direct vision with magnification and illumination will allow instruments to be used safely while refining the access and pulp floor. The canal orifices tend to be located at the extremities of the darker pulp floor, and may appear as a small white dot if packed with dentine chips.

Use a micro-opener (Dentsply) to gauge for signs of an orifice. In a maxillary molar such as the one in this article, the palatal canal is likely to be most readily located and, once confirmed, working along the border of the pulp floor map makes location of the main buccal canals easier.

In this case, an attempt had already been made to locate the canals; the divots and iatrogenic irregularities created by burs can be disorientating, so great care is required to establish and confirm the true pulp floor map to allow identification of the canal orifices.

In the maxillary first molar there is often a lip of dentine covering the second mesiobuccal canal that needs to be removed in order to locate the orifice. Once the primary mesiobuccal canal has been located, look for signs of an isthmus – following this in the direction of the palatal canal will often lead you to the second canal.

Ultrasonics

There are many ultrasonic instruments available for working deep in the access cavity to remove calcifications and trough between canals; some are diamond coated while others have machined tips.

In this case, a #3 Start-X (Dentsply) instrument was used, vibrated at medium power in a Piezon ultrasonic unit (Satelec, Acteon). The tip can be used dry or with water spray, but it is important to be able to see where the tip is cutting to avoid perforation. Dentine chips and smear can be washed away with sodium hypochlorite, EDTA or citric acid to clear the operative field.

Gaining access

The tip of a fine file, DG16 endodontic probe or micro-opener (Dentsply) will catch in the orifice of the canal once located. This can be teased open with the micro-opener before confirming patency in the coronal aspect with a flexible handfile and continuing with preparation. ■

WATCH THE VIDEO

To see how these steps are applied visit <https://youtu.be/BL2MKxF4vK0> or search Youtube for 'Endo Practice - Decoding the pulp floor map'. The author is happy to answer questions directly via Youtube or Twitter @johnrhodesendo.

AUTHOR

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