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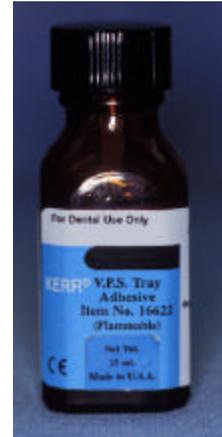
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# ADMINISTRATION

## 57-01 Tray Adhesive Complaint

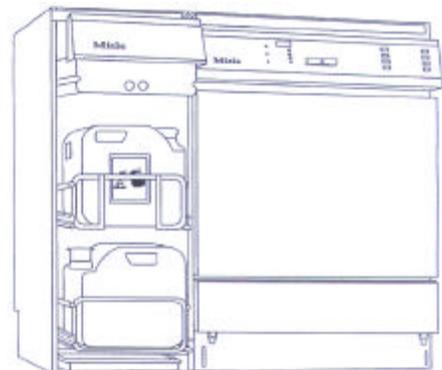
DIS recently received a complaint from an active duty USAF prosthodontist about a new version of V.P.S. Tray Adhesive (item number 16622) marketed by the Kerr Corporation. The adhesive is applied to tray acrylic in order to adhere addition silicone impression materials to the tray. One aspect of the complaint concerned the lack of pigment in the new clear adhesive (the previously marketed adhesive was blue). He reported that the lack of pigment made it difficult to see if the entire intended area of the tray had been covered with adhesive. Kerr has confirmed that other users have reported this problem. The clinician also reported that he believed the adhesive was less effective in adhering impression material to trays. Kerr has also confirmed this to be true, **if the clear adhesive is not allowed to dry adequately following application** (i.e., for the full 20-minute period recommended in the instructions). Laboratory testing at DIS found that it may be possible to use a shorter drying time without compromising retention, however DIS recommends waiting for a minimum of 20 minutes to allow the adhesive to completely dry. The problem will become moot in the future because Kerr intends to discontinue marketing the clear adhesive and replace it with the previous blue version. Until that time, **DIS recommends that users of the clear adhesive observe the recommended 20-minute drying time. Careful visual examination of trays should be made during the drying period to ensure that adhesive has been applied to all involved surfaces of the tray.**



(Lt Col Charlton)

## 57-02 Miele Thermal Disinfector Complaint

A number of facilities have reported reliability, repair, and customer service problems with the Miele Model G7781 Dental Thermal Disinfector (originally reviewed in *Dental Items of Significance* 47-38). To assess the severity of the problem, DIS conducted a survey of bases with Miele machines. The results of the survey indicated that of the reported 36 units in operation, 17 never or seldom broke down. Of the remaining 19 machines: 12 malfunctioned more than three times a year, 14 had circuit boards that required replacement or repair, 12 exhibited leaks, and 5 required replacement of their circulation pumps.



After providing the results of the survey to the Miele Corporation, DIS personnel met with a company representative to discuss the problems and seek satisfactory solutions. The problems basically centered on four areas: (1) water leakage from the unit (2) circulation pump and drain pump malfunctions (3) circuit board failures and (4) inadequate customer support which led to improperly trained personnel who didn't correctly install and service the Thermal Disinfectors. Each of these problems and their corrective actions are discussed below.

**Water Leaks** – Leakage occurred for several reasons with Miele units. A defective molding around the sump in some of the early units caused leakage as did a loose washer, seal, and nut assembly on a

component called the thermo limiter. Miele also was able to determine that certain pre-soak solutions that some technicians used to clean instruments before placing them in the Thermal Disinfectors occasionally caused oversudsing that led to water leaks. The mechanical problems have been corrected on newer units to prevent future problems with leaks.

**Circulation Pump and Drain Pump Malfunctions** – Miele acknowledged that some Thermal Disinfectors were shipped with faulty circulation pumps and drain pumps. This problem has since been corrected.

**Circuit Board Failures** – Circuit board failures commonly occurred as a result of water leaks within the Thermal Disinfectors. Correcting the causes of the water leaks has addressed the circuit board failures.

**Inadequate Customer Support** – Because training for repair and maintenance personnel was not as complete as it could have been, some Thermal Disinfectors were improperly installed and mechanical problems were not accurately diagnosed and corrected. Miele has responded to these difficulties by producing a training video and is sending the tape and a service manual to all federal service facilities that have purchased a unit. The company has also improved the system it uses to track individual machines after they have been purchased, so customers can be notified by Miele of potential problems. Finally, Miele has added direct telephone lines and e-mail addresses that customers can use to obtain information and assistance. These numbers and addresses are provided below.

Miele, Inc.

9 Independence Way  
Princeton, NJ 08540  
Phone: (800) 843-7231

Technical Service Department

Phone: (800) 999-1360  
Fax: (888) 586-8056  
E-Mail: techserv@mieleusa.com

Customer Service Department

Phone: (800) 421-4685, ext. 425  
Fax: (609)419-4241  
E-Mail: products@mieleusa.com

DIS will continue to monitor these improvements to ensure that customer's problems with the Thermal Disinfectors have been adequately addressed.

(Mr King, Col Leonard, Col Kane, Col Bartoloni)

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## 57-03 New National Stock Numbers (NSNs) for Megalloy Amalgam

New National Stock Numbers (NSNs) have been released for Megalloy, a precapsulated, spherical amalgam alloy marketed by Dentsply/Caulk. The numbers are 6520-01462-6928 for 1-spill, 6520-01462-6915 for two-spill, and 6520-01462-6922 for three-spill. NSNs already exist for another stocklisted spherical alloy, Valiant from Ivoclar/Vivadent, (6520-00-149-0132, two-spill; and 6520-00-149-0123, three-spill).

(Lt Col Roberts)



# QUESTIONS & ANSWERS

"Questions & Answers" is a feature in which we present and answer the questions we most frequently receive from the field. This month we feature questions about Empress 2, the effect of water filters on fluoride levels, and laboratory chair selection. If you want more information about a particular topic, please contact the individual whose name follows the specific answer in which you are interested. If you have a question about a topic not discussed in this issue, feel free to call DIS at DSN 240-3502.

## 57-04 Water Filters and Fluoride Water Levels

**Question:** The Brita water filter system advertises that it filters out lead and chlorine. Should I be concerned about it removing fluoride?

**Answer:** The Brita and other similar water filtration systems utilize activated charcoal. Mary O'Connell, a marketing spokesperson for Brita has said that slight amounts of fluoride (0.6% to 2%) are removed from the first two gallons of water filtered through the unit. After that, the fluoride-binding capacity of the charcoal is saturated. This should not really be a concern, because the manufacturer's recommendations state that the first two gallons should be discarded due to potential unbound particles of activated charcoal from the filter. Further questions concerning Brita products can be directed to the company at (800) 242-7482 or [www.brita.com](http://www.brita.com). Other information about water filters is provided by NSF International, a third-party certification agency, at (800) 673-6275, (734) 769-8010, or [www.nsf.org](http://www.nsf.org).  
(Lt Col Roberts)

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## 57-05 New Light Techniques for the Millenium?

**Question:** I recently went to a dental meeting where a speaker talked about some new light units that cure composites in stages. Is this something new and what's the reason for using a new technique like that?

**Answer:** It isn't surprising that there was a lecture on visible light units at the meeting you went to because there has been a lot of attention given to new ways of polymerizing light-activated resin composites in dentistry. Light units have come a long way since the Nuva Light (Dentsply/Caulk) was introduced in the mid-1970s. It used ultraviolet light to activate a special kind of filling material. For many years, the standard has been visible light units that use a quartz-tungsten-halogen (QTH) bulb as their light source to produce a filtered blue light. These units perform well at polymerizing light-activated materials as long as they are properly maintained to ensure their light output is adequate. Proper incremental placement of the resin composite remains important too. Recent research indicates that there may be some advantages to curing resin composites by varying the intensity of the QTH light. Typically, we use QTH units simply by turning them on for 40 to 60 seconds to activate the material and then the light goes off. This constant exposure to an intense light source may cause the resin composite to polymerize too quickly. The rapid polymerization causes stresses that compromise the strength of the recently formed bond of the material to tooth structure. This, in turn, may lead to leakage. The new research suggests that by using a different light technique, we may be able to reduce the amount of polymerization stress and maintain the integrity of the bond and reduce leakage. The most commonly discussed techniques are the stepped and the pulse-delay cure methods where the light unit activates the material using a short-duration of low-intensity light followed by a longer duration at a higher

intensity. With the stepped technique, the low-intensity exposure is immediately followed by the high-intensity exposure; in the pulse-delay technique, a waiting period is recommended between the exposures. In both cases, the low-intensity light exposure theoretically allows the resin's newly-induced stresses a chance to dissipate. The first commercially-available light unit using the stepped technique was the Elipar Highlight (ESPE America). It uses a 10-second exposure of light at 150 mW/cm<sup>2</sup> followed by 30 or 50 seconds (chosen by the clinician) at 700 mW/cm<sup>2</sup> (see *Dental Items of Significance* 54-14). A recently introduced unit from Bisco, the VIP Light, uses the pulse-delay cure technique; a very short (3-second) exposure at 200 mW/cm<sup>2</sup> is first used to harden the resin composite. This is followed by a three-minute waiting period to allow for stress relaxation. During this time, the clinician can finish and polish the restoration. Then a 30-second exposure at 600 mW/cm<sup>2</sup> is used. The final exposure time may vary, depending on the specific resin composite you use. It appears that this technique requires bulk cure through several mm of the resin composite if it is to save chair time. Previous research, however, has shown that QTH lights are incapable of polymerizing several mm of resin typically placed with bulk filling.

The stepped and pulse-delay cure techniques are the subjects of quite a bit of research and it is always a good idea to delay purchasing any new product, especially if research is currently being conducted to assess the validity of the method it uses. DIS will continue to monitor the results of the research and to evaluate these products to determine the validity of the claims made for them.

(Lt Col Charlton, Col Leonard)

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## 57-06 PSR Probe Prices

**Question:** Our clinic is looking for a low-cost alternative to the PSR probes that are listed in the Sullivan-Schein and Patterson Dental catalogs. When ordering through those suppliers the probes are from 15 to 20 dollars each. Do you know of a cheaper source?

**Answer:** Although commercial dental catalogs are great resources and very responsive to the needs of dental logistics personnel, they are sometimes a bit more expensive than other sources. The list price of commercially available PSR probes is an excellent example of this. A thorough check of the FED LOG revealed that there is a National Stock Number assigned to one company that provides a PSR probe. NSN 6520-01-374-1458 is a periodontal probe with the requisite 0.5-mm ball tip and color coding used for periodontal screening. At a unit price of \$6.74, it is quite the bargain. The very same item, listed in the Sullivan-Schein Fall 1998 catalog, costs \$14.29. If your facility does not currently receive the FED LOG, contact (800) 351-4381 or (970) 226-0734 and ask to be added to the FED LOG mailing list.

(SSgt Martin)

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## 57-07 Empress 2: Successor to Empress

**Question:** Last week a company representative visited our clinic and talked about a new ceramic material called Empress 2. I have had some veneers made with Empress and they turned out well; how does Empress 2 differ from Empress?

**Answer:** Introduced by the Ivoclar Corporation in the late 1980s, Empress is described as a leucite-reinforced ceramic. Because the leucite crystals reinforce the glass matrix and impede crack propagation, the material is strong enough to be used for veneers, inlays, onlays, and full crowns. To fabricate a restoration with Empress, the lost-wax technique is used to produce a wax pattern that is then sprued and invested. A heated ceramic ingot is pressed into the mold to produce the restoration. The restoration is then surface characterized or can be cut back and veneered with porcelain. Unfortunately, although the restorations are very esthetic, Empress is not strong enough to be used for fixed partial dentures. One reason for its limited strength is that the leucite crystalline content is at most approximately 40%; a higher crystalline concentration imparts excessive opacity to Empress.

According to Ivoclar, Empress 2 has three times the strength of Empress. There are several compositional differences between the two products that contribute to Empress 2's greater strength. Empress 2 consists of a lithium disilicate glass-ceramic that is used to form the framework of the restoration or bridge. The crystals are from 0.5 to 4 microns long and are uniformly bonded to a glass matrix. Because the index of refraction of the crystals is similar to that of the glass matrix, the crystal content can be as high as 60% without compromising the material's esthetics. As a result, Ivoclar claims that Empress 2 exhibits much greater strength than Empress and can be used for fabricating three-unit anterior bridges (from 2<sup>nd</sup> premolar forward). Although the fabrication process for Empress 2 is similar in many respects to that used with Empress, there is one significant difference. Rather than making the wax pattern to final contour, the pattern is made for the crown or bridge framework and it is this, not the final contoured pattern, that is sprued and invested. An Empress 2 lithium disilicate ingot is then heated and pressed into the mold at a temperature of 920°C. Appropriate dentin and enamel shades of a veneering ceramic are fired in a ceramic oven, shaped to final form and contour, and glazed. Ivoclar claims that the crystals in the veneering ceramic mimic the crystalline structure of enamel and, therefore, produce a lifelike result. One final way that Empress 2 restorations differ from those made with Empress is that they may be cemented with the resin-modified cement, Pro-Tec Cem, from Ivoclar. Traditional adhesive cementation with a resin cement can also be used, as it is with Empress restorations.

These are some of the basic ways in which Ivoclar claims that Empress 2 differs from Empress. As with any newly-marketed dental material, it is important to closely follow the published literature to ensure that the product is performing as the manufacturer claims before purchasing and using it.

(Lt Col Charlton)

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## 57-08 Selecting A Good Dental Laboratory Chair

**Question:** Do you folks have any recommendations for laboratory chairs? We are in the process of purchasing new dental laboratory chairs and want something with lumbar support. (I guess we are getting older). Any comments would be appreciated.

**Answer:** There are a many types and styles of ergonomic chairs. A good, basic model is KaVo's "dental lab" chair which has a government price of \$337.96. The KaVo chair has height adjustments for the seat and seat back [item number 650-2310, Kavo (800) 522-9525]. The seat back can also be adjusted forward and backward. Chairs with more adjustable features are also available such as those made by Eck Adams [(203) 256-1600], BodyBilt (each state has local company representative), Haage [local distributors], Nevin Laboratories, Inc. [(800) 544-5337], Herman Miller [(616) 654-8278], and Neutral Posture [(800) 864-8073]. The government price for an Eck Adams chair is \$243.00 while a Neutral Posture chair is \$477.00. Another thing I would recommend is that you check with your local Military Public Health folks to see if they have any suggestions. It is also a good idea to talk with with your base logistics personnel to get a list of vendors who make ergonomic products and have existing base contracts.

The best way to shop for a chair is to match it to the individual who will be using it. The chair should fit you; you should not have to fit the chair. It is important to spend the time to find a comfortable, ergonomic chair so you prevent potential problems down the road.

Let me mention some other points about chairs that you should keep in mind when shopping around. Do not limit yourself to plastic upholstery; cloth is OK for the laboratory. Woven fabrics are particularly nice because they allow cooling for extra comfort. Features to look for are adjustable seat height, forward/back seat tilt, a contoured seat, "waterfall" drop-off at the seat edge to prevent pressure on the thighs, lumbar support with height adjustment and thickness adjustment (inflatable), and a seat back that also can be adjusted forward and back. Arm supports reduce stress on the shoulders and neck. If you want arm supports, they should not prevent you from getting close to your bench. Arms should also adjust vertically for different torso heights and laterally to accommodate different shoulder widths. They should also rotate in and out to support different work positions. One special kind of arm support is the "floating" type which has adjustable resistance. It supports you through a range of vertical and lateral motions. Finally, the chair base should roll easily, rotate, and be stable to prevent rocking.

