Root ZX II OTR Module
Frequently Asked Questions

Advantage for Endodontics

What are the advantages of OTR?

OTR can maintain the original shape of the canal even if it is curved because the unique clockwise and counter-clockwise rotation follows the shape of the canal without creating ledges or straightening - a serious concern in endodontics. Additionally, a lower Auto Torque Reverse setting can be chosen because the file reverses only 90 degrees. This lower Auto Torque Reverse setting will also help prevent file breakage.

The file will continue to rotate if no load is applied to the file, thus offering very efficient file advancement. The technology can also shorten the overall work time because it can reduce the amount of time for each individual file and also the total number of necessary files needed to clean and enlarge the canal.

General Specifications

I purchased the Root ZX II Module several years ago. Can I connect the new OTR module to it?

Yes. Existing contra angles, motor handpieces, main tubes, and foot switches can still be used. Some old contra angles, however, do not have an internal file electrode and must be replaced with a contra angle using an external one.

Existing contra angles with an external file electrode can be connected to handpieces with an internal electrode, but users should note that these will not trigger the alarm indicating that the electrode should be replaced.

What are the rotation speeds for OTR?

100, 300, and 500 rpm

OTR has a built-in file electrode for auto apical reverse. Can all types of files be used with this?

Most Ni-Ti files can be used except for those with handles made of plastic or other non-conductive materials.

Can I use DENTSPLY Wave One, Zipperer, or Recipro-lock Files?

These **cannot** be used with the OTR module as these files are twisted in the opposite direction of conventional files like a reverse screw. If one of these is used accidentally, there is a high risk of jamming when the reverse rotation is triggered.

With some manufacturer's files, a preparation can be completed with a single file. Can the OTR unit be used in combination with a compatible file to achieve this?

Of course there are some canals which have a simple structure and can be prepared easily with a single file, but basically there is no single file that can be used to prepare all canals. Also, there is the problem of micro-fractures when a file reaches within 5 mm of the apex. Preparing a canal with only a single file increases the risk of this happening. With OTR, you may be able to prepare a canal with a simple structure with one file, but we do not recommend this.

How much smaller is the new contra head compared to the older one?

Old Head: Diameter: 11.0 mm. Height: 15.5 mm to the file electrode.
New Head: Diameter: 9.1 mm. Height: 13.5 mm

The smaller head is easier to use in confined areas such as the molar region. Also, the smaller head gives a better view of the working area when using a microscope.

How is OTR (optimum torque reverse) different from regular torque reverse?

OTR is more efficient because it only reverses 90 degrees. Regular torque reverse reverses rotation more frequently and is therefore less efficient. Also, you can set the torque reverse level for OTR to a lower value. If you do this with regular torque reverse, it will reverse too frequently. On the other hand, if you increase the torque reverse level, the risk of file breakage also increases. You can potentially complete canal enlargement with fewer files.

What is the principal of movement of OTR?

In OTR mode, the file rotates clockwise with a maximum torque of 4.9 Ncm. If the preset load is detected at the file, as is common in curved canals, it automatically reverses 90 degrees and then continues to rotate clockwise again if the load is less than the preset. Every 180 degrees, it measures the load applied to the file. During the 180 degrees before measurement, the maximum torque of 4.9 Ncm is applied to the file.

According to most of the clinical cases we collected that used OTR mode, 70% of the procedure was spent rotating clockwise 360 degrees and only 30% automatically reversed 90 degrees before continuing again clockwise.

The torque setting for OTR is designed for low torques to avoid of the risk of file breakage. There are 4 different settings: 0.2, 0.4, 0.6, and 1.0 Ncm. We recommend using a lower setting in sensitive, critical areas.

Default settings

	OTR Mode M1 and M2	Normal Mode M3
Auto Apical Reverse	Yes	Yes
Auto Apical Slow Down	No	Yes
Auto Apical Stop	Yes	Yes
Standard Auto Torque Reverse	No	Yes
Optimum Torque Reverse (OTR)	Yes	No
Auto Torque Slow Down	No	Yes
Auto Start Stop	Yes	Yes
Speed settings rpm	100 300 (default, M1) 500 (default, M2)	150 200 250 (default) 300 400 500 600 800
Rotation direction (cutting direction)	Clockwise only	Clockwise only
Torque settings Ncm	0.2 0.4 (default, M1 & M2) 0.6 1.0	0.2 0.4 0.6 (default) 1.0 1.5 1.8 2.5 3.0 3.4 3.9 4.9 Off

M3 default mode does not have the OTR function. This mode would be helpful for opening the upper part of the canal.

