DEDICATED to DENTISTRY

THE DENTAL ADVISOR™

"Improving Patient Care Through Research & Education"

Vol. 23, No. 4
May
2006

UPDATE ON IMPLANTS 2

CLINICAL EVALUATIONS

CLASSIC PRODUCT
ONE-STEP PLUS 6
(Bonding agent)

Perfecta REV! 7
(Tooth whitening agent)

ALPHA-CORE DC 8
(Core material)

CLASSIC PRODUCT
Duo-Link 8
(Composite luting cement)

frog 9
(Bonding agent)

EDITORS' CHOICE

3-YEAR CLINICAL PERFORMANCE
3M ESPE RelyX Unicem Self-Adhesive Universal Resin Cement 10

PRODUCT UPDATE

Variolink Veneer 4
(Esthetic resin cement)



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

Update on Implants

Over the past decade, the use of dental implants has become one of the fastest growing treatment options in dentistry. An American Dental Association survey from 2002 revealed that the number of single-tooth implants placed in the last 10 years has increased more than threefold. While posterior single-tooth replacement with an implant is a relatively straightforward, predictable treatment, maxillary anterior single-tooth implants often present an esthetic challenge. Unsuccessful esthetic outcomes can lead to makeshift solutions that hide tissue defects. Advancements in surgical techniques and implant materials include improvements in implant surfaces and designs, the use of customized abutments, the meticulous orientation of implants, and the use of temporization protocols to develop favorable soft tissue profiles around the implants.

This issue of THE DENTAL ADVISOR discusses newer techniques in implant dentistry that aid in gaining an esthetic result with maxillary anterior implants. New implant materials and troubleshooting common problems with single-tooth implants are also reviewed.

Ratings

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

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Update on Implants

Stimulating and Maintaining Interproximal Bone

The occurrences of soft and hard tissue changes in implantology are significant due to resorption of bone before and after implant placement. The gingival architecture of an implant is closely tied to the underlying bone structure. Changes in bone morphology often manifest themselves in changes in the soft tissue profile around an implant. When single implants are placed beside adjacent teeth, the interproximal tissues are usually maintained, provided that the biologic width of the teeth remains constant. However, when two implants are placed adjacent to each other it is often difficult to maintain an adequate amount of interproximal bone height to support a papilla. While research has shown that an inter-implant distance of 2 to 3 mm and a bone crest-to-contact point of about 3.5 mm can support the presence of an inter-implant papilla, there is still great need to increase the predictability of papilla formation between anterior implants.

Manufacturers have changed the design of their implant body or the relation of their abutment and implant in order to help support soft tissue and/or maintain interproximal bone. Some of the more recent changes include:

Certain*® *PREVAIL*™/*3i – the abutment implant interface is changed utilizing the concept of platform switching, where an abutment diameter smaller than that of the implant is used. Theoretically, this change medializes the forces on the implant and leaves more room for the connective tissue to adapt around the collar of an implant. Thus, preventing the loss of bone to the first thread of an implant, as normally seen with a traditional abutment placement, is prevented.



Certain PREVAIL
(3i)

NobelPerfect®/*Nobel Biocare* – the first implant that replicates natural anatomy. The scalloped profile is designed to support the interproximal bone ridge, encourage soft tissue attachment and make natural soft tissue contours possible with implants. ***NobelPerfect*** can be used in all positions with scalloped bone anatomy. The primary advantage is in the premolar-to-premolar region for single or multiple units.



NobelPerfect
(Nobel Biocare)

Maturing of the Soft Tissue – Provisional Restoration and Fabrication of a Custom Impression Coping

The development of an ideal soft tissue contour often requires the use of a provisional restoration to shape the surrounding tissue. As much as an ovate pontic site in a traditional fixed partial denture can help support the appearance of a papilla between abutment teeth, the addition of resin on a temporary implant crown can guide the soft tissue into areas that are deficient in the appearance of a papilla. This technique requires careful detail in order to avoid too much pressure on the soft tissue around an implant and prevent total collapse of this fragile area. Once a provisional restoration with an ideal contour is placed and the peri-implant tissue is allowed to mature and heal in this new position, it is necessary to have an accurate transfer of this contour to the laboratory for fabrication of the definitive restoration.

