

TABLE OF CONTENTS

DIS 58 September 1999

ADMINISTRATION

- 58-01 Dental Forensics Briefing
- 58-02 Promix Amalgamator Problems
- 58-03 Withdrawal of Caulk Tooth Conditioner Gel
- 58-04 DIS Comments Concerning Updated Dental Mercury Hygiene Recommendations from the ADA Council on Scientific Affairs
- 58-05 Odontoson-M Ultrasonic Scaler Problem

QUESTIONS & ANSWERS

- 58-06 Packable Resin Composites as Amalgam Alternatives
- 58-07 Preventing Headaches when Installing a Wall-Mounted X-Ray Unit
- 58-08 The Sixth Generation of Bonding Agents?
- 58-09 Dental Cements: Anything New on the Horizon?
- 58-10 American Dental Association (ADA) Seal of Acceptance

WHAT'S NEW?

SensiMent
SensiTemp
Optimix Computerized Mixing System
Prompt[®] L-Pop[®]
Heliomolar Flow
Vivastick
Diamond Floss
Harvey DI Water System
PermaFlo
Endo Analyzer 8005
ICB (Intracoronary Bristle) Brushes
Excite Adhesive
Ceramic Repair Kit

FROM THE LITERATURE

You Gotta' Find Another Reason for Your Memory Getting Worse...
Some Mouthrinses May Not Be So Good...
Hepatitis C: The New Danger
Percutaneous Injuries: Who's Truly at Greatest Risk?
A Pinch Between The Cheeks And Gums
Bleach Those Lines
Elastomers Can Be Disinfected

GENERAL DENTISTRY

58-11 SureFil High Density Posterior Restorative
58-12 Principal Compomer Cement
58-13 RotoMix
58-14 Temphase Temporary Crown and Bridge Material
58-15 Prime & Bond NT Dual Cure
58-16 Assistina 301 Plus
58-17 Acucam Concept III
58-18 NI-DX Digital Radiography System
58-19 Ariston pHc Alkaline Glass Restorative
58-20 Filtek™ Z250 Universal Resin Composite
58-21 Pelton & Crane Spirit 2000 Ellipse Dental Unit
58-22 Pelton & Crane Spirit 2005 Dental Chair
58-23 Piezon Master 400
58-24 Apollo 95E Curing Light
58-25 Synopsis of Automatic X-ray Processors
58-26 Implant Recall Kit
58-27 DenOptix Digital Imaging System
58-28 Lares Director+ Air Abrasion System

ATTACHMENTS

1. Synopsis of Automatic X-ray Processors

ADMINISTRATION

58-01 Dental Forensics Briefing

(Project 99-04)

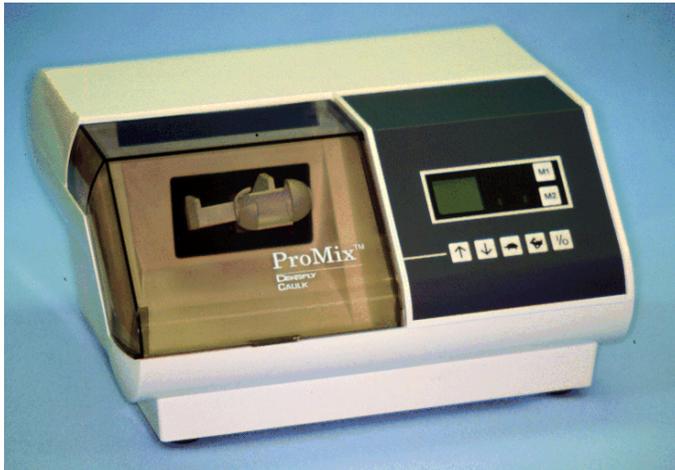
DIS currently has three Powerpoint briefings on our website: Infection Control, Radiation Safety, and Health and Safety. These were authored in a DIS collective effort to serve as resources for federal dental clinics in meeting mandatory annual training requirements. A Dental Forensics briefing has recently been completed and is now also available on the DIS website. This briefing has been reviewed by both HQ USAF SGD and AFIP.

(Lt Col Roberts)

58-02 Promix Amalgamator Problems

(Project 99-21)

The ProMix triturator is a two-speed mixer that features touchpad controls, digital display, and two programmable memories. The unit, introduced in 1994, is manufactured and sold by the Dentsply/Caulk company. Shortly after its introduction, DIS evaluated it and rated it "Acceptable" (see *Dental Items of Significance* 45-19).



The Dunn Dental Clinic, Lackland AFB TX purchased 12 new ProMix triturators in October 1998 to replace Varimix II units that had reached the end of their lifecycles. By December, two of the new units had stopped operating. At the request of Dunn Logistics personnel, DIS contacted Dentsply/Caulk and arranged overnight replacements for the units. At that time, the problem appeared to be an isolated incident. In April 1999 DIS was informed that three more ProMix units had become non-functional. In fact, one of the replacement units provided by Dentsply in December had also stopped operating.

Manufacturer:

Dentsply/Caulk
38 West Clarke Avenue
P.O. Box 359
Milford, DE 19963-0359
(800) 532-2855
(302) 422-4511
(800) 788-4110 FAX

SUMMARY AND CONCLUSIONS:

Several failures of new ProMix triturators were reported to DIS by a USAF dental clinic. DIS contacted Dentsply/Caulk and the company determined that the failures were due to a design flaw in a powerboard wire that rubbed against the base plate as the unit operated. Over time this caused the wire's insulation to wear which resulted in an electrical short. A design change has been implemented that involves re-

routing the wire through a lead clip that secures the wire and prevents it from rubbing against the base plate. The correction will have been made to all ProMix units with serial numbers greater than 19477 with a shipping date after 3 May 99. Facilities that are experiencing difficulties with ProMix tritulators should contact Mr. Dan Bryant at (800) 532-2855 ext 207.

