INTRODUCTION/MANUFACTURER'S CLAIMS

Third version of the venerable hydrophilic VPS material. Its improvements include purported increases in hydrophilicity and tear strength. Of the evaluators who used the previous version and were able to compare it to this new one, half felt that Ultra+ is better, while the other half stated both versions were about the same. Two evaluators found Ultra+ to be slightly better, while one noted there was a clear difference.

However, when it comes to hydrophilicity, two-thirds of the evaluators found Ultra+ to be more hydrophilic, while the other third did not find a difference between the two versions. One evaluator noted that there is no difference on a dry prep, but in the presence of moisture, there is a big difference.

When the evaluators were asked to evaluate the difference in hydrophilicity between Ultra+ and other VPS materials they have used, two-thirds stated Ultra+ is better, 24% did not think there were significant differences, and 9% considered other materials to be better.

Concerning the fit of restorations, most (85%) evaluators found both versions to produce similar results, while the other 15% thought Ultra+ restorations were better. When compared to all VPS materials, most (86%) evaluators thought there was virtually no differences between the brands, while 10% thought Ultra+ restorations were better and 4% had better fitting restorations with other materials.
VISCOSITIES AND COLORS

<table>
<thead>
<tr>
<th>Viscosity</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>XLV</td>
<td>Muted orange</td>
</tr>
<tr>
<td>LV</td>
<td>Teal</td>
</tr>
<tr>
<td>Medium</td>
<td>Purple</td>
</tr>
<tr>
<td>Rigid</td>
<td>Green</td>
</tr>
<tr>
<td>Heavy</td>
<td>Green</td>
</tr>
</tbody>
</table>

Rigid was considered stiff enough for use in a sideless, closed bite tray by all the evaluators. One evaluator, however, stated that he still preferred putty.

Most (90%) evaluators found the colors to be easy to read, while the other 10% thought they were difficult. One evaluator liked the LV and Medium colors, while another felt LV was too dark. A third did not like the green of Rigid/Heavy, stating it was gross and reminded him of the Mucinex TV commercial!

DISPENSING

Conventional cartridges, DECA for mixing machines, and unidose (digit). For the syringe materials, most (70%) evaluators used conventional cartridges, 10% loaded an intraoral syringe, 10% used digit, and 10% did not have a preference. Four evaluators did not like digit at all, with two believing it was not economical and another finding it cumbersome to use.

POUR TIME DELAY

30 minutes for stone and 60 minutes for epoxy after disinfection.

SHARK FIN HEIGHT

This test shows that both XLV and LV have plenty of flow since they both completely fill the Shark Fin (33+). Even the medium body has decent flow, since it came close to filling the Shark Fin.

<table>
<thead>
<tr>
<th>Viscosity Combinations</th>
<th>Set Time</th>
<th>Shark Fin Height (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>XLV/Heavy</td>
<td>Regular</td>
<td>33+</td>
</tr>
<tr>
<td>XLV/Heavy</td>
<td>Fast</td>
<td>33+</td>
</tr>
<tr>
<td>LV/Heavy</td>
<td>Regular</td>
<td>33+</td>
</tr>
<tr>
<td>LV/Heavy</td>
<td>Fast</td>
<td>33+</td>
</tr>
<tr>
<td>Medium</td>
<td>Regular</td>
<td>32.8</td>
</tr>
<tr>
<td>Medium</td>
<td>Fast</td>
<td>32.5</td>
</tr>
</tbody>
</table>
EXTRAORAL WORKING TIME
(REGULAR SET)

<table>
<thead>
<tr>
<th>Set Time</th>
<th>Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular</td>
<td>2.25</td>
</tr>
<tr>
<td>Fast</td>
<td>1.2</td>
</tr>
</tbody>
</table>

INTRAORAL WORKING TIME

Of the evaluators who used the regular set materials to impress 6+ preps, most (87%) considered it to be adequate, while the other 13% needed extra time. One evaluator noted that you need to hustle to impress 6+ preps.

MOUTH REMOVAL TIMES

<table>
<thead>
<tr>
<th>Set Time</th>
<th>Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular</td>
<td>5.0</td>
</tr>
<tr>
<td>Fast</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Note: Even though the manufacturer listed MRT for fast set is 2.5 minutes, our hardness tests (see below) show that the heavy and medium materials are still relatively soft at 2.5 minutes. (Rigid set adequately in 2.5 minutes.) We believe it would be prudent to allow at least 3.0 minutes from the beginning of mixing before removing the impression from the patient’s mouth.

