THE MAKERS OF Cavitron® | ProTaper® | Prime&Bond® NT™ | SpectrUM® | Ash® Instruments

Cavitron® family of inserts: one for every clinical need

Introducing the new ProTaper Next™

Ceram-X®. Natural aesthetics with fewer shades

FREE PRODUCTS
See inside for details

EARN CPD HOURS
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We understand that CPD is important to you and ‘The Difference’ can enable you to earn verifiable CPD points. All you need to do is read this brochure which contains information about some of DENTSPLY’s newest product innovations, and the scientific research data which supports these.

Then go to dentsplyacademy.co.uk/thedifference to answer a few simple questions. If you get all of the answers correct, you will receive an electronic CPD certificate for two hours verifiable CPD.
Welcome to the spring edition of The Difference

It’s like buses! You wait for years for a new endodontic system to come along to make your life easier and then two come along at once. First WaveOne, a single file system* that hit the market in 2011, offering the ultimate in simplicity and control. And now, in April 2013, we are introducing the brand new ProTaper Next system with a unique swaggering action which enables even complex canals to be shaped with just two files. Turn to pages 12 to 16 find out how these can meet your needs.

Also, in this edition we focus on making your restorative procedures simpler, saving you time using a combination of SDR®, our bulk fill flowable composite, and Ceram. X®, a nano-ceramic universal composite system that achieves natural looking aesthetics with fewer shades.

Preventive treatment is becoming an ever more important part of dental treatment plans. We offer advice on getting the most from ultrasonic scaling with a Cavitron unit and inserts whilst, for hygienists and therapists, physiotherapist Mary Somers provides her top 10 tips for helping to prevent repetitive strain injury (RSI).

Many of you will already be familiar with dentsplyrewards.co.uk, the website ordering system that enables you to earn DENTSPLY Rewards Pounds back on your DENTSPLY products. Turn to page 21 to find out how, with DENTSPLY Rewards Plus, you can earn up to 10% discount on every DENTSPLY product you order by ordering more of the products that you use every day. So products that you know and trust, such as ChemFil® Superior, K-flexofiles and Prime&Bond® NT™ can start to earn you money back.**

If, like many dental professionals, you are coming up to the continuous professional development (CPD) deadline and find that you have a shortfall in your hours, turn to page 22. Here you will see a number of ways to earn free CPD hours. Plus, as usual, you can also earn two hours of verifiable CPD just by reading The Difference and answering a few simple questions at dentsplyacademy.co.uk/thedifference.

I wish you happy reading!

Gerard Campbell
Vice President and General Manager

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*Only one file required in 80% of cases
** Earnings made on your purchases are paid into your online account as Rewards Pounds which can be redeemed against any DENTSPLY products. % earned is dependent on total amount at DENTSPLY’s guide prices.
Clinical success with simple restorations

The performance of SDR®-based Ceram∙X® posterior composite restorations is compared to non-based composite restorations in a clinical study by Professor J. W. V. Van Dijken, Biomaterial Research Group, Umea, and Associate Professor U. Pallesen, Copenhagen.

Results after 12 months

Objectives
Clinical evaluation of the bulk fill composite, SDR, in Class I and Class II cavities, bonded with the single step self-etching primer Xeno® V+ and covered with the nanoceramic resin composite Ceram∙X mono+.

Design
Prospective, longitudinal, controlled, randomized clinical study; method according to ADA Guidelines for Resin Based Composites for Posterior Restorations (2001).

Number of restorations
200 (76 Class I, 124 Class II) on 84 patients.

Test materials
Xeno V+, Ceram∙X mono+ and SDR.

Control materials
Xeno V+, Ceram∙X mono+.

Method of evaluation
Clinical examination, rating according to Van Dijken (1986).

