

A race to the apex— Crown-down in 1!

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One of the characteristics of the R-phase of the Twisted File (TF; SybronEndo) is that it gives the file flexibility and a higher stress tolerance compared with other alloys, which allows for a faster and safer root-canal enlargement. Arrival at the apex can be achieved with one file, if the practitioner is in favour of this technique. Crown-down can be achieved with a single file too, depending on the initial canal anatomy.

_Technique

NiTi files are designed to enlarge and not to open the canal. Thus, checking the canal patency prior to any file enlargement in the environment of a proper irrigating solution is necessary. We can face two different clinical situations related mostly to anatomic considerations:

1. In the upper centrals, laterals and premolars, for example, and even in the distal canal in molars, where we can identify the root-canal space on the preoperative X-ray, no pre-flaring or pre-enlargement is needed. TF 25/08 can easily perform crown-down safely and quickly.
2. In a different clinical situation, such as the lower molars and the mesial canals of the upper molars, it is preferable to check the patency of the canals, as they can be pretty tricky—especially the lower mesial canals, as they present two curves in the centre of the root canal. More importantly, the first

Fig. 1_Immediate post-op of the lower molar, showing the radiolucency around the mesial and distal roots.

Fig. 2_Post-op after eight months, showing very nice healing around both roots.

Fig. 3_Pre-op X-ray, showing the extrusion of the material into the maxillary sinus.

Fig. 4_After removal of the Thermoafil and the paste that was attached to it from inside the palatal root.

_Is it really a race? It seems to me that dentists are very eager to get to the apex as fast as possible these days. For whatever reason, it makes us feel more comfortable when we are able to put a file at the end of a root canal. Its signals mission accomplished for us.

Different manufacturers are advertising their techniques, which use practically the same or a slightly modified NiTi alloy in a multistep technique with reciprocating motion. The quality of the dentine, the direction in which the debris is pushed or evacuated and the internal stress on the file itself are some areas of concern regarding these techniques.



of the two curves will not appear on the X-ray and may become a perfect trap for NiTi files. In such cases, after checking the patency, TF 25/.06 is a perfect file for crown-down. The 25/.06 may get you to the apex in a few seconds or, if you have not reached the apex after the first four strokes, you may need to clean the file, irrigate the canal and try again. The .06 taper is a very good choice for treating curved canals because a larger taper inside a curve may result in taper lock and lead to file separation.

Achieving crown-down in such a fast and high-tech way may tempt us to neglect the irrigation protocol. Here, the use of ultrasonic activation can be of great help to disinfect the canal space and remove the smear layer when this is done with proper irrigating solutions.

Reaching the apex with the crown-down technique may not be the ultimate technique for proper root-canal enlargement, especially with respect to the apical enlargement of the last 3 mm of the canal. According to a variety of studies, the crown-down technique cannot be the sole instrumentation technique, and the last 3 mm of the root-canal space should be addressed in a different way. This subject is a controversy amongst practitioners and amongst schools owing to differences in the philosophy of root-canal enlargement.

I personally support the idea of apical enlargement and find the TF 40/.04 to be the best file to do the job, as it offers the flexibility and safety necessary for reaching the apex after the canal has been enlarged with a 25/.08 or .06 file. In such a case, the total number of files used for the crown-down and apical enlargement will amount to two NiTi files.

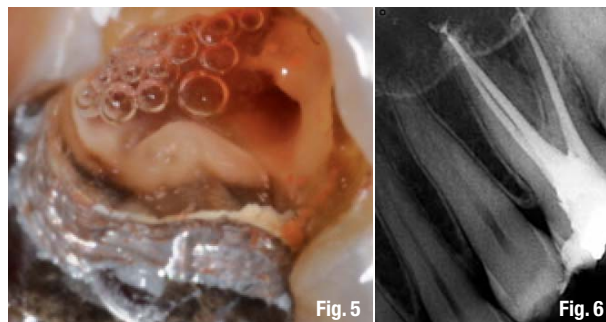
Clinical cases

The patient was referred to the office to check a possible crack in the mesial and distal root (Fig. 1). Depth probing did not reveal a pinpoint pocket. After I had done a bite test and carefully checked the access cavity and the entries of the canals for potential cracks, I decided to treat the root canal and check the post-operative situation, since the patient was desperate to save her tooth.

Upon establishing a direct/straight-line access to the coronal part of the canal, a TF 25/.06 was used for crown-down, which was followed by copious irrigation activated with an ultrasonic file for 15 seconds for each solution used. Apical enlargement was then done with a TF 40/.04, followed by a 15-second activation of sodium hypochlorite in order to eradicate the organic part of the apical biofilm that had been mechanically disrupted with the apical file.

The sodium hypochlorite was carefully removed from the root-canal space using distilled water and ultrasonic activation. Sealing the canal was achieved with Resilon (RealSeal, SybronEndo) in a modified vertical compaction technique. At the eight-month follow-up, nice healing was observed (Fig. 2).

The second case was a bit more complicated (Fig. 3). The patient was referred after she had received a root-canal treatment but was still suffering from pain and pressure in her sinuses. The pre-operative X-ray clearly showed that obturation material inside the palatal root had passed into the sinus cavity. Upon opening the access cavity, I was surprised to see that Thermafil carrier-based obturators (DENTSPLY) had been used, which explained the extrusion of the material into the maxillary sinus. A retreatment was scheduled after the options had been discussed with the patient. Three Thermafil obturators were successfully removed with a TF 25/.06 (Fig. 4). The patient felt immediate relief, as air was escaping the sinus from the palatal canal (Fig. 5).



No sodium hypochlorite was used to irrigate the canal. Chlorhexidine solution was activated slowly with an ultrasonic file and apical enlargement was done with the TF 40/.04, followed by an immediate obturation of the root-canal space with Resilon using a modified vertical obturation technique (Fig. 6). The patient was impressed with the speed of the treatment and expressed her gratitude for saving her molar.

Proper cleaning and shaping of the whole root-canal space have been recognised as a challenge, particularly in curved and narrow canals. NiTi instruments can only prepare a certain percentage of the root-canal space. Irrigation and sealing are the other important steps in the microbial control phase for successful endodontic treatment. A deficiency in mechanical preparation or in the sealing of the root canal could offer the remaining micro-organisms an opportunity to re-colonise the filled canal space, resulting in failure of the endodontic treatment.

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Fig. 5 Air bubbles coming out of the sinus via the palatal canal.
Fig. 6 Sealing of the root canal in the same session.

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