Interview

Modern root canal preparation: Precision is everything

Field trial of the new OTR safety function

Modern therapy methods are playing an increasingly significant role in endodontics in particular where the maxim "Prevention of Extension" has a very special meaning as the discipline is aimed at lasting tooth preservation. With regard to automated root canal preparation, the manufacturer Morita provides support for dentists active in the endodontic field with the DentaPort ZX Set OTR measurement and preparation system with its new "Optimum Torque Reverse (OTR)" function which reduces the file breakage risk while at the same time helping to protect the natural tooth substance. We spoke to Prof. Dr. Dr. h. c. Andrej Kielbassa, Director of the Center for Conservative Dentistry and Periodontology at the Danube Private University in Krems (Austria) about his personal experience with DentaPort ZX Set OTR.

Professor Kielbassa, in your opinion what role is played by modern endodontics in today's dentistry?

Endodontics forms the backbone of modern tooth preservation as it is capable of preserving teeth effectively and permanently. In view of the demographic development in Germany, this is particularly important. Patients are getting older and older; they should be able – and want – to keep their own teeth for as long as possible.

What demands are placed on the endodontic practitioner by root canal preparation in particular?

A whole range of aspects need to be taken into account in this respect: The root canal wall should be treated completely, or at least sufficiently, in order to achieve appropriate cleaning. In addition, the root canal must be adequately formed to allow rinsing and later, possible hermetic, obturation. A precondition for this is

ensuring the retention of the apical constriction – and clogging with debris also needs to be avoided. In addition, aspects of treatment safety with lowest possible risk of instrument breakage, in particular in the root canal, as well as avoiding a *via falsa* must be considered. Both careful infection control as well as a standardized treatment protocol are essential for this. A particularly important role is played by the preparation of the tooth and the access cavity. The objective is to create a good straight access to the root canals. At the same time, sufficient retention for the provisional restoration must be ensured while at the same time retaining as much healthy dental hard tissue as possible. These days, endometric appliances are essential for determining the correct preparation length because preparation and cleaning complement each other over the complete working length. Precision is everything for the optimum preparation of a root canal. For this reason, we recommend using a microscope and automated endodontic systems with variable torque limits.

The current third generation of the DentaPort ZX Set OTR measurement and preparation system is fitted with the new "Optimum Torque Reverse" function. To what extent does this feature meet the named requirements?

The OTR function is based on the principle of a torque-provoked reversal of rotational direction. The main advantage is the continuous monitoring of torque during preparation – which only requires a very small angular rotation of the file for measurement - and in doing so the risk of file breakage is reduced to a minimum. In this way, the user can work with optimized rotational angles both in the cutting and non-cutting directions of the file. With nickel-titanium files, half a rotation (180 degrees) in the cutting direction and a quarter of a rotation (90 degrees) in the non-cutting direction are possible with without any risk of a fracture. The files are mainly driven in cutting direction and the debris is transported out coronally. According to the manufacturer, around 70 percent of canal preparation can be carried out with continuous rotation using OTR whilst the file only reverses during about 30 percent of the preparation.

To what extent does OTR comply with minimum invasive therapy methods?

Widening and shaping the root canal should only be carried out to such extent that the original course of the root canal is retained. The course of the canal should therefore be shaped for the purpose of rinsing and obturation, but not straightened undesirably. Some conventional motors, for example, operate with a 360 degree rotation and as a consequence often cause straightening and steps during the preparation of curved root canals. With OTR, however, a cyclic rotational behavior of the file occurs in curved canals: At the beginning of a severe curvature in a canal, the frictional resistance is only increased to a small amount, however, the defensive low trigger values for the torque cause a reversal of the rotational direction and with it a soft up and down movement of the file which, as a result, follows the course of the canal perfectly.

Which of the system's features do you also value in particular?

Attention should also be drawn to the other automatic and safety functions to increase work safety. The OTR principle scores with its high cutting efficiency and comparatively low drive torque levels because the cutting performance in 180 degree rotation only goes into torque reverse when the preset torque setting has been reached – and otherwise the file continues operating in the cutting direction. This reduces the strain and wear and tear on the files significantly. For comparison: In the reciprocal method, a torque value of about 400 gcm is assumed, with Auto Torque Reverse this value is about 100 gcm and with the OTR function it is about 20 to 40 gcm. In addition, the DentaPort ZX Set OTR automatically emits an acoustic signal if the internal file electrode needs to be replaced – which can be carried out easily by the dentist.

Where do you see the future challenges for endodontics and what can innovative systems do in this respect?

Endodontic retreatment therapy and fragment removal represent some of the major challenges as initial treatment continues to be subject to errors in the case of some practitioners working as all-rounders – the time required is then even greater than in the case of initial treatment. Along with correct indication, an important role for successful therapy is played by the individual anatomical structures and the choice of the right equipment. A microscope or at least a dental loupe should be included in treatment without fail – to this day, this is still not common practice among all endodontic practitioners. The integration of a cone-beam computed tomography

unit is also recommended for obtaining diagnostic information in 3D. In the subsequent therapy, innovative systems such as DentaPort ZX Set OTR help the dental practitioner master the requirements of root canal treatment.

Professor Kielbassa, thank you very much for taking the time for this interview!