Success criteria
Determination of the effectiveness of the restorations was carried out by assessing the following parameters:
- secondary caries
- anatomic form
- marginal adaptation
- marginal discolouration
- surface roughness
- colour match

These were assessed by using the slightly modified US Public Health Service criteria. For marginal adaptation and discolouration, the involvement of marginal excess was noted. Also postoperative sensitivity was analysed.
Detailed results at 12 months Class I and Class II

<table>
<thead>
<tr>
<th>Criteria</th>
<th>T=Xeno V+, SDR, CXm+</th>
<th>C=Xeno V+, CXm+</th>
<th>n</th>
<th>Alpha</th>
<th>Bravo</th>
<th>Charlie</th>
<th>Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomic form</td>
<td></td>
<td></td>
<td>98</td>
<td>95.00%</td>
<td>4.00%</td>
<td>1.00%</td>
<td>n/a</td>
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<tr>
<td>Marginal adaptation</td>
<td></td>
<td></td>
<td>98</td>
<td>99.00%</td>
<td>0.00%</td>
<td>1.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Colour match</td>
<td></td>
<td></td>
<td>98</td>
<td>89.70%</td>
<td>10.30%</td>
<td>0.00%</td>
<td>n/a</td>
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<tr>
<td>Marginal discolouration</td>
<td></td>
<td></td>
<td>98</td>
<td>94.90%</td>
<td>5.10%</td>
<td>0.00%</td>
<td>n/a</td>
</tr>
<tr>
<td>Surface roughness</td>
<td></td>
<td></td>
<td>98</td>
<td>100.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>n/a</td>
</tr>
<tr>
<td>Secondary caries</td>
<td></td>
<td></td>
<td>98</td>
<td>100.00%</td>
<td>0.00%</td>
<td></td>
<td>n/a</td>
</tr>
</tbody>
</table>

**Conclusion of Principal Investigator at baseline**
No significant differences were seen between the two experimental restorations for the evaluated variables in the two cavity classes. In some of the restorations the adhesive could be detected as local small white marginal lines.

**Conclusion of the Principal Investigator at 12 months**
No significant differences were seen between the two experimental restorations for the evaluated variables in the two cavity classes.

**Conclusion of the Sponsor at 12 months**
No significant difference was seen between the two techniques (SDR-based and conventional non-based). The use of SDR, which involves a simpler and shorter placement technique, seems to have no negative impact on restoration quality.

Both SDR-based and non-based posterior Ceram-X restorations performed well with a survival rate close to 100%.

To read the full study visit [dentsply.co.uk/ceramx](http://dentsply.co.uk/ceramx)

Read on to find out more about Ceram-X and SDR.
**What is Ceram·X?**

Based on the latest nano ceramic technology with nano fillers (average size: 10 nm) and nano particles (average size: 2.3 nm), Ceram·X is a universal composite with a unique simplified shading system. This means natural aesthetics are easy to achieve for every patient and all indications with fewer shades.

Seven different shades of the material cover the VITA shade guide, allowing clinicians to provide sophisticated aesthetic restorations with a minimised inventory and less material wastage. Nanotechnology and methacrylate-modified polysiloxane bring out the natural shades, and the colour of the material adapts to the surrounding hard tissue.

Ceram·X mono+ is a single-translucency system and is ideal as a capping composite for SDR® in posterior restorations. In situations where highly aesthetic anterior restorations are required, Ceram·X duo+ dual translucency system is recommended.

**Indications for SDR now extended**

The range of indications for SDR, the 4mm bulk fill composite material, have been extended.

In addition to use as a base in cavity Class I and II direct restorations and a liner under direct restorative materials, SDR has been approved as a fissure sealant, for core build-ups and small Class I restorations in direct occlusal contact without a separate enamel cap. These extended indications mean that SDR is also ideal for use in paediatric dentistry.

SDR is the original bulk filling material with unique self-levelling properties still unsurpassed when it comes to simplifying the restoration of posterior teeth.

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**Earn Rewards:**
each time you purchase DENTSPLY SDR
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**LEARN ABOUT IT**
dentsplyacademy.co.uk
Do you want to save money on local anaesthetic?

If you currently pay more than £16.00 for a box of 50 lidocaine cartridges then read on…

Different manufacturers sell boxes of local anaesthetic with different quantities of cartridges in the box, which can make calculating the best deal somewhat confusing! If you are a keen bargain hunter at the supermarket (calculating price per gramme or ml) then seeking the best deal comes naturally to you. Ensuring you get the best deal within the dental practice on an everyday essential such as local anaesthetic is just the same.

