

# Problem-solving endodontics

**John Rhodes** presents an interactive practical and problem-solving solution in endodontics. This month, he discusses simple glide path management

**When preparing challenging root canals with nickel titanium rotary and reciprocating instruments, it is important to establish a reproducible and predetermined pathway for the instruments to follow: the glide path.**

## The glide path

Modern nickel titanium preparation techniques provide a very efficient means of rapidly tapering the primary root canals prior to disinfection, but negotiating complex anatomy such as sclerosed canals or severe curvatures can be difficult. Iatrogenic errors that can occur during preparation include transportation, perforation and instrument fracture, and can be avoided by ensuring that the rotary or reciprocating instruments have a predetermined and reproducible path to follow. An infected, blocked canal could result in a persistent inflammatory response and failure of treatment.

The glide path must respect the original anatomy of the primary canal, ensure patency and be reproducible. Generally, the glide path does not need to be bigger than an ISO size 010 hand file, and indeed, as nickel titanium instruments are more flexible than stainless steel, they are the instrument of choice in curved canals, as they tend to remain centred and avoid straightening of the canal.

In this case, a glide path was prepared using Ready Steel (Dentsply Sirona) hand files ISO sizes 006 and 010.

Here are several steps that will make the process of preparing challenging canals more achievable.

## Coronal seal

It is important to assess the quality of coronal seal before embarking on root canal treatment. In this case, the coronal restoration consisted of multiple restorative materials and was undoubtedly allowing microleakage. It was, therefore, imperative that the existing restoration was removed before root canal treatment started. Removing a restoration also gives much better visualisation of the pulp floor and access to the canal orifices. It is not necessary to build the tooth up at this stage as it can be adequately isolated with good rubber dam technique. Placement of a dentine-bonded core after obturation and with rubber dam isolation allows much greater control of the operative field and avoids contamination with saliva, which can have a seriously detrimental affect on the complex chemistry of dentine bonding agents.

## Decoding the pulp-floor map

Carious dentine and the roof of the pulp chamber were removed with a Tungsten Carbide LN bur (Dentsply Maillefer), using a light brushing technique.

The pulp floor tends to be darker than the walls and is a useful guide for locating 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 was located, a

smaller LN bur was used to trough between the MB1 and MB2. The orifice of the MB2 was confirmed with a DG16 endodontic probe.

## Establishing a glide path

The canal orifices were gauged with an ISO size 010 Ready Steel flexible stainless steel hand file. Primary coronal flaring was then completed using a Protaper Gold SX (Dentsply Sirona) instrument. The canals were flushed with 3% sodium hypochlorite.

The working length was estimated using an apex locator, EDTA lubricant (File-eze Optident) and an ISO size 006 Ready Steel hand file. The file is used with a watch-winding action and occasionally a small amplitude filing action to define the path to the apex.

Once the apex locator reaches the zero reading the working length is measured against a reproducible reference point. The glide path was enlarged with an ISO 010 Ready Steel hand file, using a similar action and followed by copious irrigation with sodium hypochlorite. EDTA-based lubricants and gels are generally contraindicated during preparation with nickel titanium rotary or reciprocating instruments but can be invaluable for initial negotiation and scouting of the root canal when estimating the working length.

## Tapering the canals

Once a glide path has been established, rotary or reciprocating instruments can be used to rapidly and predictably taper the canal. In this case, preparation was carried out with a single Primary Waveone gold (Dentsply Sirona) instrument. The canals were prepared to approximately two-thirds of the length in one pass. Patency was confirmed with an ISO size 010 file. The glide path had to be re-established in the mesiobuccal canals at which point a diagnostic radiograph was exposed to confirm the lengths, and preparation completed. ■



**Figure 1:** The maxillary left first molar proved difficult to root treat as the sclerosed canals could not be located or instrumented



**Figure 2:** The completed root canal treatment

### WATCH THE VIDEO

To see how these steps were applied, visit <https://www.youtube.com/watch?v=bdqOasgORKY> or search Youtube for 'Endodontic Practice gutta percha retreatment'. The author is happy to answer questions directly via Youtube or Twitter @johnrhodesendo.

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