

THE DENTAL ADVISORTM

"Improving Patient Care Through Research & Education"



Photography by John W. Farah, D.D.S., Ph.D., Ann Arbor, Michigan

Zirconia-based Ceramics

Currently, almost all zirconia-based ceramics utilize CAD/CAM technology for fabrication of crowns, bridges and implant abutments. Due to the high strength of zirconia-based materials, trimming is most often performed at the "green" or presintered state. After sintering, the core material shrinks about 20% to the desired size and shape. Yttria-stabilized zirconia is the most common zirconia-based ceramic. Transformation toughening occurs with the addition of yttria particles, increasing fracture toughness of the material.

This issue of THE DENTAL ADVISOR describes zirconia ceramics and discusses the advantages and disadvantages of several different brands of material.

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EDITORS' CHOICE

BOND FORCE 12
<i>(Bonding agent)</i>
V-Ring Sectional Matrix System 15

An Editors' Choice award is given to products recognized by our editors as being a unique or significant product.

Ratings

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

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PUBLISHER

Dental Consultants, Inc.

Please send inquiries and address
changes to: **THE DENTAL ADVISOR**,
3110 West Liberty, Ann Arbor, MI 48103

Call: 800.347.1330 • 734.665.2020
Fax: 734.665.1648

Email: info@dentaladvisor.com
Website: www.dentaladvisor.com

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Zirconia-based Ceramics

Indications

- Anterior and posterior crowns
- Anterior and posterior, 3- to 4-unit bridges
- Implant abutments
- Inlay bridges
- Maryland bridges
- Blocking-out of most darkened tooth structure or cores without the need for ceramic-metal restorations

Contraindications and Limitations

- Long-span bridges, longer than 47 mm
- Cantilever bridges, inlays/onlays, veneers
- Need for partial denture precision/semi-precision attachments
- Inadequate occlusal clearance or axial reduction - requirements depend on the zirconia system used

Advantages of Zirconia-based ceramics

- Metal-free
- Translucent compared to ceramic-metal restorations
- Can be used for posterior bridges
- Cementation with traditional cements, adhesive resin cements (*Table 1*), and self adhesive cements (*Table 2*).
- High flexural strength and fracture toughness
- Can be used with zirconia-based implant abutments
- Block-out of discolored tooth/colored core materials
- More cost-effective when high noble metal prices are high

Disadvantages of Zirconia-based ceramics

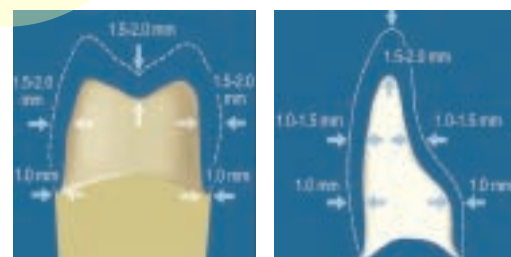
- Limits on bridge spans
- Generally require more axial reduction
- Due to outsourcing, laboratory work times may be longer

Definitions

- **HIP Zirconia** – **H**ot **I**sostatic **P**ressing is a special sintering technique occurring in a closed system, using high temperature and pressure to increase the density of material. Both **HIP zirconia** and **zirconia** are the same materials, sintered in two different ways.
- **Presinter** – the 'green' state before heating, when zirconia is not as hard and more easily milled. A presintered framework is 20-25% larger than the final piece. During sintering the material will shrink to the correct size.
- **Sinter** – to heat (not melt) and form a coherent, hardened material. Firing the material at high temperatures hardens and strengthens the final framework.
- **Zirconia** – a polycrystalline material partially stabilized with yttrium oxide.

Preparation guide/limitations

- Axial reduction - 1.0 to 1.5 mm
- Rounded shoulder margins (contact lab for specific recommendations)
- Occlusal reduction - 1.5 to 2 mm
- No internal modifications (boxes, grooves, undercuts) for any CAD/CAM system



Reprinted with permission of 3M ESPE

Myth or Truth?

MYTH - Tooth preparation is less important because zirconia is so much stronger than pressed ceramics.

Tooth preparation is very important. The thickness of unsupported porcelain should not exceed 2 mm. The zirconia coping should be as thick as needed to avoid unsupported porcelain.

Adhesive Resin Cements

Table 1

Product	Company	Type of Cure	Working Time	Setting Time	Shades	Clinical Rating
C&B Metabond	Parkell	SC	20 sec to 5.0 min	5.0 min	2	na
Cement-It Universal C&B	Pentron Clinical Technologies	DC, SC	1.5 min	3.5-4.0 min	3	96%
Clearfil Esthetic Cement	Kuraray America	DC, LC	5.0 min	3.5 min	1	96%
Multilink Automix	Ivoclar Vivadent	DC, SC	3.0 min	5.0 min	3	97%
Panavia 21	Kuraray America	SC	4.0 min	1.0-3.0 min *	3	96%
Panavia F 2.0	Kuraray America	DC, SC	3.0 min	1.0-3.0 min *	4	97%
Tokuyama M-Bond	Tokuyama Dental Corp./Tokuyama America Inc.	SC	1.4 min	4.0 min	2	84%

*1.0 minute with ED Primer
DC – dual-cure; SC – self-cure; na – not available; ce – currently evaluating



Clearfil Esthetic Cement
Kuraray America



Panavia F 2.0
Kuraray America



Multilink Automix
Ivoclar Vivadent

Myth or Truth?

