

THE DENTAL ADVISOR™

"Improving Patient Care Through Research & Education"



Photography by Jennifer Lill, Ann Arbor, Michigan

All-ceramic Restorations

THE DENTAL ADVISOR has documented the placement and monitored nearly 6,000 all-ceramic restorations over the past 25 years. Early on, many of the restorations were one or two units. Today, it is not unusual to restore six, eight or more all-ceramic units in one appointment.

This issue of THE DENTAL ADVISOR reports on the performance of many of these restorations over time and provides the clinician with insight as to what works and why. Of special interest is the fracture rate of nine all-ceramic materials.

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Very Good	+++
Good	++

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All-ceramic Restorations

Over the past 25 years, nearly 6,000 all-ceramic restorations have been placed and monitored by THE DENTAL ADVISOR. Dr. Farah placed restorations during the first 14 years; while during the most recent 11 years, Drs. Farah, Brown, Anderson, and their associates have added more than 4,000 restorations. *Table 1* shows the number of restorations placed over that period of time.

Table 1. All-ceramic restorations (total of 5816) placed over 25 years

◆ Cerpress (<i>Leach & Dillon</i>)	42%
◆ OPC (<i>Pentron Ceramics</i>)	16%
◆ IPS Empress (<i>Ivoclar Vivadent</i>)	13%
◆ 3G (<i>Pentron Ceramics</i>)	9%
◆ IPS e.max (<i>Ivoclar Vivadent</i>)	5%
◆ Optec HSP (<i>Pentron Ceramics</i>)	5%
◆ 3M ESPE Lava Crowns and Bridges (<i>3M ESPE</i>)	4%
◆ LUMINEERS By Cerinate (<i>Den-Mat Holdings</i>)	4%
◆ Cerinate (<i>Den-Mat Holdings</i>)	2%

Preparation Guidelines for All-Ceramic Restorations

- Open contacts with a #2 round (*S.S. White Burs, Inc.*) or #330 fissure carbide (*S.S. White Burs, Inc.*) bur.
- Reduce the interproximal with a cylinder bur (beveled cylinder **1812.8C NEODIAMOND/MICROCOPY**).
- Reduce tooth circumferentially by 1.0 – 1.5 mm with a diamond bur (pointed taper **1718.8c NEODIAMOND/MICROCOPY**) (*Figure 1 - Dr. Farah's preferred bur*).
- Reduce the occlusal 1.5 – 2.0 mm using a chamfer bur (bell **C2C/Strauss Diamonds**, chamfer **C3C** or **C3F/Strauss Diamonds**) (*Figure 2 - Dr. Farah's preferred bur*).
- Reduce the lingual of anterior restoration with a football diamond (**1923.c, 1923.m** or **1923.f NEODIAMOND/MICROCOPY**).



Figure 1 Circumferential tooth reduction



Figure 2 Occlusal tooth reduction

Rules for Good Preparation Design

- Uniform reduction results in optimal ceramic strength.
- Reduce the tooth uniformly circumferentially. This results in optimal stress distribution and minimizes potential fracture.
- Adequate reduction gives the laboratory more space to produce an esthetic restoration.
- Sharp edges result in high stress concentration and increase the potential for fracture of the ceramic.

Fabrication of All-ceramic Restorations

Flaws in the restoration such as internal cracks, weakening of the material because of heating and cooling cycles, improper layering of the ceramic, and contour and anatomy are reasons an all-ceramic restoration can fail. Knowing the required firing and cooling temperatures of the material and proper layering technique of the ceramic will strengthen the restoration. Internal cracks in the ceramic can develop during the firing and cooling process and in building the external layers of ceramic. Use of a transilluminating light (*Microlux/AdDent, Inc.*) on the intaglio side of the restoration will show internal flaws and cracks that are not always visible to the naked eye. If cracks appear, return the restoration to the laboratory.

Patient occlusion can also contribute to the failure of an all-ceramic restoration. Patients that are heavy bruxers or restorations with improper occlusion can put tremendous force on a restoration causing catastrophic failure.

Bonding or Cementation of All-ceramic Restorations

High-leucite all-ceramic restorations should be bonded using a bonding agent and resin cement (see *Table 2*). Lithium disilicate and alumina restorations can be bonded or cemented with self-adhesive resin cement in selected cases. All-ceramic products are listed in *Table 3*.

Performance of Ceramics over 25 years

The restorations were evaluated at placement for:

- Shade match
- Vitality
- Marginal integrity
- Fit to the tooth

The same restorations were evaluated at recall for:

- Fracture/Chipping
- Marginal staining
- Wear resistance
- Esthetics

Overall, the performance of all-ceramic restorations has been excellent over the past 25 years. With a relatively low failure rate and excellent esthetics, all-ceramic restorations are growing in popularity. As the all-ceramic materials improve and adapt to the needs of patients, dentists and lab technicians, their usage will continue to climb.



NX3
(Kerr Corp.)

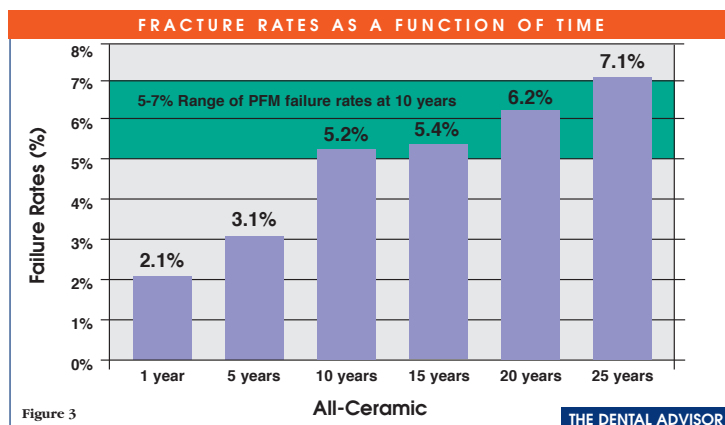
Table 2. All-ceramic Restoration Cementation and Bonding Guidelines