The cylindrical shape of standard impression copings cannot accurately transfer the natural three-dimensional emergence profile of incisors, because once the temporary is removed, the peri-implant tissue is unsupported and will collapse. Customization of standard impression copings, based on the shape of an ideal temporary, can be used to transfer an ideal soft tissue contour.

Procedure

- The ideal provisional crown and temporary abutment are detached from the implant site and attached to an implant analog.
- The analog with the abutment jig and provisional crown are then embedded into an impression material, making sure to record the cervical area at least 1-mm coronally to the peaks of the papilla.
- Once the material sets, the provisional restoration and the abutment are removed from the analog and a standard impression coping is placed on the analog. The contour of the provisional crown will be represented in the space between the impression coping and the walls of the impression material. This space is filled with a resin material.
- After the resin is set, the impression coping is removed from the analog.
- The customized impression coping is placed in the mouth and a final impression is made.
- When the impression is poured, the lab technician will unscrew the customized impression coping and have the contours of the ideal restoration in the model.

Fabrication of the Provisional Restoration

Patients who select implants to replace anterior teeth often wish for a faster treatment time in order to hasten a presentable dental appearance. The placement of a fixed provisional at the time of implant placement will contribute to the early foundation for esthetic implant restorations, aiding in the creation of proper soft tissue contours and emergence profiles. Some clinicians have postulated that the sooner a provisional crown can be used to help develop soft tissue profile, the better the likelihood of an esthetic result.

continued on page 4

Survey of Clinical Consultants

In a recent survey of our Clinical Consultants, we asked about their preferences for usage of impression materials for implant cases. The results are summarized from over 80 responses.

Do you ask your laboratory for impression material recommendations?

17% Yes
83% No

Does your laboratory recommend different impression materials for crown and bridge versus implant cases?

10% Yes
90% No

Does your laboratory recommend specific brands of impression materials for implant cases or just advise on a viscosity?

17% Recommends a specific brand
37% Advises heavy-bodied
30% Advises regular-bodied
9% Advises "implant" impression product

Does your laboratory suggest an impression technique?

53% Full-arch tray
28% Custom tray
17% Quadrant tray
9% Double-arch tray

What kind of impression materials do you primarily use for implant cases?

29% Polyether
71% Addition silicone

What kind of impression materials do you primarily use for crown and bridge cases?

31% Polyether
69% Addition silicone

Update on Implants *continued*

Benefits of making an impression for the fabrication of a custom provisional crown and final abutment at the time of implant placement include:

- Allows the dentist to evaluate the development of the emergence profile during provisional phase.
- Requires that only one impression be taken on the day of surgery by the surgeon.
- Allows placement of the provisional abutment and provisional crown by the surgeon at Stage 2, if not on the same day as the surgery.
- Allows simple adjustments to be made to the final abutment out of the mouth before having the final crown made if gingival recession occurs.

Index Implant Day of Surgery – Two Options

- Some implant systems have fixture mounts or drivers that can act as impression copings. The surgeon can take indexes of the implant the day of the surgery before the flap is closed. These indexes can then be used to help fabricate provisional restorations, custom abutments, or final restorations for later restorative steps.
- All implant systems (e.g., ***Bioborizon***, ***Zimmer***) have impression copings that can be attached the day of surgery to create an index.

Matching Component System

CAD/CAM technology can be used to mill custom titanium or zirconium abutments that help support soft tissue and leave the ideal amount of space for the final restoration.

One company, *Atlantis*, has partnered with most of the major implant companies to provide duplicates of abutments. With an index taken at surgery and an opposing model, two identical abutments and one temporary can be fabricated.

Troubleshooting

- After placing the impression coping, check that it is seated completely. Take an x-ray to make sure the coping is flush with the implant.
- When torquing a component for an impression coping or an abutment, never force the screw. Providing torque greater than that recommended by the manufacturer can strip the screw. If a screw requires extra force, determine if the component is seated properly.
- Before cementing the crown on the implant, it is advisable to take an x-ray to be certain that the abutment is seated completely on the implant.
- It is safer to use a temporary cement in place of a permanent cement in case one needs to remove the crown; however, use of a permanent cement will provide better retention.
- If the screw holding the abutment loosens and the crown cannot be removed, drill an access opening similar to an endodontic access opening to reach the screw head.
- Before cementing the crown, place a bead of low-viscosity silicone impression material over the screw head to prevent the cement from clogging it.

