

DENTAL ITEMS OF SIGNIFICANCE 68

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QUESTIONS & ANSWERS

"Questions & Answers" is a feature in which we present and answer some of the questions we have recently received from the field. This month we feature questions about provisionals, dentin bonding agents, obturation, sealants, bone grafts, latex in the operatory and a new denture material. Should 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 792-7676.

68-01 The Frustrations of Making Provisionals: Have Manufacturers Made it any Easier?

Question: Are there any new materials on the market for making temporary crown and bridges?

Answer: Over the last few years, dental product manufacturers have spent a great deal of time and money developing provisional (i.e., temporary) crown and bridge products that are easier to use and have better physical properties. Standard acrylic-type provisional products have been the mainstay of dentistry since the 1930s and have, for the most part, worked satisfactorily. Products such as Jet Tooth Shade (Lang), Snap (Parkell), and Trim II (HJ Bosworth) are popular because of their low cost, acceptable esthetics, and versatility. These products come as two-part systems (a powder and a liquid) that are mixed immediately before use. Generally, they are best used for making short-term provisionals that will be needed for only a few months at most. They have several disadvantages, however. Among their drawbacks are an objectionable odor, significant shrinkage, heat production during setting, and a tendency to discolor. To address these shortcomings, manufacturers have begun producing provisional products that are bis-acryl resin composites. These materials shrink less (and therefore fit better), give off less heat, and can be polished at chairside. They don't polish to as high a luster as the acrylics and often have an air-inhibited layer following setting, which needs to be removed prior to finishing and polishing. They also tend to be brittle, so close attention must be paid to the occlusion if they are used to make long-span bridges. Many of these products are packaged in cartridges and mixed/dispensed using an automix gun. The bis-acryl composites polymerize (i.e., harden) in one of several ways: by chemicals (e.g., Integrity, Dentsply/Caulk; Tempphase, SDS/Kerr; Protemp 3 Garant, 3M ESPE); by visible light (Revotek LC, GC America); or by both chemicals and light (Unifast LC, GC America). These products generally perform very well, and differences among them primarily center around setting and working times, cost, and packaging form. For a list (in PDF format) of recently evaluated provisional products, please click [here](#). For guidance when purchasing a provisional material, please contact DIS.

(Col Charlton)

68-02 The Numbers: Is that all there is to it?

Question: All the ads for dentin bonding products contain claims about their bond strengths. Is this an important thing and should I base my decision to buy the product on it?

Answer: You're right in that manufacturers commonly tout the bonding ability of their products by featuring the product's shear bond strength to dentin. Often, they provide a chart and compare their product to other popular bonding agents. Obviously, they are depending on you to think higher is always better. Bond strengths are just one of many factors you should look at when deciding to buy a bonding product. In fact, it may be one of the less important ones. Let's look at how bond strength is measured. The test to measure shear bond strength is done by using the bonding agent to bond a cylinder of resin composite to the ground dentin surface of an extracted tooth. After storage in water (and possible cycling between hot water and cold water baths), the amount of force required to shear the composite cylinder from the dentin is measured. The average number for the group of specimens is then calculated and represents the shear bond strength. As you can see, this laboratory test is only a rough approximation of what we need the bonding product to do intraorally. What it will be required to do in bonding a composite restoration to a tooth depends on many factors, including the size of the restoration, amount and type of dentin and enamel to which it will be bonded, the forces applied to the restoration, and the appropriateness of the technique used to apply the adhesive. So, the way to interpret the numbers given in an ad for a bonding agent is first to keep in mind that lab tests are only a screening test. They provide a rough idea as to how the bonding product compares to other similar products, and are most valuable in identifying products that significantly underperform. You should also be aware that just having the bond strength number alone doesn't tell the whole story. It is also important, for example, to know where the failure happened (e.g., between the adhesive and tooth, within the tooth, within the composite, etc.) because this tells something about the significance of the numbers. Finally, you should also remember that the numbers are only going to be featured by manufacturers when their products outperform their competitor's products. In other words, regardless of the number, the company that is advertising will always compare its product to competing brands which have not performed as well.

The bottom line is that bond strength is only one factor (and perhaps a minor one) to consider. More important factors are how the adhesive has performed in clinical studies, and the product's ease of use, cost, and range of clinical uses. DIS has evaluated more than 20 bonding products over the past few years and serves as a source of current information about these products. Please call us with any questions you have on selecting or using a dentin bonding agent.

(Col Charlton)

68-03 You've got to Heat it to Believe It!

Question: Newly arriving dental officers have requested the purchase of Obtura II and System B gutta-percha systems. Do you have any information on this equipment?

Answer: Obtura II is an injectable gutta-percha system whereas System B uses a heated-tip to soften gutta-percha points placed in the canal. Two totally-different injectable thermoplasticized gutta-percha systems are currently available - Obtura II (Spartan Co., Fenton, MS) and Ultrafil (Hygienic Corp., Akron, OH). Obtura II is a heated-gun system, whereby gutta-percha sticks are placed within a chamber in the gun, and a plunger is used to express the heated, flowing gutta percha through replaceable injection tips. The flow of the gutta percha is controlled through the temperature of the unit - the higher the temperature, the easier the flow. By design, the system is considered a "high heat" system, because the gutta percha provided by Spartan flows best at about 200 degrees C. You can buy low-heat gutta percha from other companies, which allows the gutta percha to flow at a lower temperature. The system consists of a gun connected to a temperature-control unit. The unit requires high maintenance because you must clean it after every use by submerging the nose of the gun in solvent and using a brush to clean out the chamber/plunger assembly. The gun itself is hot to touch, and to minimize risk when contacting the patient lips, special plastic-protective sleeves are slipped over the end of the gun. Obtura II is primarily used for backfilling canals with apical plugs. Canals without some form of apical plug/constriction could result in overextrusion of the gutta percha. Most of the literature seems to show that the high temperature is not detrimental to the periodontal ligament as long as the heated tip is not left in the canal for extended periods. The gutta percha cools fairly quickly, and to counteract shrinkage, must be condensed during

cooling. The system allows continuous heat, so the gutta percha stays soft as long as the unit remains active.

In contrast, Ultrafil uses a pre-dosed cannula system. Cannulas containing various types of gutta percha are placed in a heating unit. When needed they are loaded into a gun (similar to a periodontal ligament injection unit), which expresses gutta percha from the cannula. The system is characterized as a low-heat unit, since the temperature needed to plasticize the gutta percha is much lower than the Obtura II system. Ultrafil has several advantages. The cannulas are disposable, the injection gun may be sterilized, and the heating unit is easily cleaned. Three types of gutta percha are available, which vary by firmness and length of working time, allowing the practitioner to tailor the type of gutta percha for a specific procedure. A disadvantage of the Ultrafil system is that it takes about fifteen minutes to get the cannulas to temperature, compared to the Obtura system, which only takes about one minute. Overall, the versatile Ultrafil system requires less counter space and the various types of unit-dose gutta-percha cannulas allows for better infection control. However, the cannula system is more expensive and if you are performing extensive backfilling, the Obtura II may be more cost effective.

System B (SybronEndo, Orange, CA) is not a injection technique, but rather a heated tip used to soften gutta-percha points placed in the canal. It follows the "continuous-wave" concept advocated by Steve Buchanan. In principle, you take a plugger tip and insert it in your prepared canal. The plugger tip needs to bind about 5-mm from your working length. A gutta-percha cone is then fit to length in the canal. The plugger tip with the System B is heated to a high temperature. Temperature and power is controlled digitally on the unit. The heated plugger is then inserted into the canal, melting the gutta-percha cone on insertion and creating a leading front (or wave) of heated gutta percha. When you get close to your binding point, the heat is discontinued, but apical pressure is continued to condense the now softened gutta percha and coneract any contraction during cooling. After a few seconds, the tip is activated for one second (high heat, short burst) and pulled back to remove excess gutta percha. The coronal space is then usually backfilled with a softened gutta-percha system.

Unless you have excellent apical control, these systems will lead to overfill of material past the apex and potential problems of apical periodontitis. In skilled hands, it is another tool for obturation. Practice on extracted teeth first before attempting the technique on patients. Be careful in canals which have apical lesions, resorptions, or open apices, as these clinical situations are not good candidates.

(Lt Col Harkacz)

68-04 Just Seal It!

Question: A wide variety of sealants are available, from filled to colored to fluoride-containing. Are there really any differences?

Answer: Surprisingly, research has found that unfilled sealants perform as well as or better than filled sealants. Studies have found that unfilled sealants are significantly better retained^{1,2} and have less microleakage³ than filled sealants. Although potentially more difficult to control during placement, the lower viscosity of the unfilled sealants allows them to penetrate deeper into the fissure system.⁴ Filled sealants may provide better mechanical properties and therefore less wear, but they suffer from a potential need for occlusal adjustment as part of the application procedure. If an unfilled sealant is left in occlusion, it will usually abrade rapidly.⁴ However, one study found that with filled sealants, most patients were unable to abrade the interferences to a comfortable level.⁵ Also, reduction in wear may not be as clinically significant as penetration when evaluating the sealing and retentive abilities of a sealant in the deeper depths of a pit or fissure.⁴

Colored sealants are easier to see during application and at recall examinations. A study by Rock and others found the error rate in identifying a sealant was 22.8% for a clear resin and only 1.4% for an opaque

resin.⁶ The latest marketing trend is to incorporate color-change chemistry into the sealant to make it easier to see during placement. One example is a product recently evaluated by DIS (see *DIS* 65-13) called Clinpro, a new fluoride-containing, light-activated pit and fissure sealant by 3M ESPE. Clinpro is pink when expressed from its delivery syringe and turns white following light activation.

While no one will argue against the substantial advantages of fluoride in caries prevention, it has been difficult to unequivocally prove any significant reduction in caries with the use of fluoride-releasing restorative materials. The actual fluoride release of fluoride-releasing resin-composite restorative materials and sealants is among the lowest of all the fluoride-releasing materials manufactured.⁷ No studies have documented a caries reduction due to fluoride in fluoride-releasing sealants, raising serious doubts about any clinical significance. The addition of fluoride is probably more of a marketing benefit than a clinical advantage.⁴

Finally, the introduction of light-activated sealants many years ago provided the advantages of command set, the ease of non-mixing, and fewer voids compared to autopolymerizing materials. However, De Craene and others found no significant difference in terms of retention or caries prevention between self-cured and visible light-cured sealants.⁸

(Col Vandewalle)

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6. Rock WP, Potts AJ, Marchment MD, Clayton-Smith AJ, Galuszka MA. The visibility of clear and opaque fissure sealants. *Br Dent J* 1989;167:395-396.
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68-05 I Can't Wait till you Obturate!

Question: Do you have any information on the Thermafil Plus system? Our clinic is considering its purchase.

Answer: Thermafil Plus (Dentsply Tulsa Dental) is a system where plastic carriers are coated with alpha-phase gutta percha. The carrier/gutta percha is heated in an oven to plasticize the outer gutta percha, then inserted in the canal to length. During the insertion, the warm outer gutta percha flows into all the anatomic variances of the canal. An entire system is devoted to this method of obturation, to include size verifiers, obturators, an oven, and an epoxy endodontic sealer. The plastic carrier core has a groove to promote backflow of excess gutta percha during insertion, and to facilitate retreatment by providing an area for instrument insertion to loosen and remove the carrier.

Advantages of the system are ease of use, good three-dimensional fill, and quick obturation. Disadvantages are questionable apical seal, difficulty in retreatment and problematic post-space preparation. Sometimes the gutta percha will strip off the carrier to bare plastic by the time the carrier is at

working length. However, the clinical significance of this remains unknown. Also, if you have a patent apical foramen, there is a good chance you will extrude softened gutta percha, sealer, or both. The carrier may be difficult to remove during retreatment. Also, creating post space is technique sensitive. You have to remove gutta percha and carrier for post space without disturbing the apical seal, which may be very difficult with this system.

The Thermafil Plus system is an acceptable method of obturation, but may not offer any big advantage over conventional lateral condensation. The system is more expensive when including the cost of the oven, carriers and nickel-titanium sizers. Whether a three-dimensional gutta percha fill is clinically superior to lateral condensation with sealer fill has yet to be proven. If stationed overseas, getting supplies in a timely manner is an additional concern. Once you have purchased the system, you are obligated to use the system's gutta-percha carriers and products, whereas standard gutta-percha cones with eugenol sealer can be purchased anywhere fairly quickly.

(Lt Col Harkacz)

68-06 Is Chloroform Permissible?

Question: I am a supply NCO and I have dentists requesting that I order chloroform for them because they say that halothane does not work. Is chloroform permissible in endodontic therapy or retreatment?

Answer: Chloroform is permissible. The FDA ban on the material was lifted. The literature has shown that the amount of chloroform used in retreatment is unlikely to cause any systemic effects, and the amount entering the system from extrusion is negligible. The bottom line is that all currently used solvents (xylene, halothane, rectified turpentine, chloroform, eucalyptol, etc.) are cytotoxic when in contact with cells, but when confined to a canal space, they probably pose only a minimal risk.

(Lt Col Harkacz)

Reference:

Chutich MJ, Kaminski EJ, Miller DA, Lautenschlager EP. Risk assessment of the toxicity of solvents of gutta-percha used in endodontic retreatment. J Endod 1998;24:213-216.

68-07 Risk of Disease Transmission with Bone Grafts

Question: What is the risk of disease transmission with bone allografts during periodontal procedures?

Answer: An allograft is a graft between genetically dissimilar members of the same species. An allograft may be obtained from living donors who are having bone removed during surgery or cadaveric donors. Allograft material has been used for more than 30 years in periodontal therapy. There are several types of allografts:

1. Fresh, fresh-frozen
2. Freeze-dried bone allograft (FDBA)
3. Demineralized freeze-dried bone allograft (DFDBA)

Both FDBA and DFDBA materials are widely used in periodontal therapy and there are no reports of disease transmission during the 30-year history of using freeze-dried bone allografts. However, there have been four cases of human immunodeficiency virus (HIV) infection following procedures using fresh-frozen bone allografts. These cases involved surgeries of the spine, hip, and knee. It is important to note, however, that fresh-frozen and fresh allografts are not typically used in periodontal therapy. Also, when using FDBA and DFDBA, the delay in processing ensures adequate time for testing for potential pathogens.

Most bone banks adhere to the guidelines of the American Association of Tissue Banks (AATB) with respect to procurement, processing, and sterilization of bone grafts. The AATB advocates excluding collection of bone under the following circumstances:

- Donors from high-risk groups, as determined by medical testing and behavioral risk assessments.
- Donors test positive for HIV antibody by ELISA.
- Autopsy of donor reveals occult disease.
- Donor bone tests positive for bacterial contamination.
- Donor and bone test positive for hepatitis B surface antigen (HbsAG) or hepatitis C virus (HCV).
- Donor tests positive for syphilis.

Using donor-screening recommendations, it has been calculated that the chance of obtaining a bone graft from an HIV-infected donor (e.g., one who failed to be excluded by one of the exclusionary techniques) is one in 1.67 million [Buck 1994]. Furthermore, the probability that DFDBA might contain HIV has been calculated to be one in 2.8 billion [Russo 1995]. Therefore, the established exclusionary criteria combined with recommended processing procedures (harvesting in a sterile manner, repeated washings, immersion in ethanol, freezing in liquid nitrogen, freeze-drying, demineralization, and vacuum sealing) render DFDBA and FDBA grafts safe for human implantation.

Adapted from *CDC Infection Control: Bone Allografts*:
http://www.cdc.gov/OralHealth/infection_control/faq/allografts.htm

Selected References and Additional Resources

American Academy of Periodontology Position Paper: Tissue banking of bone allografts used in periodontal regeneration, *J Periodontol* 2001;72:834-838.

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CDC. Epidemiologic notes and reports transmission of HIV through bone transplantation: case report and public health recommendations. *MMWR* 1988;37:597-599.

CDC. Guidelines for preventing transmission of human immunodeficiency virus through transplantation of human tissue and organs. *MMWR* 1994;43(RR-8);1-17.

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Russo R, Scarborough N. Inactivation of viruses in demineralized bone matrix. FDA workshop on tissue transplantation and reproductive tissue, June 20-21 1995, Bethesda, MD.

Simmonds RJ, Holmberg SD, Hurwitz RL, et al. Transmission of human immunodeficiency virus type 1 from a seronegative organ and tissue donor. *NEJM* 1992;326:726-732.

(Lt Col Harte)

68-08 Latex-Safe Operatory

Question: Is it necessary to have a designated latex-free dental operatory to treat latex-allergic patients?

Answer: Dental providers need to prevent latex exposure when treating latex-allergic patients. Persons

with a latex allergy should not have direct contact with latex-containing materials and should be treated in a **latex-safe** environment. A dental operatory should be identified for treatment of latex-allergic patients, preferably one closest to the entrance of the clinic. All latex-containing products should be identified and then removed (or covered if removal is not physically possible) from the operatory **before** patient treatment. Individuals also may be allergic to the chemicals used in the manufacturing of natural rubber latex gloves, as well as metals, plastics or other materials used in the provision of dental care. A thorough health history and appropriate avoidance of contact with potential allergens can minimize the possibility of adverse reactions. Considerations in providing safe treatment for patients with possible or documented latex allergy include (but are not limited to) the following:

- Screen all patients for latex allergy (e.g., health history, medical consultation when latex allergy is suspected).
- Educate all dental health-care personnel on the different types of reactions to latex (i.e., irritant contact dermatitis, allergic contact dermatitis, and latex allergy) and the risks that these pose for patient and staff.
- Consider sources of latex other than gloves. Dental patients with latex allergy histories may be at risk from a variety of dental products including, but not limited to, prophylaxis cups, rubber dams, and orthodontic elastics.
- Use only non-latex containing materials in the treatment environment as alternatives. Ensure a latex-safe environment or one in which no personnel use latex gloves and no patient contact occurs with other latex devices, materials, and products.
- Remove all latex-containing products from the patient's vicinity. Adequately cover/isolate any latex containing devices that cannot be removed from the treatment environment.
- Be aware that latent allergens in the ambient air can cause respiratory and/or anaphylactic symptoms in people with latex hypersensitivity. Therefore, it may be advisable to schedule patients with latex allergy as the first appointment of the day to minimize inadvertent exposure to airborne latex particles.
- Frequently clean all working areas contaminated with latex powder/dust.
- Frequently change ventilation filters and vacuum bags used in latex-contaminated areas.
- Have latex-free kits (e.g., dental treatment and emergency) available at all times.
- Be aware that allergic reactions can be provoked from indirect contact as well as direct contact (e.g., being touched by someone who has worn latex gloves). Hand hygiene, therefore, is essential.
- Communicate latex allergy (e.g., verbal instructions, written protocols, posted signage) to other personnel to prevent them from bringing latex containing materials into the treatment area.
- If latex-related complications occur during or after the procedure, manage the reaction and seek emergency assistance as indicated. Follow current medical emergency response recommendations for management of anaphylaxis.