Type of Ceramic	Type of Restoration	Bonded or Cemented	Cementation Protocol	Suggested Cements
High Leucite <i>Authentic</i> (Jensen Industries); <i>Avantè</i> (Pentron Ceramics); <i>Cerpress SL</i> (Leach and Dillon); <i>Creation CP</i> (Jensen Industries); <i>Finesse All-Ceramic</i> (DENTSPLY Ceramco); <i>IPS Empress</i> (Ivoclar Vivadent); <i>Luminesse Pressable Porcelain</i> (Talladium); <i>OPC</i> (Pentron Ceramics)	Inlays, Onlays, Crowns, Veneers (Excluding 2 nd molar crowns)	Bond, then cement	1. Etch with phosphoric acid 2. Rinse 3. Apply bonding agent (4 th - or 5 th - generation) 4. Cement with Light-cure or Dual-cure Cement	<i>3M ESPE RelyX Veneer Cement</i> with <i>3M ESPE Adper Single Bond Plus Adhesive</i> (3M ESPE); <i>Calibra</i> with <i>Prime and Bond NT</i> (DENTSPLY Caulk); <i>NX3</i> with <i>OptiBond Solo Plus</i> (Kerr Corp.); <i>Variolink II</i> with <i>AdbeSE</i> (Ivoclar Vivadent)
Lithium Disilicate <i>3G</i> (Pentron Ceramics); <i>IPS e.max Press</i> (Ivoclar Vivadent)	Anterior and Posterior Crowns, 3-unit Bridges up to 2 nd bicuspid	Bond, then cement	1. Etch with phosphoric acid 2. Rinse 3. Apply bonding agent (4 th - or 5 th - generation) 4. Cement with Light-cure or Dual-cure Cement OR Use Self-adhesive Resin Cements	<i>3M ESPE RelyX Veneer Cement</i> with <i>3M ESPE Adper Single Bond Plus Adhesive</i> (3M ESPE); <i>Calibra</i> with <i>Prime and Bond NT</i> (DENTSPLY Caulk); <i>NX3</i> with <i>OptiBond Solo Plus</i> (Kerr Corp.); <i>Variolink II</i> with <i>AdbeSE</i> (Ivoclar Vivadent) OR <i>3M ESPE RelyX ARC Adhesive Resin Cement</i> (3M ESPE); <i>3M ESPE RelyX Unicem Self-Adhesive Universal Resin Cement</i> (3M ESPE); <i>Linknax</i> (GC America); <i>Maxcem Elite</i> (Kerr Corp.); <i>Multilink Automix</i> (Ivoclar Vivadent); <i>Panavia F 2.0</i> (Kuraray America)
Alumina <i>In-Ceram ALUMINA</i> (Vident); <i>NobelRondo Press</i> (Nobel Biocare); <i>NobelRondo Press Alumina</i> (Nobel Biocare); <i>ProCera</i> (Nobel Biocare)	Anterior and Posterior Crowns, 3-unit Bridges	Cement	No etching or bonding, Use a Self-adhesive Resin Cement or Resin-modified Glass Ionomer Cement	<i>3M ESPE RelyX ARC Adhesive Resin Cement</i> (3M ESPE); <i>3M ESPE RelyX Unicem Self-Adhesive Universal Resin Cement</i> (3M ESPE); <i>Breeze Self-Adhesive Resin Cement</i> (Pentron Clinical Technologies); <i>G-CEM</i> (GC America); <i>GC Fuji Plus</i> (GC America); <i>Maxcem Elite</i> (Kerr Corp.)

All-ceramic Restorations

Failures as a Function of Time

Fracture rates ranged from 2.1% at one year to 7.1% at 25 years. Over time, restorations will weaken, regardless of the material used. *Figure 3* illustrates the fracture rates of all-ceramic versus PFM restorations. Many dentists and laboratories argue that metal is stronger than all-ceramic. However, our data show the failure rate of all-ceramic restorations at 10 years to be less than the failure rate of PFM. In recent years, the cost of all-ceramic restorations has aligned with the cost of PFM due to an increase in the cost of precious metals.



Fracture and Chipping

There are many reasons why all-ceramic restorations fail.

Top Five Reasons for Fracture

- Improper tooth preparation
- Improper bonding/cementation
- Pre-existing internal cracks
- High occlusal forces/bruxism
- Age of restoration

Dentists can assist the laboratory by properly reducing and preparing teeth.

Marginal Staining

Marginal staining is noted by the graying margins of anterior and posterior crowns and veneers. Marginal staining is rarely noted for inlays and onlays, but occurs in 5.5% of other all-ceramic restorations at 10 years. The graying is unattractive to patients and is the most frustrating factor pertaining to cosmetic restorations, often occurring within days of cementation. Using a zirconia coping under a ceramic overlay masks the graying.

Possible causes of marginal staining are:

- Improper etching/bonding of tooth and/or ceramic.
- Bruxism resulting in high stress at the cervical margin, followed by debonding.
- Improper isolation/bleeding at cementation.
- 5th-generation bonding agents seem to be associated with a higher rate of marginal staining than 4th-generation bonding agents.

Debonding

- About 3.6% of all-ceramic restorations (onlays, crowns and veneers) debond from 1 to 10 years of service.
- The debonding of all-ceramic inlays cemented with resin cement is quite low (<1.0%).
- The failure of the bond could result from weakening due to thermal and loading cycling.

It is not always easy to determine if the bond failure is at the tooth/resin or resin/ceramic interface. Most often it seems to be related to both interfaces. Inlays have a much lower debonding rate, less than 1%.

Wear Resistance

- The wear of the ceramic and opposing dentition has not been a major problem in the past 10 years.
- With the introduction of low-fusing ceramics, wear of the opposing dentition has decreased markedly.

Esthetics

All-ceramic restorations are designed with extraordinary esthetics in mind. Factors such as tooth staining and dark posts or cores can dramatically affect the overall final appearance and shade of the restoration. In recent years, esthetic post systems and tooth-colored core materials have been developed to assist dentists in attaining excellent esthetic results.

Checklist for Success Communicating With Your Laboratory

The dentist and the laboratory must have open communication and awareness of the limits of the material. These are the items you should send to the laboratory with each all-ceramic restoration request. Your preparation and clear communication with your laboratory will result in excellent esthetics.

- Diagnostic wax-up
- Pre-op study models and digital photographs
- Custom shade or shade tabs in photo

Helpful Hint – An easy way to take a preparation color is to use the VITA shade guide and rotate so the neck of the shade tab is near the tooth. This is the dentin shade and will give an accurate shade to the laboratory.

- Preparation color
- Impression of patient approved temporaries

Helpful Hint – The patient approved temporaries will provide the laboratory with the template for creating the ideal restorations.

- Bite registration

All-ceramic Restorations: The Next 10 Years

Trends in all-ceramic restorations are moving to exciting and new areas. Digital workflow and chairside CAD/CAM fabrication allow instant feedback for the dentist and laboratory. Our November 2008 issue of THE DENTAL ADVISOR will focus on the basic principles of CAD/CAM, the introduction of zirconia restorations, and the integration of digital dentistry into daily practice for laboratories and dentists.