(Lt Col Roberts)

58-03 Withdrawal of Caulk Tooth Conditioner Gel

In July 1999, the Dentsply/Caulk Company withdrew from the market specific lots of Caulk Tooth Conditioner Gel. Testing indicated that a blockage could occur in the tip of the syringe, preventing the gel from being extruded. The effectiveness of the gel was not affected. In conjunction with the withdrawal, Dentsply/Caulk used the opportunity to reemphasize some of the directions for



using the gel. For instance, users were reminded that the gel should be easy to extrude from the syringe and excessive force should never be applied. If the gel could not be extruded with gentle pressure, Dentsply/Caulk recommended that the syringe be removed from the patient field and examined for an obstruction. The specific lot numbers of the syringes involved were 9902101, 990225, 990302, and 990305. The syringes may have been sold individually as refills or may have been included in kits of the following products:

Item #	Product Description	Product Lots Affected
646125	Tooth Conditioner Refill	9902101, 990225, 990302, 990305
607040	EnForce Introductory Kit	990305, 990318, 990325
634351	Prime & Bond NT Economy Kit	990301, 990308
634353	Prime & Bond NT Dual Cure Kit	990326
642120	Prisma TPH Complete Kit	990304
642310	TPH Spectrum Operator Kit	990318, 990319
645003	SureFil Operator Kit	990312, 990315
685605	Dyract Flow Operator Kit	990224, 990310

Dentsply/Caulk asked customers to review their inventory to determine if they had any of these kits, refills, or individual syringes so they could be replaced. Dentsply/Caulk notified account holders of this action with instructions on how to return the affected syringes. The instructions asked that customers collect the affected syringes and call Caulk Customer Service at (800) 532-2855 Ext 791 for specific information on how to return them and obtain free replacements. For military overseas locations that found it impractical or impossible to call the 800 number, the syringes could be returned to Dentsply/Caulk at the following address:

L.D. Caulk
L.D. Caulk Division
Dentsply International, Inc.
P.O. Box 359
Milford, DE 19963-0359

This information was posted in late June on the DIS web site and is being included here in the newsletter to ensure that federal service clinics are aware of the withdrawal. If you have any of these syringes, please contact Dentsply/Caulk at the number provided above.

(Col Charlton)

58-04 DIS Comments Concerning Updated Dental Mercury Hygiene Recommendations from the ADA Council on Scientific Affairs

The ADA Council of Scientific Affairs recently updated the 1991 mercury hygiene recommendations (J Am Dent Assoc 1999;130:1125-1126). The ADA states that this 15-item list is not intended to establish standards of care that must be followed in all situations but to provide guidance to dental personnel on mercury hygiene procedures. Unfortunately, some of the recommendations appear vague and do not provide source citations, which may make compliance difficult. DIS has reviewed the 1999 ADA mercury hygiene recommendations and is providing these comments to assist federal dental facility commanders.

ADA Recommendation #1

Train all personnel in the potential hazard of mercury vapor and good dental amalgam hygiene practices.

ADA Recommendation #2

Make personnel aware of potential sources of mercury vapor in the dental operator. Personnel should also be aware of the proper handling of amalgam waste and environmental issues.

DIS Comments: Sources of mercury vapor in the dental operator include the trituration, handling, and placement of amalgam, the polishing of amalgam restorations, and the removal of old amalgam with a dental handpiece.^{1,2} The total amount of mercury released during any of these procedures has been shown to be far below the total exposure level threshold limits established by regulatory agencies for occupational exposure.² See Recommendations 9, 11, and 12 below for discussion concerning amalgam waste and environmental issues.

ADA Recommendation #3

Work in well-ventilated spaces, with fresh air exchange and outside exhaust. Air conditioning filters should be replaced periodically.

DIS Comments: ADA recommendations do not quantify "well-ventilated spaces." Federal facility design for Heating, Ventilation, and Air Conditioning (HVAC) requirements are based on actual occupancy, mechanical and ventilation codes, and building codes. Dental treatment rooms are required to have 6-12 air changes per hour but not necessarily exhausted to the outside. The entire HVAC system should provide 2-3 outside air changes per hour. As per federal requirements, the only dental areas that are required to have direct exhaust are the dental laboratory, contaminated instrument cleaning area, and X-ray processing room.³

Currently, there exist no federal design requirements for dental treatment rooms to have direct outside air exchange and exhaust.³ As with any material, increased air exchange rates will reduce mercury vapor levels. Proper maintenance of ventilation equipment is important to achieve compliance with OSHA regulations.

Although the replacement of air conditioning filters may be beneficial for other health reasons, commercial air conditioning filters are designed for the collection of airborne particulate matter and have

no effect on mercury vapor. The only filters that have been shown to help reduce mercury vapor levels contain specific chemical absorbents (usually iodized charcoal).⁴⁻⁶

ADA Recommendation #4

Periodically check the dental operatory atmosphere for mercury vapor. Monitoring should be considered in case of a mercury spill or suspected spill, or when there is a reasonable concern about the concentration of mercury vapor in the operatory.

DIS Comments: This guideline does not define the timeframe “periodically,” and this is the first suggestion that mercury vapor levels be checked.