HARDNESS (SHORE A UNITS)

<table>
<thead>
<tr>
<th>Viscosity</th>
<th>Set Time</th>
<th>MRT</th>
<th>24h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>Regular</td>
<td>54.5</td>
<td>68.5</td>
</tr>
<tr>
<td>Medium</td>
<td>Fast</td>
<td>37.5</td>
<td>68.5</td>
</tr>
<tr>
<td>Rigid</td>
<td>Fast</td>
<td>73.0</td>
<td>84.0</td>
</tr>
<tr>
<td>Heavy</td>
<td>Regular</td>
<td>54.5</td>
<td>72.0</td>
</tr>
<tr>
<td>Heavy</td>
<td>Fast</td>
<td>45.5</td>
<td>72.5</td>
</tr>
</tbody>
</table>

TEAR STRENGTH

Most (86%) of the evaluators had no tears, while the other 14% had a few tears. Of the evaluators who used the previous version and were able to compare it to this new one, most (74%) felt that both versions are about the same, while the other 26% considered Ultra+ to be better. One evaluator noted lab tests have shown that both versions are equal.

When the evaluators were asked to evaluate the difference in tear strength between Ultra+ and other VPS materials they have used, most (57%) stated Ultra+ is better, while the other 43% did not think there were significant differences. Two evaluators performed tear strength tests in their labs and found no major differences in tear strength, while another noted another study found Ultra+ to be stronger.

PATIENT RESPONSE

No patients complained about the taste and pleasant mint odor. One evaluator found the mint scent to be stronger than the previous version.

PACKAGING

Our evaluation samples were shipped in a bulk method without the actual packaging. The conventional cartridges and those destined for a mixing machine are typical and unchanged from the previous version, as are the digit unidose, which has three parts: single-use cartridge, mixing tip, and syringe dispenser.

Conventional and mixing machine cartridges are color-coded for their viscosities, and plainly show
whether they are regular or fast set along with their working and mouth removal times as well as the expiration dates.

Digit tips are also color-coded and are imprinted with the MRT and expiration date. To use, install an intraoral tip on the end of the mixer, break off the sealed orifice cover on the cartridge using the slot in the dispenser plunger, insert the cartridge into the mixer, and place this assembly into the dispenser. There are two sizes of cartridges: small (1.6ml) and large (2.4ml). The small cartridges have enough material for 2-3 preparations, while the large ones can be used for 3-4 preparations.

Since we didn’t really receive the products in their actual boxes, the evaluators were not able to comment on that aspect, but they felt the cartridges were adequate, but nothing special.

Note that B4, the flow promoter that was packaged with the previous version, is now an a la carte product and does not come in the kit any longer.

**DIRECTIONS**

Plain paper, multilingual, annoying foldout. Information is reasonably straightforward and fairly typical for impression materials. Digit comes with a coated paper card illustrating its assembly with good color photos although they feature the previous version's colors. Most evaluators thought the directions were adequate.

**REALITY**

**STRENGTHS**  Predicable impressions. Nice colors that are easy to read. Excellent hydrophilicity, tear strength and flow. Option of digit unidose. Rigid works well in sideless, closed bite trays. Has a pleasant mint scent.

**WEAKNESSES** Elimination of previous version’s Superfast and Xtra set times. Fast set versions of Heavy and Medium were still not completely set at MRT in our tests.

**BOTTOM LINE**

Not much different than its processor although it still leads the pack as the impression material that sets the standards for excellence, but we miss Superfast and Xtra.

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Macro-Lock Oval

INTRODUCTION/MANUFACTURER’S CLAIMS

It is a fact of dental anatomy that all root canals are not perfectly round. So when you prepare the root canal for a post, there is typically space around the post at its coronal end. Until recently, you basically filled up this space with resin cement or core build-up material. However, having a post swimming in resin cement may not be the best way to provide stability for the ultimate coronal restoration.

Instead of leaving this sea of cement around a circular post, you could insert one or more Fibercone auxiliary posts. This solution minimizes the volume of cement and can increase the strength and retention of the core material. But while Fibercones have a very small learning curve, they do add to your office inventory woes and their small size can make retrieving them from their holding area somewhat dicey.

This is where Macro-Lock Oval comes in. They are fiber posts with the same X-RO Illusion composition as their RTD brethren, featuring unidirectional, pretensed quartz fibers in an epoxy matrix.

While the apical ends are still round, they flare coronally into an oval cross-section. The oval design allows the posts to fit canals of the same configuration more precisely, thus limiting the volume of resin cement. Most (73%) evaluators thought the design was clever and useful, while the other 27% still considered round posts to be more than adequate. Indeed, one dissenter thought fitting the oval design into root canal anatomy is like a lottery.

And most (64%) evaluators felt the anti-rotational movement that could be gained by using an oval post would make them less likely to loosen, although the other 36% did not feel rotational movement has any direct effect on post loosening. Again, one naysayer felt anatomical differences between the shape of the post and root canals render this factor moot.

There are also serrations in the apical and coronal thirds, while the center section is smooth. These serrations were considered to be valuable to help retain a core buildup material by most (70%) evaluators, while the other 30% thought they were nice to have but not really necessary.

