THE DENTAL ADVISOR™

Improving Patient Care Through Research & Education



Handpieces and Maintenance

Dental Handpieces are essential to the practice of dentistry. In this issue, we provide descriptions of innovative solutions in both electric and air-driven handpieces developed to address clinical challenges.

As with any piece of equipment critical to practice operation, dental handpieces must be maintained properly to avoid costly downtime or damage to other equipment in the office. Handpiece maintenance is discussed, as well as a tips for keeping handpieces performing optimally.

March 2015
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www.dentaladvisor.com

RATINGS:

Excellent + + + + +
Very Good + + + +
Good + + +

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From the Desk of
Dr. Bunek, Editor-in-Chief



Electric or air-driven? The answer to this question may not be as black and white as some think. While electric handpieces are favored for their lower volume, high and constant torque, versatility through multiple attachments, high concentricity and low vibration, many dentists still prefer to use their air-driven handpieces. Why?

The choice between electric and air driven ultimately comes down to the individual and his or her practice and patient population. If you are doing several crown preparations a day, then an electric system will deliver the torque and precision you require. If, however, you spend most of your day removing caries and placing fillings, an air driven handpiece will offer the tactile feel you desire. Utilizing both types of handpieces in your practice can be optimal, keeping in mind the different techniques required by each system.

As electric and air driven handpieces continue to offer unique benefits to practicing clinicians, manufacturers are striving to close the gap between the two systems. Electric motors and attachments are becoming smaller and lighter, more closely approximating the size of an air driven handpiece, while some air driven handpieces are acquiring characteristics of electrics including quicker response (break time), lower noise output, improved impeller designs leading to less stalling and higher, more constant torque. As always, I welcome your comments and suggestions; you can reach me at *drbunek@dentaladvisor.com*. Thank you for your continued support and reading!



Dental Handpieces: Air or Electric?

Name one piece of equipment you cannot practice dentistry without. We've all likely considered the question, and while there may be many right answers, you would be hard pressed to come up with a short list that did not include a dental handpiece, that notorious piece of equipment referred to as the drill. Dental handpieces have existed in some form since ancient civilizations used bow-drills to remove decay. In 1778 dentistry saw the introduction of a mechanical handpiece driven by a hand crank and gear followed less than one hundred years by a clockwork drill which ran for 2 minutes before the spring had to be re-wound and a pneumatic drill operated with foot-pedal powered bellows offering more control over speed. If you did not practice with or learn on a belt-driven handpiece, it is likely that you have heard many stories about them from your mentors. Introduced in 1871, these large and loud machines remained relevant and predominant until the first air turbine made its way on the scene in 1949. Air driven handpieces maintain their popularity today rivaled only recently by brushless electric motors and contra angle attachments.

Electric

Advantages
+ High constant torque
+ Low volume
+ Versatility through multiple attachments
+ Control (programming tools/speed and torque settings)
+ Smoother walls/more precise margins

Disadvantages
- Initial cost high
- Repair costs high
- Learning curve
- Intimidating (setting options/control panel)
- Heavy weight

OR

Air-driven

Advantages
+ Better visualization
+ Tactile sensation
+ Lighter/smaller
+ Low cost

Disadvantages
- Stalling
- More frequent repairs
- Slower cutting
- Bur Chatter
- High pitch/noise
- Vibration

Challenges in Handpiece Design

Challenge: Electric Motor is too heavy.

Bien Air The MX2 Microseries by *Bien Air* includes the MX2 Micromotor, an e-type, brushless, motor with adjustable LED light. At 30% shorter and 23% lighter than a typical electric motor, this model when combined with one of the micro series contra angles is approximately the size of a traditional air driven handpiece. *Bien Air* recognized that, especially with the continually increasing number of female dentists, the size and weight issue of electric motors needed to be addressed. The combination of short motor and short attachments has also moved the balance point forward, resulting in decreased hand fatigue. The motor itself has 40 programmable settings for virtually unlimited customization.

The ***E-STATIS*** *(Sci Can)* line of equipment feature the ***E-STATIS SLM*** (Short, LED, Micromotor) which is reportedly 35% shorter and lighter than many of its competitors and is fully autoclavable. The ***E-STATIS Advantage*** electric motor system offers a range of customizable settings for both operative and endodontic procedures. The ***E-STATIS Prep*** offers customizable settings for up to 8 preparatory procedures.

The ***KL703 Short Motor*** *(KaVo)* is the 4th generation of *KaVo* electric motors. The motor itself is 30% lighter and 25% shorter than leading competitors and features a field replacable MULTI LED, and is fully autoclavable. The ***KL703*** is available on the *ELECTROtorque Plus* and the *ELECTROtorque TLC* electric motor systems.

Challenge: Transitioning from air to electric is a learning curve.

KaVo COMFORTdrive 200XDR integrates a sterilizable motor that delivers constant power for consistent performance. The integrated motor reduces the distal area length after the pivot point in the doctor's hand allowing for comfort and control. The system features Plug-n-Prep auto calibration for easy setup which does not require any adjustment to other equipment in the office. Once calibrated, the foot pedal can be used between 30,000-200,000 rpm for a an air-like feathering effect, thus reducing the learning curve for doctors used to the tactile feel of air driven handpieces.

Challenge: Electric Handpiece repairs are more expensive.

The ***Ti-Max Z95L*** *(NSK, LLC)*, a 1:5 increasing contra angle by *NSK* was designed to increase access and visibility by reducing head and neck size, while increasing durability with the implementation of carbon gear coating. The titanium shell cuts down on the weight of the handpiece and offers improved wear resistance while the shape of the shaft improves balance and decreases hand fatigue. Despite its small head size, the ***Z95L*** maintains a 4 port water spray, offering optimal cooling and the gear shape provides a low volume output and little vibration. The attachment fits all e-type motors.