As per AFI 48-145, the need for surveillance and its frequency are determined by the local Bioenvironmental Engineering (BE) Flight Commander (or equivalent). Dental commanders should contact local BE personnel to monitor dental clinics IAW AFOSH Standard 48-8 if elevated mercury vapor levels are suspected. Typically, mercury vapor levels are monitored only after suspected or identified mercury exposure (e.g. after a mercury spill). Consultation with local BE personnel will determine what schedule (if any) is required by federal or local requirements.

ADA Recommendation #5

Work areas should be designed to facilitate spill contamination and cleanup. Floor coverings should be nonabsorbent, seamless, and easy to clean.

DIS Comments: All USAF facilities designed or remodeled IAW with federal guidelines³ adhere to this recommendation.

ADA Recommendation #6

Use only precapsulated amalgam alloy.

ADA Recommendation #7

Use an amalgamator with a completely enclosed mixing chamber.

ADA Recommendation #8

Avoid skin contact with mercury or freshly mixed amalgam.

DIS Comments: Although extremely rare, occupational exposure to mercury is known to cause contact dermatitis.^{7,8} Use of gloves during the preparation and placement of amalgam should provide skin protection against skin contact with mercury.

ADA Recommendation #9

If possible, recap amalgam capsules after use. Properly dispose of them according to applicable waste disposal laws.

DIS Comments: Recapping is recommended. Used amalgam capsules have been identified as a source of mercury vapor.⁹ No mercury vapor from these capsules has been detected in the ambient air (breathing spaces) in dental treatment rooms. The only mercury vapor detected from discarded capsules has been directly over the trash container, and was below established OSHA threshold limits.⁹

Used amalgam capsules are not presently identified by EPA regulations as environmentally hazardous waste.¹⁰ It is prudent to review both federal (EPA) and state hazardous waste disposal regulations, as adherence to the stricter requirement is mandated.

Local USAF hazardous waste managers are the source of local requirements concerning proper hazardous waste disposal.

ADA Recommendation #10

Use high-volume evacuation when finishing or removing amalgam. Evacuation systems should have traps or filters. Traps and filters should be periodically cleaned.

DIS Comments: Again, the timeframe “periodically” in this guideline is not defined. The USAF Consultant in Dental Infection Control recommends that evacuation system traps be cleaned daily due to infection control requirements.¹¹

Facilities that utilize amalgam separation devices should dispose of accumulated residue in accordance with local USAF hazardous waste management guidelines.

ADA Recommendation #11

Salvage and store all scrap amalgam in a tightly closed container, either dry or under radiographic fixer solution. Amalgam scrap should not be stored in water.

DIS Comments: USAF SGD Instructions (IAW AFI 47-101, May 1999) mandate that scrap amalgam be stored dry in a covered container that has screwed-on lid. Amalgam scrap from evacuation system traps may be first disinfected with five percent sodium hypochlorite (bleach), allowed to dry, and then stored accordingly.

ADA Recommendation #12

Where feasible, recycle amalgam scrap and waste amalgam. Some recyclers will accept only dry materials. When choosing a recycling company, it is important to ensure that the recycling company has obtained all required federal and state permits. Environmental laws state that the generator of the waste (e.g. the dental office) may be held legally responsible even if improperly handled by others. Otherwise, dispose of amalgam materials according to applicable laws.

DIS Comments: IAW with AFI 47-101 and SG Policy Letter 96-02, dental facilities must meet requirements established in AFOSH Standard 161-21, *Hazard Communication*. Hazardous materials in the dental clinic should be stored and maintained IAW AFI 32-7086, Hazardous Material Management Program.

Scrap amalgam from central evacuation traps should be decontaminated IAW *In Control*, Number 5, September 1994, Attachment 2.¹² USAF Hazardous Waste Managers are empowered to arrange for proper hazardous waste disposal. Facilities should contact local hazardous waste managers as the source of local requirements and for information on the proper disposal of hazardous waste.

ADA Recommendation #13

Dispose of mercury-contaminated items in sealed bags according to applicable regulations. Do not dispose in regulated medical waste that will be incinerated.

DIS Comments: As previously mentioned, it is important to refer to EPA regulations, AFOSH Standard 161-21, and AFI 32-7086 as minimum requirements. USAF Hazardous Waste Managers are the source of local regulations and disposal methods.

ADA Recommendation #14

To clean up spilled mercury, use freshly mixed amalgam, trap bottles, or a commercial cleanup kit. Do not use a household vacuum cleaner.

DIS Comments: Local BE and Civil Engineer personnel should be contacted for assistance in the event of a mercury spill.

ADA Recommendation #15

Remove professional clothing before leaving the workplace.

DIS Comments: USAF infection control guidelines require the use of clinic-specific clothing during the treatment of dental patients.¹¹ This requirement is primarily based upon sound infection control practices and not mercury hygiene.

References

1. Okabe T. Mercury in the structure of dental amalgam. *Dent Mater* 1987;3:1-8.

2. Engle JH, Ferracane JL, Wichmann J, Okabe T. Quantitation of total mercury vapor release during dental procedures. *Dent Mater* 1992;8:176-180.
3. Military Handbook 1191, 24 May 1996.
4. Eames WB, Palmertree CO. Twelve dental mercury devices: an evaluation of methods of monitoring, containment, and removal of mercury. *Oper Dent* 1980;5:72-81.
5. Koski RE, Kantor J, Gough EJ. Controlling mercury vapor within the dental operatory. *CDA J* 1981;9:33-39.
6. Brown D. The decontamination of a mercury-polluted room with iodized-charcoal filter fans. *Br Dent J* 1984;156:453-454.
7. Rao GS, Hefferren JJ. Toxicity of mercury. In Smith DC, Williams DF, eds. *Biocompatibility of Dental Materials*, vol 3, *Biocompatibility of dental restorative materials*. Boca Raton, FL. CRC Press 1982, pp 19-40.
8. Anacona A, *et al*. Mercury sensitivity in a dentist. *Contact Dermatitis* 1982;8:218.
9. Cooley RL, Lubow RM. Mercury vapor emitted from disposable capsules placed in trash containers. *Gen Dent* 1985;32:498-500.
10. Code of Federal Regulations, Protection of the Environment. 40 CFR Chap 1, 261.30:47-48.
11. USAF Dental Service Infection Control Program Update (In press), Jan 2000.
12. In Control, The USAF Dental Infection Control Update, Sept 1994, 5:p.5, atch 2.

