

Reciproc® Family Scientific Highlights

1 Description

Inspired to find a simpler and more convenient way to successfully prepare a root canal, Prof. Ghassan Yared, at that time Professor of the Endodontic Undergraduate and Graduate Programmes at the University of Toronto, started researching and testing mechanical reciprocation with NiTi instruments. In 2008, he published a clinical article on canal preparation using only one engine-driven NiTi instrument^[1] and joined together with VDW (Dentsply Sirona) to start developing a system specifically to be used in reciprocation. The idea of Reciproc® was born. Presented the first time in 2010 and finally launched in 2011, Reciproc® introduced root canal preparation with only one mechanical instrument used in reciprocation, without a glide path (see Figures 1 and 3). This new concept was a paradigm shift. Constantly striving for innovation, VDW (Dentsply Sirona) developed a heat treatment solution to bring more flexibility to NiTi. Five years after launching Reciproc® VDW (Dentsply Sirona) presented Reciproc® Blue in 2016 – a universal and flexible instrument for the majority of cases (see Figures 2 and 3).

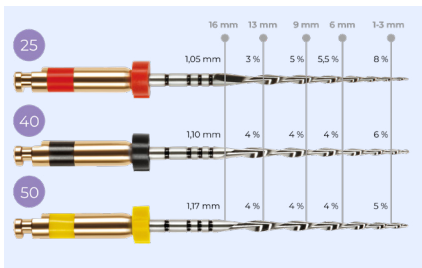


Figure 1
Reciproc® instruments, size R25, R40 and R50 (In purple circles: ISO sizes).

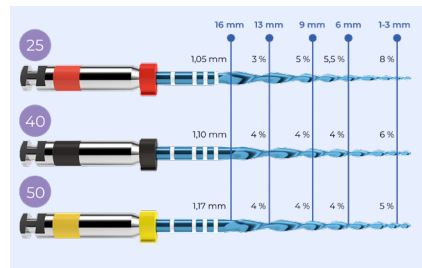


Figure 2
Reciproc® Blue instruments, size R25, R40 and R50 (In purple circles: ISO sizes).

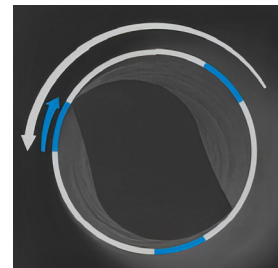


Figure 3
SEM image of the S-shaped cross-section of a Reciproc® R 25 instrument, showing the reciprocating motion (white arrows and lines showing the counterclockwise motion and blue arrows and line showing the clockwise motion).

2 Key literature

So far, more than 650 peer-reviewed scientific papers have been published on this endodontic system, with various topics of interest as shown in the figure below, making Reciproc® family one of the most extensively studied NiTi treatment solution in the endodontic field.

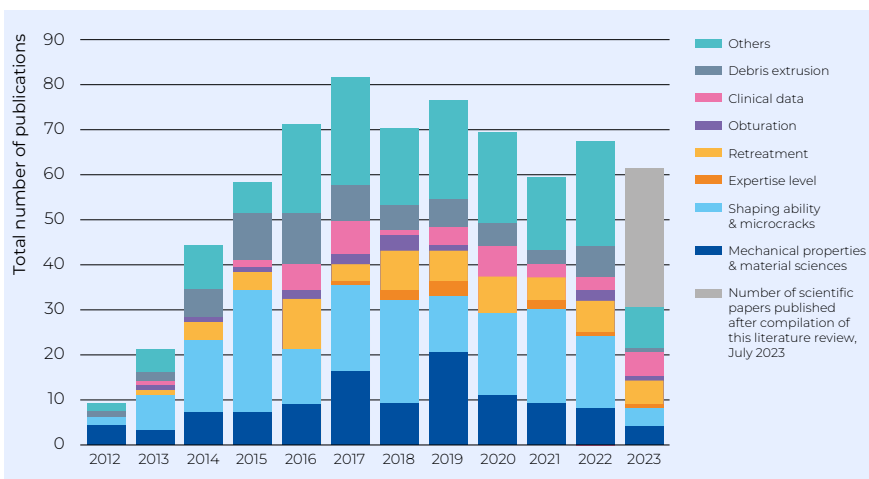


Figure 4
Total number of publications on the Reciproc® family from PubMed (key words : "Reciproc" (title/abstract), on June 30, 2023). "Other" category means publications on Reciproc® devices but not in English, mislabel uses, or studies using Reciproc® without focusing on it.