As you can see, there are many factors to consider, which is why a test drive is important. What looks good on paper may not fit your back or the laboratory.

The following websites contain ergonomic information and ergonomic chairs:

<http://www.osha-slc.gov/SLTC/ergonomics/index.html> (information only)

<http://www.bda-dentistry.org.uk/factfile/fact05.html> (British Dental Association, information only)

<http://www.unicor.gov> (Department of Justice catalog)

<http://www.gravityplus.com/>

<http://www.kavo.com/english/fzahntechnik.html>

<http://www.americanergonomics.com/ergomax/>

<http://www.hermanmiller.com/>

<http://www.bodybilt.com/>

<http://www.dauphin.com/>

<http://www.ergoweb.com/Pub/ewhome.shtml>

<http://www.neutralposture.com/>

<http://ourworld.compuserve.com/homepages/objektstuhl/AUSWAHL.HTM> (German language, innovative products)

(MSgt Ryerson)

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## 57-09 Proper Use of Waterless Antiseptic Hand Rubs

**Question:** Can waterless antiseptic hand rubs be substituted for routine handwashing with antimicrobial soap and water between patient care in the dental clinic?

**Answer:** Handwashing in healthcare facilities is the most important procedure for the prevention of clinically-acquired infections, because contaminated hands are a potential source for person-to-person infection transmission. The primary purpose of handwashing is to decrease potential pathogens that have been acquired by recent contact with infected or colonized patients, contaminated instruments, and/or environmental sources. The decision regarding when handwashing should be done depends on (1) the frequency of contact with patients or fomites, (2) the degree of contamination that is likely to occur with that contact, (3) the susceptibility of patients to infection, and (4) the procedure to be performed. In dentistry, it is very important to wash hands before gloving and after glove removal. Microorganisms dramatically increase when gloves occlude the skin. Washing before gloving reduces the initial microbial levels, and washing after glove removal reduces the number of those that have multiplied under the gloves. Handwashing after glove removal is also important because it removes the microbes that may have contacted the skin through defects in the gloves. Another benefit of handwashing, at least when using handwashing products that contain antimicrobial agents, is that they have a prolonged effect that minimizes the number of microbes on the skin.

Waterless antiseptic hand rubs are recommended for special situations where water and soap can not be used such as when the water supply has been interrupted (e.g., water shutdown). They are also used by individuals who desire extra protection after routine handwashing. Most of the antiseptic waterless hand rubs contain some formulation of alcohol. Alcohols have excellent bactericidal activity and act against many fungi and viruses. Alcohols are among the safest known antiseptics, and in appropriate concentrations (i.e., greater than 60 percent by weight) provide a rapid reduction in microbial counts on the skin. Alcohols are not good cleaning agents though, and are not recommended for use in the presence of physical dirt. The major disadvantage of using alcohols for skin antisepsis is its drying effect. To prevent drying, most products add emollients. Emollients may enhance antibacterial activity by slowing drying, resulting in increased contact time of the alcohol. Another disadvantage of alcohols is volatility/flammability and consequently hand rub products that contain them must be stored away from fire or open flames.

In summary, waterless antiseptic hand rubs should not be substituted for routine handwashing between patient visits because they have poor cleaning ability and are not recommended by their manufacturers for this purpose. Also, since the hands are not rinsed with water after using these products, treated nonviable microorganisms remain on the skin. Waterless hand rubs are best indicated

for use when extra protection is desired after proper handwashing, especially before lunch and at the end of the workday.

(Col Bartoloni)

# WHAT'S NEW?

"WHAT'S NEW?" features recently-marketed dental equipment and materials. New and innovative products are marketed each month and DIS is unable to evaluate all of them. This section of the newsletter brings these products to your attention. Because DIS has not had the opportunity to evaluate these products, we cannot confirm manufacturers' claims about them. If you would like additional information about the products or are interested in evaluating them, please contact DIS or the manufacturers.

The **Amdent US 30** is a new table-top piezoelectric ultrasonic scaler marketed by Biotrol International. The Amdent US 30 is very compact weighing only 3 pounds and having a 5-inch by 8-inch footprint. The unit features sleek, infection control-friendly styling and removable silicone control covers that are autoclavable. The scaler comes with three Quick-a-Tip autoclavable handpieces that are reported to improve handling and reduce fatigue. The Amdent US 30 is ETL and CSA approved and can be purchased from Biotrol International (800) 822-8550, (303) 673-0341 for \$1,665.00 (retail) and \$999.00 (government).

(SSgt Martin)



**Panavia F**, a new dual-cure, two-paste resin cement from J. Morita, is advertised as "the most versatile cement in the world." Several characteristics are said to make Panavia F different from other cements. First, its purported antibacterial action eliminates the need for using other pre-cementation disinfectants. Second, it is said to be self adhesive, meaning that etching, priming, and bonding are combined into one step (using ED Primer). Panavia F also contains fluoride, has a low (18-micron) film thickness, and is available in three shades (tooth color, opaque, white). Morita recommends the product for final cementation of silanated porcelain, metal, all-ceramic, and all-composite restorations. It is also provided with instructions for use in amalgam bonding. A box of Panavia F contains ED Primer, one syringe each of catalyst and base paste, Oxyguard II, and Alloy Primer. The Alloy Primer is said to increase the bond strength of the cement. Panavia F is available from J. Morita (888) 566-7482, (949) 581-9600, FAX (949) 465-1095, [www.jmoritausa.com](http://www.jmoritausa.com), for \$200.00 (retail) and \$120.00 (government).

(Lt Col Charlton)



**Prodigy Condensable** is a packable resin composite recently introduced by the Kerr Corporation. Prodigy Condensable enters an increasingly crowded field of "condensable" or "packable" resin composites whose manufacturers claim possess resistance to condensation which makes it easier for clinicians to establish tight interproximal contacts. Other products in this category include Solitaire (Heraeus Kulzer), SureFil (Dentsply/Caulk), Alert (Jeneric/Pentron), and Pyramid (Bisco). Kerr claims that Prodigy Condensable is based on the proven technology found in its traditional resin composites, Herculite XRV and Prodigy. A special Rheologic Controlled Additive imparts condensability to the product. Kerr claims a very low polymerization shrinkage rate of 1.8% and a depth of cure of up to 5 mm. Prodigy Condensable is packaged in the standard Kerr plastic "tackle box" kit which contains 10 unidose tips each of five shades (A1, A2, A3, B1, C1), 2 syringes of acid etchant, and 50 single-use doses of OptiBond Solo. A dispensing gun and OptiGuard surface sealant are also included. Three other shades can be purchased separately. Prodigy Condensable (item #29350) is available from Kerr at (800) 537-7123, (714) 516-7400, or FAX (714) 516-7633 for \$231.00 (retail) and \$121.13 (government).



(Lt Col Charlton)

**Pyramid Stratified Aggregate Restorative** is a packable resin composite recently introduced by the Bisco Corporation. According to Bisco, Pyramid is non-sticky and does not slump when placed. It is provided in syringes and comes in three enamel shades (Vita A1, Neutral, Translucent) and six dentin shades (Vita A1, A2, A3.5, B3, C2, D3). Either a single dentin shade can be placed or a layered technique can be used in which an enamel shade is placed over a dentin shade. The latter technique is said to mimic natural tooth structure and provide the most lifelike result.



Bisco claims a low polymerization shrinkage rate of 2.7% and recommends incremental placement (2-mm thickness) followed by light activation. A Complete Package (item number H-5140K) of Pyramid contains: three syringes of dentin shades A2, A3.5, and C2; two syringes of enamel shades A1 and Neutral; one syringe of acid etchant; one bottle of One-Step bonding agent; one syringe of Aeliteflo LV flowable resin composite; disposable dispenser tips; MSDS; and instructions. The product can be purchased from Bisco at (800) 247-3368, (847) 534-6000, or FAX (800) 959-9550 for \$185.00 (retail) and \$157.25 (government).

(Lt Col Charlton)

**White Lightning** is a variable-speed, microprocessor-controlled, brushless laboratory handpiece with integrated suction that is marketed by Euro-Worldent. The handpiece has an advertised speed range of

2,000 to 40,000 r.p.m. while the in-cord suction is reported to collect 99.99% of the dust particles generated during laboratory procedures. White Lightning is featured as having independent settings for dust collection and speed control, a fully encapsulated motor with sealed bearings, antimicrobial modular filter cartridge, and a 6.5-ounce ergonomic handpiece with a “quick grip” chuck design. White Lightning is purchased through dental supply retailers and has a suggested retail price of \$1725. Further information may be obtained from Euro-Worldent at (561) 470-9287.

(Lt Col Roberts)

The **VIP Light Curing Unit** has recently been introduced by Bisco Dental Products. The VIP is a microprocessor-controlled, visible-light curing unit that has been designed and marketed for the pulse-delay cure technique for resin composites. The pulse-delay cure technique involves an initial short, low-intensity cure of the resin composite that is followed by a longer, high-intensity light cure after finishing and polishing. This technique is touted to reduce polymerization stress on the bond between the resin composite and tooth structure which theoretically should result in less microleakage. The VIP features variable power settings that give the user independent control of both time and light intensity. Two pulse-cure settings can be programmed, but the VIP may also be used in a conventional continuous curing mode. Curing intensity may be set at 100, 200, 300, 400, 500, and 600 mW/cm<sup>2</sup>. Curing time is adjustable at 2-, 3-, 4-, 5-, 10-, 20-, and 30-second intervals; a continuous curing mode up to 255 seconds is also available. Curing modes can be set using either the curing light handpiece or a toggle switch located on the power unit base. Both 8- and 11-millimeter curing tips are available, and the manufacturer states that the VIP is compatible with Demetron Tips. The VIP also features a built-in radiometer that is said to automatically calibrate itself. The unit is unique in that it is touted to provide advanced self-diagnostics. It provides information on bulb life history, headroom reading (difference between maximum output and present calibrated output), and filament integrity. The VIP costs \$995 (retail), \$847.75 (government) and further information is available from Bisco at (800) 247-3368, (847) 534-6000, FAX (847) 534-6111, or [intl@bisco.com](mailto:intl@bisco.com).

(Lt Col Roberts)

The **Spectrum 800 Curing Unit with Intensity Control** is now available from Dentsply/Caulk. This visible-light curing unit is advertised to provide flexibility in visible light curing techniques because its light intensity can be adjusted in 50 mW increments from 300 to 800 mW/cm<sup>2</sup>. The unit also features a digital radiometer and a variable timer that can be set in 10-second increments. The timer and radiometer values are displayed via LCD readouts on the handle and the Spectrum 800 accepts light guides from three to thirteen millimeters in diameter. The unit carries a two-year warranty in addition to a five-year warranty on the Kevlar-reinforced, hospital-grade power cord. The Spectrum 800 is available for \$813.85 (retail), \$529.00 (government) and further information is available from Dentsply/Caulk at (800) 532-2855, (302) 422-4511, or [www.caulk.com](http://www.caulk.com).

(Lt Col Roberts)

**Glide® Threader Floss** is advertised as a Teflon-coated, non-shredding dental floss with a built-in threading device and is marketed by W.L. Gore and Associates, Inc. The product was designed specifically for patients with fixed partial dentures, implants, or orthodontic appliances. Glide® Threader Floss is said to effectively remove plaque and food particles, resist shredding between teeth and dental appliances, and slide easily through tight interproximal contacts while minimizing the snapping of floss. A Professional Pack of 150 single-use packets is available for \$15.50 for one box; \$15.00/box for orders of two or more. The product can be ordered by contacting W.L. Gore at (800) 645-4337, (410) 392-3200, or FAX (410) 996-8585.

(Lt Col Roberts)

Biotrol International has introduced a new line of handcare products called **Perfect Care** that are formulated specifically for healthcare providers. **Perfect Care 0.75% CHG Handwash** has the lowest chlorhexidine gluconate (CHG) concentration available, minimizing potential skin irritation. Studies show that CHG provides immediate and residual antimicrobial activity on the skin that builds with repetitive use. **Perfect Care Lotion** is a latex-compatible, nonionic CHG lotion formulated to soften and moisturize rough, dry skin caused by frequent handwashings. **Perfect Care Antimicrobial Handrinse** is an easy-to-use waterless handrinse for healthcare personnel who lack handwashing facilities or who desire extra protection after routine handwashing. Bottles of these products are available in several sizes, and can be ordered by the case. Contact Biotrol International at (800) 822-8550 or (303) 673-0346 FAX for more information.



(Col Bartoloni)

**Kodak Silver Estimating Test Paper** is a new test strip to help determine if your silver recovery unit is functional. A test strip is placed into used fixer coming out of the silver recovery unit and if the strip changes color within one hour, your silver recovery unit requires service. If it does not change color after one hour of contact with the used fixer, it indicates that the silver recovery unit has removed at least some silver and is, therefore, at least partly functional. It is important to note that the product does not provide a means of determining whether or not the tested fixer solution meets regulatory requirements for environmental compliance. Kodak Silver Estimating Test Paper (part number 196-5466) costs \$13.25 (government) and \$15.00 (retail) for a package of 200 strips.

(Lt Col Kane)

**Take 1** is a polyvinyl siloxane impression material from the Kerr Corporation. Kerr claims that the product is extremely hydrophilic which enables it to easily wet prepared teeth and to be wetted by gypsum. It is also said to be easy to remove from undercut areas because its bimodal fillers give it a high tear strength. It is available as regular set and fast set and comes in four viscosities (regular tray, rigid tray, wash, and medium/monophase). Take 1 is easily identifiable because of its rather bright colors and is supplied in standard 50-mL automix cartridges. Four types of introductory kits can be ordered: tray/wash regular set,



tray/wash fast set, medium regular set, and medium fast set. Each kit contains four cartridges of impression material, an extruder gun, and mixing tips. A kit can be ordered from Kerr (800) 537-7123, (714) 516-7400, FAX (714) 516-7633, [www.kerrdental.com](http://www.kerrdental.com) for \$129.00 (retail) and \$85.50 (government). (Lt Col Charlton)

**Flows-Rite™** is a light-cured flowable resin composite and fissure sealant from the Pulpdent Company.

The product enters the crowded market of flowable resin composites that are recommended for Class III, small Class IV, and Class V restorations. According to Pulpdent, it can also be used for repairing marginal defects, for sealing cervical gaps caused by toothbrush abrasion, and for cervical erosion of root surfaces under crowns. Pulpdent claims that the product is filled to 68% (presumably by weight), has an average filler particle size of 0.7 microns, and contains fluoride. One of the features that distinguishes Flows-Rite™ from other flowable resin composites is a special ShadeFusion™ shade provided in the kit. ShadeFusion™ is said to reflect and blend adjacent hues, which produces a more esthetic result. An Intro Kit contains five 1.5-g syringes (one syringe each of shades A2, A3, B3, C3, ShadeFusion™) and 20 applicator tips. Six other shades are also available. Flows-Rite™ is sold only through local dental dealers. Suggested retail price is \$39.95; local dental dealers will offer the product to government purchasers at a slight discount.