Challenge: Air driven handpieces stall under heavy load.

The ***Midwest Stylus ATC*** *(DENTSPLY Professional)* is a high-speed , air-driven handpiece that is electrically controlled. The speed-sensing intelligence (SSI) technology automatically optimizes power to virtually eliminate stalling without the need for manually changing settings. It has the ability to adjust the speed based on the load, minimizing wear on the bearings. This technology provides the dentist with the speed, size, and weight of an air-driven handpiece and the power (when needed) of an electric motor.

Challenge: *Air driven handpiece has low or inconsistent torque.*

The ***Ti-Max Z900L*** *(NSK, LLC)* delivers 26 W of power and operates between 330,000 and 400,000 rpm. A proprietary specially shaped turbine allows for this power output enabling fast cutting for reduced treatment time as well as a smooth, consistent cutting feel for comfortable operation. The handpiece features a solid titanium body. The ergonomic shape and DURAGRIP coating offer a firm grip and improved control even in wet conditions. A slim neck, angled head, and a unique notch to rest your index finger and thumb further improve both ergonomics and access. The ***Ti-Max Z900L*** is equipped with cellular glass optics and long-lasting ceramic bearings.The ***Ti-Max Z*** series handpieces fit *Kavo, Sirona, Bien-Air,* and *W&H Roto Quick* couplers.

The ***Sterling S495*** *(Benco Dental)* is a high powered (20W), fiber optic, high speed hand piece, designed with a small head for improved access and visibility. The handpiece incorporates double impeller technology for improved precision and stability, a quick stop brake system with a rubber brake ring that engages with the turbine axis decreasing brake time significantly, and a unique rotor design for increased power and constant torque.

Challenge: *Air Driven Handpiece is too loud.*

The ***Kavo MASTERtorque LUX M8900 L*** reportedly features the lowest noise level available at 57 decibels, increased power output of 23 watts, and their Direct Stop Technology™ which stops the bur in less than one second (on average) when the operator steps off the foot control.

430 SWL

+ + + + +

DentalEZ
(866) 383-4636
(610) 725-8004
www.dentalez.com



Product Description: The ***430 SWL*** is an air-driven, high-speed handpiece with a swivel coupler. Characteristics include dual-beam, fiber-optic lighting; push-button bur-changing in the autochuck; ceramic bearings, and a small 11 mm head. ***430 SWL*** LubeFree handpiece is backed by a one-year warranty; the lubricated style has a two-year warranty. ***430 SWL*** LubeFree Handpiece with the 360° Quick Connect HiFlo Swivel was used by nine consultants during a three-month evaluation period. This high-speed handpiece received a 90% clinical rating.

Challenge: *More frequent repairs necessary with air driven handpieces.*

STAT*IS* *(Sci Can, LLC)* air-driven handpieces, available in two head sizes feature 25,000 LUX illumination, an innovative spray system, and a push-button chuck mechanism. The short head sizes enhance access in the oral cavity. The handpieces include a technologically advanced cage material, which houses ceramic bearings, lowering friction and extending bearing longevity. **STAT*IS*** utilizes the MULTIfl ex-style Connex quick connect system. **STAT*IS*** handpieces are designed to have easier handling and quieter operation with increased lateral cutting torque. The **STAT*IS ML*** has four jets for optimum cooling of the bur and tooth, and the smaller **STAT*IS SL*** comes with a slotted nozzle to cool the entire treatment region with a fan-shaped spray. **STAT*IS*** handpieces are backed by *SciCan's* 48-hour quick repair service and a two-year warranty.

Future Trends

The new ***iOptima*** *(Bien Air)* follows the trend of developing apps for wireless devices and utilizing them as an interface to drive their own technology. The ***iOptima*** combines the ***Bien Air MX2*** motor and attachments with the *iPod Touch* via the ***iOptima*** application, bypassing the need for a traditional control panel. The application/*iPod* interface offers pre-programmed restorative and endodontic procedures as well as capabilities for designing custom programs. The ***iOptima*** console attaches to your 4 hole tubing. As new features are added to the application, they are available to the user by updating, free of charge.

As the healthcare field becomes increasingly aware of hygiene risks and as regulations continue to increase, changes in equipment at the design and manufacturing level are welcome and inevitable. *SciCan* has introduced the ***Sanao*** line of contra angle attachments feature HPS resin (Hygiene Protection System) designed to prevent buildup of debris within the attachments. The areas of the contra angle that would be hollow are filled with HPS resin blocking debris from collecting in these spaces.

iOptima

Bien-Air USA, Inc.
(800) 433-BIEN
(949) 477-6050
www.bienair.com



Product Description: *Bien-Air* has launched a unique electric system, the ***iOptima***, which will substantially boost the performance of dental procedures. With the ***iOptima***, any practitioner can transform their existing dental unit into a modern system equipped with a brushless and sensorless micromotor and an *Apple iPod®* interface. All at an unrivalled price. The ***iOptima*** is perfect for all restorative and endodontic procedures.

Handpiece Maintenance

One of the most critical components to ensure optimal performance of any piece of machinery is proper maintenance and care. Clinicians often mention the high cost of handpieces and turbine replacement, but rarely review their maintenance protocols and procedures to ensure consistency.

In daily practice, handpieces can be dropped, scratched, and damaged. Proper protocol requires handpieces to be sterilized between patients; therefore, they will be subjected to hundreds of sterilization cycles during their lifetime. Performance is compromised with repeated sterilizations, meaning there is a reduction in speed, power, and fiberoptic output. It is critical to follow the manufacturers' instructions for lubrication and routine care.