TRUTH - Do not grind zirconia without water spray.

If the temperature of zirconia rises above 1000°C, a phase change can occur, which can induce cracking and surface defects. Always use water when adjusting or grinding zirconia.

Self-adhesive Resin Cements

Table 2

Product	Company	Type of Cure	Working Time	Setting Time	Shades	Clinical Rating
3M ESPE RelyX Unicem Self-Adhesive System-Aplicap	3M ESPE	DC, SC	2.0 min	LC-20 sec/surface; SC-5.0 min	6	98%
3M ESPE RelyX Unicem Self-Adhesive System-Clicker	3M ESPE	DC, SC	2.0 min	LC-20 sec/surface; SC-5.0 min	3	97%
BisCem	Bisco Dental Products	DC, SC	1.0 min	6.0 min	2	90%
Breeze	Pentron Clinical Technologies	DC, SC	1.5 min	3.5-4.0 min	3	ce
EMBRACE* WetBond Resin Cement	Pulpdent	DC, SC	Indefinite	LC-20-40 sec; SC-7.0-8.0 min	1	na
G-CEM Capsule	GC America	DC, SC	2.25 min	6.5 min	4	88%
Maxcem	Kerr Corporation	DC, SC	2.0 min	3.0 min	5	ce
MonoCem	Shofu	DC, SC	Indefinite	7.0 min	2	na

DC – dual-cure; SC – self-cure; na – not available; ce – currently evaluating
* This product is available in either low or medium viscosity.

Cementation guidelines

- Cement zirconia ceramic restorations with traditional cements, adhesive resin cements (Table 1) or self-adhesive resin cements (Table 2).
- Use self-cured or dual-cured materials - light transmission through zirconia core material is reduced.
- Due to the non-etchable nature of the zirconia core material, hydrofluoric or phosphoric acid etching of the intaglio surface of the crown/bridge will have a minimal effect on the bond strength when cementing with adhesive resin cements.
 - The **3M ESPE CoJet Silicate Ceramic Surface Treatment System**/3M ESPE, for use chairside and the **3M ESPE Rocatec Junior Bonding System**/3M ESPE, for use in the laboratory, will tribochemically bond silicon dioxide to the restoration. Once the silicon dioxide is silanated, bond strength is shown to improve 3-5% over air-abrasion (alumina sandblasting) only.
- Follow standard cementation protocol when cementing zirconia-based ceramics.
- Teeth should be well isolated and the retainer surface left moist - not dry or wet.

Myth or Truth?

MYTH - It takes longer to cut a zirconia crown compared to a PFM crown.
Using fine diamond burs, one can cut through a zirconia crown just as fast as a PFM crown.

Cutting Products

Cercon 0°/2°/Meisinger; **Magic Touch FG**/Strauss Diamond; **Piranha**/S. S. White Burs; **ZirCut** (LS-7556)/AXIS Dental; **ZR Diamonds**/Komet USA

Finishing and Polishing Products

- **AXIS Dental** – www.axisdental.com
 - **CeraGlaze Ultimate Porcelain Polishing Set** (LS-506)
 - **CeraGlaze Extra-oral Porcelain Adjusting & Polishing Set** (LS-911)
 - **NTI Gray Super High Shine**
 - **NTI Pink High Shine**
 - **NTI White Pre-Polishing**
 - **Shammy Bright Porcelain Polishing Paste**

- **Brasseler USA** – www.brasselerusa.com
 - **CeramiPro Dialite**
 - **CeramiPro Universal**
- **E. C. Moore** – www.ecmoore.com
 - **Moore-Flex Porcelain/Veneer Polishing System**
 - **Porcelain Finishing Points & Wheels**

- **Garreco, Inc.** – www.garreco.com
 - **Ceramic-Bonded Diamonds**
 - **Compo-Flex**
 - **DIAFLEX**
 - **Naturalglaze – Diamond Polishing System**

- **Ivoclar Vivadent** – www.ivoclarvivadent.us.com
 - **OptraFine**
- **Meisinger** – www.meisinger-online.com
 - **All Ceramic Restoration Kit** (#2663)
 - **Ceramic Polishing Kit** (#1470)
 - **CEREC Advanced Kit** (#2605)
 - **CEREC Basic Kit** (#2606)
 - **CEREC Diamond Kit** (#2567)
 - **Cercon Crown and Bridge Kit** (#2686)
 - **Everest Advanced and Finishing Kit** (#2675)

- **Shofu** – www.shofu.com
 - **CoreMaster**
 - **CeraMaster Coarse**
 - **CeraMaster Polishers**
 - **Ceramiste**

- **S.S. White Burs** – www.sswwhiteburs.com
 - **Jazz P3S (Porcelain 3 Step Polishing Kit)**