(Lt Col Charlton)

**One-Gloss** is a new resin composite finishing and polishing system from the Shofu Company. The product consists of three differently-shaped finishing/polishing tips (disk, cup, point) that fit on a latch-type mandrel which comes in the kit. Each finishing tip is intended for single use, but is durable enough to last for an entire treatment. The main advantage claimed for One-Gloss is that it can be used for both finishing and polishing, simply by altering the amount of contact pressure placed on the tip. In addition to resin composite finishing and polishing, One-Gloss is recommended for polishing enamel, removing stain from teeth, and removing cement following cementation of brackets or fixed prostheses. A One-Gloss Kit (PN 0180) contains 20 disks, 20 cups, 20 points, and 3 latch-type mandrels and can be bought from Shofu (800) 827-4638, (650) 324-0085, FAX (650) 323-3180, www.shofu.com for \$59.95 (retail) and \$35.97 (government).

(Lt Col Charlton)



**SuperBuff** is a paste-impregnated disk designed for polishing resin composite restorations. The manufacturer, Shofu, claims that the cloth-type disk simply needs to be wetted at time of use; no additional paste needs to be applied. The disks are intended for a single use and attach to a special latch mandrel that is provided. SuperBuff disks are said to produce a high luster on the surface of all types of resin composites. A SuperBuff Set (PN 0535) contains 25 disks and 2 latch-type mandrels and can be bought from Shofu (800) 827-4638, (650) 324-0085, FAX (650) 323-3180, www.shofu.com for \$17.95 (retail) and \$10.77 (government).

(Lt Col Charlton)



Dentsply/Midwest recently introduced the **Midwest XGT™**

**Fiberoptic Highspeed Handpiece**, which, it claims, features significant improvements over their previous highspeed handpieces. The exclusive ComforTouch™ design reportedly reduces hand

fatigue by providing better balance and greater comfort. The fiberoptics have been changed to fuse over 1000 fiberoptic strands into a solid glass rod that purportedly provides considerably brighter light and longer durability than Dentsply/Midwest's previous fiberoptic technology. For the first time, the company

offers a coupler-based swivel and quick-connect. The couplers provide true 360° rotation with two different couplers available that fit existing five-hole fiberoptic or six-pin fiberoptic tubing. The coupler for the five-hole tubing costs \$200 (retail) and \$108 (gov't) while the coupler for the six-hole tubing costs \$250 (retail) and \$135 (gov't). The XGT™ handpiece is equipped with an anti-retraction valve on the water tube to virtually eliminate retraction of contaminated fluids into the handpiece. Also new is the Midwest Plus Aerosol Spray. It is both a cleaner and lubricator, CFC-free, and used only prior to sterilization. The Midwest XGT™ sells for \$850.00 (retail) and \$459.00 (govt). For more information, contact Dentsply/Midwest at (800) 800-2888.



(Col Leonard)

The **Centurion Mixer** is a new electronic nitrous oxide analgesia machine marketed by MDS Matryx (formerly Fraser Sweatman). The Centurion Mixer is advertised as using state-of-the-art electronic transducer technology that permits the user to precisely control mixing and flow rates. The machine features LED displays for total gas flow and oxygen concentration by percentage. Both visual and audio alarms are available. In addition to standard oxygen fail-safe features, the Centurion provides a minimum oxygen concentration of 30 percent and has an automatic air intake valve that shunts room air to the patient if the breathing bag reservoir is depleted. A non-rebreathing circuit is also present that prevents the patient from rebreathing exhaled gases. The Centurion Mixer meets industry Diameter Indexed Safety System (DISS) standards and is unique in that all electronic controls for machine operation are disabled with an integrated key-access system. The Centurion Mixer retails for \$4526 (a government price can be negotiated with MDS Matryx) and further information can be obtained at (800) 847-1000, (716) 662-6650, FAX (716) 662-7130, or [www.matryxmedical.com](http://www.matryxmedical.com).

(Lt Col Roberts)

The **A.N.S. (Autoclavable Nitrous Scavenger) System** is a new nitrous oxide nasal hood marketed by MDS Matryx (formerly Fraser Sweatman). The A.N.S. is designed to deliver the NIOSH- and ADA-recommended scavenger flow rate of 45 liters per minute at 3 inches of vacuum. This nitrous nose hood has a low-profile scavenger cone that is said to provide greater accessibility and to be sterilizable. Single-use nasal hoods are also available and come in strawberry, bubble gum, orange, and vanilla scents. The A.N.S. can be purchased for a retail price of \$334 (a government price can be negotiated with MDS Matryx) and further information may be obtained at (800) 847-1000, (716) 662-6650, FAX (716) 662-7130, or [www.matryxmedical.com](http://www.matryxmedical.com).

(Lt Col Roberts)

**The Specialized Care Company** is a dental supplier that specializes in products that help manage patients with special needs. The company markets an assortment of dental support pillows, mouth props, and stabilizing systems for comfortable and safe patient support and management. Catalogues and information concerning their products can be obtained at (800) 722-7375, (603) 926-0071, and FAX (603) 926-5905.

(Lt Col Roberts)

**Filtek™ Z250** is a new universal resin composite recently introduced by the 3M Corporation. The company describes it as a radiopaque, light-cured composite suitable for anterior, posterior, and indirect restorations. Z250's composition is based on that of 3M's popular Z100 resin composite. By substituting two higher molecular weight resins for one of Z100's low molecular weight resins, 3M claims that it has produced a product that shrinks less, is less sensitive to atmospheric moisture, and is less prone to thickening from aging. Z250 is also said to be nontacky and possess excellent optical properties, easy polishability, and resistance to slumping. A 2.5-mm depth of cure is said to be possible using only a 20-

second light exposure time. The filler particles are the same as those in Z100: the sizes range from 0.01 to 3.5 microns with an average size of 0.6 microns. The product is available in 15 shades and can be purchased in single-dose capsules and bulk syringes. An Intro Capsule Kit (item number 6021) contains 10 capsules each of 5 shades (A2, A3, B0.5, B2, and C3), a syringe of Scotchbond Etchant, and a bottle of Single Bond Adhesive. The product can be purchased from 3M (800) 237-1650, (612) 733-8524, FAX (800) 888-3132 for \$198.00 (retail) and \$119.00 (government).  
(Lt Col Charlton)



**Filtek™ P60** is a new packable posterior resin composite marketed by the 3M Corporation. The company describes it as a radiopaque, light-cured composite designed specifically for direct and indirect posterior restorations. As with Filtek™ Z250, P60's composition is based on that of Z100 resin composite. The filler particle size range and average size are the same as those in Z100, however P60 contains a larger number of finer particles. 3M claims that P60 is faster to place than comparable packable products such as Solitaire (Heraeus Kulzer), SureFil (Dentsply/Caulk), and ALERT (Jeneric/Pentron), in large measure because it purportedly can be cured in a 2.5-mm thickness using a 20-second light exposure time. P60 is available in 3 shades (A3, B2, C2) and is provided in bulk syringes. An Intro Kit (item number 4720) contains three 4-g syringes of the product, a syringe of Scotchbond Etchant, and a bottle of Single Bond Adhesive. P60 can be purchased from 3M (800) 237-1650, (612) 733-8524, FAX (800) 888-3132 for \$163.00 (retail) and \$98.00 (government).  
(Lt Col Charlton)



**RelyX™ Luting Cement** is the new name of 3M's hybrid resin/glass-ionomer product formerly known as Vitremer Luting Cement. The product was evaluated by DIS in 1994 shortly after it entered the market. 3M continues to recommend it for the permanent cementation of all-metal inlays, onlays, crowns, and FPDs as well as PFM crowns and FPDs. According to 3M, it can also be used for cementing posts and orthodontic bands. The cement should not be used for luting composite, porcelain, or ceramic inlays, onlays, crowns, or FPDs because of a post-placement expansion that can cause clinical failure. DIS found in its evaluation that Vitremer was easy to clean up, adequately radiopaque, and relatively inexpensive compared to comparable products such as Fuji Plus (GC



America) and Advance (Dentsply/Caulk). RelyX (item number 3505) is available from 3M (800) 237-1650, (612) 733-8524, FAX (800) 888-3132 for \$87.90 (retail) and \$42.05 (government).  
(Lt Col Charlton)

**RelyX™ ARC Adhesive Resin Cement** from 3M is a dual-cure, two-paste product for the permanent cementation of a wide variety of indirect restorations. Among the many types of restorations that can be cemented with it are: metal and PFM inlays, onlays, crowns, bridges, posts, and Maryland bridges; porcelain/ceramic inlays, onlays, crowns, bridges, and veneers; and resin composite inlays, onlays, and crowns. According to 3M, RelyX™ ARC can also be used for amalgam bonding. Chemically and compositionally, RelyX™ ARC is a BIS-GMA resin that is filled to 67.5% by weight with zirconia/silica filler particles having an average size of 1.5 microns. The cement is dispensed using an innovative hand-operated "clicker" that dispenses equal amounts of each paste. The cement is available in two shades: Universal and Transparent. Included with Rely™ ARC is the "one-component" bonding agent, Single Bond (rated as "Acceptable" by DIS in the Sept 1997 newsletter, item 52-18). Also provided is a silanating solution called RelyX™ Ceramic Primer (a renamed version of Scotchbond Ceramic Primer). 3M recommends applying the primer to all restorations (metal included) that are to be cemented with RelyX™ ARC to increase the bond strength. An Introductory Kit of the cement (item number 3415) is available from 3M (800) 237-1650, (612) 733-8524, FAX (800) 888-3132 for \$225.00 (retail) and \$135.00 (government).

(Lt Col Charlton)

**Kleen Pen** is a system designed to disinfect pens and pencils in the medical and dental environment. Several studies have shown that pens and pencils used by healthcare providers are contaminated with various microorganisms that may contribute to cross-infection. Using this product involves exposing the writing instruments to the Kleen Pen Disinfectant for two seconds. The disinfectant is said to work quickly and dry in minutes. The recommended contact time for the disinfectant is ten minutes. The Kleen Pen System consists of: one Kleen Pen unit, one quart of EPA-approved Kleen Pen Disinfectant, one 100-mL beaker to dispense disinfectant, five decontamination pads, five pen cup pads, instruction manual, four pens or pencils, and a Kleen Pen Award Plaque. This represents approximately an eight-month supply. The reorder kit contains: three quarts of Kleen Pen Disinfectant, one 100-mL beaker, 15 decontamination and pen cup pads, and eight pens or pencils. The government cost is \$55.00 for the initial system and \$53.00 for the reorder kit. For further information contact Kleen Pen Inc., at (888) 553-3695 or visit [www.kleenpen.com](http://www.kleenpen.com).

(Col Bartoloni)

# FROM THE LITERATURE

Periodically, articles appear in the literature that present clinically useful information or evaluate the performance of a material or piece of equipment. Because DIS believes that this type of research is of value to clinicians, we present a brief description of these articles to make you aware of them. The complete citation is provided so you can obtain the article if you are interested in reading it in its entirety.

## *BIOFILMS NEVER DIE*

Dental unit waterlines: biofilms, disinfection, and recurrence. Meiller TF, DePaola LG, Kelley JI, Baqui AA, Turng BF, Falker WA. J Am Dent Assoc 1999;130:65-72.

Multiple studies have demonstrated the development of biofilms within dental unit waterlines (DUWLs). These biofilms can harbor potential human pathogens that could place dental patients, particularly immunocompromised ones, at risk. Biofilm microorganisms are difficult to completely destroy through chemical disinfection; as a result, they may recolonize and the potential exists for them to develop resistance to the disinfectants. The aim of this investigation was threefold: (1) to evaluate whether biofilms recur after disinfection or disruption using sodium hypochlorite, glutaraldehyde, or isopropanol; (2) to determine the minimum concentrations of the above three chemical agents that would inhibit growth or recurrence of bacteria pre- and post-treatment; and (3) to evaluate the effectiveness of multiple overnight treatments with these germicides in inhibiting the recurrence of biofilm. **Results showed that 5.25% sodium hypochlorite, 3% glutaraldehyde, and 15.3% isopropanol inhibited bacteria in biofilm and effluent for up to 15 days. Significant recolonization occurred, however, even after one day. The minimum inhibitory concentrations for the three chemical germicides did not significantly change after repeated exposures to rapidly recurring bacteria. Multiple repeated treatments were effective in reducing the number of bacteria within the DUWL to below-culturable levels. The agents were ineffective, however, at totally disrupting the biofilm matrix and recolonization occurred rapidly when the treatment was discontinued.** The residual effect of these chemicals raises questions regarding slow release of potentially toxic substances from the residual biofilm matrix, which may represent an additional risk to the patient. In addition, dental personnel should consult with the dental unit manufacturer before using chemical germicides to remove biofilms from DUWLs because they may adversely affect the units.

## *USE THEM ONCE, AND ONLY WITH GLOVES AND ALUMINUM FOIL...*

Factors affecting light transmission of single-use, plastic light-curing tips. Rueggeberg FA, Caughman WF. Oper Dent 1998;23:179-184.

Single-use, plastic light-curing tips are marketed to enhance infection control and eliminate the possibility that sterilization may reduce light transmission. This study evaluated two plastic visible-light curing tips, the Demetron Disposable Tip (Demetron Research Corp.) and the SaniCure tip (L D Caulk). The physical and clinical handling properties of the tips were compared to those of conventional curing tips. Results found that the plastic tips exhibited either a slight increase or decrease of light intensity output as compared to conventional curing tips. Treatments to the tip surface (scratching or painting) designed to reduce glare resulted in extremely low light-transmission values. Touching the tip with the bare hand, patient tongue or mucosa resulted in significant lowering of the light output. Only two light-curing tip surface treatments did not decrease light intensity output: stabilizing the tip with a latex-gloved hand and covering the external surface with aluminum foil. Heat buildup during long-exposure light curing did not degrade light transmission. The authors pointed out that Demetron tips only fit Demetron units, while the Caulk tips include adapters that allow them to be used with any light curing unit. **Disposable plastic light curing tips produce clinically acceptable light intensity values. To maintain acceptable light transmission these tips must be handled with care and not be scratched, painted, or allowed to come into contact with bare skin or patient mucosa during use. The tips are for single use only. If glare from them is a nuisance, they may be covered with a**

**layer of aluminum foil.**

### ***PROTECTION AGAINST POST-OPERATIVE SENSITIVITY WITH AMALGAMS?***

Effect of different liner treatments on postoperative sensitivity of amalgam restorations. Gordan VV, Mjor IA, Hucke RD, Smith GE. Quintessence Int 1999;30:55-59.

The purpose of this study was to assess the sensitivity experienced and reported by patients following treatment of new carious lesions with Class I or Class II amalgam restorations. Seventy-six virgin carious lesions scheduled for restorations were randomly assigned to one of four groups: 1) no liner (control); 2) two layers of copal varnish (Copalite); 3) dentin adhesive liner (Scotchbond Multipurpose Adhesive); and 4) resin-modified glass-ionomer liner (Fuji Bond LC). Preparation depth was assessed and recorded during treatment. Teeth were restored with a dispersed-phase amalgam (Original D) and burnished. Patients were contacted on days 2, 7, 14, 30, and 90 and were questioned regarding the presence or absence of sensitivity, as well as its duration, intensity, and the stimuli provoking the pain. Results found that at day 2, no significant differences existed between the groups. At day 7, no teeth treated with the resin-modified glass ionomer exhibited sensitivity, and half of the teeth with no liner treatment were sensitive. On day 14, none of the unlined teeth were sensitive but some sensitivity remained until day 30 for the Copalite and Scotchbond Multipurpose Adhesive groups. At day 90, no persistent sensitivity was reported. **The results of this study indicate that post-operative sensitivity usually resolves with time and that resin-modified glass-ionomer liners may provide some protection against sensitivity.**

### ***DYRACT AP: TO ETCH OR NOT TO ETCH***

Dyract compomer: comparison of total etch vs. no etch technique. Kugel G, Perry RD, Hoang E, Hoang T, Ferrari M. Gen Dent 1998;46:604-606.

