

  
FKG  
swiss endo

**XP ENDO®**  
*finisher*



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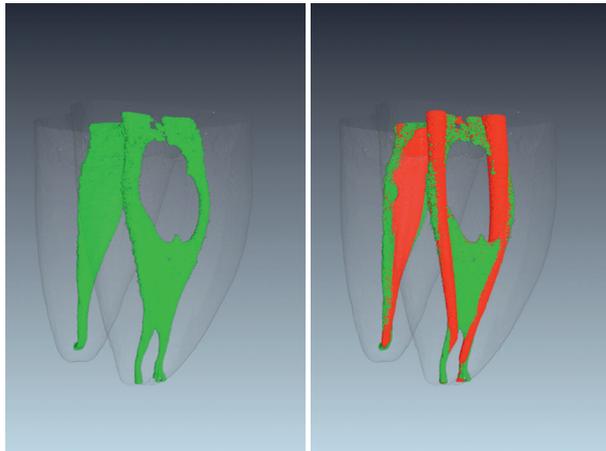
**XP-endo Finisher**  
3D Generation

# The problem

## The complexity of the root canal

The root canal system is highly complex: it can be oval or C-shaped; the canals sometimes divide; or an isthmus may connect the canals (Dye and Micro CT 3D studies). In the face of such complexity, standard NiTi files are not always up to the task. Despite their flexibility, the files make round shapes only and thus cannot reach certain parts of the canal during treatment. Several studies involving micro CT technologies have shown that, on the whole, when standard NiTi files are used to prepare the root canal, only 45-55 per cent of canal walls are actually touched.

Various complementary techniques, such as the use of a high concentration of NaOCl or EDTA, ultrasound or lasers, lead to only marginally better results.

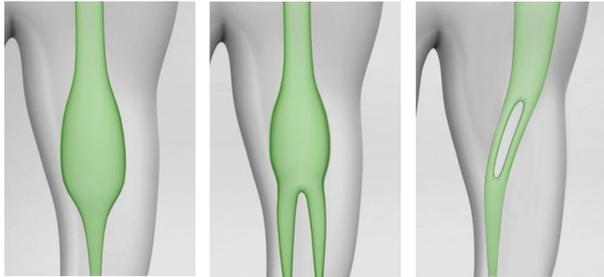


3D Micro CT : Canal morphology before instrumentation (green); canal walls touched using a standard NiTi file (red).

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## Schematic examples of root canal morphology

(Oval, caverns, double canal, C, 8, isthmus shape)



## The complexity in case of a retreatment

A retreatment case poses unique problems.

In the initial treatment, root filling materials are forced into the canal irregularities. These materials shield microbial infection that should be removed in order to effectively disinfect the canal. Standard NiTi files cannot remove these materials and bacteria particularly if there is a curvature in the canal.

*“Traditionally, root canal retreatment has been accomplished using solvent and hand files, and recently, this procedure has been replaced using rotary nickel-titanium (NiTi) files specially designed for retreatment procedures. Nevertheless, despite the development of new instruments and devices, none of them could render a root canal system completely free of root filling residue.”*

### **Oval-shaped canal retreatment with self-adjusting file: a micro-computed tomography study.**

A. Keleş, H. Alcin, A. Kamalak, MA. Versiani.

*Clin Oral Investig.* 2014 May;18(4):1147-53.

# The technology

## The MaxWire® alloy



The XP-endo Finisher files are produced using an exclusive FKG alloy, the NiTi MaxWire® (Martensite-Austenite-electropolish-fleX). This material reacts at different temperature levels and is highly flexible. FKG has patented this technology.

## Shape-memory effect

The XP-endo Finisher files are based on the shape-memory principles of the NiTi alloy.

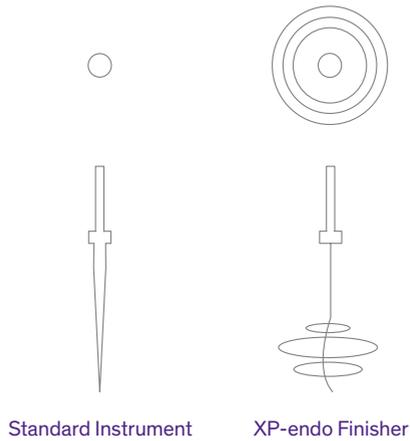
The files are straight in their M- phase at room temperature. When the files are inserted in the canal, exposed to the body temperature, they will change their shape due to their molecular memory to the A- phase. The A - phase shape in the rotation mode allows the files to access and clean areas that are otherwise impossible to reach with standard instruments.



The files can be returned to their original straight shape again manually after they have been cooled down (M-phase).