If you buy Xylocaine® 2% with adrenaline (lidocaine) on the DENTSPLY Rewards website, the most you will pay is £32.00* for a box of 100 cartridges.” This equates to £16.00 if you usually buy in boxes containing 50 cartridges. If you are paying more than this currently, then this could be a quick and easy way to help the practice save lots of money.

Visit dentsplyrewards.co.uk to start saving money!

*Terms and conditions apply
**DENTSPLY sells in boxes of 100 cartridges compared to other manufacturers who sell in packs of 50.
One insert is not enough in ultrasonic scaling

One insert can’t do it all – that’s why the Cavitron® family of inserts offers a broad selection to fit the needs of your practice. Just like with hand scaling, some inserts are built for removing certain levels of deposit, while others are designed for working around specific types of tooth anatomy. Most patients require more than one type of insert during a single visit; following these guidelines for insert selection and use can help with comfort and efficiency for your patients, and ultimately your practice.

### Insert use guide*

<table>
<thead>
<tr>
<th>Anatomy of treatment site</th>
<th>Calipers</th>
<th>Biofilm</th>
<th>Non-visible biofilm</th>
</tr>
</thead>
<tbody>
<tr>
<td>For flat anatomy or contoured anatomy (with heavier deposits)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For contoured anatomy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For flat anatomy</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*These are only recommendations, based upon qualitative indications of calculus and biofilm levels.

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**Visit:**
dentsplyacademy.co.uk/thedifference

Fill in your answers to our CPD questionnaire and earn CPD hours.

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**EARN CPD HOURS**

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Monitoring the wear of your ultrasonic inserts is key to ensuring optimal performance.

Using an insert that is excessively worn will cause it to operate at substandard efficiency. It can also cause you to use excessive pressure while scaling, which results in discomfort for both you and the patient.

Regularly checking the wear of your ultrasonic inserts and replacing them when necessary can help maximise efficiency and comfort for you and your patients.

Call your DENTSPLY product specialist to request an Efficiency Indicator or to reorder Cavitron inserts.
Cavitron® Maintenance Guide

All DENTSPLY products are manufactured to exacting standards, meaning equipment can last for many years, but here are some tips to make sure they stay in top condition.

Important guidelines for Cavitron inserts
• Cavitron inserts should never be re-shaped/sharpened.
• Be careful not to bend the metal stack of the insert, especially when removing the insert from its sterilisation bag. This will make it inoperable.
• FSI Slimline inserts should only be used subgingivally and on a low power setting.
• Powerline™ (FSI®) inserts are available for high power and for heavy supra/subgingival calculus removal.
• Do not use any other manufacturer’s prophy powder, which could lead to blockage and damage of the nozzle.

Daily care between treatments for all Cavitron units
• Remove Cavitron insert and clean and sterilise according to the infection control procedures enclosed with the insert.
• Always autoclave Cavitron inserts and Steri-Mate® handpieces after every patient.
• If the handpiece is not autoclavable, apply Disposa-Shield™ No 5, cross-infection barrier for Cavitron handpieces and inserts, and discard after every patient.
• Flush handpiece through for 30 seconds on the maximum water flow setting or by using the Purge setting (without a Cavitron insert in the handpiece).
• Check the water line filter regularly, if discoloured, please replace.

Daily care between treatments for the Cavitron Jet Plus
• After cleaning the air polishing insert with running water or in an ultrasonic cleaner (containing water only), dry completely with an air syringe. Be certain to air-dry the inside diameter of the air polishing nozzle’s central tube, then place the cleaning wire into the centre tube in the nozzle tip (from back to front). Then place the Cavitron insert in a paper or paper/plastic steam sterilisation bag and place the bagged insert into a steamed autoclave.
• Remove residual prophy powder from the cap and bowl threads using a soft brush.
Daily care between treatments for the Cavitron® Select™ SPS™, Cavitron Select™ and Cavitron DualSelect™

- Solution should be flushed from the waterline.
- Place the dial on the H2O setting (DualSelect only), or place the water dial to maximum and activate the foot pedal for three minutes.
- If the Cavitron units are not connected to an external water supply, the line should be flushed with water (taken from either the bottles/ reservoir). Set the water control to the maximum, then flush.
- Do not leave solutions in any Cavitron unit overnight.

