

RECIPROC[®]
one file endo





 **RECIPROC®**
one file endo

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Reciprocating History

Canal curvature has always introduced complexity into canal preparation. The “balanced force concept”, i.e. small clockwise and counter-clockwise movements, was developed over a period of twelve years, and proposed in 1985 by Roane as a means of overcoming the curvature influence. Using the balanced force technique, it is possible to shape curved canals with larger diameter hand instruments. The use of stainless steel hand instruments, however, is time-consuming and strenuous, and there is a high frequency of preparation errors.

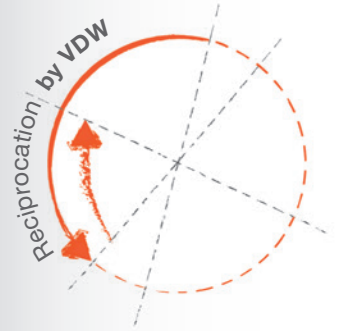
The development of continuous rotary preparation with nickel-titanium instruments solved some of these issues, although it is still necessary to use several hand and rotary files in different steps, and there may be a lengthy learning curve before proficiency can be achieved.

Inspired to find a simpler and more convenient safe way to successfully prepare a root canal, Prof. Ghassan Yared, who was at that time Professor of the Endodontic Undergraduate and Graduate Programmes at the University of Toronto, started researching and testing mechanical reciprocation with nickel-titanium instruments. In 2008, he published a clinical article on canal preparation using only one NiTi engine-driven instrument and joined together with VDW to develop RECIPROC®, a system specifically for use in reciprocation.



Reciprocation by VDW

In reciprocation, the instrument is driven first in a cutting direction and then reverses to release the instrument. One complete rotation of 360° is completed in several reciprocating movements. The angle in the cutting direction is greater than the angle in the reverse direction, so that the instrument continuously progresses towards the apex. The angles of reciprocation are precise and specific to the design of the RECIPROC® instrument and to VDW endo motors. They are designed to be smaller than the angle settings where the elastic limit of the instrument would be met, thus minimising the risk of instrument fractures.



II The RECIPROC® System

RECIPROC® Instruments

RECIPROC® instruments are marked with the ISO colour of the instrument tip size for easy identification.



R25 prepares the root canal to a diameter of 0.25 mm with a taper of .08 over the first apical millimetres.



R40 prepares the root canal to a diameter of 0.40 mm with a taper of .06 over the first apical millimetres.



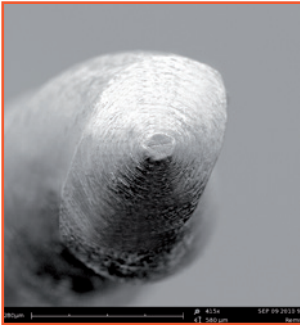
R50 prepares the root canal to a diameter of 0.50 mm with a taper of .05 over the first apical millimetres.



Instrument Design

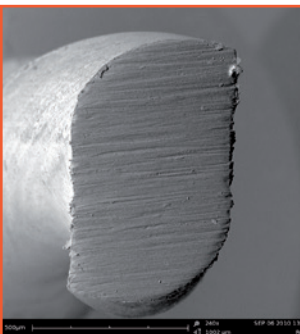
RECIPROC® instruments have been specifically designed for use in reciprocation. RECIPROC® has a non-cutting tip.

Non-cutting tip



RECIPROC® is produced with M-Wire® nickel-titanium. Increased cyclic fatigue resistance is achieved through the use of this alloy produced in an innovative thermal-treatment process. M-Wire® has both greater resistance to cyclic fatigue and greater flexibility than traditional nickel-titanium.