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(Lt Col Harte)

68-09 Flask- and Monomer-Free Dentures

Question: Recently I saw an advertisement for a new denture resin system called Eclipse. It is reported to be flask-free and monomer-free. Is this a viable alternative to our traditional compression molded method of processing denture bases?

Answer: Eclipse prosthetic resin system is a new method of fabricating dentures from Dentsply International. It is being marketed as an indirect build-up method for fabricating dentures that is monomer-free and flask-free. Eclipse is a light-cured system that does not contain any ethyl-, methyl-, butyl-, or propyl-methacrylate monomers. Let me begin by briefly explaining how the Eclipse system works.

The Eclipse system uses three different types of light-cured resins to build a denture. First, a baseplate resin material is adapted over the master cast and light-cured in the processing unit. After curing, the master cast may need to be destroyed, as it is not blocked out prior to adapting the baseplate material. If the master cast is destroyed, a working cast must then be made using the processed baseplate. This processed baseplate is going to be part of the final denture and provides final denture fit during the occlusal registration and try-in appointments. A traditional wax rim can now be adapted to the baseplate and used for the occlusal registration appointment. At this time the dentist also evaluates the fit of the processed baseplate. The completed occlusal registration is now articulated with the working cast. After articulation, all wax must be removed from the baseplate to enable the set-up resin to properly bond with the baseplate resin. A small amount of the set-up resin is used to hold the teeth in place during set-up procedures. But before teeth can be set, mechanical retention must be made in each tooth to achieve bonding with the resin, as Eclipse does not form a chemical bond with denture teeth. After the set-up is complete, a contour resin is applied to form the completed contours of the denture base. The contour resin is first melted in a warming pot then applied with an electric spatula. A traditional try-in can now be accomplished. The dentist reportedly can make small changes to the set-up by placing the denture in warm water, then gently moving the teeth into the desired position. Extensive changes may need to be accomplished by the dental lab. After the try-in, final contouring of the denture base is completed, followed by polymerization in the Eclipse processing unit, then final polishing. Eclipse is also reported by the manufacturer to work well for processing RPD bases and nightguards.

Eclipse is purported by Dentsply to meet or exceed ISO specification 1567 for color stability, tooth retention, sorption, solubility, and flexural properties. Eclipse eliminates flasking and the use of monomer, and reduces the use of wax during the set-up. It is also said to be reliable and repairable like conventional denture base materials. However, Eclipse does seem to make the use of an occlusion rim as a guide for tooth set-up more difficult. When using a traditional contoured occlusion rim you would first need to set the teeth in the maxillary wax rim using the labial contour, cuspid lines, and midline as guides for tooth placement. Next, a matrix would need to be made to preserve the placement of this set-up. Then the teeth and wax must be removed from the processed baseplate. Now the teeth can be reset on the clean baseplate using the matrix along with set-up resin and contour resin. Additionally, although the manufacturer states tooth retention requirements are met by incorporating mechanical retention, this could be a problem area.

As you can see, Eclipse is different from our traditional compression-molded way of making dentures. Whether it is faster and lowers cost is still not known. Eclipse has a start-up government cost of \$11,055.00. Additionally, a two-day training course must be attended before a system can be purchased. The course costs \$600.00, which is deducted from the cost of the system if it is purchased at the time the course is attended. Because this is a new system on the market I would suggest gathering all the information possible on how it would work for your particular laboratory environment. Additional information can be obtained by visiting the Dentsply website at: www.trubyte.dentsply.com.

(MSgt Osborn)

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.

Tempit Ultra is a new temporary restorative material recently introduced by Centrix Incorporated. The product is a light-activated, diurethane dimethacrylate resin microfilled to 30% with silicon dioxide particles to enhance wear resistance and durability. Centrix claims that

temporary restorations made of Tempit Ultra can last for up to a year. The product requires no mixing and is packaged in single-use, unit-dose capsules. Among the other advantages claimed for the product are that it is biocompatible, easy to remove with a bur, and less soluble than zinc oxide-eugenol temporary materials. Tempit Ultra is also available with fluoride (Tempit Ultra-F). The product (REF 310065) is supplied as thirty 0.25-g prefilled tips in a small plastic jar. It is available for \$52.95 (retail) and \$47.95 (government) from Centrix at (800) 235-5862, (203) 929-5582, (203) 929-6804 FAX, or www.centrixdental.com.

(Col Charlton)

Centrix has recently introduced **Benda Brush Micro Applicators** for applying small amounts of liquid, both chairside and in the laboratory. Chairside uses include the placement of varnishes and bonding agents. Centrix claims that the applicators, which come in a regular and a fine-point tip, enable clinicians to precisely place small amounts of liquids in difficult-to-reach locations, such as in root canal spaces. The neck of the tip can be bent to further improve intraoral access. Centrix notes that because they are disposable, the applicators eliminate clean-up and enhance infection control. The retail price of a box of 576 applicators is \$25.95 (45¢ each), while the government price is \$24.95 (43¢ each). For additional information, please contact Centrix at (800) 235-5862, (203) 929-5582, (203) 929-6804 FAX, or www.centrixdental.com.

(Col Charlton)

Clinipix is offering the all new 6.2 mega-pixel **Fuji S-2** digital clinical camera system with a 105-mm Sigma macro lens. The company claims that the high-quality optics yields the finest digital images currently available. The camera provides four levels of resolution, dual-memory card ports, a rear LCD screen and ring- or point-flash capabilities. The complete system comes with a 1-GB IBM Microdrive, 32-MB Smart-Media card, card reader, software, recharger, rhodium-plated glass mirrors, and retractors. It is available for \$3595.00 (retail and government). For further information, contact Clinipix at (866) 254-6749, (561) 793-4142, (561) 798-6721 FAX, or www.clinipix-on-line.com.

(Col Vandewalle)

Dr. Smooth Stone (DSS) is a water replacement for dental stone mixes, marketed by Mikel and Company, LCC. This new product is reportedly a unique mixture of TriCoPolymers, smoothing agents, wetting agents, and water. It is said to eliminate clumping, remove bubbles, and improve the workability of

all types of dental plasters and stones. The manufacturer also claims DSS will increase the hardness and reduce chipping of stones, while making shrinkage and expansion negligible. DSS can be used full strength in gypsum die stones, buffstones, and dental plasters as well as synthetic stones. It may also be mixed as a 50/50 dilution with water for synthetic or poly stones. If stone expansion is desired, the manufacturer states 3-5 mL of water can be substituted in the total amount of DSS to achieve this expansion. DSS purportedly eliminates the use of debubblers and hardeners. More information on DSS can be found at www.drsmoothstone.com, or by calling (800) 650-0053, (770) 244-4912, or (770) 345-0910 FAX. DSS is distributed through Lincoln Dental Supply as well as many other dental supply companies. For price information at Lincoln Dental Supply, see the table below or call (800) 289-6678, (856) 663-3280, (856) 488-6346 FAX, or www.lincolndental.com.

Size	Product Number	Retail Price	Government Price
16 oz bottle	257900	\$5.95	\$4.85
1 gallon	2579010	\$34.75	\$30.25

(MSgt Osborn)

Den-Mat Corporation has just introduced a new light-emitting diode (LED) curing light, the **Rembrandt Allegro**. The light features a lightweight, cordless design that reportedly provides high, constant irradiance with up to 300 ten-second exposures before needing to be recharged. The handpiece presents a digital display of 5-, 10-, 15- or 20-second exposure times and a battery-charge indicator. The charger has a built-in battery gauge to monitor charge levels and a digital radiometer to measure irradiance. The Allegro is available from Den-Mat Corp. for \$1295.00 (retail and government). For further information, call (800) 445-0345, (805) 922-8491, (805) 922-6933 FAX, or www.dentmat.com.

(Col Vandewalle)

Fuji TRIAGE is a new radiopaque, low-viscosity glass ionomer by GC America. The chemically-setting, fluoride-releasing material is indicated for pit and fissure sealing, for filling of endodontic-access openings, and for treatment of non-cavitated lesions. The company claims that the moisture-friendly glass ionomer is ideal for sealing partially-erupted molars, and the self-bonding feature allows fewer steps in a shorter amount of time. The reported high fluoride release of Fuji TRIAGE may be beneficial when used as an intermediate-restorative material in a situation of rampant caries. The Fuji TRIAGE Starter Package containing 50 capsules and an applicator may be purchased from GC America for \$175.00 (retail) and \$84.00 (government) at (800) 323-3386, (708) 597-0900, (708) 597-6222 FAX, or www.gcamerica.com.

(Col Vandewalle)

Ultradent Products recently introduced **UltraTemp**, a new polycarboxylate temporary cement. UltraTemp is a water-soluble, noneugenol luting and filling material indicated for the temporary cementation of provisional restorations, sealing of endodontic access openings, and filling of small temporary preparations. The product's syringe system allows easy mixing and delivery in one step. The cement reportedly remains water-soluble until set, providing easy clean-up. Once set, UltraTemp purportedly remains moist to seal out bacteria, prevent dehydration, and reduce postoperative sensitivity. UltraTemp is available in regular (item no. 1174) and firm (item no. 3037) set and may be purchased for \$39.95 (retail) and \$33.96 (government) from Ultradent at (800) 552-5512, (800) 842-9024 FAX, or www.ultradent.com.

(Col Vandewalle)

Dentsply Professional has recently introduced the **Midwest Stylus** line of dental highspeed handpieces. The Stylus follows the ergonomic design of the Midwest XGT, but features an added dimpled grip and wider proximal end that is designed to rest in the cradle of the hand and reduce hand fatigue. Stylus

design improvements include proprietary turbine balancing with a noise-dampening suspension system that is said to make it the quietest handpiece on the market. The turbine suspension system is also designed to provide increased resistance to the rigors of sterilization while the ball bearings are supposedly shielded to prevent internal buildup of debris. The push-button chucking mechanism is purported to be carbide-piloted to extend chuck life while also providing tighter bur concentricity. The manufacturer claims that the Stylus turbine was designed using computerized-fluid dynamics that facilitates the production of greater than 15 watts of power while not compromising intra-oral access. Like the Midwest XGT, the Stylus uses a fused-rod fiberoptic bundle. The Fusion optic technology is advertised to be virtually resistant to sterilization degradation, lasting 300% longer than other fiber optic technologies, and is backed with a five-year warranty. The Stylus also features a four-port water spray, and an easy on-off, 360-degree swivel connector that is compatible with both five- or six-pin handpiece hoses. Dentsply Professional now also offers a maintenance-free version of the Stylus, the **Midwest Stylus with EasyCare Technology**, which is said to contain prelubricated, sealed grease-packed bearings that are designed to provide bearing lubrication over the life of the handpiece. Both versions of the Stylus may be purchased for \$1043.95 (retail) and \$499.00 (government) at (800) 800-2888, (847) 640-5312, (847) 640-6165 FAX, or www.prevent.dentsply.com

(Col (sel) Roberts)

Heraeus Kulzer has just introduced **iBond**, a new light-cured one-step self-etching bonding agent for use with direct or indirect restorations. The adhesive purportedly saves you time by etching, desensitizing, priming and bonding in wet, moist, or dry conditions in a single step without any mixing. iBond is reportedly suitable for bonding composites, compomers, amalgam or porcelain and is available from Heraeus Kulzer in unidose capsules (40 doses per kit, item # 66008944) for \$130.00 (retail) and \$70.20 (government) or in a single 4-mL bottle (item # 66008943) for \$100.00 (retail) and \$54.00 (government). For further information call (800) 431-1785, (914) 273-8600, (914) 273-9379 FAX, or www.heraeus-kulzer-us.com.

(Col Vandewalle)

Shofu Dental has just introduced **Niveous**, a new in-office whitening system. Conveniently packaged in single-patient ampules, the pre-mixed gel consists of a stabilized blend of hydrogen peroxide and an orange pigment. The bleaching gel is applied to the teeth with Booster brushes containing a proprietary oxidizing agent incorporated onto each bristle that purportedly optimizes the whitening effect. Each kit (item number PN 1291) contains 10 bleach ampules, 30 Booster brushes, and Niveous liquid resin dam material. It can be purchased for \$169.95 (retail) and \$101.00 (government) from Shofu Dental Corp. at (800) 827-4638, (760) 736-3277, (760) 736-3276 FAX, or www.shofu.com.

(Col Vandewalle)

Simplicity is a new universal self-etching, two-step bonding system from Apex Materials. It requires no mixing, shaking, and no need for a separate catalyst. Simplicity is reportedly very simple to use with an application time of approximately 30 seconds, including light curing. The company claims high bond strengths, and practically the elimination of postoperative sensitivity. The adhesive purportedly is compatible with all composites and can be used for all procedures: direct restorations, light-cured and self-cured composites, bonding of crowns, bridges, inlays and onlays, desensitizing root surfaces, and even bonding of posts. The adhesive system is available for \$120.00 (retail) and \$90.00 (government). For further information call (877) 273-9123, (847) 310-0624 FAX, or www.SimplicityAdhesive.com.

(Col Vandewalle)

MirrorLite is a new self-illuminating mouth mirror by Defend, Inc. The portable, battery-operated lighted mirror is said to provide greater visibility and less eye and back strain. The illumination of the disposable mirror head is provided by an LED light emanating from a lightweight, ergonomic and compact handle.

MirrorLite is reportedly ideal for air abrasion, implants, restorative dentistry, oral diagnosis and oral cancer exams. However, the handle is not autoclavable or immersible. Disposable barrier sleeves are available. The introductory kit (item number IN-7003) comes complete with mirror, batteries and 50 disposable mirror-head refills. It can be purchased for \$69.00 (retail) and \$34.50 (government) from Carl Parker Associates at (800) 275-0020, (631) 434-7760, (631) 434-7750 FAX, or www.defend.com.

(Col Vandewalle)

Distributed through A-dec, W & H has recently introduced the **Implantmed** surgical-handpiece motor in the US. Primarily designed for surgical-implant procedures, the Implantmed is purported to be a high-quality electrical-power unit that provides a wide range of performance with straight- and contra-angle handpieces for both implant and maxillofacial surgery procedures. The sealed, brushless high-torque motor unit is fully autoclavable, is compatible with both 1:1 ratio and 20:1 speed-reducing handpieces, and is advertised as providing 95 watts of power over an available speed range from 300 to 40,000 rpm. For implant procedures, the Implantmed is reported to provide precise and constant torque control adjustable from 5 to 50 Ncm. An integrated roller irrigation pump is advertised as providing a flow rate of approximately 100 mL per minute to provide sterile-coolant flow during treatment. The Implantmed is available in both 120- and 220-volt versions and is compatible with operating theater safety requirements. The motor unit may be purchased for \$3995.00 (retail) and \$2157.30 (government) (handpieces not included). Additional information can be obtained at (800) 547-1883, (503) 538-7478, (503) 537-2702 FAX, or www.a-dec.com. Available handpieces are listed in the following table.

Handpiece	Configuration	Gear Ratio	Indications	Retail Price (\$)	Govt Price (\$)
WS-75 E/KM	Contra-angle	20:1	Implants	1100	594
WS-92 E/3	Contra-angle	1:2.7	Third molar surgery, hemisections	1100	594
S-12	Angled-Straight	1:2	Third molar surgery, osteotomy	1200	648
S-11	Straight	1:1	Third molar surgery, osteotomy	1000	540

(Col (sel) Roberts)

The **GENTLEforce LUX 6000B** is the latest air-turbine handpiece from KaVo America that is advertised as offering excellent intraoral access and visibility, user comfort and convenience, and powerful performance. The handpiece has a smaller head design coupled with improved head and handle angles to allow better intraoral access and visibility. Although the GENTLEforce has the smallest handpiece head of any KaVo conventional handpiece, an improved turbine-cartridge design with KaVo ceramic ball bearings is said to provide quiet, vibration-free performance and the highest power rating (18 watts) of any KaVo handpiece. The 6000B is also claimed to contain a proprietary automatic-pressure regulator that adjusts air pressure to provide optimum performance and turbine durability, while the cartridge design prevents debris produced during preparations from entering the handpiece-head housing. Optimal water-spray cooling is provided to the bur tip by four-hole spray ports that deliver a fine water-spray mist for better visibility. The GENTLEforce contains glass-rod cellular optics that is touted to deliver 25,000 lux of illumination while not suffering degradation from the rigors of sterilization. The handpiece is the first in the KaVo line to offer a Plasmatec coating that is designed to increase the gripping power of gloves to ensure slip-free control. The GENTLEforce is also advertised as being able to be cleaned in thermal disinfectors before autoclave sterilization. The handpiece and turbine are backed by an 18-month warranty, while the glass optics are covered for five years. The GENTLEforce LUX 6000B is available from KaVo for \$1075.00 (retail) and \$584.00 (government). Further information can be obtained at (800) 323-8029, (847) 550-6800, (847) 550-6825 FAX, or www.kavousa.com.

(Col (sel) Roberts)

Whip Mix Corporation has recently introduced **Dazzle PS**, a pumice substitute for polishing acrylic resins. As an alternative to pumice, it is said to be specially formulated with unique abrasives to cut faster and smoother than pumice, while its fine-grain powder is reportedly gentler on the hands. Dazzle PS is also said to dry quickly, thus eliminating odors and providing a sanitary work environment. A 10-lb container of Dazzle PS is \$29.95 (retail/without shipping) \$31.06 (government/including shipping), while a 2 lb container costs \$44.95 (retail/without shipping) \$45.40 (government/including shipping). For additional information contact Whip Mix at (800) 626-5651, (502) 637-1451, or www.whipmix.com.

(MSgt Osborn)

Microlux, a new transilluminator by Addent, Inc., provides a focused beam of cool white light for use in the clinical diagnosis of caries, calculus, and crown fractures. It also functions as an auxiliary light source which aids in general operative procedures, preventive dentistry and patient education. Powered by a high-intensity light-emitting diode (LED), the light is focused through an autoclavable fiber-optic light guide that concentrates into a 3-mm spot. Measuring only 5" long by 5/8" in diameter, the Microlux is compact and portable with a reported bulb life of over 50,000 hours with low battery drain. The kit (item number 110019) comes complete with LED transilluminator, glass light guide, batteries and pocket clip and can be purchased for \$169.00 (retail and government) at (203) 778-0200, (203) 792-2275 FAX, or www.addent.com.