Product Update

Variolink Veneer, previously known as *Appeal Anterior*



Ivoclar Vivadent, Inc., (800.533.6825) introduced *Appeal* in 2004 as their new esthetic resin cement. *Appeal Anterior* and *Appeal Posterior* were evaluated by the editorial staff of THE DENTAL ADVISOR and received a 5+ rating in Vol. 21, No. 6, July/August 2004. *Appeal* does not replace *Variolink II*, but rather offers clinicians a choice of a light-cured esthetic resin cement based on a value-shaded system. *Appeal Anterior* consists of seven value shades: three brightening and three darkening effects and a medium translucency. It received excellent ratings for the shade accuracy of the try-in pastes, viscosity and ease of clean up. Editors found this system very easy to use and allowed them to shift the brightness or darkness of a restoration at cementation. Ivoclar Vivadent, Inc., recently changed the

Crown Cementation

Permanent cements – As implant systems have proven to be successful, many practitioners are using permanent cements to retain crowns on implant abutments rather than temporary cements. The main consideration in the choice of a permanent cement is easy clean up. With any cement, removal of all excess cement is critical to maintain the health of the surrounding gingiva. Most commonly, glass ionomers (***3M ESPE Ketac-Cem***, ***GC Fuji I****/GC America*), resin-modified glass ionomers (***3M ESPE RelyX Luting Plus***, ***GC Fuji Plus****/GC America*), and polycarboxylate (***3M ESPE Durelon Carboxylate Luting Cement***) cements are used.

Temporary cements – Though permanent cements are being used more often for retaining crowns on implant abutments, many practitioners prefer temporary cements in the event that they would need to reach the implant or abutments. The comparative table below highlights temporary cements that can be used with implant systems. ■

THE DENTAL ADVISOR Recommends:

Non-eugenol Zinc Oxide: ***3M ESPE RelyX Temp NE (96%), GC Temp Advantage (93%), TempoCemNE Automix (93%);***
Resin: ***PreVISION CEM (93%)***

Temporary Cements for Use with Implants

Product	Company	Dispensing Method	Cure	Working Time, min	Setting Time, min	Compressive Strength, MPa	Cost, $/ml	Rating
Non-eugenol Zinc Oxide								
3M ESPE RelyX Temp NE	**3M ESPE**	Tubes A & B	SC	1:30-2:30	3:30-4:00	2.8	$1.22	**96%**
EXACTA CEMENT XTRA	**EXACTA DENTAL**	Cartridge and automix syringe	SC	1:00-1:30	2:00-3:00	4.7	$5.19	**93%**
GC TEMP ADVANTAGE	**GC America**	Automix syringe	SC	2:00	2:00-4:00	7.7	$3.02	**93%**
NOGENOL	**GC America**	Tubes A & B	SC	3:00	3:00-5:00	5.9	$0.90	**na**
NoMIX Temporary Cement	**Centrix**	Syringe & unit dose	SC*	1:30	5:00-15:00	nt	Starter kit: $8.07/ml, Syringe refill kit: $8.58/ml, Unit dose refill kit: $7.06/ml	**92%**
PowerTemp	**J. Morita USA**	Cartridge and automix syringe	SC	1:30	2:00-3:00	5.9	Cartridge: $1.58/ml, Automix syringe: $3.98/ml	**na**
ProvisaCEM	**Benco Dental**	Cartridge and syringe	SC	2:00	2:00-3:00	nt	Refill: $1.30/ml, Kit: $5.50/ml	**na**
Provicol	**VOCO**	Automix syringe, cartridge and tubes	SC	1:30-2:00	4:00-6:00	nt	Automix syringe: $6.39/ml, Cartridge: $1.29/ml, Tubes: $0.74/ml	**93%**
SensiTemp NEZO	**Sultan Healthcare**	Cartridge and automix syringe	SC	1:30	2:00-3:00	nt	$3.36	**88%**
Temp-Bond NE	**SDS/Kerr**	Tubes A & B and unit dose	SC	1:30	6:00	4.4	$0.76	**92%**
TempoCemNE Automix	**Zenith Dental/DMG**	Cartridge	SC	1:00	4:00-5:00	5.6	$4.89	**93%**
ZONE	**DUX Dental**	Automix syringe, syringe, tubes A & B, unit dose	SC	0:30	2:30	4.3	Automix syringe: $13.75, Syringe: $3.76, Tubes: $1.10, Unit dose: $1.96/ml	**na**
Resin								
Premier Implant Cement	**Premier**	Automix syringe	SC	0:45-1:00	4:00-5:00	156	$9.92	**91%**
PreVISION CEM	**Heraeus Kulzer**	Tube	SC	1:30	2:00	nt	$1.91	**93%**
SensiTemp Resin	**Sultan Healthcare**	Cartridge and automix syringe	SC	1:30-2:00	4:00-5:00	nt	$3.36	**86%**
Systemp.link	**Ivoclar Vivadent**	Automix syringe	DC	2:30-3:00	4:00**	16.1	$8.81	**88%**
Temp-Bond Clear	**SDS/Kerr**	Syringes A & B	DC	2:00	4:00**	15	$10.55	**87%**
TNE	**Temrex**	Syringe and automix syringe	SC	2:30-3:00	2:00	81	Automix syringe: $5.89/ml, Syringe: $3.18/ml	**na**