Polyacid-modified composite resins (also known as compomers) have become popular restorative materials, particularly for Class V lesions. A new version of one of these PAMCRs, Dyract AP (Dentsply/Caulk), is provided with a dentin bonding agent, Prime & Bond 2.1. The product instructions recommend that Prime & Bond 2.1 be used to treat the cavity preparation prior to placing Dyract AP in order to enhance bonding and improve marginal seal. Interestingly, the instructions do not call for use of an acid etchant to condition the dentin and enamel first. This study evaluated the degree of microleakage of Class V cavity preparations restored with Prime & Bond 2.1 and Dyract AP using a total etch and a no etch technique. Standardized Class V preparations were made in the facial or lingual surfaces of 20 human molars with the gingival margin in cementum. One group of ten preparations were restored with Prime & Bond 2.1 and Dyract AP after the preparation was acid etched for 15 seconds with 34% phosphoric acid; a second group of ten teeth were restored with the same materials but were not acid etched. Twelve hours after being restored, the teeth were sealed with nail varnish to within 1 mm of the margins and thermocycled in basic fuchsin dye. The teeth were then sectioned and leakage was evaluated at the enamel and cementum margins using a pre-established scale. Statistical analysis found that the teeth that were etched prior to restoration exhibited significantly less leakage at both margins than the teeth that were not etched ( $p \leq 0.05$ ). **The authors recommend that a total etch technique be used prior to restoring teeth with Prime & Bond 2.1 and Dyract AP.**

### ***DUAL-CURE RESIN CEMENTS: DO YOU NEED TO USE A LIGHT TO ACTIVATE THEM?***

Hardening of new resin cements cured through a ceramic inlay. El-Mowafy OM, Rubo MH, El-Badrawy WA. Oper Dent 1999;24:38-44.

The growing popularity of esthetic restorations such as cast ceramic, porcelain, and resin composite has led to the development of dual-cured resin cements. The dual-cured cements, as their name implies, are light cured and self cured, and they are indicated for luting light-transmitting restorations that may be too thick to enable the light alone to polymerize the cement. As a result, chemicals are added to these cements so they at least partially polymerize without the need for exposure to a light unit. Some research has indicated that self curing alone does not adequately cause these dual-cured cements to harden. This study measured the hardness of disks made of eight dual-cure cements (Adherence, Choice, Duolink, Enforce, Lute-It, Nexus, Resinomer, and Variolink). For each cement, four

disks were exposed to a visible light unit (dual-cured specimens) and four were not (self-cured specimens). Hardness testing was performed on the disks at 1 hour, 1 day, and 1 week. Specimens of each cement were also prepared and light cured through ceramic spacers varying in thickness from 1 to 6 mm; their hardness was also measured. Results showed that, in general, hardness values of the self-cured specimens were lower than those for the dual-cured specimens. For three of the cements (Adherence, Duolink, and Variolink) self curing alone was found to produce hardness values 50% lower than those obtained when dual curing was used. Specimens light cured through ceramic spacers thicker than 2 mm were also softer than those cured without spacers. The authors mention that insufficient hardening of these cements may lead to postoperative sensitivity due to wash out of the unset cement with subsequent microleakage. **Dual-cure resin cements need to be light cured in order to maximize their degree of polymerization. Hardness is significantly reduced when a thickness of ceramic greater than 2 mm is between the light source and cement.**

### *BONDED AMALGAM RESTORATIONS: ARE THEY LESS SENSITIVE?*

Short-term clinical evaluation of post-operative sensitivity with bonded amalgams. Kennington LB, Davis RD, Murchison DF, Langenderfer WR. Am J Dent 1998;11:177-180.

Although anecdotal reports indicate that using dentin bonding agents under amalgam restorations reduces post-treatment sensitivity compared to using copal varnish, the majority of published clinical studies refute these reports. This research was a 30-day clinical study that compared the post-operative sensitivity of teeth restored with amalgam using a bonded resin liner versus teeth restored using a copal varnish. Twenty patients received Class I or II contralateral paired restorations placed at the same appointment. One restoration of each pair was lined with a dentin bonding agent (Scotchbond Multi-Purpose Plus Adhesive, 3M) and the other was lined with a copal varnish (Plastodont, Plastodont, Inc.). Patients were given visual analog scale response forms and asked to indicate the level of their post-operative sensitivity for the restorations at baseline, 1, 3, 7, 14, and 30 days post-operatively. Data were analyzed using a paired t-test. Results indicated that in most cases, sensitivity peaked on day 1 or day 3 and returned to baseline levels by day 30. **No significant difference in post-operative sensitivity was found between the cavity lining materials at any post-operative interval.**

### *THE EFFECT OF CARIES-DETECTING DYES ON BOND STRENGTH*

Dyes for caries detection influence sound dentin bond strength. Demarco FF, Matos AB, Matson E, Powers JM. Oper Dent 1998;23:294-298.

Caries-detecting dyes are used during cavity preparation to identify outer carious dentin so it can be completely removed. To properly use these dyes, they are applied to the cavity preparation, allowed to remain for a few seconds, and then rinsed away. Invariably, some of the dye is applied to sound dentin. The purpose of this study was to determine if treatment with a caries-detecting dye reduced the bond strength of adhesive materials to dentin. Extracted human molars were prepared to expose a flat dentin surface and the dentin was then treated with one of two dyes: 0.5% basic fuchsin or Cari-D-Tect (Gresco Products, Inc.). Teeth not treated with a dye were used as a control. Following dye removal with rinsing, the teeth were etched with 35% phosphoric acid, rinsed, and lightly dried. Prime & Bond 2.0 (Dentsply/Caulk) was applied and then one of three adhesive materials was placed: a resin composite (TPH Spectrum from Dentsply/Caulk), a compomer (Dyract from Dentsply/Caulk), or a multi-purpose resin-modified glass ionomer (Advance from Dentsply/Caulk). Tensile bond strength was tested at 24 hours and the data were analyzed using analysis of variance to determine if dye application had an effect on bond strength. Results indicated that for TPH Spectrum and Dyract, bond strength was significantly reduced by dye use. Bond strength for Advance was not affected. **The authors concluded that the bond strength of some adhesive materials is adversely affected by the use of caries-detecting dyes.**

### *THE LATEST ON LATEX*

The dental team and latex hypersensitivity. ADA Council on Scientific Affairs. J Am Dent Assoc 1999; 30:257-264.

This article presents a comprehensive review of latex hypersensitivity and its relevance to dental healthcare workers. Since the late 1980's, there have been numerous reports of allergic reactions to

natural rubber latex (NRL), especially in the medical and dental environment. This report summarizes the signs and symptoms of NRL protein allergies, allergic contact dermatitis, and irritant dermatitis. The Council presents information on methods for definitely diagnosing these conditions, with suggestions for reducing occupational exposure to the causative agents in the dental office. The information contained in this report is based on currently available data; as new information becomes available, it will be updated by the ADA Council on Scientific Affairs. **This is an excellent article that provides the latest information on latex hypersensitivity.**

### *THINK SPEED*

Accuracy of proximal caries depth determination using two intraoral film speeds. Jessee SA, Makins SR, Bretz WA. *Gen Dent* 1999; 47:88-93.

Numerous studies have shown that observers using radiographs to evaluate the extent of caries penetration consistently underestimate the severity of the lesion. Bitewing radiographs are one of the most effective diagnostic tools for detecting interproximal caries and the most widely accepted. This study evaluated the accuracy of the radiographic interpretation of interproximal caries depth on extracted teeth using Ultraspeed and Ektaspeed Plus film (40 percent more sensitive), as compared to histological results found following sectioning. Results indicated that, regardless of the film speed used, observers were correct less than 25 percent of the time in their estimation of the extent of caries penetration of proximal surfaces. The finding revealed substantial variability between the radiographic interpretation of the examiners for both the presence and extent of proximal caries when compared to the histological data. Diagnostic results for both films were similar with regard to the presence and extent of caries. **The authors concluded that Ektaspeed Plus film is the most logical choice for dental practitioners because it is comparable diagnostically to Ultraspeed film and substantially reduces radiation exposure to the patient.**

### *EKTASPEED PLUS FILM JUDGED FAVORABLY*

The influence of storage conditions and film characteristics of Ektaspeed Plus and Ultra-Speed film. Platin E, Nesbit SP, Ludlow JB. *J Am Dent Assoc* 1999;30:211-218.

In 1982, the Eastman Kodak Co. introduced Ektaspeed film which considerably reduced radiation exposure to dental patients. The dental profession was slow to accept the new film because of perceived problems with decreased contrast, increased fog, film graininess, and processing sensitivity. Studies confirmed that during storage, Ektaspeed film fogged more rapidly than the more commonly used Ultraspeed. This made the Ektaspeed film unusable before the manufacturer's expiration date. In 1995, in an attempt to correct this problem, Eastman Kodak introduced Ektaspeed Plus film to replace Ektaspeed. This study compared Ektaspeed Plus film with Ultraspeed film over time under various storage conditions and evaluated the effect of new and used processing solutions on the two film types. Results indicated that for both types of film, shielding them from sources of background radiation provided the best means of maintaining high film quality over long storage times. Both film types maintained acceptable base + fog levels up to the manufacturer's expiration date; storage location had a minimal influence on film contrast. Ultraspeed film's contrast decreased over the study period while Ektaspeed Plus' remained essentially the same. For both films, base + fog levels increased with increased age and use of the processing solutions, but the effect was clinically insignificant. **The authors recommend that Ektaspeed Plus film be used for intraoral imaging, because its performance is comparable to that of Ultraspeed film and it reduces patient radiation exposure by 50 percent. All dental clinics must ensure that correct safelights and processing solutions are used before switching to the new film.**

### *YOU MAY NOT ALWAYS HAVE TO USE CUSTOM CAST POST AND CORES*

Effects of cyclic loading on selected post-and-core systems. Reagen SE, Fruits TJ, Van Brunt CL, Ward CK. *Quintessence Int* 1999;30:61-67.

The purpose of this study was to evaluate the resistance of selected post-and-core systems to fatigue testing. A fatigue-testing machine with data acquisition software was developed for this *in vitro* study. Fifty pulpless mandibular second premolars were divided into five groups that were restored with prefabricated or custom post-and-core systems. The first two groups were restored with Dispersalloy

amalgam cores using two different prefabricated post systems (Parapost XP and Tri-R Posts). The third and fourth groups utilized the same prefabricated post systems but the core was restored with TiCore resin composite. The control consisted of cast gold post-and-cores. The post spaces were prepared per manufacturer's instructions with supplied equipment. All post-and-core systems were cemented with zinc phosphate cement. Each core was prepared to standardized dimensions and then subjected to cyclic loading until the core was displaced to a predetermined failure distance of 63.5 microns. Results found that there was no statistical difference between any of the groups. **All the post-and-core systems that were tested in this study may be feasible for restoring endodontically treated premolars.**

### *DETECTING THE POTENTIAL FOR STROKES DURING A DENTAL EXAM*

Carotid artery calcification in a general dental population: a retrospective study of panoramic radiographs. Lewis DA, Brooks SL. *Gen Dent* 1999;47:98-103.

The dentist may be the first healthcare provider to detect a potentially life-threatening illness by carefully assessing findings from the health questionnaire and clinical/radiographic examination. One important finding is the presence of a calcified plaque in the carotid artery, which may contribute to a cerebrovascular accident (stroke). The presence of calcified plaques on routine panoramic radiographs may signify a patient who is at an increased risk for a stroke. To detect plaques on a panoramic radiograph, the area of importance is located posterior and inferior to the angle of the mandible at the C3 and C4 vertebral level. Patients with suspected carotid atheromas should be referred for further evaluation. Previous studies have shown a 2 to 4.5 percent rate of positive radiographic signs for carotid artery calcification on routine panoramic films. This retrospective study involved a review of all panoramic radiographs exposed at a clinic over a 6-month period using three brands of panoramic radiograph machines. Examiners looked for radiographic evidence of radioopacities of soft tissues in the region of the common carotid artery bifurcation. They also looked for the presence or absence of cervical spine images. Results indicated radiographic signs of carotid artery calcification in nine subjects (0.8 percent of patient pool). The presence of the cervical vertebrae was visualized to a different degree on the various panoramic machines, but the presence or absence of the vertebral image was not critical in the detection of carotid artery calcifications. **The authors recommend that all panoramic radiographs be screened for carotid artery calcifications, particularly for patients whose family or medical history puts them at a greater risk for stroke.**

### *CLINICAL TRIAL OF KETAC-FIL VS. PHOTAC-FIL*

Two-year clinical performance of a resin-modified glass-ionomer restorative material. Brackett WW, Gilpatrick RO, Browning WD, Gregory PN. *Oper Dent* 1999;24:9-13.

Although conventional glass-ionomer restorative materials such as Ketac-Fil and Fuji II have been used clinically for nearly 20 years, they have certain shortcomings that have limited their popularity. Early sensitivity to moisture makes handling them somewhat difficult and their overall esthetics is less-than-ideal. More recently developed resin-modified glass ionomers such as Fuji II LC, Vitremer, and Photac-Fil contain resin that gives them command set with light exposure; they also are more esthetic than the conventional glass ionomers. Unfortunately, few studies have been published evaluating the clinical performance of the RMGICs. This article presented the results of a two-year clinical study of the performance of a conventional glass ionomer (Ketac-Fil) and a RMGIC (Photac-Fil). Thirty-four restorations of each material were placed without tooth preparation in Class V abrasion/abfraction lesions in premolars. At periodic intervals, the restorations were evaluated and rated using a pre-determined rating scale. Results showed the same retention rate at two years (93%). Both groups of restorations were comparable in appearance and only one case of secondary caries was noted for each material. **No significant difference between the two materials was observed for any evaluated category.**

### *NEW TEMPORARY MATERIALS FOR MILITARY FIELD USE*

Temporary dental restorative materials for military field use. Hondrum SO. *Mil Med* 1998;163:381-385.

A wide range of materials can be used as temporary restorative materials and each has advantages and disadvantages. Included among the many potential temporary materials are the zinc oxide-eugenol products (ZOE) [e.g., IRM] and glass-ionomer cements (GICs) [e.g., Fuji II]. Within the last few years, two other materials have been introduced that may function well as temporaries: resin-

modified glass ionomers (RMGICs) [e.g., Fuji II LC and Vitremer] and the high-viscosity modified glass ionomers (MGIs) [e.g., Fuji IX GP, Hi Dense, Ketac Molar]. Identifying a specific product for use under field conditions is a special challenge because such a material must possess the characteristics of being easy to obtain, inexpensive, and be able to be manipulated and placed under varying environmental conditions. The purpose of this study was to evaluate several common temporary materials, including the RMGICs and MGIs, for use as temporary materials under field conditions. A number of physical properties were measured for the following materials: the ZOE product, IRM; a GIC, Fuji II; a MGI, Fuji IX GP; and two RMGICs, Vitremer and Fuji II LC. Comparative shelf life was also evaluated by exposing the liquid components of the products to a temperature of 50°C for prolonged periods and testing their viscosity (i.e., thickness). Results found that for compressive strength, rigidity, and hardness, the materials could be ranked: MGI>GI>RMGIC>ZOE. For tensile strength, they were RMGIC>MGI>GI>ZOE. Storage stability testing yielded the ranking of ZOE>MGI>GI>RMGIC. **The author concluded that although none of the materials met all the ideal requirements of a temporary material, the MGI offered the most promise for military field use.**

### *DENTAL UNITS AND INCIDENCE OF PERCUTANEOUS INJURIES*

The influence of dental unit design on percutaneous injury. Harte J, Davis R, Plamondon T, Richardson B. J Amer Dent Assoc 1998;129:1725-1731.