- **Intra Oral Porcelain Adjustment Kit** (#2662)
- **Porcelain Polishing Discs Kit** (#2668)
- **Procera Polishing Points Kit** (#2669)
- **Procera Laminate Kit** (#2679)
- **Procera Preparation Kit** (#2678)
- **Procera Preparation and Finishing Kit** (#2680)
- **Zirkon Master Kit** (#2670)

- **Ceramiste Soft**
- **Dura-Green Stones**
- **Dura-White Stones**



Cercon 0°/2°
(Meisinger)

Zirconia-based Ceramics

Zirconia Products

3M ESPE Lava Crowns and Bridges (3M ESPE)

- Seven shades of core material
- Milled framework size is 20-25% oversize to compensate for firing shrinkage
- 38-mm maximum bridge span

Cercon (DENTSPLY Ceramco)

- Wax-up or stone dies/models are scanned
- Two shades of zirconia milled then sintered
- Core stains available
- 47-mm maximum bridge span

CEREC inLab (Sirona)

- Can be used with various presintered zirconia blocks and different veneering porcelains
- 55-mm maximum span

Materials to use with the CEREC inLab system

- **IPS e.max ZirCAD** (Ivoclar Vivadent)
 - Yttrium-stabilized zirconia blocks milled using the **CEREC inLab** system.
 - **IPS e.max Ceram** can be layered directly over **ZirCAD** frameworks.
- **IPS e.max ZirPress** (Ivoclar Vivadent)
 - used to press porcelain onto the zirconia frameworks, followed by
 - **IPS e.max Ceram** veneering porcelain.
 - Pressed ceramic over zirconia core comes in three levels of opacity (MO,LT, and HT), and nine A-D shades, and four bleach shades.
- **InVizion** (Vident)
 - Zirconia system with presintered yttria-stabilized blocks and corresponding Vita VM9 overlay porcelain
 - 40-mm maximum span

InCeram Zirconia (Vita)

- Standard material is fabricated by infusing a layered and fired zirconia core material with colored glass.
- **InCeram Zirconia** presintered blocks are also available for use with a CAD/CAM technique using the **CEREC inLab** system.
- Indicated for 3-unit bridges and small-span 4-unit bridges.

KaVo Everest (KaVo)

- Yttrium-stabilized, presintered and sintered zirconium oxide available in five shades
- Large-span posterior bridges are available
- 45-mm maximum bridge span

Procera AllZirkon (Nobel Biocare)

- Ceramic abutment available for implant restorations
- 0.7-mm coping (uniform thickness)
- Scan of die/dies sent to Nobel Biocare for core fabrication
- Up to 9-unit bridges, 60-mm spans now possible

Versus System (Whip Mix)

- Custom ceramic abutments available for 28 implant interfaces
- Available in seven shades
- Single tooth to 14-unit bridges available

ZENO Tec System (Wieland Dental + Technik)

- Available in several Vita shades
- High production system with 98-mm blocks
- Ability to mill 16 different implant abutments ■



3M ESPE Lava Crowns and Bridges
3-unit bridge



IPS e.max ZirCAD
(Ivoclar Vivadent)

Apex DENTAL MILLING

tel: 734.623.4236

email: info@apexdentalmilling.com

▲ **Apex Dental Milling**, located in Ann Arbor, Michigan, is a premier facility, dedicated to providing customers with excellent results.

▲ We are the first 3M ESPE Authorized Lava™ Milling Center in Michigan.

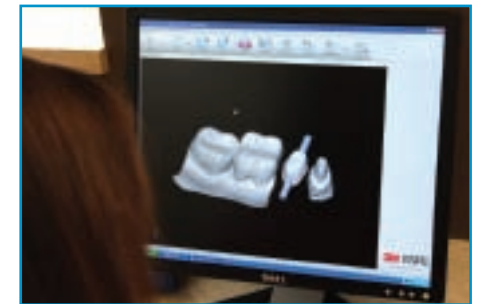
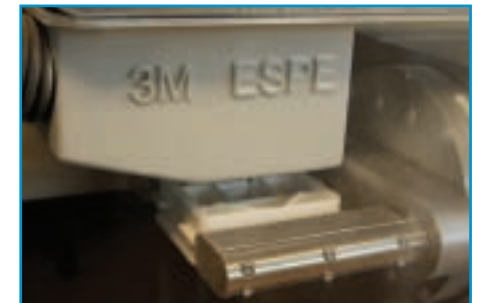
▲ We pride ourselves on being the first milling center in the country to work with a world class biomaterials testing center, a busy esthetic dental practice, and a partner laboratory.

▲ At **Apex Dental Milling**, we provide personalized service with a focus on relationship. Each case is handled with precision, attention to detail, and open communication with our customer.

▲ We welcome visitors and students to learn more about the exciting technology of CAD/CAM restorations and zirconia-based ceramics.



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Dr. Farah, why did you decide to open Apex Dental Milling?

I like to look ahead and see where dentistry is heading in the future. CAD/CAM is not a new technology, but with dental offices going digital, CAD/CAM becomes a natural extension of this technological growth industry. And it is not just dental offices; dental laboratories are also looking to digital technology to help them provide better restorations and better communicate with clinicians.

Dr. Farah, how will this technology improve dentistry?