Table 3. All-ceramic Products

Product	Company	Material	Fabrication Type	Recommended Uses
3G	Pentron Ceramics	Lithium disilicate	Pressable	B, C, I, O, V
Authentic	Jensen Industries	Leucite-reinforced ceramic	Pressable	C, I, O, V
Avanté	Pentron Ceramics	Leucite-reinforced ceramic	Pressable	C, I, O, V
Cerpress SL	Leach and Dillon	Leucite-reinforced ceramic	Pressable	C, I, O, V
Creation CP	Jensen Industries	Leucite-reinforced ceramic	Pressable	C, I, O, V
Finesse All-Ceramic	DENTSPLY Prosthodontics- Ceramco	Leucite-reinforced glass-ceramic	Pressable	C, I, O, V
HeraCeramPress	Heraeus	Synthetic quartz glass	Pressable	C, I, O, V
In-Ceram ALUMINA	Vident	Oxide ceramic	Glass infiltrated	B, C, I, O, V
In-Ceram SPINELL	Vident	Oxide ceramic	Glass infiltrated	C*
IPS e.max Press	Ivoclar Vivadent	Lithium disilicate glass ceramic	Pressable	B [#] , C, I, O, V
IPS Empress	Ivoclar Vivadent	Leucite-reinforced glass	Pressable	C, I, O, V
LUMINEERS 360 Crowns	Den-Mat Holdings	Feldspathic porcelain	Pressable	C, V [^]
Luminesse Pressable Porcelain	Talladium	Glass leucite ceramic	Pressable	B, C, I, O, V
NobelRondo Press Alumina Solo	Nobel Biocare	Alumina	Pressable	C, I, O, V
NobelRondo Press with Procera Substructure	Nobel Biocare	Alumina	Pressable	B, C, I, O, V
OPC	Pentron Ceramics	Leucite-reinforced ceramic	Pressable	C, I, O, V
Procera	Nobel Biocare	Alumina	Preformed coping	C, I, O, V
VITA PM9	Vident	Feldspathic porcelain	Pressable	B, C, I, O, V

* Single crowns

See manufacturer's recommendations for bridge span

[^] LUMINEERS By CERINATE for minimal preparation veneers

B = Bridge; C = Crown; I = Inlay; O = Onlay; V = Veneer

DuoTEMP + + + + 1/2

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Visit online at www.dentaladvisor.com
to view Q & A about this product!



Description

DuoTEMP is a white, dual-cured, eugenol-free, temporary filling material indicated for short-term, temporary applications. **DuoTEMP** contains zinc oxide and zinc sulfate for their antibacterial properties and is radiopaque and fluoride releasing. **DuoTEMP** is supplied in a 5-g syringe and packaged with instructions in an aluminum-coated plastic bag. Although this product will self-cure within 2 hours, light curing will allow immediate patient loading after placement. The product can be placed directly with an instrument and can be light cured in 40 seconds. **DuoTEMP** was evaluated by 27 clinical consultants in 213 provisional restorations. This product received a 91% clinical rating.

Suggested Retail Cost

- \$18.55/pkg

Product Features

DuoTEMP features simple instructions and packaging. The viscosity is like soft putty and is easy to dispense from the syringe. **DuoTEMP** is easy to place and does not stick to instruments, minimizing the time the patient is in the chair. The light-cured feature is an advantage, allowing patients' use of the provisional material quickly after placement. While consultants generally prefer tooth-colored materials, the opaque white color of **DuoTEMP** was easily visible within the tooth, which was an advantage during removal. Removal is better accomplished using a high-speed handpiece rather than hand instruments.



Consultants' Comments

- ♦ "Excellent for temporary closure of endodontic access openings."
- ♦ "Ability to light cure is great!"
- ♦ "Easy to use and works great."
- ♦ "White color is highly visible."
- ♦ "Convenient, clean and non-sticky to use."

Overall retention was reported to be very good. Eighty-five percent of consultants found **DuoTEMP** to be equal to or better than their current provisional filling material, 82% would recommend it to a colleague and 78% would switch.

Clinical Tips

- Use **DuoTEMP** for intracoronal provisional restorations.
- Instruct the patient to occlude before curing to minimize adjustments.
- Use a wet cotton-tip applicator to smooth before curing.
- Useful for covering implant abutment screw heads. ■

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Description

EtchMaster is a single-use air abrasion tip for intraoral use. It is indicated for polishing, roughening and/or etching of enamel, dentin, crowns, veneers, prosthetics, orthodontic brackets, and dental restorative procedures. The abrasive powder comes in three hardness grades and six material varieties, color-coded on the tip:

Hard = *Bond Enhancer*

- 27-μm aluminum oxide for general bonding and sealant applications.
- 50-μm aluminum oxide for orthodontic bonding applications.
- Glass beads for porcelain repair.

Mild = *Surface Polisher*

- 25% aluminum oxide/75% sodium bicarbonate for engrained stain removal.

Soft = *Prophy Brush* for stain removal and prophy procedures.

- Sodium bicarbonate
- Calcium carbonate

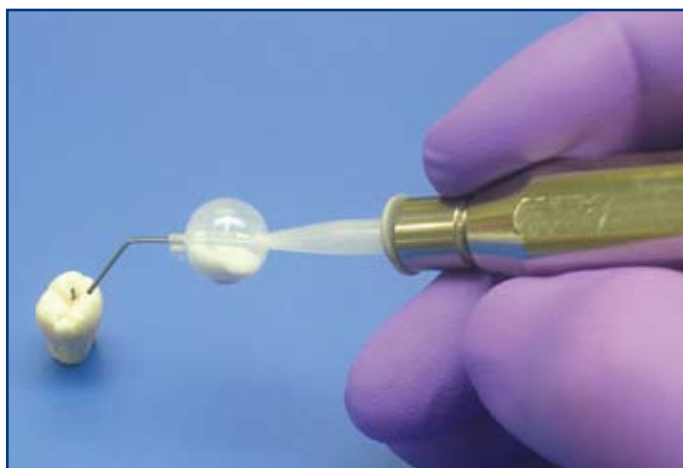
EtchMaster tips are disposable and attach to one of four connectors:

- 4-Hole *Handpiece Adapter* and *Kavo Style Adapter*, which allow control of air flow by the delivery unit's foot pedal.
- *Quick Disconnect Adapter*, which attaches directly to an airline via a supplied pressure regulator and a traditional-style air syringe with push-button control.
- *Cordless Etcher® Handpiece* that is powered by replaceable CO₂ cartridges.
- Groman provides lifetime warranty and free replacement on all adapters.