Percutaneous injuries are a significant occupational hazard in dentistry. Studies indicate that most of these injuries occur extraorally and frequently involve dental burs. This investigation compared, by use of a prospective diary, the incidence of percutaneous injuries sustained by dental personnel using the European "buggy-whip" handpiece delivery system (handpieces situated over the top of the tray, with the bur nearly resting on the instrument tray) versus the conventional delivery system (handpiece in a fixed upright position in front of the instrument tray). The duration of the prospective diary was 30 workdays, with 236 survey respondents. Confidentiality of survey responses was emphasized to all participants. **The results of this study demonstrated there was no statistically significant difference in the incidence of percutaneous injury between the users of conventional style dental units and users of the European-style unit.** Interestingly, ninety percent of the participants who experienced a percutaneous injury in this study chose not to report the incident. This investigation confirmed the results of previous studies that the dental bur was found to be a frequent cause of percutaneous injuries in dentistry. This emphasizes the need to sterilize all dental instruments (including dental burs) between patient use.

### *DISPOSABLE LIGHT PROBES--WAVE OF THE FUTURE?*

Single-use, disposable, presterilized light-activation probe: The future? Morrow L, Wilson NHF, Setcos JC. Quintessence Int 1998;29:781-785.

Because infection control is such an important concern in dental offices, clinicians and assistants are re-evaluating their use of equipment to ensure it does not form a weak link in the infection control process. Light-activation probes (i.e., light wands, light unit tips) have traditionally been manufactured for reuse and can be sterilized between patients. Some studies have found that the sterilization process can cause a degradation of the probes. As a result, at least one manufacturer now markets a single-use, disposable light-activation probe (Sanicure, Dentsply). The purpose of this study was to measure the light output, heat generation, and depth of cure produced by this disposable probe and to compare them to that of an equivalent, sterilizable probe (Euromax, Dentsply). The three properties were measured in a laboratory for 10 Sanicure probes and 2 Euromax probes (all with an 8-mm tip diameter) and results indicated that their light output and depth of cure were not significantly different. It was noted that the autoclavable probes generated significantly more heat than the disposable probes. **The authors concluded that the disposable probes performed as well as the autoclavable probes. They also recommended that a cost comparison be done to evaluate the cost effectiveness of purchasing and using disposable probes.**

### *STRESS NO BOND BEFORE ITS TIME...*

Resin-modified glass ionomers: dentin bond strength versus time. Miyazaki M, Iwasaki K, Soyamura T, Onose H, Moore BK. Oper Dent 1998;23:144-149.

Most dentin bond strength tests for resin-modified glass-ionomer restorative materials (RMGI) are conducted after 24 hours storage in water. This may not be clinically relevant, however, because some restorations may be stressed immediately after placement. The purpose of this study was to investigate the bond strength development rate of RMGIs. Two millimeter by four millimeter cylinders of Fuji II LC (GC Corp) and Vitremer (3M) were bonded to prepared bovine dentin. Bond strengths were measured at 1, 5, 10, 30, and 60 minutes as well as after 2, 5, and 24 hours storage in water. An auto-cure glass-ionomer (Fuji II, GC) and a resin composite (Herculite XRV/OptiBond, Kerr Corp) were used as controls. Results found that the dentin bond strengths of all materials increased with prolonged storage time. Also, bond strengths increased significantly at 10 minutes for Fuji II LC and OptiBond, 20 minutes for Fuji II, and 60 minutes for Vitremer. **It seems clinically prudent not to stress these respective materials until sufficient time passes for their bond strengths to develop.**

### ***CAN ULTRASONICS KILL MICROBES?***

Effect of ultrasonic cleaning on microorganisms. Bettner MD, Beiswanger MA, Miller CH, Palenik CJ. Am J Dent 1998;11:185-188.

Ultrasonic cleaning is a common method of cleaning dental instruments prior to sterilization. Cleaning reduces the number of microbes on instruments and removes blood, saliva, tissue, and residual dental materials. The use of ultrasonics reduces contact with contaminated instruments, offers enhanced efficiency, and is advocated by the American Dental Association and Centers for Disease Control and Prevention. There are limited published studies concerning the antibacterial effects of ultrasonic cleaning. The purpose of this study was to create a system capable of measuring microbial kill during ultrasonic cleaning using three commercial enzymatic detergents and saline as the cleaning solutions. The study also estimated the escape of bacteria from cleaning solutions during operation of the cleaning unit. *Streptococcus mutans* was utilized for the bacterial suspension. **Results showed that the kill of the bacteria increased as the operational temperature rose from 21°C to 37°C and from 37°C to 60°C whether or not ultrasonics was used with the cleaning solutions. Also, minimal bacteria escaped from the ultrasonic cleaning solution into the air during the cleaning process. Covering the unit with a lid reduced emission to zero.** It should be noted that the primary purpose for using ultrasonics is not to kill bacteria, but rather, to effectively clean soiled dental instruments.

## DIS IN PRINT

This feature of the newsletter appears periodically to highlight recent publications by the DIS staff. A brief description of the work follows the title. If you are interested in reading the entire article, please call the individual whose name is highlighted for a reprint.

Effect of curing-tip diameter on the accuracy of dental radiometers. **Leonard DL, Charlton DG, Hilton TJ.** Oper Dent 1999;24:31-37.

Because the number and types of light-activated dental materials have dramatically increased in the last decade, visible light units have become an indispensable piece of equipment. It is important to periodically check the light intensity of these units to ensure they can adequately polymerize materials. Unfortunately, most radiometers have a fixed opening against which the light tip is placed for testing. This may affect the accuracy of the reading they provide depending on the size of the tip being used. The purpose of this study was to evaluate the accuracy of four commercially-available radiometers when curing tips of different diameters were used. A visible light unit (Optilux 500) with an 80-watt quartz-halogen bulb (OptiBulb) was used as the sole light source. The unit's irradiance was measured using three hand-held radiometers (Demetron 100, Cure-Rite, Coltolux) and a built-in radiometer (Optilux 500). Measurements were made with curing tips of diameters 4 mm, 7.5 mm, 10.5 mm, and 12 mm. The irradiance values were compared to the values measured by a laboratory-grade power meter. Results showed that, except for the Optilux 500 built-in radiometer with the 10.5-mm tip, all the commercially available radiometers had irradiance values that were different from those of the power meter. In general, when smaller-diameter tips were used, the radiometers underestimated the actual irradiance; when the larger-diameter tips were used, the radiometers overestimated the actual irradiance. **The authors concluded that the commercial radiometers tested in the study were poor indicators of the light's actual irradiance. The size of the curing tip also affected the degree of accuracy. Radiometers still have value in monitoring the performance of a light unit over time if the same diameter tip is used during testing.**

Atypical presentation of odontogenic pain. **Roberts HW,** Wright EF. Gen Dent 1999;47:46-47.

This case report involved a patient who had sought medical care due to throbbing retro-orbital and occipital pain that radiated down the left cervical region to the arm. The patient was evaluated and then treated for three days with various migraine medications without resolution of the symptoms. At this point, he was referred for both neurological and dental evaluations. The patient accepted the dental referral with reluctance because he felt his problems were not dental in origin. The dental evaluation was unremarkable except for a carious #18 with a fractured distal marginal ridge. Interestingly, the tooth tested normal to endodontic pulp testing. During excavation of the lesion, a carious hyperemic pulpal exposure was encountered. A total pulpectomy was performed and a provisional restoration placed. A follow-up evaluation 24 hours later found total resolution of all the patient's painful cranio-facial symptoms. **This case report reinforces the importance of performing a dental evaluation on all patients with craniofacial pain that is not responsive to treatment.**

Comparative radiopacity of flowable resin composites. Murchison DF, **Charlton DG,** Moore WS. Quintessence Int 1999;30:179-184.

Flowable resin composites have become quite popular because of their ease of placement, convenient delivery (most come in syringes), and excellent esthetics. Most manufacturers of these products recommend their use in small Class II lesions or as liners beneath posterior resin composites. Although manufacturers' product information sheets state that flowable resin composites contain "glass" fillers and are radiopaque, only one study to date has been published evaluating their radiopacity. This study measured the radiopacity of eight flowable resin composites and compared them to enamel, dentin, and a popular "universal" resin composite. Five disk-shaped specimens of eight flowable resin composites (Tetric-Flow [Ivoclar], Flow-It LF [Jeneric/Pentron], Crystal-Essence [Confi-Dental], Aeliteflo

[Bisco], Revolution [Kerr], Versaflo [Centrix], Ultraseal XT Plus [Ultradent], FloRestore [Den-Mat]) were made and two different methods were used to measure their radiopacity and that of similar thicknesses of enamel, dentin, and Herculite XRV resin composite (Kerr). Statistical testing was performed to determine if significant differences existed between the materials. **Results indicated that the degree of radiopacity of flowable resin composites is product specific. Only three met the generally accepted standard of having a radiopacity equal to or greater than that of enamel (Tetric-Flow, Flow-It LF, Crystal-Essence). The remaining flowable products were not radiopaque enough to prevent them from being misinterpreted as caries if used as liners beneath Class II restorations.**

# GENERAL DENTISTRY

## 57-10 PQ1 Single Syringe Bonding System

(Project 98-47)

PQ1 is a new fifth-generation (i.e., "one-component") dentin bonding agent marketed by Ultradent Products, Inc. According to Ultradent, PQ1 is filled to 40% with a fluoride-releasing, radiopaque filler and is recommended for bonding to porcelain, metal, resin composite, and to enamel and dentin using resin composite or amalgam. PQ1 is one of the few bonding products that is supplied in syringes and comes in a paper box with a hinge-opening top. Four 1.2-mL syringes are in the kit: two of 35% phosphoric acid etchant (Ultra-Etch) and two of PQ1 bonding agent. Also included are disposable syringe tips and brushes, a four-page sheet of written instructions, a well-illustrated laminated instruction card, and Material Safety Data Sheets.

The first step in applying PQ1 for bonding resin to tooth structure is to etch the enamel and dentin for 15 seconds with the acid etchant. The etchant is removed with thorough rinsing for 5 seconds and the tooth structure is either blot dried or lightly dried with compressed air. PQ1 is then scrubbed into the etched enamel and dentin for 15 seconds. Intermittent 1- to 2-second blasts of compressed air are used to thin the bonding agent. At this point, the treated tooth surface should retain its glossiness. The bonding resin is light cured for 20 seconds and the restorative material is then placed using traditional methods.

### Manufacturer:

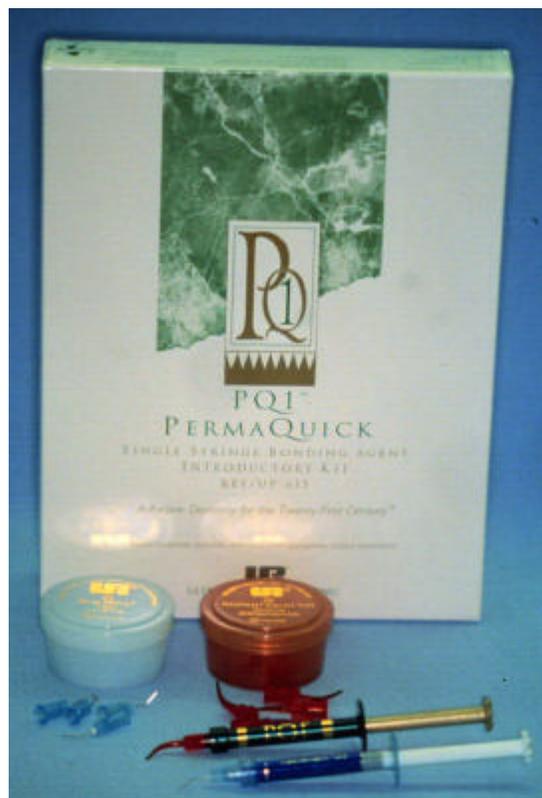
Ultradent Products, Inc.  
505 West 10200 South  
South Jordan, UT 84095  
(800) 793-5216  
(801) 572-4200  
(801) 553-4915 FAX

### Suggested Retail Price:

\$70.25 PQ1 Introductory Kit (REF/UP 615) contains:  
-two 1.2-mL syringes of PQ1  
-two 1.2-mL syringes of Ultra-Etch (35% phosphoric acid etchant)  
-20 Blue Micro Tips  
-40 Inspiral brush tips

### Government Price:

\$59.71 PQ1 Introductory Kit (item number and contents as listed above)



**ADVANTAGES:**

- + Application process is easy to learn.
- + Fast to apply.
- + Excellent bond strength to dentin (29 MPa).
- + No offensive odor.
- + Provided with an excellent laminated instruction card.
- + Expiration date and lot number provided for kit.
- + Recommended storage conditions are listed on box.
- + Optional syringe covers (item number: REF/UP 249) provide good infection control for syringes.
- + Comes with a Material Safety Data Sheet (MSDS).

**DISADVANTAGES:**

- Product is not all-inclusive; basic bonding components such as silane, porcelain etchant, and metal opaquers are not provided.
- Bonding resin is somewhat thick which makes its precise placement difficult and leads to waste.
- Some phase separation noted in syringe of bonding resin.
- Box is large for the amount of product provided.

**SUMMARY AND CONCLUSIONS:**

Although PQ1 is marketed as a simplified (ie, "one-component") multi-purpose bonding product, not all components are provided for the different uses described in the instructions. Clinical users rated PQ1 highly for its ease of use and noted that the optional syringe covers were good barriers for the etchant and bonding resin syringes. DIS recommends that the syringe covers be purchased even though they are expensive (7¢ apiece), because without them infection control is compromised. PQ1's simplicity of application is illustrated by the speed with which it can be applied (it was the third fastest "one-component" product yet tested by DIS). The product produced a very strong bond to moist dentin in DIS laboratory testing. Some separation of filler and resin was noted, so users should bleed the syringe prior to applying the resin to ensure that it is homogeneously mixed with filler particles. Because PQ1 is not provided with all the components called for in the instructions, it is best suited for simple bonding procedures such as bonding resin composite to enamel and dentin. **PQ1 Single Syringe Bonding Agent** is rated **Acceptable** for use by the federal dental services.

(Lt Col Charlton)

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**57-11 élan Compomer Restorative System****(Project 98-48)**

According to its manufacturer, élan is a compomer (also known as a polyacid-modified composite resin) that exhibits physical properties that are better than those of other compomers on the market. These improved physical properties are purportedly due to the use of a special aromatic monomer that forms a strong molecular backbone which, in turn, forms a strong polymer network. The product is recommended by Kerr for the restoration of Class I, II, III, IV, and V lesions and is filled 79%/wt with fluoroaluminosilicate filler particles having an average size of 1.4 microns. élan is available in unit-dose (Unidose) tips individually sealed in foil pouches. The Unidose tips are used in Kerr's dispenser gun which is provided with the kit, however, the tips also fit in other standard resin composite dispenser guns. A kit of élan comes with 30



Unidose tips, five each of six shades (A2, A3, A3.5, A4, B1, and C2). Ten other Vita shades are available as well as four non-Vita shades (three cervical and one extra light).

