

## Root Canal Retreatment Using the RECIPROC® System: Proficiency and Efficiency Through Simplicity

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Gutta-percha obturation material can be removed easily from the canal with the R25 instrument. The procedure is safe as long as the clinician respects the guidelines of using the RECIPROC® instruments for canal preparation. The purpose of the present article is two-fold:

1. To describe the clinical procedure for the retreatment of gutta-percha and carrier-based gutta-percha root canal fillings (i.e. GuttaMaster® and Thermafil®-type obturation materials).
2. To discuss the safety of the retreatment procedure.

### ■ Clinical procedure

Guidelines have already been established for the use of RECIPROC® instruments for the initial canal preparation; they include the forward and reverse angles, speed settings on the motor, the pressure applied on the instrument, the pecking and brushing motion with the instrument, the canal preparation without establishing a glide path, and the need to establish a glide path in some cases (<http://www.endodonticcourses.com/literature>). One major benefit of the RECIPROC® system is its simplicity regardless of the nature of the procedure. The guidelines for using the RECIPROC® instruments for initial endodontic treatments and retreatments are the same. The retreatment clinical procedure is very similar to an initial canal preparation. The access cavity preparation and the straight-line access guidelines, and the irrigation protocol remain unchanged.

### ■ Retreatment of gutta-percha root canal fillings

Before commencing the retreatment procedure, the length of the canal is estimated with the help of a preoperative radiograph, adequately exposed and angulated. The retreatment procedure comprises 4 steps.

ONE FILE ENDO  
RETREATMENT

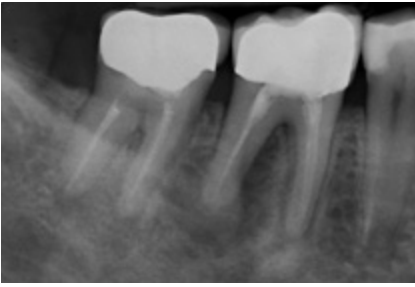


Fig. 1a

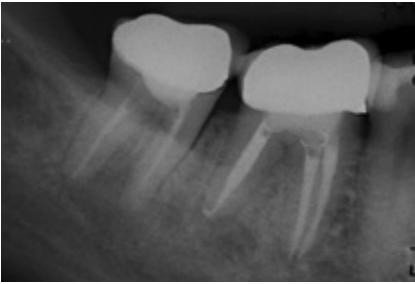


Fig. 1b

### ***Step 1: removal of obturation material in the coronal third***

The bulk of the gutta-percha in the coronal third of the canal should be removed with an appropriate instrument (e.g. electric heat carrier, ultrasonic tip).

### ***Step 2: removal of obturation material in the body of the canal***

Gutta-percha obturation material can then be easily removed from the canal with the R25. The silicone stopper is set on the R25 at 2/3 of the estimated canal length. The R25 is introduced into the canal with a slow in-and-out pecking motion without pulling the instrument completely out of the canal. The amplitude of the in-and-out movement should not exceed 3-4 mm. Only very light pressure should be applied. The instrument will advance easily in the obturation material and the canal in an apical direction. After a maximum of three in-and-out movements, or when more pressure is needed to make the instrument advance further in the canal, or when resistance is encountered, the instrument is pulled out of the canal to clean the flutes. The canal is copiously irrigated with sodium hypochlorite. The R25 is used in the same manner until it has reached 2/3 of the estimated working length as indicated by the stopper on the instrument. The instrument is then removed from the canal; the canal is irrigated. A gutta-percha solvent (e.g. eucalyptus oil) may have to be used as required to allow the R25 to advance in the canal.

### ***Step 3: working length determination and removal of obturation material in the apical third***

A size 10 or 15 hand file is used to determine the working length; a gutta-percha solvent may have to be used as required to allow the hand file to advance in the apical third to determine the working length. The working length is then confirmed electronically and/or radiographically. The author's preferred method to determine the working length, based on 5 years of clinical experience with the use of RECIPROC® instruments, was to continue using the R25 slowly and carefully after it reached 2/3 of the estimated length with continuous monitoring of the working length with an apex locator. In addition, it was the author's impression that the R25 would advance in the apical third of the canal to the working length easier than a hand file. It was also the author's impression from his experience that in many cases, the R25 instrument was able to reach the working length after the attempt to reach that length with a hand file failed. However, in only a few cases, in which an abrupt canal curvature was present, the R25 could not reach the working length; hand files had to be used. The use of a solvent may be necessary. The small hand files are pre-curved and used in order to obtain patency. A glide path is created with hand files up to a size 15. The R25 instrument is then used to the working length. If the R25 does not advance easily in the canal, the preparation is then completed with hand files.

