

THE DENTAL ADVISORTM

Improving Patient Care Through Research & Education



Infection Control

Environmental Surface Disinfection

Current infection control recommendations state that environmental surfaces (dental equipment, light handles, counter surfaces, and dental unit hose lines) require either surface cleaning and disinfection or replacement of disposable covers between patients. Until recently, environmental surfaces were thought to play only a small role in the transmission of nosocomial (i.e., hospital-acquired) pathogens. Updated evidence now indicates that contaminated surfaces are important vehicles in health-care associated infections caused by certain microorganisms, including methicillin-resistant *Staphylococcus aureus* (MRSA) and noroviruses. Medical evidence has shown that these pathogens are able to persist in the environment for prolonged intervals, frequently contaminate hands/gloves of health professionals, and are difficult to eradicate by cleaning and disinfection procedures.

This issue of THE DENTAL ADVISOR reports on environmental surface cleaning and disinfection and discusses commercial disinfectant spray and wipes.

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RATINGS:

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

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Guest Editorial

John A. Molinari, Ph.D. and Peri Nelson, B.S.



John A. Molinari, Ph.D.

Many operatory surfaces become coated with saliva, blood, exudate, and other biological debris during delivery of patient care. These surfaces require cleaning and disinfection when it is not feasible to use disposable covers. Chemical disinfectants serve a useful purpose to accomplish this important infection control procedure. A number of product formulations have become available, as the area of environmental surface asepsis continues to be emphasized in recommendations published by the Centers for Disease Control and Prevention (CDC) and the American Dental Association (ADA).

Unfortunately, dental professionals can sometimes become confused when deciding which of the many products to use. Despite extensive published medical and dental literature, questions continue to be asked about what features should be considered when selecting a spray or wipe disinfectant. The following brief article was written to provide information, describing basic principles of environmental surface asepsis, classification and regulation of commercial products, research findings from our laboratory studies, as well as available product choices. Space for the discussion does not allow for a more detailed presentation, so please do not hesitate to contact us at THE DENTAL ADVISOR should you have specific questions or need additional information.



Peri Nelson, B.S.

Environmental Surface Disinfection

Cleaning and decontamination processes between patients remain important elements of an effective infection control program and the procedures involved in environmental surface asepsis are the same for both medical and dental clinical settings. Unfortunately, even though introduction of new disinfectants and disposable barriers has assisted health care professionals in implementing recommended protocols that address surface contamination, some people remain confused regarding potential hazards and current recommendations to minimize the potential for cross-contamination and cross-infection from inanimate surfaces.

Classification of Contaminated Items and Environmental Surfaces

The efficacy of available agents can be compared with published criteria for an ideal surface disinfectant. Note that none of the available products fulfills all criteria.

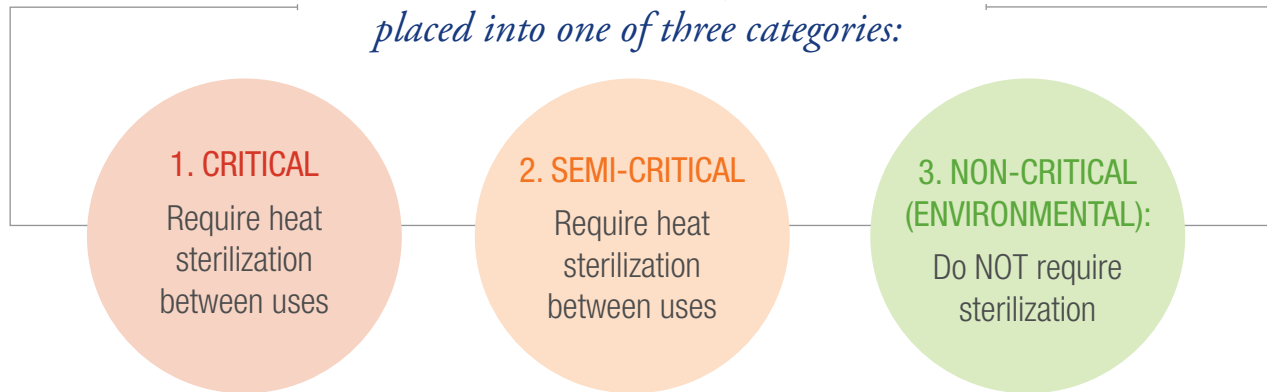
Ideal Features of a Disinfectant

- Broad spectrum: *Widest possible antimicrobial spectrum*
- Fast-acting: *Rapidly lethal action on all vegetative bacteria, fungi, and viruses*
- Not affected by physical factors (*blood, saliva, and exudate, etc.*)
- Non-toxic, non-allergenic
- Odorless
- Surface compatibility: *Should not compromise integrity of dental equipment and metallic surfaces and should not cause the disintegration of cloth, rubber, plastics, or other materials*
- Residual effect on treated surfaces
- Eco-Friendly
- Economical and easy to use

Classification (cont.)

A standard classification system for chemical sterilants and disinfectants was proposed by Spaulding in 1972 and is used by regulatory agencies and manufacturers alike. This system was updated to include dental instruments, equipment, and surfaces in 1991 (Table 1). This system differentiates infection risks from contaminated instruments compared with those from other health care-related devices or environmental surfaces.