**cures on contact with moisture*
***without light curing*
na = not available, nt = not tested
DC = dual-cured, SC = self-cured

EDITORS' NOTES: *Only products evaluated by THE DENTAL ADVISOR will have a rating listed, and are eligible for listing as a recommended product. Some table information provided by manufacturers. Costs are listed for comparison only and are not used to calculate the ratings. Cost of accessories is not removed for the calculation of the Cost, $/ml.*

Copy

THE DENTAL ADVISOR typically evaluates products that are relatively new to the market. Recently, we have identified a category of products we call *Classic Products*. A *Classic Product* is one that was rated highly in a previous evaluation and continues to perform well consistently. Manufacturers are offered the opportunity to have their *Classic Products* re-evaluated to determine how they rate in today's market and to introduce them to a new generation of dental professionals. Look for *Classic Product* evaluations in this and future issues of THE DENTAL ADVISOR. ■

ONE-STEP® PLUS + + + +

Bisco, Inc.
800.247.3368 • 847.534.6000
www.bisco.com



Consultants' Comments

- ***"Patients did not report an objectionable odor or any post-operative sensitivity."***
- ***"This is a well-organized kit in a durable box."***
- ***"Great versatility."***
- ***"It is difficult to judge the amount of liquid remaining in the bottle."***

Description

ONE-STEP PLUS is a 5th-generation, 8.5% filled, light-cured bonding agent (average filler particle size – 1 µm, average film thickness – 10 µm) with an acetone solvent. It may be used to bond light- and self-cured composite to dentin, enamel, cast metal, set amalgam alloys, and treated ceramic surfaces. It may also be used in combination with resin cement for the luting of indirect resin, metal, or ceramic restorations. Additional suggested uses include the desensitization of tooth preparations and exposed root surfaces. Bonding steps include etching with phosphoric acid or *TYRIAN SPE* (self-priming etchant), applying two consecutive coats of ***ONE-STEP PLUS***, air drying, and light curing for 10 seconds. The kit evaluated included two syringes of *UNI-ETCH*® (5 g each), *CAVITY CLEANSER* (3 ml), *AQUA-PREP™F* (2 ml), ***ONE-STEP PLUS*** (6 ml), disposable mixing wells, and accessories packaged together in a plastic storage container. Twenty-seven clinical consultants evaluated the adhesive in over 450 restorative applications. This product received an 88% clinical rating.

Suggested Retail Cost
- $103.00/kit

Product Features

Consultants found the packaging, kit organization, ease of use, handling characteristics, and overall utility as a bonding agent to be very good. Lack of patient sensitivity, a good viscosity and thin film thickness were also mentioned as positive attributes. No separate activation component is required, and storage and use at room temperature were considered time-saving aspects. Some consultants found the suggested 20-second application of *AQUA-PREP F* (a post-etchant rewetting agent) to be a time-consuming additional step. Other consultants saw little benefit in the inclusion in the kit of *CAVITY CLEANSER*, a 2% chlorhexidine gluconate solution to be used immediately following rotary instrumentation or acid etching. The need to apply the ***ONE-STEP PLUS*** adhesive in two coats and agitate the layer was also viewed as a step away from simplicity. Eighty-five percent of consultants termed ***ONE-STEP PLUS*** to be equivalent to or better than their current adhesive. Approximately 33% of the consultants stated their willingness to switch to ***ONE-STEP PLUS***, and 75% would recommend it to a colleague. ■