## The expansion capacity

Made with this highly flexible NiTi-based alloy, and due to their specific sickle shape, the XP-endo Finisher files follow the walls of the canal with an improved reach of 6mm in diameter or 100-fold compared to a standard instrument of the same size.



The XP-endo Finisher files are able to treat root canals with highly complex morphologies, from the narrowest to the largest, and from the straightest to the most severely curved canals. Because of their small core size – ISO 25 or ISO 30 in diameter – and their zero taper, the files benefit from incredible flexibility and show unparalleled resistance to cyclic fatigue. In addition the files will contact and scrape the dentine surface and/or the root filling material without changing the original shape of the canal.



## The solution: 2 Instruments

The XP-endo Finisher files enhance treatment outcomes, they should be used after any root canal preparation.

### **XP-endo® Finisher**

The XP-endo Finisher is dedicated to:

- ▶ Clean inner canal walls of all root canal morphologies, especially:
  - irregular canals, large canals
  - C-shaped canals, oval canals
  - isthmuses, furcation canals
- ▶ Clean root canal pathology:
  - internal root resorptions
- ▶ Finish the apical part, cleaning apical constrictions and foramens, especially:
  - open apex of immature roots
  - wide apex in periapical lesions
- ▶ Improve irrigants benefits

### **XP-endo® Finisher R**

The XP-endo Finisher R is dedicated to:

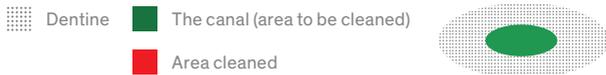
- ▶ Remove residual obturation material:
  - elimination of Gutta Percha and sealer on canal walls in retreatment cases
  - scraping of the exposed dentin walls to remove bacteria and biofilm
- ▶ Improve irrigants benefits:
  - creation of turbulences of sodium hypochlorite and EDTA or any other irrigants
- ▶ Remove blockages allowing obturation of accessory canals

**XP ENDO<sup>®</sup>**  
*finisher*



# XP-endo® Finisher

## Original canal anatomy



### ► Root canal preparation with standard NiTi files



*Canal partially cleaned. Microbes and dental debris accumulate in the untouched areas.*

### ► Root canal preparation with standard NiTi files + XP-endo Finisher



*XP-endo Finisher ideally used following any root canal preparation to achieve an improved cleaning of the root canal while preserving dentine.*

**XP-endo Finisher is incredibly flexible and can expand its reach 6mm in diameter or 100-fold of an equivalent sized file. This is why XP-endo Finisher allows mechanical cleaning of the canal in areas previously impossible to reach.**

## Description

- ▶ A universal NiTi-based instrument measuring ISO 25 in diameter and with zero taper (25/.00).
- ▶ Available in 21 mm and 25 mm.

## Unique characteristics

- ▶ Mechanical cleaning of the canal in areas previously impossible to reach thanks to its incredible flexibility and capacity to expand.
- ▶ Unprecedented resistance to instrument fatigue thanks to its zero taper and the ability of the file to work in mixed M and A phases (exclusive FKG MaxWire® alloy).
- ▶ Adaptation to canal morphology and preservation of the dentine.
- ▶ Thorough removal of debris.
- ▶ Removal of medication from inside the canal during treatment over several visits

## When to use

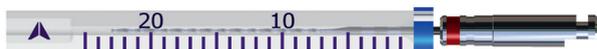
- ▶ Universal instrument that should be used following any root canal preparation of diameter ISO 25 or more.

## Packaging

- ▶ Three instruments in a sterile blister pack, for single use (each instrument can be used to clean one tooth with up to four canals).
- ▶ The instruments are stored inside a plastic tube so their straight shape can be maintained or restored and the working length can be defined.

## References

- ▶ XP-endo Finisher 21 mm : S1.XB0.00.0AC.FK
- ▶ XP-endo Finisher 25 mm : S1.XB0.00.0AA.FK



### Example canal shape in an artificial tooth

Mesial root of a lower molar, cut to 1, 3, 5 and 7mm

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Group 1: canal before preparation