Patient care items and equipment are placed into one of three categories:



Item Category	Item Definition	Is Item Used in the Mouth?	Potential Risk of Disease Transmission	Method of Decontamination
Critical	Penetrate soft tissue, contact bone, enter into or contact the bloodstream, or other normally sterile tissue	Yes	Very high to high	Sterilization
Semi-critical	Contact mucous membranes or nonintact skin, but will not penetrate soft tissue, contact bone, enter into or contact the bloodstream, or other normally sterile tissue	Yes	Moderate	Sterilization or high-level disinfection
Non-critical items (environmental)	Contact with intact skin	No	Low to none	Intermediate- to low-level disinfection or simple cleaning

Table 1: Modified Spaulding Classification of Chemical Sterilants and Disinfectants.

Optim 33TB

++++ 1/2

SciCan
(800) 572-1211
www.scican.com



Product Description: *Optim 33TB* is a ready-to-use, disinfectant designed for cleaning and disinfection of non-porous environmental dental surfaces. It has a non-abrasive formula and virucidal, bactericidal, tuberculocidal and sanitizing properties.

Optim 33TB has an approved tuberculocidal contact time of 5 minutes in the US and 1 minute in Canada. *Optim 33TB* is available in 32 oz bottles, 1 gallon bottles and in wipes. *Optim 33TB* was evaluated by 40 consultants in 2092 uses. It received a 92% rating.

Different classes of chemical germicides and their use are related to sterilization or disinfection capabilities. These include the efficacy against vegetative bacteria, tubercle bacilli, fungal spores, lipid and nonlipid containing viruses, and bacterial endospores (Figure 1).

Treatment of contaminated environmental surfaces does not require use of chemical sterilants or high-level disinfection. Instead, CDC recommendations for preparation of these surfaces between patient appointments describe utilization of either intermediate- or low-level disinfectants. Intermediate level disinfectants may not inactivate bacterial endospores but do kill other microbial forms, especially tubercle bacilli. *Mycobacterium tuberculosis* presents a severe challenge to many chemical disinfectants because of its outer cellular wax and lipid layers. Therefore, it is considered to be among the more resistant microorganisms after bacterial endospores, and documentation of tuberculocidal activity is required for a product to be classified as an intermediate-level disinfectant (Table 2). The ability to destroy *M. tuberculosis* does not necessarily signify that a chemical is able to inactivate all viruses. Intermediate level disinfectants used in dentistry should be EPA-registered as tuberculocidal hospital disinfectants, with appropriate virucidal activity (Figure 1).

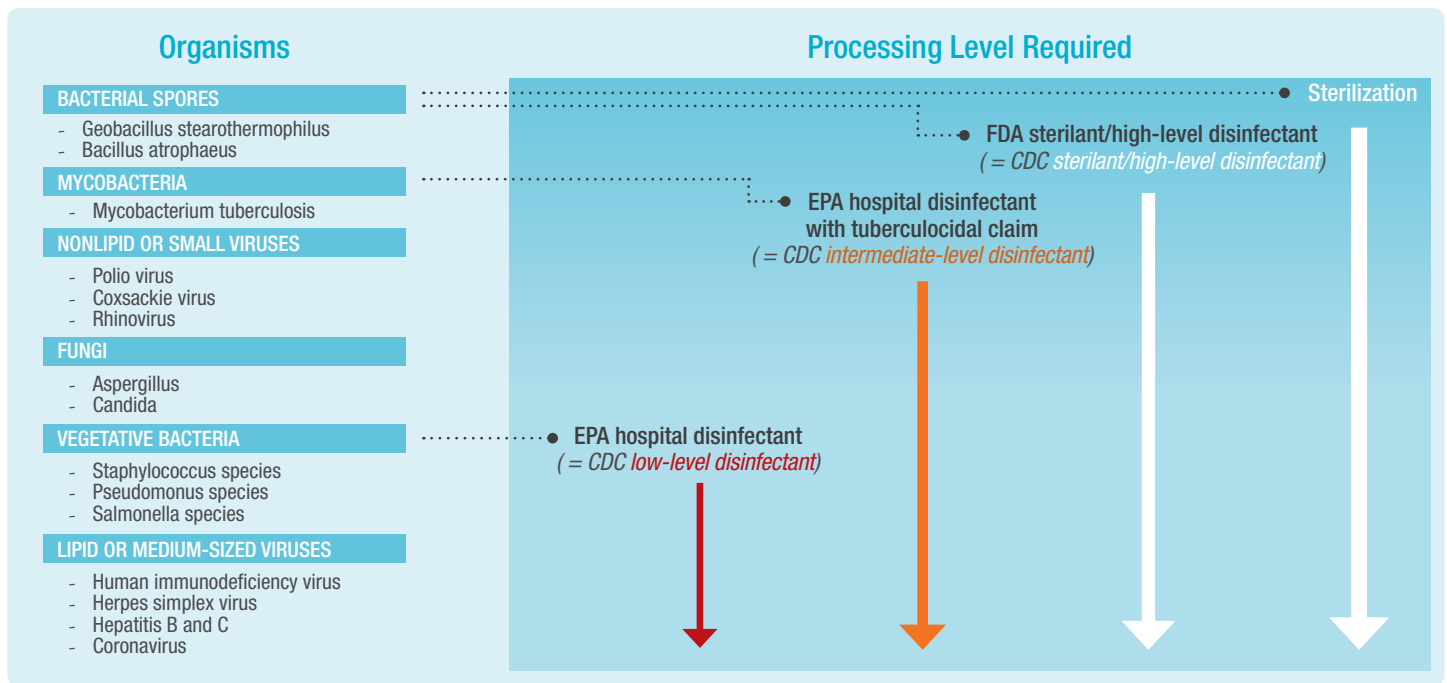


Figure 1: Decreasing Order of Resistance of microorganisms to Germicide Chemicals.