élan is placed in the cavity preparation following enamel and dentin etching and treatment with OptiBond Solo. élan is then incrementally added and light activated for 40 seconds. All components in the kit (compomer, bonding acid etchant and bonding agent) have separate expiration dates clearly identified.

**Manufacturer:**

Kerr Corporation  
1717 W. Collins Avenue  
Orange, CA 92867-9880  
(800) 537-7123  
(714) 516-7400  
(714) 516-7633 FAX

**Suggested Retail Price:**

\$225.00 élan Compomer Restorative System (item number 28794) contains:  
-thirty (0.25-g) Unidose tips; 5 each of the shades A2, A3, A3.5, A4, B1, and C2  
-OptiBond Solo (20 Unidose packets)  
-one 3-g syringe of Kerr Acid Etchant  
-50 Kerr Applicators  
-one gun dispenser

\$46.65 élan Unidose Refills, (each shade has an individual item number); each refill contains twenty 0.2-g Unidose tips

**Government Price:**

\$128.25 élan Compomer Restorative System (contents and item number as listed above)

\$26.60 élan Unidose Refills (as listed above)

**ADVANTAGES:**

- + Excellent handling characteristics (eg, nontacky, nonslumping).
- + Very good polishability and overall esthetics.
- + Placement procedure is straightforward and simple.
- + Packaged with excellent bonding agent (OptiBond Solo).
- + Wide range of Vita-indexed shades available.
- + Unidose tips have shade stamped on them.
- + Unidose tips have long nozzle that facilitates placement.
- + Tips fit common gun dispensers (e.g., Caulk, 3M).
- + "Tackle-box" packaging provides excellent portability; highly rated by users.
- + Is sufficiently radiopaque to ensure easy detection on a radiograph.
- + Expiration dates are provided for all items in kit.
- + Recommended storage conditions listed on box.
- + Provided with superb laminated instruction card that uses graphics to depict product use.

**DISADVANTAGES:**

- Some evaluators judged élan as being too thick.
- Plastic case has wasted space making it larger than it needs to be.
- Partially-filled bonding agent can leave unesthetic white line at margin.
- Lacks long-term laboratory and clinical studies of performance.
- Not provided with Material Safety Data Sheet (MSDS).

**SUMMARY AND CONCLUSIONS:**

élan was very well received by the majority of our clinical evaluators. Although it is somewhat thick, its

non-tackiness and resistance to slumping made it easy to handle. Its shade matching ability and polishability enabled users to achieve excellent overall esthetic results. The six-language instruction booklet lacks information about the product's composition and purported advantages, however a nicely-designed instruction card effectively summarizes product use. Kerr products continue to be distinguished by their excellent "tackle box" packaging, although élan's plastic case could be made smaller if wasted space were more efficiently utilized. As is true with other compomers, published long-term clinical and laboratory studies have yet to appear that evaluate élan's performance. Per gram of refill material, élan is comparable in price to several other popular compomers and resin composites. élan is rated **Acceptable** for use by the federal dental services.

(Lt Col Charlton)

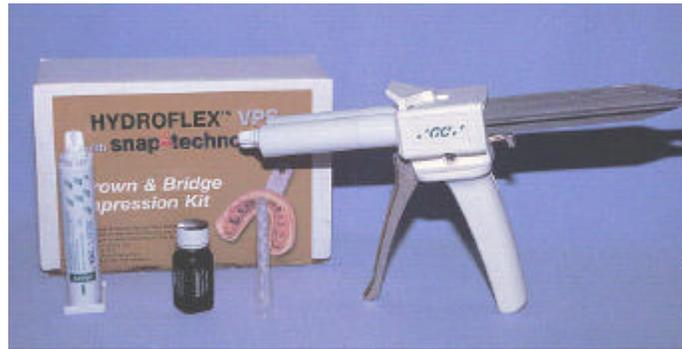
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## 57-12 Hydroflex™ VPS Impression Material

(Project 98-27)

Hydroflex™ VPS is GC America's newest polyvinylsiloxane impression material. This advertised multi-purpose hydrophilic impression material was introduced to the market in February 1998. Hydroflex™ VPS is said to possess the "Snap<sup>2</sup> Technology System" that imparts a combination of flexibility and flow designed to make the material accurate, easier to use, and easier to remove from the mouth than other polyvinylsiloxane impression materials.

Hydroflex™ VPS is marketed with one viscosity of wash material (Injection Viscosity) but has three different heavy body viscosities: Heavy Body, Heavy Body F, and Heavy Body R. Heavy Body is described as a tray material that provides the added compression needed for an everyday tray material. Heavy Body F is a tray material purported to have both the compression needed to push injection material into the sulcus but also elasticity and high tear strength for easy removal. GC America recommends that Heavy Body F be used in a rigid tray with Injection Viscosity for full arch impressions, multiply units, and cases where extra flexibility is desired (e.g., tori, implants, existing fixed partial dentures, existing undercuts, or periodontally compromised teeth). Heavy Body R is said to be a rigid high-viscosity tray material with high compression, high viscosity, and an extremely hard set. GC America states that Heavy Body R's rigid extra-firm set helps stabilize plastic trays and prevents deformation that can occur with dual arch or triple-tray impressions.



The manufacturer claims that Hydroflex™ is extremely hydrophilic, which facilitates impression making when moisture is present. GC also lists as advantages the material's high resistance to tearing and ease of removal (for injection viscosity).

### Manufacturer:

GC America, Inc.  
3737 West 127<sup>th</sup>  
Alsip IL 60803  
(800) 323-3386  
(708) 597-0900  
(708) 371-5148 FAX

### Suggested Retail Price:

\$67.05 Hydroflex™ Snap<sup>2</sup> Technology Introductory Kit (Product Code 130306)  
--two 48-mL cartridges of Injection Viscosity  
--12 Injection mixing tips

- 12 Intraoral tips
- two 48-mL cartridges of Heavy Body
- two 48-mL cartridges of Heavy Body F (Flexible Tray Material)
- 12 Heavy Body mixing tips
- one 7-mL bottle VPS Tray Adhesive

\$67.05 Hydroflex™ Dual Arch Impression Kit (Product Code 131306)

- two 48-mL cartridges Injection Viscosity
  - 12 Injection mixing tips
  - 12 Intraoral tips
- two 48-mL cartridges of Heavy Body
- two 48-mL cartridges of Heavy Body R (Rigid Tray Material)
- 12 Heavy Body mixing tips
- one 7-mL bottle VPS Tray Adhesive

**Government Price:**

\$43.60 Hydroflex™ Snap<sup>2</sup> Technology Introductory Kit (Product Code 130306) (contents as listed above)

\$43.60 Hydroflex™ Dual Arch Impression Kit (Product Code 131306) (contents as listed above)

**ADVANTAGES:**

- + Meets the ANSI/ADA specification requirement for dimensional stability.
- + Meets the ANSI/ADA specification requirement for detail reproduction; material should accurately capture fine detail.
- + Clinical working and setting times found to be adequate.
- + Three different tray viscosities allow technique flexibility.
- + Exhibits good clinical flow and viscosity.
- + Clinical users report good tear strength.
- + Good packaging configuration.
- + Cartridge delivery system easy to use.
- + Disinfection procedures detailed in manufacturer's instructions.
- + Relatively inexpensive.

**DISADVANTAGES:**

- Tray material's working time may be shorter than expected.
- Earth-tone colors may be objectionable to some users and may make margins difficult to read.
- Instructions are unclear about what type of mixing tips are used with different viscosities.
- Instructions are unclear concerning clinical uses for different viscosities of tray material.

**SUMMARY AND CONCLUSIONS:**

Hydroflex™ is an accurate polyvinylsiloxane impression material that was well received by clinical users. Hydroflex™ is innovative in that it offers three different tray viscosities to meet a variety of clinical situations. Its earth-tone colors may not be appreciated by all users because they make reading margins somewhat difficult. Clinical evaluators found the material easy to use with good clinical working and setting times, a good cartridge delivery system, and straightforward packaging. Hydroflex's cost is comparable to Reprosil (Dentsply/Caulk) and less than Extrude PS (Kerr) or Imprint II (3M).

**Hydroflex™ VPS Impression Material** is rated **Acceptable** for use by the federal dental services.  
(Lt Col Roberts)

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## 57-13 Root ZX

(Project 98-20)

The Root ZX is a fully automatic root canal length-measuring device referred to as an electronic apex locator. Because its advanced microprocessor automatically calibrates the Root ZX, a measurement can be made immediately after the unit is turned on. This is a purported advantage because no time-consuming set up is required and no resetting is necessary for multiple measurements. The Root ZX uses a measuring method that calculates the ratio of two different frequencies (400 and 8,000 Hz). This purportedly makes it accurate under all canal conditions including a canal that is wet with sodium hypochlorite, water, hydrogen peroxide, local anesthetic, blood, or pulp. To use the unit, an electrode is clipped to the working length file and a second electrode, called the contrary electrode, is placed in contact with the patient's lip. The Root ZX has a large LCD display and provides a constant indication of file position with respect to the apex. The unit has three different audible alarms that correlate to file position. An earphone is provided so that the patient doesn't have to listen to the alarms. The device automatically turns off if it is not used for 20 minutes; this is said to prolong the life of the battery. A bar graph indicator denotes remaining battery life (average life: 100 hours according to the manufacturer). All attachments are autoclavable for infection control. Standard accessories include: three file holders, a probe, five contrary electrodes, an earphone, and five AA alkaline batteries. The Root ZX's exterior has a smooth design for ease of cleaning with a flat on/off switch for operation. The unit weighs 550 grams (1.2 pounds) and is 96-mm wide X 80-mm deep X 105-mm high (3.7" W X 3.2" D X 4.1" H).



### **Manufacturer:**

J. Morita USA, Inc.  
9 Mason  
Irvine, CA 92618  
(888) 566-7482  
(949) 581-9600  
(949) 465-1095 FAX

**Suggested Retail Price:** \$990.00

**Government Price:** \$792.00

### **ADVANTAGES:**

- + Extremely accurate.
- + Facilitates working length determination in difficult cases.
- + Decreases chair time.
- + Short learning curve.
- + Lightweight and portable.
- + Large, easy-to-read display.
- + Automatic calibration which reduces set-up time.

### **DISADVANTAGES:**

- File holder reduces the effective length of files.

- Not accurate with surrounding metal restorations.
- Not accurate with leaky restorations.
- Cord discolors when disinfected.

**SUMMARY AND CONCLUSIONS:**

The Root ZX is an electronic apex locator that evaluators found to be extremely accurate, particularly for difficult cases. Less than 10% of the time evaluators experienced false readings while using the unit. The evaluators felt the Root ZX aided working length determination and considerably reduced chair time. The major drawback was the design of the file holder. The attachment of the file to the file holder reduced the working length of the file by 3 mm. As a result, providers often had to use 30-mm-long files for determining working length. Both evaluators felt the Root ZX should be part of the required armamentarium for endodontic procedures and would purchase this device for their clinics. The **Root ZX** is rated **Recommended** for use by the federal dental services.

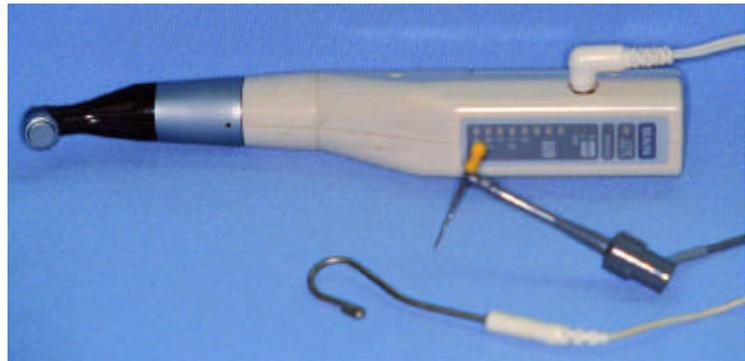
(Col Bartoloni)

**57-14 Tri Auto-ZX**

**(Project 98-21)**

The Tri Auto-ZX is a rechargeable, battery-operated, low-speed endodontic handpiece with a built-in apex locator. Endodontic nickel-titanium rotary files (not included) are used with the unit. The Tri Auto-ZX has three automatic functions for root canal instrumentation: start/stop, torque reverse, and apical reverse. The automatic start/stop starts the file rotating when it enters the canal. The automatic torque reverse stops the file and reverses rotation when too much torque is applied. The automatic apical reverse stops the file and reverses the rotation when the tip reaches a level

preset by the clinician (e.g., at the apex or 2 mm, 1.5 mm, 1 mm, or 0.5 mm from the apex). The cordless handpiece offers a choice of automatic or manual mode operation, and has an LED control panel that automatically shuts off after three minutes of inactivity. The handpiece is powered by a nickel cadmium battery and has a speed of 280 revolutions per minute. To use the unit as an apex locator, an electrode is clipped to the working length file and a second



electrode, called the contrary electrode, is placed in contact with the patient's lip. The handpiece is recharged by placing it in a base unit that is 80-mm wide X 123-mm deep X 55-mm high (3.1" W X 4.8" D X 2.2" H). The outer dimensions of the handpiece are 30-mm wide X 37-mm deep X 212-mm long (1.2" W X 1.5" D X 8.3" H) and it weighs 160 grams (5.6 ounces). Accessories include: a probe cord, three file holders, a function tester, five contrary electrodes, and lubrication spray.

**Manufacturer:**

J. Morita USA, Inc.  
 9 Mason  
 Irvine, CA 92618  
 (888) 566-7482  
 (949) 581-9600  
 (949) 465-1095 FAX

**Suggested Retail Price:** \$2,100.00

**Government Price:** \$1,575.00

**ADVANTAGES:**

- + Is accurate as an apex locator.
- + Lightweight.
- + Portable.
- + Good torque.
- + Quiet.
- + Conforms to IEC 601.
- + UL listed.

**DISADVANTAGES:**

- Inaccurate readings during automatic mode operation.
- Inconveniently located manual mode button.
- File holder attachment reduces working length of file by 3 mm.

**SUMMARY AND CONCLUSIONS:**

The Tri Auto-ZX is a rechargeable, battery-operated endodontic handpiece with a built-in apex locator. The unit gives the clinician the ability to electronically monitor the canal before, during, and after instrumentation. The handpiece was found to be lightweight, portable, and quiet. It provided excellent torque for instrumentation. The apex locating features were found to be accurate. The major drawbacks were false readings during the automatic mode operation, the design of the file holder, and the location of the manual mode button. The evaluator experienced false readings 30 to 40 percent of the time while in the automatic mode. Many times the handpiece would auto-reverse when reading the apical constriction, which differed from the clinician's initial working length. The design of the file holder requires attachment below the handle resulting in approximately a 3-mm reduction in file length, which necessitated the use of 30-mm long files many times. The manual mode button is difficult to activate while placing the handpiece into the root canal system. Even with these shortcomings the evaluator felt that, with practice, the Tri Auto-ZX has the potential to be easier and more time efficient than hand instruments. The **Tri Auto-ZX** is rated **Acceptable** for use by the federal dental services.