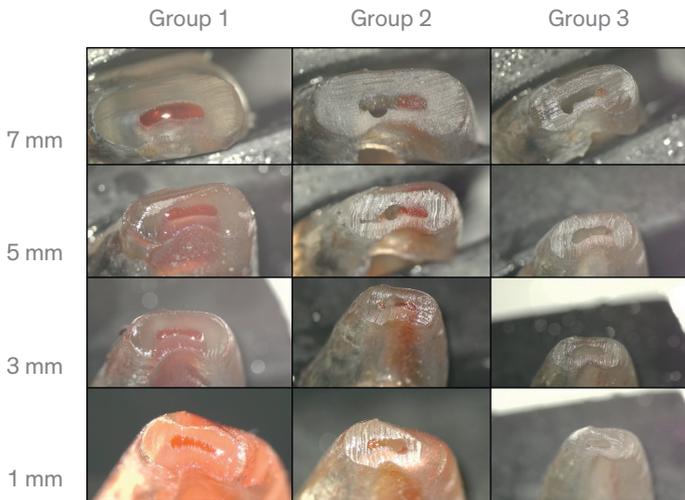
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Group 2: canal prepared to size ISO 30/.04

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Group 3: canal prepared to ISO 30/.04 and XP-endo Finisher

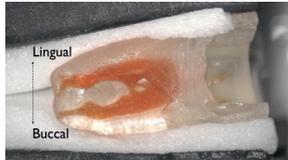
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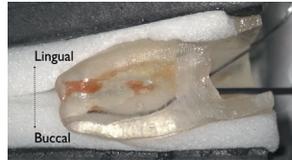
## Adaptation capacity : example in an artificial lower molar

1



*Pre-op with pulp.*

2



*Under preparation with XP-endo Finisher.*

3



*After preparation with XP-endo Finisher. Looking the root on the L-B direction, the canals are efficiently cleaned thanks to XP-endo Finisher without changing the original shape of the canal.*

4



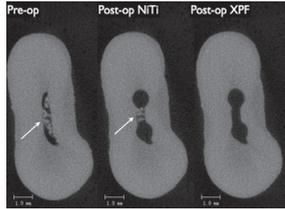
*After obturation with TotalFill® BC Sealer™ and TotalFill® BC Points™.*

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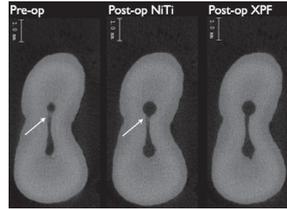
## Clinical case

Micro CT of the Distal and Mesial roots of a lower molar instrumented to 35/.04 with standard NiTi files and then after final cleaning with the XP-endo Finisher.

### Lower Molar Distal Root

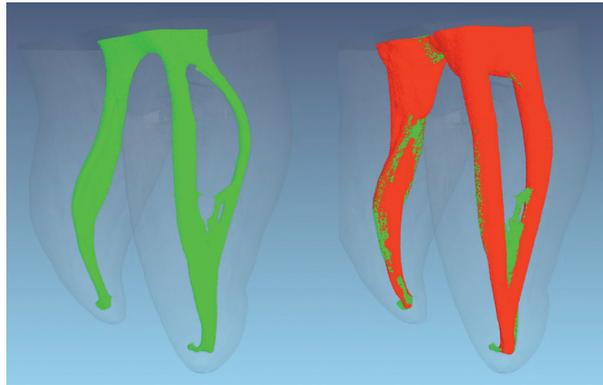


### Lower Molar Mesial Root



*Pre-op and Post-op NiTi pictures: show debris in the canal and in the isthmus areas.*

*Post-op XP-F pictures: after final cleaning with the XP-endo Finisher, no debris are seen.*



*3D Micro CT: Canal morphology before instrumentation (green); canal walls touched using a standard NiTi file + XP-endo Finisher (red).*

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*finisher R*



## XP-endo® Finisher R

► **Representations of retreatment cases before and after instrumentation with standard NiTi files.**

After obturation procedure

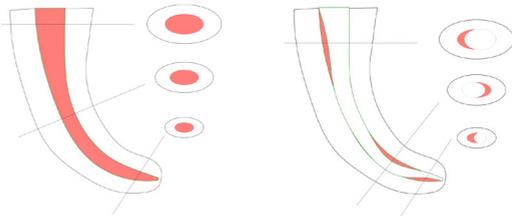


After retreatment procedure



*Representative micro-CT 3D reconstructions of a maxillary canine with oval-shaped canal after obturation showing the presence of remnants of root canal filling materials (in pink) after retreatment procedures using rotary instruments*

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*Representation of the problematic in a retreatment case before and after instrumentation with standard NiTi files. The 2<sup>nd</sup> schema shows remaining root filling material in the canal.*

© FKG Dentaire SA, Courtesy of Dr Gilberto Debelian (Norway)

**The XP-endo Finisher R has a core diameter larger than the XP-endo Finisher, making it slightly stiffer and also more efficient in removing root filling materials adhering to the canal walls, especially in the curvature and oval areas.**

## Description

- ▶ A universal NiTi-based instrument measuring ISO 30 in diameter and with zero taper (30/.00).
- ▶ Available in 21 mm and 25 mm.