Adapted from: CDC. *Guidelines for infection control in dental health-care settings – 2003*. Morbidity and Mortality Weekly Report. 2003;52(RR-17)1-66.

Product	Company	Active Ingredients	Alcohol (%)	Tuberculocidal Time	Application Options	Microbiological Testing by TDA
 Birex	Biotrol	0.28% o-phenylphenol; 0.03% o-benzyl-p-chlorophenol	—	10 minutes	Sprays and Wipes	C & D
 Cavicide1	Kerr Totalcare	0.76% didecyl dimethyl ammonium chloride	22.5	1 minute	Sprays and Wipes	C & D
Cetylstat	Cetylite, Inc.	0.33% didecyl dimethyl ammonium chloride	72.5	1 minute	Sprays	CE
Defend Plus	Mydent International	0.12% n-alkyl dimethyl benzyl ammonium chloride 0.12% n-alkyl dimethyl ethyl benzyl ammonium chloride	41.58	5 minutes	Wipes only	C & D
Discide Ultra	Palmero Health	<1% quaternary ammonium compound	63.25	1 minute	Sprays and Wipes	C & D
Lysol III	Reckitt Benckiser	0.10% alkyl dimethyl benzyl ammonium saccharinate	58	10 minutes	Spray only	C & D
Monarch Surface Disinfectant	Air Techniques	0.2% chlorhexidine gluconate	70.5	1 minute	Sprays and Wipes	CE
 Opticide	Biotrol	0.154% n-alkyl dimethyl ethylbenzyl ammonium chloride 0.154% n-alkyl dimethyl benzyl ammonium chloride	21	3 minutes	Sprays and Wipes	C & D
 Optim 33TB	SciCan	0.5% hydrogen peroxide	—	5 minutes (U.S.) 1 minute (Canada)	Sprays and Wipes	C & D
PD Care	Patterson Dental	0.28% diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride	17.2	3 minutes	Sprays and Wipes	NT
Prospray C-60	Certol	9% o-phenylphenol; 1% o-benzyl-p-chlorophenol	—	10 minutes	Sprays and Wipes	NT
Sani-Cloth Plus	PDI	0.25% n-alkyl dimethyl ethylbenzyl ammonium chloride 0.25% n-alkyl dimethyl benzyl ammonium chloride	14.85	5 minutes	Wipes only	C
Sporicidin Surface Disinfectant	Sporicidin	1.56% phenol; 0.06% sodium phenate	—	10 minutes	Sprays and Wipes	NT
Super Sani-Cloth	PDI	0.25% n-alkyl dimethyl ethylbenzyl ammonium chloride 0.25% n-alkyl dimethyl benzyl ammonium chloride	55	2 minutes	Wipes only	C & D
Volo	Sultan Healthcare	0.12% n-alkyl dimethyl ethylbenzyl ammonium chloride 0.12% n-alkyl dimethyl benzyl ammonium chloride	41.58	2 minutes	Wipes only	NT

Table 2: Representative Intermediate-Level Environmental Surface Disinfectants.

Legend: C = cleaning study, D = disinfection study, CE = currently being evaluated, NT = not tested



TDA Recommends: *Intermediate-Level Environmental Surface Disinfectants*

- **Birex** (Biotrol)
- **Cavicide1** (Kerr Totalcare)
- **Opticide** (Biotrol)
- **Optim 33TB** (SciCan)

Proper Cleaning and Disinfection of Environmental Surfaces

Published guidelines for dentistry attempt to foster understanding by defining and discriminating between the two categories of environmental surfaces (Table 3):

Type of Surface	Definition	Examples
Clinical Contact	Surfaces that are frequently touched or that become contaminated and subsequently contact instruments, devices, hands, or gloves	Light handles, switches, dental x-ray equipment, chairside computers, drawer handles, faucet handles, countertops, pen, telephone handle, doorknob
Housekeeping	Surfaces that do not come into contact with patients or devices used in dental procedures	Floors, walls, sinks

Table 3: Categories of Environmental Surfaces.

The simplest way to approach the subject of environmental surface disinfection is to adhere to a basic premise of aseptic technique; that is, **clean it first**. If barriers are not used, surfaces should be cleaned and disinfected using an EPA-registered hospital disinfectant with a low- (i.e., HIV and HBV label claims) to intermediate-level (i.e., tuberculocidal claim) activity after each patient. An intermediate-level disinfectant should be used when the surface is visibly contaminated with blood or other potentially infectious material (OPIM).

Initial cleaning and disinfection are important not only for esthetic reasons, but primarily because together they minimize the potential for cross infection from environmental surfaces. Manufacturers are also required to state on the product label that the disinfectant should be used on pre-cleaned surfaces. Although separate cleaners and disinfectants may be applied, chemical agents that accomplish both functions offer a more efficient approach. Thus, a fundamental consideration for chemical selection should be the agent's ability to penetrate and pre-clean surfaces contaminated with saliva, blood, or exudate.

Surfaces where a barrier is not used should be cleaned and disinfected using a intermediate-level (i.e., tuberculocidal claim) or low-level disinfectant after each patient. An intermediate-level disinfectant should be used when the surface is visibly contaminated with blood or other potentially infectious material.