(Col Vandewalle)

Bisco has just introduced **BisCover**, a new liquid polish for all resin-composite restorations. The new polish, the company claims, saves time by finishing direct, indirect or provisional restorations in one step. A unique viscosity modifier purportedly allows BisCover to be thinned when covering large restorations or acrylic appliances. The polish is simply brushed-on and light-cured to reportedly create a hard, smooth polished surface without any sticky air-inhibited layer. BisCover is available in a bottle for application from a mixing well (item #G-93200K) for \$69.00 (retail) and \$34.50 (government) or in syringes for direct application (item #G-93260P) for \$30.00 (retail) and \$15.00 (government). For further information call (800) 247-3368, (847) 534-6000, (800) 959-9550 FAX, or www.bisco.com.

(Col Vandewalle)

CaStix is a cast stabilization system from Articulation Innovations, LLC. CaStix is reported to provide a highly accurate method for stabilizing dental casts during the articulation process. The CaStix technique includes a rigid, disposable stabilizing device, high-viscosity adhesive, and an accelerator for rapid set of the adhesive. The company claims that CaStix is easy to use. To use the product, first the maxillary and mandibular cast are related into the proper position. Next, determine where the stabilizers are placed on the casts for maximum contact of the attachment pads. A small amount of adhesive is then used to attach the stabilizers to the casts base and sprayed with accelerator to produce initial set. After articulation has been accomplished, CaStix is removed by gently twisting the stabilizer cross-arm to separate the arm from the attachment pads. CaStix purportedly works with almost any type of articulator and can be used with all types of registration materials. It is supplied as an introductory kit of 50 CaStix, a 20-gm bottle of adhesive, and a 2-oz bottle of accelerator for \$22.75 (retail and government). Also available are refill packages of 100 CaStix for \$15.25 (retail and government), or 500 CaStix for \$64.75 (retail and government), 50-gm high-viscosity adhesive for \$14.75 (retail and government), and 2-oz accelerator for \$4.95 (retail and government). For additional information contact Articulations Innovations LLC at (304) 754-5138, or www.castix.com.

(MSgt Osborn)

Embrace WetBond is a new, lightly-filled, light-activated product that can be used to purportedly seal

pits and fissures and restore small lesions without producing perceptible resin margins. The manufacturer, Pulpdent, claims this is possible because Embrace consists of a more hydrophilic resin than is found in other sealants/restorative materials. Pulpdent also reports that the product is less technique sensitive than similar products, releases fluoride, and forms a chemical as well as a mechanical bond to tooth structure. It appears only slightly opaque following light activation. Product instructions call for Embrace to be applied to acid etched, rinsed, moist tooth structure. A box of Embrace WetBond contains four 1.2-mL syringes and 20 applicator tips, and is available for \$49.95 (retail) and \$29.97 (government). To order or obtain additional information, contact Pulpdent at (800) 343-4342, (617) 926-6666, (617) 926-6262 FAX, or www.pulpdent.com.

(Col Charlton)

OrgaNice is a transparent plastic storage system for organizing and storing resin composite products and accessories. The product is specifically intended for storing resin composites/comonomers, bonding agents, and accessories. OrgaNice consists of three separate but stackable components that can be used in any combination. The base unit, which comes with a plastic transparent cover, is used for storing adhesives, shade guides, and accessories. The middle component is for storing resin capsules and comes with shade code stickers for easy identification of the capsule compartments. Lastly, the top module is designed for storing syringes and also comes with shade code stickers. The transparent covers and faces of the modules protect the contents from the operatory environment and allows for easy inspection for inventory purposes. The manufacturer, Ivoclar Vivadent, claims that the components are dishwasher safe and easy to disinfect. Pricing information for the modules is given below. For additional information or ordering, please contact Ivoclar Vivadent at (800) 533-6825, (716) 691-0010, (716) 691-2285 FAX, or www.ivoclarvivadent.us.com.

Product	Item Number	Retail Price	Government Price
OrgaNice Base Unit	563533	\$40	\$24
OrgaNice Syringe Unit	563534	\$40	\$24
OrgaNice Cavifil Unit	563535	\$40	\$24

(Col Charlton)

Pelton & Crane introduces a **Relay Control Kit** for its **Magna-Clave** manual sterilizer. The relay control purportedly moderates the power to the main heaters of the sterilizer to prevent potential overheating. The timer activates the relay controls at the end of the cycle and causes power to be cut-off from the heaters. Additionally, the power to the main heaters is removed by the relay control if there is an interruption with incoming power. If the unit trips the overheat protector to the main heater, the power is removed and cannot be restored without going through the proper startup procedure. This insures that when the sterilization cycle is interrupted by an out of water condition or similar failure, the Magna-Clave will remain off until the operator restarts the cycle. With the heater power removed, the Magna-Clave purportedly begins cooling down. The relay controls are added to increase the life and reliability of the Magna-Clave. The Relay Control Kit (part # 045814) is available for \$450.00 (retail) and \$255.00 (government) from Pelton & Crane at (800) 659-6560, (704) 588-2126, (704) 587-7204 FAX or www.marus.com/pelton/pindex.html

(TSgt Sutter)

Discus Dental has just introduced **FLASHlite 1001**, a second-generation light-emitting diode (LED) curing light. The cordless, light-weight (3.8-oz) curing unit reportedly has an irradiance of 1001mW/cm² and is

capable of curing camphoroquinone-initiated dental materials. FLASHlite is powered by a lithium-ion rechargeable battery and purportedly provides 300 ten-second cures on a single battery charge. The unit has a one-touch button for on/off and a 5-second audible indicator for monitoring cure time. The ergonomic and curved design reportedly allows easy access to all areas of the oral cavity. FLASHlite is available from Discus Dental for \$695.00 (retail and government). For further information, call (800) 422-9448, (310) 845-8260, (310) 845-1537 FAX, or www.discusdental.com.

(Col Vandewalle)

SS White has announced the introduction of **SmartPrep**, a new rotary bur reportedly designed to remove carious dentin and leave healthy dentin intact. The polymer-based disposable bur is purportedly self-limiting, and the edges become rounded when they contact harder, healthy dentin. After access has been created, SmartPrep is used in a slow-speed handpiece (500-800 rpm) to complete caries removal. The company claims the instrument will reduce the risk of inadvertent pulp exposure and the need for anesthesia. Suitable for deep and shallow lesions on both adult and pediatric patients, SmartPrep is available in an introductory kit for \$150.00 (retail) and \$90.00 (government). Each kit contains 30 SmartPrep and 10 caries-access burs:

- 10 SmartPrep RA #2
- 10 SmartPrep RA #4
- 10 SmartPrep RA #6

- 2 FG 169L
- 2 FG 329
- 2 Fissurotomy Original
- 2 Fissurotomy NTF (narrow taper fissure)
- 1 Great White No. 1
- 1 Great White No. 2

For further information call (877) 779-2877, (732) 905-1100, (732) 905-0987 FAX, or www.smartprep.net.
(Col Vandewalle)

IF SALIVA WERE RED TRAINING VIDEO

In a landmark study from the 1970s, University of North Carolina researcher and professor Dr. James Crawford used red poster paint and a mannequin head to increase awareness of cross-contamination in dentistry. This 2003 OSAP-produced video, using actual dental health-care personnel (DHCP), colorfully demonstrates cross-contamination that can result from routine dental treatment. It also effectively shows how proper precautions protect DHCP and patients.

The seven-minute video contains no voice track, and is not intended to be a stand-alone teaching tool. Trainers must guide students through the video presentation and stimulate discussion. The video contains three segments highlighting (1) common infection control and safety flaws, (2) the cross-contamination DHCP would see if saliva were red, and (3) how controlling contamination with proper engineering controls, work practices, and personal-protective equipment reduces the risk of exposure. An eight-page Trainer's Guide complements the video program, providing visual cues and talking points from the video.

The "If Saliva Were Red" Video Training Program, including the Trainer's Guide and video presentation on both VHS videotape and CD-ROM, is available for \$69.95 (\$55.95 for OSAP members). For purchasing information contact OSAP at (800) 298-OSAP, (410) 571-0003, or www.osap.org.

(Lt Col Harte)

Xeno III is a new self-etching one-step bonding system from Dentsply/Caulk for use with light-cured direct restorative materials. The adhesive is reportedly very simple to use with an application time of only about 40 seconds, including light curing. The company claims high bond strengths, and practically the elimination of post-operative sensitivity. Xeno is reportedly less technique sensitive because it eliminates the possibility of overdrying or overetching the dentin. The nanofilled, fluoride-containing adhesive is available from Dentsply/Caulk in an introductory kit containing two 4-mL bottles, applicators and mixing dish for \$160.00 (retail) and \$96.48 (government). For further information call (800) 532-2855, (302) 422-4511, (800) 788-4110 FAX, or www.dentsply.com.

(Col Vandewalle)

Garrison Dental Manufacturing recently introduced **WedgeWands** as an alternative to traditional wooden wedges for operative dentistry. WedgeWands are specially-designed, disposable, plastic wedges attached to plastic applicator sticks that Garrison says makes use of an instrument unnecessary during placement. The company also claims that placement is fast, easy, and precise. Various design features are said to account for these claims. First, the angle of the wedges can be adjusted by bending the neck area where the wedge meets the applicator/handle. This is said to make it easy to place the wedges in various locations in the oral cavity. Second, the wedges have a curved underside and contoured sides that are designed to leave room for the interproximal papilla and enable the wedges to more intimately adapt to the interproximal contours of the teeth. Finally, the wedges have a slightly upturned end that prevents them from inadvertently piecing the soft tissues and rubber dam during placement. Following placement, the handle is twisted to separate it from the wedge. The wedge's textured end purportedly makes it easy to remove using cotton forceps or a hemostat. The wedges come in three color-coded sizes (small, medium, large) and can be purchased individually (in lots of 300) according to size or as an assortment kit with 100 of each of the three sizes. The price of each packaging version is \$57.00 (retail and government). For additional information or to order, please contact Garrison Dental Systems at (888) 437-0032, (616) 842-2244, (616) 842-2430 FAX, or www.garrisdental.com.

(Col Charlton)

Sterilex Liquid Ultra is an alkaline peroxide-based dental unit waterline cleaner specially formulated and clinically proven to clean deposits and control bacterial contamination. The manufacturer claims this once per week dental-unit waterline treatment product is safe and non-corrosive for the dental unit. The product is packaged in a ready-to-use two-part solution. The product is available by the case (40 applications) for \$227.00 (retail) or \$122.58 (government). For more information, contact the Sterilex Corporation at (800) 511-1659, (410) 581-8860, or www.sterilex.com.

(Lt Col Harte)

Ultradent Products recently introduced a new curing light, the **UltraLume LED 5**. The light features five light-emitting diodes (LEDs) and a unique, large oval (10 x 14 mm) curing footprint which may save time by illuminating the entire occlusal or facial surface. The low-profile design is claimed to allow access to any intraoral area. A primary LED provides curing for products containing camphoroquinone (peak at 468 nm) and four accessory LEDs (peak at 400 nm) for products containing other photo-initiators. The dual-wavelength emission purportedly allows UltraLume LED 5 to cure every photo-initiated product on the market. The corded handpiece is lightweight and stores in a handpiece holder or on a wall mount. The UltraLume LED 5 can be purchased for \$999.00 (retail) and \$849.15 (government) from Ultradent at (800) 552-5512, (800) 842-9024 FAX, or www.ultradent.com.

(Col Vandewalle)

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.

CRACKING THE PACKABLE COMPOSITES

Fracture toughness of packable and conventional composite materials. Knobloch LA, Kerby RE, Seghi R, Berlin JS, Clelland N. J Prosthet Dent 2002;88:307-313.

Packable resin composites have been available since 1997, and dentists often use them as amalgam substitutes for the restoration of posterior teeth. They purportedly offer the advantages of having handling characteristics similar to those of amalgam, being able to be light cured in thicker increments than traditional resin composites, and having less shrinkage. This study evaluated the fracture toughness of three packable composites (SureFil, Dentsply/Cauk; Alert, Jeneric Pentron; Solitaire, Heraeus Kulzer) two conventional composites (Heliomolar, Ivoclar Vivadent; Herculite XRV, SDS/Kerr), and one laboratory-processed composite (Belleglass, Belle de St. Clair/Kerr). Eight specimens were made of each product by placing the composite in a circular mold into which a razor blade had been partially inserted. This resulted in specimens with a pre-established crack. After being cured, the specimens were removed from the mold and stored in water for seven days. They were then loaded to failure in a testing machine and the force required to fracture them was measured. **Results found that Alert exhibited a significantly higher fracture toughness than the other composites, and Solitaire had a significantly lower one. There was no significant difference among the other three.**

DIS Comment: Packable composites were introduced to the market as substitutes for amalgam in the posterior dentition. They were claimed to handle more like amalgam and to be packable, which made it easier to establish an acceptable proximal contact. The manufacturers of these products claim that their physical properties and handling characteristics are better than those of traditional hybrids and microfills. They purportedly have larger filler particles, higher filler loading, and different shapes and types of filler particles. If true, one would expect that their fracture toughness (their ability to resist failure from crack propagation) should be better than that of traditional composites because their filler particles should make it harder for cracks to move through the resin. This was not the consistent finding of this study, however. The packable composite with chopped microfibers as fillers, Alert, did perform significantly better than the others, but Solitaire performed worse. This shows that at least this physical property varies widely across the class of packables. Perhaps most surprisingly is that the indirect composite, Belleglass, did not perform better. One would expect that it would because it is processed using heat and pressure, which should make it more highly cured. DIS has found, and others have confirmed, that the physical properties of packables are generally no better than those of hybrid resin composites. It is also important to note that none can be cured to the 5-mm depth that their manufacturers claim, and they tend to be more expensive than traditional resin composites. Perhaps the main reason to use one is because they tend to resist packing better than traditional composites, so it is easier to establish a good proximal contact.

MAKE EM AND BREAK EM: FRACTURE STRENGTH OF CROWNS

Comparison of the fracture strengths of metal-ceramic crowns and three ceromer crowns. Ku CW, Park SW, Yang HS. J Prosthet Dent 2002;88:170-175.

Several new systems have been introduced to fabricate esthetic, full-coverage anterior and posterior restorations. Among these are ceromer (i.e., ceramic-optimized polymer) products, that are purported to

offer superb esthetics along with acceptable physical properties. The purpose of this study was to measure and compare the fracture strengths of three ceromer products to that of a traditional metal-ceramic. A resin maxillary central incisor analog was made and prepared with a 2-mm incisal reduction, 90-degree 1-mm shoulder, and 5-degree convergence angle. The die was then replicated in wax ten times, and from them ten metal dies were cast. Ten full-coverage crowns were then fabricated of each of three ceromer products (Targis, Ivoclar Vivadent; Sculpture, Jeneric Pentron; Artglass, Heraeus Kulver), and ten metal-ceramic crowns were made using the standard process. After the die and intaglio surfaces of the restorations were air abraded, they were cemented with ProTec CEM (Ivoclar Vivadent). Fourteen hours later, the crowns were mounted in acrylic and loaded at a 130-degree angle to the die's long axis until fracture occurred. **Results found that the metal-ceramic crowns required a significantly greater force to fracture them compared to the three ceromer crown systems. No difference was found among the three ceromer products.**

DIS Comment: New products for the indirect fabrication of crowns, inlays, onlays, and veneers have appeared over the last decade in an attempt to overcome some of the shortcomings associated with metal-ceramic restorations. Often called ceromers, they consist of a combination of resin polymers and glass or ceramic particles. Compared to porcelain, they exhibit less shrinkage and are claimed to be more esthetic because they don't rely on a metal substructure. They can also be repaired more easily intraorally and exhibit wear that is similar to that of tooth structure. One of the limitations of the ceromers is that they may be less resistant to fracture because they lack a metal substructure. This study, in fact, confirmed this belief by showing that metal-ceramic crowns were more resistant to fracture than several popular ceromers. It is important to note, however, that the ceromer crowns were not adhesively bonded to the dies using a dentin bonding agent. This is important because bonding has been shown to increase the fracture strength of an all-ceramic product.¹ They were also cemented with a hybrid resin/glass-ionomer cement (ProTec CEM, a product no longer being marketed), rather than a resin cement. Using a resin cement might also have resulted in a higher fracture strength for the ceromer crowns. At any rate, the authors highlighted a critically important point: the fracture strengths of all the products tested in this study exceeded (by a factor of approximately two) normal occlusal loads that occur in the mouth.

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DO PACKABLE COMPOSITES REALLY HELP IN ESTABLISHING A GOOD PROXIMAL CONTACT?

Proximal contact formation with different restorative materials and techniques. Klein F, Keller AK, Staehle HJ, Dorfer CE. *Am J Dent* 2002;15:232-235.