## Unique characteristics

- ▶ Mechanical cleaning of the canal in areas previously impossible to reach thanks to its incredible flexibility and capacity to expand.
- ▶ Unprecedented resistance to instrument fatigue thanks to its zero taper and the ability of the file to work in mixed M and A phases (exclusive FKG MaxWire® alloy).
- ▶ Adaptation to canal morphology and preservation of the dentine.
- ▶ Thorough removal of debris.
- ▶ Removal of residual obturation material during retreatment.

## When to use

- ▶ Universal instrument that should be used following any root canal preparation of diameter ISO 30 or more.

## Packaging

- ▶ Three instruments in a sterile blister pack, for single use (each instrument can be used after desobturation to clean one tooth with up to four canals).
- ▶ The instruments are stored inside a plastic tube so their straight shape can be maintained or restored and the working length can be defined.

## References

- ▶ XP-endo Finisher R 21 mm : S1.XB0.00.0AE.FK
- ▶ XP-endo Finisher R 25 mm : S1.XB0.00.0AD.FK



# Clinical cases

## Case 1

Retreatment case (ex-vivo) of an upper first pre-molar instrumented to 30/.04 with standard NiTi files followed by the XP-endo Finisher R to reach areas not touched by the standard NiTi files.

Pre-Op



*Root filling material in the canals.*

Post-Op



*After instrumentation with standard NiTi files and final cleaning with the XP-endo Finisher R, no debris are seen.*

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## Case 2

Retreatment case (ex-vivo) of an upper molar instrumented with standard NiTi files to 30/.04 and then after final cleaning with the XP-endo Finisher R (XP-FR).

1



*Residual root filling material after instrumentation with standard NiTi files to 30/.04.*

2



*Insertion of the XP-FR into the root filling material after placing a drop of solvent.*

3



*Under preparation with XP-FR, remaining filling material in the apical third is observed.*

4



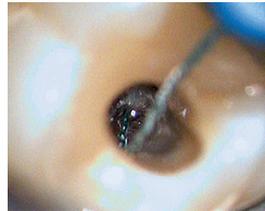
*Irrigation step with NaOCl, after 30 seconds of preparation with XP-FR. Debris are visible in the solution.*

5



*Use of NaOCl until no more debris are observed.*

6



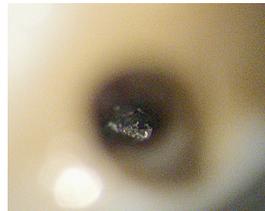
*Second phase of the preparation with XP-FR in the canal full of irrigant.*

7



*Residual debris remaining in the solution can be observed.*

8



*After final irrigation and drying with paper point of the entire canal. The canal is efficiently cleaned after use of XP-FR. 16x magnification showing patent apical foramen.*

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*J Endod. Article first published online: 28 APR 2016*  
 DOI: <http://dx.doi.org/10.1016/j.joen.2016.03.009>

**Ex vivo evaluation of four final irrigation protocols on the removal of hard-tissue debris from the mesial root canal system of mandibular first molars.**

*G.B. Leoni, M. A. Versiani, Y. T. Silva-Sousa, J. F. B. Bruniera, J. D. Pécora, M. D. Sousa-Neto*  
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**Cleaning the third dimension.**

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*Endodontic Practice US 2015; Volume 8, Issue 6, p22-24*

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*L. Fruchi et al.*  
*J Endod. 2014; Volume 40, Issue 7, p1000-1004*  
 DOI: <http://dx.doi.org/10.1016/j.joen.2013.12.011>



## FKG Dentaire SA

Founded in Switzerland in 1931, FKG Dentaire SA gained a new momentum in 1994, the year Jean-Claude Rouiller took over the reins of the company.

He propelled FKG to the forefront in the development, manufacturing and distribution of dental products destined for general practitioners, endodontists and laboratories.

The FKG strategy is centered on innovative high-precision products and the creation of machines designed specifically for the dental field. Its aim is to offer solutions that meet the most demanding needs of end users.

In 2011 the son of Jean-Claude Rouiller, Thierry, succeeded to the head of the company. Through his incentive, the network of distributors has expanded significantly and allowed FKG to make its products available in over 100 countries worldwide.

In 2012, the Swiss Venture Club rewarded FKG for its dynamism, high product quality, and its continuing innovation.

Equipped with a clean room since 2013, FKG is now developing a range of sterile products.

In 2013 and 2014 the company unveiled state-of-the-art training centers in La Chaux-de-Fonds, Dubai, and Oslo.

FKG Dentaire is certified according to international norms and regulations.



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