


Breakthrough Shaping Technique
Using the latest NiTi Instrumentation and Adaptive Motion Technology

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Nickel Titanium Clinical Performance (2012) Depends on: three main factors :



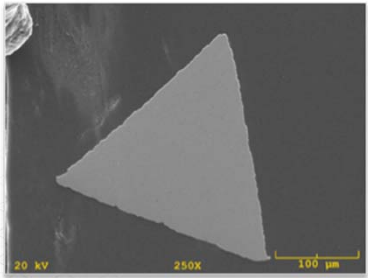
1. Design
2. Metallurgy-Alloy/Manufacturing
3. Methods of use

All of them are nowadays strictly interconnected, allowing manufacturers more options for improvements.

Therefore, since 2008, we must integrate the analysis of different, specific files designs with above-mentioned factors.

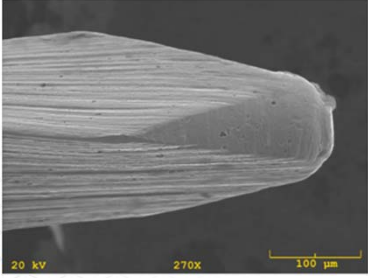
File Design

Triangular Cross Section



20 kV 250X 100 µm

Safe Ended Tip



20 kV 270X 100 µm

Kinematics

The branch of mechanics concerned with the motion of objects

Motion:

- ✓ Rotary
- ✓ Reciprocation

Rotary when you want it,
Reciprocation when you **need** it!



Elements Motor

I can count on one hand
why this motor is great!



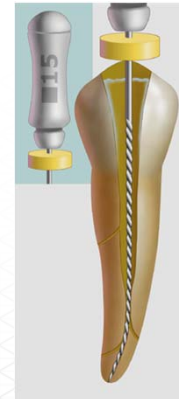
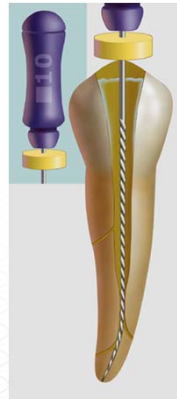
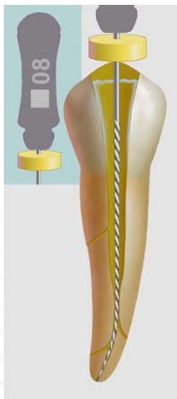
Elements Motor



Elements Motor



Glide Path



M4 Reciprocating Handpiece



Especially Useful For:

- ✓ Establishing a glide path in calcifying canals
- ✓ Establishing a glide path around ledges and sharp curvatures
- ✓ Establishing a glide path around separated instruments

**A Continuous
Feedback Loop!**

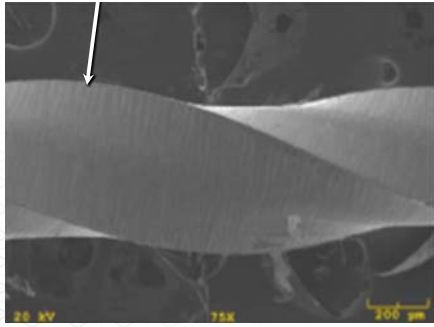
**Self adjusts to Intracanal
Torsional Stresses!**

What's Good About Adaptive Motion Technology?

- ✓ Increased Resistance to Cyclic Fatigue
- ✓ Better File Control - No "Suck Down"
- ✓ Significantly **Less Debris Extrusion**
- ✓ Maintains **Original** Canal Curvature
- ✓ More **Efficient** and **Uniform** Cutting