Editors' Note: *A 5th-generation bonding agent used with a traditional phosphoric acid etchant requires more time and steps than the newer 6th- and 7th-generation self-etching products. The **ONE-STEP PLUS** kit evaluated contains additional products – AQUA-PREP F and CAVITY CLEANSER - which add more steps and time to each procedure. While the manufacturer recommends their use to help decrease post-operative sensitivity, their use is optional. ONE-STEP was previously evaluated in THE DENTAL ADVISOR PLUS, Vol. 5, No. 5, June 1995. It received a 96% rating. **ONE-STEP PLUS** with **TYRIAN SPE** was previously evaluated in THE DENTAL ADVISOR, Vol. 21, No.8, December 2004. It received an 86% clinical rating.*

Perfecta REV! + + + +

Premier Dental
888.670.6100 • 610.239.6000
www.premusa.com

Description

Perfecta REV! is a 14% hydrogen peroxide, home tooth-whitening agent in a predominantly water base to hydrate the teeth as it whitens. Hydrogen peroxide breaks down more quickly than the carbamide peroxide used in some whitening products, permitting a shorter application time of 15 minutes. The whitening gel is dispensed in small amounts into custom trays and worn for 15 minutes, once per day during a two-week course of treatment. Immediately after the whitening trays are removed, two capfuls of *Perfecta REV! Finishing Rinse* are swished around the teeth for 20 seconds, and then expelled. *Perfecta REV! Finishing Rinse* has a cool-mint flavor and contains pentasodium triphosphate, which the manufacturer reports will help to lift and remove enamel stains. The kit contains two, 3-ml syringes of 14% whitening gel; one, 4-oz bottle of *Perfecta REV! Finishing Rinse*; whitening toothpaste; dispensing tips; instructions; and a patient guide. Thirty patients used ***Perfecta REV!*** at home over a three-month period. This product received an 86% clinical rating.

Suggested Retail Cost
- $32.50/kit

Product Features

Consultants and patients found the packaging to be very good, noting that the kit was different from other whitening systems on the market. Some consultants would have liked tray material to be included, and more than one patient noted that they ran out of product before the end of the treatment. The majority of patients commented that ***Perfecta REV!*** was easy to use, and the treatment time of 15 minutes was excellent. Many consultants felt that the ease of use and the short treatment time added to patient compliance. Whitening results reported were varied. Many patients showed shade changes of three to nine shades on the Vita value-arranged guide. Several consultants and patients were disappointed with the whitening results, noting that the level of whitening was less than that achieved with other products they previously recommended or used. Taste, aftertaste, and odor were rated as good. The finishing rinse markedly reduced tissue irritation and sensitivity although some patients commented that there was some burning when using the finishing rinse. The rinse was noted by many to be their favorite part of the kit. Fifty percent of consultants would recommend ***Perfecta REV!*** to a colleague, and 50% would purchase it.

Clinical Tips

- Warn patients that the gel is very strong.
- Use the minimum amount of gel in a scalloped tray to avoid contact with soft tissue. ■



Consultants' Comments

- ***"The packaging is great, really unique."***
- ***"The rinse really helps with sensitivity."***
- ***"Some patients ran out of gel."***
- ***"Include a bleaching tray case in the kits."***

Patients' Comments

- ***"The short amount of time I have to wear the trays is great!"***
- ***"My gums stung a little when using the finishing rinse."***
- ***"I did not like the results as much as I did with the last home product."***

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ALPHA-CORE™ DC + + + +

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



Consultants' Comments

- ***"My assistants liked not having to hand mix the core material."***
- ***"Make a shorter mixing tip – a lot of material seems to be wasted."***
- ***"Include more mixing tips in the kit."***
- ***"Natural shade is ideal under all-ceramic restorations."***

Description

ALPHA-CORE DC is a highly filled, dual-cured composite core material supplied in an automix cartridge. The material is radiopaque and contains fluoride. ***ALPHA-CORE DC*** is intended for core build-ups and cementation of pins and posts when used with a 5th-generation dentin adhesive. The automix cartridge allows for direct placement of the material with intraoral tips. ***ALPHA-CORE DC*** is available in three shades: natural (approximately an A2 shade), white, and blue. Working time is 1.5 minutes; self-curing time is 5 minutes. Light curing of 4-mm layers requires 40 seconds. ***ALPHA-CORE DC*** is packaged in a 50-g cartridge with 10 mixing tips and 10 intraoral tips. Only the natural shade was evaluated. Twenty-five consultants evaluated ***ALPHA-CORE DC*** in over 225 uses. This product received an 88% clinical rating.