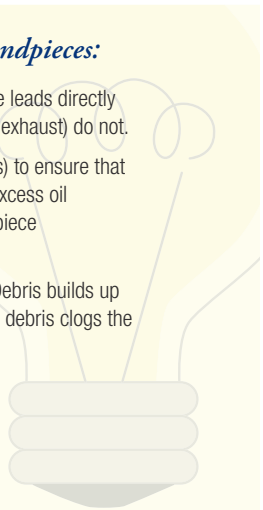
Handpiece Maintenance Tips

Handpiece processing and sterilization:

- Have at least three handpieces for every operatory (one in use,one in the autoclave, one cooling down).
- Do not place handpieces in an ultrasonic cleaner or pre-soak solutions.
- Remove bur from handpiece before sterilization. Leaving a bur in will shorten the life of the chuck and cause burs to "cement" into place.
- Prior to sterilization, scrub handpiece head including chuck and water ports under water.
- After sterilization completely cool the handpiece before use. If the turbine runs while it is still warm (and expanded), it will quickly fail. The handpiece outer shell should be cool to the touch before use. Running the handpiece under cold water will not cool the turbine sufficiently.
- Properly clean and maintain the autoclave to avoid buildup that can occur, affecting the entire system, including the handpieces.

If you are manually lubricating handpieces:

- Apply oil to the correct opening. The drive-air line leads directly to the handpiece turbine while other lines (water,exhaust) do not.
- Run the handpiece after lubrication (3-4 seconds) to ensure that the lubricant reaches all moving parts and that excess oil is expelled. Alternatively, use an automatic handpiece maintenance system.
- Spray cleaner into the bur hole once per week. Debris builds up quickly inside the chuck (bur insertion hole). This debris clogs the spring and causes bur slippage.



The Benefit of Automated Handpiece Maintenance Systems

Most handpiece maintenance systems pay for themselves very rapidly due to the fact that they consistently deliver a process to maintain handpieces in daily routine. This avoids inconsistencies that can affect handpiece performance, including having too much or too little lubricant. Alternatively, automatic handpiece maintenance systems provide measured amounts of lubricant to handpieces and attachments then use compressed air to clean and purge excess oil. Maintenance takes place in the sterilization area rather than in the operatory, streamlining the procedure and leaving operatories free for use. Dental Assistants find this process of maintenance very simple and consistent. Some manufacturers even extend the handpiece warranty when they are used.

Most automated handpiece maintenance systems on the market can clean and lubricate 3-4 handpieces at once; however, metered times vary for lubrication and cleaning. Multiple brands of handpieces can be cleaned and lubricated using a variety of available couplers. Some units have proprietary lubricant which must be used to ensure the proper function and performance of the unit. Further testing of these units can compare long-term handpiece function with and without the use of an automated system. Our consultants who own automated systems report a general improvement in the life and performance of their handpieces.

Available Handpiece Maintenance Systems

Product	Company	TDA Rating
Assistina Plus	Adec	na
iCare	NSK	na
Lubricare	Bien Air	na
Lubrina	J Morita	na
Quattocare Plus	KaVo	5/99%
Statmatic	SciCan	5/96%

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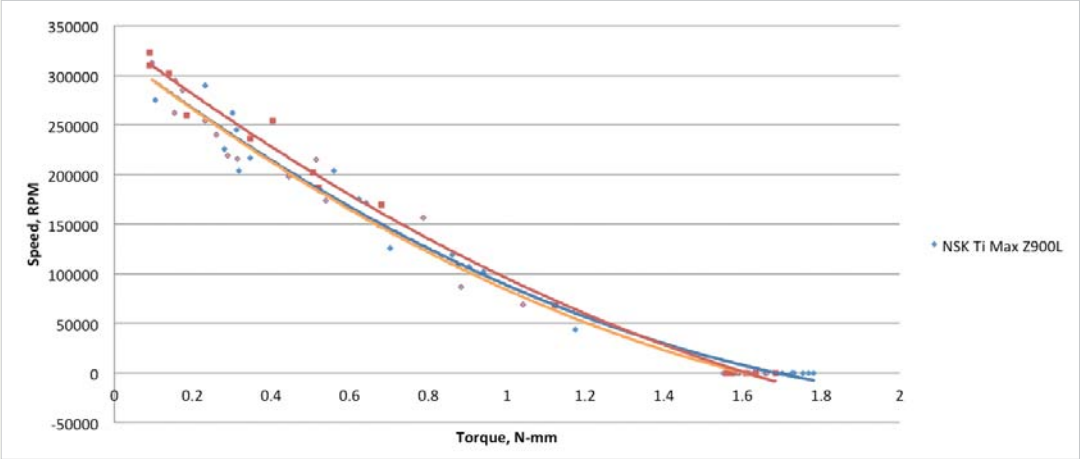
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Air Turbine Handpiece Torque vs Speed Performance

Ron A. Yapp, M.S., John M. Powers, Ph.D. | Dental Consultants, Inc., Ann Arbor, Michigan

The cutting proficiency of dental burs is directly related to the torque vs speed performance of the air turbine handpiece driving the bur. When used at a constant hand pressure, the higher the torque at a given speed, the more proficient the cut. Torque by definition is related to rotation caused by a system of forces which either increase the rotation, such as the driving force which causes a turbine to rotate or decrease it as in a brake or as in the case of a dental bur from friction caused by rotary cutting. When a device which can measure the torque output of a handpiece is brought together with a photo speed sensor which is setup to measure the RPM of the handpiece, measurements of the effect of friction on the handpiece torque at several speeds is possible. Such a measurement produces a Torque vs Speed curve which is a great way to determine the performance of a handpiece under load. Additionally, knowing the torque at which the handpiece is caused to stall is very helpful when determining which unit to use for a specific application. Below are the Torque vs Speed curves and for some popular handpieces and below that Stall Torques and torque at 150,000 RPM (SD in parentheses).