In surveys, we have found that 85% of the challenge in creating an ideal restoration is tooth preparation, taking superior impressions and communicating with the laboratory. A CAD/CAM system scans the preparation, instead of taking a traditional impression, and that image can be sent directly to the dental laboratory. While the patient is in the chair, the dentist can communicate directly with the laboratory technician, reviewing the tooth preparation and scan, and making any necessary final adjustments. The result is a better fitting restoration with

fewer adjustments, better esthetics and a happier patient.

Dr. Farah, what is the future of Apex Dental Milling?

Apex Dental Milling is not just a milling center. It is a research facility as well. We will be working with other partners to track and evaluate, over time, the durability and success of CAD/CAM restorations. As a research facility we will be answering many of the questions that clinicians and laboratories have about materials and procedures pertaining to CAD/CAM restorations. For example, we will be exploring the optimal thickness of copings, the thickness of the ceramic overlay, the preparation techniques, failure modes, and the best way to help eliminate failures as well as other issues that surface.

We believe that the system we are using, the LAVA™ Crowns and Bridges from 3M ESPE system is the best available now. The support and expertise from 3M ESPE is excellent. Eventually we will be adding new systems, to further our understanding and improve CAD/CAM dentistry.

Cavex ColorChange + + + + +

Cavex Holland B.V.
+31 (0)23 530 77 00
www.cavex.nl

Description

Cavex ColorChange is an all-purpose alginate featuring a three-step color shift from the start of mix to placement to completed set. The product is appropriate for all traditional alginate impression uses. **Cavex ColorChange** is dust-free and may be mixed by hand or in an auto-mixer. Distilled water is recommended to standardize the color shifts and setting time. With a 30-second hand-mix, the total setting time is approximately 2 minutes 15 seconds (1 minute in the mouth). The manufacturer states that multiple pours of impressions may be made, and if placed in an airtight plastic bag, pouring of gypsum may be delayed up to five days without sacrificing accuracy or detail. The starter kit includes three, 500-g bags of alginate powder; scoop; storage canister; water measure; bowl; spatula; and cleaner. Single-dose packs are available. **Cavex ColorChange** was used in over 300 applications by 27 consultants. This product received a 96% clinical rating.

Suggested Retail Cost

- \$46.99/starter kit
- \$11.99/refill bag

Product Features

The viscosity and smoothness of the mix, ease of loading trays, firmness of the set material, lack of bubbles, and model quality were ranked highly. The powder and water combined readily with hand mixing and produced a smoothly-textured gel. The color change feature was new



Consultants' Comments

- ♦ "The self-measuring water dispenser is unique, accurate and very nice."
- ♦ "Very few bubbles."
- ♦ "It doesn't seem to inadvertently flow down the throat."

to some clinicians and received favorable comments. The powder canister holds one bag of alginate with a place inside the lid to store the scoop. The canister has a tight seal to prevent moisture contamination of the powder. Eighty-two percent of reporting clinical consultants found **Cavex ColorChange** to be equal to or better than their current alginate, 71% would switch, and 76% would recommend **Cavex ColorChange** to colleagues.

Clinical Tips

- For patients with a strong gag reflex, sprinkle a bit more powder into the mix to make it more viscous.
- Giving some material to the patient to watch the color change provides some distraction. ■

What's New?

With **CEREC**, top quality, highly esthetic restorations are simple to achieve. Create all-ceramic inlays, onlays, crowns and veneers in a single visit by capturing an image of the preparation and designing the restoration on-screen. Patented **Biogeneric** software uses samples of hundreds of teeth to restore the missing tooth structure in the most natural way possible. The powerful, straightforward tools and simple, predictable workflow allow you to easily create sophisticated dental restorations which are then sent wirelessly to the milling unit. The **MC XL** mills a top quality, precisely fitted restoration in just 4 to 12 minutes, while the patient waits.

go! + + + + ½

SDI North America, Inc.
800.228.5166 • 630.238.8300
www.sdi.com.au

Description

go! is a one-component (7th-generation), self-etching, light-cured adhesive for use on dentin and enamel. It contains 7% nano fillers and releases fluoride. It is indicated for direct filling restorations, composite repair of ceramic restorations, sealing exposed root surfaces, cavity sealing, core build-ups, and composite repair. It should not be used with chemically cured composites, eugenol, ferric sulfate products, or desensitizing agents. **go!** should be applied to a moist cavity preparation, saturating all internal cavity surfaces; left in place for 20 seconds; blown with high-pressure air for five seconds; and light cured for 10 seconds. It is available in a 5-ml bottle with 50 brush applicators and a dispensing well. It is also available in a 50-count, 0.1-ml single-dose package with a single-dose holder and 50 brush applicators. **go!** single-dose was evaluated by 22 consultants in over 500 restorations. This product received a 94% clinical rating.