Disinfection of environmental surfaces involves a two-step procedure, historically termed a “spray–wipe–spray” technique. Water-based disinfectants, particularly those that contain a detergent, are effective in the initial pre-cleaning step. For the most part, pump spray bottles are appropriate for cleaner/disinfectants. Recently, disposable cloths or wipes pre-saturated with disinfectants have become more commonly used in dental practices than liquid spray formulations. Because these products are saturated with chemical cleaners and antimicrobial agents they decrease the amount of chemical sprayed in the environment. A number of the currently available disinfectant wipes contain a range of alcohol concentrations in addition to other chemical agents that function primarily as surface cleaners. A common problem when these products were first introduced was that they evaporated quickly and weren't able to keep the surfaces wet for the required disinfection contact time. A number of changes were made in the composition and thickness of the fabric and amount of liquid absorbed into the wipe to address this concern. Also, to be effective two cloths must be used when surfaces are visibly soiled — one for cleaning and another for disinfecting the surface (i.e., “wipe-discard-wipe” technique).

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GC KALORE

GC America, Inc.

(800) 323-7063, (708) 597-0900 | www.gcamerica.com, www.kalore.net

Description

GC KALORE is a low-shrinkage, universal nanofilled composite indicated for use in all classes of direct restorations. This composite combines a new monomer from DuPont along with UDMA but contains no Bis-GMA. **GC KALORE** contains High Density Radiopaque (HDR) pre-polymerized fillers. **GC KALORE** is available in 26 shades, including 15 universal shades, five opaque shades and six translucent shades. Each shade is available in 0.3 g capsules or 4 g syringes. Curing time is 20 seconds with a standard halogen or LED light for most shades.

Clinical Evaluation Protocol

- 178 **GC KALORE** restorations were placed and monitored over a three-year period.
- Recall ratings for 87 restorations were recorded and are included in this report.
- Of these restorations, 93% were posterior and 7% were anterior.
- At recall the following categories were assessed on a scale of 1-5 (1=poor, 2=fair, 3=good, 4=very good, 5=excellent).

Clinical Observations

Resistance to Fracture/Chipping

GC KALORE proved to be very durable during the three-year recall period (Figure 1). Over 98% of the restorations evaluated received an excellent rating. Of 87 restorations, one had a slight chip that did not require treatment and one fractured, requiring replacement. The fractured filling was a Class II restoration on tooth #20.

Esthetics

Ninety percent of restorations were rated excellent for esthetics at three years (Figure 1). The remaining 10% were rated very good and showed minor discoloration or lack of blending with the tooth. Superior esthetics was obtained when shades were layered at placement. **GC KALORE** blends well and has a high quality of finish and polish at placement; restorations maintained an excellent finish over the three-year period.

Resistance to Marginal Discoloration

The majority of restorations placed with **GC KALORE** were resistant to staining and marginal discoloration. Ninety-five percent of restorations evaluated received an excellent rating (Figure 1). Four restorations showed slight staining at the margin.

3-year Clinical Performance

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Consultants' Comments

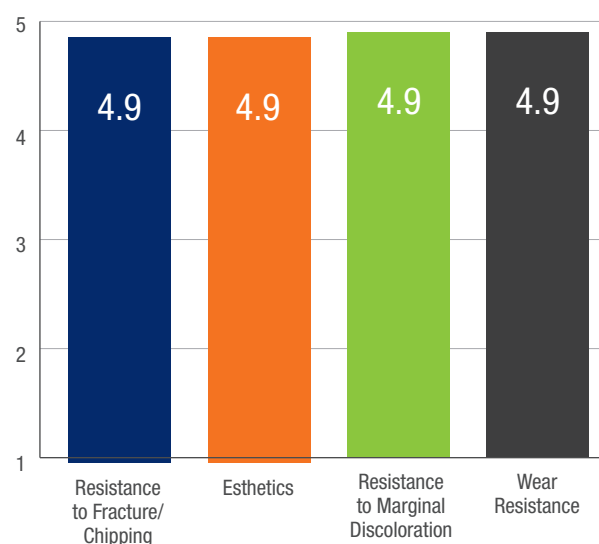
"Body shades can be used alone or layered."

"Great handling characteristics - not sticky at all."

"Good consistency for establishing interproximal contacts."

"Material is radiopaque."

FIGURE 1 Results of three-year recall of **GC KALORE**.



Wear Resistance

Only one restoration placed with **GC KALORE** was observed to have slight wear at year three. That restoration was a Class I filling on a second molar. The remaining 86 recalled **GC KALORE** restorations rated very good or excellent for wear resistance (Figure 1).

Conclusions

GC KALORE universal composite had excellent ratings for resistance to chipping/fracture, resistance to marginal discoloration and wear resistance over a three-year period. Shades blended well and excellent esthetics was maintained. **GC KALORE** received a 98% clinical performance rating. ■

PRODUCT UPDATE

1Shot SUB Series + + + 1/2

1Shot SUB Series is a dental x-ray holder system with recently upgraded medical-grade silicone elastic bands to help secure the film or sensor in place. The system is designed to fit all film, phosphor plates and digital sensors in all sizes. Holders are color-coded plastic and include styles for taking bitewing, anterior/posterior periapicals, and anterior/posterior endodontic radiographs. **1Shot SUB Series** can also aid in aligning the x-ray tube to the film/sensor. All x-ray holders and silicone universal bands are reusable and autoclavable. The starter box contains eight holders and 80 **SUB** bands. Seventy-five percent of consultants found the new bands to be an improvement over the previous version and 100% felt they held the sensor more securely in the holder. This product received an 82% clinical rating.