S-shaped cross-section




m-wire®
nickel titanium

Radiographs:

Dr. David Sonntag,
University of Düsseldorf

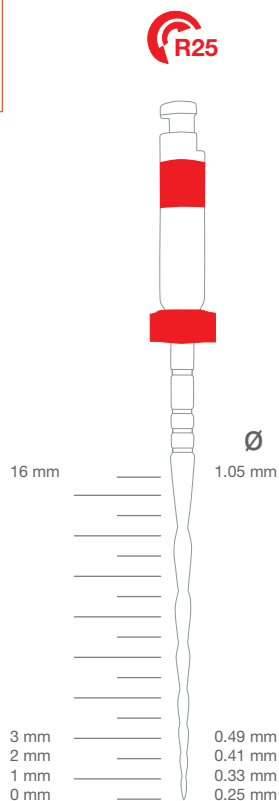


■ RECIPROC® instruments are designed to be used as a **single instrument**. That means that **one instrument only** is required to prepare a root canal.

■ The shape obtained by the RECIPROC® instrument enables effective irrigation and obturation with both cold and warm techniques.

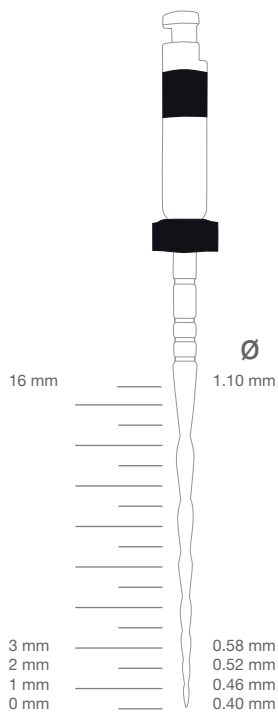
narrow canals

See “Selecting the Correct RECIPROC® Instrument” on page 20 for guidelines on selecting the RECIPROC® instrument suitable for the canal type.

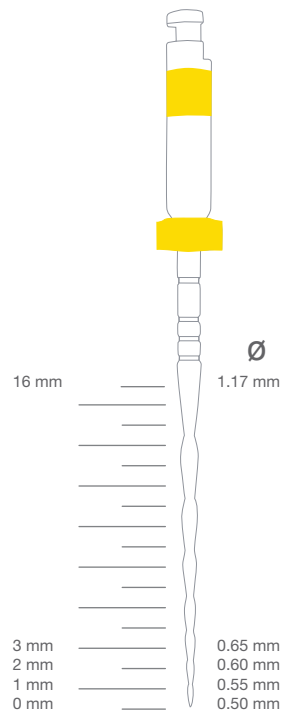




medium canals



wide canals



Instrument Identification

Silicone stopper

The stopper, in the ISO colour of the specific RECIPROC® instrument tip size, supports clear identification of the RECIPROC® instrument when it is inserted in the contra-angle. The three points represent three movements needed to complete 360° in reciprocation.



Depth markings

RECIPROC® instruments have radiograph visible depth markings e.g. at 18, 19, 20 and 22 mm.

Shaft

RECIPROC® instruments have a short shaft of 11 mm enabling better access to molars compared to many other instruments which have a shaft of 13 mm or longer.



Working length

Working length: Depth markings at:

21 mm	18, 19 and 20 mm
25 mm	18, 19, 20 and 22 mm
31 mm	18, 19, 20, 22 and 24 mm



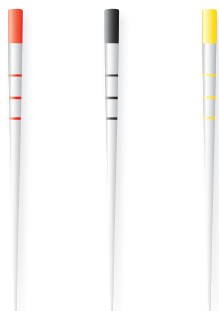
Frequency of Use

A RECIPROC® instrument is designed for single use in maximum one molar. As with all nickel-titanium instruments, it should be examined during the treatment and discarded if signs of wear, such as untwisting, can be seen. If an instrument appears to be bent after being used in a strongly curved canal, it should be discarded.