Suggested Retail Cost

- \$115.00/single-dose kit

Product Features

go! single-dose packaging was a favorite feature among consultants. It is easy to use and has an ample volume of material for treating multiple teeth at the same time. **go!** has an ideal viscosity for even coating of the surface of the preparation. The single application, without the need to scrub the liquid into the tooth surface, was noted by consultants as a key feature and time saver. The packaging is convenient, keeping the product all in one box in the refrigerator. The refrigeration and bringing **go!** up to room temperature was the least liked feature. Overall, 65% of consultants found **go!** to be equal to or



Consultants' Comments

- ♦ "The self-measuring water dispenser is unique, accurate and very nice."
- ♦ "The application and dispensing were easy."
- ♦ "I like that I only need one coat."
- ♦ "The single-dose is easy to use, but the holder requires disinfection after each patient."
- ♦ "I do not like having to keep the material in the refrigerator and waiting for it to come up to room temperature."
- ♦ "Amount of material in the single-dose package seems wasteful."

better than their current bonding agent, while 80% would recommend it to a colleague and 65% would switch.

Editors' Note: Since the evaluation of **go!**, the manufacturer is updating the instructions to reflect additional uses for this product.

Additional uses include:

- Bonding of indirect restorations with indicated resin cement
- Orthodontic brackets (etching required)
- Bonding composite to old amalgam
- Crown preparations ■

Clearfil Majesty Posterior + + + +

Kuraray America
800.879.1676 • 212.986.2230
www.kuraraydental.com

Description

Clearfil Majesty Posterior is a light-cured, radiopaque composite restorative indicated for both anterior and posterior teeth in Class I-V restorations. The material is 92% filled by weight and features high strength with low polymerization shrinkage. The material is available in 4.9-g syringes in six shades: A1, A2, A3, B2, E2, and E3 and will soon be available in 0.25-g unit-dose Pre-loaded Tips (PLT) as well. The syringes of **Clearfil Majesty Posterior** were evaluated by 20 editors in over 450 posterior restorations. This product received an 88% clinical rating.

Suggested Retail Cost

- \$80.00/syringe

Editors' Observations

Instructions/Packaging

Instructions for use are clearly written and are included in each individual syringe package. Although indicated for both anterior and posterior use, the material was evaluated primarily as a product for posterior restorations. The labeling of the shade on the syringe end, including color-coding for enamel shades, makes identification very easy. Available only in syringes at the time of evaluation, unit-dose PLTs would have been preferred by many consultants.

Viscosity/Ease of Placement

The moderate-to-soft consistency of **Clearfil Majesty Posterior** allows for easy dispensing and delivery to the tooth; however, placement in increments using syringes was inconvenient for some consultants compared to direct application using PLTs. The material occasionally sticks to the condensing instrument, pulling away from the tooth. Use of bonding resin on the instrument minimizes this drawback.

Sculptability/Packability

Although not as "packable" as other posterior composites, the material has a fair blend of packability and sculptability. A sticky feel to the material was reported by some consultants, limiting the manipulation.

Shade Match/Blending

There are many shades from which to choose, providing a good variety for a posterior composite restoration. The shade match before and after curing is excellent; and in most cases, the material blends well with the tooth without appearing too opaque.

Editors' Evaluation



Editors' Comments

- ◆ "Final polish is adequate."
- ◆ "Translucency contributes to good shade match/blending with the tooth - imperceptible in many cases."
- ◆ "Too soft for creating good contacts and for packing."
- ◆ "The material is very hard after curing and is difficult to finish."

Sensitivity to Ambient Light

Some editors reported moderate sensitivity to light, limiting the amount of time the material could be manipulated. In syringe form, where the material must be dispensed extraorally, the material should be protected from ambient light to maximize working time.

Ease of Finishing/Polishing and Final Esthetics

The material is very hard, requiring some time to establish a smooth finish. After finishing, it polishes well with commonly used rotary instruments. The final esthetics was rated very good to excellent by all editors.

Clinical Tips

- After dispensing the material from the syringe, do not roll it on the pad. Rather, cut it into increments. Rolling softens the composite, increasing its tendency to stick to instruments.
- Layer an enamel shade (E2, E3) on the surface of the restoration for optimal esthetics.
- Use a medium or coarse diamond for preliminary occlusal adjustment and finishing as the cured composite is very hard. ■

Piksters + + + + ½

Erskine Dental
877.227.0855
www.erskinedental.com

Description

Piksters are hand-held interproximal brushes intended for patient homecare as an adjunct to usual tooth brushing. They can also be utilized for cleaning around orthodontic braces or splints. The brushes are made of nylon filaments mounted into a plastic-coated wire core with a plastic handle. The slim, round handle is designed to be "twisted" to ease insertion and aid with removal of debris. The brush end may be bent to facilitate access to all proximal surfaces. **Piksters** are made in eight color-coded sizes with replaceable plastic caps. They are packaged in transparent envelopes in the configurations of: 8 pack - one of each size 0-7; 10 pack of one size; 40 pack of one size, for the dentist and hygienists a professional pack of 200 brushes is available in a mix of sizes from 0-7. Patient education brochures are also available on request from the manufacturer and their distributors. Fourteen consultants and 75 of their patients used **Piksters** over 260 times during the evaluation period. This product received a 95% clinical rating.