Troubleshooting for all Cavitron units

Important: be careful not to connect the water line to the air line and vice versa.
Air line is Grey. Water line is Blue.

1. No water flow from the handpiece
   - Check the water regulator on the control panel, check water line connection.
   - Flush the water line (water regulator set to maximum flow) daily before using Cavitron units (without an insert) to avoid biofilm build up.

2. Handpiece is warm
   - Little or no water flow from the hand piece.
   - Water regulation needs adjusting.
   - Ensure handpiece is full of water before using a Cavitron insert.

3. Insert ejects
   - Too much water being delivered to the handpiece.
   - Check O-rings/ do not grease O-rings.

4. No powder delivery from handpiece
   - Check that powder chamber is free from powder clumps.
   - Powder absorbs moisture – powder must be stored in an air-tight container.
   - Empty powder chamber overnight.

5. Not enough powder flow
   - Check the prophy nozzle for blockage by inserting the cleaning wire.
   - Check the powder flow adjustment knob on the top of the powder chamber.

For further detailed guidelines refer to: Directions for Use booklet supplied with the product or contact the service department.

Telephone: +44 (0)1932 837 332
Email: service.uk@dentsply.com
Introducing the new ProTaper Next™

Discover how to treat complex canal shaping with just two files. Stephen Claffey, Endodontic Brand Manager, explores this impressive addition to DENTSPLY’s endodontic file range.

In March 2011, with much excitement, DENTSPLY launched the long-awaited, single reciprocating file, WaveOne™ to the global market.

It was a formidable addition to our world leading stable of endodontic files, such as ProFile®, System GT® and ProTaper Universal® which the majority of clinicians continue to trust as their preferred choice for root canal treatments (RCT).

The subsequent and ongoing success of WaveOne from the launch and its accompanying motor, the X-Smart™ Plus, has been unparalleled in markets around the world and their popularity continues to grow at a phenomenal rate.

The key to this accomplishment was not just the obvious simplicity of a single NiTi file, combined with the trust in the DENTSPLY Maillefer heritage already held by many dentists, the support of key opinion leaders and teachers of endodontics but also the feeling of being in control. This made the system particularly attractive for those wishing to make the step from hand filing to rotary endo. Before, during and after the launch the word on the lips of all users, experienced and novice, was that they felt in total control with this file.

Swagger
So with all this success, why introduce the new ProTaper Next?

Well, the short answer is complex canal shaping with only two files. This makes ProTaper Next an extremely attractive proposition to those who wish to tackle trickier canal anatomies.

The key evolutions are the new swaggering movement of the file and the utilisation of our proprietary NiTi, M-Wire technology.*

ProTaper Next has a patented, off-centred, rectangular cross section giving the files a unique, snake-like swaggering movement. This improved action creates an enlarged space for debris removal and optimises the canal tracking.

To see the swagger video, please visit dentsply.co.uk

The complete system only requires one torque setting, one speed setting (pre-programmed on all new X-Smart Plus motors in 2013) and only two files per treatment.** With ProTaper Next, just two files give predictable shapes for irrigation, every time, without compromise.

Predictability
ProTaper Next has all the features you are used to with ProTaper Universal plus more;

- backing by international and national opinion leaders and peers
- a single file sequence for all clinical cases
- variable tapers for optimised crown-down technique
- commonly approved apical finishing diameters
- continuous rotation
- 11mm handle for improved accessibility in posterior teeth
- five instruments, but only two needed in most cases
- pre-sterilised blister packaging of three files
- complete system kit; paper and GP points and the addition of matching GuttaCore

All these features come together to cover more difficult clinical cases with increased simplicity.

*Which strengthens the file
**The majority of root canals have a size below 025 (MinKai Wu et al 2000)
With ProTaper Next it’s now possible to shape more severely curved narrow canals than was possible before, with fewer files. You can create the perfect shape for your irrigation protocol every time.