Single-Use Convenience

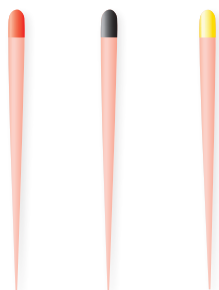
The RECIPROC® system is designed for convenience and safety. The instruments are delivered ready to use, pre-sterilised in blister packaging and should be simply discarded after use, making work flow more efficient; eliminating the need to clean and sterilise instruments, considerably reducing the risk of contamination to office personnel and eliminating the risk of cross contamination to patients.

One RECIPROC® instrument does the job of several instruments which would need to be used for preparation with regular hand or continuous rotary instruments. The RECIPROC® instrument cannot be autoclaved due to its non-autoclavable handle. This safety feature protects against metal fatigue caused by over-use.



RECIPROC® Paper Points

There are highly absorbent and pre-sterilised RECIPROC® Paper Points corresponding to instrument sizes R25, R40 and R50. For convenient use they are packed in blister cells of four paper points each. Sterile paper points help to prevent the root canal from recontamination after thorough cleaning and disinfection. Markings at 18, 20 and 22 mm assist working length control.



RECIPROC® Gutta-Percha

The RECIPROC® system includes RECIPROC® Gutta-Percha for use with either cold obturation techniques such as single cone and lateral compaction or as a master cone for warm vertical condensation, for example with the BeeFill®2in1 system. RECIPROC® Gutta-Percha has a special α -phase and a low melting point and it corresponds to the individual shapes of the RECIPROC® instruments R25, R40 and R50.



GUTTAFUSION® for RECIPROC®



The GUTTAFUSION® for RECIPROC® obturators have been developed for an easy, warm and homogeneous 3D-obturation of the whole root canal system. Made entirely of gutta-percha the obturators can be heated in the GUTTAFUSION® oven and can be placed precisely into the root canal either by hand or with tweezers, thanks to the specially designed handle.

The obturators correspond to the RECIPROC® preparation system and are available in the sizes R25, R40 and R50.

RECIPROC® Endo Motors from VDW

VDW.CONNECT Drive®, VDW.GOLD®RECIPROC® and VDW.SILVER® RECIPROC® endo motors are designed to enable the use of both reciprocating and continuous rotary nickel-titanium systems. Thanks to the intuitive menu navigation and clearly structured display the motors ensure easy and convenient use.



VDW.GOLD®RECIPROC®
with integrated apex locator



VDW.SILVER®RECIPROC®



VDW.CONNECT Drive®

For further information on VDW's RECIPROC® Endo Motors, please consult our website: www.vdw-dental.com



RECIPROC REVERSE Comfort Function

VDW RECIPROC® motors are equipped with the unique RECIPROC REVERSE Comfort Function, which has been specially designed by VDW. This function is a two-stage indicator, which signals when to switch to a brushing file motion in order to reduce stress on the instrument during preparation and to enable an easy advancement towards the apex.

RECIPROC REVERSE supports the user in working with the RECIPROC® system by giving a first acoustic signal to indicate an increase in friction experienced by the instrument in the root canal. In order to reduce friction, the instrument should temporarily be used in a lateral brushing motion towards the coronal section. This creates space in the root canal and the instrument can further advance towards the apex by using a pecking motion.

If the instrument is subjected to further stress, a second acoustic signal is given and the motor will automatically start rotating in clockwise direction. In this way, stress on the instrument will immediately be reduced. By releasing and pressing the foot pedal again, the motor will resume reciprocating motion. However, the instrument must be cleaned, the canal irrigated and an ISO size 10 C-PILOT® File used to check that the canal is not blocked before resuming reciprocating motion. The preparation can then be continued by temporarily using lateral brushing motions until the instrument can easily advance towards the apex. Following this, the canal can be further prepared by returning to the usual pecking motions (see “Preparation Step by Step” on page 22).

III Advantages of Reciprocation and the RECIPROC® System



Tooth: 25



Tooth: 27



Tooth: 47

Radiographs: Prof. Ghassan Yared
Ontario, Canada

Centring ability

In reciprocation, the instrument stays better centered in the root canal. Large instruments with a large core can safely and efficiently negotiate even narrow and strongly curved canals.