Suggested Retail Cost

- \$23.00/10, 8-count packs – one of each size per pack (Variety Pack)
- \$35.00/10, 10-count packs – 8 sizes, one size per pack (Standard Pack)
- \$14.00, 40-count packs – 8 sizes, one size per pack (40 pack)
- \$46.00/200-count variety pack (Professional Pack)

Product Features

Consultants and their hygienists were all in agreement that **Piksters** contributed to good oral hygiene. The wide variety of sizes provides most patients with a comfortable experience; however, not all interproximal spaces are large enough to accommodate even the smallest brushes. The color-coding made finding the correct size easy, and the bristle stiffness was determined to be ideal for the majority of users. The wire stem of the smaller sizes requires gentle use to avoid breakage. Orthodontic and periodontal patients found the **Piksters** to be excellent for keeping brackets and pockets cleaner. Ninety percent of consultants and their patients would recommend **Piksters** and 91% found them equivalent to or better



Consultants' Comments

- ◆ "Very useful during hygiene instruction."
- ◆ "Useful around fixed bridges."
- ◆ "Most patients need more than one size to access all interproximal areas."
- ◆ "The handle is small for some to grasp easily."

Patients' Comments

- ◆ "The brushes are soft and pliable."
- ◆ "Compact size for purse or travel bag."
- ◆ "Brush caps are open-ended for ventilation and air drying."
- ◆ "Cleans well around implants."

than the product they are currently using.

Clinical Tips

- To avoid breakage, especially with the small size, bend the wire along its length, not at the handle interface.
- Apply pastes or desensitizers to brush for interproximal application.
- To facilitate insertion in narrow spaces, twist or roll the handle. ■

BOND FORCE + + + + +

Tokuyama Dental Corp./ Tokuyama America Inc.
877.378.3548 • 760.942.7211
www.tokuyama-us.com



Description

BOND FORCE is a single-component (7th-generation), self-etching, fluoride-releasing bonding agent. It requires one application and a light curing time of 10 seconds. **BOND FORCE** contains Bis-GMA, HEMA, phosphoric acid monomers, and an alcohol solvent. It is supplied in a 5-ml bottle and 20 or 50, 0.1-ml unit-dose capsules. The adhesive needs to be stored at a temperature of 32° to 55° F and should not be used with self-cured composites. It is indicated for bonding of light- or dual-cured materials to cut/uncut enamel and dentin and for composite repair of fractured ceramic. Twelve editors evaluated **BOND FORCE** in 186 clinical applications. This product received a 96% clinical rating.

Suggested Retail Cost

- \$70.00/Intro kit (20 unit-dose)
- \$155.00/Standard kit (50 unit-dose)
- \$115.00/kit (5-ml bottle)

Bond Strength to Tooth Structure, MPa		
	Enamel	Dentin
BOND FORCE	32	28

Editors' Observations

Manufacturer's Instructions

The instructions clearly describe the need to use the material within five minutes of dispensing. Requirements for rubbing the material along the demarcation line and uncut enamel for 20 seconds followed by five seconds of indirect air drying and five seconds of direct air flow are also clearly described. The editors would prefer a product that does not require refrigeration.

Packaging/Kit Contents

Editors appreciated the simple packaging with a 5-oz, soft plastic bottle. The unit-dose packaging is easy to use. The unit-dose is easily converted into an upright, stand-alone container to prevent material from leaking out during the procedure.

Ease of Dispensing

The soft plastic bottle is easy to squeeze and dispenses single drops that are relatively uniform in size.

Viscosity/Ease of Application

The viscosity of the material is very good. The material is easy to control as it is dispensed and thoroughly coats



Editors' Comments

- ♦ "Excellent viscosity - wets the tooth surface well."
- ♦ "The illustrated instruction card is a good quick reference for chairside use."
- ♦ "The instructions clearly explain the use and storage requirements."
- ♦ "The design of the unit-dose is great."
- ♦ "The material does not stick to matrix bands."
- ♦ "The need for refrigeration makes storage and use a bit more time consuming."

the tip of the brush. When applied to the tooth, the material coats the surface without pooling or excessively flowing out of the preparation.

Convenience of Unit-Dose

Editors found the upright, stand-alone design of the unit-dose to be unique and useful. The use of a unit-dose or bottle system is a personal choice of each clinician and the availability of both is important.

Ease of Air Dispersal

The viscosity of the material allows it to be easily dispersed with air, without excessive flow out of the preparation. The highly specific technique for air dispersal is an additional step and instructions that the editors felt could be simplified.

Time Required for Bonding Procedure

The ease of dispensing, controlled viscosity and good coverage make the material easy to apply. The editors found the required 20-second rubbing and 10-second air application times to be acceptable for a 7th-generation bonding material.

Absence of Stain at Cavosurface margin

No stain was reported by the editors during the two-month evaluation period.

Ease of Band Removal

Unlike some other 7th-generation bonding systems,

(continued on page 13)

Piranha Diamonds + + + + ½

S.S. White Burs, Inc.
800.535.2877 • 732.905.1100
www.sswwhiteburs.com

Description

Piranha Diamonds are single-patient-use and are manufactured for all types of restorative and finishing procedures. They are available in six grits (super-coarse to ultra-fine) and three shank lengths (standard, 19-24 mm; short, 16-19 mm; and shorter-than-short, 16 mm). The diamonds are available in a wide selection of shapes including football (pointed and standard), round, cone (inverted and double inverted) depth cutters, pear, taper (flat end, modified flat end, and round), mosquito-nose, barrel, flame, needle, wheel, and more. The diamonds are manufactured using centerless-ground, stainless steel shanks for concentricity and resistance to corrosion. The diamond particles are bonded using nickel as the matrix material. **Piranha Diamonds** are individually packaged in sealed, transparent, plastic envelopes, 25 to a box. Individual diamonds are color-coded on the shank, indicating the grit. Thirty-three clinical consultants used the **Piranha Diamonds** in over 1,100 procedures. This product received a 95% clinical rating.