Auto Apical Reverse function can be enabled or disabled.

Memory Settings

OTR or Normal can be selected for any of the memories, M1, M2, and M3
- In Normal mode all the standard Root ZX II Low Speed Handpiece functions are available.
- For the newest Ni-Ti files, the 50 rpm speed has been eliminated.
  New speeds: 150, 200, 250, 300, 400, 500, 600, & 800 rpm
  Previous speeds 50, 100, 250, 300, 400, 500, 600, & 800 rpm
- Torque Settings (unit: N. No change.)
  0.2 / 0.4 / 0.6 / 1.0 / 1.5 / 1 .8 / 2.5 / 3.0 / 3.4 / 3.9 / 4.9 / off

Does OTR have a reciprocal filing mode?

No. The movement of OTR is not reciprocal.

Can OTR be set to rotate forward only without reversing?

Yes.

Can the values for the OTR's torque reverse be changed?

Yes. It can be set to 0.2, 0.4, 0.6, and 1.0 N/cm.

Under what circumstances would the preset torque be changed?

If you are working on a delicate region inside the canal, a lower setting such as 0.2 is recommended.

When is it necessary to use the optional external file electrode?

The internal electrode can be used most of the time, but the external electrode is required if Ni-Ti files have shanks that do not conduct electricity or if there is an insulating material separating the shank and the cutting part of the file. We have not yet checked every type of file available, but the internal electrode works well with the majority of common files in use today.

Why does the unit come standard with a foot controller?

Even if the electrode circuit is not closed, you can still rotate the file by stepping on the foot switch. This is for your convenience.

*In OTR mode stepping on the foot switch when the unit is linked to the canal measurement function will rotate the file, but if for some reason, the measurement circuit is cut off while the file is inside the canal, it will stop rotating even when the foot switch is depressed. This is deliberate and for safety reasons. Step on the foot switch again or restore the integrity of the measurement circuit to continue filing.

*To use the file without linking to the measurement circuit, step on the foot switch to start it and release the switch to stop it.

File Breakage

Why is file breakage for the OTR less likely than for normal forward rotation without reverse?

By reversing rotation for 90 degrees when the torque reaches a set limit, the torsional stress on the file is relieved.

Even though files are less likely to break when using the OTR system, under what condition might files break?

Files could break if they are forced down the canal too quickly or with too much strength or if the same file is used too many times.

Efficiency

Why is the OTR module more efficient than the regular Root ZX II Low Speed Handpiece module? Since OTR rotates 360 and 180 degrees forward and also 90 degrees in reverse, it seems like it would be less efficient than a handpiece that rotates forward all the time.

Non-stop, forward rotation actually is more efficient, but the risks of file breakage and ledge formation inside the canal are also greater. It is critical to reduce the risk of file breakage as much as possible. Once the file is broken inside the canal, it is nearly impossible to remove it. Regular auto torque reverse reverses rotation more frequently and is therefore less efficient than OTR.

Compared to Other Systems

Which is more efficient, the OTR system or the reciprocal filing system?

Internal clinical evaluations show that the OTR system is more efficient. The reverse rotation only occurs when the preset torque has been reached. Otherwise, motion is constant towards the apex. Reciprocal file systems continuously rotate forward and backward regardless of tension in the file. This is the classic "2 steps forward, one step back" and is not efficient.

Which reduces the risk of file breakage more, the OTR system or the reciprocal filing system?

Some reports suggest that the reciprocal filing system is more likely to crack the apex.

Other Clinical Considerations

I use a lot of disinfecting solution inside the canal. Will auto apical reverse still work normally?

Auto apical reverse does not work well if the canal is filled with a lot of disinfecting solution. The problem is that the solution can easily overflow the crown of the tooth and cause a short circuit. This can be overcome by using a rubber dam to prevent short circuiting.

I always file curved canals manually because motorized handpieces are very likely to deform the canal. Does the OTR system reduce canal deformation?

Canal deformation can be reduced in most cases if a Ni-Ti file is used and the file is not forced down the canal too quickly or with too much strength. Using too much force to advance the file towards the apex can break the file. It is best to use an up-and-down pecking motion.

Filing debris should be carefully cleaned away with a piece of cotton, etc. Otherwise, it may accumulate at the apex and could result in ledges, increase the risk of file breakage, or even be forced out through the apical foramen.