Single file preparation

A root canal can be completely prepared to a greater taper with only one reciprocating instrument.

Retreatment

Gutta-percha filling material and carrier based obturators can be removed with R25.

Simplicity

RECIPROC® is very simple to use.

Less work steps

Chair-side preparation is reduced to a minimum, as the RECIPROC® instrument comes pre-sterilised. There is no need to change instruments in the contra-angle during preparation.

Time-saving

Designed for convenience, RECIPROC® instruments are used on only one patient and then simply discarded, eliminating two work steps – cleaning and sterilising.

Proven cleaning ability

RECIPROC® is effective in cleaning even severely curved canals (Bürklein et al. 2012).

Less risk of contamination

The risk of cross contamination to patients is eliminated and the risk of contamination to both office personnel and dentist is considerably reduced.

**Easy to learn
Less likelihood of
procedural errors**

Root canal preparation with RECIPROC® is easy to learn and tests with RECIPROC® showed less likelihood of procedural errors compared to rotary NiTi.

**The risk of instrument
fracture is minimised**

The angles of reciprocation are specific to the design of the RECIPROC® instrument. They are smaller than the angle settings where the elastic limit of the instrument would be met, thus minimising the risk of instrument fractures.



IV Glide Path Management

There are two ways of using RECIPROC®: with and without initial hand filing to create a glide path.

The Standard Up Until Now: Initial Hand Filing to Create a Glide Path before the Use of Rotary Instruments

With continuous rotary NiTi systems it is necessary to create a glide path in order to minimise the risk of fracture due to instrument binding. During the use of a rotary instrument, the tip of the instrument may bind in the canal. For this reason, it is necessary to create an initial glide path, or a minimal canal enlargement, before using continuous rotary instruments.

Just as with any continuous rotary NiTi system, it is possible to use the RECIPROC® reciprocating instrument after creating an initial glide path with hand instruments (e.g. C-PILOT® File) to an ISO size 10 or 15. However, RECIPROC® and the reciprocating movement has opened a new possibility: using RECIPROC® without initial hand filing in the majority of cases.

A Paradigm Shift in Endodontics: Using RECIPROC® without Initial Hand Filing to Create a Glide Path in the Majority of Cases

“ The concept of using a shaping instrument without first creating a glide path with hand or mechanical glide path instruments is a completely new way of thinking, a paradigm shift. It goes against the current teaching standard which requires the creation of a glide path prior to using a rotary instrument to prevent it binding in the root canal.

In reciprocation, clockwise and counterclockwise angles determine the amplitude of reciprocation, the right and left rotations. These angles, stored in the motor, are significantly lower than the angles at which the RECIPROC® instrument would usually fracture (if bound). When a reciprocating instrument binds in the canal, it will not fracture because it will never rotate past its specific angle of fracture. Therefore, the creation of a glide path to minimise binding is not required for the RECIPROC® instruments.

I want to introduce the notion of **the path of least resistance**. The reciprocation technique's **centring ability** together with the design of the RECIPROC® instrument and its increased cutting ability allows the RECIPROC® instrument to follow the existing and natural path of least resistance, which is the root canal. I want to take advantage of the presence of that natural path with the RECIPROC® instrument in order to eliminate initial hand filing for the creation of a glide path in the majority of cases. This is not only time-saving but also particularly convenient in teeth with limited access. Additionally, errors associated with the use of hand filing prior to using mechanically driven instruments can be avoided. ”

Prof. Ghassan Yared

Ontario, Canada



The creation of a glide path may be required in some cases **during** the use of RECIPROC®. For more information see “Glide Path Management During the Use of RECIPROC®: Indication and Recommendations” on page 26.

First Steps

Ensure you have achieved a straight line access to the root canal entrance.

It is not necessary to widen the root canal entrance with a Gates Glidden drill or an orifice opener. The design of the RECIPROC® instrument allows any obstructions in the coronal third to be removed.