Suggested Retail Cost

- \$30.00/25 (0.18 diameter or smaller)
- \$40.00/25 (0.20 diameter or larger)

Product Features

Consultants found the **Piranha Diamonds** fit very well into the handpiece and were very easy to use. The variety of shapes and grits is excellent. The color-coded shanks are a useful feature making it easy to find the appropriate grit, but the color-coding fades or peels away when the diamonds are sterilized before use. **Piranha Diamonds**



Consultants' Comments

- ♦ "This is a nice diamond and due to being single-patient-use they are always new."
- ♦ "These diamonds were effective for sectioning ceramic crowns."
- ♦ "Excellent shape selection."
- ♦ "The transparent packaging makes selection easy when setting up for a procedure."
- ♦ "The 'shorter-than-short' shanks are great for cases with limited access."

are designed to be single-use and one of the most-liked features was that a new diamond was available for every patient, increasing the cutting and preparation efficiency. The concentricity of the diamonds is an excellent feature, and the effectiveness of the coarse grit is highly efficient. Ninety-three percent of clinical consultants found **Piranha Diamonds** to be equal to or better than the diamond they are currently using, 82% would recommend them to a colleague, and 75% would switch.

Editors' Note: The manufacturer has recently changed the packaging. **Piranha Diamonds** are now sold in boxes of 25-count rolls of individually packaged diamonds. Each package is perforated for easy use. ■

BOND FORCE + + + + +

(continued from page 12)

BOND FORCE does not adhere to the surface of the metal matrix band and therefore makes band removal very easy.

Odor/Taste

While the odor of the solvent was apparent, it was not noted as objectionable by the editors or patients.

Postoperative Sensitivity

No postoperative sensitivity was reported during the two-month evaluation period.

Usefulness for Various Restorative Procedures

Over 230 direct Class I-V composite restorations were placed using **BOND FORCE**. Some editors suggested a dual-cured component would allow them to expand the use of this material.

Editors' Note: Tokuyama Dental Corp./Tokuyama America Inc. recently modified the instructions for **BOND FORCE**.
• Apply bonding agent and rub for 20 seconds
• Weak air dry for 5 seconds
• Strong air dry for 5+ seconds
• Light cure for 10 seconds ■

G-COAT PLUS + + + + ½

GC America, Inc.
800.323.7063 • 708.597.0900
www.gcamerica.com

Description

G-COAT PLUS is a nano-filled, light-cured, protective coating with a self-adhesive monomer. The material adheres to enamel, dentin, composite, glass ionomer, and resin-modified glass ionomer. It also seals and protects the adhesive interface between restorations and tooth structure. Dispersion of the nano-filler particles as a protective coating offers high wear resistance, preventing abrasion and discoloration of the restoration. The surface of the restorative material does not need to be etched before application of **G-COAT PLUS**. A 20-second cure is sufficient with an LED or halogen curing light. **G-COAT PLUS** can be stored at room temperature but should be refrigerated if it is not used for a prolonged period of time. The kit contains a 4-ml bottle of **G-COAT PLUS**, dispensing dishes, micro-tip applicators and an applicator holder. Thirty consultants evaluated **G-COAT PLUS** for two months in more than 800 clinical applications. This product received a 95% clinical rating.

Suggested Retail Cost
• \$58.50/kit

Product Features

G-COAT PLUS is currently the only protective coating material available that contains a self-adhesive monomer with the ability to adhere to many different substrates. Eliminating the need for etching the surface to be covered reduces the application steps and the time required for the procedure. The material has sufficient viscosity for easy control during placement but also



Consultants' Comments

- ♦ *"Quick – very easy to use."*
- ♦ *"No need to polish temporary crowns for smooth finish - saves time."*
- ♦ *"Very effective on direct resins."*
- ♦ *"Has a strong odor."*
- ♦ *"Liquid has a slight yellow tint."*

exhibits good flow to adequately cover all of the indicated materials. **G-COAT PLUS** was judged to be a very effective surface coating for composites and glass ionomers, and the resultant gloss is comparable to a highly polished surface. The lack of discoloration and maintenance of surface gloss during the two-month evaluation period were judged to be very good. Seventy-five percent of the consultants rated **G-COAT PLUS** equivalent to or better than the current protective material they were using, while 77% would switch to **G-COAT PLUS** and 82% would recommend it.