EtchMaster tips are available in boxes of 25, 50, and 100 in both large and small sized tips. The **EtchMaster Starter Pack** with the 4-hole adapter was evaluated by 32 consultants in over 450 clinical procedures. This product received a 95% clinical rating.

Product Features

Consultants found **EtchMaster** to be innovative and convenient. The 4-hole adaptor evaluated allows for easy connection of **EtchMaster** to the dental unit, rather than requiring additional bulky or expensive equipment. Consultants who had experience using air abrasion units overwhelmingly preferred **EtchMaster** for basic chair-side procedures. Those using laboratory abrasive systems also found having a chair-side system to be an excellent benefit.



Consultants' Comments

- ♦ "Very compact and easy to use."
- ♦ "I have been looking for a chairside device that can prepare surfaces for bonding—this is perfect!"
- ♦ "The convenience of having a small chairside unit is outstanding."
- ♦ "Probably the best new product I've tried yet!"
- ♦ "Works well for cleaning cement out of crowns."
- ♦ "My hygienist likes the soft powder for orthodontic patients and cleaning around brackets."
- ♦ "The small size tips do not contain enough powder."

Tips are bent at a 45° angle, creating challenges with access to certain areas of the mouth; optional contra-angle tips are available. The effectiveness in cleaning out grooves and abrading restorations was rated very good. No clogging was reported during the evaluation period. As with all air abrasion units, overspray occurs, but consultants reported minimal overspray with the **EtchMaster**. Seventy-four percent of consultants found **EtchMaster** to equal to or better than the current air abrasion unit; 72% of consultants would switch to **EtchMaster** and 83% would recommend it to a colleague.

Clinical Tips

- Air pressure settings of 35 to 45 psi are ideal.
- As with all air abrasion units, **EtchMaster** should be used with rubber dam isolation, and eye protection is critical for the patient, dentist, and dental assistant due to alumina powder.
- Practice using **EtchMaster** on extracted teeth or glass slides before use on a patient. ■

CompCore AF SyringeMix Flow + + + +

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➤ EXCLUSIVE REVIEW

Description

CompCore AF SyringeMix Flow is a dual-cured, fluoride-releasing, radiopaque composite core build-up material designed to flow easily. This material uses *Hyperbranched* technology, which is the cross-linking of composite monomers that reportedly causes a more complete curing. It is indicated for the fabrication of core build-ups in vital and non-vital teeth. It is also useful as a flowable liner prior to placing bulk material in large cavities and core build-ups. It has a working time of 2.5-3.0 minutes at room temperature (72°F). Time for light curing is 40-50 seconds and the chemical cure setting time is 4.5 minutes. **CompCore AF SyringeMix Flow** is available in shades white and A3. The manufacturer stresses the use of a bonding system compatible with dual- and self-cure composites and recommends self-etching primer *Bond Boost SE™* with *IntegraBond™* bonding agent. Fourteen editors evaluated **CompCore AF SyringeMix Flow** in over 180 clinical procedures. This product received a 90% clinical rating.

Suggested Retail Cost

• \$106.00/kit

Evaluation Protocol

CompCore AF SyringeMix Flow was evaluated by 14 editors in over 180 cases.

Editors' Observations

Manufacturer Instructions and Packaging

The **CompCore AF SyringeMix Flow** kit is very well organized with mixing tips for core build-ups and small angled intraoral tips to reach into tight areas, as well as post preparations in non-vital teeth.

Dispensing/Consistency of Mix

The auto-mix dispensing was a favorite of the editors. It made dispensing the material easy. The dispenser consistently delivered a complete mix of material.

Adaptation and Flow

Editors found that because of the high flow of **CompCore AF SyringeMix Flow**, the material adapted well to pins and posts, flowing into tight line angles easily. However, the material did not stay in place when used in prepared teeth, as with a maxillary molar core build-up. Editors agreed that the flowability of this material was ideal for certain procedures.



Editors' Comments

- ♦ "This is a great material for pins, posts and pinpoint decay."
- ♦ "I love the way it flows around pins and into tight line angles."
- ♦ "An excellent product to have for when it is needed."
- ♦ "I found the shades a little too opaque."

Working Time, Setting Time and Depth of Cure

The 2.5-3.0 minute working time is very good, as is the dual-cure feature of **CompCore AF SyringeMix Flow**. The setting time was reported to be long by many editors, but the dual-cured material did allow for bulk fill of a preparation.

Material Preparation and Final Surface

The core material cured to a hard surface.

Clinical Tips

- For more precision, use extra-fine intraoral tips to place this material.
- Light cure quickly and add material in increments.
- Use a core form to contain the material before light curing. ■



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Integrity TempGrip + + + + 1/2

Ask The Editors:
Visit online at www.dentaladvisor.com
to view Q & A about this product!



Description

Integrity TempGrip is a zinc oxide, non-eugenol, temporary crown and bridge cement. It is designed for temporary cementation of provisional acrylic and composite indirect restorations, and provisional or trial cementation of ceramic, porcelain, composite, and PFM and all-metal crowns and bridges. **Integrity TempGrip** is available in a 9-g, dual-barreled syringe. Two syringes are packaged with 20 mixing tips. For application, purge the syringe of a small amount of material and place the mixing tip. Dispense the cement directly into the provisional restoration, place and remove excess. The cement has a one-minute working time and a setting time of two to three minutes. **Integrity TempGrip** was evaluated in over 530 cementation procedures. This product received a 95% clinical rating.

Suggested Retail Cost

- \$87.50/kit

Consultants' Comments

- ♦ "It cleans up better, dispenses easier, sets quicker."
- ♦ "No residue on preparation."
- ♦ "Nice dispensing system, thin viscosity, easy clean up."
- ♦ "Easy to store in a shallow drawer."
- ♦ "Easy, easy, easy."

Product Features

Integrity TempGrip provides an easy solution to mixing and dispensing of temporary cement. Dispensing of **Integrity TempGrip** was highly praised by consultants, due to the auto-mix tips removing the need for hand mixing. This provided easy and reliable dispensing and application, a feature appreciated by consultants. The cement has a fast setting time and easy clean-up of excess at the margins. The working and setting times are ideal. The tooth is easily cleaned after removal of the provisional restoration, as the cement often remains on the provisional restoration and not on the prepared tooth. Eighty percent of the consultants rated **Integrity TempGrip** as equal to or better than their current temporary cement; 59% would switch to it, while 71% would recommend it to a colleague. ■

Alpen Carbide Operative Burs + + + +

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to view Q & A about this product!