For more information and/or questions, please contact Lt Col Howard Roberts
(howard.roberts@ndri.med.navy.mil) or DSN 792-7679 or (847) 688-7679.

(Lt Col Roberts)

58-05 Odontoson-M Ultrasonic Scaler Problem

(PR 02-99)

The Odontoson-M is a multi-purpose ultrasonic scaler with an autoclaveable handpiece and cord. The unit is equipped with an external irrigation system and a pump for the delivery of sterile irrigant to the treatment site. The manufacturer (Flex Dent, Denmark) recommends the device for periodontal and endodontic use. In the past, DIS has evaluated this product and rated it "Acceptable" (see *Dental Items of Significance* 43-20).

In April 1998, the manufacturer modified the plastic material of which the Odontoson-M handpiece was made (it was converted from a black to a grey plastic). In February 1999, the U.S. distributor (Periogiene Corporation) notified DIS of a defect in the handpiece. The company had received reports of swelling and warping at the base of the grey-colored handpiece following several autoclave cycles. The manufacturer tested individual components and determined that the problem occurred because an internal injection-molded section expanded and warped after repeated exposure to normal autoclave temperatures. It was determined that this new internal grey plastic part did not possess the same heat tolerances and specifications as the original black material. The heated-related warping of the defective section deformed the outside of the handpiece, which caused water to leak from the joint where the handpiece and cable joined.

U.S. Distributor:

Periogiene Corporation
3188 Airway Avenue, Suite K-2
Costa Mesa, CA 92626
(800) 368-5776
(714) 662-3300
(888) 368-4787 FAX

SUMMARY AND CONCLUSIONS:

As a short-term solution, the manufacturer replaced the defective internal part with a part made of the original black material. The rest of the handpiece is designed with the new grey plastic. The grey/black handpieces have performed well in field-testing. The manufacturer has been testing new materials with higher heat tolerances that will provide a greater margin of error during the autoclaving process. Testing should be completed by September 1999 with commercial production by December 1999. Dental clinics that have Odontoson-M handpieces made entirely of the gray plastic should contact Jim Dieroff at Perigiene Corporation for replacement.

(Col Bartoloni)

QUESTIONS & ANSWERS

"Questions & Answers" is a feature in which we present and answer the questions we most frequently receive from the field. This month we feature questions about packable posterior resin composites and adding an intraoral x-ray unit to a clinic. 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.

58-06 Packable Resin Composites as Amalgam Alternatives

Question: I keep seeing more and more ads for condensible composites. Last week a salesman visited our clinic and said his product can be used as an amalgam alternative. What can you tell us about these products?

Answer: In the past few months, DIS has done quite a bit of testing of these products, and what we have learned is quite interesting. For review, because traditional resin composites used in the posterior dentition can be time-consuming and difficult to place, manufacturers have developed a subset of posterior resin composites that they describe as "condensible" or "packable." Most of the manufacturers indicate that they can be used in the posterior dentition as amalgam alternatives. Although initially, "condensible" was the term most commonly used to distinguish them from traditional resin composites, it is better to describe them as "packable" because no real condensation is being done during placement. Currently there are several packable resin composites on the market: SureFil (Dentsply/Caulk), ALERT (Jeneric/Pentron), Solitaire (Heraeus Kulzer), Prodigy Condensable (Kerr), Filtek P60 (3M), and Pyramid (Bisco). First marketed in 1998, they purportedly have several characteristics that make them esthetic alternatives to amalgam. First, their manufacturers claim they can be placed and packed into a preparation as if they were amalgam. In fact, they are still resins and handle like resins, but do resist packing to an extent because they are filled with either fiber (ALERT), porous (Solitaire), or irregularly-shaped (SureFil) filler particles, or different sizes of particles (Pyramid). In an attempt to make them appear to be similar to amalgam, some of the resins (e.g., ALERT, SureFil) are packaged in blister packs that differ by spill size. One product (SureFil) also comes with an amalgam carrier that the clinician uses to place it into the preparation. All the products can be packed with amalgam condensers and are used with traditional metal matrix bands and wooden wedges.



Because they are more viscous and stiff than standard resin composites, it is a bit easier to achieve acceptable interproximal contacts with them than with traditional resin composites. Wear rates are supposedly similar to that of amalgam (about 3.5 microns/year), however, it should be noted that a study presented at a recent dental research meeting found a much higher wear rate for one of these products (Solitaire).

The manufacturers' claims notwithstanding, the packable resin composites exhibit properties that are quite similar to those of standard resin composites already on the market. For example, they are no harder, shrink about the same amount or slightly more, can not be carved, and must be incrementally placed and light activated. Also, they cost at least as much or more than many currently-available resin composites such as Z100 (3M), Spectrum TPH (Dentsply/Caulk), Prodigy (Kerr), and Herculite XRV (Kerr). Perhaps the most troubling claim made for these products by their manufacturers is that they can be placed in bulk (usually 5-mm thicknesses are cited) and light activated because they shrink less than other resins. It is important to note that none of these products can be adequately polymerized when placed in a 5-mm thickness. To their credit, Bisco and 3M do not recommend bulk placement for their products.