**Laboratory work**
Published clinical studies will shortly be available on the DENTSPLY Academy e-learning website – [dentsplyacademy.co.uk](http://dentsplyacademy.co.uk) but here’s a summary of the statistics from laboratory testing of ProTaper Next so far:

- Reduced risk of file breakage as demonstrated in laboratory tests had fatigue resistance up to 215% higher than and the screwing effect up to 70% lower than ProTaper Universal.
- A significant improvement in respect of original root canal anatomy with up to 65% less transportation than with ProTaper Universal.
- Increased versatility was also seen where special plastic blocks with severe curvatures were successfully shaped. The results show ProTaper Next gives 60% higher flexibility for X2 vs. F2 and 35% higher flexibility for X3 vs. F3.
- Total shaping time was reduced by 30% on extracted teeth.

ProTaper Next. What you’ve been waiting for.
WaveOne™ – First experiences of third-year students

WaveOne’s unique reciprocating movement allows for efficient and reproducible shaping of the canals using just one single NiTi instrument. Here we look at the evolution of this pioneering technology.

Author: Professor Michael A. Baumann, Germany (Roots, 2012)

Rotary root canal instrumentation with NiTi files has been very successful over the last 20 years. Starting with ProFile® (DENTSPLY Maillefer) in 1994, the time-consuming and complicated hand instrumentation of root canals, which had dominated endodontic procedures for more than a century, was replaced with a totally new approach.

In the beginning, that is the 1990s, there was a debate about the advantages and disadvantages of the new NiTi files and about an initially high fracture rate. Before long, knowledge about the behaviour of the new material, correct handling, auxiliary support of specific endodontic motors with torque-control mechanisms and the understanding of cyclic versus torsional fatigue, the advantage of a crown-down approach and many, many more details led to a breakthrough in this new area. The initial fears – that a rotary instrument would screw into the root dentine too deeply and become stuck or fractured – led to a radial land design.

At the turn of the millennium, the first files with sharp edges, such as FlexMaster (VDW) and ProTaper® (DENTSPLY Maillefer), were introduced to the market and the triangle cross section was diversified, ranging from two sharp edges to three (which still is the most frequently used type), four or five. In addition, a variety of sizes and tapers were introduced.

In 1998, Ghassan Yared published his idea of using only one file from the ProTaper system, the F2 (#25 at the tip and 0.08 taper in the first 3mm), in the ATR motor, which enabled the user to programme the file movement in a reciprocating file motion at self-defined angles and time. This idea goes back to Roane, who discussed clockwise (CW) and counter-clockwise (CCW) movement of K-files1 and introduced the balanced force technique in the early 1980s.2

In 1984, Roane and Sybala evaluated 493 used K-files from an endodontic practice. In a preliminary test, new K-files were rotated CW and CCW until they broke and exhibited a special, totally different and characteristic fracture pattern for each movement. This pattern had been delineated by Chernick et al.3 Roane and Sybala concluded that file damage predominantly occurred when the K-files were used in a CW motion (91.5%), whereas the CCW motion caused distortion or separation in less than 10% of cases (Table 1).

Table 1: Results of the study by Roane and Sybala (1984), showing that most fractured K-files in daily practice result from use in CW motion.

<table>
<thead>
<tr>
<th>Fracture Type</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete separation CCW</td>
<td>29</td>
<td>5.9</td>
</tr>
<tr>
<td>Complete separation CW</td>
<td>37</td>
<td>7.5</td>
</tr>
<tr>
<td>Partial separation CCW</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Partial separation CW</td>
<td>21</td>
<td>4.3</td>
</tr>
<tr>
<td>Distortions of the flutes CW</td>
<td>13</td>
<td>2.6</td>
</tr>
<tr>
<td>Distortions of the flutes CCW</td>
<td>393</td>
<td>79.7</td>
</tr>
<tr>
<td>Fractures CW</td>
<td>451</td>
<td>91.5</td>
</tr>
<tr>
<td>Fractures CCW</td>
<td>42</td>
<td>8.5</td>
</tr>
<tr>
<td>Total</td>
<td>493</td>
<td>100</td>
</tr>
</tbody>
</table>
"This observation is explained by the fact that counter-clockwise rotation unthreads the instrument, decreasing its load and releasing its cutting edge. Clockwise rotation threads the instrument into the canal and increases its load until its cutting edges cease to rotate. At that point, the instrument shaft must either distort or separate unless the operator terminates the rotation."1

