Matching Gutta-percha cones with TF/TF Adapter Instruments

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Introduction
With the widespread use of the rotary NiTi instruments, matched taper gutta-percha (GP) cones (of greater tapers) were developed to make root canal obturation techniques easier, more predictable and improve quality. Nowadays many manufacturers commercialise matched taper GP cones in order to be used with a specific instrumentation technique. As a consequence, not only the single-cone technique regained popularity due to the fact that single matched cone could now produce a satisfactory three-dimensional fill; also warm vertical techniques gained advantages from the use of a matched master cone, by reducing the risk of voids or gaps inside the filled endodontic space.

However, the greater amount of variability in design and dimensions of commercially available NiTi instruments and GP cones of greater tapers can easily create confusion among practitioners, especially if they use instruments and cones of different brands. If selected gutta-percha cones do not precisely match with the used NiTi instruments, the whole concept fails and the resulting GP cones do not reach the desired working length and/or don’t fill the apical preparation precisely.

In order to appreciate how much bigger than the tolerance gap inside the filled endodontic space, it is 10 mm.

Therefore, these GP cones can be divided in two categories: uniform and non-uniform taper. The first ones are usually commercialised as 0.4 or 0.6 tapered cones, while the second ones are usually commercialised with a brand name related to a specific instrumentation technique (i.e. TF cones, TFA cones, etc.).

Tips sizes and tapers of NiTi instruments
Even if some instruments have a non-uniform taper, the great majority of endodontic NiTi rotary instruments have a uniform taper, and techniques are designed to create at least a 0.04/.06 tapered preparation. This is why GP cones of greater tapers are usually commercialised in 0.4 and 0.6 tapers. However, NiTi instruments having the same nominal size and taper may not have the same dimensions and consequently not create an identical root canal preparation. So far, dimensions and sizes that can be encountered during these procedures. These are tips that can be useful not only with TF/TF instruments but with many other instrumentation techniques.

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nal preparation by not reaching the working length, one possible solution is to increase coronal flaring by brushing with the last instrument. By doing so a TF/TFA instrument will increase the dimensions of the prepared canal in the coronal part, solving the problem related of “GP Taper-lock”.

Correct apical fitting. Clinicians may experience two different clinical problems in the apical fitting: the need for a better apical tug-back, which may require slightly cutting the tip of the master cone, and the fitting related to the amount of canal transportation.

The first case may happen due to the different dimensions; tolerance of a GP cone may be slightly smaller than the nominal size, increasing the risk of overfilling during obturation. In such cases, the advice is to slightly increase the dimensions of the master cone by cutting 0.5/1 mm off the tip, or ideally to precisely recalibrate the master cone using a tip-snip device. This can also happen if a canal is iatrogenically slightly over-instrumented (due to a mistake in the working length determination or in the position of the rubber stop on the file); the apical constriction is now modified and the cone fitting must try to accommodate this mistake by increasing the tip size of GP master cone.

TF/TFA are significantly more flexible than the majority of competitor NiTi rotary instruments. As a consequence they tend to follow more precisely and maintain the original trajectory of root canals, minimizing canal transportation. Canal transportation is a mistake that frequently occurs when a rigid file is inserted into a curvature, and tends to straighten it by cutting more in the inner part of the curvature coronally and in the outer part apically. However, this mistake, which can affect quality of debridement, makes insertion of master GP cone easier, especially when complex, double or triple curvatures are present.

This is why the TF/TFA user may clinically experiment with a slightly more difficult insertion of the master GP cone to the working length. If this problem occurs, once again slightly increasing circumferential filing can help.

Conclusions
Hence we may conclude that TF/TFA users should preferably use TF/TFA cones that perfectly match the prepared canals. By doing so, fitting the master GP cone becomes much easier and more predictable, and in the very few cases where some problems can still be found, the provided clinical tips may help clinicians in understanding problems and finding proper solutions.

References

Fig. 1 Fig. 2 Fig. 3

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