In summary, it doesn't appear that the packable resin composites present any great improvement compared to already-marketed resins for posterior use. Perhaps one of the few advantages they have is that it is easier to obtain an acceptable interproximal contact with them because they are stiffer and resist packing.

(Col Charlton)

58-07 Preventing Headaches when Installing a Wall-Mounted X-Ray Unit

Question: Our clinic would like to install a wall-mounted x-ray unit primarily for endodontics. What do we need to do?

Answer: When faced with an installation of this type, careful planning is critical because many issues arise. For example, what type of radiation shielding is required? Does the door to the room need to be fire rated? Does it have to meet handicap access requirements? Is a leaded view window necessary? What type of wall bracing does a wall-mounted x-ray unit require? As you can see, many questions need to be answered during the planning stages. Let's look at these often confusing requirements.

Radiation Shielding: As of 9 May 1996 HQ AFMOA/SGO (Medical Operations Agency) directed USAF Bioenvironmental Engineers (BEEs) to follow EPA guidelines and lower the annual radiation dose limit from 500 mRem to 100 mRem. When the limit was 500 mRem, most x-ray units used for an average workload of endodontic patients did not produce enough radiation to cause people on the other side of a gypsum wall to exceed their 500 mRem annual dose. At the 500-mRem level, a leaded door was required unless the workload was exceedingly low. Now that the limit has been reduced to 100 mRem, leaded walls and a leaded door are typically required unless the workload is low. The only way to determine if lead shielding is required is to ask your BEEs to do a shielding evaluation. Be aware that for the BEEs to do a good evaluation, they will need the following information:

- Kvp, mA, and length of exposure for a maxillary molar periapical exposure for the film speed you use
- Distance from the x-ray source to each wall
- What is on the other side of the wall – another operatory, office, corridor and whether or not the area is occupied
- Composition of the wall
- The average number of exposures per week or month (which is perhaps the most important information they will need)

With this information, a computation can be done to determine if the 100 mRem per year limit is likely to be exceeded. If so, the BEEs will be able to calculate the amount of lead that needs to be added to the

walls to bring your operation back within the 100-mRem limit. In virtually all cases, a leaded door is required unless the workload is very low, as might be the case with a portable machine rarely brought into a room. Note that the shielding requirement for a portable machine versus a wall-mounted machine is the same if they have the same Kvp, mA, and workload.

Leaded Doors: The cost of purchasing and installing a leaded door typically exceeds \$1000. In addition to the lead requirement, all non-leaded door requirements apply as well. What this means is that if the corridor in which the door is located requires fire-rated doors, the leaded door must be fire rated as well. This is typically the case in medical centers or hospitals where ambulatory care or hospital fire codes apply. Make sure you check with your Civil Engineering (CE) people before you proceed. Another requirement also will apply. In order for a wheel chair patient in the room to be able to get out, there needs to be a minimum of 18 inches of clear wall space on the latch or doorknob side of the door. When opening the door, the wheel chair patient places his/her chair in this space and opens the door. Without the space, the wheelchair blocks the door and prevents it from opening. This space requirement is mandated by the Americans with Disabilities Act (ADA) and must be met regardless of whether or not there are currently any handicapped persons employed or otherwise using the facility. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) recognizes ADA requirements, so this indirectly becomes a JCAHO standard.

View Window: National Council on Radiation Protection and Measurements (NCRP) Report No. 49 requires a view window so the x-ray operator can see the patient while an exposure is being made. Since JCAHO recognizes NCRP, this indirectly becomes a JCAHO requirement. The view window can be mounted in a wall, door, or lead shield.

Installation Issues: In order to install an X-ray unit, the wall needs to be braced so the weight of the unit is transferred to the wall's studs. In some cases, this is done by bolting through the wall to a sheet of plywood on the other side of the wall. If the appearance of this type of installation is unacceptable, be sure to mention that clearly in your work order request for installation; this will prevent a misunderstanding later and ensure you receive the type of installation you want.

According to NCRP 49, the x-ray unit control panel should be located at least 18 inches from the door to the room containing the x-ray tube head. This reduces the chances for the operator to receive scatter radiation and prevents him/her from standing in the door way while an exposure is being made. If the control panel is closer than this, an interlock is required on the door so that the exposure can not be made while the door is open. Since it is usually easy to meet the 18-inch requirement, an interlock is usually not needed.

Electrical: While x-ray units do not require a great deal of electricity and usually run on 120 volts, they do require a dedicated electrical line. This is because there is a surge created when the exposure is made. If there are other loads on the line, the required power may not be available when the exposure is made and this can result in light films. It is important, therefore, to verify that the electrical circuit box in the area has the capacity remaining for a new dedicated line before you proceed.

Hopefully, by being aware of these issues, you will make the installation of your x-ray unit a less troublesome experience.

(Lt Col Kane)

58-08 The Sixth Generation of Bonding Agents?

Question: I have used the new dentin bonding agent from Caulk called Prime & Bond NT. What makes it different from the other products on the market?

Answer: Prime & Bond NT is one of the most recently introduced bonding agents (see DIS 58-15).

Although it is packaged and looks like any of the two dozen or so other bonding products currently on the market, it is different. The difference, though not superficially apparent, is an important one. Most of the new bonding agents have partially filled adhesives which supposedly make them more flexible. As a result, they have a shock absorber effect that causes them to flex and "give" when the overlying resin composite is light activated and shrinks. This maintains the integrity of the bond and is said to reduce leakage.