With these facts in mind, Roane et al. published another article in the following year, describing the ‘balanced force’ concept for instrumentation of curved canals, in which they state: “Its concepts use force magnitudes in order to create control over undesirable cutting associated with canal curvature. Rotation is promoted as the means for maintaining magnitude as a control and CCW direction of rotation provides finite operator control.”2 They thus suggested combining CW and CCW motion in root canal instrumentation to prevent breakage of K-files and preserve curved canals much better than before. To obtain this result, they introduced a new K-type file with a parabolic tip, expecting that the load would be distributed and reduced to below the regular cutting magnitude.

Today, the balanced force concept is taught in many dental schools and is well known all over the world. When the new NiTi instruments appeared in the early 1990s, the constant rotation of files at a speed of 250 to 350min⁻¹ appeared to be the gold standard over the next few decades. With Yared’s idea⁴ – combining CW and CCW when using NiTi files, namely the ProTaper F2 – both ideas were unified.

Yared suggested the use of a #8 stainless-steel hand file to negotiate the canal to working length using an apex locator and #10 or 15 files only in severely curved canals. This is followed by the 25.08 ProTaper F2. The CW rotation is greater than the CCW rotation. In this manner, a CW motion screws the file into the canal and a CCW motion unscrews it. As CW is greater than CCW, the file automatically passes more deeply into the canal and the user is warned to avoid apical pressure that will force the instrument deeper still.

Yared’s idea triggered the design of a new instrument and motor that would fulfil the requirements of a reciprocating technique, the WaveOne system. WaveOne is available in three sizes – 21.06, 25.08 and 40.08 (Fig. 1.) – and comes with the WaveOne motor, which is programmed to move the file in the special reciprocating motion. The main advantages of WaveOne are:

**WaveOne enables the realisation of the one-file concept**

Only one file is needed for a single tooth. In some cases, molars demand two WaveOne files, namely the small or primary for the buccal and the large for the palatal canals. This replaces the use of numerous files necessary in the past. The files may be used as disposable instruments because of a lower price, which may be accepted more easily by the patient than the higher prices of a complete set of files used with other systems.
WaveOne™ lowers the fracture risk

The fracture risk of NiTi files is low, with a deformation rate of 0.75% for ProFile® and 2.9% for ProTaper®. Instrument separation occurs in 0.26% for ProTaper and 0% for ProFile. Nevertheless, practitioners still fear file breakage. The reciprocating motion respects the fatigue threshold of NiTi alloys far better than a constant rotary motion, which leads to a lower fracture risk than with conventional NiTi files.

In an initial trial with the aim of collecting information about the routine use of WaveOne files, third year dental students at the University of Cologne, Germany, were given the opportunity to work with the WaveOne primary file (25.08). These students have little experience with root canal treatment because they only work on six teeth (two incisors, two bicuspids and two molars) and a plastic block during their seventh term. Instrumentation is taught through the initial use of hand files up to #15 for creating a glide path and using ProTaper or FlexMaster in a constant rotary motion with the ATR motor.

At the end of this course, ten students were selected to participate in a pilot study. The students were introduced to the handling of WaveOne files and the balanced force technique. The students then instrumented endodontic plastic blocks with WaveOne files and other blocks with hand instruments (K-files) using the balanced force technique with the #30 AMF and with step-back to #50 to reach comparable sizes with the 25.08 WaveOne file.

The results show that the mean instrumentation time (without file exchange and rinsing) for WaveOne with 23.3s was much more shorter than for hand instrumentation with 217.3s (Table II). The students were nearly ten times faster with WaveOne than with hand instrumentation (between 129 to 346 seconds). No instruments were fractured, which suggests that even inexperienced students were able to instrument plastic blocks easily and quickly (between 12 and 41 seconds).

In addition, the resulting shape with WaveOne was much better, smoother and without zip, elbow or ledge formation.