Top Operator Products
(256) 234-5678 | www.1shotdental.com



Bluephase Style

Ivoclar Vivadent

(800) 533-6825 | www.ivoclarvivadent.com

Description

Bluephase Style is a cordless LED curing light designed with “polywave” broadband spectrum technology making it suitable for the polymerization of light-curing dental materials between the wavelengths of 385-515 nm. This includes restoratives, bonding agents/adhesives, bases, liners, fissure sealants, temporaries, and luting materials for brackets and indirect restorations. It has a light intensity of 1100 mW/cm² and curing time selections of 10, 15, 20 and 30 seconds. The lithium-polymer battery is manufactured to last approximately 2 ½ years, takes approximately 2 hours to completely charge and has a total curing capacity of 20 minutes. The unit includes an induction-charging base with corded operation of the light as an option. **Bluephase Style** is available with blue, gray or pink color bands and includes a 10-mm light probe, three anti-glare cones, 50 protective sleeves, lithium polymer battery, charging base, and power supply cord. **Bluephase Style** was evaluated by 14 consultants in 605 uses. This LED curing light received a 96% clinical rating.

Suggested Retail Cost \$1330.00/unit

Equipment Features

Bluephase Style is a slim, lightweight curing light with comfortable ergonomics. The pen-style light is designed for simple use and has only two buttons. One button changes the time setting and the other is used for activation. The activation button is sensitive, requiring the lightest

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Consultants' Comments

“Lightweight and ergonomically friendly.”

“Easy to get in tight spaces.”

“Easy, stable docking.”

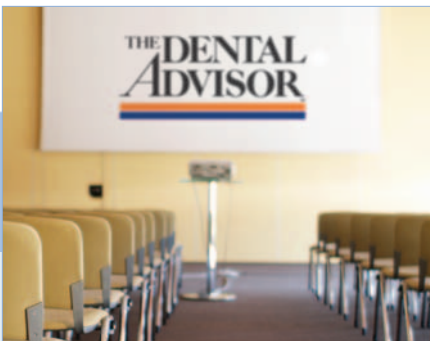
“Quiet operation.”

“Illuminated docking station has a high-tech appearance.”

“Make the activation button less sensitive.”

“Add a five-second time option.”

touch. The display is easy to read as it counts down the time. Consultants found this light reached posterior teeth well. The inductive charging does not use battery contacts so the light unit drops in place in any orientation. Forty-three percent of consultants rated **Bluephase Style** better than other LED curing lights they were using and 36% rated it equivalent. Eighty-six percent would switch to **Bluephase Style** and would recommend it to a colleague. ■



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(734) 665-2020 ext. 107

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Composi-Tight 3D XR Sectional Matrix System

Garrison Dental Solutions

(888) 437-0032, (616) 842-2244 | www.garrisdental.com

Description

Composi-Tight 3D XR Sectional Matrix System is designed to create tight, anatomical contacts on Class II composite restorations. The rings in the **3D XR system** are produced with *Soft Face™* silicone to enhance matrix band adaptation and improve contacts, reducing flash and finishing time. The **3D XR Ring** (blue tip) is an ultra-retentive matrix ring designed for use on short or malpositioned teeth, primary teeth and in areas between the canine and first bicuspid. The **3D XR Ring** also works well with standard height teeth. The **3D Ring** (orange tip) is indicated for use in most circumstances as it adapts to a variety of tooth anatomies. **Composi-Tight 3D XR** and **3D Rings** are angled to allow stackability in any combination for MOD and multiple-tooth restorations. The **Composi-Tight 3D XR Sectional Matrix System** is available in a variety of kit configurations. The complete kit includes one **3D XR Ring**, two **3D Rings**, 100 assorted non-stick *Slick Bands*, 100 *WedgeWands*, 20 *FenderWedge* interproximal tooth shields, matrix band forceps, ring placement forceps and a multi-function composite instrument. **Composi-Tight 3D XR Sectional Matrix System** was evaluated by 14 consultants in 359 uses. This sectional matrix system received a 96% clinical rating.

Suggested Retail Cost \$699/Complete Kit

Product Features

The new blue **Composi-Tight Soft Face 3D XR Rings** were very retentive, even on short teeth. The soft silicone on the rings contributed to adaptation of the bands to the teeth and reduced the amount of flash in interproximal areas. The slick bands were easy to place and prevented composite from sticking to the surface. Consultants found the blue rings more stable than the orange rings and preferred them overwhelmingly. They were effective in all areas of the mouth. The main challenges with this system were on wide buccal-lingual preparations.

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Consultants' Comments

- "Blue rings are retentive and stable on teeth."
- "I thought the original 3D was a good product, but the new blue face is even better."
- "Great contours and contacts."
- "No excess flash."
- "Everything needed is in the kit."
- "Not ideal for wide proximal boxes."
- "The plastic wedges are slippery."