(Col Bartoloni)

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**57-15 Trophy Everest System****(Project 98-11)**

The Trophy Everest System consists of the RadioVisioGraphy (RVG) digital radiography unit and the StomaVision (STV) intraoral camera. RVG is a filmless, direct, digital, intraoral radiographic imaging system that uses a charge-coupled device (CCD) sensor in lieu of conventional dental radiographic film. A standard x-ray unit is used to produce ionizing radiation that falls on the sensor (Figure 1 shows sensor). The sensor then responds to the radiation and transmits the digital signal to a computer monitor. The sensor measures 24 mm X 40 mm and is 6 mm thick. Disposable sheath-barriers provide proper infection control during intraoral use and the sensor can be surface disinfected if contaminated. The sensor plugs directly into the computer and can be positioned intraorally using Trophy's positioners. When using the standard positioner, the sensor is placed within a plastic holder that is attached to a metal ring that helps align the tubehead. The digital image can be enhanced through different software functions, examined in the positive or negative, and colorized. Measurements are automatically calibrated and differences in bone density can be identified.



Figure 1

STV is a digital intraoral camera that provides digital images which can be viewed on a computer

monitor. The camera lens is located at the end of an ergonomically-designed handpiece that is protected by disposable barrier-sheaths. The focus control is located at the base of the handpiece, which enables the user to switch from extraoral to intraoral views and to zoom. The Trophy Everest System is packaged with a personal computer, installed software package, computer monitor (cart is optional; for configuration evaluated by DIS, see Figure 2). Various configuration options are available for purchase. This project evaluated a unit that included a cart (21.5 inches wide X 22 inches deep X 33 inches tall) and a Sony UP-D890 digital graphic printer.

**Manufacturer:**

Trextrophy Dental Division  
37 Appleridge Road  
Danbury, CT 06810  
(800) 667-1780  
(203) 207-4545  
(203) 207-4546 FAX

**Suggested Retail Price:** \$17,500

**Government Price:** \$13,357

**ADVANTAGES:**

**RVG**

- + Software is user friendly.
- + Radiographic images are produced in seconds.
- + Eliminates the need for radiographic processing chemicals.
- + Printer is conveniently located on cart and provides immediate hardcopy image.

**STV**

- + Excellent image quality.
- + Camera is easy to focus.
- + Can be used as a communication tool with patient when discussing the treatment plan.

**DISADVANTAGES:**

**RVG**

- Diagnostic image quality was less than that of conventional film.
- Bulky cart system lacked portability.
- Sensor holder was difficult to place intraorally.
- Poor design of sensor holder made it difficult to align the tubehead.
- Sensor thickness impeded proper placement.

**STV**

- Length of cord.

**SUMMARY AND CONCLUSIONS:**

The Trophy Everest System combines direct digital intraoral radiographic capabilities with digital camera imaging. The evaluators enjoyed the benefits of direct digital radiography (RVG) which included fast image speed, elimination of processing chemicals, ability to print images at chairside, and extremely user-friendly software. One important shortcoming was that the diagnostic quality of the image was less than that of conventional film. The unit also lacked portability in the dental treatment room because the cart was bulky. Finally, the sensor was difficult to place properly because it is thick and its holder is



Figure 2

cumbersome. The digital camera (STV) produced excellent image quality, was easy to focus, and aided in patient communication. The **Trophy Everest System** is rated **Acceptable** for use by the federal dental services.

(Col Bartoloni)

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## 57-16 AirTouch Tower Air Abrasion System

(Project 98-19)

The AirTouch Tower is Dentsply/Midwest's top of the line self-contained air abrasion system. Air abrasion provides an alternative to the high-speed handpiece for removing caries from tooth structure. Dentsply/Midwest reports it is indicated for sealants, Class I, Class II tunnel preparations, Class III, Class IV, root caries, removal of composite and stains, and porcelain repair. Its many purported advantages compared to traditional preparation procedures include: less invasive, more conservative treatment; reduced need for local anesthetic; earlier and more accurate diagnosis which reduces under- or over-treatment; reduction or elimination of vibration, chipping, and micro-fracturing; and immediate beveling of cavo surfaces. The AirTouch Tower is available with either single or dual powder chambers for use with 27- or 50-micron aluminum oxide powder. It is available in two different models based on whether pressurized air or gas is used to cause the flow of aluminum oxide. One model provides pressurized air with a built-in 1/3 horsepower oil-less compressor, while the other other uses a built-in CO<sub>2</sub> tank. In addition, the AirTouch Tower is the only air abrasion system to provide both intra-oral and extra-oral powder evacuation. The digital display membrane touchpanel allows the user to regulate the air pressure (40 to 120 psi in 10-psi increments), cutting time (0.2 to 2.5 sec in 0.5-sec increments and continuous mode), powder size (27 or 50 microns), and includes a separate powder boost mode for increased powder flow when more powerful cutting is required. A memory function allows recall of preferred pre-set pressure and cutting settings. The Smart Digital Display provides continuous information and instructions on use and maintenance. Handpiece nozzles are available in three different angulations (45°, 90°, and 120°) and three different orifice diameters (.015", .018", and .027") for increased versatility. The AirTouch Tower measures 35"H x 14"W x 17.5"D and weighs 130 pounds (compressor model) or 99 pounds (CO<sub>2</sub> tank model). The unit is available in 110V and 220V models and is UL listed and CSA certified.



### Manufacturer:

Dentsply/Midwest  
901 Oakton Street  
Des Plaines, IL 60018-1884  
(800) 800-7202  
(847) 640-4800  
(847) 640-6155 FAX

### Suggested Retail Price:

Single-Chamber Model \$15,495  
Dual-Chamber Model \$17,495

### Includes:

- Midwest AirTouch Tower with air compressor and supplemental suction system
- one pound each of 27-micron and 50-micron aluminum oxide powder
- three autoclavable handpieces

- five autoclavable nozzles
- disposable mirrors
- three pairs of safety glasses
- evacuation kit
- owner's manual including operating instructions and operational videotape.

**Government Price:**

Single Chamber Model \$10,072.00

Dual Chamber Model \$11,372.00

Includes: Same as above.

**ADVANTAGES:**

- + Portable self-contained mobile unit is easy to move from operator to operator.
- + On-board intra- and extra-oral evacuation.
- + Multiple nozzle angulations and orifice diameters.
- + Logical, organized membrane touchpad controls.
- + Autoclavable handpiece and nozzles.
- + Multiple air pressure settings.
- + User can easily switch between particle sizes (with dual-chamber model).
- + Membrane filter provides moisture control.
- + Contains a High Efficiency Particulate Air (Hepa) filter to reduce airborne pathogens in evacuation exhaust.
- + Multiple settings for cutting times.
- + Quiet operation [68 dB(A)].
- + Excellent instructional manual and videotape.
- + Easily cleaned or barrier protected.
- + UL listed and CSA certified for electrical safety.

**DISADVANTAGES:**

- Expensive.
- Powder overspray is messy and limits view of working area.
- Air abrasion offers limited clinical indications over highspeed handpieces for the general dental practice.
- Clinical evaluators reported that 70% to 80% of procedures still required local anesthesia.
- Not effective in removing soft caries.
- Depth and width of tooth preparations are difficult to control.
- Loss of tactile feel during tooth preparation.
- Removing the evacuation assembly for autoclaving can tear suction hose.

**SUMMARY AND CONCLUSIONS:**

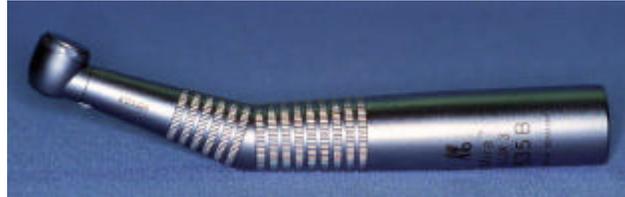
The AirTouch Tower is a well-designed, easy-to-use, mobile air abrasion system with an on-board compressor and auxiliary intra- and extra-oral evacuation system. The autoclavable handpiece and nozzles come in three angulations and three orifice diameters for increased procedure flexibility and access to all tooth surfaces. The clinical evaluators reported that the AirTouch functioned well and was easy to learn to use. They also reported that the unit effectively removed tooth structure as advertised but that air abrasion in general had limited indications. They reported only 20% to 30% of the preparations were able to be performed without local anesthesia and of those, none of the patients was completely comfortable. None of the clinical evaluators felt air abrasion should be made routinely available in all Air Force clinics due to its limited indications and high cost. However, the AirTouch Tower was judged favorably by the evaluators and met or exceeded the minimal requirements established by DIS. The **AirTouch Tower Air Abrasion System** is rated **Acceptable** for use by the federal dental services.

(Col Leonard, Mr. King)

## 57-17 KaVo 635B High-speed Fiberoptic Handpiece

(Project 98-39)

The KaVo 635B Fiberoptic High-speed Handpiece features a compact turbine head and is designed for a wide range of dental restorative procedures. It replaces the discontinued Kavo 642B model high-speed handpiece. Improvements over the 642B include a redesigned turbine with the same power as the 642B but at reduced RPM's and lower noise levels, softer grip knurling for easier cleaning prior to sterilization, and a non-return valve to virtually eliminate aspiration of contaminated fluids into the handpiece. The 635B is connected to the dental unit handpiece hose by either the KaVo Multiflex Lux 465 LRN or the Kavo Multiflex Lux 1390 Coupler. Both couplers provide easy handpiece interchangeability, anti-retraction valves, and 360° swivel. The Multiflex Lux 465 LRN Coupler contains the fiberoptic bulb and water spray adjustment and is used with Kavo LCM illuminators and tubing (6-pin type). The Kavo Multiflex Lux 1390 Coupler



allows the handpiece to be connected to standard ISO 5-hole fiberoptic handpiece hoses that provide the fiberoptic light with a bulb at the end of the hose or from a remote source. The handpiece has a push-button autochuck and can be heat sterilized in either an autoclave or chemiclave. The free-running speed was measured by DIS and found to be 337,000 RPM at 34 psi. The handpiece contains an automatic air regulator valve that senses line air pressure and automatically reduces it to the correct 34 psi. This allows all handpiece hose pressures to be set at the higher air pressures required for slow-speed handpieces without damaging the high-speed handpiece. The turbine is field replaceable to reduce down time but Kavo recommends returning the handpiece to them for servicing. The KaVo 635B handpiece (including coupler) is 14 cm (5.5 inches) long and weighs 88 grams (3.1 ounces). The handpiece head is 11 mm (0.43 inches) in diameter and 12.5 mm (0.5 inch) long. The distance from the back of the handpiece head to the tip of a standard 19-mm bur (i.e., interocclusal clearance) is 21 mm (0.83 inches). The 635B is warranted against defects in materials and workmanship for one year.

### Manufacturer:

KaVo America  
340 East Main Street  
Lake Zurich, IL 60047  
(800) 323-8029  
(847) 550-6800  
(847) 550-6825 FAX

### Suggested Retail Prices:

635B High-speed Handpiece	\$875.00
Multiflex Lux 465 LRN Coupler	\$245.00
Multiflex Lux 1390 Coupler	\$205.00

### Government Prices:

635B High-speed Handpiece	\$446.25
Multiflex Lux 465 LRN Coupler	\$147.00
Multiflex Lux 1390 Coupler	\$98.00

### ADVANTAGES:

- + Excellent longevity following repeated use/sterilization (based on previous evaluations of Kavo handpieces).
- + Good power (12.2 watts).
- + Minimal degradation of fiberoptic intensity (based on previous studies of Kavo handpieces).
- + Automatic air pressure regulator.
- + 360° swivel coupler.
- + Excellent concentricity.

- + Push-button bur release.
- + Excellent visibility and interocclusal clearance.
- + Turbine is field replaceable.
- + Only requires lubrication before sterilization.
- + One-year warranty.

**DISADVANTAGES:**

- Coupler is easily damaged if dropped or abused.
- Cellular fiberoptics can break if dropped.

**SUMMARY AND CONCLUSIONS:**

The Kavo 635B fiberoptic high-speed handpiece is the replacement for the popular 642B model. It performed much better than average for most parameters evaluated. Its power (12.2 watts) was in the middle third of all models evaluated, but was well over the 5 watts required for clinical acceptability. Previous long-term clinical use/sterilization studies have demonstrated the excellent fiberoptic transmission degradation resistance of the Kavo cellular optics. Similarly, Kavo handpiece longevity following repeated use/sterilization has been demonstrated in previous DIS studies. The noise level of the 635B was measured at 65.8 decibels, well below the maximum 8-hour, 85-dB(A) exposure limit established by the Occupational Safety and Health Administration (OSHA). The compact head increases operator visibility and interocclusal access. Both clinical evaluators rated the Kavo 635B as "Excellent." The **Kavo 635B** is rated **Recommended** for use by the federal dental services.

(Col Leonard, Mr. King)

**57-18 KaVo 643B High-Speed Fiberoptic Handpiece**

**(Project 98-40)**

The KaVo 643B High-speed Fiberoptic Handpiece has a compact cylindrical turbine head with two-port cooling and cellular optics designed for use in a wide range of dental restorative procedures. The handpiece features a bronze-toned surface coating to withstand sterilization temperatures. The 643B is connected to the dental unit handpiece hose by either the KaVo Multiflex Lux 465 LRN or the Kavo Multiflex Lux 1390 Coupler. Both couplers provide easy handpiece interchangeability, anti-retraction valves, and 360° swivel. The Multiflex Lux 465 LRN Coupler contains the fiberoptic bulb and water spray adjustment and is used with Kavo LCM illuminators and tubing (6-pin type). The Kavo Multiflex Lux 1390 Coupler allows the handpiece to be connected to standard ISO 5-hole fiberoptic handpiece hoses that provide the fiberoptic light with a bulb at the end of the hose or from a remote source. The handpiece has a push-button autochuck and can be heat sterilized in either an autoclave or chemiclave. The free-running speed was measured by DIS and found to be 398,000 RPM at 33 psi. The handpiece contains an automatic air regulator valve that senses line air pressure and automatically reduces it to the correct pressure. This allows all handpiece hose pressures to be set at the higher air pressures required for slow-speed handpieces without damaging the high-speed handpiece. The turbine is field replaceable to reduce down time but Kavo recommends returning the handpiece to them for servicing. The KaVo 643B handpiece (including coupler) is 14 cm (5.5 inches) long and weighs 79 grams (2.8 ounces). The handpiece head is 11 mm (0.43 inches) in diameter and 13.2 mm (0.52 inches) long. The distance from the back of the handpiece head to the tip of a standard 19-mm bur (i.e., interocclusal clearance) is 21.9 mm (0.86 inches). The handpiece is warranted against defects in materials and workmanship for one year.



**Manufacturer:**

KaVo America  
 340 East Main Street  
 Lake Zurich, IL 60047

(800) 323-8029  
(847) 550-6800  
(847) 550-6825 FAX

**Suggested Retail Prices:**

643B High-speed Handpiece	\$850.00
Multiflex Lux 465 LRN Coupler	\$245.00
Multiflex Lux 1390 Coupler	\$205.00

**Government Prices:**

643B High-speed Handpiece	\$382.50
Multiflex Lux 465 LRN Coupler	\$147.00
Multiflex Lux 1390 Coupler	\$98.00

**ADVANTAGES:**

- + Excellent longevity following repeated use/sterilization (based on previous evaluations of Kavo handpieces).
- + Good power (12.1 watts).
- + Minimal degradation of fiberoptic intensity (based on previous studies of Kavo handpieces).
- + Automatic air pressure regulator.
- + 360° swivel coupler.
- + Excellent concentricity.
- + Push-button bur release.
- + Good visibility and interocclusal clearance.
- + Turbine is field replaceable.
- + Only requires lubrication before sterilization.
- + One-year warranty.