Torque vs Speed for Various Air Driven Handpieces



Stall Torque and Related Specifications

Handpiece	Stall Torque, N-mm	Torque @ 150,000 RPM, N-mm	Max RPM	Operational Pressure, PSI
NSK Ti Max Z900L	1.7	0.68 (.05)	313,000	40
Other	1.6	0.66 (.05)	328,000	42
Other	1.6	0.72 (.05)	328,000	42

Ti Max Z900L

NSK
(888) 675-1675
www.nskdental.us



Product Description: The ***Ti-Max Z900L*** delivers 26 W of power and operates between 330,000 and 400,000 rpm. A proprietary specially shaped turbine allows for this power output enabling fast cutting for reduced treatment time as well as a smooth, consistent cutting feel for comfortable operation. The handpiece features a solid titanium body (up to 30% lighter than stainless steel). The ergonomic shape and DURAGRIP coating offer a firm grip and improved control even in wet conditions. A slim neck, angled head, and a unique notch to rest your index finger and thumb further improve both ergonomics and access. The ***Ti-Max Z900L*** is equipped with cellular glass optics and long-lasting ceramic bearings. The ***Ti-Max Z*** series handpieces fit *Kavo, Sirona, Bien-Air,* and *W&H Roto Quick* couplers.

MEISINGER "Singles"

+ + + +

Meisinger USA, L.L.C.
www.meisingerusa.com



Description

MEISINGER "Singles" are synthetic diamond-coated burs designed for single-patient use. They are pre-sterilized and sterile packaged. The burs are color-coded by grit for quick categorizing and selection. ***"Singles"*** are sold in boxes of 25 individually packaged, sterile burs and are available in 180 shapes in Super-Coarse, Coarse, Medium, Fine, and Extra-Fine grits. ***"Singles"*** were evaluated by 25 consultants in 492 uses. These diamond burs received an 88% clinical rating.

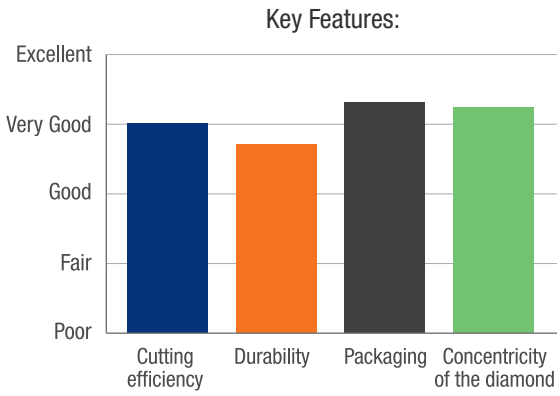
Suggested Retail Cost	
Most Shapes and Grits: Box of 25	$44.00
Specialty Shapes and Extra-Fine Grits: Box of 25	$60.00
Spiral Shapes: Box of 25	$80.81

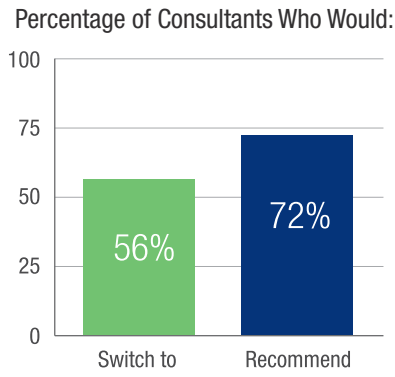
Consultants' Comments

"Diamonds are consistently sharp right out of the package."
"Smooth tooth reduction."
"Color coding is helpful - I can choose the right grit at a glance."

Product Features

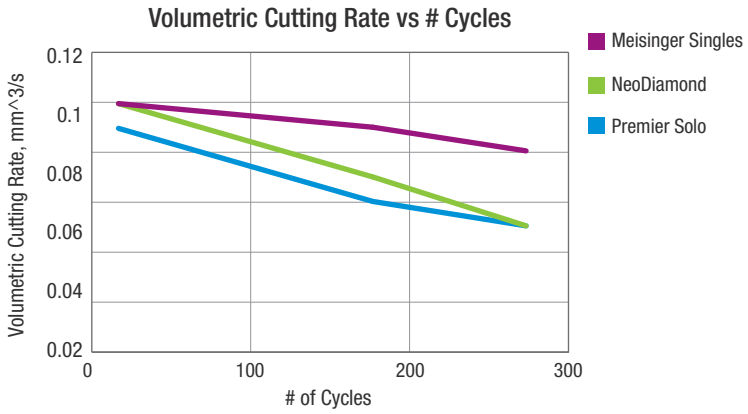
"Singles" diamonds have a uniform grit and very good cutting efficiency. The pre-sterilization allows them to be used right out of the package, saving time and increasing efficiency. Consultants evaluated a variety of shapes, and they proved to be durable for single-patient use. The fine grit finishes restorations well and performs as well as some multi-use diamonds. The packaging is easy to open chairside.





Laboratory Testing

A test comparing the durability of the ***MEISINGER "Singles"***, NeoDiamond and Premier Solo type 856 diamond burs where all were driven by a Kavo Gentle Silence handpiece to cut a 2 mm deep groove in a plate glass specimen was performed. Pulsatile loading and unloading at a rate of 1 cycle per 3 seconds was used. Volumetric cutting rate versus the number of cycles was determined and is reported in the graph below.



