

Technical report

## Very gentle root-canal treatments with OTR

Innovative and functional: Optimum Torque Reverse (OTR) is gentle on tooth substance and file materials

**Mechanical root-canal preparation challenges the materials being used – the ensuing forces may cause the file to break – and may take a toll on healthy tooth substance. Protecting healthy tooth substance as well as possible throughout endodontic treatments is one goal of the dentist. State-of-the-art preparation systems have numerous safety functions that, amongst other things, reduce the risk of file breakage and are gentle on tooth substance at one and the same time. This is also true for the innovative OTR function (Optimum Torque Reverse) – a new standard for rotating root-canal preparation.**

The long-term success of root-canal treatments basically is determined by how well the canal system is prepared, in particular by the chemical and mechanical cleaning as well as subsequent sealing procedures. The three fundamental steps are: measuring, preparation and finishing. And, what is more, all three steps can be executed with one device, e.g. Morita's DentaPort ZX Set OTR, since it unites measuring and preparation systems in one device.

Particularly the files are subject to substantial mechanical force in the root canal, and this may cause the instruments to break. In order to prevent this, modern preparation systems are equipped with intelligent safety functions. Some of these functions, such as an automatic Start/Stop function, optimize treatment comfort: the file begins rotating automatically when it is inserted in the root canal and stops as soon as it is withdrawn. There also are protective functions that prevent excessive preparation and file breakage by limiting the torque acting on the file during the treatment. Although this also could be achieved by „working with feeling“

when carrying out the preparation manually, it should be borne in mind that tactile sensation is inhibited to a significant extent whenever a preparation motor is used.

### **Complex and effective: torque-provoked reversal of the direction of rotation**

Mechanical effects, i.e. torque, that act in opposition to the drive torque of the file may lead to file breakage as a result of ensuing torsion. The complicated sounding term “torque-provoked reversal of the direction of rotation” describes an automatic function that releases the file only when such action is actually necessary: the torque impeding the file is measured and, at the same time, the rotation speed of the file is reduced only when the file approaches a previously set reference point in relation to the apex (Auto Apical Slow-down). In contrast, the function Auto Apical Stop stops the file when this point is reached and, if necessary, causes it to rotate in the opposite direction (Auto Apical Reverse). Not only is the DentaPort ZX Set OTR (Fig. 1) mentioned above equipped with all of these functions, it now offers an additional innovative function: OTR (Optimum Torque Reverse).

### **Auto Torque Reverse and Optimum Torque Reverse – the essentials of the safety functions**

The new OTR works like the well-known Auto Torque Reverse: In the latter system, the file stops and then rotates in the opposite direction as soon as the file approaches a previously set torque limit. This limits the wear of the file and protects the tooth substance. Auto Torque Reverse was implemented for the first time in the world in TriAuto ZX and later in DentaPort ZX (both made by Morita). Now, the new OTR function combines the advantages of both the rotating and alternating methods. Just like Auto Torque Reverse, OTR also is based on the principle of torque-provoked reversal of the direction of rotation: the file is released by changing its direction of rotation immediately when a defined torque is reached – it continues rotating in the direction of cutting when there is no load. The Torque Reverse is not activated unless a preset torque value is permanently exceeded during 180° forward rotation. When this occurs, the file rotates backwards 90° to release itself and then immediately continues rotating in the direction of cutting.

What other differences are there to Auto Torque Reverse? Contrary to Auto Torque Reverse, OTR requires only a small angular rotation of the file to obtain accurate feedback about the load. Consequently, the dentist can predominantly work in the efficient direction of cutting and, moreover, the file is relieved effectively during reverse rotation. In addition OTR enables treatments at very low drive torque values and speeds between 100 and 500 rpm because of the high cutting effectiveness. The defensive torque settings as well as optimized rotation angles result in gentle up and down motions of the file in the root canal. This, in turn, improves the movement of the file in the canal, increases safety and reduces file wear (only 1 to max. 3 files are needed). Given the fact that fewer file changes are necessary, the OTR function also reduces the treatment time.

#### **From start to finish: Go the distance with modular combination systems**

OTR– as the name suggests – has been integrated in the current third generation of the DentaPort TriAuto OTR endomotor. Together with the independent apex locator DentaPort Root ZX and an LED polymerization handpiece, the endomotor forms Morita's combination system DentaPort ZX Set OTR. DentaPort Root ZX is the basic module: Before starting with the preparation and sealing the canal system, the working length has to be measured accurately. Now the module can be expanded at any time with the DentaPort TriAuto OTR endomotor that is equipped with OTR (preparation) as well as the LED polymerization handpiece (finishing). Precise treatment work up to the smallest detail is possible because both devices feature small instrument heads that facilitate access and allow optimal sight. Therefore, DentaPort ZX Set OTR always will be the device that is needed at any precise moment. With its innovative safety function it is setting a new standard for gentle mechanical root-canal preparation. Gentle in two respects: for one, the system preserves as best as possible healthy tooth substance; and, for another, it minimizes the risk of file breakage.

**Figures**



Figs.1 and 2: Endodontic procedures with one device: DentaPort ZX Set OTR for measuring, preparation and finishing