A scientific manual, providing a synopsis of the key published research findings on Reciproc® family system with focus on fatigue resistance (mechanical properties), level of expertise required, ability to reach working length, shaping ability, quality of obturation, clinical data on initial treatment and retreatment, is available (on Dentsply Sirona website). These insights were gained:

- **Performance and ability to directly scout and shape:** In an ex vivo study, the Reciproc® R25 instrument was able to reach the full working length without a glide path in 93.4% of the cases, in straight and moderate curved mandibular molar canals^[2]. In another study with a similar design, focusing on Reciproc® Blue R25, the full working length was reached in 98.70% of the cases without a glide path^[26]. An original study on 300 patients highlighted the successful use of Reciproc® R25 as a first instrument (no K-file) in 85.63% of the cases in second mesiobuccal canals, vs. 57.48% for the K file instruments^[3]. Regarding shaping ability, Reciproc® and Reciproc® Blue maintain the original canal curvature^[4-6].
- **Resistance to cyclic fatigue (file breakage):** Reciproc® and Reciproc® Blue instruments show a very predictable and constant resistance to cyclic fatigue, emphasizing their reliability and reduced risk of breakage^[7, 8]. Cyclic fatigue resistance is even further increased when using Reciproc® Blue compared to rotary files and compared to Reciproc® (M-wire)^[7, 8].
- **Level of experience:** In the hand of novel users, only the Reciproc® R25 instruments were successfully used (safe, efficient experience, no file breakages), without any previous instruments for glide and/or scouting steps, even in molar anatomy^[9].
- **Obturation:** Following a canal preparation with Reciproc® instrument (mostly with R25 only), obturation with Gutta-fusion® or with a gutta-percha matching single-cone or via continuous wave of condensation technique is successful even in curved canals, showing a good gutta-percha filling and minimal voids^[10-12].
- **Clinical data:**
 - > Prospective randomized controlled clinical studies performed on more than 1500 patients support the performance and safety of the Reciproc® and Reciproc® Blue solutions for initial root canal treatment^[13-19].
 - > Retreatments clinical studies on more than 650 patients confirmed the performance and reliability of the Reciproc® solution^[20-25]. No instrument fractures have been reported^[20-25].

In a retrospective cohort study including 14,233 teeth, the teeth survival rates were 30-40% higher with a protocol including Reciproc® (Reciproc® and Reciproc® Blue) compared to treatment protocols including handfile or multiple Niti rotary instruments (a 5-10 year follow-up). Moreover, the incidence of non-surgical retreatments was 66% lower with the protocol including Reciproc® (Reciproc® and Reciproc® Blue) vs. the two other groups. The authors stated, in the discussion section of the publication, that “the superior performance of protocol 3 might be attributed to the specific features of Reciproc® system”, including its ability to achieve patency^[27].

These key peer-reviewed studies, all together, emphasize the simplicity, performance, reliability, and clinical advantages of the Reciproc® family. Reciproc® should be your endodontic system of choice, for first treatments and retreatments such as Reciproc® Blue which even shows enhanced fatigue resistance ^[7, 8]. With both systems, the majority of cases can be treated with only a single instrument, the R25, in a simple, reliable and fast manner thanks to its forgiving reciprocating motion.

Keen to discover more scientific evidence and facts on the Reciproc® family? Please have a look at the Scientific Manual of Reciproc® including a preface written by Prof. Yared, the inventor of the reciprocating motion (available on Dentsply Sirona website).

3 References

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Instruments -
GPP and paper
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