One of the purported advantages of higher-viscosity (i.e., thicker) resin composites such as packables is that they make it easier to establish an adequate proximal contact since they more effectively distend the matrix band during placement than do less viscous composites. The purpose of this laboratory study was to measure the proximal contact strengths (PCSs) produced by composites of different viscosities and to compare them to each other and that obtained using amalgam. The researchers prepared standardized MO preparations in 360 artificial lower first molars and divided the teeth into 8 groups of 45 teeth each. Each prepared tooth was placed in a socket of a dentaform which allowed a certain degree of mobility for the tooth. One group was restored with amalgam (Dispersalloy, Dentsply/Caulk), two groups with a low-viscosity composite (Tetric Flow, Ivoclar Vivadent), two with a medium-viscosity composite (Tetric Ceram, Ivoclar Vivadent), and two with a high-viscosity (i.e., packable) composite (Solitaire, Heraeus Kulzer). One group of each type of composite was placed in bulk and light cured for 120 seconds, while the second group was restored using 2-mm increments, each cured for 60 seconds. For all materials, a plastic matrix band, light-transmitting wedge, and a band holder were used. After finishing and polishing, the researchers used a universal testing machine to measure the force required to push a piece of dental floss through the proximal contact. The results showed that the PCSs varied from 1.32 Newtons for the low-viscosity resin to

9.90 Newtons for the amalgam. For the bulk-placed technique, significant differences were found between the low-viscosity resin and the medium- and the high-viscosity resins. The latter two did not show a significant difference. For the restorations placed in increments, PCSs were significantly higher for all composite types. Again, the low-viscosity resin's PCS was significantly less than those of the medium- and the high-viscosity resins. The latter two did not significantly differ from each other or from a nonprepared tooth. The amalgam's PCSs were significantly greater than that of each composite group. **The authors concluded that the limiting factor for the contact strength is application technique, and only secondary is the composite viscosity.**

DIS Comment: This study attempted to test the claim made by most manufacturers of packable resin composites that their products make it easier to produce restorations with acceptable proximal contacts than do traditional composites that have a low viscosity (i.e., flowable) or a medium viscosity (i.e., hybrids). The belief is that since they are thicker, it is easier to distend the matrix band and produce a more solid contact than with the other thinner composites. The packable did produce better contacts than the flowable, but not better than the traditional (medium-viscosity) hybrid. This study further confirms that packable composites do not produce as tight a contact as amalgam. This is not terribly surprising because one study found that they do not resist condensation as much as amalgam.¹ The available evidence indicates that manufacturers' claims that packables handle like amalgam are inaccurate. Perhaps the most interesting finding is that the incremental placement technique with the composites resulted in better contacts than did the bulk filling technique. This, in part, may be due to the greater absolute shrinkage seen in the bulk technique. This study, then, further supports the use of incremental placement when using resin composites. As a final point, all contacts may have been improved somewhat had the researchers used a sectional matrix system such as Composi-Tight Gold (see DIS 67-12) or Palodent (see DIS 56-14).

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DON'T COMPOMER-ISE YOUR RESTORATIONS

A 3-year clinical evaluation of a compomer, a composite and a compomer/composite (sandwich) in Class II restorations. Wucher M, Grobler SR, Senekal PJC. *Am J Dent* 2002;15:274-278.

Increasing demands by esthetic-conscious patients have led to the development and marketing of multiple tooth-colored restorative systems by dental manufacturers. One of the more recent types of esthetic-restorative materials is the polyacid-modified composite resin or compomer. The purpose of this study was to clinically compare the performance of a hybrid-resin composite, a compomer and an open-sandwich of a compomer layered occlusally with a resin composite in Class II cavities of permanent molars and premolars. The study used clinical codes (Ryge/USPHS) to assess the performance of the restorations after three years. The authors completed three Class II restorations (30 molars and 39 premolars) in each of 23 adult patients using cotton roll isolation. The preparations were bonded with a two-step total-etch system (Prime and Bond 2.1, Dentsply). Three different restorative groups were created and utilized in each patient: a hybrid resin composite (Spectrum-TPH, Dentsply/Caulk); a compomer (Dyract, Dentsply/Caulk) or an open-sandwich of the compomer (Dyract, Dentsply/Caulk) layered occlusally by the resin composite (Spectrum-TPH, Dentsply/Caulk). Color slides, periapical radiographs and a clinical assessment evaluating 11 different criteria were taken at baseline and at three years. **Results found that all three types of restorations performed well clinically with only one open-sandwich restoration requiring replacement due to secondary caries. However, the compomer restorations exhibited significantly greater occlusal wear and significantly greater degradation of marginal integrity over the three years compared to the resin composite or open-sandwich restorations.**

DIS Comment: This study confirms clinically what was already suspected from laboratory testing - compomers have lower mechanical properties than hybrid-resin composites. Compomer materials were

introduced as an alternative to resin-modified glass ionomers. Their ease in placement and polishing, and fluoride release made them an attractive alternative. Compomers have better mechanical properties and esthetics than resin-modified glass-ionomer restorative materials, however, they release less fluoride and provide no chemical bond to tooth structure. Compared with hybrid-resin composites, compomers have inferior mechanical properties that may lead to accelerated wear and ledging in restorations receiving direct contact.¹ Marketing by some manufacturers and a least one clinical study suggest that compomer materials will provide reliable restorations in stress-bearing areas.² However, due to the increased potential for wear in direct-contact restorations as found in this study, compomers should be limited to areas of lower stress such as Class V³, or III⁴ or perhaps lower life expectancy, such as pediatric Class I or II restorations.⁵

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PERMANENT CEMENTS: THE ONES THAT STICK IT OUT

Retentive properties of five different cements on base and noble metal copings. Ergin S, Gemalmaz D. *J Prosthet Dent* 2002;88:491-497.

Using the most retentive permanent cement for luting indirect restorations is often very important to successful prosthodontic treatment. This is especially the case when restorations are cemented to overtapered and/or short preparations. This study evaluated the retentive properties of five luting cements on base and noble metal copings to short and overtapered preparations. Eighty extracted human premolars were prepared to receive a full-metal coping. Preparations included a 33-degree convergence angle, flat occlusal surface, and 3-mm height. Half of the copings were cast using a gold/silver/palladium alloy (AuroLloyd KF, Bego), while the other half were cast with a nickel/chromium alloy (W iron 99, Bego). Cementation was done under standardized conditions using one of five cements: a zinc phosphate (Phosphate Cement, Heraeus Kulzer), glass ionomer (Meron, Voco), two resin/glass-ionomer hybrids (Fuji Plus, GC; Principle, Dentsply/Caulk), and a resin (Avanto, Voco). After cementation, the specimens were stored in distilled water at 37 degrees Centigrade for 24 hours and then thermocycled. After thermocycling, a vertical tensile force was applied using a testing machine until separation occurred. Means for the various groups were calculated and statistically analyzed. **The researchers found that for the noble-metal alloy, Fuji Plus and Avanto resulted in significantly greater retention. For the base-metal alloy, Fuji Plus was significantly more retentive than the others.**

DIS Comment: This well-designed study looked at a clinically relevant question: what permanent cement provides the best retention of castings to less-than-ideal preparations. Not infrequently, clinicians are faced with cementing a casting or prosthesis to overtapered, short preparations. In such cases, the retention afforded by the cement becomes critical. The results of this study indicated that, for both types of alloys, the hybrid resin/glass-ionomer cement (Fuji Plus, GC), performed best. One minor error in this study concerns the authors' classification of Principle (Dentsply/Caulk) as a similar type of cement. Actually, it is a compomer cement and behaves more like a resin than a glass-ionomer cement. The true hybrid cements have many positive characteristics. Compared to traditional glass-ionomer cements such as Ketac-Cem and Fuji Ionomer Type I, they are easier to use, have greater tensile strength, and are less

brittle, less soluble, and less sensitive to moisture contamination. They also leach at least as much fluoride as the glass-ionomer cements. This study indicates that we can also add excellent retention to the list.

LOCAL ANESTHETIC CARTRIDGES AND LATEX ALLERGY

Local anesthetic cartridges and latex allergy: a literature review. Shojaei AR, Haas DA. J Can Dent Assoc 2002;68:622-626.

Numerous items used in dental practice contain natural rubber latex and therefore are possibly allergenic. The local anesthetic cartridge is one example. At one end of the anesthetic cartridge is the stopper, also called the plunger, where either the harpoon penetrates or the flat piston end of a self-aspirating syringe rests. At the other end of the cartridge is the diaphragm, where the needle penetrates. There has been some concern that latex allergen may leach from natural rubber vial stoppers into drug solutions with the potential of causing an allergic reaction in a person with latex allergy. The purpose of this literature review was to search for reports of latex allergy involving cartridges for dental local anesthetic. In medicine, the analogous product is the vial, so the potential of medical vial stoppers to induce a reaction was also assessed. Twelve publications met the selection criteria and are summarized in the article. **The medical literature provides some evidence that latex allergen can be released into pharmaceutical solutions contained within vials, by either penetration through or direct contact with natural rubber latex stoppers. However, there are no reports of studies or cases in which a documented allergy was due to the latex component of cartridges for dental local anesthetic.**

DIS Comment: The lack of reports to date does not rule out the possibility of an allergic reaction some time in the future, especially given the reported allergic reactions to medical sources of drug-associated latex, such as medication vials and intravenous tubing. The American Academy of Allergy and Immunology Task Force on Allergic Reactions to Latex has a suggested protocol for all patients in whom latex exposure is anticipated. The protocol includes the following statement: Medications stored under latex closures should not be used if a substitute is available in a nonlatex-covered storage vial. Dr. Stanley Malamed, author of the textbook Medical Emergencies in the Dental Office, recommends the following: When latex allergy exists, the use of local anesthetic cartridges should be avoided. The thin diaphragm through which the needle enters the cartridge is composed of latex. Although unlikely, it is potentially possible for this latex to be injected into the sensitive patient, inducing a serious allergic reaction. There is a trend in reducing the use of latex in health-care products, including dental local anesthetics (e.g., a synthetic material used for the diaphragm versus one containing latex) and it is likely in the future that the dental local anesthetic cartridge will be latex-free. Until then, the use of glass ampule-based local anesthetics and latex-free syringes for patients with known latex hypersensitivity is indicated. As always, consultation with the patient's primary care provider may be indicated for optimal patient management.

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FLUORIDE-RELEASING RESTORATIVE MATERIALS AND RECURRENT CARIES

Three restorative materials and topical fluoride gel used in xerostomic patients: A clinical comparison. Haveman CW, Summitt JB, Burgess JO, Carlson K. J Amer Dent Assoc 2003;134:177-184.

The purpose of this clinical study was to compare the clinical performance and recurrent caries associated

with two fluoride-releasing glass-ionomer materials (Ketac-Fil and Vitremer Core, 3M ESPE, St. Paul, MN) and one non-fluoride releasing amalgam material (Tytin, Kerr, Orange, CA) used in Class 3 or 5 restorations in patients with a low salivary flow rate. Nine xerostomic patients received 111 restorations. The patients were instructed in the daily use of a neutral fluoride gel (PreviDent, Colgate, Canton, MA) and recalled at six months, one year and two years. The restorations were evaluated for marginal adaptation, anatomic form, caries in adjacent tooth structure and caries at the cavosurface margin. Patients were categorized as fluoride users (greater than 50% of the time) or nonusers (less than 50% of the time). Significantly less caries developed at the cavosurface margin of the fluoride-releasing glass-ionomer restorative materials compared with amalgam in patients who were less than 50 percent compliant in the daily use of topical fluoride gel. No caries developed within 3 millimeters of any of the restorations in fluoride users. No statistical significant difference was found between the three restorative materials in regard to marginal integrity and an anatomical form. **Results suggest that fluoride-releasing glass-ionomer restorative materials may reduce caries surrounding restorations in high-risk patients who do not routinely use topical fluoride.**

DIS comment: Laboratory research confirms the ability of glass-ionomer restorative materials to reduce the demineralization of adjacent tooth structure.¹⁻³ However, conflicting clinical information exists concerning the reduction in recurrent caries rates surrounding glass-ionomer restorations.⁴⁻⁶ The authors speculate that a significant problem with clinical studies involving fluoride-releasing materials is that much of the research has not been completed on patients at high risk of developing caries and therefore, these materials have not been challenged severely enough to determine their effectiveness. However, a very recent study by McComb and others found similar results in xerostomic head-and-neck radiation patients with significant reduction in recurrent caries around both conventional and resin-modified glass-ionomer restorations over resin-composite restorations in patients not using topical fluoride⁷ (see DIS 67). The recharge ability of glass ionomers may be the most important factor in caries resistance. This study supports the continued use of glass-ionomer restorative materials in Class 3 or 5 restorations in non-compliant patients at high risk for caries.

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I SEE THE LIGHT

Light-emitting diode curing: Influence on selected properties of resin composites. Asmussen E, Peutzfeldt A. Quintessence Int 2002;34:71-75.

A number of manufacturers have recently introduced curing lights for resin composites that use light-emitting diodes (LEDs) instead of a halogen bulb for light production. Since the units have only recently come to the market, little research has been done to evaluate their efficacy at curing resin composites. To accomplish this, this study was designed to measure several properties of various resin composites cured

using either a halogen bulb curing light or one of two LED units. Specimens were made of three resin composites (Z250, 3M ESPE; Pertac II, 3M ESPE; Definite, Degussa) using three curing lights (the halogen unit XL3000, 3M ESPE; the LED unit Elipar Freelight, 3M ESPE; the LED unit e-Light, GC America). Specimens were made in accordance with pertinent standards of the International Organization for Standardization (ISO), and the following properties were measured: flexure strength and modulus, depth of cure, degree of conversion (i.e., polymerization), and polymerization contraction. Statistical analysis revealed that the depth of cure of the three composites was significantly less with the LED units than with the halogen unit. The LED units also caused less and slower contraction of the resins than did the halogen unit. The LED lights produced a lesser degree of conversion, although the differences were not always statistically significant. Finally, for flexural strength, the e-Light appeared the least effective, while both LED units caused lower flexural modulus values for two of the three composites. **The authors concluded that the tested LED units provided the resin composites with physical properties that were the same or inferior to those produced with the halogen light unit. They also found the e-Light less effective than the Elipar Freelight.**

DIS Comment: Because LED units (compared to halogen bulb units) emit a narrower spectral range of light that corresponds well to the absorption spectrum of the most commonly used photoactivator in resins (camphoroquinone), the units offer several advantages. First, since they require less power to operate, they can be powered by rechargeable batteries, which eliminates the need for an electrical power connection. This, in turn, adds great portability to LED units. Also, they generate less heat so there should be less of a chance that thermal damage will be done to adjacent tissues. Producing less heat also means that they do not require cooling fans, which makes them quieter than halogen units. Unfortunately, a number of LED units are now commercially available with little published research to attest to their efficacy in curing resin composites. This study found that the two LED units tested produced the same or moderately inferior properties in resins than those produced by the halogen bulb unit. The two tested units, the Elipar Freelight and the e-Light, are second-generation LED units. The first generation units, a number of which have been evaluated by DIS, performed less effectively. Before purchasing LED units, which are usually more expensive than halogen units, it is probably prudent to wait until additional studies have been done to assess their performance.

ADVERSE REACTION ASSOCIATED WITH AN ALCOHOL-BASED HAND ANTISEPTIC

Adverse reactions associated with an alcohol-based hand antiseptic among nurses in a neonatal intensive care unit. Cimiotti JP, Marmur ES, Nesin M, Hamlin-Cook P, Larson EL. *Am J Infect Control* 2003;31:43-48.

This prospective study compared 2 hand-hygiene regimes, an alcohol-based (61% ethyl alcohol with moisturizers) antiseptic and a detergent containing 2% chlorhexidine gluconate in two neonatal intensive care units. The authors described skin reactions to these products and compared them with typical reactions associated with traditional handwashing. Mild to severe dermatologic symptoms associated with the alcohol-based antiseptic occurred in seven of 58 nurses. This compared with 4/58 reactions reported for the traditional detergent-based antiseptic handwashing product. Four of the seven nurses were able to resume use of the original alcohol-based product after several days. The reactions associated with alcohol were qualitatively different from those associated with traditional handwashing. They occurred in younger women, immediately or very soon after initial exposure to the product, and in most cases, subsided within a few days so that the individual was able to resume use of the product without further problems. Conversely, reactions associated with traditional handwashing generally occur after prolonged and frequent use of a product and are more common with older age as the skin becomes less resilient. This dermatologic damage often becomes chronic and resistant to treatment. **This case study alerts users to anticipate possible, albeit unlikely, reactions to topical products applied to the skin. Although there may be the rare health-care professional who can not tolerate alcohols, ultimately fewer skin problems may be anticipated when compared with the use of antiseptic soaps or detergents.**

DIS Comment: Adverse reactions can occur when applying any topical product to the skin. The authors note that on the basis of their case study, it is neither possible nor appropriate to distinguish between an allergic and an irritant reaction. The fact that four of the seven nurses were able to resume use of the alcohol-based product argues against an allergic cause in those individuals. The nature of the reactions to alcohol products may differ from traditional handwashing, and the reactions are likely to be short-lived. Allergic contact dermatitis due to alcohol hand rubs is very uncommon. However, with increasing use of such products by health-care personnel, it is likely that true allergic reactions to such products will occasionally be encountered. The 2002 Centers for Disease Control and Prevention's hand hygiene guideline recommends several potential strategies for minimizing hand-hygiene-related irritant contact dermatitis which include: replacing hand-hygiene products having high irritation potential with preparations that cause less damage to the skin; educating personnel regarding the risk of irritant contact dermatitis; and providing health-care professionals with moisturizing skin-care products or barrier creams. It is important to note that oil-containing products can compromise the integrity of rubber gloves and affect the efficacy of antiseptic agents used in the facility. Also, if alcohol hand rubs are used, routinely washing hands with soap and water immediately after using the alcohol product may lead to dermatitis. Several recent studies with alcohol-based products containing emollients have been associated with improvements in skin health and improved compliance with hand hygiene compared with traditional handwashing products.

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ALLERGIC CONTACT DERMATITIS

Allergic contact dermatitis in dental professionals. Hamann C, Rodgers PA, Sullivan K. *J Am Dent Assoc* 2003;134:185-194.

Allergic contact dermatitis (ACD), also referred to as type IV or delayed hypersensitivity, is a localized immune response usually confined to the area of skin contact. Symptoms range from dry skin to patchy eczema to chronic sores. Allergic chemicals can be found in many products used in the dental operator, such as bonding agents, disinfectants, antiseptics, and preservatives and processing chemicals added to rubber products. With repeated exposure, these chemicals can cause ACD in dental health-care

professionals (DHCP). The presence of many of these chemicals in household products often increases exposure and exacerbates symptoms. Research indicates that the prevalence of ACD in DHCP is increasing, particularly in reaction to the chemicals in bonding agents and disinfectants. Because DHCP often wait several years before obtaining an accurate diagnosis and undergoing effective treatment, chronic skin disease and permanent skin damage can develop.

DIS Comment: Not all skin reactions are related to gloves or natural rubber latex. This article reminds DHCP of other common chemical allergens, symptoms of ACD and appropriate treatment of occupational skin disease. DHCP should be aware of the chemical content information from dental and consumer products (e.g., MSDS, product labels), obtain an accurate diagnosis of any recurring or chronic skin reactions, and if diagnosed with ACD, DHCP must learn to avoid the products containing the allergen(s) and eliminate or minimize exposure.

ALOE VERA GEL GLOVES

Evaluation of aloe vera gel gloves in the treatment of dry skin associated with occupational exposure. West DP, Zhu YF. Am J Infect Control 2003;31:40-42.