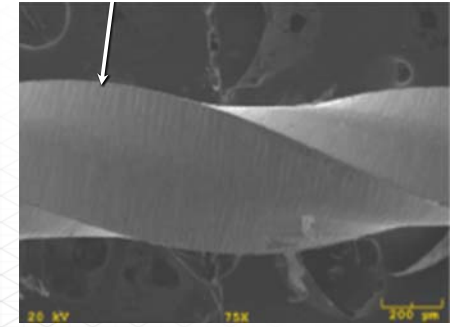
Metallurgy

Ground File



Austenite

Ground File



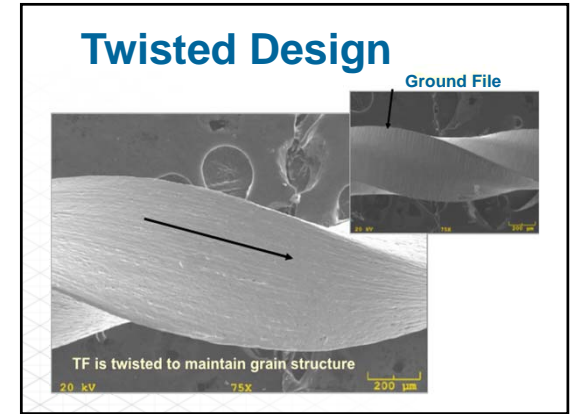
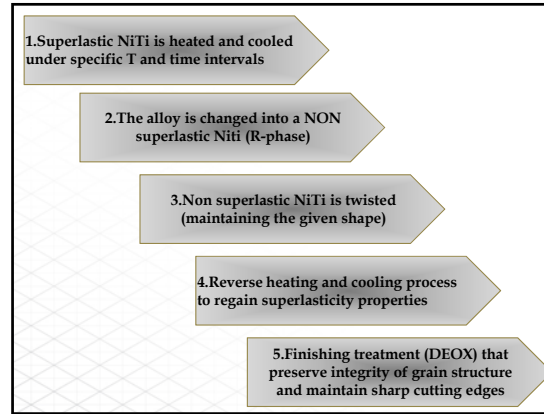
Elastic vs. Plastic

Elastic Range Plastic Range Yield Point
Shape Memory Permanent Deformation Breakage!!!

Elastic vs. Plastic

Elastic Range Plastic Range ★Yield Point
Shape Memory Permanent Deformation Breakage!!!



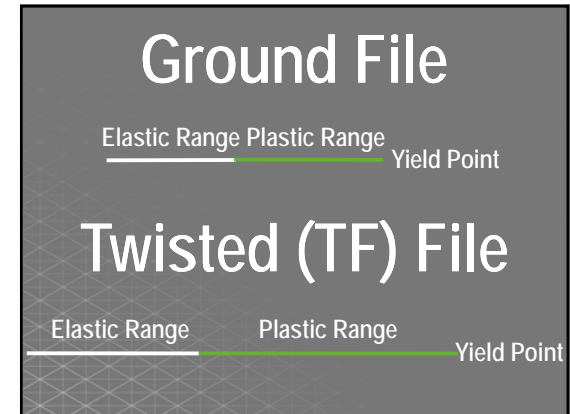


A Quantum Leap in File Design

The first and only file made with **three** unique proprietary processes for unsurpassed strength and flexibility

1. R-phase heat treatment technology
 - Breaks less than ground files
2. Twisted design, not ground
 - Eliminates formation of micro-fractures
3. Advanced surface treatment
 - Maintains file hardness and cutting edges

Elastic Vs. Plastic

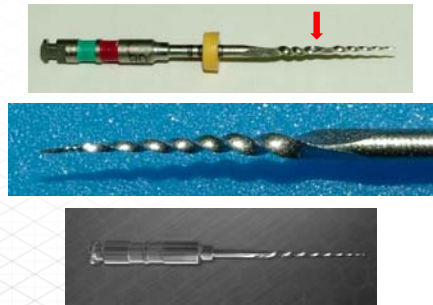


TF = "Teaching File"



TF unique behaviour : (residual R-phase)
TF can show unique tendency to coil when the tip is blocked as a result of an improper clinical use. These findings should be considered as a "safety feature," which absorbs stress and prevents failure, and inform the dentist where the problem is.

TF = "Teaching File"



Corrosion of NiTi files after immersion overnight in a warmed 5% sodium hypochlorite solution



Handle and File Shaft of Dissimilar Metals



TF Resists Fracture



Cyclic fatigue testing device consists of a main frame mobile plastic support allowing precise and reproducible placement of each instrument inside the artificial canal.

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Rome, Italy

Data on file, Sybron Dental Specialties, Inc. Data from Gambarini G and Garoto M, University of Rome, Sapienza, Italy, 2008. Cyclic fatigue and flexibility testing.

Increased Cyclic Fatigue Resistance

Twisted File manufacturing process: Higher cyclical fatigue (TF vs. Profile, K3 and M2)

An In Vitro Cyclic Fatigue Analysis of Different Endodontic Nickel-Titanium Rotary Instruments

Nikola Blagojević, MD, Sonoma Endo, MD, and Eugene R. Sabherwal, MD

Abstract
The aim of this study was to evaluate the cyclic fatigue resistance of twisted file (TF) instruments compared to ground files (GF) instruments. The study was conducted in a laboratory setting using a cyclic fatigue testing machine. The instruments were subjected to cyclic loading until fracture. The results showed that TF instruments had significantly higher cyclic fatigue resistance compared to GF instruments. The study concluded that TF instruments are more resistant to cyclic fatigue and therefore provide a higher safety margin for the clinician.

