For more than 20 years, the use of nickel-titanium (NiTi) in endodontics has allowed the speed, quality and reproducibility of root canal therapy to be improved. Over the same period, the geometry of the relevant instruments has evolved significantly too. In 2008, the appearance of the asymmetrical cross section with Revo-S1 (MICRO-MEGA) allowed for fewer restrictions and the cleaning capacity of endodontic instruments to be improved. MICRO-MEGA’s mastering of NiTi machining and changes in cross section and surface treatments (electropolishing and thermal treatment) have created a new instrument dedicated to enlarging root canal entrances.

The corono-radicular junction sometimes produces a particular form of mineralisation that partially obstructs root canal entrances. To give an example, sometimes this triangular mineralisation, at the level of the root canal entrances to the molars, is located opposite the furcation (Fig. 1). In order to prevent it from limiting the use of files and to optimise initial preparation for endodontic treatment, it must be removed (Fig. 2). Generic instruments such as Gates-Glidden or Largo drills have been used for this purpose, but they present a risk of effecting major changes to the root canal anatomy, particularly in the case of the endodontic treatment of multirooted teeth. This challenge was the reason for the development of specific instruments such as ENDOFLARE (MICRO-MEGA) and ProTaper Universal SX (DENTSPLY, now Dentsply Sirona). A new generation of these files, whose design has benefited from advanced technologies related to asymmetry, cross section and thermal treatment, is now available in the form of MICRO-MEGA’s One Flare.

At only 17 mm, One Flare is relatively short in order to be able to work at the root canal entrance at the corono-radicular junction. It features a triple-helix cross section, which has been found to be one of the sturdiest among those that are currently used in clinical practice. Like the one of Revo-S or One Shape (MICRO-MEGA), this cross section is asymmetrical, but with a progression from the tip to the shaft for optimised flexibility. One Flare has a constant cone taper of 9% and a tip diameter of 0.25 mm. This tip gives the file extraordinary strength while remaining sufficiently thin to be able to easily penetrate after a scouting file.

The sharpened section of the instrument (13 mm) is made from...
NiTi wire with a diameter of 1 mm. The active section therefore varies from 0.25 to 1 mm, from the tip to the shaft, while the interval and angle of the helix increase. It also undergoes electropolishing treatment to remove machining burrs and give it a smooth surface and straight cutting edges without any snags, as well as thermal treatment to increase its flexibility and resistance to fracture (Figs. 3a & b). This treatment proves particularly significant when enlarging the entrance to a second mesobuccal canal in the maxillary molar, for example.

The great flexibility also makes it possible to enter extremely curved canals or ones with extreme changes of direction, all without any risk of fracturing the tip or of creating blockages or stops. The geometry of and treatments used in the production of One Flare allow it to be used with a motor, with or without torque control, and continuous rotations of between 250 and 400 rpm, without pressure or with very low apical pressure.

After the initial scouting and securing using a hand file with a tip diameter of 0.1 mm or a continuous-rotation NiTi instrument such as One G (MICRO-MEGA), One Flare prepares the area of the corono-radicular junction. The instrument uses a conventional wave movement in three successive phases, from the crown to the tip, centred in the canal and allowing it to progress by a few millimetres. After treatment, the file is withdrawn from the canal and cleaned. The canal is irrigated once again and negotiated using the steel file used for the initial root canal exploration. Once the instrument has penetrated to a depth of 4 mm (± 1 mm), it can be used with pressure on the walls to selectively collect samples, remove the initial dental irregularities and reduce the initial restrictions to the following shaping instrument (Fig. 4). This penetration (maximum of 4 mm) theoretically allows it to create a root canal entrance of 0.6 mm (maximum of 0.7 mm), which is less than or equal to the diameter of a No. 2 Gates-Glidden drill (0.7 mm).

Conclusion

This new flaring instrument offers a new minimally invasive approach to endodontic treatment by selectively eliminating dentine formations at the corono-radicular junction. It meets multiple requirements of endodontic preparation, such as removing initial interferences to root canal preparation instruments, preliminary removal of the first millimetres of a dense pulp, fibro-calcic or even necrotic parenchyma and re-centring of root canal shaping instruments (Fig. 5), as well as ensuring the precision of the apical limit of endodontic preparation \(^1\) and 3-D cleaning or filling of the root canal (Fig. 6).

Dr Franck Diemer
is a practitioner at the centre Hospital Universitaire de Toulouse in France.

Dr Jean-Philippe Mallet
is a lecturer at the Faculty of Dentistry of the Université Toulouse III—Paul Sabatier in France.

Haifa Ben-Rejeb
works at the University of Monastir’s Faculty of Dental Medicine in Tunisia.

Dr Waldem Palmer
is a lecturer at the Université Saint-Joseph’s Department of Endodontics in Beirut in Lebanon.