Conclusion

The ***MEISINGER "Singles"*** did not wear as much over the 275-cycle test as the other two burs tested. ■

DryShield

+ + + + ½

DryShield
(888) DRY-0300 | www.dryshield.com

Description
The ***DryShield*** System provides isolation, evacuation of oral fluids, retraction of the cheeks, shielding of the tongue, protection of the airway, and a bite block. ***DryShield*** mouthpieces are made of autoclavable, flexible silicone material designed for maximum comfort. They come in four different sizes to fit adults and children. In addition, ***DryShield*** offers interchangeable bite blocks in multiple sizes to improve access and patient comfort. ***DryShield*** can be permanently installed or used as a portable system. The system also comes with a Y-connector kit for users who have only one HVE port and want to use ***DryShield*** along with the existing HVE. ***DryShield*** was evaluated by 20 consultants in 472 uses. This isolation system received a 92% clinical rating.

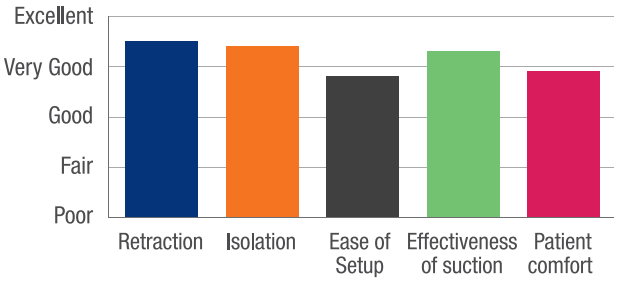


Product Features
DryShield is a high quality isolation system that can improve the efficiency of an operative procedure. The bite blocks are firm and removable from the isolation mouthpieces, allowing mix-and-match combinations for versatility. The ability to sterilize the components is valuable for try-in without wasting mouthpieces. Once in place, ***DryShield*** provided excellent retraction, suction and airway protection, freeing the dental assistant for other tasks. The silicone material is soft and pliable, creating a comfortable experience for the patients.

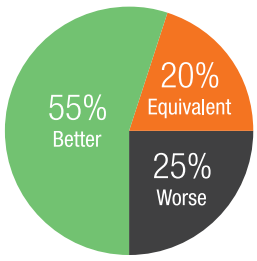
Clinical Tips
- Patient cooperation is important. Explain the advantages to the patient before placing the device.
- Use mixture of air and water to lubricate the tubing for easier connection of the components. ■

Consultants' Comments
"Mouthpieces are soft and comfortable for the patient."
"Great isolation, retraction, and ability to work independently."
"Multiple mouthpiece sizes."
"Easy to move from room to room."
"Mouthpieces can be sterilized. That allows me to try in different sizes for the perfect fit with no waste."
"This system was amazing. My patients loved it and my production was increased."

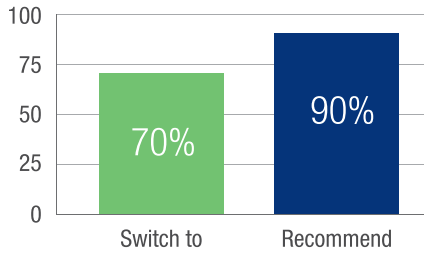
Key Features:



Compared to competitive products:



Percentage of consultants who would:



Adhese® Universal VivaPen

+ + + + ½

Ivoclar Vivadent, Inc
www.ivoclarvivadent.com

Description
Adhese Universal is a single-component, light-cured adhesive for direct and indirect bonding procedures. It is compatible with self-etch, selective-enamel-etch, and total-etch techniques. The ***Adhese Universal VivaPen*** delivery system is ergonomically friendly and allows for direct intra-oral access to all tooth surfaces with virtually no waste. The 2 mL of adhesive contained in the ***VivaPen*** are sufficient for approximately 190 single-tooth applications, resulting in a low cost-per-application. The brush tip is saturated with two to three clicks of the button on the pen, a single coat (applicable with any etching technique) is placed and agitated for 20 seconds, then dispersed with air and light cured for 10 seconds. ***Adhese Universal VivaPen*** was evaluated by 32 consultants in 1158 uses. This universal bonding agent received a 93% clinical rating.

Suggested Retail Cost	$120/***Adhese Universal VivaPen***

Consultants' Comments
"Low film thickness."
"No post-operative sensitivity."
"Less waste than a dropper bottle or unit-dose delivery."
"Precise application."
"Versatile material that can be used for most bonding applications."
"No separate brushes or wells needed."
"Pen requires proprietary tips."

Product Features
Adhese Universal is compatible with all dual- and light-cured dental materials, making it a versatile product. The bonding agent has an ideal viscosity, wetting the tooth completely without pooling. The convenience of the ***VivaPen*** dispenser was the favorite feature of both dentists and dental assistants. A few presses of the button dispenses

Picasso and Picasso Lite

+ + + +

AMD LASERS
(866) 999-2635 | www.amdlasers.com



Description

Picasso Lite is designed for the first-time laser dentist and hygienist. Its affordable price point, ease of use, and sleek design make it the perfect replacement for a scalpel and electro-surge for the use of treating soft-tissue. ***Picasso Lite*** cuts and coagulates tissue with reduced trauma, bleeding, and necrosis of tissue and is used for soft-tissue surgical procedures. ***Picasso Lite*** offers 2.5 watts of power and three customizable presets. ***Picasso Lite*** comes complete with laser certification options, multiple accessories, world power adapter, wireless foot control, option of disposable tip system or strippable fiber, and a two-year warranty. ***Picasso*** is a multi-functional soft tissue diode laser that offers comprehensive clinical results in surgical procedures, periodontal therapy and bleaching. ***Picasso*** offers the complete laser solution for dentists who want the flexibility to integrate laser technology throughout their practice. The ***Picasso's*** innovative design, 7 watts of power, 8 programmable presets, color touch screen, multi-lingual menu, option of disposable tip system or strippable fiber, wireless foot control, standard two-year warranty, and low annual operating cost makes ***Picasso*** the complete laser solution for dentists who want the flexibility to integrate laser technology throughout their practice. ***Picasso*** and ***Picasso Lite*** were evaluated by six consultants over a two-month period. These diode lasers received an 86% clinical rating.