Suggested Retail Cost
- $79.95/package

Product Features

The auto-mix cartridge delivery system of ***ALPHA-CORE DC*** was well received, and the material provides adequate working time. The narrow intraoral tips are bendable with finger pressure and allow accurate placement of material, but the cartridge requires a significant amount of pressure to extrude the material through the intraoral tip. The flow of ***ALPHA-CORE DC*** is ideal for use with posts or when a fairly large amount of tooth structure is remaining.

When ***ALPHA-CORE DC*** was used in large cores, it was noted to slump and a stiffer material would have been preferred. ***ALPHA-CORE DC*** has fair adaptation to dentinal walls with minimal voids noted. The material cuts nicely and many consultants commented that it cut similarly to dentin. The instructions included with ***ALPHA-CORE DC*** are complete regarding handling of the material but do not recommend a specific bonding agent. Sixty-eight percent of consultants rated ***ALPHA-CORE DC*** the same or better than their current core material, while 55% would switch and 68% would recommend ***ALPHA-CORE DC*** to a colleague.

Clinical Tips

- The manufacturer recommends the use of a 5th-generation bonding agent. One with a dual-cured feature would be appropriate with a dual-cured core material.
- When using intraoral tips in canals before post placement, use a slow, steady pressure as the tip is moved from an apical to a more coronal position to allow for the escape of trapped air.
- Build up the core in increments, curing each section to allow the material to be stacked. ■

frog + + + + ½

Southern Dental Industries
800.228.5166 • 630.238.8300
www.sdi.com.au

Description

frog is a 6th-generation, Type I, light-cured, self-etching bonding system for use with direct and indirect restorations, dentin sealing, and repair of restorations. It is available in both two-bottle and unit-dose kits. The system can be used on both dentin and enamel, without the use of a separate phosphoric acid etchant. The bonding agent includes a color dye indicator that turns clear to indicate complete light curing has occurred. The primer must be left on the tooth for 20 seconds, lightly air-blown, followed by bond application, air-blowing, and light curing for 10 seconds. ***frog*** requires refrigeration when not in use. The introductory kit evaluated includes one, 5-ml bottle of primer; one, 5-ml bottle of bond; 40 disposable brush applicators; two dispensing wells; and instructions. Thirty-three consultants evaluated ***frog*** in over 750 restorative procedures. This product received a 92% clinical rating.



Consultants' Comments

- ***"Good viscosity – primer covers the tooth surface well."***
- ***"Easier to remove metal matrix bands compared to similar bonding agents."***
- ***"Post-operative sensitivity was non-existent!"***
- ***"Longer application time than some other 6th-generation agents."***
- ***"Color change was not very dramatic."***

Suggested Retail Cost
- $90.00/introductory kit

Product Features

frog was very well-received by consultants. All were familiar with similar 6th-generation bonding agents and found ***frog*** easy to use. Instructions are easy to follow and packaging is compact. Although consultants preferred a shorter application time for the primer, the overall time for use is not significantly different from similar products. The most highly-rated features of ***frog*** include the lack of post-operative sensitivity, the ease of bottle dispensing, and the ease of application. The viscosities of the primer and bond allow proper wetting of tooth structure. A lack of odor was noted to be an advantage over similar products. Although the product can be used for a broad range of applications including repair of porcelain restorations, a dual-curing option would make the system more universal. Overall, 97% of consultants found ***frog*** to be equivalent to or better than their current 6th-generation bonding agent. Forty-two percent indicated that they would switch to ***frog***, and 97% would recommend it to a colleague. ■