Conclusions: Under the conditions of this study, size 36/0.25 TF was significantly more resistant to fatigue than the other 3 instrument systems produced with the traditional grinding process. (J Endod 2012;38:515-518)

Adaptive Motion **Recip. Motion** **The Tech**

Increased Flexibility

Up to 70% greater flexibility compared to ground files

Bending properties of nickel-titanium instruments: a comparative study. Gambarini G, Pongione G, Rizzo F, Testarelli L, Cavalleri G, Gerosa R. Department of Dental Sciences, La Sapienza University, Rome, Italy. Minerva Stomatol. 2008 Sep;57(9):393-8.

Data on file, Sybron Dental Specialties Inc. Data from Gambarini G and Garala M, University of Rome, La Sapienza, Italy. 2008. Cyclic fatigue and flexibility testing.

*Dr Sergio Rosler
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26/09/2011*

Guidelines for Use

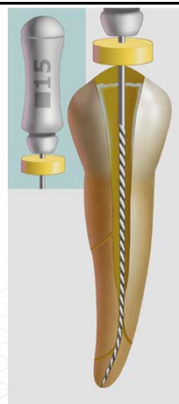
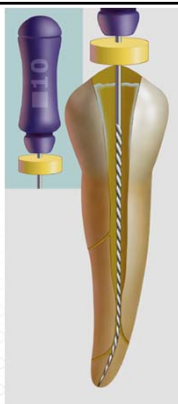
- ✓ Start off with simple cases
- ✓ Remember 3 primary concepts!

Rules of Engagement

Glide Path

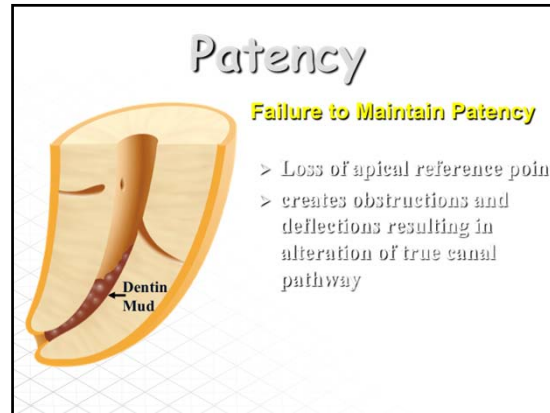
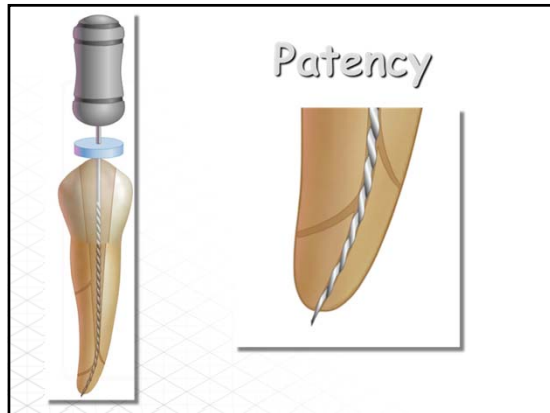
Glide Path
Pressure
Time

Glide Path



M4 Reciprocating Handpiece





A Continuous Feedback Loop!

Self adjusts to Intracanal Torsional Stresses!

**Rotary when you want it,
Reciprocation when you need it!**

The Science Behind it!

Stronger

Increased Cyclic Fatigue Resistance

Reciprocation Motion: Increase in cyclical fatigue life
(K3XF in various reciprocation motion profiles)

Basic Research—Technology

Influence of Different Angles of Reciprocation on the Cyclic Fatigue of Nickel-Titanium Endodontic Instruments

Chaitanya Ganeshtur, DDS, PhD, PhD¹, Abhinav Chaitanya Reddy, DDS, PhD,² Elmer A. Anderson, DDS, PhD, Richard Grant, DDS, PhD, Alexander Gohel,³ Praveen B. Reddy, DDS, PhD, Rajesh B. J. Reddy, DDS, PhD,⁴ Anand Kumar, DDS, PhD,⁵ and Laxmi Reddy,⁶ DDS, PhD,⁷