The kit was very complete and contained everything needed for matrix procedures. Fifty-seven percent of consultants rated **Composi-Tight 3D XR Sectional Matrix System** better than other sectional matrix systems they were using and 29% rated it equivalent. Seventy-one percent would switch to **Composi-Tight 3D XR Sectional Matrix System** and 86% would recommend it to a colleague. ■

Optimum Diamonds

Benco Dental

(800) 462-3626 | www.benco.com

Description

Optimum Diamonds are multi-use, friction-grip burs designed to cut quickly with minimum vibration while producing less heat. The burs are manufactured using a specialized HBN plating technique to enhance the bond and equalize distribution of the grit. This process may result in less pressure being required on the prepared tooth, reducing the load on the handpiece turbine. The manufacturer reports each diamond bur is microscopically tested for quality assurance. **Optimum Diamonds** are available in five-count packages and come with a 100% satisfaction guarantee. **Optimum Diamonds** were evaluated by 23 consultants in 694 uses. These diamond burs received an 89% clinical rating.

Suggested Retail Cost \$24.99/5 burs

Product Features

Optimum Diamonds are high quality, long-lasting burs, and many consultants noted that they cut as well as their currently-used name brand burs. They cut fast with precision and minimum vibration. Concentricity and fit in the handpiece were rated excellent. The wide selection of options allowed consultants to choose burs in similar sizes, shapes and grits to which they were accustomed. Burs are packaged in a five-count blister pack on a cardboard backing. Consultants would have preferred individual packaging for more efficient storage. ■

Venus White Max

Heraeus

(800) 431-1785 | www.heraeusdentalusa.com

Description

Venus White Max is an in-office whitening system utilizing 38% hydrogen peroxide as the active ingredient with potassium nitrate to minimize sensitivity. It does not require a chairside whitening light to produce impressive results. The gel is mixed using a syringe-to-syringe technique (one syringe contains concentrated hydrogen peroxide and the other contains chemical activator). The system comes with a light-cured gingival barrier designed to maintain an effective barrier yet be easily removed from embrasures and undercuts. **Venus White Max** may be used alone or followed up with a take-home product such as *Venus White Pro* or *Venus White Ultra*. Each **Venus White Max** kit contains:

- two syringes of hydrogen peroxide (0.96 mL)
- two syringes of activator with potassium nitrate (0.24 mL)
- one syringe of gingival barrier (1.2 mL)
- dispensing tips (five, 22 gauge Flock tips and two, 20 gauge Black Mini tips)
- instructions for use

A full line of patient marketing materials are available, including customizable pieces. **Venus White Max** is just one offering within the complete family of *Venus White* teeth whitening and oral care products.

Venus White Max was evaluated by four consultants in 12 whitening procedures. This in-office whitening system received an 90% clinical rating.

Suggested Retail Cost

\$57.53/Kit

Product Features

Venus White Max allows users the ease and flexibility of performing whitening procedures without a light. Mixing the gel is easily accomplished, and the kit contains enough material for at least 5, 15-minute treatments, although that many is not usually needed. The

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Consultants' Comments

"Good whitening results."

"Full line of marketing materials is available."

"Gingival barrier leaked, causing gingival irritation."

"Package the gels in a dual-barrel syringe with mixing tips."

Patients' Comments

"Even whitening - natural look."

"Took the stains away."

"Burned on my gums."

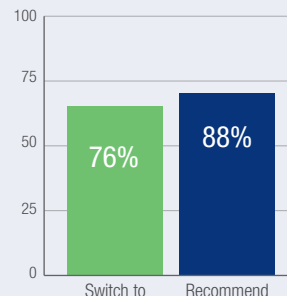
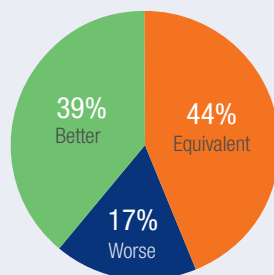
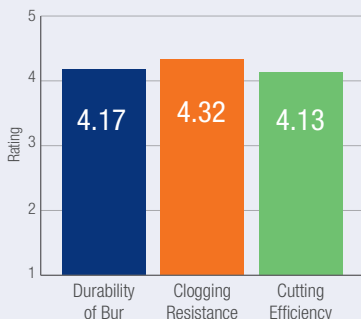
gingival barrier is effective in reflecting light and heat away from the soft tissue, but the low viscosity gel is challenging to apply effectively. Tooth sensitivity during the procedure was reported by 40% of patients; 60% reported gingival irritation. Whitening results were very good, and the shade changes averaged 5.5 (range of 2-10) on the Vita value-ordered shade guide. Seventy-five percent of consultants found **Venus White Max** to produce whitening results that were the same as or better than other in-office whitening systems they had used. Fifty percent of consultants rated **Venus White Max** better than other products they were using and they would switch to it and recommend it to a colleague. Ninety percent of patients would recommend **Venus White Max** to friends and family.

Clinical Tips

- Keep product refrigerated in storage, but bring to room temperature prior to use.
- Heraeus offers *Venus Comfort Gel*, containing potassium nitrate and fluoride, for patients that may be prone to sensitivity. ■

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Consultants compared **Optimum Diamonds** to other diamond burs:



Consultants' Comments

"Fast cutting and clog resistant."

"Durable through multiple sterilization cycles."

"**Optimum Diamonds** perform as well as my current brand."

"I prefer single-use disposable diamonds."