Although Prime & Bond NT follows this current trend of having a partially filled adhesive, its fillers are much smaller than the size of fillers in other bonding resins. This is the reason the product is called Prime & Bond NT ("NT" stands for "Nano Technology.") Dentsply/Caulk, the manufacturer of Prime & Bond NT, claims that the filler particles can penetrate the entire depth of the hybrid layer because of their extremely small size. This is said to markedly increase bond strength and improve marginal integrity. It is interesting to note that Prime & Bond NT formed a strong bond in DIS testing and in a recently published article (Perdigao et al, J Esthet Dent 1999:11:23-35). Another

difference between other bonding products and Prime & Bond NT is that it easily coats the tooth surface with only one application. Many of the fifth-generation (AKA "one-component" or "one-bottle") bonding agents require two or more separate applications to adequately cover the enamel and dentin. This is a disadvantage because it adds more time to the application process. Prime & Bond NT requires only a little over one minute to apply which is the second shortest application time measured at DIS for a bonding product.

Expect to see new nanofilled bonding products in the near future because other manufacturers are actively working on them. In fact, Ivoclar has recently introduced a product called Excite that DIS will review in an upcoming newsletter. It is said to contain nanofillers and be able to coat with one application. DIS knows of one other manufacturer that is actively working on a nano-filled bonding product. It may be that these bonding agents represent the sixth generation of bonding agents, although they have not been recognized as such yet. As with almost all newly-introduced products, the nanofilled bonding agents need to undergo long-term clinical testing to determine if their compositional differences actually help them perform better than products already on the market.



(Col Charlton)

58-09 Dental Cements: Anything New on the Horizon?

Question: It seems like I see a new cement being advertised almost every time I pick up a dental journal. In dental school I learned about one or two cements and got to know how to use them, but I don't want to miss the boat if there are new and better products being sold. What are the new cements

and are they any better than zinc phosphate?

Answer: Although we have had good luting agents for more than 100 years, the development and use of innovative, esthetic restorative materials have led to the marketing of new types of cements. Some of the recently developed luting agents represent significant advances in physical properties that may result in better clinical performance of the luted restorations.

The case can be made that the recent increased attention to developing and marketing new cements began with the development of zinc polycarboxylate cement in the late 1960s. This cement was a truly innovative development in dentistry because it was the first material to chemically bond to tooth structure. This led researchers to assume that it would provide a strong, durable bond between restorations and tooth structure. However, some clinicians have expressed reservations about zinc polycarboxylate cement's ability to retain restorations and researchers have recently shown that the cement deforms under load, which may contribute to this perceived problem. At any rate, the jury still seems to be out concerning the degree to which the chemical bond contributes to the retention of the cemented restoration. Zinc polycarboxylate cements are also well known for their biocompatibility. Because they are kind to the pulp, they are particularly indicated for situations where the involved tooth has minimal remaining dentin or a history of sensitivity. The most commonly noted disadvantages of polycarboxylate cement is its marked thickness and short working time. Currently marketed brands include Durelon (ESPE America), Liv Carbo (GC America), Shofu Polycarboxylate (Shofu), and Tylok Plus (Dentsply/Caulk). The most recent innovation in these cements has been the development of Durelon Maxicap, an encapsulated version of Durelon, from ESPE America (see *DIS* 50-23 for a full review). Because it is mixed and expressed from a capsule, the traditional difficulties of short working time and excessive thickness are overcome. For those who like to use polycarboxylate cement, this is a nice product.

Glass-ionomer cements, which have had a major effect on dentistry, were first marketed as luting products in 1979. These cements have many positive features including fluoride release, chemical bonding, and low solubility. Several well-performing products have been on the market for many years and include Ketac-Cem (ESPE America), Fuji Ionomer I (GC America) , and Glaslonomer (Shofu). Although post-cementation sensitivity has been noted for at least one of these products (Ketac-Cem), proper attention to mixing and handling of the cement can greatly minimize the occurrence.

A tremendous amount of attention has been given to the development of resin cements in the last 10 years, primarily because of the growing interest in esthetic types of restorations. All-ceramic and resin composite veneers, inlays, onlays, and crowns have characteristics that call for the use of low-solubility, high-strength cements and, for the most part, resin cements are well suited in these regards. An entry in an upcoming *DIS* newsletter will discuss the many changes in resin cements that have been made over the years and will describe some of the new products available. For a recently-published list of resin cements, please see *DIS* 55-11 in our September, 1998 newsletter.

The most recently developed cements have been the compomer cements and hybrid resin/glass-ionomer cements. The best known compomer cement, Principle (Dentsply/Caulk), was recently evaluated by *DIS* (see *DIS* 58-12 for a full review). Although most of our clinical evaluators found it easy to handle and use, they disliked the fact that it had to be hand mixed and felt it didn't offer any advantages over cements already available.

The hybrid resin/glass-ionomer cements (Fuji Plus, GC America, see *DIS* 47-20; RelyX, formerly known as Vitremer Luting Cement, 3M, see *DIS* 45-16; Advance, Dentsply/Caulk, see *DIS* 46-17; and Pro-Tec Cem, Vivadent) have several advantages compared to traditional glass-ionomer cements. For example, they are stronger in tension (which should improve retention), less brittle, less sensitive to moisture, and less soluble. All of these characteristics are important to a cement. Unfortunately, there have been a number of anecdotal reports of post-cementation fracture of all-ceramic restorations luted with Fuji Plus, RelyX, and Advance. This problem is believed to be the result of expansion due to water sorption. **It is very important to avoid using these cements for luting all-ceramic restorations.** Vivadent claims that Pro-Tec Cem exhibits less expansion and can be safely used to lute all-ceramic

restorations, however product information indicates that it should only be used to lute Empress and Targis/Vectris restorations, both of which are Vivadent products. It is probably best to avoid using any of the hybrid cements for luting all-ceramic restorations. Fuji Plus, RelyX, and Advance differ considerably in cost, use, and handling characteristics. For a full discussion of these differences, please see *DIS* 45-13.