Description

Alpen Carbide Operative Burs are reusable carbide burs indicated for operative and surgical procedures, including endodontic access, trimming and finishing. The burs are also indicated to rapidly cut amalgam, porcelain, metal, enamel, and dentin without clogging or stalling. This comprehensive line of 72 burs comes in a large variety of shapes to accommodate a wide variety of uses. The **Alpen Carbide Operative Burs** are manufactured as a single piece, eliminating a brazed joint that could break or rust. Available shanks include a friction grip (FG), friction grip short shank (FGSS), friction grip surgical length (FSOS), right angle latch type (RA) and handpiece straight shank (HP). **Alpen Carbide Operative Burs** are available in 10 packs and 100 packs. **Alpen** friction grip burs #557 and #330 were evaluated by 28 clinical consultants in 755 procedures. These burs received an 88% clinical rating.

Suggested Retail Cost

- \$18.16/10 pack

Consultants' Comments

- ♦ "Excellent amalgam removal - stayed sharp."
- ♦ "Fast and efficient cut from these burs."
- ♦ "Smoothest carbide I have used to date."
- ♦ "Burs become dull after sterilization."

Product Features

Consultants liked the concentricity and the cutting efficiency of the **Alpen Carbide Operative Burs**, especially when cutting amalgam and dentin and commented that these burs excelled at rapidly removing amalgam restorations. The smoothness of cutting as well as the resistance to clogging were also well-received. The burs fit well into the handpiece and are durable during the first use. After the first use and sterilization, consultants reported dullness in the burs. Ninety-six percent of clinical consultants found the **Alpen Carbide Operative Burs** equal to or better than their current burs while 82% would switch and recommend them to a colleague. ■

3M ESPE
800.634.2249
www.3MESPE.com

Ask The Editors:
 Visit online at www.dentaladvisor.com
 to view Q & A about this product!



Description

3M ESPE Filtek Supreme Plus is a universal composite indicated for all anterior and posterior direct restorations. The composite is filled 57-60% by volume with 5-20 nm particles and 60-140 nm pre-polymerized particle clusters. The composite is available in dentin, body, enamel and translucent shades that may be layered or used alone. All shades, except for the translucent shades, are radiopaque. Curing time for 2-mm increments is 20 seconds for enamel, body and translucent shades and 40 seconds for dentin shades. **3M ESPE Filtek Supreme Plus** is available in 4-g syringes and 0.2-g unit-dose capsules in 34 shades. This product received a 94% rating for clinical performance at five years.

Clinical Evaluation Protocol

- **3M ESPE Filtek Supreme Plus** restorations have been placed and recalled on an ongoing basis during the past five years (Figure 1).
- 1034 restorations were available for evaluation of clinical performance during the recall period; 86 were in anterior teeth and 948 were in posterior teeth (Figure 2).
- Various 5th-, 6th-, and 7th- generation bonding agents were used.
- Restorations were evaluated on a 1-5 rating scale: 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent.

Clinical Observations

Fracture Resistance

Ninety-three percent of restorations recalled showed no chips or fractures (Figures 3 & 4). Eleven restorations (1%) in this recall period fractured and required replacement.

Consultants' Comments

- ♦ *"Versatile composite."*
- ♦ *"Some chipping of the marginal ridges has occurred."*
- ♦ *"In most cases the body shade alone looks great."*
- ♦ *"From an esthetic standpoint, material behaves much like a microfill."*

AGE OF 3M ESPE FILTEK SUPREME PLUS RESTORATIONS AT RECALL

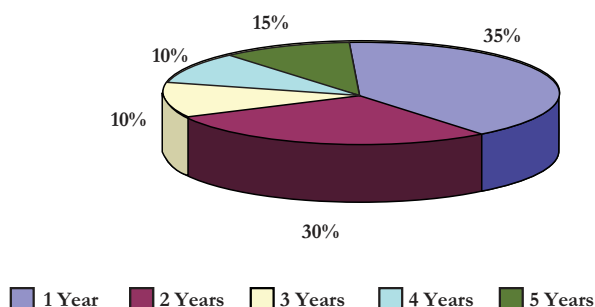


Figure 1

THE DENTAL ADVISOR

3M ESPE FILTEK SUPREME PLUS - TYPE OF RESTORATIONS

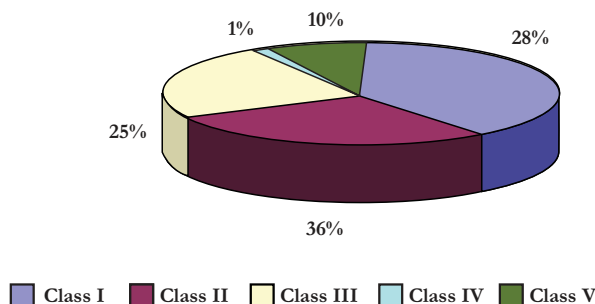


Figure 2

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3M ESPE FILTEK SUPREME PLUS - RATINGS AT 5 YEARS

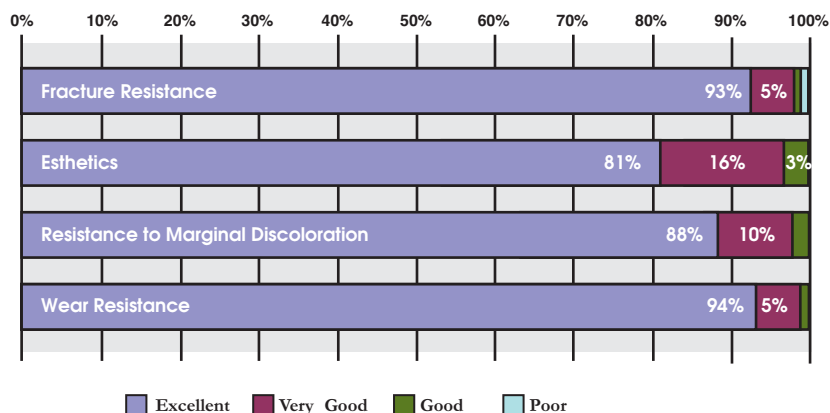


Figure 3

THE DENTAL ADVISOR

Another 11 restorations had moderate fractures that required repair. Slight chipping occurred on 5% of the restorations, requiring no treatment or minor refinishing.