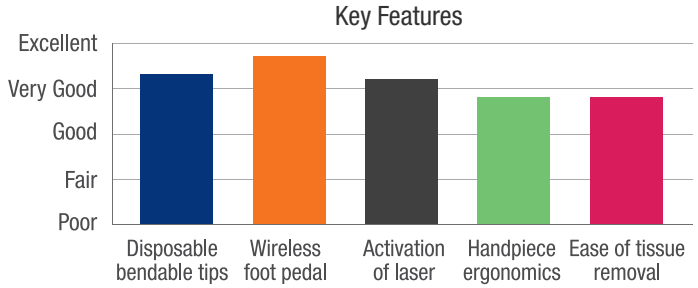
Suggested Retail Cost	***Picasso*** - $5,495 | ***Picasso Lite*** - $2,995

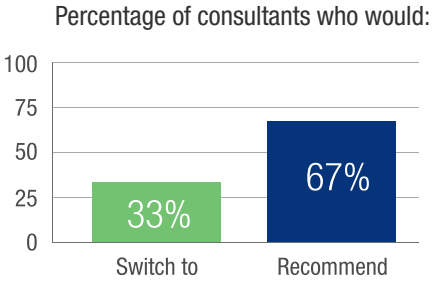
Consultants' Comments

"Disposable tips are great! Stripping/cleaving are eliminated."
"Laser is effective."
"Laser is lightweight, and the handle makes it easy to carry."
"The fiber is stiff."
"A retractable fiber would be an advantage."

Equipment Features

The disposable tips that attach to the ***Picasso*** *Multi-Tip Handpiece* enhance the ease of use and set-up. Most consultants had one or two favorite tips but appreciated the variety from which to choose. The wireless foot pedal adds to the convenience in the operatory. Consultants found they could perform all desired soft tissue procedures with either the ***Picasso*** or ***Picasso Lite***; the whitening function of the ***Picasso*** was not evaluated. The simplicity of ***Picasso Lite*** appealed to new laser users and those who only use one occasionally. The additional settings and higher power of ***Picasso*** allows the advanced user more versatility. The optical fiber (between the countertop unit and the handpiece) has plenty of length and requires manual winding onto the spool for storage. ■



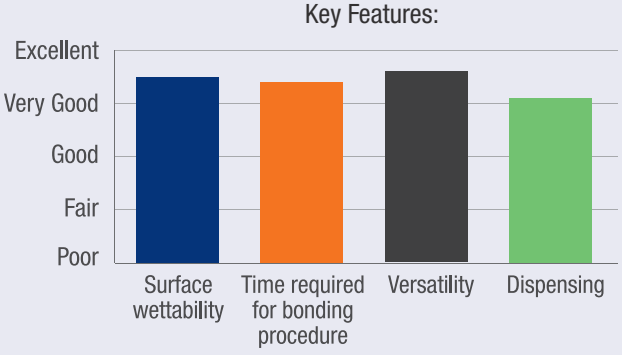


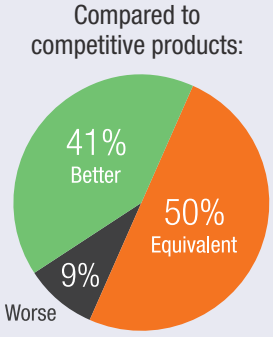
Adhese® Universal VivaPen *(cont.)*

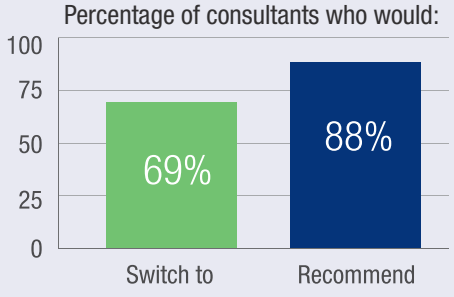
a drop of liquid to the brush. If an additional drop is needed, two or three more presses of the button are required. The narrow tip and angled brush cannula enables fit into narrow preparations. The volume indicator is a useful feature to see how much material remained in the pen.

Clinical Tips

- Unprepared enamel must be etched with phosphoric acid.
- Remove the cannula and recap the pen after each use. ■







Estelite Sigma Quick

5-year Clinical Performance

+ + + + +

Tokuyama Dental America
(877) 378-3548 | www.tokuyama-us.com

Description

Estelite Sigma Quick is a supra-nano filled, low shrinkage, universal composite indicated for anterior and posterior restorations. ***Estelite Sigma Quick*** uses the RAP technology (Radical-Aplified Photopolymerization initiator technology) that offers increased working time of 90 seconds under ambient light and decreases curing time to 10 seconds. ***Estelite Sigma Quick*** is available in both syringes and pre-loaded tips in about 20 different shades.

Consultants' Comments

"My material of choice when doing anterior cosmetic bonding."