Selecting the Correct RECIPROC® Instrument

In most cases, the R25 will be suitable in size for the root canal treatment. Consult the pre-operative radiograph to see if the canal is likely to be considered as narrow, medium or wide:



If the canal is partially or completely invisible on the radiograph:

The canal is considered narrow; use an R25.



If the canal is completely visible on the radiograph:

Take an ISO size 30 hand instrument; insert it passively into the canal. If it reaches working length, the canal is considered large; use the R50.



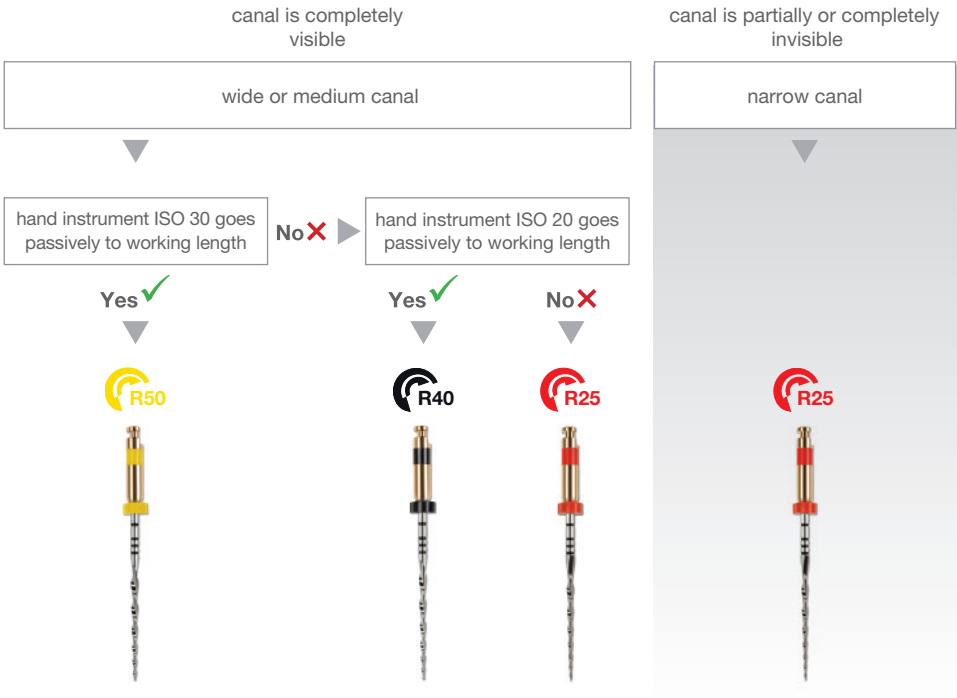
If an ISO size 30 hand instrument does not go passively to working length, try an ISO size 20 hand instrument. If this goes passively to working length, the canal is considered medium; use the R40.



If an ISO size 20 hand instrument does not go passively to working length, use the R25.

Passively means that the instrument goes directly to working length with a gentle watch winding movement (small right left rotations) but **without filing action**.

Pre-Operative Radiograph DECISION

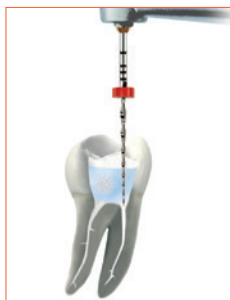


Preparation Step by Step

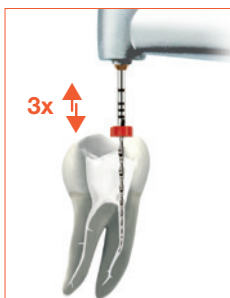
Estimate or determine the root canal length depending on whether it is a narrow, medium or wide canal (see “Electronic Length Determination” on page 24).



1. Place irrigant in the access cavity of the root canal.
2. Select the appropriate RECIPROC® instrument and secure it in the handpiece of the VDW RECIPROC® motor.
3. Check that the RECIPROC® motor setting has been selected.



