

The gold standard in file systems

Endodontic Practice looks at advancements in file systems and the developments behind Dentsply's Waveone Gold

Endodontics, as an established science, has come a long way in the past 20 years, and treating the root canal system successfully is now more predictable than ever before.

Consequently, due to major advancements in file systems and the materials used in their construction, the provision of quality endodontic treatment is now available not only to endodontic specialists, but also to many general dentists.

The introduction of Dentsply's Protaper nickel titanium (NiTi) rotary instruments in 2001 led to a major revolution in modern day endodontics, allowing a real progression in root canal preparation procedures. The Protaper system, with its active cutting edges, variable tapered design and shaping and finishing files, quickly became a leading file system and file of choice for endodontists worldwide (Advanced Endodontics, 2012).

Building on this success, in 2008 a team of six international clinicians, in collaboration with Dentsply, began the work of developing a new reciprocating single file system for shaping canals, leading to the launch of Dentsply's Waveone endodontic system in 2011.

The introduction of M-Wire NiTi technology has meant that files have become increasingly flexible, are more resistant to cyclic fatigue (greatly reducing the risk of file separation), and in the majority of cases, only one file is needed for each root canal procedure.

Further research

Along with the notable advances in endodontic file design, recently there has also been a real move towards minimally invasive endodontics and the recognition that clinicians should be aiming to remove less of the existing tooth structure in order to maintain the integrity of the tooth. Minimally invasive techniques put further demands on the clinician as well as the file systems used, increasing the need for greater cutting efficiency, strength and flexibility.

Dentsply research has continued in an effort to further improve the Waveone single file system, not only taking into account minimally invasive techniques, but also to encourage and give confidence to those clinicians wishing to shape canals with mechanical nickel titanium instruments for the first time. In collaboration with Dentsply, four of the key opinion leaders involved in Waveone's initial development – Dr Cliff Ruddle, Dr Sergio Kuttler, Dr Wilhelm Pertot and Dr Julian Webber – have been working for the last two years on how to improve the existing system and this has led to the launch of a new generation of reciprocating files: Waveone Gold.

Waveone Gold has kept the simplicity of the Waveone



system, but with strong additional benefits. Constructed of nickel titanium, the file is repeatedly heat-treated and cooled after the manufacturing, giving it a distinctive gold colour. This significantly improves the file's strength and flexibility, enabling a wider range of canal morphologies to be shaped more efficiently and safely.

Cyclic fatigue resistance has been improved by 50% over Waveone Primary, and 100% more than most standard rotary systems, greatly enhancing patient safety (data on file). In addition, based on Dentsply in-house testing, the flexibility over Waveone has been improved by 80%. The system now boasts an extended range of file sizes to cover a greater range of canal morphologies. Four files, instead of the previous three, are now available: small #20.07; primary #25.07; medium #35.06; and large #45.05 – in a choice of three lengths (21, 25 and 31mm).

Enhancements

As with Waveone, the majority of cases (around 80%) can be treated with the Waveone Gold Primary file to start and complete the shaping of the canal. The files are single-use only, the gold standard in infection control, and compliant with HTM 01-05 guidelines that state that all endodontic files should be treated as single patient use, regardless of manufacturer's instructions, to reduce the risk of prion transmission. Just as importantly, a single file is performing

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the work of three or four rotary files, so it must not be overused and run the risk of separation.

The cross-section in Waveone Gold has been enhanced from the triangular shape of its predecessor to a parallelogram design that gives one or two cutting edges depending on the location along the file. These edges minimise the screwing effect, thereby reducing torque. This, in combination with the enhanced cutting efficiency, allows for smoother operation and a shorter shaping time. As with Waveone, the reciprocating movement allows the file to engage with the canal wall, but before it has a chance to continue rotating it reverses back, releasing its grip, leaving the user in control. The reciprocating motion, in combination with the smoother operation, can lead to less tendency for the clinician to want to push on the file, which, in either rotary or reciprocation motion, is one of the leading causes of file separation.

With the introduction of Waveone Gold the emphasis has been to enhance the confidence levels of dentists, especially those lacking experience in endodontics, those worried about instrument separation, or those looking for

enhanced file performance.

Dr Webber emphasises this point, adding: 'Endodontic treatment has never been easy to undertake. The root canal systems in our teeth are just too complex. However, with this new and improved technology, our aim has been to try and make treatment easier for the many clinicians worried about carrying out endodontic procedures with mechanical nickel titanium instruments, chiefly because of the fear of file separation.

'We believe that the enhancements we have made in Waveone Gold will increase clinicians' confidence, help take away the fear factor and encourage them to take on cases considered too difficult in the past.' ■

References

Advanced Endodontics (2012) ProTaper Gold Series. [Online] Available at: <<http://www.endoruddle.com/protaperd.html>> [Accessed March, 2015]