Table 2: Instrumentation time using WaveOne and hand files

<table>
<thead>
<tr>
<th>WaveOne (time in s)</th>
<th>Hand files (time in s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>251</td>
</tr>
<tr>
<td>25</td>
<td>210</td>
</tr>
<tr>
<td>38</td>
<td>223</td>
</tr>
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<td>41</td>
<td>129</td>
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<td>22</td>
<td>299</td>
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<td>14</td>
<td>346</td>
</tr>
<tr>
<td>12</td>
<td>163</td>
</tr>
<tr>
<td>17</td>
<td>328</td>
</tr>
<tr>
<td>34</td>
<td>224</td>
</tr>
<tr>
<td>Total time</td>
<td>233</td>
</tr>
<tr>
<td>Mean</td>
<td>23.3</td>
</tr>
<tr>
<td></td>
<td>217.3</td>
</tr>
</tbody>
</table>

In summary, upon initial observation, WaveOne is a promising system that is easy to learn for first-time users, results in less breakage and allows the use of one single-use instrument.

The Future of Root Canal Obturation

The use of GuttaCore™ in root canal obturation presents a major breakthrough in dentistry, allowing clinicians to bypass common challenges. Dr James Gutmann explores these technological advances and their importance in dentistry today.

Introduction

The use of core carriers with attached gutta-percha for root canal obturation is not new, as there was evidence in the late 1800s that indicates gutta-percha was softened and adapted to gold wires and placed in the root canal system. In the past 40 years there have been additional attempts to use this approach to obturate prepared root canal systems, namely the use of silver cones wrapped in gutta-percha and the formation of softened gutta-percha on root canal files. In each historical attempt to devise a better obturator or technique, a hard core material was used that often created challenges if treatment revision was necessary. Likewise, post space preparation posed numerous difficulties for clinicians.

To meet these challenges, a plastic core obturator was created in the early to mid-1990s that was flexible, had sufficient strength for placement in the canal, was easily softened with chemicals or heat, and could be removed for treatment revision. However, as with any technique or material, improper usage created numerous clinical impasses. These included the inability to remove the carrier in small tortuous canals, stripping of the gutta-percha from the carrier with subsequent binding of the plastic in the improperly shaped root canal, and the potential for root perforation during post space preparation.
Strong cross-linked core developed

To eliminate these challenges, and to develop core obturators that would provide the clinician with the best possible canal filling technique, advances in materials science and polymer chemistry enabled the development of a strong core that is made from a cross-linked, thermoset elastomer of gutta-percha [GuttaCore™ Crosslinked Gutta-Percha Obturator (DENTSPLY Tulsa Dental Specialties)].

This core, when coated with regular gutta-percha, allows clinicians to achieve their desired goal, bypassing all the previous challenges to this obturation technique. This technology allows the movement of warm gutta-percha three-dimensionally into all areas of the properly shaped root canal system. While many obturation techniques rely on lateral or vertical compaction techniques, the hydraulic force from these techniques sends gutta-percha in one or two unequal and unpredictable directions (laterally or apically). With GuttaCore, the vectors of force for the movement of softened gutta-percha during placement are in all directions within the canal. This outcome, however, is based on proper canal shaping and thorough irrigation. Preparation of root canals with this approach is paramount to the removal of pulp tissue and dentinal debris, and for a more effective volume of disinfecting irrigant to penetrate, circulate and clean all areas of the root canal’s system. The result is a shaped and cleaned space that permits a maximisation of the hydraulic force and flow of gutta-percha into the canal system with the placement of GuttaCore.

Generally, applications of GuttaCore are somewhat similar to those used with other gutta-percha core carriers. However, there are some important aspects to the delivery of GuttaCore that require attention. Prior to obturation, canals should be shaped and enlarged to a minimum of a 25/.06 or greater if possible to ensure not only thorough canal debridement but also to provide sufficient space and taper for the GuttaCore material to flow into the canal intricacies. In a recent long-term cohort study, the presence or absence of sufficient taper of the root canal preparation was the main factor associated with the development of periapical lesions following treatment. When using a rotary file with a taper equal to or greater than .06, the GuttaCore Crosslinked Gutta-Percha Core Obturator that is the same apical size as the last file taken to working length is selected.