An innovative dry-coating technology has produced a new concept - an examination glove that gradually delivers aloe vera gel to the skin of the gloved hand. Powder-free latex examination gloves with aloe vera were tested in women in a Chinese factory with currently active, clinically dry skin (scaling and with or without erythema) associated with occupational exposure. An open, contralateral comparison study evaluated the efficacy of repeated aloe vera glove use (i.e., 8 hours/day) to one hand versus no glove use to the opposite hand during 30 days, followed by 30 days rest, followed by 10 days of repeated use. Standardized photographs at baseline, during, and at the end of the study documented the skin condition of the participants' dorsal hands. Mean time to noticeable improvement in skin quality for the aloe vera glove hand was 3.5 days whereas marked improvement in skin quality was 10.4 days for the aloe vera glove hand. No improvement was detected for nonglove hands. **Dry-coated aloe vera gloves that provide for gradual delivery of aloe vera gel to the skin produced a uniformly positive outcome of improved skin integrity, decreased appearance of fine wrinkling, and decreased erythema in the management of occupational dry skin and irritant contact dermatitis.**

DIS Comment: The use of topical aloe vera to alleviate irritated and dry skin is well reported, as is the use of aloe vera to treat human burns and skin wounds. Although the sample size in this study is small (n=29), it demonstrated that individuals with occupationally-related dry skin and irritant contact dermatitis showed a marked improvement in skin quality when using aloe vera gel gloves. Dental health-care personnel who frequently suffer from occupationally-related dermatitis (e.g., from frequent hand hygiene and glove use) may benefit from using a glove that provides for prolonged and continual delivery of aloe vera to the skin.

INFECTION CONTROL PRACTICES FOR MULTIDOSE MEDICATION VIALS

Nosocomial transmission of hepatitis C virus associated with the use of multidose saline vials. Krause G, Trepka, MJ, Whisenant RS, Katz D, Nainan O, Wiersma ST, Hopkins RS. Infect Control Hosp Epidemiol 2003;24:122-127.

The purpose of this investigation was to identify the source of an outbreak of acute hepatitis C virus (HCV) infection among three patients occurring within eight weeks of hospitalization in the same ward of a Florida hospital. The outbreak of HCV probably occurred when a multidose saline vial was contaminated with blood from an HCV-infected patient. **Adherence to standard procedures to prevent bloodborne infections should continue to be emphasized. In addition, using single-dose vials or pre-filled syringes might further reduce the risk for nosocomial transmission of bloodborne pathogens.**

DIS Comment: This is not the first report of a nosocomial transmission of a bloodborne pathogen disease

from a multidose medication vial. Although this outbreak was related to an in-patient hospital setting, it is possible for this to occur in an outpatient dental setting where multidose medication vials are used for conscious sedation. When using either single-dose or multidose medication vials attention to aseptic technique is critical. Leftover contents from a single-dose vial or syringe should be disposed of appropriately and never be administered to another patient, even if a new sterile device is used to enter the container. If using a multidose medication vial, cleanse the access diaphragm with 70% alcohol before inserting a sterile device into the vial, avoid contaminating the device before penetrating the access diaphragm, and discard the contents immediately if the sterility is compromised.

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OCCUPATIONALLY ACQUIRED HIV INFECTION SURVEILLANCE DATA

Occupationally acquired human immunodeficiency virus (HIV) infection: national case surveillance data during 20 years of the HIV epidemic in the United States. Do AN, Ciesielski CA, Metler RP, Hammett TA, Li J, Fleming PL. Infect Control Hosp Epidemiol 2003;24:86-96.

Data from case surveillance efforts in the US have remained important in understanding occupationally acquired HIV infection and have been widely used in that context. The data have been valuable in the development of infection control measures, which have been shown to be effective at reducing the frequency of health-care workers' exposures to blood - a potential source of infection with HIV and other bloodborne pathogens. This article summarizes the national surveillance data on HIV infection and acquired immunodeficiency syndrome (AIDS) among health-care workers in the US reported through December 2001, focusing on those with documented occupationally-acquired HIV infection. Of 57 health-care workers with documented occupationally acquired HIV infection, most (86%) were exposed to blood, and most (88%) had percutaneous injuries. The circumstances varied among 51 percutaneous injuries, with the largest proportion (41%) occurring after a procedure, 35% occurring during a procedure, and 20% occurring during disposal of sharp objects. Of 55 known source patients, most (69%) had AIDS at the time of occupational exposure, but some (11%) had asymptomatic HIV infection. Eight (14%) of the health-care workers were infected despite receiving postexposure prophylaxis (PEP). **Prevention strategies for occupationally acquired HIV infection should continue to emphasize avoiding blood exposures. Health-care workers should be educated about both the benefits and limitations of PEP, which does not always prevent HIV infection following an exposure. Technologic advances (e.g., safety-engineered devices) may further enhance safety in the health-care workplace.**

DIS Comment: As of June 2001, there were no dental health-care workers among the 57 US health-care workers with documented HIV seroconversion following a specific exposure to a known HIV-infected source patient. Out of the possible 138 additional health-care workers considered to have possible occupational HIV transmission, only six were dental health-care workers. Each of these reported a history of occupational percutaneous or mucous membrane exposure to blood or body fluids in the dental setting, but HIV seroconversion could not be linked to a specific exposure. Other evidence supporting the low risk of occupationally acquired HIV infection among dental health-care workers includes HIV seroprevalence studies showing low rates of HIV infection among dental health-care workers, including oral surgeons. Even though the overall risk of infected patients transmitting HIV to dental health-care workers is very small, preventive measures must be taken to avoid occupational blood exposures. All dental practices should develop a comprehensive written program for preventing and managing occupational exposures to blood (USAF Dental Services are not required to prepare a separate, comprehensive, exposure control plan if they are covered under a Medical Treatment Facility or installation plan). Reducing percutaneous injuries can be accomplished through engineering controls, such as using safer devices (e.g., those with engineered sharps-injury prevention features) and by modifying work practices (e.g., used needles should never be recapped or otherwise manipulated using both hands.) Personal protective equipment (e.g., gloves, mask, protective eyewear with solid sideshields, protective apparel) is used to prevent skin and

mucous membrane exposures.

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BIOFILMS AND DENTAL UNIT WATERLINES

Clearance of biofilms from dental-unit waterlines through the use of hydroperoxide ion-phase transfer catalysts. Shepherd PA, Shojaei MA, Eleazer PD, Stewart AV, Staat RH. *Quintessence Int* 2003;32:755-761.

The purpose of this study was to demonstrate the effectiveness of hydroperoxide ion-phase transfer catalyst (HPI-PTC) cleaners and disinfectants for maintaining dental-unit waterlines. Water samples were taken from 117 sites including a variety of dental units. The presence or absence of biofilms was confirmed by scanning electron microscopy. The cleaning procedure involved an overnight application of an HPI-PTC cleaner followed by a two-minute water rinse. Water from both the air-water syringe and the high-speed handpiece lines from all untreated units contained at least 6×10^2 CFU/mL of planktonic or free-floating bacteria (average 1.4×10^5 CFU/mL). An initial 5% solution of HPI-PTC successfully cleared the lines of any apparent biofilm when applied for three consecutive days. Thereafter, once weekly use of the cleaner maintained the dental water supplies free of significant numbers of planktonic organisms.

Routine weekly use of an HPI-PTC cleaner controlled dental-unit waterline biofilm and reduced, with minimum effort, the microbial contamination level of water used for patient treatment to less than 200 CFU/mL.

DIS Comment: It is well documented that microorganisms colonize and multiply on the interior surfaces of DUWL resulting in the formation of biofilms. The levels of bacteria in water from untreated dental units often exceed 100,000 CFU/mL of water. Despite the lack of documented adverse health effects, exposing patients or dental health-care personnel to water of uncertain microbiological quality is inconsistent with generally accepted infection control principles. Current dental-unit water systems cannot deliver water of optimal microbiologic quality without some form of intervention (e.g., use of a disinfectant). The commercial product used in this study was Sterilex Ultra Dental Water Line Cleaner. DIS has evaluated Sterilex Ultra and rated it acceptable for use in federal dental clinics. Information on other waterline disinfectants DIS has evaluated can be found by visiting www.brooks.af.mil/dis/infrc.htm#wdis.

SURFACE CONTAMINATION IN THE DENTAL OPERATORY

Surface contamination in the dental operator: a comparison over two decades. Williams HN, Singh R, Romberg E. *J Am Dent Assoc* 2003;134:325-330.

This study compared surface bacterial contamination levels in a large teaching clinic in 1998 with that of a 1976 study in the same clinic to determine if renovation and more stringent infection control practices have made a difference. The authors obtained samples from light-handle covers, jacket cuffs, sinks and floors in the morning and afternoon. The bacterial counts were compared with those from the 1976 study. In both the 1976 and 1998 studies, mean bacterial counts were higher at the end of the day than in the morning; however the differences were only significant in the 1976 study. **Improvements in clinic design and equipment, as well as infection-control procedures and practices resulted in a lower level of surface bacterial contamination in 1998 than in 1976 in this large teaching clinic.**

DIS Comment: This study reinforces the importance of surface cleaning and disinfection in the dental operatory. Attention to clinic and equipment design is also a contributing factor in reducing environmental contamination. Using barriers, particularly on difficult to clean and disinfect surfaces, is an excellent option vs. surface cleaning/disinfection. The study used microbial sampling to compare contamination levels. However the Centers for Disease Control and Prevention does not recommend routine microbial monitoring of environmental surfaces except for the purposes of research and epidemiologic investigations.

CARING FOR PATIENTS WITH BLOODBORNE DISEASES

Managing the care of patients infected with bloodborne diseases. DePaola LG. J Am Dent Assoc 2003;134:350-358.

This article presents background information on bloodborne pathogens frequently encountered in dental practice: human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV). When treating a patient infected with a bloodborne disease, the clinician should take a thorough medical history, make a record of medications the patient is taking and assess the patient's immunologic and hepatic function to provide safe and efficacious dental care. **Compliance with recommended infection control practices is an important component of dental practice, but must be accompanied by an understanding of infectious and bloodborne diseases and the medical/dental management of the care of infected dental patients.**

DIS Comment: Dental health-care personnel should comply with current Centers for Disease Control and Prevention and American Dental Association infection control recommendations with every patient, regardless of the presence or absence of bloodborne disease. This article is an excellent review of HIV, HBV and HCV infection, as well as the medical and dental treatment considerations necessary when caring for patients infected with these diseases.

PORTABLE DENTISTRY AND INFECTION CONTROL FOR NONTRADITIONAL SETTINGS

Portable dentistry in an austere environment. Meyer RD, Eikenberg, S. Gen Dent 2002;50:416-419.

The availability and versatility of portable dental equipment make possible the delivery of dental treatment in a wide variety of nontraditional settings. There is an ever-increasing demand for portable dental equipment that is lightweight, dependable, highly transportable, and easy to use and maintain. The level of dental services to be rendered, transportation limitations, and the environment in which dentistry will be delivered determine the type of equipment and supply requirements necessary to support a portable dental mission. A battery-operated electric-motor handpiece, light source, and sterilization capabilities are recommended by the authors as the minimal equipment requirements. The dental team must make a reasonable attempt to follow infection control recommendations. In addition to the required personal protective equipment, plans must be made to sterilize dental instruments and disinfect surfaces, as well as disposing of medical waste. Several resources on portable dental equipment and supplies for dental missions in nontraditional settings include the Christian Dental Society (www.christiandental.org) and World Dental Relief (www.dentalrelief.com).

DIS Comment: This article is an excellent resource for anyone providing dental treatment in a nontraditional setting. In addition to discussing portable equipment, the authors address infection control issues. Sterilization of dental instruments/equipment is always a concern in these situations. The authors recommend using a four-quart stainless-steel pressure cooker fitted with a 30 pounds per square inch (psi) pop-up valve as a simple and dependable portable autoclave. Sterilization is accomplished via the superheated steam under pressure. The authors recommend placing six to eight ounces of water in the pressure pot and heating the pot so that the internal pressure remains at 30 psi for 10 minutes. If there is no generated power, a gas flame, propane torch, camp stove, or open fire will suffice.

DOES THE SMEAR LAYER GET IN THE WAY?

Effect of smear layer thickness on bond strength mediated by three all-in-one self-etching priming adhesives. Chihiro C, Finger WJ. Oper Dent 2002;4:283-289.

The latest development in adhesive dentistry has been the introduction of dentin bonding products that consist of one solution. These products accomplish all three functions of previous three-step bonding agents, but do so with only one solution. Unlike total-etch bonding agents where the acid etchant is applied separately to the smear layer-covered dentin and then rinsed off, the one-solution products are applied to smear layer-covered tooth structure and not rinsed off. Because of this, researchers have wondered about the effect of the smear layer on the resulting bond. This study evaluated the effect of dentin smear layer thickness on the bond strength of three all-in-one bonding products having different acidity levels. Extracted human teeth were ground to expose a flat dentin surface and then ground with one of various grits of silicon carbide paper (80, 180, 240, 320, 400, 600, 4000) or cut with a diamond bur of one of five degrees of coarseness (super coarse, coarse, medium, fine, extrafine layer). The thicknesses of the resulting smear layers were measured for each of the preparation conditions. For each of the seven grits of silicon carbide paper, mean shear bond strengths were determined for the following three bondings agents: AC Bond, (ph=2.1, an experimental product from Heraeus Kulzer); AQ Bond (ph=2.5, Sun Medical); and Prompt L-Pop, (ph=1.1, 3M ESPE). The modes of failure were also recorded. Results found that the smear layer thickness varied according to grit of the paper or diamond bur. The coarser the paper or bur, the thicker the smear layer. The mean shear bond strengths of the adhesives did not significantly differ when analyzed according to grit size of paper. Overall, the mean bond strength of the experimental product AC Bond was significantly great than those of the other two bonding products. **The authors concluded that the thickness of the smear layer did not significantly affect the mean bond strengths of the all-in-one bonding products.**

DIS Comment: All-in-one bonding products such as Prompt L-Pop, Touch & Bond, and One-Up Bond F have become popular in clinical dentistry because of they are simple to apply and potentially reduce post-treatment sensitivity. Although they consist of only one solution, they produce bonding in the same way that traditional three-step products do: they demineralize the superficial dentin and then infiltrate it with polymerizable monomers to produce the hybrid layer. Some clinicians have questioned the effectiveness of these products because they must penetrate the smear layer before they etch and infiltrate the demineralized dentin. This study evaluated the effectiveness of all-in-one products in bonding to dentin covered with various thicknesses of smear layers. They also examined the effect of the acidity of the product on bond strength. The tested hypotheses were that neither the smear layer thickness nor the product's acidity would affect the bond strength. The results indicated that neither the smear layer thickness nor the acidity of the bonding agents influenced their ability to produce an adequately strong bond. In other words, neither the smear layer thickness nor the product's acidity level adversely affected its ability to solubilize the smear layer, demineralize the underlying dentin, and infiltrate it adequately with resin. This should be reassuring to those who questioned the potentially negative effect of applying these self-etching, all-in-one products to smear layer-covered dentin.

GENERAL DENTISTRY

68-10 ImageMax

(Project 01-28)

The ImageMax is a portable, self-contained automatic processor specifically designed to follow the x-ray film developing guidelines from Eastman Kodak Corporation. Unlike conventional film processors, the ImageMax is uniquely designed in that the x-ray film remains stationary. Films are secured in specially designed holders while solutions are brought to them through custom-engineered valves using a combination of air pressure and vacuum. The ImageMax lacks rollers, gears, and belts commonly encountered with conventional processors and purportedly reduces maintenance requirements and film loss. The developer, fixer, and water are contained in their own sealed, one-quart tank compartments that eliminate external plumbing requirements, and purportedly eliminates chemical odors and spills. An internal microprocessor automatically adjusts the developing process based on film type, developer temperature and chemistry age, while a front-panel LCD display annotates the status of the development cycle. The ImageMax is 18 W x 21 H x 15 D, weighs 49 pounds empty, and requires 115-volt AC current with a rating of 8 amperes. It will process films in a room temperature range of 60 to 85 degrees Fahrenheit and an optional, 28-pound daylight loader (21 W x 24 H x 21 D) eliminates the need for a darkroom. Additional accessories available for separate purchase include concentrated solutions with longer shelf life, staging boxes for film, and film holders. The ImageMax has a five-year limited warranty.

Manufacturer:

Dental X-ray Support Systems
11616 E. Montgomery Suite 35
Spokane, WA 99206
(888) 230-9500
(509) 242-1011
(509) 242-1012 FAX
www.dxss.com

Suggested Retail Price:

\$3450.00 ImageMax Automatic X-ray Film Processor, includes:

- AC Power Cord
- DXSS WaterFlo
- Long handled cleaning brush
- Film Holders:
 - 3 size # 2
 - 1 size # 1
 - 1 size # 0
- Film holder Light-Tight staging box
- Film Light-Tight staging jar
- Two color-coded drain lines with quick connect fitting
 - Red-developer & water
 - Blue-fixer
- Owners manual
- Laminated quick reference wall chart
- Four 8-oz bottles DXSS developer concentrate
- Four 8-oz bottles DXSS fixer concentrate
- 2-quart plastic pitcher with flexible spout

Accessories:

\$595.00--Image Max Daylight Loader
 \$80.00----Case of Developer & Fixer Concentrate (makes 32 quarts of solution)
 \$56.00----Intra Oral Film Holder Light Tight Staging Box
 \$8.00-----Film Holder size # 0
 \$8.00-----Film Holder size # 1
 \$8.00-----Film Holder size # 2
 \$8.00-----Film Holder size # 3
 \$8.00-----Film Holder size # 4
 \$9.00----Owners Manual
 \$7.00----DXSS WaterFlo
 \$9.00----2-Quart Plastic Pitcher
 \$4.00----Quick Reference Wall Chart
 \$4.00----Intra Oral Light-Tight Staging Jar
 \$9.00----2 Drain Lines
 \$4.00----Long Handled Brush

Government Price:

\$2650.00 ImageMax Automatic X-ray Film Processor (includes individual components as listed above)
 \$450.00 ImageMax Daylight Loader
 Accessories same price as listed above

ADVANTAGES:

- + Self-contained automatic radiographic film processor that requires only a power source.
- + Consistently produced high-quality radiographs.
- + Well designed and constructed of high-quality materials.
- + Eliminates radiographic film artifacts due to rollerless design.
- + Designed specifically for processing Kodak fast-speed E and F films.
- + Instruction manual is well written and easy to understand.
- + Includes an informative, quick-reference laminated wall chart.
- + Is easy to set up, operate, and maintain.
- + Compact and portable, an excellent choice for small or remote clinics.
- + Optional daylight loader negates the need for a darkroom.
- + Operates at an ambient temperature range that negates need for warm-up time.
- + Contains solution temperature change mechanisms to allow for faster processing times.
- + Internal microprocessor automatically adjusts processing time due to changes in the solutions - informs user of developing-cycle status and identifies any needed maintenance.
- + Data port connection allows downloading of updated software from DXSS website if processing parameters change.
- + Can process up to 24 intraoral films simultaneously using specially designed film holders that are easily loaded into central-processing tank.
- + Can accommodate extraoral film up to 5 x12 cm as well as standard panoramic and cephalometric films.
- + Light-Tight staging containers are available to help reduce problems caused by non-continuous feed function.
- + Unit has quiet operation and annotates end of processing cycle by beeping.
- + Can be used with either pre-mixed or concentrated processing solutions.
- + Eight-ounce proprietary concentrated solutions are space and usage efficient compared to one-gallon premixed solutions.
- + Sealed-solution containers eliminate fumes and spills.
- + Electronic mechanism easily drains used solutions.
- + Simpler maintenance requirements compared to conventional automatic processors.
- + Does not require use of a cleaning film.
- + Virtually impossible for film to be lost during processing.
- + Automatically shuts off after two hours of non-use.
- + MSDS provided with each purchase of new solutions.