### ***Step 4: increased apical enlargement***

An additional apical enlargement may be required; it can be accomplished easily with the R40 or the R50 instrument. They can be used in a brushing motion against the lateral walls of the canals to remove any residual filling material. Any further enlargement can be continued with larger hand files.

### ■ Retreatment of carrier-based gutta-percha root canal fillings

Carrier-based obturators can be removed in the same manner as described above for gutta-percha filling material. The carrier may be removed in one piece with the RECIPROC® instrument; otherwise, it will be removed in small pieces with the gutta-percha.

### ■ Safety of the retreatment procedure

Generally, when used in a continuous rotary movement, an instrument can bind in the canal. When this happens, the instrument will be subjected to stress which will increase with the rotation of the instrument when bound; ultimately, the instrument will fracture. Also, an instrument will repeatedly engage the root canal walls to cut dentine; the instrument will be subjected to stress in torsion from the cutting procedure; the repeated stress can cause torsional fatigue which can also result in instrument fracture. With the RECIPROC® system, the forward and reverse angles set on the motor were selected in order to eliminate the possibility of fracture from binding and to reduce the incidence of fracture from torsional fatigue. These specific angles are crucial to the safety of the RECIPROC® system. Consequently, the preparation of curved and narrow canals with only one RECIPROC® instrument is safe (<http://www.vdw-RECIPROC.de/en/articles-and-studies.html>).

Removing gutta-percha is obviously easier than enlarging a narrow and curved canal because gutta-percha is soft; therefore, the torsional stress to which the instrument will be subjected when engaging gutta-percha is lower compared to dentine. The clinician should not have any concerns in using the RECIPROC® instruments for a retreatment procedure.

In vitro trials (unpublished data) on the use of RECIPROC® instruments for the retreatment of gutta-percha and carrier-based gutta-percha root canal fillings in resin blocks demonstrated the safety and efficiency of these instruments in removing the obturation materials. Instrument fracture or deformation did not occur and the working length was reached in all of the canals as long as the procedure guidelines, described above, were followed. Similar results were obtained on patients over a period of use exceeding 4 years. A 3-year outcome evaluation of root canal retreatments performed with the RECIPROC® instruments on teeth with apical disease (<http://www.endodonticcourses.com/literature>) showed that the healing rate was 91.59 % (Fig. 1, 2).

### ■ Conclusions

In summary, the retreatment procedure of gutta-percha and carrier-based gutta-percha root canal fillings is safe, simple and efficient. The healing rate of endodontic retreatments of teeth with apical disease is excellent.

### Acknowledgement

Prof. Ghassan Yared is the inventor of single file reciprocation and was involved in the development, field testing and research of RECIPROC®. He serves as a consultant to the RECIPROC® product range.



Fig. 2a

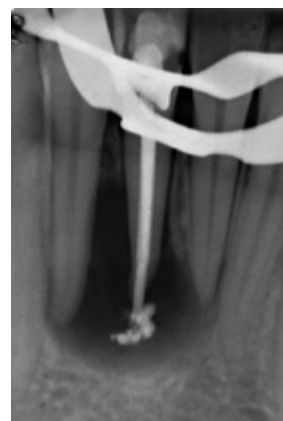


Fig. 2b



Fig. 2c



Ghassan Yared DDS MSc

## Curriculum Vitae

Prof. Ghassan Yared is an endodontist practicing in Ontario, Canada. He completed his endodontic specialty training at University Paris VII (Paris, France) in 1987 and obtained his MSc from the Lebanese University (Beirut, Lebanon) in 1994.

Prof. Yared has been extensively involved in teaching. He joined the Faculty of Dentistry at the Lebanese University in Beirut, Lebanon in 1988 and became Professor and Head of the Department of Endodontics; he also created and chaired the Department of Research. He joined the Department of Endodontics at the University of Toronto, Canada in 1999 for a full-time position as Assistant Head of the Department of Endodontics and Director of the Endodontic Undergraduate Programme. He remained at that position as Associate Professor until summer 2004. He was Acting Head of the Department of Endodontics for 2003 and 2004. Prof. Yared was elected for four consecutive years as the “Best Teacher of the Year”, and received the “Master Bruce Howard Award for Excellence in Teaching”, the highest teaching award at the Faculty of Dentistry, University of Toronto.

Prof. Yared has supervised the research projects of graduate endodontic students at the University of Toronto and has published extensively in peer-reviewed international endodontic journals. He has also given numerous lectures and continuous education courses worldwide.

Prof. Yared is a reviewer for the International Endodontic Journal, the Journal of Endodontics, Endodontic Topics, and for Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology and Endodontics. He is also a member of the Canadian Academy of Endodontology and the American Association of Endodontists.

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