4. Introduce the RECIPROC® instrument into the canal. Press the motor foot pedal when the instrument is at the root canal orifice.



5. Move the instrument in a slow in-and-out pecking motion. The amplitude of the in-and-out movements should not exceed 3 mm. Only very light pressure should be applied. The instrument will advance easily in the canal. 1 in-and-out movement = **1 peck**.



- 6. After 3 pecks, remove the instrument from the canal.**
Clean the debris from the flutes in the Interim Stand.



- 7. Irrigate the canal.**



- 8. Make sure the canal is free to approx. 3 mm beyond the prepared canal section with an ISO size 10 C-PILOT® File.**
- 9. In this way, continue with the RECIPROC® instrument until approx. 2/3 of the working length has been reached. **When using an R25:** determine the working length by using an ISO size 10 C-PILOT® File (see “Glide Path Management” on page 26). **When using an R40 or R50:** the working length should be re-checked with an apex locator (see “Electronic Length Determination” on page 24).**
- 10. Continue with the RECIPROC® instrument until full working length has been reached.**
- 11. As soon as full working length has been reached, withdraw the instrument from the root canal.**

Electronic Length Determination

Narrow canals:

Before commencing preparation, the length of the root canal is estimated with the help of an adequately exposed and angulated pre-operative radiograph. The silicone stopper is set on the RECIPROC® instrument at $\frac{2}{3}$ of that length.

During preparation with R25, after approximately $\frac{2}{3}$ of the root canal has been prepared, use a C-PILOT® File or a K-File ISO size 10 and an apex locator such as RAYPEX®6 to determine the length of the root canal. The silicone stopper can be set on the RECIPROC® instrument at this determined length.

Medium or wide canals:

Before starting preparation with R40 and R50, determine the working length with an apex locator such as RAYPEX®6 by using a C-PILOT® File or a K-File. Set the silicone stopper at that length. After the coronal and middle thirds of the canal have been prepared, the working length should be re-checked.