Amazingly, although the time-tested zinc phosphate cement continues to be an excellent choice for routine daily prosthodontic use, it is important for clinicians to be aware of the many new luting products. Some of these products may be suited for use in your practice, particularly if you frequently place esthetic all-ceramic or all-resin restorations.

(Col Charlton)

58-10 American Dental Association (ADA) Seal of Acceptance

Question: I've noticed that in your product evaluations you sometimes report that a product is ADA Accepted. If a product is not ADA Accepted, how can *DIS* rate it as Acceptable or Recommended?

Answer: At first glance it would appear that this is a serious disconnect, however, the quick answer is that the ADA Seal of Acceptance Program is totally voluntary. A product may be perfectly acceptable yet not have been submitted to the ADA for evaluation.

The ADA has sought to ensure the safety and effectiveness of dental products for more than 125 years. For example, in 1866 an ADA committee prepared a statement concerning toothpaste. In 1930, the ADA established guidelines for the testing and advertising of dental products. The first Seal of Acceptance was awarded in 1934. Currently, about 350 companies participate and some 1,300 products are permitted to display the ADA Seal of Acceptance.

To qualify for the Seal, the company must:

- Supply objective data from clinical and/or laboratory studies that support the product's safety, effectiveness and promotional claims.
- Conduct clinical trials as needed in strict compliance with ADA guidelines and procedures.
- Provide evidence that manufacturing and laboratory facilities are properly supervised and adequate to assure purity and uniformity of the product, and that the product is manufactured in compliance with Good Manufacturing Practices.
- Submit all advertising, promotional claims and patient education materials for review and approval by the ADA, and be in compliance with the ADA's standards for accuracy and truthfulness in advertising.
- Submit ingredient lists and other pertinent product information for review and approval.

The ADA utilizes more than 100 consultants, including members of the ADA's Council on Scientific Affairs and ADA staff scientists to review the more than 400 product submissions every year. Only after a product has demonstrated its safety and effectiveness will the ADA Council on Scientific Affairs award

the Seal.

In summary, just because a product doesn't have the ADA Seal of Acceptance, one cannot assume that it is unsafe or that it is inferior to other products that have the Seal. What you can be sure of is that if a product has earned the Seal, it is safe and effective for its intended use.

** All information obtained from ADA Pamphlet W125, "American Dental Association Seal of Acceptance, A Symbol of Safety and Effectiveness," 1995.*

(Col Leonard)

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.

SensiMent is a new carboxylate cement marketed by Sultan Chemists. It is advertised to be the only carboxylate cement formulated with potassium nitrate and is marketed to reduce hypersensitivity and post-restoration pain. Sultan Chemists maintains that SensiMent has improved clinical handling characteristics over traditional carboxylate luting agents. The manufacturer recommends SensiMent for the luting of inlays, crowns, posts, bridges, and orthodontic brackets. Other advertised uses include bases and liners for restorations, restorations for deciduous teeth, temporary restorations, and pulp capping. SensiMent Carboxylate Cement includes 60-gm of powder, 40-ml of liquid, mixing pad, and powder scoop. The luting agent retails for \$80 and can be ordered by contacting the company at (800) 637-8582, (201) 871-1232, FAX (201) 871-0321, or www.sultanintl.com.

(Lt Col Roberts)

SensiTemp is a new provisional luting agent marketed by Sultan Chemists. This temporary cement features auto-mix delivery from a syringe-size cartridge that is advertised to allow cement placement directly into the restoration. The manufacturer states that SensiTemp is based on a patented potassium nitrate formulation that is purported to prevent hypersensitivity and post-restoration pain while releasing fluoride to provide therapeutic benefit for long-term provisional restorations. Each 10-ml SensiTemp cartridge is advertised to provide enough material for 50 provisional restorations. The SensiTemp Intro Kit (available with or without fluoride) contains three cartridges and ten mixing tips, retails for \$99, and can be ordered by calling (800) 637-8582, (201) 871-1232, FAX (201) 871-0321, or www.sultanintl.com.

(Lt Col Roberts)

The **Optimix Computerized Mixing System** is Kerr's newest triturator and is advertised as an improved successor to the Automix. The Optimix is manufactured and serviced by Demetron, a division of the Kerr Corporation. The unit retains the microprocessor control and LCD visual displays like those of the Automix but Kerr claims that the Optimix is completely programmable, eliminating the need for the computer "credit cards" which were provided with the Automix. Other listed Optimix features include an improved capsule holder, the ability to customize and save modified trituration programs, increased frequency ranges (3000 to 4800 cycles per minute), and laminated instruction cards for quick reference. The retail price is \$620 while the government price is the same as that of the Automix (\$441.45). Further information can be obtained at (800) 537-7187, FAX (800) 537-7345, or (714) 516-7400.

(Lt Col Roberts)

Prompt[®] L-Pop[®] is a new all-in-one adhesive marketed by ESPE America for bonding compomers to enamel and dentin. The product is innovatively packaged as a foil pack attached to a plastic applicator. The foil pack contains two separate pouches of liquids that are combined in a sequential manner by squeezing the contents of one pouch into the other. Mixing is thereby accomplished in a closed system.