Esthetics

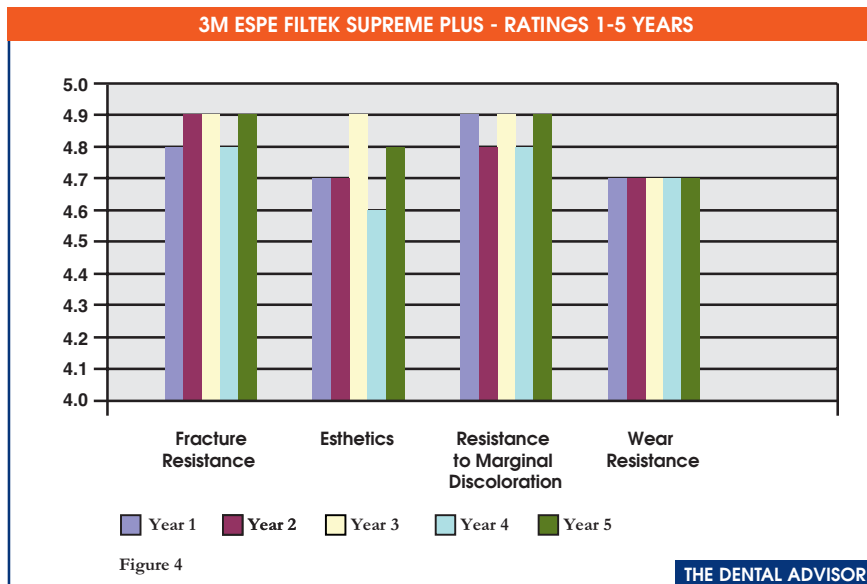
3M ESPE Filtek Supreme Plus shades blended well with surrounding enamel, earning an excellent rating for esthetics in 81% of recalled restorations (Figures 3 & 4). Surface texture was smooth - in many cases smoother than at the time of initial placement. Some of the five-year-old restorations (3% overall) lacked shade stability and were yellow or opaque.

Resistance to Marginal Staining

Eighty-eight percent of restorations had well-sealed margins with no visible staining (Figures 3 & 4). Light brown or gray stain along the margins was noted in 10% of restorations. The cases that exhibited mild to moderate staining at the margins were independent of the type of bonding system used. Two percent of restorations had moderate stain, but none were replaced. More marginal staining was noted in Class V restorations, compared to other classes.

Wear Resistance

3M ESPE Filtek Supreme Plus exhibited very good wear resistance (Figures 3 & 4). Ninety-four percent of restorations received a rating of excellent, as they exhibited no visible signs of wear. Wear resistance has been consistent through each year of this five-year evaluation. ■



ALPHA II AP + + + + 1/2

Dental Technologies, Inc.
800.835.0885 • 847.677.5500
www.dentaltech.com

Ask The Editors:
Visit online at www.dentaladvisor.com
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Description

ALPHA II AP is an esthetic, light-cured, resin-based, micro-hybrid composite. The material is indicated for Class I-V restorations. It is filled 53% by volume with inorganic particles ranging in size from 0.02 – 2 microns. The radiopaque composite contains fluoride and may be light-cured in 2-mm increments with a 600 mW/cm² light-curing unit. **ALPHA II AP** is available in 13 Vita shades (plus four opaque and one incisal shade) and is packaged in 4.5-g syringes or unit-dose capsules. There are three composite syringes, 4 g of **ALPHA-ETCH37**, 3 ml of **ALPHA-BOND Adhesive**, accessories and instructions in a syringe kit and 15, 0.30-g unit-dose capsules per unit-dose refill kit. **ALPHA II AP** was evaluated by 27 clinical consultants in 521 restorations. This product received a 92% clinical rating.

Suggested Retail Cost

- \$50.00/syringe kit
- \$24.95/unit-dose refill kit

Product Features

ALPHA II AP is a good composite with excellent shade matching and blending with restored tooth after curing. Consultants reported that the composite polished to a nice finish and was a simple system to use. The minimal packaging is ideal for

Consultants' Comments

- ♦ "Shades were an excellent match."
- ♦ "A good, simple-to-use system."
- ♦ "I like the minimal packaging."
- ♦ "The applicator brush heads are too large."

ecologically-conscious consultants. Consultants found the handling to be ideal. Several consultants noted that the material was sensitive to ambient light. The fluoride-release is a good feature and the unit-dose availability provides convenience. A majority of the consultants noted they preferred the unit-dose to syringe dispensing and some had difficulty dispensing the material from the syringe. Consultants recommended that the product name and shade be imprinted on each capsule for ease of identification. Seventy-two percent of consultants rated **ALPHA II AP** as equal to or better than the resin composite they were currently using, 55% would switch, and 55% would recommend **ALPHA II AP** to a colleague.

Clinical Tips

- Refrigerate **ALPHA II AP** for optimal use.
- Agitate the bonding liquid during application to get a solid, shiny surface.
- Bevel the cavosurface and feather-in the margins with a moist microbrush for great esthetics. ■

Quadrant Anterior Shine + + + +

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

Description

Quadrant Anterior Shine is a light-cured, radiopaque, Bis-GMA, micro-hybrid composite. It is filled 63% by volume and 74% by weight. The composite is indicated for Class III, IV, and V restorations and is available in 15 shades: A1, A2, A3, A3.5, A4, B2, B3, C2, C4, D3, OA2, OA3.5, Dark, Incisal, and Bleach. Fluorescent pigments increase the vitality of the restored teeth. The refractive index of the barium glass helps the restoration to blend into the cavity preparation.

Quadrant Anterior Shine is available in 0.25-g unit-dose capsules and 4-g syringes. The starter kit contains five syringes or 50 capsules of composite (shades A2, A3, A3.5, AO3.5, and Incisal), a 2.5-ml syringe of *Quadrant Total Etch* (20% phosphoric acid), a 4-ml bottle of *Quadrant Uni-1-Bond*, and accessories. A custom kit of **Quadrant Anterior Shine**, including a complete shade selection and accessories all in a plastic storage container with capsule holder slots, was evaluated by 34 clinical consultants in 323 restorations. This composite received an 88% clinical rating.