RAVES & RANTS

+ Can be useful in ovoid root canals
  + Serrations can help retain core build-up materials
- May not even fit some ovoid canals
- Could be a bench warmer for long stretches

MANUFACTURER

RTD

www.rtddental.com

PRICES

INTRO KIT
$154.99/10 ($15.50/post)

REFILLS
$72.99/5 ($14.60/post)
COLOR
Using a slightly modified resin that wets the fibers, they have a translucent appearance at body temperature. However, they also feature the Illusion thermochromic property, which comes into play if and/or when you ever have to remove a post. You are supposed to spray it with cold water or air to recreate the color, which should help you differentiate between the post and tooth structure.

We tested this thermochromic property on its sibling by placing a post in our temperature/humidity (T/H) chamber for 24 hours. It had become completely colorless. However, within one minute of removing it from the T/H chamber, it started to regain its color. After five minutes, all the color had returned.

All evaluators except one liked the thermochromic property, while the lone holdout was not impressed. One evaluator stated that it gave a high tech twist to a decidedly low tech item.

LIGHT TRANSMISSION
Not very good. When we tested their brethren, they scored near the bottom in light transmission. This means the use of dual-cured cement is mandatory.

RADIOPACITY
Most (60%) evaluators found the radiopacity to be excellent, while the other 40% considered it to be adequate.

SIZES AND COLOR-CODING

<table>
<thead>
<tr>
<th>Designation</th>
<th>Color</th>
<th>Apical End (mm)</th>
<th>Coronal End (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Yellow</td>
<td>0.7</td>
<td>2.2 x 1.3</td>
</tr>
<tr>
<td>#2</td>
<td>Red</td>
<td>0.8</td>
<td>2.3 x 1.4</td>
</tr>
<tr>
<td>#3</td>
<td>Blue</td>
<td>1.1</td>
<td>2.5 x 1.7</td>
</tr>
<tr>
<td>#4</td>
<td>Green</td>
<td>1.1</td>
<td>2.6 x 1.8</td>
</tr>
</tbody>
</table>

The built-in color to aid in retrieval when necessary and for definitive differentiation between sizes during the selection process is an attractive feature. It eliminates the need to use color-coded paint on the back end of the post or even a color-coded endo stopper. On the other hand, the color is very subtle so the posts can still be translucent at body temperature, especially the yellow in the #1 posts.

All evaluators thought the four sizes were adequate.

DRILLS
The drills come in starter and finisher versions. The starters are either #1 (one ring on its shank) or #2 (two rings on its shank). Starter #1 is designed for use with posts #1 and #2, while starter #2 is used with posts #3 and #4. Yes, this is somewhat confusing, since you would assume the starter drill numbers would coincide with the post numbers. The finishers, however, do come in four sizes to correspond with the similarly identified posts.

USE
Most (60%) evaluators found placing the post to be easy and similar to placing a round one, 20% thought placement was easy most of the time, but with a few hiccups, and 20% considered placement to be cumbersome. Two evaluators noted that the cross-section of the post does not always follow the cross-section of the root canal, even when the latter is oval. Another commented that unless you perform the endo treatment yourself, the clinician rendering the treatment may create a circular space for the post, which would obviously rule out using this oval design.

No evaluators experienced any failures during the short evaluation period.

PACKAGING
The kit comes in a conventional, rectangular box plastic shrink-wrapped for security. Product identification is on every side, top and bottom. Inside is a white plastic tray with recesses for the drills and matching posts.

All five posts of the same size are secured in a sealed, blister pack with foil backing. This allows
posts to be removed individually without exposing the other ones, but if the post is the wrong size, there is no way to reseal it other than using tape. The drills are secured in individual blister packs and have painted color-coded rings.

Most (80%) evaluators found the packaging to be acceptable, while the other 20% commented that the recesses are too shallow, which means the blister packs tend to migrate and get disorganized.

There is also a clear plastic, calibrated card for measuring lengths. Half of the evaluators used it, but didn’t find it help significantly in selecting the right size, while 40% found it useful and 10% never tried it.

**DIRECTIONS**

The multi-lingual directions are printed on plain paper in the annoying foldout format. Information is clear and straightforward. There is also a CD with more info. All evaluators thought they were easy to follow, acceptable, and complete.

**REALITY**

**STRENGTHS**

Oval shape can be helpful when dealing with ovoid root canals. Good radiopacity. No failures during the evaluation period. Thermochromic property. Adequate size selection. Serrations can help with core build-up retention. Drills are reasonably sharp.

**WEAKNESSES**

May not even fit all oval root canals. Most rotary nickel titanium instruments prepare canals to a round cross section. This ends up with an oval-shaped canal with a round cross section and two canal fins, making the idea of an oval-shaped post good but could limit its usefulness.