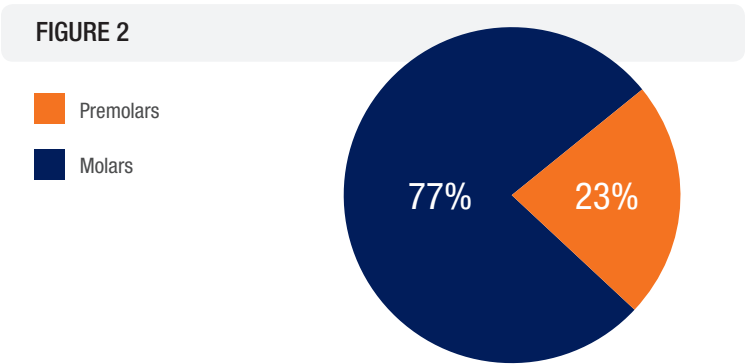
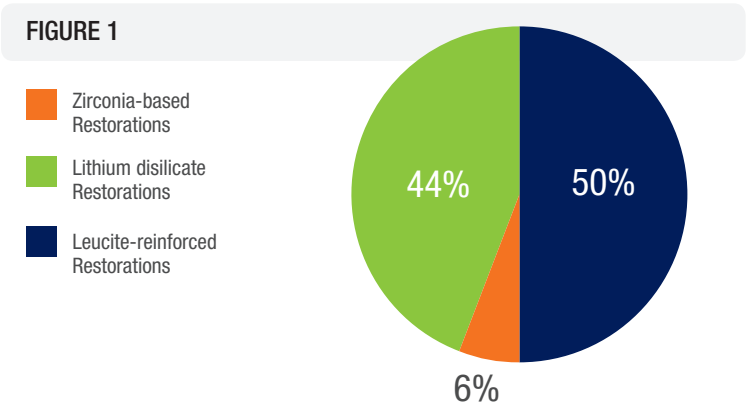
Ivoclar Vivadent
(800) 533-6825 | www.ivoclarvivadent.us.com

Description

Multilink Automix is a self-cure with optional light cure adhesive resin cement with a self-curing and self-etching primer. Suggested applications for **Multilink Automix** include cementation of indirect restorations made of metal, metal-ceramic, all-ceramic (zirconia, aluminum oxide, and glass ceramics), and fiber-reinforced composite. The use of a *Monobond Plus*, a universal restorative primer is recommended to achieve a stronger bond to all types of restorative materials. **Multilink Automix** is available in four shades with different degrees of translucency: transparent (high translucency), yellow (high translucency), white (medium translucency), and opaque (low translucency). The System Pack includes: 9 g **Multilink Automix** syringe, **Multilink Primer A & B**, *Monobond Plus*, 15 mixing tips, Liquid Strip and accessories. The purpose of this study was to determine the long-term clinical performance of **Multilink Automix** at three years.

Clinical Evaluation Protocol

Three hundred fifty-six all-ceramic restorations, cemented with **Multilink Automix**, were recalled at three years. The distribution of restorations is shown in Figure 1. Restorations were placed on 275 molar and 81 premolar teeth (Figure 2). At recall, restorations were evaluated on a 1-5 rating scale: 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent.



3-year Clinical Performance

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Consultants' Comments

"The esthetics and color stability in the restorations cemented with **Multilink Automix** is excellent."

"Little marginal discoloration was exhibited during the three years."

"Applying the primer during placement was easy and it appears to have enhanced the bond of the cement to the restoration."

Patients' Comments

"My crown feels great."

"My tooth still looks so natural."

"I had to have a root canal treatment after my crown but the crown is still in place."

Clinical Observations

Esthetics
Multilink Automix maintained excellent color stability in 100% of restorations placed over the three-year evaluation period (Figure 3), ensuring optimal esthetics of the restoration.

Resistance to Marginal Discoloration
Multilink Automix had minimal evidence of marginal discoloration (Figure 3). Ninety-nine percent of the restorations recalled showed no marginal discoloration. Three (<1%) of 356 restorations recalled at three years will need to be replaced as a result of discoloration.

Lack of Sensitivity
The majority of patients reported no sensitivity (Figure 3). Three patients indicated there was some initial mild sensitivity that resolved within a few months. Five (1.4%) of the 356 teeth recalled at three years had subsequently undergone root canal therapy due to large/deep cavity preparations. The pre-existing condition of these teeth, rather than the cement, seemed to be the reason the root canal therapy was needed. None of these restorations required replacement after endodontic treatment.

Multilink Automix Three-year Clinical Performance Report *(cont.)*

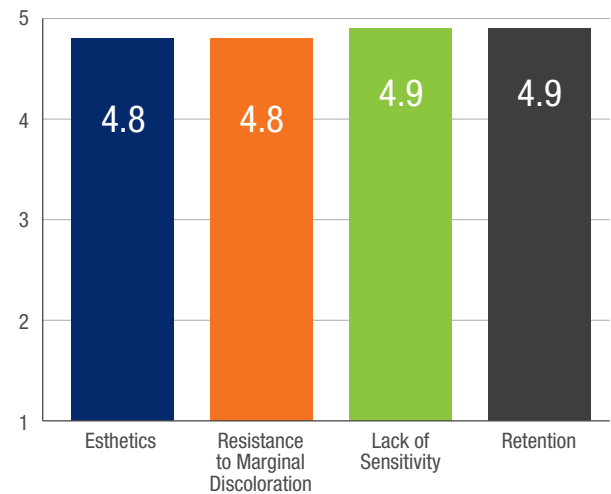
Retention

Multilink Automix was used to cement zirconia, lithium disilicate and leucite-reinforced inlays, onlays and crowns in posterior restorations. A low debonding rate was documented over the three-year evaluation period. Only seven (2%) of these restorations debonded, indicating excellent retention (Figure 3).