Suggested Retail Cost

- \$ 29.99 refill kit
- \$ 164.99 starter kit

Product Features

The extensive instructions for **Quadrant Anterior Shine** include color photographs of step-by-step cases. The packaging is excellent and the kit complete. The composite syringes and unit-dose capsules dispense the material with moderate pressure. The viscosity allows for easy dispensing and adaptation of the composite to the tooth, but composite did stick to instruments. The material stacks well and readily adapts to the tooth. The shade match before and after curing



Consultants' Comments

- ♦ "Packaging is exceptional – wow!"
- ♦ "Quadrant Anterior Shine is easy to sculpt."
- ♦ "Material is creamy and handles nicely."
- ♦ "Blends nicely with tooth."
- ♦ "Color-code the capsules for easy identification."
- ♦ "Increase the selection of light shades and translucent shades."

and the blending of the composite are very good. Long bevels of the cavity preparation will result in a smooth color transition from tooth to composite. The composite is easy to finish, and a high-gloss polish can be achieved. Final esthetics of the restorations received high marks. Sixty-three percent of consultants found **Quadrant Anterior Shine** equal to or better than their current anterior composite, 50% would switch to it and 75% would recommend it to a colleague.

Editors' Note: The Cavex Quadrant line of restoratives also includes *Quadrant Universal LC* for anterior/posterior use and *Quadrant Posterior Dense* for posterior use. ■

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Description

seT is a self-etching, self-adhesive, fluoride-releasing, dual-cured resin cement. It is indicated for the cementation of indirect ceramic, metal or composite inlays, onlays, crowns, bridges, posts, and screws. Cementation of veneers is not indicated because of the limited working time. **seT** is packaged in unit-dose capsules that are activated, triturated, and applied using a gun. The 50-count capsule kit requires refrigeration. The working time is 2 minutes and overall setting time is 5 minutes. Light-cure is 20 seconds for translucent materials and 40 seconds for darker shades. Exposure to operatory lights can accelerate the setting time. After seating the restoration, a two-second tack cure is recommended at the margins to facilitate cement cleanup. **seT** is available in six shades - A1, A2, A3, OA3, Translucent, and White Opaque. The cement has an 18-month shelf life. Twenty-seven consultants used **seT** in over 500 procedures. This product received a 96% clinical rating.

Suggested Retail Cost
• \$185.00/kit

Product Features

Consultants reported the packaging and manufacturer's instructions for **seT** to be very good. The consistency and flow of the cement also rated very good. Many consultants noted the cement had a nice viscosity and the adaptation to walls and posts was great. The shades available are excellent and the fluoride-releasing feature is a plus. Once mixed, the cement is easy to use and cleans up nicely. Consultants recommended cleaning up the cement quickly because it sets fast. The need to mix the cement in a triturator, the delivery mechanism and the need for refrigeration of kits were drawbacks for some. Many consultants reported a strong odor and unpleasant taste. There



Consultants' Comments

- ◆ "Shades are true to their designations."
- ◆ "Good working time."
- ◆ "The capsule activation button can be difficult to depress."
- ◆ "Make larger capsules for multiple-unit cases."
- ◆ "I would love to have this in a two-paste system."

were no reported debonds during the evaluation period. Fifty-six percent of consultants found **seT** to be equal to or better than their current self-adhesive resin cement, 41% would switch and 52% would recommend it to a colleague.

Clinical Tips

- Use just a two-second light-cure and then cleanup excess cement.
- Have your assistant hold the HVE in the mouth to reduce odor. ■

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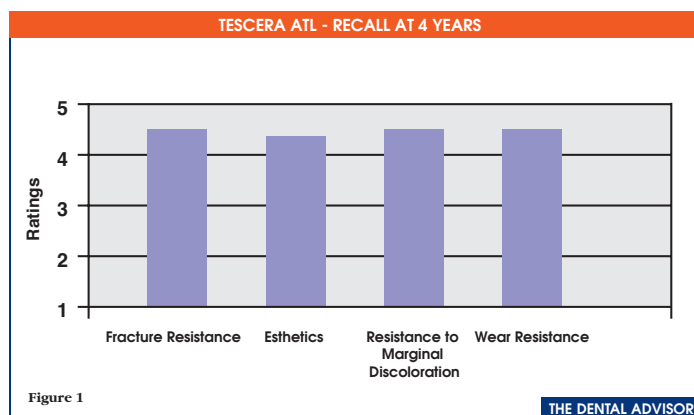


Description

TESCERA™ ATL™ is an indirect composite system indicated for inlays, onlays, veneers and crown and bridge permanent restorations. In the laboratory, a polymerization unit processes the restoration in an oxygen-free environment utilizing water, pressure, light, and heat. **TESCERA ATL** is available in a full range of opaque (Dentin) and translucent (Body) Vita shades. Additional Incisal shades and Characterization Tints can also be used for enhanced esthetics. This product received a 91% clinical rating.

Clinical Evaluation Protocol

- 52 restorations in 31 patients were available for recall at four years. These included 19 crowns, 26 inlays, and 7 onlays.
- All of these restorations have been in place for at least four years and 16 of them approached five years in vivo.
- 20% of the restorations were cemented with *DuoLink*, while the majority was cemented with *3M ESPE RelyX Unicem Self-Adhesive Universal Resin Cement* and *Appeal*.
- Restorations were rated on a scale of 1 to 5: 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent.
- Restorations were fabricated by Nellmar Laboratory, Ann Arbor, MI.



Clinical Observations

Fracture Resistance

Three **TESCERA** restorations fractured and were replaced during the four-year evaluation period. Two of the fractures involved Class II inlays on teeth #15 and #20 and the third was an MODL onlay on tooth #19. The fractures of the inlays were attributed to bruxism, whereas the fracture of the onlay occurred when the patient bit on an olive pit. Four other restorations had minor chips and these were repaired with flowable composite. Seventy percent of the restorations were rated excellent (Figures 1 & 2).



Consultants' Comments

- ◆ *"Inlays blend well with the teeth. In many cases it is hard to detect them."*
- ◆ *"TESCERA is very easy to adjust and polishes well after occlusal adjustments."*
- ◆ *"A good option for select cases."*
- ◆ *"TESCERA restorations have held up well at four years."*

Esthetics

Most restorations produced excellent blending with adjacent tooth structure. Translucency of the composite allows some of the underlying tooth color to shine through the restorations, enhancing vitality and esthetics. In one case involving a tooth with dark stain on the pulpal floor, the translucent quality negatively affected the final appearance. The majority of restorations were resistant to external staining, and the surfaces were smooth and glossy. Two of the 52 restorations were judged to be too opaque while five were too translucent; in those cases the restorations did not blend well with the surrounding tooth structure. Fifty-four percent of the restorations were rated as excellent (Figures 1 & 2).

Resistance to Marginal Staining

Seven restorations exhibited some microleakage, resulting in stain at the margins. Four of seven were slight in nature, while three were more pronounced. A contributing factor to the microleakage may be the relatively weaker bond of the cement to the laboratory-cured composite. In most cases the margins remained well sealed and were clinically acceptable (Figures 1 & 2). In no instance was any secondary caries detected at the margins of the restorations with microleakage.