Duo-Link + + + + ½

Classic Product

Bisco, Inc.
800.247.3368 • 847.534.6000
www.bisco.com



Consultants' Comments

- ***"Easy to use and dispense."***
- ***"I've used Duo-Link for three years and experienced no debonding."***
- ***"Good for post cementation."***
- ***"Long setting time when not light-cured."***

Description

Duo-Link is a dual-cured composite luting cement. It is indicated for the adhesive cementation of all-ceramic and indirect composite restorations and esthetic fiber posts. The material is "radio-apparent," filled 60% by weight, and comes in translucent (universal) and clear shades. ***Duo-Link*** is intended for use with 4th- or 5th-generation bonding agents. Working time is 2:15 minutes, with a maximum 5:30 minutes set time without light curing. Light curing for 40 seconds is recommended when possible. The kit evaluated includes two, 8-g dual-barrel syringes of base/catalyst translucent cement; 30 mixing tips; and instructions. Kits with separate base and catalyst syringes are also available. Twenty-five consultants evaluated ***Duo-Link*** for the adhesive cementation of over 200 ceramic inlays/onlays and crowns, 135 composite inlays/onlays and crowns, and 90 esthetic fiber posts. This product received a 92% clinical rating.

Suggested Retail Cost
- $89.00/kit

Product Features

Overall, ***Duo-Link*** was well-received by consultants. The material has been on the market for many years and is a time-tested product that follows classic adhesive cementation procedures. The manufacturer's instructions are concise and easy to follow. The most-liked features included the ease of dispensing from the dual-barreled syringe and the usefulness for a variety of applications. Best results for easy cement removal were reported when tack-curing the material to a rubbery stage for 3-5 seconds, then removing the excess. Consultants noted very good working and setting times, with minimal post-operative sensitivity. The two shades were adequate for all cementation procedures performed. Eighty-two percent of consultants rated ***Duo-Link*** to be equivalent to or better than their current resin cement. Sixty-one percent would switch to ***Duo-Link***, and three out of four consultants would recommend the product to a colleague. ■

Editors' Note: *Bisco makes a unit-dose needle tip which was not included in the packaging for this evaluation.* ***Duo-Link*** *was previously evaluated in THE DENTAL ADVISOR Plus, Vol. 5, No. 2, March/April 1995. It received a 91% clinical rating.*

Copy

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2006 Preferred Product

Editors' Choice

3M ESPE RelyX Unicem Self-Adhesive Universal Resin Cement + + + + +

3M ESPE
800.634.2249
www.3MESPE.com

Description

3M ESPE RelyX Unicem Self-Adhesive Universal Resin Cement is an encapsulated, dual-cured resin cement. It is self-adhesive, requiring no tooth surface preparation such as etching or priming. The cement is filled 72% by weight and contains fluoride. ***RelyX Unicem*** is supplied in capsules in shades A1, A2, A3 opaque, white opaque, and translucent. It is indicated for the cementation of metal, PFM, ceramic and laboratory composite crowns, bridges, inlays/onlays, and posts. It is not recommended for use with veneers. Working time is 2:00 minutes for the Aplicaps and 2:30 minutes for the larger Maxicaps. The Aplicaps have enough material to cement one or two restorations, whereas the Maxicaps have enough material for up to five restorations. This product received a 98% clinical rating.

Suggested Retail Cost

- $99.00/Aplicap trial kit (20 capsules + hardware)
- $225.00/Maxicap introductory kit (20 capsules + hardware)
- $220.60/Aplicap refill (50 capsules)
- $178.60/Maxicap refill (20 capsules)

RECALLED AT 3 YEARS

Distribution of Restorations Cemented with *3M ESPE RelyX Unicem Self-Adhesive Universal Resin Cement*

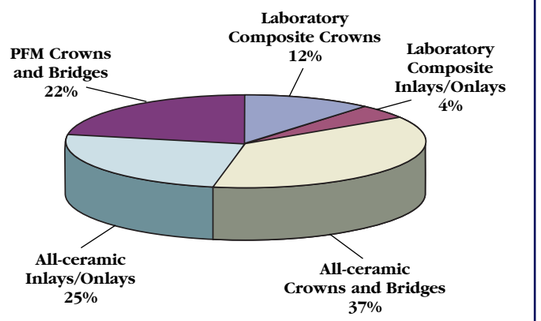


Figure 1

THE DENTAL ADVISOR

Clinical Evaluation Protocol

- More than 3,000 restorations have been cemented with ***RelyX Unicem*** over the past three years. The majority were all-ceramic and PFM restorations while 200 were laboratory-fabricated composites. These included crowns, bridges, inlays/onlays, and posts. ***(Figure 1)***
- 1,250 restorations were available for recall at three years.
- Categories evaluated at recall included:
  - Post-operative sensitivity
  - Microleakage
  - Debonding