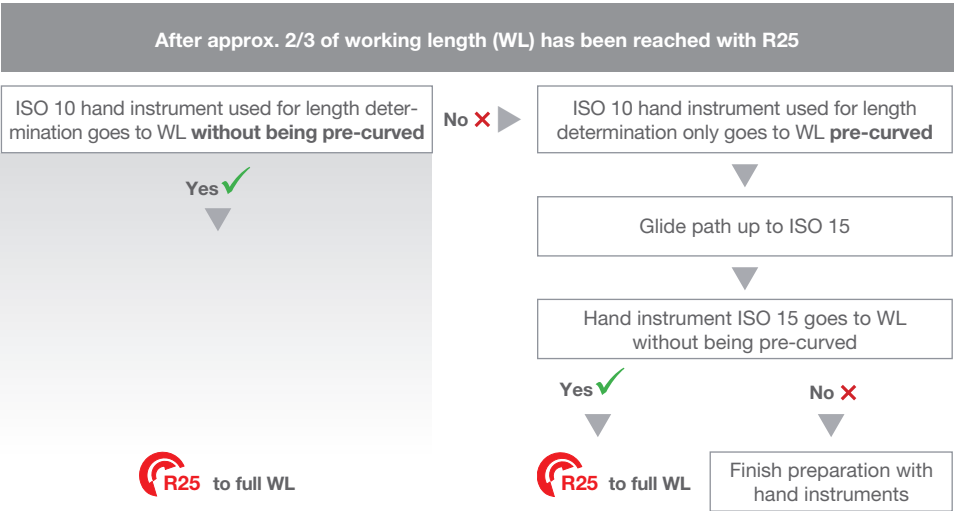
Tips

1. RECIPROC® instruments can be used in a lateral brushing motion to enable preparation of irregular shaped canals or to enlarge the root canal entrance. The lateral brushing motion can also help to achieve an easier advancement of the instrument.
 2. Clean RECIPROC® instrument flutes after 3 pecks.
 3. Use an ISO size 10 C-PILOT® File to check that the canal is not blocked after 3 pecks with RECIPROC®.
 4. Irrigate the root canal according to the appropriate irrigation protocol.
- △ Never apply pressure if resistance is encountered, instead repeat points 2 to 4 above.
 - △ Remove the instrument from the canal as soon as working length has been reached. Working with a mechanical instrument too long in one spot will cause canal transportation!
 - △ Pull the RECIPROC® instrument out of the canal after 3 pecks or when resistance is encountered.

Glide Path Management During the Use of RECIPROC®: Indication and Recommendations

During Electronic Length Determination

In rare cases, the ISO size 10 C-PILOT® File used for determining the working length (after the RECIPROC® instrument has reached 2/3 of the estimated working length) has to be pre-curved in order to reach the working length. In these cases, a glide path has to be created with C-PILOT® Files up to ISO size 15. If an ISO size 15 C-PILOT® File then goes to full working length **without being pre-curved**, the preparation can be completed up to full working length with a RECIPROC® instrument. If the hand instrument does not go to full working length, an abrupt apical curvature is present. The use of RECIPROC® instruments is contra-indicated in this instance. The canal preparation has to be finished with hand files. This limitation also applies to continuous rotary instruments.





Whenever Advancement Becomes Difficult

In some canals, the RECIPROC® instrument may stop advancing in the canal or its advancement may become difficult.

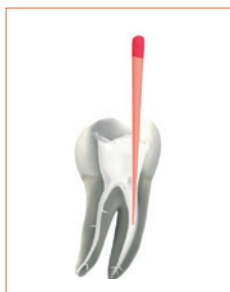
Do not apply pressure on the instrument.

1. Remove the instrument from the canal. Clean the debris from the flutes in the Interim Stand. Irrigate the canal.
2. Continue the preparation by temporarily using the RECIPROC® instrument in lateral brushing motions. If it still advances with difficulty or if it does not advance, remove it from the canal. Clean the debris from the flutes in the Interim Stand. Irrigate the canal.
3. Use C-PILOT® Files ISO sizes 10 and 15 to create a glide path up to working length.
4. Continue with the RECIPROC® instrument until the working length is reached.
5. If it is still difficult or not possible for the RECIPROC® instrument to advance in the canal, the preparation should be completed with hand files.

This limitation also applies to continuous rotary NiTi systems.

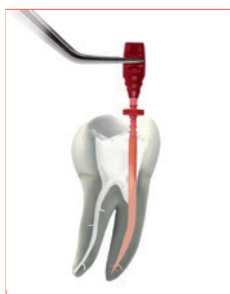
VI Obturation with RECIPROC®

Root canals prepared with RECIPROC® instruments have a shape suitable for all obturation techniques. Use RECIPROC® Gutta-Percha with α -phase for both cold and warm obturation techniques. See RECIPROC® Gutta-Percha on page 12 and www.vdw-dental.com for further information on VDW obturation products such as BeeFill®2in1 or 2Seal easymiX®.



RECIPROC® Gutta-Percha

For single cone or lateral compaction technique select a RECIPROC® Gutta-Percha cone according to the instrument size used.



GUTTAFUSION®

For an easy and warm 3D root canal filling GUTTAFUSION® for RECIPROC® offers obturators entirely of gutta-percha. Select an obturator according to the instrument size used.



BeeFill®2in1

For warm vertical condensation select a RECIPROC® Gutta-Percha master cone and use downpack and backfill techniques.



Retreatment of gutta-percha obturations

Gutta-percha filling material can be removed from the root canal with the RECIPROC® R25.