**BOTTOM LINE**

Definitely a niche product which can be nice to have when root canal morphology is more oval than round, but you will probably stick with more conventional round posts most of the time.
HANDPIECES

Highspeed, air turbine handpieces have not changed dramatically over the last 15 years or so. Granted, they have gotten more powerful and their cladding has become smoother and easier to clean, but the tweaks from year to year have been evolutionary, not revolutionary. The only somewhat exception to this mantra has been the Midwest Stylus ATC, which incorporates an electronic control to balance its torque even when the air pressure decreases. But while the ATC remains a terrific handpiece, it is pricey and requires installation.

With all this in mind, we have embarked on a journey to investigate the latest offerings from the top handpiece manufacturers, which include Bien-Air, NSK, and Midwest. This FirstLook report covers two new flagship, standard head, highspeed air turbine handpieces from Bien-Air and NSK. Additional models from NSK and Midwest are already in the pipeline and full evaluation reports will be posted on realityesthetics.com and published in RN when they are completed in early summer.

But back to the task at hand: Tornado vs. Z900L.

The Tornado features, according to Bien-Air, 30 watts of power with its so-called SteadyTorque technology. We are unaware of any other air turbine handpiece that has a higher torque claim. It is also stated to be the quietest on the market due to its Accu-Spray Quattro Mix spray system and the Accu-Chuck PreciPlus vibration-canceling bur-retention mechanism. The PreciPlus is additionally stated to offer optimal stability and precision, while the Quattro Mix spray is supposed to provide superior bur-cooling action and clear illumination.

The ceramic ball bearings are stated to provide extended turbine life and lower noise, while the sealed head supposedly prevents fluid infiltration, reduces cross-contamination risk, and prolongs the life of the bearings. And it has a Cool Touch feature, which is designed to reduce or eliminate the handpiece itself becoming hot and burning the patient. Although this burning patient phenomenon has mainly been associated with electric handpieces, it’s nice to know that Bien-Air has also incorporated its advantages into its air turbines.

Tornado

Bien-Air

www.bienair.com

PRICE

Handpiece + coupler

$995.00

WARRANTY

2 years

Z900L

NSK

www.nskdental.com

PRICES

Handpiece

$1,399.00

LED Couplers

$249.00-$399.00

WARRANTY

2.5 years

(1 year for turbine)
The design is the latest in euro-cool with virtually seamless, satin-finished cladding and a nonslip coating called TotalTact. This smooth profile also facilitates cleaning.

The Z900L features, according to NSK, 26 watts of power (still pretty impressive) with its Quattro Spray system, Cellular Glass Optics, Ceramic Bearings, and the Clean Head System, which is described as a special mechanism designed to automatically prevent the entry of oral fluids and other contaminants into the handpiece head. This Clean Head System is supposed to prolong the life of the bearings. It also has a microfilter to prevent particles from entering the water spray system to guarantee optimum water spray cooling at all times.

The design incorporates satin-finished, pure titanium cladding that presumably weighs less to reduce the burden on your hands during use. Its enhanced hardness is also stated to improve durability during repeated autoclaving. In addition, the biocompatible properties of titanium eliminate concern over allergies to other metals.

Both handpieces have 4-port water spray, which provides plenty of cooling irrigation. We measured the light intensity of the Tornado about 9,860 lux, while the Z900L performed at about 8,720 lux. LED couplers from each manufacturer were used for these tests.

The Tornado weighs in at 3.3oz/93.6g, while the Z900L tipped the scale at 3.1oz/87.9g (both including their respective couplers). The lower heft of the Z900L is probably due to the titanium cladding.

The Tornado head measures 12.2mm in diameter and 21.1mm long with a 330 bur. This compares to 12.5mm in diameter and 20.3mm long with a 330 bur for the Z900L. The overall length and diameter of the Tornado are 125.4mm (including the coupler) and 16.5mm respectively, while the Z900L is close at 129.5mm (including the coupler) and 17.4mm respectively.

The head angle of the Tornado is 102° compared to 110° for the Z900L. While the head angle of the Z900L is closer to most handpieces in this category, the 102° for the Tornado may offer better access to some areas of the mouth.

Noise for the Tornado was measured at 60.8dB, which makes it the quietest highspeed air handpiece that we have ever tested. Thus we can confirm its quietest on the market claim. The Z900L was recorded at 70.8dB, which is also similar to most handpieces in this category.

Our clinical simulation cutting tests showed both handpieces cut with nice precision and minimal vibration. The full clinical evaluations, which as noted previously just started, will certainly provide more detailed specs on the performance of each handpiece. In the meantime, if you are looking for what appears to be the quietest handpiece on the market and at an amazingly affordable price, the Tornado appears to be your best option. On the other hand, if a lighter weight is more important to you, the Z900L could be a better choice for you.

Stay tuned for the updates in the coming months.