- + Less expensive than conventional automatic-film processors.
- + Has a five-year limited warranty.

DISADVANTAGES:

- Reliability uncertain--processing tank required two separate repairs during initial operation.
- Lack of continuous feed capability will hamper ability to process large number of radiographs quickly.
- Cannot simultaneously process different-sized films.
- Endodontic processing feature very cumbersome and time-intensive.
- Processing time increases with each use as solutions age.
- No automatic solution replenishment - requires more frequent solution change as compared to traditional automatic-film processors.
- Although less time intensive, does require more frequent maintenance than conventional automatic-film processors.

SUMMARY AND CONCLUSION:

The ImageMax Automatic X-ray Film Processor features an innovative new concept in dental x-ray processing. Instead of a conventional roller-based, continuous-feed mechanism, radiographs remain stationary in a central-processing tank where they undergo a five-step processing procedure. All solutions are delivered to the film with processing controlled by an on-board microprocessor. The unit was found to be well constructed and consistently produced high-quality radiographs without the artifacts produced by roller-based processors. Self-contained, the ImageMax requires only an electrical source to operate. Maintenance requirements are less time intensive as compared to conventional automatic-film processors, but due to the lack of an automatic-replenishment system, more frequent maintenance is required. Drawbacks include the inability to process a large number of radiographs quickly and the need to separately process different-sized films. In addition, the endodontic film-processing feature was found to be cumbersome and time-intensive to use. The ImageMax may be best indicated for low-volume clinical situations while its lightweight, self-contained features may also make it a viable option for remote satellite locations and/or field conditions. The ImageMax is a well engineered, unique radiographic processor that may function well as an adjunct to an existing automatic processor. The **ImageMax** is rated **Acceptable** for use by the federal dental services.

(TSgt Sutter)

68-11 UltraLume LED2

(Project 02-34)

UltraLume LED2 features two, second-generation light-emitting diodes (LEDs) and a unique, large, oval (10 x 13 mm) curing footprint which may save time by illuminating the entire occlusal or facial surface. The curing light produces high-intensity light ($> 460 \text{ mW/cm}^2$) in the visible spectrum ranging from 410 to 490 nanometers (nm). The peak (453 nm) and base wavelengths are shorter than that of all other LEDs (468 nm). Shifting the spectral output to the left, the company claims, not only activates more of the camphoroquinone range, but also engages a substantial amount of other proprietary photo-initiator ranges as well. The unit has a hand-held wand and multi-voltage power supply connected by a cord. The wand, designed to rest in a dental-instrument console or in a bracket provided with the kit, is 7.5 long, $\frac{3}{4}$ wide and weighs only 11 ounces. The power supply is adaptable for power outlets from 100 to 240 volts and is CSA certified. The light comes with 20 clear, snap-on lenses that must be used to focus the light into one oval-shaped footprint. The UltraLume LED2 also features minimal heat generation, adjustable audio timer controls, and colored lenses for transillumination.

Manufacturer:

Ultradent Products, Inc
505 West 10200 South
South Jordan, UT 84095
(800) 552-5512

(800) 842-9024 FAX
www.ultradent.com

Suggested Retail Price:

\$1299.00 UltraLume LED2 with a 7.5-foot-long cord and adapter, 20 clear lenses, 4 transluminator lenses.

Government Price

\$1100.00 UltraLume LED2 (contents as listed above).

ADVANTAGES:

- + Lightweight, slim design.
- + High irradiance value for an LED unit.
- + Adequately cures 2-mm increment of microfill composite in less than 40 seconds.
- + Easy intraoral access.
- + Minimal heat emitted from light source.
- + Quiet no fan noise.
- + Internal voltage regulator.
- + Audible time indicator has adjustable volume and interval settings.
- + Ergonomically-placed timer controls.
- + Easily cleaned or barrier protected.
- + CSA certified.
- + Is held like a handpiece.
- + Takes up less counter space than other similar units.
- + Fits in standard handpiece holder.

DISADVANTAGES:

- No light shield available.
- Does not feature a radiometer.
- Only one curing-tip size available (built-in).
- May not polymerize all photo-initiated dental materials.
- Not easy to sense if button controls were pushed.
- Length of cord makes it susceptible to damage.

SUMMARY AND CONCLUSIONS:

The UltraLume LED2 is a well-designed, easy-to-use, lightweight, corded light-emitting diode (LED) curing light. Clinical evaluators appreciated the quiet, low-heat, easy-access handpiece design. Laboratory testing found it capable of adequately polymerizing a 2-mm increment of microfill or hybrid resin composites in less than 40 seconds, making the UltraLume LED2 one of the more powerful LED units evaluated by DIS. However, the curing light may not polymerize all photo-initiated dental materials due to the narrowness of its emission spectrum. The light comes without a protective eye shield and a built-in radiometer. All clinical evaluators rated the UltraLume LED2 as either Excellent or Good. **The UltraLume 2 LED-Powered Curing Light is rated Acceptable** for use by the federal dental services.

(Col Vandewalle)

Update: In March 2003, Ultradent Products announced the introduction of UltraLume LED5, an upgraded version of UltraLume LED2. More information is posted in our What's New section of this newsletter.

68-12 RelyX Unicem

(Project 02-33)

3M ESPE has developed a new self-adhesive universal resin cement, RelyX Unicem. The cement is formulated to be self-adherent - eliminating the potential need for a separate etching, priming or bonding

step and purportedly reducing patient sensitivity. The dual-curing cement is dispensed from convenient unit-dose capsules with excess product claimed to be easy to remove clinically. Completely new monomer, filler and initiator technologies were reportedly created. Unicem contains phosphorated methacrylates, which the company claims can generate self-adhesion. Unicem monomers contain at least two phosphoric acid groups and a minimum of two double-bonded carbon units per molecule, providing potentially high reactivity and cross-linking. The acidic monomers are reportedly neutralized with alkaline-filler molecules rather than soluble-fluoride salts leading to a purported pH increase and fluoride-ion release. The percentage of inorganic fillers is said to be approximately 72% by weight while the particle size is less than 9.5 microns. The setting reaction involves basic radical polymerization with either visible-light or oxidation-reduction self-cure mechanisms. Combining the advantages of both conventional-luting cements and resin cements, the company reports excellent adhesion, physical strengths, low linear expansion and superior marginal integrity. The cement is designed for all types of porcelain, composite, metal and metal-ceramic restorations and is available in five shades.

Manufacturer:

3M Dental Products Division
3M Center, Bldg 275-2SE-03
St. Paul, MN 55144-1000
(800) 237-1650
(612) 733-8524
(800) 888-3132 FAX
www.3MESPE.com

Suggested Retail Price:

\$99.00 RelyX Unicem Universal Resin Cement Trial Pack item number 56829 contains:

- 20 Applicap capsules assorted:
 - 10 of A2 Universal
 - 5 of Translucent
 - 5 of A3 Opaque
- Activator/Applier

Government Price

\$62.40 (item number and contents as listed above)

ADVANTAGES:

- + No bonding agent is necessary.
- + Cement is very easy to mix.
- + Working time is long enough to allow users to mix and use the cement without hurrying.
- + Setting time is appropriate.
- + Easy to clean excess cement from margins.
- + No post-treatment sensitivity reported during clinical-user evaluation.
- + Price is comparable to other resin cements.
- + Expiration dates and lot numbers are provided on individual foil pouches.
- + Well-done graphics instruction cards.
- + Recommended storage conditions are listed on box.
- + Highest degree of radiopacity of tested cements.

DISADVANTAGES:

- Kit does not contain all components (e.g., ceramic primer, try-in pastes) necessary for cementation of all-ceramic restorations.
- Material Safety Data Sheet (MSDS) not included in kit.
- Only one viscosity.

- Relatively low bond strength to dentin.
- No long-term clinical data.

SUMMARY AND CONCLUSIONS:

Rely X Unicem performed well in the laboratory and was well liked by clinical evaluators. It had an acceptable film thickness, appropriate working and setting times, and was adequately radiopaque. Clinical evaluators found it easy to mix and clean-up from marginal areas. Unicem comes with well-illustrated instruction cards that the evaluators appreciated and found useful. The most highly rated characteristic of this product is the fact that it was easy to mix and place with no separate bonding steps typically found with resin cements. However, the kit lacks necessary components for the cementation of all-ceramic restorations. **RelyX Unicem** self-adhesive universal resin cement is rated **Acceptable** for use by the federal dental services.

(Col Vandewalle)

68-13 Transport Military Dental System

(Project 02-22)

The Transport MDS is described as a state-of-the-art mobile dental system utilizing the latest-available technology to meet the demanding needs of the military dentist in an operational environment. The system is designed to provide the capability to support a wide variety of dental procedures, ranging from oral prophylaxis, and restorative procedures to surgery. The Transport MDS handpiece is based on a brushless, sealed electric motor that is available with or without fiberoptics. The speed of the handpiece is determined by the choice of the appropriate attachment and electrical settings. The Transport MDS also contains an air/water supply, piezo ultrasonic scaler, air/water syringe, high-volume evacuator (HVE), saliva ejector, and variable-speed foot switch.

The Transport MDS is advertised as being lightweight and totally self-contained. It includes an oil-less compressor that supplies pressurized air for the water and air subsystems with a self-contained water supply that provides for handpiece coolant spray and oral irrigation. In addition, the dental suction system has waste reservoirs for the collection of liquids and solids from the vacuum supply subsystem. The Transport MDS supports all E-type handpieces. The entire system is self-contained within a hard-shell, hinged container with a handle that allows the unit to be carried in the same manner as a suitcase. The Transport MDS can be quickly assembled and disassembled and packs into one molded, military-specification shipping container for safe transport and storage.

Components and features of the system include:

- 3-way autoclavable syringe
- Autoclavable 30,000 rpm motor
- High & low volume evacuation
- Self-contained water supply
- Self-contained air compressor.
- Variable-speed foot control
- High impact case with wheels
- Four power ratio settings: 5:1, 1:1, 1:4, 1:16
- Piezo ultrasonic scaler
- Power inverter with NATO connector for operation with 24-volt, military vehicle electrical system
- Compatible with either 110 or 220V power sources

The Transport MDS unit weights 46.5 pounds with closed dimensions of 10.5 H x 14.5 W x 24 D, and occupies a volume of 1.81 ft³. Along with the power inverter packed in the MILSPEC shipping case, the entire Transport MDS system weighs 83.6 pounds and occupies 4.25 ft³.

Manufacturer:

Aseptico International
P.O. Box 1548
Woodinville WA 98072-1548
(800) 426-5913
(425) 487-3157
(360) 668-8722 FAX
www.aseptico.com

Retail Price: The Transport MDS presently is not marketed for civilian sale.

Government Price: \$8100.00

ADVANTAGES:

- + Easy to set up and operate.
- + Unit functioned reliably during the evaluation.
- + Unit allows clinicians to provide adequate dental care under field conditions.
- + Small and lightweight.
- + Dental unit itself can be transported within government-issue, large internal frame field pack.
- + Unit designed similar to a suitcase for easy transport outside of shipping/storage container.
- + All clinical evaluators indicated that they are comfortable enough to deploy with the unit.
- + Electrical system meets all safety requirements.
- + Comes standard with NATO-compatible electrical inverter.
- + Electrical inverter provides adequate function from compatible military vehicles.
- + Brushless electrical handpiece motor can be autoclaved.
- + Vacuum system meets MPID and DIS functional requirements.
- + Does not require external compressed air storage.
- + Compressed air system functioned well.
- + Self-contained water system is easy to set up, use, and maintain.
- + Vacuum system is easy to set up, use, and clean.
- + Vacuum waste container is autoclavable.
- + Instructions are complete and easy to understand.
- + Instruction manual contains helpful schematic diagrams and illustrations.
- + Shipping/storage case meets MILSPEC requirements.
- + Less expensive than the DEFTOS.
- + National Stock Number allocation in process for Defense Service Center Philadelphia (DSCP) electronic catalog purchases.

DISADVANTAGES:

- Electric handpiece may require learning curve for some users.
- Fused-based electrical system.
- Self-contained water system reservoir needs to be of a larger volume.

SUMMARY AND CONCLUSION:

The Transport MDS is a self-contained field dental unit marketed for the military operational environment. The unit is compact, lightweight, easy to assemble, and meets all electrical safety requirements. It functioned well and enables dentists to provide adequate dental care in the field environment. The unit's vacuum system met all MPID and DIS functional requirements, a problem that plagued earlier air turbine-based mobile dental units previously evaluated by DIS. Clinical evaluators thought the electric handpieces functioned well, although they required a short learning curve for clinicians who are accustomed to air-turbine handpieces. Although some problems were noted concerning the size of the self-contained water reservoir, the clinical users expressed overall satisfaction with the unit and said they would feel very

comfortable using it during deployments. The Transport MDS is less expensive than other the electric-handpiece based dental unit evaluated by DIS. The **Transport MDS** is rated **Recommended** for use by the federal dental services.

(Col (sel) Roberts)

68-14 Twist2it

(Project 02-19)

The Twist2it is a unique disposable prophylaxis angle (DPA). Unlike other DPAs that rotate a full 360 degrees, the Twist2it DPA oscillates in a reciprocating arc of 90 degrees (1/4 turn). The reciprocation motion requires the Twist2it DPA to be in constant contact with the tooth surface, in contrast to the on-and-off dabbing technique required with rotary DPAs. The manufacturer purports that debris spatter commonly associated with rotary DPAs is virtually eliminated. Furthermore, the Twist2it is advertised as producing less heat while causing less gingival irritation.

Manufacturer:

Twist2it, Inc.
39-23 62nd Street
Woodside, NY 11377
(877) 776-7497
(718) 672-4234
(718) 396-4500 FAX
www.Twist2it.com

Suggested Retail Price:

\$49.95 Firm Cup (item no. TWHC002) or Soft Cup (item no. TWSC001) contains:
- 100 Twist2it DPA

Government Price:

Same as retail

ADVANTAGES:

- + Functioned flawlessly during clinical evaluation.
- + Highly accepted by patients with minimal reports of sensitivity during use.
- + Produces significantly less spatter than rotary DPAs.
- + Produces less gingival irritation and heat than rotary DPAs.
- + Quieter during clinical use than rotary DPAs.

DISADVANTAGES:

- Reported by clinical users to be less efficient than rotary DPA in removing stain.
- DPA head slightly larger in size than those of rotary DPAs.
- More expensive than rotary DPAs.
- Minor clinician learning curve.

SUMMARY AND CONCLUSIONS:

The Twist2it is a disposable prophylaxis angle that functions on a 90° reciprocal-action arc compared to full-rotary action of traditional prophylaxis angles. It requires a different clinical application technique, because the Twist2it is designed for constant contact with the tooth for maximum effectiveness. The Twist2it met all pertinent requirements of draft ANSI/ADA Specification No. 85. Clinical evaluators greatly appreciated its function, reporting that the Twist2it virtually eliminated spatter and produced less gingival irritation. Twist2it is more expensive than rotary DPAs and less effective on stain removal. Clinical users were very

impressed with the overall function of the Twist2it. All of the evaluators recommended that it replace the current disposable prophylaxis angle in use in their clinics. **The Twist2it** is rated **Recommended** for use by the federal dental services.

(SMSgt (sel) Belde & Mr. Joe Laforge)

68-15 Filtek Supreme Universal Restorative Material

(Project 02-33)

Filtek Supreme is a new resin composite by 3M ESPE with unique nanofiller technology. Formulated with nanomer and nanocluster filler particles, the composite is purported to combine the strength of a hybrid and the polish of a microfil. Nanomers are discrete nonagglomerated particles of 20-75 nm in size. Nanoclusters are loosely bound agglomerates of nano-sized particles. The agglomerates act as a single unit, the company claims, enabling high filler loading and high strength. Most shades contain a combination of non-agglomerated 20 nm nanosilica filler and aggregated zirconia/silica nanocluster (primarily 5-20nm) filler. The cluster particle size range is 0.6 to 1.4 microns. The filler loading is 79% by weight. The combination of nanomer-sized particles and the nanocluster formulations reduces the interstitial spacing of the filler particles. This reportedly provides increased filler loading, better physical properties and improved polish retention when compared to composites containing only nanoclusters. The resin monomer system is the same as found in Filtek Z250 with BisGMA, BisEMA6, UDMA and small amounts of TEGDMA.

The composite is available in 30 different shades in 4 opacities (dentinal, body, enamel and translucent) and is purportedly suitable for anterior and posterior restorations, core build-ups, splinting, and indirect restorations, including inlays, onlays and veneers. A shade selection wheel is provided for more complex restorations and serves as a guide for placing anywhere from one to four layers of composite.