Abstract

The purpose of this study was to evaluate the effect of different angles of reciprocation on the cyclic fatigue life of nickel-titanium endodontic instruments. The study was conducted using a reciprocation motion profile (K3XF) in various reciprocation motion profiles. The results showed that the cyclic fatigue life of the instruments was significantly higher in group 1 (reciprocation angle of 15 degrees) compared to group 2 (reciprocation angle of 30 degrees). The mean time to failure was significantly higher in group 1 (P < .001) compared to group 2 (P = .251). The results indicate that reciprocation motion with a reciprocation angle of 15 degrees is more effective in increasing the cyclic fatigue life of nickel-titanium endodontic instruments.

Key Words: Reciprocation motion, cyclic fatigue, nickel-titanium endodontic instruments.

Adaptive Motion
Recip. Motion
File Tech

Increased Cyclic Fatigue Resistance

Adaptive Motion: Increase in cyclical fatigue life
(TF vs. ProTaper F2)

Abstract

The purpose of this study was to evaluate the effect of adaptive motion on the cyclic fatigue life of nickel-titanium endodontic instruments. The study was conducted using a reciprocation motion profile (TF) in various reciprocation motion profiles. The results showed that the cyclic fatigue life of the instruments was significantly higher in group 1 (adaptive motion) compared to group 2 (ProTaper F2). The mean time to failure was significantly higher in group 1 (P < .001) compared to group 2 (P = .251). The results indicate that adaptive motion is more effective in increasing the cyclic fatigue life of nickel-titanium endodontic instruments.

Key Words: Adaptive motion, cyclic fatigue, nickel-titanium endodontic instruments.

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File Tech

Increased Cyclic Fatigue Resistance

Twisted File manufacturing process: Higher cyclical fatigue
(TF vs. Profile, K3 and M2)

An In Vitro Cyclic Fatigue Analysis of Different Endodontic Nickel-Titanium Rotary Instruments

Shah, Rajagopal, BS, Srinivas Reddy, BS, and Gangadhar Babbar, MS

Abstract

The purpose of this study was to evaluate the effect of twisted file manufacturing process on the cyclic fatigue life of nickel-titanium endodontic instruments. The study was conducted using a reciprocation motion profile (TF) in various reciprocation motion profiles. The results showed that the cyclic fatigue life of the instruments was significantly higher in group 1 (twisted file manufacturing process) compared to group 2 (traditional grinding process). The mean time to failure was significantly higher in group 1 (P < .001) compared to group 2 (P = .251). The results indicate that twisted file manufacturing process is more effective in increasing the cyclic fatigue life of nickel-titanium endodontic instruments.

Key Words: Twisted file manufacturing process, cyclic fatigue, nickel-titanium endodontic instruments.

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File Tech

Increased Cyclic Fatigue Resistance

TF in W1/VDW reciprocating motion: Increase in cyclical fatigue

International Endodontic Journal

Cyclic fatigue analysis of twisted file rotary NiTi instruments used in reciprocating motion

G. Gokhale¹, R. Goyal², A. Naveen³, S. Goyal⁴, & B. Reddy⁵

Abstract

The purpose of this study was to evaluate the effect of twisted file manufacturing process on the cyclic fatigue life of nickel-titanium endodontic instruments. The study was conducted using a reciprocation motion profile (TF) in various reciprocation motion profiles. The results showed that the cyclic fatigue life of the instruments was significantly higher in group 1 (twisted file manufacturing process) compared to group 2 (traditional grinding process). The mean time to failure was significantly higher in group 1 (P < .001) compared to group 2 (P = .251). The results indicate that twisted file manufacturing process is more effective in increasing the cyclic fatigue life of nickel-titanium endodontic instruments.

Key Words: Twisted file manufacturing process, cyclic fatigue, nickel-titanium endodontic instruments.

