EDITORIAL

Endodontic Ni–Ti Rotary Instruments for Glide-path, Are They Still Necessary and How to Think about the Ideal Instrument?

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The Ni–Ti endodontic rotary instruments have represented the modern revolution in terms of mechanical instrumentation of the root canal system, in terms of effectiveness, conservative and safety of the endodontic treatment (such as quantity of tissue removed), and speed of the endodontic treatment as well as comfort for the operator and patient.[1–4]

If thinking about the concepts of canal shaping, which perhaps it is now possible to judge as “past,” it is interesting to evaluate the current importance of the glide-path, and which instrument is useful for this purpose.[5,6]

Considering the increasingly frequent possibility of working with a single-file instrument that allows clinicians to shape the canal from start to finish, quickly and safely, the use of a glide instrument probably represents a step that is no longer essential in endodontic treatment.[6]

It is possible to argue that this phase of endodontic treatment, in “simple” canals, i.e., which can be immediately probed from the orifice to the apex, is unnecessary.[6]

So, if we consider taking the working length, or probing the apical third of the canal passively with a hand-file, when should we use the glide-path instrument, and what type of rotary instrument is ideal?

The possibility of shaping the canal with endodontic instruments with an alloy tending toward martensite, with heat treatments designed to compensate for the characteristics of the geometric design of the instrument, have allowed the canal system to be probed, shaped, and finished with a single instrument from start to finish, if this canal can easily gain the patency of the canal up to the apex.[7–9]

The stresses to which endodontic instruments are subjected in their dentine cutting movement inside the canal have always been simplified into torsional and flexural stresses, aware of the important simplification that was made in static and dynamic *in vitro* studies for the study of their mechanical characteristics.[10]

Having such highly martensitic instruments to complete endodontic treatment can represent an advantage from the point of view of resistance to flexural stresses, but not with respect to cutting capacity and resistance to torsional stresses, stresses to which it is subjected the instrument is particularly suitable if the canal does not immediately acquire patency.[11–13]

This is certainly an aspect to take into consideration, and on which we try to improve the characteristics of the instrument with an adequate heat treatment, or with safer movement kinematics for the instrument.[14–17]

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Therefore, if a rotary instrument is needed to provide glide-path, this instrument is used to address canals where a larger diameter, less sharp, martensitic instrument cannot shape. Therefore, to complete an endodontic concept of this type, it should have a reduced diameter, and since it is subjected to torsional stress perhaps to a greater extent than flexural stress, a more austenitic phase, capable of guaranteeing a certain superelasticity.[8,18]

Since it must also have a fair cutting capacity, a fairly sharp cross section, with a more austenitic phase to guarantee greater resistance to torsional stress considering the small diameter, makes it an instrument that could benefit from a less aggressive movement kinematics, and therefore a reciprocation perhaps with reduced angles, to put little stress on an instrument of this type in cyclic fatigue.[19–22]

Therefore, considering a totally mechanical instrumentation, from scouting to finishing, in a canal whose patency is not found immediately in a passive manner by a hand-file or does not guide the advancement in the canal of a rotary instrument, it is the idea of the authors of use a glide tool with characteristics similar to those described.

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