Manufacturer:

3M Dental Products Division
3M Health Care
3M Center, Bldg 275-2SE-03
St. Paul, MN 55144-1000
(800) 237-1650
(612) 733-8524
(800) 888-3132 FAX
www.3MESPE.com

Suggested Retail Price:

\$291.65 Filtek Supreme Professional Kit, (item no. 3911P) contains:
-one hundred 0.20-g capsules, 10 each of shades A2B, A2D, A2E, B2B, B3E, C3B, B1E, WB, WE, A3B
-one 4-g syringe each of shades GT, YT
-one Shade Selector Wheel

Government Price:

\$183.80 Filtek Supreme Professional Kit (item number and contents as listed above)

ADVANTAGES:

- + Handles well; easy to place and manipulate from unit-dose capsules.
- + Excellent mechanical properties.
- + Body, enamel and translucent shades require only 20 seconds for adequate curing.
- + High degree of radiopacity; can easily be distinguished from enamel on radiographs.

- + Surface roughness after polishing is similar to popular microfills.
- + Instructions are supplemented with high-quality, graphics-containing technique cards.
- + Provided with innovative shade-selection wheel.
- + Lot number and expiration date are printed on individual capsules.

DISADVANTAGES:

- Most expensive resin composite evaluated by DIS to date.
- No shade guide.
- 30 shades available, but only 12 provided in Professional Kit.
- Kit is overly large with wasted space and is difficult to close.
- Kit does not come with dentin bonding agent.
- Material Safety Data Sheet (MSDS) is not provided with the product.

SUMMARY AND CONCLUSIONS:

Overall, Filtek Supreme did well in clinical-user testing. Its polishability, esthetics, and shade matching were rated highly by users. Even though it is nanofill, its mechanical properties and radiopacity were comparable to those of traditional hybrid resin composites and its polishability was similar to microfills. However, Filtek Supreme is the most expensive resin composite yet evaluated by DIS. The packaging is bulky and does not include a dentin bonding agent, shade guide or Material Safety Data Sheet. **Filtek Supreme** is rated **Acceptable** for use by the federal dental services.

(Col Vandewalle)

68-16 Versa-Temp Temporary Crown and Bridge Resin

(Project 02-38)

Versa-Temp is a self-cured, bis-acryl resin composite from Sultan Chemists intended for fabricating provisional (i.e., temporary) restorations. It is available in a total of six shades (A1, A2, A3.5, B1, C2, and A0-Bleach) and is supplied in cartridge form for use in an automix dispenser gun. The manufacturer claims that the cartridges are clog-free and make it easy to mix and dispense the material. Smaller mixing tips provided with the resin are claimed to minimize waste. Sultan Chemists reports that restorations made with Versa-Temp are strong, hard, and esthetic. The Introductory Kit version of Versa-Temp evaluated by DIS contains only four of the six shades (A1, A2, A3.5, B1), however DIS provided clinical users with all six shades. Two other products were evaluated at the same time as Versa-Temp, although they are not included in the Introductory Kit. The first, TempArt LC Stain, is a 6-bottle collection of light-cured, externally-applied colorants used to characterize Versa-Temp (or other acrylic) provisional restorations. Also evaluated was GlossCote, a light-cured varnish used to impart a glossy surface to the restoration.

Manufacturer:

Sultan Chemists, Inc.
 85 West Forest Avenue
 Englewood, NJ 07631
 (800) 637-8582
 (201) 871-1232
 (201) 871-0321 FAX
 www.sultanchemists.com

Suggested Retail Price:

\$200.00 Versa-Temp Crown and Bridge Resin Introductory Kit (item number REF 72010) contains:
 -four 25-mL cartridges of Versa-Temp (shades A1, A2, A3.5, B1)
 -one Automix Dispenser
 -40 Mixing Tips

\$95.00 TempArt LC Stain Kit (item number REF 71087)

\$30.00 GlossCote Light-Cure Varnish Kit (item number REF 71090)

Government Price:

\$120.00 Versa-Temp Crown and Bridge Resin Introductory Kit (contents and item number as listed above)

\$57.00 TempArt LC Stain Kit (item number REF 71087)

\$18.00 GlossCote Light-Cure Varnish Kit (item number REF 71090)

ADVANTAGES:

- + Produces well-fitting, esthetic provisional restorations.
- + Working time is adequately long for mixing and placement.
- + Sets quickly, which reduces chair time.
- + Good range of shades available.
- + Uses small mixing tips which minimize waste.
- + Low incidence of restoration fracture reported during the evaluation.
- + Easy to repair voids and defective margins with flowable resin composite.
- + Laminated instruction card has nicely done graphics showing product use.
- + Lot number, expiration date, and recommended storage temperature range are stamped on each component in kit.
- + Very attractive price.
- + Exhibits little odor.
- + Comes with Material Safety Data Sheet (MSDS).

DISADVANTAGES:

- Compressive strength was 40% lower than the value claimed by the manufacturer.
- Insufficiently radiopaque on radiograph.
- Users found the packaging box larger than it needed to be.
- Instructions do not give light-curing time for TempArt and GlossCote.
- Requires special gun dispenser for the cartridges.

SUMMARY AND CONCLUSIONS:

Versa-Temp performed well in the laboratory and during clinical-user testing. Clinical provisionals were esthetic, easy to polish, and well-fitting. Users had sufficient time to work with the material before it began to set. They also appreciated its relatively rapid set because this minimized chair time. The shades provided to the evaluators were found to be adequate, and the automix gun dispenser made it easy to produce homogeneous mixes. The gun is specific to the VersaTemp cartridges, however it is included in the packaging version evaluated by DIS. The product has an extremely attractive price. Finally, the optional light-cured shade characterization tints (TempArt) and glaze (GlossCote) were found to be useful. **Versa-Temp Temporary Crown and Bridge Resin** is rated **Recommended** for use by the federal dental services.

(Col Charlton)

68-17 Command Air X-ray System II

(Project 02-23)

The Command Air X-ray System II is described as a technologically-advanced radiographic unit that is designed to support portable and field dental radiography procedures. The unit is advertised as being a high-frequency, full-wave-rectified X-ray unit with electronic timing control. The Command Air X-ray

System II is said to be compatible with all intraoral imaging and digital modalities. The manufacturer lists the following parameters:

Top-mounted, touchpad controls with LED digital readouts;
10 mA output at 60, 65, or 70 kV DC;
0.8-mm focal spot;
7.5-inch focus-to-cone tip;
A 99-step exposure timer with a range of 0.02 to 1.98 seconds;70-kHz inverter frequency;
Compatible with 110-130 and 210-230 volts AC at either 50 or 60 Hz;
Two-stage deadman exposure switch with phone jack connection; and
Underwriters Laboratory (UL) Certified.

The Command Air X-ray System II includes a leaded, clear backscatter shield for hand-held operation. The system includes a tripod (ARU-01S) that has a 57.5-inch maximum center post height and includes a vinyl storage/carrying case. The X-ray unit is 6 H x 8.25 W x 10.75 L (including dental cone) and weighs 9.25 pounds. Stored in the MILSPEC shipping/storage container, the entire assembly is 15.5 H x 19 W x 19 L and weighs 31 pounds.

Manufacturer:

MinXray, Inc.
3611 Commercial Avenue
Northbrook, IL 60062-1822
(800) 221-2245
(847) 564-0323
(847) 564-9040 FAX
www.minxray.com

Marketed by:

Aseptico International
P.O. Box 1548
Woodinville, WA 98072-1548
(800) 426-5913
(425) 487-3157
(360) 668-8722 FAX
www.aseptico.com

Retail Price: The Command Air X-ray System II is currently not offered for the civilian market

Government Price:

\$12,100 Command Air X-ray System II (ARU-HF70D)
Contains: X-ray tubehead and control
Mounting handle
Dental cone
Scatter shield
Exposure cord
MILSPEC carrying case
Tripod (ARU-01S) with vinyl carrying case
Operating manual

ADVANTAGES:

- + Easy to set up with intuitive operation.
- + Unit functioned reliably during an actual deployment mission.

- + Unit allows clinicians to provide adequate radiographs in field conditions.
- + Is small and lightweight.
- + Electrical system meets all safety requirements.
- + Dead man safety exposure switch design.
- + Instructions are complete and are easy to understand.
- + Instruction manual contains helpful schematic diagrams and illustrations.
- + Shipping/storage case meets MILSPEC requirements.
- + Has National Stock Number (NSN) allocation for Defense Service Center Philadelphia (DSCP) electronic catalog purchase.

DISADVANTAGES:

- Fused-based electrical system.
- Tripod does not allow positioning for all anatomic locations.
- Tripod crank adjustment is too slow.
- More expensive than another field X-ray unit evaluated by DIS.

SUMMARY AND CONCLUSION:

The Command Air X-ray System II is a dental radiographic unit marketed to meet mobile/remote dental needs and is also designed for the military operational environment. The unit is compact, lightweight, easy to assemble, and met all electrical safety requirements. It provided reliable function while deployed in the military operational environment and consistently enabled a dental officer to provide dental radiographs of acceptable quality. The clinical user was clearly impressed with the simple set up and intuitive, easy operation of the unit. The tripod adjustment mechanism was reported to be slow during operation and the tripod mount did not allow tube head positioning to meet all radiographic anatomical requirements. The evaluator described the X-ray unit as a good choice for the military operational environment. The **Command Air X-ray System II** is rated **Acceptable** for use by the federal dental services.

(Col (sel) Roberts)

68-18 Venus Color Adaptive Matrix Restorative

(Project 02-36)

Venus is a new microhybrid resin composite by Heraeus Kulzer. The Bis-GMA based resin contains fillers consisting of barium aluminum boron fluoride silica glass and highly dispersed silicon dioxide. The barium glass fillers average 0.7 microns characterized by a very narrow particle size distribution. The colloidal silica ranges from 0.01 to 0.04 microns. The overall filler content is 78% by weight and 61% by volume. Venus is built around 23 shades in three opacities. The Venus 2-Layer shade guide is made up of original Venus composite resin and is hand-layered in the same manner as is done clinically. The superficial layer is the semi-translucent enamel shade and the deeper layer is the opacious dentin shade. Its viscosity has been increased substantially, the company claims, to make the material more sculptable, nonslumping, and nonsticky. An illustrated technique guidebook covers all major indications plus the art of layering, avoiding postoperative sensitivity, and optimizing interproximal contacts. Venus is indicated for all classes of cavity preparations as well as indirect restorations, core build-ups, and veneering.

Manufacturer:

Heraeus Kulzer, Inc.
 99 Business Park Drive
 Armonk, NY 10504
 (800) 431-1785
 (914) 273-8600
 www.Heraeus-Kulzer-US.com

Suggested Retail Price:

\$735.00 Venus Master s Kit (item no. 66007955) contains:
-23 Venus shades
-5 Durafill shades
-2 Effect Color shades
-Gluma Etch 20
-Gluma Bond
-2-Layer shade system

Government Price:

\$430.02 Venus Master s Kits (item number and contents as listed above)

ADVANTAGES:

- + Handles well; easy to place and manipulate from unit-dose capsules.
- + Very complete Master s Kit with bonding agent, 2 surface effect stains, 5 microfill and 23 hybrid shades in 3 opacities.
- + Well-designed packaging holds product securely..
- + Lot number and shade are printed on individual capsules.
- + High degree of radiopacity; can easily be distinguished from tooth structure on radiographs.
- + Enamel and translucent shades require only 20 seconds for adequate curing.
- + Instructions are provided in a high-quality, graphics-containing booklet.
- + Innovative 2-layer shade guide made of actual composite.
- + Refills are moderately priced.
- + Users rated the product highly for polishability and overall esthetics.
- + Does not slump after placement.
- + Surface roughness after polishing was similar to tested microfills.

DISADVANTAGES:

- Master s Kit is expensive.
- Diametral tensile strength is among the lowest of hybrids tested.
- Dispensing gun did not hold capsules securely.
- Expiration date not printed on individual capsules.
- Some sticking to instruments noted on placement.
- Material Safety Data Sheet (MSDS) is not provided with kit.
- Four shades (out of a possible 27) not provided in the Master s Kit.
- Large storage box.

SUMMARY AND CONCLUSIONS:

Overall, Venus did well in clinical-user testing. Its polishability, esthetics, and shade matching were rated highly by users. Its mechanical properties and radiopacity were comparable to some popular hybrid resin composites and its immediate polishability was similar to tested microfills. The Master s Kit comes complete with bonding agent, surface effect stains and microfill composites. DIS recommends Venus for multi-opacity esthetic restorations and it may be especially useful in general dentistry residency programs. The initial kit is very expensive to purchase, but refills are moderately priced. **Venus** is rated **Acceptable** for use by the federal dental services.

(Col Vandewalle)

LABORATORY

68-19 BL-1A Bench Lathe

(Project 02-26)

The BL-1A is a compact, multi-purpose bench lathe for grinding, buffing, and polishing both metal and acrylic dental materials. Reported features of the BL-1A include a 1/6 horsepower motor with a 5/16 shaft, permanently lubricated ball bearings, and a sealed dust-proof motor housing. The unit's motor is attached to a 6 x 5 cast iron base with four holes for mounting to the benchtop. The base is equipped with a lighted power on/off indicator and variable-speed dial, which controls the motor from 1800 to 7000 rpm. The bench lathe purportedly can be used with 1 to 4 diameter buffing wheels and accommodates grinding wheels up to 2 in diameter. The BL-1A accessories include TM5 (left hand) & TM6 (right hand) tapered spindle mandrels, WM-5 (right hand) wheel mandrel, CHA-5 (right hand) collet holder with 1/4 and 3/32 collets, screwdriver, allen wrench and collet wrench. The bench lathe has a 6 power cord, weighs 7 1/2 pounds, and is available in 110 or 220 voltages.

Manufacturer:

The Foredom Electric Company
16 Stony Hill Road
Bethel, CT 06801
(203) 792-8622
(203) 796-7861 Fax
www.foredom.com

Suggested Retail Price:

\$219.00 - Bench Lathe (item # BL-1A)
Includes: TM5, TM6, and WM-6 mandrels
CHA-5 collet holder mandrel and collet wrenches

Government Price:

Same as retail

ADVANTAGES:

- + Functions reliably for most laboratory tasks.
- + Has variable speeds that polish metals and acrylics well.
- + Small and lightweight.
- + Motor brush replacement is easily accomplished.
- + Contains a comprehensive instruction manual.
- + Meets all electrical safety standards.

DISADVANTAGES:

- Necessary to secure to benchtop for optimum use.
- Absence of quick-release chuck requires the use of wrench for bur changes.

SUMMARY AND CONCLUSIONS:

The BL-1A Bench Lathe has advantages and disadvantages compared to traditional bench lathes. Clearly, its main advantages are its small size, lightness in weight, and variable speeds. It performed all grinding, buffing, and polishing tasks with the collet holder and mandrels provided. Evaluators found its 1/6

horsepower motor to provide sufficient power and the variable-speed feature to be very effective for polishing procedures. One disadvantage is that the lathe must be secured to the benchtop to prevent movement when performing tasks that demand heavier pressure. Therefore, its portability is an advantage only for tasks that require light-to-medium pressure. In addition, the lack of a quick-release chuck and the requirement for the lathe to come to a complete stop makes bur changing more time-consuming. In general, the BL-1A was found to be best suited for tasks that require few or no bur changes. For most effective use, the lathe should be secured to the benchtop. Five out of the six evaluators recommended its purchase. The **BL-1A Bench Lathe** is rated **Acceptable** for use by the federal dental services.

(MSgt Osborn)

68-20 Synopsis of Shade-Scanning Units

(Project 02-21)

Accurately selecting a shade is a critical step in the fabrication of any esthetic prosthodontic appliance. If an incorrect shade is chosen, the prosthesis must either be modified with colorants (i.e., stains) or remade. Current methods for selecting shades can be influenced by both objective and subjective variables that can greatly affect the quality of the final prosthesis. These variables include light source, surrounding environment, and the clinicians /technicians color perception. The light source and environment can easily be changed by using color-corrected lights and by using light, neutral background colors during shade selection. Human factors are more difficult to compensate for, as color perception differs due to age, eye fatigue, and neural color receptors in the eye. To at least partially offset these variables, excellent communication must exist between the dentist and laboratory technician.

Digital shade-scanning technology is now available that is designed to eliminate subjective factors from shade selection. These digital devices use either a spectrophotometer, colorimeter, or a digital camera to obtain information for respective shade-scanning systems. Most of these systems work by using a hand-held device to scan an image of the patients tooth and translate the information into either a tooth shade map or a shade recommendation. Digital shade-scanning technology has been used for years by automotive manufacturers and body shops as well as paint supply stores. This technology has only been recently introduced to the dental market.

Included in this synopsis are five digital shade-scanning systems currently on the market. Four of the five use a hand-held device to scan the patients tooth. The fifth system uses a digital picture taken with a camera. After the image is captured with a hand-held device or digital picture, shade information based on hue, value, and chroma is analyzed and then assigned to a current porcelain shade system. Depending on the shade-scanning system, this information is viewed either on the hand-held instrument, the systems base station, or on a computer. Most of the systems have the capability to upload the obtained shade information to a computer-based software program where the image can be viewed and manipulated. Digital shade information can be transmitted to the laboratory by using one or more of three methods: a printed shade analysis, e-mailed shade analysis, or shade analysis saved to a disk.

There are several factors to consider when choosing a shade-scanning system. The first consideration is expense. The systems have a starting cost between \$3000 and \$6000, and a considerable prosthodontic workload would be required to justify the cost. The second consideration is compatibility with your current porcelain system. Four of the five systems are compatible with a number of porcelain systems while the Vita Easyshade is only compatible with Vident products. The final consideration is the possible learning curve required before the user becomes competent with it.

The synopsis consists of two tables in PDF format that can be downloaded by clicking here. **Please be aware that information provided in these tables has been supplied from the manufacturers and has not been verified by DIS evaluation.** Each table provides pertinent information for the listed digital

shade-scanning systems and should assist in selecting a potential system that meets your needs. Please contact the appropriate manufacturer for additional information not included in the tables.

(MSgt Osborn)

68-21 IPS d.SIGN Porcelain System

(Project 00-47)

IPS d.SIGN is a new component-coordinated system for metal-ceramic restorations from Ivoclar North America, Inc. The ceramic component of IPS d.SIGN is a new, fluorapatite-leucite glass-ceramic that reportedly provides excellent esthetics with light transmission and dispersion similar to natural tooth structure. The esthetic qualities are purportedly enhanced by the IPS d.SIGN ceramic-particle structure that is designed to replicate the needle-like shape of natural hydroxyapatite crystals. The manufacturer states that a high degree of luminous reflectance and translucency can be obtained without the addition of the opaque layer, thus allowing almost true-to-nature fluorescence. Also, d.SIGN is said to offer wear characteristics similar to enamel. IPS d.SIGN porcelain is matched to six different Williams (also marketed by Ivoclar) alloys that include both high- and reduced-gold alloys, as well as palladium-based, palladium-silver, cobalt-chromium, and nickel-chromium alloys. These alloys are advertised as having coefficients of thermal expansion matched to the porcelain as well as being specially coordinated for optimal performance with the IPS d.SIGN system.