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Less Debris Extrusion

Less Debris Extrusion

Reciprocation motion: Higher incidence of post operative pain due to apical debris (TF in rotary mode vs. Recipro)

INCREASED INCIDENCE OF POSTOPERATIVE PAIN AND PERIAPICAL INFLAMMATION AFTER ENDOSMITH'S TREATMENT WITH TWO DIFFERENT INSTRUMENTATION TECHNIQUES

G. GAMBARIANI, D. AL-SUDANI, S. DE CARLO, G. PIRAPPA, F. PIRELLI, E. PIERONI, and L. TOSCANI

Department of Oral and Maxillofacial Science, Rome, Italy; SBU; University, Rome, Italy

Received December 28, 2011; Accepted March 28, 2012

Abstract: The purpose of this study was to compare the amount of extruded debris with two different instrumentation techniques: a reciprocation motion using TF Adaptive (TF) and a reciprocation motion using Reciproc (Recip). The study was conducted on 100 patients with root canal infections. The patients were divided into two groups: TF and Recip. The patients were followed up for 12 months. The results showed that the TF group had a significantly higher incidence of postoperative pain and periapical inflammation compared to the Recip group. The TF group also had a significantly higher incidence of debris extrusion compared to the Recip group.

RESULTS: The results are shown in Table 1. A statistically significant difference was found between the two techniques. When comparing patients who had developed no pain, the TF instrumentation technique showed significantly fewer results (46.0%) compared to Reciproc (61.0%). When evaluating patients with postoperative pain, the incidence of periapical inflammation was significantly higher with the Reciproc technique (45.0%) compared to TF (32.0%). Overall, fewer patients reported pain in the TF group (13.7%) compared to the Recip group (20.0%).

CONCLUSIONS: The results of this study indicate that the TF instrumentation technique is associated with a lower incidence of postoperative pain and periapical inflammation compared to the Reciproc technique. This finding is particularly important for patients who are at high risk of postoperative pain and periapical inflammation.

Adaptive Motion Recip. Motion File Tech

Less Debris Extrusion

Motion comparison: Less apical debris extruded with TF-Adaptive vs. W1 (TF Adaptive vs. W1 Reciprocation)

Comparison of the Extrusion of Debris Debris Using a New Instrumentation

David J. Ferrello, DDS, Reciproc Access 805

Introduction: The purpose of the present study is to measure the amount of extruded debris extruded through the apical foramen for three different instrumentation techniques: A new concept TF Adaptive (Dorville TF) and up to 200 microns (Dorville) depending on the final apical size (W1), Versa One (Dorville), TF and another technique (W1), and using a single (W1) and stop back method technique.

Methods: A total of 50 extracted human mandibular premolars were prepared with either a reciprocation motion (TF) or a reciprocation motion (W1) according to the manufacturer's instructions. Radiographs were taken to verify the length of the instrument and a single view radiograph was taken to verify the length of the instrument at the tip of the root. All teeth were instrumented to 10 mm from the apical foramen. The TF Adaptive instrument and a W1 #15 were used to instrument the root canal to the size. A modified method of using a W1 #15 was used for the study to reduce the extruded debris and the irrigant. After collection, the debris was placed into a container and the amount of debris was measured by weighing the container. The results were compared between the two techniques with an unpaired t-test.

Results: All three techniques, TF Adaptive, Versa One and a manual stop back generated debris that was measured from the apex with the largest amount of debris, at an average of 0.0074 gms. TF Adaptive generated 0.0027 gms. Versa One generated 0.0027 gms. Manual stop back generated 0.0027 gms. TF Adaptive generated 0.0027 gms. Manual stop back generated 0.0027 gms. TF Adaptive generated 0.0027 gms. Manual stop back generated 0.0027 gms.

Conclusions: The results of this study indicate that the TF Adaptive technique is associated with a lower incidence of debris extrusion compared to the Versa One and manual stop back techniques. This finding is particularly important for patients who are at high risk of debris extrusion.

Adaptive Motion Recip. Motion File Tech

Maintain Original Anatomy

Compared with the TF Adaptive motion, Manual stop back generated 20% more debris, Versa One generated 10% more debris, and W1 generated 10% more debris.

Adaptive Motion Recip. Motion File Tech

Risk of Overinstrumentation and Transportation with Single File Systems

Single File system: Straightens canals—risk of over-instrumentation and transportation (W1 file system)

Effect of Canal Length and Curvature on Working Length Alteration with WaveOne Reciprocating Files

Elio Bortone, MD, PhD, Giorgio Chioldini, MD, PhD, Anna Santoro, PhD, PhD, Maria Lucia Bortone, PhD, PhD, Giuseppe Chioldini, MD, PhD, Annalisa Chioldini, MD, PhD, and Antonino Chioldini, MD, PhD

Abstract: The purpose of this study was to evaluate the effect of canal length and curvature on working length alteration with WaveOne Reciprocating Files. The study was conducted on 100 patients with root canal infections. The patients were divided into two groups: WaveOne Reciprocating Files and WaveOne Reciprocating Files. The patients were followed up for 12 months. The results showed that the WaveOne Reciprocating Files group had a significantly higher incidence of over-instrumentation and transportation compared to the WaveOne Reciprocating Files group.