Clinical Tips

- Use a sable brush to achieve a thin, even application. ■

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TrioDent Ltd.
800.811.3949
www.TrioDent.com

V-Ring Sectional Matrix System + + + + +

Description

V-Ring Sectional Matrix System facilitates the contouring of posterior Class II composite restorations. The **V-Ring** separator has a stainless steel inner ring and a nickel-titanium outer spring with V-shaped tines. The tines are placed over the wedge on the buccal and lingual surfaces to enhance tooth separation. Each sectional matrix band has a tab with a hole on the occlusal edge and holes on the wing ends for pin tweezers to grasp during placement and removal. Matrices are available in three heights: 4.5, 5.5 and 6.5 mm. The system also includes **V-Wedge**, **Double-Wedge** and the **Wave-Wedge**. **V-Wedge** has an inverted V-shape cross-section to protect the papilla and is available in six different color-coded sizes. The **Double-Wedge** is a clear elastic wedge that is designed to be stretched and pulled between the teeth from the occlusal aspect, rather than inserted from the buccal or lingual direction like a traditional wedge. The **Wave-Wedge** has an inverted V-shape cross-section, comes in three color-coded sizes and is a longer wedge to seal both the buccal and the lingual aspects of the matrix tab. The **Wave-Wedge's** effect is similar to placing two wedges, one from the buccal and one from the lingual. The kit evaluated contained three **V-Rings**, 50 **Tab-Matrices** in each of the three sizes, ring forceps, pin-tweezers, **V-Wedges**, **Double Wedges** and **Wave-Wedges**. Thirteen consultants used the **V-Ring Sectional Matrix System** in over 500 clinical restorations. This product received a 96% clinical rating.

Suggested Retail Cost
• \$395.00/kit

Product Features

To supplement an instructional CD/DVD, the **V-Ring Sectional Matrix System** provides a written photo series showing the correct placement of matrix, wedge of choice and placement of the **V-Ring**. Improved packaging for the **V-Ring Sectional Matrix System** now consists of a plastic container with individual compartments for each component. The pin holes in the matrix bands aid in grasping the bands during placement and removal. Bands adapt to the teeth well with a good selection of sizes.



Consultants' Comments

- ♦ *"Creates anatomical contours, even with a wide interproximal preparation."*
- ♦ *"My interproximal contacts and contours have never been better!"*
- ♦ *"I love being able to place the wedge between the tines of the V-Ring."*
- ♦ *"The V-Wedge is kinder to the gingival papilla than a wooden wedge."*
- ♦ *"The V-Ring is sometimes too large for small teeth so a smaller ring for pediatric use would be helpful."*

The most positive feature of the system is the **V-Ring** component itself. Consultants appreciated the excellent fit to the buccal and lingual embrasures, separation of the teeth, and the subsequent excellent contacts that were formed in the final restoration. The variety of different wedges required some practice to master and some consultants found it easier to focus on their traditional wedges or simply use the **V-Wedge**. Some consultants preferred the older version of the locking pliers, as opposed to the newer pin tweezers, which are still available through the manufacturer. Consultants felt that a variable height of tines with the **V-Ring** would be helpful for using multiple **V-Rings** to restore mesial and distal surfaces simultaneously. Overall, 92% of consultants would switch to the **V-Ring Sectional Matrix System**. All consultants found the **V-Ring Sectional Matrix System** to be equal to or better than their current sectional matrix system and would recommend it to a colleague. ■

Zhermack, Inc.
877.819.6206 • 732.389.8540
www.zhermack.com

Description

freealgin is a hydrophilic, medium-viscosity, addition silicone alginate substitute. It is indicated for impressions for study models, orthodontic models, opposing models, partial and complete dentures, and temporary crown matrices. freealgin has a working time of one minute and a setting time of 2.5 minutes from the start of mixing. It is lilac in color and has a tropical fruit flavor. Impression pouring can be delayed for an unlimited amount of time without loss of accuracy. **freealgin** is packaged with two 50-ml cartridges and 8 mixing tips; bulk packages containing two, 380-ml cartridges with 15 mixing tips and 2 bayonet rings; or eight 380-ml cartridges and 2 bayonet rings for auto-mixing machines. **freealgin** was evaluated by 23 consultants in 135 impressions. This product received an 84% clinical rating.

Suggested Retail Cost

• \$18.90/box

Product Features

freealgin is useful in cases where delayed pouring of models is anticipated or when multiple pours are necessary. Since multiple pours of the material are possible, freealgin is recommended for use in esthetic procedures, where opposing, study and working models are necessary. Consultants rated the detail of the impressions and lack of voids as the most positive



Consultants' Comments

- ◆ *"I love that there is no time limit on pouring impressions."*
- ◆ *"Excellent product to use when more than one model of the arch is needed."*
- ◆ *"Setting time is slower than alginate; offer a fast-set version of this material."*
- ◆ *"Product is difficult to extrude in a cartridge; use an automixing machine for best results."*
- ◆ *"Set material is very stiff. Take care to avoid breaking the stone model when separating it from the impression."*

features of **freealgin**. The fruit flavor was well received by patients. Setting time was rated as slower than other materials, and many consultants indicated a fast-set material would be an advantage. Some evaluators commented that the viscosity of the material was too thick, making it difficult to load into impression trays as compared to traditional alginate. The high viscosity also resulted in lack of detail on the teeth beyond the height of contour. Forty-one percent of the consultants would purchase the product and recommend **freealgin** to a colleague. ■

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