1. Remove the bulk of the gutta-percha in the coronal third of the canal with an appropriate instrument, e.g. a Gates Glidden drill, or an ultrasonic instrument such as VDW.ULTRA®. Depending on the consistency of the gutta-percha it is possible to start the retreatment directly with R25.
2. Use a drop of solvent (e.g. eucalyptus oil) as required.
3. Use R25 as described until working length has been reached. If resistance is encountered, do not apply pressure. Remove the instrument from the canal, re-apply solvent and try again.
4. Use a brushing motion against lateral walls to remove residual obturation material.
5. After reaching working length with R25, use R40 or R50 for an increased apical enlargement, as necessary.

Retreatment of carrier-based obturators

Proceed as described in points 1. to 5. above. The carrier may be removed in one piece during the use of the RECIPROC® instrument; otherwise, it will be removed in small pieces with the gutta-percha.

VIII RECIPROC® Product Range

RECIPROC® Instruments

STERILE

Blister pack of 6 instruments	21 mm	25 mm	31 mm
R25	0212 021 025	0212 025 025	0212 031 025
R40	0212 021 040	0212 025 040	0212 031 040
R50	0212 021 050	0212 025 050	0212 031 050
3 x R40, 3 x R50	0212 021 233	0212 025 233	0212 031 233
Blister pack of 4 instruments	21 mm	25 mm	31 mm
R25	0012 021 025	0012 025 025	0012 031 025
2 x R25, 1 x R40, 1 x R50	0012 021 200	0012 025 200	-



GUTTA FUSION® for RECIPROC® Obturators

Blister pack of 6 obturators	1 blister pack	5 blister packs
R25	1531 000 025	1532 000 025
R40	1531 000 040	1532 000 040
R50	1531 000 050	1532 000 050



RECIPROC® Gutta-Percha

Box of 60 pieces	28 mm
R25	0214 028 025
R40	0214 028 040
R50	0214 028 050
40 x R25, 10 x R40, 10 x R50	0214 028 237



RECIPROC® Paper Points

STERILE

Box of 144 pieces	29 mm
R25	0216 029 025
R40	0216 029 040
R50	0216 029 050
96 x R25, 24 x R40, 24 x R50	0216 029 237



■ VDW.CONNECT Drive® Set Medium

Cordless endo motor with iPad application for reciprocating and continuous rotary NiTi systems including 24 RECIPROC® instruments in 25 mm working length, RECIPROC® Paper Points and RECIPROC® Gutta-Percha

REF _____ 1181 000 000



■ VDW.GOLD®RECIPROC® + RECIPROC® System Kit

Motor with integrated apex locator for reciprocating and continuous rotary NiTi systems including 12 RECIPROC® instruments in 25 mm working length, RECIPROC® Paper Points and RECIPROC® Gutta-Percha

REF _____ 1173 025 611

■ VDW.SILVER®RECIPROC® + RECIPROC® System Kit

Motor for reciprocating instruments and continuous rotary NiTi systems including 12 RECIPROC® instruments in 25 mm working length, RECIPROC® Paper Points and RECIPROC® Gutta-Percha

REF _____ 1163 025 611



■ RECIPROC® System Kit 24

- 2 Blister packs of 6 instruments R25, sterile
- 1 Blister pack of 6 instruments R40, sterile
- 1 Blister pack of 6 instruments R50, sterile
- Training model
- RECIPROC® Paper Points assorted, sizes R25, R40, R50, sterile
- RECIPROC® Gutta-Percha assorted, sizes R25, R40, R50
- User card, brochure, directions for use

REF _____ 1213 025 000



■ Interim Stand

For quick chair-side storing and cleaning of root canal instruments

REF _____ 495



■ Refills for the Interim Stand

Foam discs
55 pieces

REF _____ 496





 **RECIPROC®**
one file endo

► www.RECIPROC.com

VDW GmbH
Bayerwaldstr. 15 • 81737 Munich • Germany
Tel. +49 89 62734-0 • Fax +49 89 62734-304
www.vdw-dental.com • info@vdw-dental.com



Look for the red dot.
Over 30 years' experience
in sterile endo products.