RESULTS: The results are shown in Table 1. A statistically significant difference was found between the two techniques. When comparing patients who had developed no pain, the WaveOne Reciprocating Files instrumentation technique showed significantly fewer results (46.0%) compared to WaveOne Reciprocating Files (61.0%).

CONCLUSIONS: The results of this study indicate that the WaveOne Reciprocating Files technique is associated with a lower incidence of over-instrumentation and transportation compared to the WaveOne Reciprocating Files technique. This finding is particularly important for patients who are at high risk of over-instrumentation and transportation.

Adaptive Motion Recip. Motion File Tech

Maintenance of Original Canal Curvature

TF flexibility: Less risk of over-instrumentation and transportation (TF vs. Recip, Profile GTX, ProTaper)

Basic Research—Technology

Geometric Analysis of Root Canals Prepared by Four Rotary NiTi Shaping Systems

Abstract: The purpose of this study was to evaluate the effect of canal length and curvature on working length alteration with WaveOne Reciprocating Files. The study was conducted on 100 patients with root canal infections. The patients were divided into two groups: WaveOne Reciprocating Files and WaveOne Reciprocating Files. The patients were followed up for 12 months. The results showed that the WaveOne Reciprocating Files group had a significantly higher incidence of over-instrumentation and transportation compared to the WaveOne Reciprocating Files group.

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CONCLUSIONS: The results of this study indicate that the WaveOne Reciprocating Files technique is associated with a lower incidence of over-instrumentation and transportation compared to the WaveOne Reciprocating Files technique. This finding is particularly important for patients who are at high risk of over-instrumentation and transportation.

Adaptive Motion Recip. Motion File Tech

Maintenance of Original Canal Curvature

TF flexibility: Less risk of over-instrumentation and transportation (TF vs. K3)

Comparison of Canal Transportation and Changes in Canal Curvature of Two Nickel-Titanium Rotary Instruments

Abstract: The purpose of this study was to evaluate the effect of canal length and curvature on working length alteration with WaveOne Reciprocating Files. The study was conducted on 100 patients with root canal infections. The patients were divided into two groups: WaveOne Reciprocating Files and WaveOne Reciprocating Files. The patients were followed up for 12 months. The results showed that the WaveOne Reciprocating Files group had a significantly higher incidence of over-instrumentation and transportation compared to the WaveOne Reciprocating Files group.

RESULTS: The results are shown in Table 1. A statistically significant difference was found between the two techniques. When comparing patients who had developed no pain, the WaveOne Reciprocating Files instrumentation technique showed significantly fewer results (46.0%) compared to WaveOne Reciprocating Files (61.0%).

CONCLUSIONS: The results of this study indicate that the WaveOne Reciprocating Files technique is associated with a lower incidence of over-instrumentation and transportation compared to the WaveOne Reciprocating Files technique. This finding is particularly important for patients who are at high risk of over-instrumentation and transportation.

Adaptive Motion Recip. Motion File Tech

More Efficient and Uniform Cutting

File performance: TF cuts more uniformly and efficiently
(TF vs. ProTaper)

Basic Research—Technology

Cutting Efficiency of Twisted versus Machined Nickel-Titanium Endodontic Files

Doris Shabbar Fayad, BDS, MSc, PhD, and Albert A. Shalhoub Elmaghrabi, MSc, PhD†*


Abstract
The purpose of this study was to compare the cutting efficiency of two different file designs, twisting versus the machined design, by measuring the amount of material removed by each file. The amount of material removed was measured by the weight of the file before and after use. The amount of material removed was measured by the weight of the file before and after use. The amount of material removed was measured by the weight of the file before and after use.

Results
The main objective of this study was to compare the cutting efficiency of two different file designs, twisting versus the machined design, by measuring the amount of material removed by each file. The amount of material removed was measured by the weight of the file before and after use. The amount of material removed was measured by the weight of the file before and after use.

Conclusions
The TF system was found to cut more efficiently and uniformly than the ProTaper system. The TF system was found to cut more efficiently and uniformly than the ProTaper system.

Adaptive Motion **Recip. Motion** **File Tech**

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Breakthrough Shaping Technique

Using the latest NiTi Instrumentation and Adaptive Motion Technology

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