"Definitely a great handling material for both anterior and posterior restorations. Great opalescence and translucency allow it to blend very well with surrounding tooth."

"Looks great after 5 years, and I am sure it will last much longer."

Clinical Evaluation Protocol

- Over 2800 ***Estelite Sigma Quick*** restorations were placed and bonded with variety of 6th- and 7th-generation bonding agents.
- 1511 anterior and posterior restorations (Figure 1) composed of one, two, three and four surfaces (Figure 2) were recalled.
- The restorations were in service from less than 3 years to more than 6 years (Figure 3).
- At recall, restorations were evaluated for resistance to fracture/chipping, esthetics, resistance to marginal discoloration, wear resistance, and retention.
- Restorations were rated on a 1-5 scale: 1=poor, 2=fair, 3=good, 4=very good, 5=excellent.

FIGURE 1 Distribution of Anterior and Posterior Restorations.

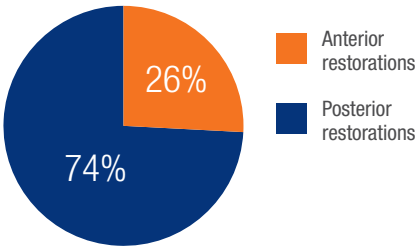


FIGURE 2 Distribution of Restoration Surfaces.

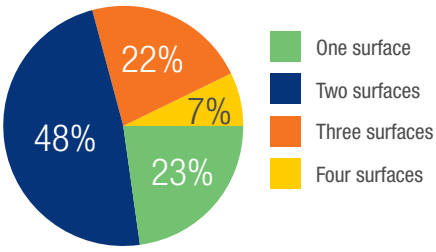
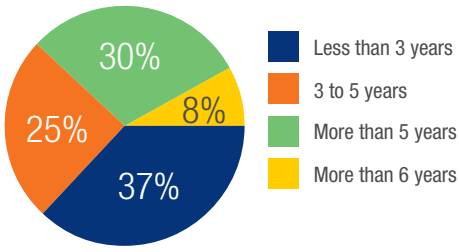


FIGURE 3 Time in Service of Restorations.



Clinical Observations

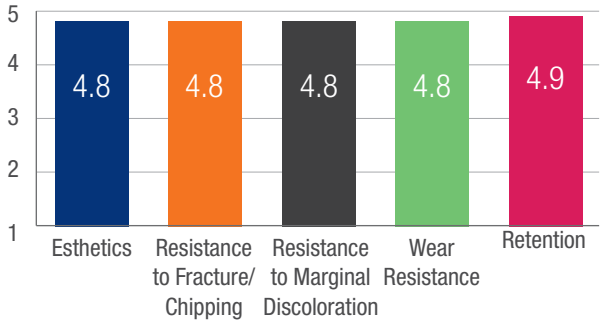
Resistance to Fracture/Chipping

Estelite Sigma Quick performed extremely well with regard to resistance to fracture and chipping over the five-year period (Figure 4). 39 restorations (2.6%) had small chips, but did not require replacement. Another 18 restorations (1.2%) fractured and were replaced. Many of the restorations replaced were large, and in several cases, the tooth fractured requiring the placement of a crown.

Esthetics

The esthetics of ***Estelite Sigma Quick*** was excellent (Figure 4). In many cases the fillings were hard to detect and blended with the teeth perfectly. The availability of many shades and opacities was extremely helpful in achieving long-lasting results.

FIGURE 4 Results of ***Estelite Sigma Quick*** at 5 years.



Resistance to Marginal Discoloration

Most of the ***Estelite Sigma Quick*** restorations were bonded with 6th- or 7th-generation bonding agents. 97% of the restorations exhibited very slight or no microleakage at the margins at recall time (Figure 4).

Wear Resistance

Estelite Sigma Quick maintained excellent wear resistance in both the anterior and posterior regions after five years in function (Figure 4). The wear on the opposing dentition was minimal.

Retention

Retention was excellent (Figure 4). There were 33 debonds (2.2%) that involved facial/buccal surfaces. Debonding was more a function of the bonding agent and surface preparation and not the composite.

Estelite Sigma Quick 5-year Clinical Performance

Summary

Among over 1500 ***Estelite Sigma Quick*** recalled restorations, the vast majority performed exceptionally well over the 5-year period. The composite has excellent translucency that helps it blend very well with the surrounding tooth structure. The material sculpts very easily especially when cosmetically bonding anterior composites. ***Estelite Sigma Quick*** received a clinical performance rating of 96%. ■



Estelite Sigma Quick, No. 3 *



Estelite Sigma Quick, No. 5-10, A1 Shade *

** Results at 5-year check-up*

Control Seal

+ + + +

VOCO
www.vocoamerica.com

Description

Control Seal is a highly filled, transparent pit and fissure sealant. It is designed to provide visual access to the underlying tooth structure and allow for monitoring with the use of laser diagnostic tools. ***Control Seal*** contains fluoride and has a filler content of 55% (by weight). It is reported to have a high compressive strength, high flexural strength, and a low level of abrasion. ***Control Seal*** is highly flowable under pressure and stable when pressure subsides. ***Control Seal*** is available in the NDT syringe (Non Dripping Technology) which, combined with a very thin cannula, provides accuracy of placement without dripping. Procedure includes a 30-second etch, rinse, dry, application of ***Control Seal***, and 20-second light cure. Each kit contains three, 2 g syringes of sealant plus etchant. ***Control Seal*** was evaluated by 30 consultants in 528 uses. This pit and fissure sealant received an 87% clinical rating.