Summary

Three hundred fifty-six all-ceramic restorations, cemented with **Multilink Automix**, were recalled at three years. It received excellent ratings for esthetics, resistance to marginal discoloration, lack of sensitivity, and retention. **Multilink Automix** received a 97% clinical performance rating. ■

FIGURE 3 Results of **Multilink Automix** at 3 years



430 SWL ® Handpiece

DentalEZ

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

Description

The **430 SWL** is a fiberoptic, air-driven high-speed handpiece with a swivel coupler. The handpiece is available in *LubeFree* or lubricated models. Product characteristics include dual-beam lighting provided by solid glass rod fiberoptics, push-button bur-changing feature in the autochuck, ceramic bearings in the turbine, and a small 11 mm head size. The **430 SWL** handpiece may be autoclaved at 121°C. This stainless steel handpiece is available with a high-gloss or satin. A 360° quick connect coupler attaches to six-pin ISO fiber optic tubing and allows the handpiece to snap on and off. The **430 SWL LubeFree** handpiece is backed by a one-year warranty; the lubricated style has a two-year warranty. **430 SWL LubeFree** Handpiece with the 360° *Quick Connect HiFlo Swivel* was used by nine consultants during a three-month evaluation period. This high-speed handpiece received a 90% clinical rating.

Suggested Retail Cost \$1200.00/Handpiece

Equipment Features

The **430 SWL** is a lightweight handpiece with a small head that provides very good access in the mouth. Consultants considered it to be a good value and a good all-purpose handpiece. The chuck holds burs securely and runs without vibration. The fiberoptics provided illumination of the tooth surface, but the single water port did not

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Consultants' Comments

"Maintenance free!"

"Small head improves access and visibility."

"Performed very well."

"Quick connect coupler adds convenience."

"Everything I need in a handpiece."

"The satin finish has a more modern appearance than the high-gloss finish."

"A little louder than I would like."

"I prefer a three-port water spray."

always provide adequate water spray. The scalloped handpiece design is easy to clean and minimizes debris buildup. Maintenance of the *LubeFree* handpiece is easily accomplished by simply cleaning the exterior surface before sterilization. Twenty-two percent of consultants rated the **430 SWL** better than other high-speed handpieces they were using and 44% rated it to be equivalent. Sixty-seven percent would switch to the **430 SWL** and would recommend it to a colleague.

Clinical Tip

- Do not lubricate the *LubeFree* style handpiece. ■

Venus White Ultra

Heraeus

(800) 431-1785 | www.heraeusdentalusa.com

Description

Venus White Ultra is a convenient entry-level whitening system that patients can use at home with no chair time required. It is ideal for teen patients or those who cannot afford custom tray or in-office whitening, and might look for an over-the-counter alternative instead. The system consists of pre-formed, single-use whitening trays that are pre-filled with whitening gel. The gel is 11.2% mint-flavored hydrogen peroxide. Each kit contains seven upper and lower trays that are intended to be worn 30–45 minutes daily. A full line of patient marketing materials are available, including customizable pieces. **Venus White Ultra** is just one offering within the complete family of Venus White teeth whitening and oral care products. **Venus White Ultra** was evaluated by six consultants in 15 patient uses. This whitening system received an 86% clinical rating.

Suggested Retail Cost

\$33.58/Kit

Product Features

Venus White Ultra provides effective teeth whitening with no chair time required. For the dental practice that wants to provide their patients with a professional-strength alternative to over-the-counter products, **Venus White Ultra** was found to be a very good option. The trays are thin and flexible to provide universal fit. Some instances of excess gel overflowing along the edges of the tray and foaming was reported. Despite any contact of gel on the gingiva, 25% of patients experienced no irritation of soft tissue or tooth sensitivity. Visible whitening was noticed after the first use in many cases, and 75% of patients felt it whitened their teeth. The trays were small enough to fit in most adult mouths, but they were not long enough or high enough to completely cover areas desired in larger mouths. Seventeen percent of consultants rated **Venus White Ultra** better than other at-



Consultants' Comments

"Whitening was visible after the first use."

"Cost effective option for patients."

"No sensitivity to teeth or gingiva."

"No trays to load or clean."

"Quick and easy."

"Trays fit loosely and slide on the teeth."

"I would like the trays to extend over the first molars."

Patients' Comments

"Venus White Ultra provided great results."

"I liked not having to schedule an extra visit to the dentist."

"The trays fit poorly."

"It would foam and make my gums sore."

home whitening products they were using and 17% rated it equivalent. Seventeen percent would switch to **Venus White Ultra** and 33% would recommend it to a colleague. Forty-five percent of patients would recommend **Venus White Ultra** and they would continue using it.

Clinical Tips

- Instruct patients not to press down too firmly on trays so they don't spread gel onto soft tissue. Remove any excess gel from the edges of the tray after placement in the mouth.
- Send this home with the patient as a touch-up after in-office whitening. ■

SPECIAL THANKS TO:

Select Senior Clinical Consultants (Over 20 years):

J. Amara, CT · R. Fisher, OH · W. Gregory, MI · E. Katkow, MD · J. Lockwood, MI · J. Mayer, OH · W. Nagy, TX · G. Poy, MI · J. Shamraj, MI · R. Trushkowsky, NY · P. Yaman, MI

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