Manufacturer:

Ivoclar North America, Inc.
175 Pineview Drive
Amherst NY 14228
(800) 533-6825
(716) 691-0010
(716) 691-2285 FAX
www.ivoclarna.com

Suggested Retail Price:

\$978.00 IPS d.Sign Basic Kit (Item #558195EN)

- 8 Paste opaques (3gm)
- 8 Dentin shades (20gm)
- 4 Enamel shades (20gm)
- 1 Glaze paste (3gm)
- 1 Add-on Powder (20gm)

\$243.75 Deep Dentin Kit (Item #558256AN)

- 7 Dentin shades (20gm)

\$476.50 Margin Kit (Item #558266AN)

- 7 Margin Shades (20 gm) plus Intensive Materials (20 gm)

\$162.50 Stain Kit (Item #561571AN)

Government Price: (All item numbers and contents as above)

\$717.20 IPS d.Sign Basic Kit

\$178.64 Deep Dentin Kit

\$346.46 Margin Kit

\$119.02 Stain Kit

ADVANTAGES

- + Produces esthetic metal-ceramic restorations.
- + Powders mix easily and resist slumping after placement.
- + Condensation easily accomplished with minimal volume loss.
- + Firing temperatures and conditions are compatible with most porcelain ovens in USAF inventory.
- + Produces a glazed finish easily with porcelain-polishing compounds.
- + Compatible with ceramic alloys used during this evaluation.
- + Manufacturer's directions are complete and easy to read.
- + Minimal learning curve.
- + Most clinical esthetic needs met by shades contained in basic kit.
- + Exterior stains and characterization easy to use and apply.
- + Comparable in cost with other porcelain systems used in the USAF.

DISADVANTAGES

- Reports of shrinkage during laboratory firing cycles.

SUMMARY AND CONCLUSION

IPS d.SIGN is a fluorapatite-leucite glass-ceramic based system for the fabrication of metal-ceramic restorations. The new ceramic system is said to provide excellent esthetics with light transmission and dispersion similar to natural tooth structure purportedly facilitated by a ceramic-particle structure that mimics the shape of natural hydroxyapatite crystals. Users reported that IPS d.SIGN had good laboratory handling properties with technique requirements similar to those of porcelain systems currently used in the USAF. Also, it was found to produce esthetic, lifelike restorations with the basic kit meeting most clinical esthetic requirements. Twelve out of thirteen clinical evaluators rated IPS d.SIGN as Good or Excellent in spite of some minor concerns of shrinkage during firing and observed softness as compared to other porcelain systems. Its cost is comparable to other porcelain systems in the USAF inventory. The **IPS d.SIGN** porcelain system is rated **Acceptable** for use by the federal dental services.

(Col (sel) Roberts)

68-22 Crosspin

(Project 02-30)

Crosspin is a model die pinning system used to fabricate casts with removable dies. The Crosspin system is composed of a regular (10 mm) or long pin (16 mm) with corresponding length sleeves, full or quadrant base formers, and a drill bit. Crosspin primarily uses the same fabrication procedures as the traditional Pindex pinning system. The main difference is its utilization of a single pin per die compared to the traditional two-pin Pindex system. Crosspin is manufactured in a cross-shape and has a shaped plastic sleeve to fit over the pin. This cross-shaped pin and sleeve reportedly improves precision and facilitates work with removable dies while necessitating only a single pin in each die. To use Crosspin, the cast is first trimmed until the bottom is flat and of appropriate thickness. Next, a single hole is drilled for each projected removable die. Then a Crosspin is cemented into each hole in the cast. This leaves the cross-shaped part of the pin exposed. A corresponding sleeve of proper length and shape is slid over each pin. Separator is then applied, followed by basing of the cast with a base former. After the stone base is set the cast is removed and the dies are sawed out and trimmed. The depth of the base formers is the same as the length of the pins. This is said to allow easy die removal from the bottom of the cast and reduce the thickness of the base thus making articulation easier.

Manufacturer:

Blue Dolphin Products
360 A Cochrane Circle
Morgan Hill, CA 95037-2859

(408) 776-0433
 (800) 448-8855
 (408) 776-0145 FAX
 www.ptcdental.com

Suggested Retail Price:

Item	Item Number	Quantity (1)	Quantity (5-9)	Quantity (10+)
Intro Kit with regular pins (250 pins, drill bit, 2 base formers)	500-100	\$42.95		
Intro Kit with long pins (250 pins, drill bit, 2 base formers)	500-105	\$42.95		
1,000 pin refills (regular pins)	500-110	\$106.15	\$96.75	\$90.55
1,000 pin refills (long pins)	500-150	\$106.15	\$96.75	\$90.55
1,000-pin refill (long pins & short sleeves)	500-170	\$106.15	\$96.75	\$90.55
Drill bit	500-130	\$20.35		
Model former (full arch) 6 per pkg	500-140	\$31.79		
Model former (quadrant) 12 per pkg	500-145	\$31.79		

Government Price:

Same as retail

ADVANTAGES:

- + Easy-to-use technique.
- + Slightly reduced fabrication times.
- + Regular-length pins provided thinner base for additional articulation space.
- + Single-pin die is advantageous with narrow dies, such as lower anteriors.

DISADVANTAGES:

- Dies not as stable as two-pin dies.
- Does not reduce cost per die.
- Must mark dies to ensure correct placement into base.

SUMMARY AND CONCLUSIONS:

Crosspin is a prosthodontic die pinning system that is compatible with existing technology and is easily utilized due to its similarity with currently-used fixed-cast fabrication techniques. In contrast to double-pinning systems, Crosspin uses a single, cross-shaped pin and plastic sleeve per die. Its use was found to be advantageous in cases with small dies where placement of two die pins is difficult. However, in spite of Crosspin's unique shape, dies were found less stable than with the traditional two-pin technique. Furthermore, Crosspin does not provide any cost savings over two-pin systems currently in the USAF inventory. Crosspin is probably best indicated for single-unit cases where die stability may not be crucial and for situations involving small dies where placement of two pins may be difficult. **Crosspin** is rated **Acceptable** for use in the federal dental services.

(MSgt Osborn)

INFECTION CONTROL

68-22 Synopsis of Air Removal Tests for Prevacuum Steam Sterilizers (Project 03-10)

Sterilization monitoring is an essential infection control process. Sterilization conditions should be monitored routinely by using a combination of mechanical, chemical, and biological indicators.

One of these tests, the air removal test, is a type of chemical indicator specifically designed for prevacuum steam sterilizers. The test is designed to detect air leaks and inadequate air removal in the sterilizer. Residual air remaining in the chamber prevents steam from contacting the items in a load and therefore interferes with sterilization. Air removal tests do not apply to gravity-displacement sterilizers. The Association for the Advancement of Medical Instrumentation (AAMI) recommends the test be conducted daily in an empty chamber, before the first processed load of instruments. Generally, a short cycle is run first to properly heat the sterilizer, and then the test pack is placed in the empty sterilizer chamber, near the door, over the drain. However, manufacturer's instructions should be followed for the specific product being used. In addition to the daily test, the air removal test should also be performed during initial sterilizer installation, following sterilization failures (i.e., positive biological indicator), and after sterilizer relocation, malfunction or repair.

The following synopsis consists of a table (HTML version, PDF version) listing selected air removal tests, their manufacturers, and basic information. This synopsis should assist the reader in selecting an air removal test for a prevacuum steam sterilizer that best suits his/her clinical needs.

(Lt Col Harte)

Recently Evaluated Provisional Products

Product	Integrity	Protemp 3 Garant	Revotek LC
Company	Dentsply/Caulk Dentsply International PO Box 359 Milford, DE 19963-0359 (800) 532-2855 (302) 422-4511 (800) 788-4110 FAX www.caulk.com	3M ESPE 3M Center, Bldg 275-2SE-03 St. Paul, MN 55144-1000 (800) 237-1650 (612) 733-8524 (800) 888-3132 FAX www.3m.com/espe/index.html	GC America Inc. 3737 W. 127th Street Alsip, IL 60803 (800) 323-7063 (708) 597-0900 (708) 371-5103 FAX www.gcamerica.com
Polymerization Method	chemical	chemical	light
Packaging Form	cartridges with gun dispenser	cartridges with gun dispenser	stick form
Total Number of Shades	Three (A1, A2, A3.5)	Four (A1, A3, B0.5, B3)	One (B2)
Adequately Radiopaque?	No	No	No
Gov t Cost (\$/gram of refill material)	1.19	1.21	1.63
Comments	Comes with only one cartridge (i.e., one shade); additional shades must be purchased separately	Only comes with one shade in kit (other must be purchased separately); provided with VLA flowable resin for making repairs	Used with a direct sculpting technique; rather thick in consistency; requires no mixing
Location of Review	DIS 48-23	DIS 66-05	DIS 65-22
DIS Rating	Acceptable	Acceptable	Acceptable

Product	Temphase	Unifast LC	Versa-Temp
Company	Kerr Corporation 1717 W. Collins Avenue Orange, CA 92867-9880 (800) 537-7123 (714) 516-7400 (714) 516-7633 FAX www.kerrdental.com	GC America Inc. 3737 W. 127th Street Alsip, IL 60803 (800) 323-7063 (708) 597-0900 (708) 371-5103 FAX www.gcamerica.com	Sultan Chemists, Inc. 85 West Forest Avenue Englewood, NJ 07631 (800) 637-8582 (201) 871-1232 (201) 871-0321 FAX www.sultanchemists.com
Polymerization Method	chemical	dual (chemical and light)	chemical
Packaging Form	cartridges with gun dispenser	bottles of powder and liquid	cartridges with gun dispenser
Total Number of Shades	Five (A2, A3.5, B1, C2, D2)	Six (A2, A3, B2, B3, C2, translucent)	Six (A1, A2, A3.5, B1, C2, A0-Bleach)
Adequately Radiopaque?	No	No	No
Gov t Cost (\$/gram of refill material)	1.00	0.60	0.80
Comments	Kit contains two shades and dispenser gun; provided with flowable resins for making repairs; available in two setting times	All shades provided in kit; requires mixing; goes through rubbery stage when excess can be removed	Four of six shades included in kit, along with dispenser gun; optional TempArt LC Stain Kit and GlossCote glaze available separately
Location of Review	DIS 58-14	DIS 65-15	DIS 68-16
DIS Rating	Acceptable	Acceptable	Recommended

Product	ShadeVision System	Vita Easyshade	ShadeScan
Manufacturer and / or Distributor	<p>Manufacturer: X-Rite Incorporated 3100 44th St SW Grandville, MI 49418 (616) 534-7663 (866) 61SHADE (616) 534-8960 Fax www.x-rite.com</p> <p>Distributor: Sullivan-Schein Dental 135 Duryea Road Melville, NY 11747 (631) 843-5325 Int'l (800) 851-0400 (631) 390-8171 Fax www.henryschein.com</p>	<p>Vident 3150 East Birch Street Brea, CA 92821 (714) 961-6200 (800) 828-3839 (714) 961-6299 Fax www.vident.com</p>	<p>Cynovad Inc. 9710 Trans-Canada Highway Montreal, Quebec, Canada (514) 337-1444 (888) 933-2444 (888) 913-9899 US Sales Rep (514) 337-4484 Fax www.cynovad.com</p>
Components Included	Cordless hand-held instrument, docking station for computer upload, software program, 5 disposable tips, training CD-ROM	Hand-held instrument with 6-ft cable, 3-lb control unit, 20 disposable tips, USB & serial ports for expanded use / upgrades	Handheld device with color LCD screen, base station, seven flashcards included (16 MB each), basic software
Type of Scanning Technology	Colorimeter	Spectrophotometer	Colorimeter
Auxiliary Equipment Needed	Computer with: Windows 98 or 2000, Pentium III or equivalent preferred, 128 MB RAM, USB port, CD-ROM drive	None	Computer (optional)
Shade Display Mode(s)	Viewed as shade mapping image on computer	Vita-corresponding shade is displayed on control unit	Hand-held display, shade map
Communication Mode to Lab	E-mailed, saved to disk, or printed	Shade results documented on lab prescription	Flash card, email, and print capability (with optional computer)
Compatible Porcelain Shade Guide Systems	Vita Classic, Vitapan 3D Master, Ivoclar Chromoscop, Noritake, Shofu Vintage Halo, Dentsply Esthetix, Trubyte Bioform	Vitapan 3-D Master, Vita Classic, 3 Bleached Shades	Vita Classic, Vitapan 3-D Master, Ivoclar Chromoscop, Noritake, Shofu, Dentsply Esthetix, Degussa Duceragold
Infection Control Requirements	Disposable tips	Disposable tips	10 reusable guards, can be disinfected between uses
Calibration Requirements	Self-calibrates in docking station before each patient	Self-calibrates by rotating handpiece down while seated in cradle	Self-calibrating
Warranty	1 yr limited warranty 2 yr extended warranty available	1 yr	1 yr parts and labor 45-day money back guarantee
Retail Price	<p>Distributor: ShadeVision & Computer - \$6000.00 Software only - \$1750.99 2-yr extended warranty - \$394.99 Manufacturer: refill item: 100 disposable tips - \$95.00</p>	<p>\$3995.00 Refill item: 100 disposable tips - \$35.00</p>	<p>Basic system - \$5995.00 – includes lab software ShadeScan Plus software - \$1995.00</p>
Government Price	<p>Distributor: ShadeVision & Computer - \$5100.00 Software only - \$1487.58 2-yr extended warranty - \$235.71</p>	Same as retail	Same as retail

Product	ShadeEye-NCC Chroma Meter	ClearMatch
Manufacturer and or Distributor	Shofu Dental Corporation 1225 Stone Dr San Marcos, CA 92069 (760) 736-3277 (800) 893-0833 (760) 736-3276 Fax www.shofu.com	Smart Technology 979 Eby Road Hood River, OR 97031 (541) 386-6400 (800) 695-3917 (541) 387-3351 Fax www.smart-technology.net
Components Included	Computer base station, cordless hand-held instrument, 1 box of 50 disposable tips, 3 contact tip holders, 1 roll of printer paper, 1 calibration cap, (3) Shofu Vintage Halo shade guides, ShadeEye viewer software, PC cable, instructional video	Software program
Type of Scanning Technology	Colorimeter	Digital camera and shade analysis software
Auxiliary Equipment Needed	Computer with Windows (optional)	Digital camera (2 megapixels or higher, macro capability, white balancing, built-in flash), Computer with Windows 98 or higher platform, 64 MB RAM, 1024x768 or higher monitor resolution, color printer
Shade Display Mode(s)	Hand-held instrument display, base station printout of data, computer displayed using ShadeEye viewer software	Computer-displayed shade mapping
Communication Mode to Lab	E-mailed, saved to disk, printed	E-mailed, saved to disk, printed
Compatible Porcelain Shade Guide Systems	Shofu Vintage Halo, Vita Classical, Vitapan 3-D Master, Bident, Ivoclar Chromoscop	Vita Classical, Vitapan 3-D Master, Chromoscop, others can be added by downloading from website
Infection Control Requirements	Disposable tips	None
Calibration Requirements	Self-calibrating	Normalized (calibrated) with each digital picture by including a shade tab and black-and-white pattern in the picture
Warranty	1 yr limited, 30-day money back guarantee	45-day money back guarantee
Retail Price	ShadeEye NCC System - \$6995.00 Refill items: 50 disposable tips - \$98.50 3 contact tip holders - \$22.95 1 roll printer paper - \$15.95	Software system - \$2995.00
Government Price	ShadeEye NCC System - \$5036.40 Refill items: 50 disposable tips - \$49.47 3 contact tip holders - \$11.47 1 roll printer paper - \$7.97	Same as retail

*The manufacturers provided the data in these tables.

AIR REMOVAL TESTS FOR PREVACUUM STEAM STERILIZERS*

Product	3M™ Comply™ Bowie-Dick Plus Test Pack	The Lantor Cube® Reusable Bowie-Dick Test Pack	DART®—Daily Air Removal Test	Chemdi® Bowie-Dick Test Sheet	Verify® Bowie-Dick Test Cards (for single pulse steam sterilizers)	Verify® Bowie-Dick Test Card (for multi-pulse steam sterilizers)
Manufacturer address	3M 3M Center Bldg 275-5E-08 PO Box 33275 St Paul MN 55133-3275 www.3m.com/healthcare	SPS Medical Supply Corp 6789 W. Henrietta Road Rush NY 14543 www.spsmedical.com	STERIS Corp 5960 Heisley Road Mentor OH 44060 www.steris.com			
Phone/Fax numbers	(800) 854-0631 (800) 772-2547 FAX	(800) 722-1529 (585) 359-0167 FAX	(800) 548-4873 (440) 639-4450 FAX	(800) 548-4873 (440) 639-4450 FAX	(800) 548-4873 (440) 639-4450 FAX	(800) 548-4873 (440) 639-4450 FAX
Government representative	Gary Miller	Mariann Burke	Al Glasgow	Al Glasgow	Al Glasgow	Al Glasgow
Product instructions included	Yes	Yes	Yes	Yes	Yes	Yes
Shelf-life	36 months from date of manufacture when stored at recommended conditions	Indefinite when stored in a cool, dry location	3 years	2 years	3 years	3 years
Disposable or reusable	Disposable	Reusable (25 uses when indicator sheet is changed for each test)	Disposable	Disposable	Disposable	Disposable
Package contents	80 test packs with early warning test sheet	<ul style="list-style-type: none"> • Cube approved for 25 uses • 25 indicator sheets (Clamps are provided for first time purchasers) 	50 tests	50 test sheets [†]	31 test cards [§]	31 test cards [§]
Retail price Government price Govt cost per test	\$402.72 \$284.08 \$3.55	\$93.75 \$75.00 \$3.00	\$361.00 Same as retail \$7.22	\$67.00 Same as retail \$1.34	\$170.00 Same as retail \$5.48	\$148.00 Same as retail \$4.77

*The manufacturers provided the data in this table.

[†]Product must be used inside a towel pack

[§] The reusable Verify® Bowie-Dick Test Card Holder (\$20.00) is needed for correct use of test cards.