Suggested Retail Cost	$114.00 /kit $38.00 refill of 1x2g syringe

Product Features

Control Seal has a very low viscosity, permitting deep penetration into occlusal grooves, pits and fissures. The syringe design and narrow tips allow controlled placement without expressing excess sealant or dripping after use. The transparency is very much a matter of personal preference, with consultants nearly equally split on whether they preferred a clear sealant versus one with some color or opacity. Being able to see the underlying tooth and potentially use a laser caries detector through the sealant was reported to be an advantage by some consultants. The lack of color makes it difficult to see the sealant during placement and during occlusal adjustment. Ease of occlusal adjustment is only limited by the ability to see it on the tooth surface. ***Control Seal*** sets hard with good retention.



Consultants' Comments

"The clarity of the material is ideal."

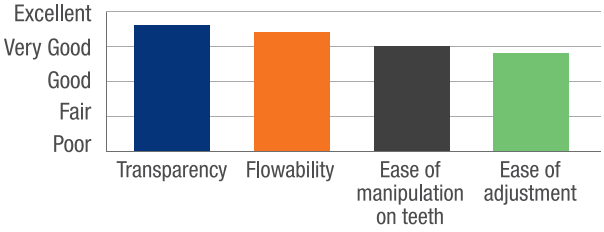
"Cured sealant feels much harder than my usual sealant."

"I really love this product. I have always had concern about sealants because you can't see under them. With this product, my worries are over - and I can still use my caries detector."

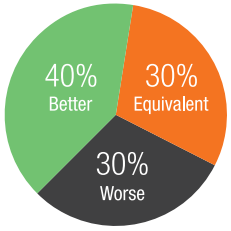
Clinical Tips

- Use light pressure on syringe – it is difficult to see where the sealant is on the tooth.
- Keep the tip imbedded in the material during placement. ■

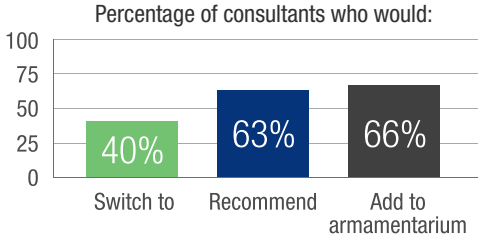
Key Features:



Compared to competitive products:



Percentage of consultants who would:



Knit-Pak+

+ + + + ½

Premier Dental Products Co
www.premusa.com



Description

Knit-Pak+ retraction cord is manufactured from microfibers impregnated with aluminum chloride to promote hemostasis. ***Knit-Pak+*** comes in an 100-inch spool in a plastic vial with a ceramic cutting blade. Cords and labeling are color-coded by size. It is available in 6 sizes including 000.0, 000, 00, 0, 1, and 2. The 000.0 size is the smallest diameter cord on the market. ***Knit-Pak+*** was evaluated by 32 consultants in 821 uses. This retraction cord received a 92% clinical rating.

Suggested Retail Cost	$15.45/package

Product Features

Knit-Pak+ slides smoothly into the sulcus, and the knitted fiber resists fraying at the ends. When dry, the cord was a little stiff - especially the larger sizes - and could rebound out of the sulcus. The size selection was excellent, and consultants found the 000.0 size useful when using a two-cord technique. The presence of aluminum chloride in the cord is convenient, but it did not produce the level of hemostasis expected. Color-coding of the containers allows quick selection of the desired cord. The ceramic blade on the lid cuts the cord cleanly and the cut section of cord is held in place by the lid until lifted off.

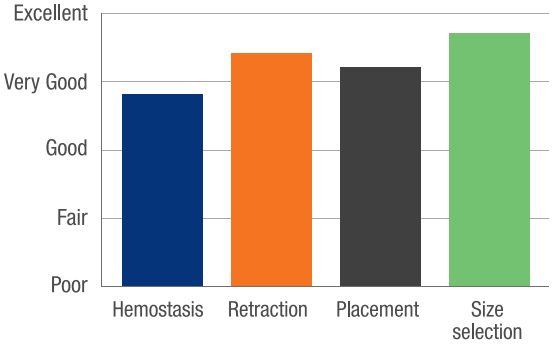
Clinical Tip

- Place a small (000 or 000.0) ***Knit-Pak+*** cord into the sulcus before beginning the preparation. This retracts the tissue and guides the preparation depth. After preparing the tooth, place a larger cord over smaller one, allowing for 1-2 minutes retraction. Remove the top cord and take the impression. ■

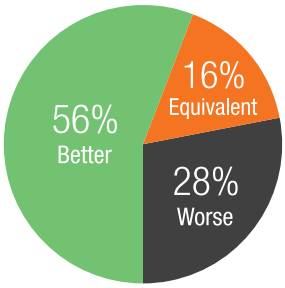
Consultants' Comments

"The 000.0 size is an excellent addition to the traditional cord sizes."
*"**Knit-Pak+** is far more resistant to shredding and wrapping around a high speed bur."*
"I love using the double- and triple-zero for two-cord technique."
"Cord is a little stiff."
"I would like to see better hemostasis."

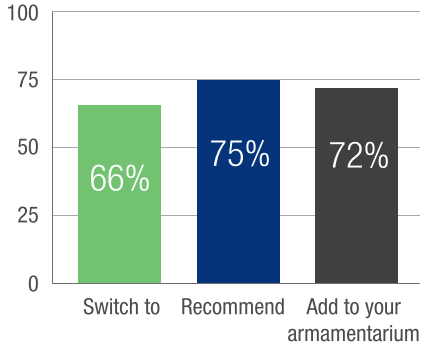
Key Features:



Compared to competitive products:



Percentage of consultants who would:



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