Wear Resistance

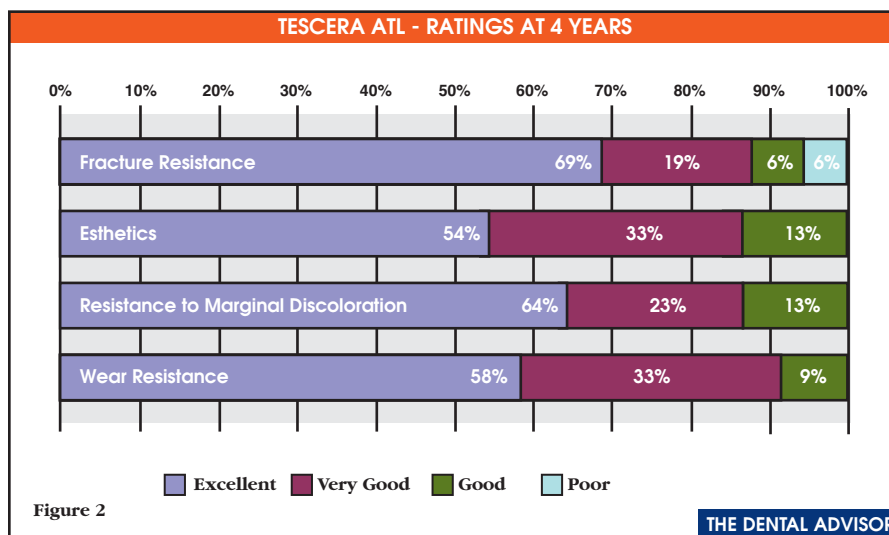
Surface wear was evaluated visually, both on **TESCERA** restorations and on the opposing dentition. Ninety percent of the restorations showed no visible signs of wear and received a very good to excellent rating (Figures 1 & 2). Only 10% of the restorations exhibited slight wear. No wear was noted on the opposing dentition! None of the restorations required replacement because of wear.

Summary

TESCERA has proven to be a reliable indirect composite for inlays, onlays, and premolar crowns in the four years since its introduction. It is especially effective in conservative restorations in teeth that are not badly discolored and patients who are not heavy bruxers.

Clinical Tips

- “Inlays blend well with the teeth. In many cases it is hard to detect them.”
- “**TESCERA** is very easy to adjust and polishes well after occlusal adjustments.”
- “A good option for select cases.”
- “**TESCERA** restorations have held up well at four years. ■



S3 C2 Face Mask + + + 1/2

Cranberry, USA
www.cranberryusa.com
 707-553-6190

Ask The Editors:
 Visit online at www.dentaladvisor.com
 to view Q & A about this product!



Description

S3 C2 Face Mask has an outside-in earloop wrap design. It has dye, chemical and lint-free cellulose inner layer. The filter layers are fiberglass- and latex- free and the outermost layer is designed to be fluid resistant for additional protection. **S3 C2 Face Mask** has a micro-layer of cucumber extract, adding a concept of skin care and comfort as well as a light cucumber scent. **S3 C2 Face Masks** are available in three colors (blue, lavender and pink) and are packaged in a 50-count box. Forty-one consultants used **S3 C2 Face Mask** in over 700 clinical procedures. This face mask received an 82% clinical rating.

Suggested Retail Cost

- \$7.99/box

Product Features

Consultants noted that the size and shape of **S3 C2 Face Mask** fit the face well. The 99% bacterial and particle filtration was

Consultants' Comments

- ◆ “The hypoallergenic construction makes it the one mask everyone in the office can grab.”
- ◆ “I love the scent, but make it last longer.”
- ◆ “The inner layer is smooth and does not irritate my nose.”
- ◆ “I really like the mask, but would probably purchase the available unscented version.”
- ◆ “The nose guard could use some increased support.”

a very important feature for consultants. They also noted the importance of a latex-, chemical-, dye-, and fiberglass-free mask. The inner surface of the mask is smooth, without any loose fibers that could irritate the nose. Cushioned earloops and full-length nose guard also enhance comfort. The cucumber extract and scent were appreciated by about half of the consultants, while the others did not care to have a scented mask. Fifty percent of consultants stated their willingness to switch to the **S3 C2 Face Mask**. Sixty percent of consultants judged this mask equal to or better than their current product and would recommend it to a colleague. ■

ProAngle PLUS + + + +

Pac-Dent International
909.839.0888
www.pac-dent.com

Ask The Editors:
Visit online at www.dentaladvisor.com
to view Q & A about this product!



Description

ProAngle PLUS is a disposable prophylaxis angle designed for ergonomics and durability. The latex-free cups are color coded to indicate their corresponding firmness: firm (purple) or soft (green), and are available in packages of 144 or 500. The angle is designed with reinforced, beveled gears providing stability of speed and improving the quietness and smoothness during operation, as well as a textured non-slip grip for the reduction of hand fatigue and arm micro-traumas. It is designed to fit all standard straight (nose-cone), Doriot-style handpieces. **ProAngle PLUS** was evaluated by 24 clinical consultants and their hygienists in nearly 800 prophylaxis procedures. This product received an 89% clinical rating.

Suggested Retail Cost

- \$149.95/500 count package
- \$49.95/144 count package

Product Features

The **ProAngle PLUS** was found to be an easy-to-use prophylaxis angle with simple instructions. The size and shape of the cup are excellent for everyday use. The color-coding simplifies identification of the correct firmness. Consultants reported a low level of noise during operation as well as good torque and feel in the hand. The cups were found to be durable and cleaned well, with good access to hard-to-reach teeth. Hygienists reported a moderate amount of splatter, and the flexibility and adaptation



Consultants' Comments

- ♦ *"These cups adapt and reach the posterior region well due to the length."*
- ♦ *"ProAngle PLUS operates quietly and smoothly."*
- ♦ *"Easy to use with no chatter and a good fit to the handpiece."*
- ♦ *"The firm cups seem to get really warm on the head."*
- ♦ *"Operating at a slower speed reduces the splatter."*
- ♦ *"The soft cups seemed more firm than what I am used to using."*

to teeth still have room for improvement. The soft cups were rated too flexible by some consultants, while others reported little or no difference in the two varieties. Seventy percent of consultants found **ProAngle PLUS** to be equal to or better than their current disposable prophylaxis angle, while 56% would recommend it to a colleague. ■

SPECIAL THANKS TO:

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