When using a .04 tapered rotary file, the GuttaCore obturator that is one apical size smaller than the last file taken to working length is selected. GuttaCore is a notable advancement in endodontics, in that polymer chemistry has enabled the development of a crosslinked gutta-percha core that has sufficient strength to be placed into demanding anatomical confines, such as severely curved canals or canals that are difficult to reach. It requires minimal heating to be effective in its flow and adaptation to the prepared canal’s walls. While it cannot be bent prior to placement, as a clinician might wish to do in difficult canal access situations, it can be placed easily when positioned at the correct angle in by utilising a pair of locking cotton forceps.
Closing comments

The development of a cross-linked gutta-percha carrier for the GuttaCore obturators represents a major breakthrough for root canal obturation that will enable any clinician to achieve a well-filled, properly prepared root canal system on a predictable basis. As with the advent of nickel-titanium rotary instruments for more ideal canal shaping and ultimate cleaning, the GuttaCore addition to root canal obturation techniques provides the clinician with confidence that the highest level of root canal obturation will be attained.

Dr. Gutmann is professor emeritus in Restorative Sciences, Baylor College of Dentistry, Texas A&M University Health Science Center, Dallas, Tex. He is a Diplomate of the American Board of Endodontics and past president of the American Association of Endodontists. He has presented more than 800 lectures, papers and continuing education courses internationally. Additionally he has authored or co-authored more than 275 articles in dental journals and three text books that address scientific, research, educational and clinical topics. Dr. Gutmann has taught full-time for more than 27 years at three major universities. Presently, he is in private practice limited to endodontics in Dallas, Tex. He can be reached at jlg4570@aol.com.

Disclosure: Dr. Gutmann has no financial interest in the product or technique discussed and he serves as a consultant to DENTSPLY Tulsa Dental Specialties.
Ten top tips to help prevent RSI

Continued use of hand instruments can make hygienists and therapists susceptible to repetitive strain injury (RSI). As a result, DENTSPLY has developed a range of Instruments specifically designed to reduce the risk. Here Mary Somers, physiotherapist, provides her top 10 tips to further help prevent the onset of RSI.

Mary Somers is a Chartered Physiotherapist and director of Canterbury Physiotherapy. She has a special interest in repetitive strain injury (RSI) in the work place and has previously worked for British Telecom and the John Lewis Partnership. She is a member of The Association of Chartered Physiotherapists working in Occupational health and Ergonomics (ACPOHE).

Mary spent time observing a dental hygienist in action and together with further research has developed these top 10 tips to help prevent RSI.

RSI is not uncommon to many dental hygienists and therapists, who may adopt static positions, repetitive movements and awkward postures during their working day. These factors are all seen as contributing towards RSI.

RSI is not a specific medical condition, like the term ‘sports injury’, it tells more about how the injury was sustained, rather than what the injury is. The condition usually affects parts of the upper body, such as the forearm, elbow, wrist, hands, shoulder and neck. Symptoms include tenderness, aches and pain, cramp, stiffness, weakness, tingling, numbness or swelling. If you have symptoms, it’s important to get treatment quickly. The sooner treatment is started, the better the chances of recovery. But as always the saying, ‘prevention is better than cure’, rings true.

These practical tips can help you to reduce the risk of developing RSI:

1. Good posture is crucial: sit up straight and pull your tummy gently in.
2. Check and adjust your seating. Ideally use a saddle stool, which encourages a neutral spinal position by stabilising the pelvis.
3. Adjust the patient’s chair height to suit you.
4. Make the tools you use accessible. Don’t twist your spine to reach, turn your whole body.
5. Use ergonomically designed hand instruments such as the DENTSPLY range.
6. Take micro breaks: between patients readjust your posture and do some simple stretches.
7. Take regular breaks: stand up, walk about and do some simple exercises.
8. Adopt a healthy lifestyle and try to take regular exercise, such as yoga and Pilates.
9. Visit your doctor or physiotherapist if you think you have RSI.
10. If you think you have RSI: change your working positions, do more exercise and do it NOW!

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2. www.nhs.uk/Livewell/workplacehealth
3. Madal, A. C. Balanced sitting position on forward sloping seats

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