**DISADVANTAGES:**

- Coupler is easily damaged if dropped or abused.
- Cellular fiberoptics can break if dropped.
- Bronze-toned finish may be objectionable to some operators.

**SUMMARY AND CONCLUSIONS:**

The Kavo 643B High-speed Fiberoptic Handpiece has a standard size head and features a bronze-toned exterior finish. It utilizes the same dependable turbine found in the Kavo 642B model. It performed much better than average for most parameters evaluated. Its power (12.1 watts) was in the middle third of all models evaluated, but was well over the 5 watts required for clinical acceptability. Previous long-term clinical use/sterilization studies have demonstrated the excellent fiberoptic transmission degradation resistance of the Kavo cellular optics. Similarly, Kavo handpiece longevity following repeated use/sterilization has been demonstrated in previous DIS studies. The noise level of the 643B was measured at 65.6 decibels, well below the maximum 8-hour, 85-dB(A) exposure limit established by the Occupational Safety and Health Administration (OSHA). The visibility angle and interocclusal dimension were slightly inferior to those of the new compact Kavo 635B model, however both clinical evaluators rated these parameters as "Good" or "Excellent" and both rated the Kavo 643B as "Excellent" overall. The **Kavo 643B** is rated **Recommended** for use by the federal dental services.

(Col Leonard, Mr. King)

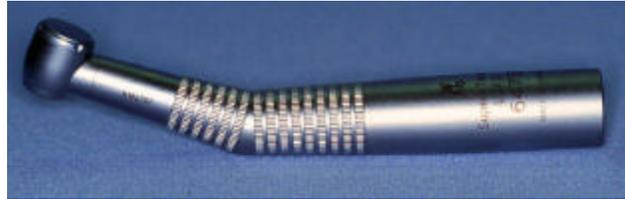
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**57-19 KaVo 647B High-Speed Fiberoptic Handpiece**

**(Project 98-41)**

The KaVo 647B High-speed Fiberoptic Handpiece is the replacement for the discontinued 640B model and features a larger, more powerful turbine with triple-port spray cooling. Improvements over the 640B include a redesigned turbine with the same power as the 640B but at reduced RPM's and lower noise levels, softer grip knurling for easier cleaning prior to sterilization, and a non-return valve to virtually

eliminate aspiration of contaminated fluids into the handpiece. The handpiece is indicated for clinical procedures requiring a significant amount of heavy cutting such as crown and bridge. The 647B is connected to the dental unit handpiece hose by either the KaVo Multiflex Lux 465 LRN or the Kavo Multiflex Lux 1390 Coupler. Both couplers provide easy handpiece



interchangeability, anti-retraction valves and 360° swivel. The Multiflex Lux 465 LRN Coupler contains the fiberoptic bulb and water spray adjustment and is used with Kavo LCM illuminators and tubing (6-pin type). The Kavo Multiflex Lux 1390 Coupler allows the handpiece to be connected to standard ISO 5-hole fiberoptic handpiece hoses that provide the fiberoptic light with a bulb at the end of the hose or from a remote source. The handpiece has a push-button autochuck and can be heat sterilized in either an autoclave or chemiclave. The free-running speed was measured by DIS and found to be 339,000 RPM at 36 psi. The 647B contains an automatic air regulator valve that senses line air pressure and automatically reduces it to the correct 36 psi. This allows all handpiece hose pressures to be set at the higher air pressures required for slow-speed handpieces without damaging the high-speed handpiece. The turbine is field replaceable to reduce down time, but Kavo recommends returning the handpiece to them for servicing. The KaVo 647B handpiece (including coupler) measures 14 cm (5.5 inches) in length and weighs 91 grams (3.2 ounces). The handpiece head is 12.5 mm (0.5 inches) in diameter and 14.6 mm (0.57 inches) long. The distance from the back of the handpiece head to the tip of a standard 19-mm bur (i.e.,interocclusal clearance) is 22.7 mm (0.9 inches). The handpiece is warranted against defects in materials and workmanship for one year.

**Manufacturer:**

KaVo America  
340 East Main Street  
Lake Zurich, IL 60047  
(800) 323-8029  
(847) 550-6800  
(847) 550-6825 FAX

**Suggested Retail Prices:**

647B High-speed Handpiece	\$875.00
Multiflex Lux 465 LRN Coupler	\$245.00
Multiflex Lux 1390 Coupler	\$205.00

**Government Prices:**

647B High-speed Handpiece	\$446.25
Multiflex Lux 465 LRN Coupler	\$147.00
Multiflex Lux 1390 Coupler	\$98.00

**ADVANTAGES:**

- + Excellent longevity following repeated use/sterilization (based on previous evaluations of Kavo handpieces).
- + Excellent power (14.0 watts).
- + Minimal degradation of fiberoptic intensity (based on previous studies of Kavo handpieces).
- + Automatic air pressure regulator.
- + 360° swivel coupler.
- + Excellent concentricity.
- + Push-button bur release.
- + Turbine is field replaceable.
- + Only requires lubrication before sterilization.
- + One-year warranty.

**DISADVANTAGES:**

- Coupler is easily damaged if dropped or abused.
- Cellular fiberoptics can break if dropped.
- Visibility and access are reduced due to larger turbine.

**SUMMARY AND CONCLUSIONS:**

The Kavo 647B Fiberoptic High-speed Handpiece is the replacement for the discontinued Kavo 640B handpiece. It is designed for practices that have heavy cutting demands such as crown and bridge. The handpiece performed much better than average for most parameters evaluated. Its power (14.0 watts) is in the upper third of all models evaluated and is well over the 5 watts required for clinical acceptability. Previous long-term clinical use/sterilization studies have demonstrated excellent resistance to fiberoptic degradation of the Kavo cellular optics. Similarly, extended longevity following repeated use/sterilization has been demonstrated in previous DIS studies. Intra-oral access was rated good by one evaluator but only fair by the other. The noise level of the 647B was measured at 62.5 decibels, well below the maximum 8-hour, 85-dB(A) exposure limit established by the Occupational Safety and Health Administration (OSHA). Overall, the Kavo 647B was rated as "Good" by half the evaluators and "Excellent" by the other half. The **Kavo 647B** is rated **Recommended** for use by the federal dental services.

(Col Leonard, Mr. King)

# LABORATORY

**57-20 KaVo EWL Protar II Articulator and Face-bows****(Project 97-25)**

The Protar articulator and face-bow system is comprised of four separate articulators and the Arcus face-bows. Casts are easily and accurately transferred from one articulator model to another. The Protar is 6.4" H x 6.6" W x 8" D and weighs 2.5 lbs. The Protar 3 has an upper member with curved sagittal and pre-set condylar guidance paths, a 45° horizontal condylar inclination, and a 15° fixed Bennett angle. The Protar 5 has an upper member identical to the one in the Protar 3 with the exception that it has an adjustable Bennett angle and an adjustable horizontal condylar inclination (from -15° through +75° relative to Frankfort Horizontal [FH] plane). The Protar 7 has an upper member with adjustable sagittal angle and horizontal condylar paths as well as immediate sideshift and retrusion with an adjustable shift angle. Two types of modular upgrades are available for the Protar 7: Shift Angle Inserts that provide latero-protrusive and latero-retrusive movements on the working side and PDR Inserts that provide protrusion, distraction (subluxation) and retrusion of the condyle. The Protar 9 has an upper member identical to that of the Protar 7 with adjustable protrusion, distraction, and retrusion. Each articulator comes with an incisal pin, mounting plates, plane incisal guidance, support pin, mounting plate screw, and magnet wrench.

**Manufacturer/Source:**

KaVo America  
340 East Main Street  
Lake Zurich, IL 60047  
(800) 522-9525  
(708) 550-6825 FAX

**Suggested Retail Price:**

Protar 3 \$749  
Protar 5 \$1137  
Protar 7 \$1498  
Protar 9 \$1676  
Arcus face-bow \$749  
Mounting plates \$137

**Government Price:**

Protar 3 \$421  
Protar 5 \$658  
Protar 7 \$983  
Protar 9 \$1092  
Arcus face-bow \$421  
Mounting plates \$102.75

**ADVANTAGES:**

- + Casts can be reliably transferred from one Protar articulator to another.
- + Casts are easily mounted on magnetically-retained split-mount rings.
- + Upper members with different features interchange with a universal lower member.
- + Articulator is designed in relation to Camper's plane which facilitates visibility and mounting.
- + Casts are mounted parallel to articulator frame; improves esthetic perception and eliminates space problems.
- + Face-bow ear pieces ensure accurate orientation to anatomical landmarks.
- + Arcus bite fork and transfer joint are stainless steel and sterilizable.
- + Bite fork is rigid and tightened using a single control.
- + Mounting face-bow record with transfer stand replaces incisal pin and face-bow; bite fork and joint attaches to transfer stand which is the preferred method for the laboratory.
- + Articulator can be used with other types of face-bows (e.g., Whip Mix, Hanau, etc.).
- + Stable when inverted, does not require a support stand; rubber feet also stabilize the articulator in all positions.
- + Three condylar settings.
- + Lower member frame posts are curved and set wide apart for improved access to lingual areas.
- + Articulator can be set back at a 45° angle on rubber bumpers for better visualization.
- + Incisal guide pin can be placed on either the upper or lower member.
- + Five types of incisal guidance are available: 20°, 30°, 40°, 50°, and adjustable; a custom incisal guide table can also be made using a recessed tray.
- + Occlusal plane indicator and tooth setting template are available for complete dentures work.

**DISADVANTAGES:**

- Can not fabricate custom condylar guidance on the articulator.
- Face-bow is sold separately.
- Expensive; costs more than other popular articulators.

**SUMMARY AND CONCLUSIONS:**

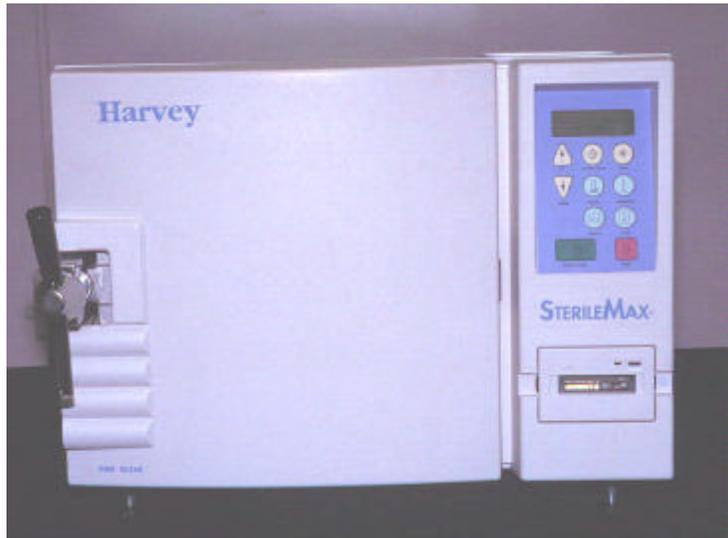
The Protar II is an articulator and face-bow system that allows accurate transfer of casts from one articulator to another. Compared to other brands of articulator, the Protar provides improved access to casts and is easier to adjust. Casts are split-mounted on magnetically-retained plates. The Protar II can be tilted back at a 45° angle for easier viewing. Evaluators tested the accuracy of cast transfers between five different Protar II articulators and found that the test pieces held shim stock at three separate points on all five articulators which indicates excellent accuracy. An optional compensating curve template is available for complete dentures. The face-bow is easy to handle with a single knob for final adjustment on the patient. The government price of the Protar 7 is comparable to other fully-programmable articulators. The concept behind Protar II is to reduce the number of articulators in the treatment room and laboratory. For example, a dentist can have only one Arcus face-bow and several transfer joints and bite forks. The joint, fork and occlusal record are sent to the laboratory where it is articulated with a

transfer stand on a Protar 3. The technician can then use a single Protar II for several cases at once. The **Protar II and Face-Bow** are rated **Acceptable** for use by the federal dental services.  
(MSgt Ryerson)

## INFECTION CONTROL

### 57-21 Barnstead/Thermolyne SterileMax 12-Inch Autoclave (Project 98-44)

The Barnstead/Thermolyne SterileMax sterilizer is a fully-automated, microprocessor-controlled, tabletop autoclave with a 12-inch diameter by 18-inch deep, round, stainless-steel chamber. The SterileMax is a 115-volt model that draws 12.5 amps of current during operation and can be connected to a standard 115-volt, 20-amp receptacle. Microprocessor-controlled sterilization parameters are constantly monitored to assure proper sterilization for each programmed cycle. Five icon-marked programs are available on the sealed-membrane touchpad (e.g., wrapped, unwrapped, liquids, packs, optional). All sterilization parameters are user adjustable, digitally displayed, and recorded at one-minute intervals with the optional printer. The digital display(s) indicate cycle status during normal operation and display error messages and corrective actions if a cycle fails to meet the proper sterilization parameters. The autoclave measures 17 inches high by 22.4 inches wide by 24.5 inches deep and is UL/C-UL listed, IEC 601-1 inspected and ASME certified.



#### Manufacturer:

Barnstead/Thermolyne  
2555 Kerper Blvd.  
P.O. Box 797  
Dubuque, IA 52004-0797  
(800) 553-0039  
(319) 556-2241  
(319) 556-0695 FAX

#### Suggested Retail Price:

SterileMax with Optional Printer	\$6,300
without Printer	\$5,670

#### Government Price:

SterileMax with Optional Printer	\$3,780
without Printer	\$3,402

#### ADVANTAGES:

+ Small footprint for a 12-inch tabletop autoclave

- + Features five pre-set cycles (packs, wrapped, unwrapped, liquids, and an operator-defined cycle).
- + Microprocessor-controlled resident diagnostics continuously monitor sterilizer parameters and identify malfunctions.
- + Digital readout provides error messages and corrective actions if the sterilization fails during a cycle.
- + Adjustable drying time.
- + Reservoir can be easily and completely drained for cleaning.
- + Operating and servicing instructions are clear, complete, and easy to understand.
- + Optional printer is available for documenting sterilizer parameters.
- + Three interlocks on the chamber door to protect the operator.
- + Large (7-liter) water capacity.

**DISADVANTAGES:**

- Sterilizer door must be opened to begin the drying cycle.
- Printer uses a lot of paper during an average cycle; no take-up spool for the printer paper.

**SUMMARY AND CONCLUSIONS:**

The Barnstead/Thermolyne SterileMax operated as designed and met all the testing requirements of the DIS sterilizer checklist. It provides an increased chamber size while still maintaining a small footprint. The SterileMax model can accommodate four standard (8"X11"x1.5") and four half-size (8"X4.5"X1.5") dental instrument cassettes placed horizontally using an optional cassette-rack system. The sterilizer is best used in small clinics with one or two dentists or to supplement a large, floor-standing sterilizer. During the clinical evaluation, the SterileMax performed flawlessly and was evaluated by three clinical evaluators. Of the three evaluators, two awarded it an overall rating of "Good" and one rated it "Average." The **Barnstead/Thermolyne SterileMax 12-Inch Autoclave** is rated **Acceptable** for use by the federal dental services.

(Mr King, Col Leonard, Lt Col Roberts)