Clinical Observations

Post-operative sensitivity

A low incidence of post-operative sensitivity has been observed with ***RelyX Unicem*** since its introduction and subsequent monitoring over a three-year period by THE DENTAL ADVISOR. It has been rare for patients to report sensitivity. At three-year recall, the number of patients who experienced occasional temperature sensitivity was 1.6% ***(Figure 2)***. Less manipulation of the prepared tooth and the minimal number of steps required for cementation may contribute to the low number of teeth exhibiting post-operative sensitivity.

CLINICAL OBSERVATIONS – RECALL

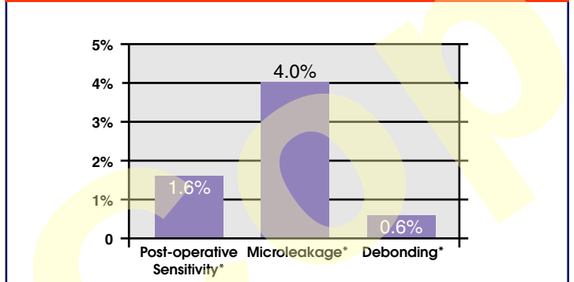


Figure 2

THE DENTAL ADVISOR

*Post-operative sensitivity and microleakage are based on 1,250 patients that were recalled. Debonding is based on 3,000 cemented restorations.

3-YEAR CLINICAL PERFORMANCE



Consultants' Comments

- ***"Best all-around cement I have ever used."***
- ***"No etching, no bonding agent, simple to use, no mess."***
- ***"I love RelyX Unicem because it requires fewer steps and minimizes the potential for contamination with almost no post-operative sensitivity."***
- ***"Excellent bond to the tooth. I had to remove a PFM crown where the porcelain fractured and I had to section it into six pieces to remove it."***
- ***"This is a must-have cement in my practice."***
- ***"It has simplified the cementation of all-ceramic restorations."***

Microleakage

Of the 1,250 ceramic restorations recalled, approximately 4% had evidence of microleakage ***(Figure 2)***. Less than 1% of the 1,250 ceramic restorations required replacement. Microleakage, often exhibited by graying at the margins of all-ceramic restorations, is unfortunately a reality in some esthetic cases. Microleakage can result from improper isolation or improper pre-treatment of the restoration. Microleakage can also result from excessive bruxism, where the bond at the cervical margin is compromised, allowing the ingress of fluid and bacteria. The microleakage rate of restorations cemented with ***RelyX Unicem*** is comparable to restorations cemented with a 5th-generation bonding agent and corresponding light- or dual-cured resin cement. Laboratory composites, especially crowns, exhibited a microleakage rate of 12.5%, three times that found with all-ceramic restorations.

Debonding

A low debonding rate was documented over the three-year period. In over 3,000 restorations cemented with ***RelyX Unicem***, 18 restorations (0.6%) required re-cementation ***(Figure 2)***.

These included 10 ceramic onlays and eight ceramic crowns. In four of the debonding cases, a portion of the tooth actually fractured in the crown. The debonding rate of laboratory composites was higher than that of ceramics. Of the 200 laboratory composites, inlays/onlays and crowns cemented with ***RelyX Unicem***, 14 (7%) debonded. This debonding rate appeared to be more related to the restorative material used than the cement itself. ■

Editors' Note: *It was noted that the rates for microleakage and debonding for laboratory composite crowns were at least three times higher than all-ceramic crowns. This result may be due to the lower rigidity of the laboratory composite crowns. As a patient masticates on a crown, it flexes and results in high stresses at the cement/composite interface, eventually resulting in microleakage and loss of retention. Another factor could be that the laboratory composites are highly polymerized and lack the free radicals that can enhance the bond. Microleakage and debonding of inlays/onlays of composite and ceramic restorations were similar, probably because these restorations are smaller and confined within the tooth, minimizing flexure.*

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