After mixing, the provided applicator is used to apply the material to rinsed, lightly-dried dentin and enamel. ESPE recommends that the material be rubbed into the tooth structure for 15 seconds as it is applied. A stream of air is then gently used to thin the material. No light activation is required. The compomer is then used to restore the lesion as recommended by its manufacturer. ESPE claims Prompt L-Pop can be used with any brand of compomer. A Standard Package of the product contains 40 L-Pops and can be purchased for \$46.50 (retail) and \$30.25 (government) by contacting ESPE America at (800) 782-1571, (610) 277-3800, or (800) 458-3987 FAX.

(Col Charlton)



Heliomolar Flow from Vivadent is a microfill resin composite that uses the same basic formulation of Heliomolar but offers flowability to facilitate ease of placement. Vivadent also claims that the resin enables clinicians to produce highly polishable, esthetic restorations because of its microfill composition and the fact that it is available in 7 shades as well as a pedo white and two translucent enamel shades. Promotional information for Heliomolar Flow indicates that it is translucent, radiopaque, and releases fluoride. The product is supplied in small syringes with needle-type tips, which is the common packaging form for most flowable resin composites. A special shade guide is supplied in the kit.



Heliomolar Flow is indicated for anterior restorations, all types of small restorations, preventive restorations in premolars and molars, and cervical restorations. Vivadent also recommends it as a base under resin composite restorations. The Heliomolar Flow Assortment Kit contains seven syringes (one each of seven different shades), 40 cannulas (syringe tips), and a shade guide. The kit is available from Vivadent (800) 533-6825, (716) 691-0010, (716) 691-2285 FAX, www.ivoclar.com for \$125.00 (retail) and \$55.00 (government).

(Col Charlton)

Vivastick is a flexible, disposable, plastic stick with a semisolid adhesive tip that is recommended for handling restorations such as veneers, inlays, onlays, crowns, and bridges. The stick has a flexible neck that enables the user to adapt it to the appropriate angle for the easiest intraoral access. Ivoclar claims that the adhesive lasts for multiple uses during a single patient treatment and is particularly helpful for manipulating small and/or fragile restorations such as veneers or inlays. The Standard Package contains 50 Vivasticks in a plastic, hinge-opened box. A box can be bought for \$16.99 (retail) and \$9.34 (government) by contacting Ivoclar North America at (800) 533-6825, (716) 691-0010, (716) 691-2285 FAX, or www.ivoclar.com.

(Col Charlton)



Diamond Floss is an ultra-thin, stainless-steel, diamond-coated wire that can be used interproximally to remove excess cement, bonding adhesive, and resin composite. The wire is quite flexible and extremely thin (0.008 inches or 0.2 mm). Its manufacturer claims that because of its flexibility, it can be contoured around tooth

surfaces and restorations so that damage to gingival tissues is minimized. It can also be used for enamel stripping in orthodontics, and the manufacturer claims the product can be placed subgingivally for atraumatic scaling and root planing (especially in through-and-through furcations). The wire is autoclavable. A standard multi-use pack (a 6-foot length) costs \$49.95 (retail); an economy 3-pack is \$139.00 (retail). The manufacturer recommends cutting the standard length into 7- to 10-inch segments for clinical use. Contact Lynnhaven Enterprises at (877) 895-4705 or visit their website at www.diamondfloss.com for further information.



(Col Bartoloni)

The **Harvey DI Water System** is a piece of equipment that treats water which can then be used in steam sterilizers. The Harvey DI can be connected directly to a faucet via a quick-fitting connector so it delivers water when needed. The system uses nuclear-grade resin enclosed in a virgin polypropylene canister to purify tap water without the need for heating, which is required with a distillation process. The process removes calcium, magnesium, and other ionic impurities that can harm steam sterilizers. The unit can be placed on a counter top or wall mounted for easy installation. A piece of four-foot-long tubing and a dispenser are provided to place the deionized water directly into the sterilizer. The Harvey DI treats up to 0.5 liters of water per minute. The volume of water processed is based on feedwater quality. Maintenance consists of removing the cover to replace used cartridges. A color-change indicator shows when a cartridge needs to be replaced. The Harvey DI is available from Barnstead/Thermolyne at (800) 446-6060 for \$390.00 (retail) and \$292.50 (government). The replacement cartridge kit sells for \$56.00 (retail) and \$42.00 (government).

(Col Bartoloni)

PermaFlo is a flowable resin composite and light-cure cement that has recently been introduced by Ultradent Products. It is available in a wide range of shades, including all 22 Vita shades as well as an UltraLite shade for use with bleached teeth. Information from Ultradent states that PermaFlo is filled to 68% by weight, has a 12-micron film thickness, is fluoride releasing, and has an average filler particle size of 0.7 micron. In particular, the company stresses that PermaFlo is quite translucent which contributes to its overall esthetics. It is indicated for anterior and posterior restorations such as Class I, II, III, and V. It can also be used to lute esthetic, light-transmitting inlays, onlays, and veneers. An introductory kit (ref/up 946) contains six syringes (one each of six different shades), 40 dispenser tips, shade guide, and MSDS. The kit is available from Ultradent (800) 793-5216, (801) 572-4200, (801) 553-4915 FAX for \$100.25 (retail) and \$85.21 (government).

(Col Charlton)



The **Endo Analyzer 8005** is both an endodontic pulp vitality tester and electronic apex locator marketed by Analytic Sybron Dental Specialties. The pulp vitality feature is advertised to be pain-free with consistent, microprocessor control. The apex locator function is purported to accurately locate the foramen regardless of the presence of canal irrigants or fluids. The Endo Analyzer 8005 features two self-calibrating apex location programs that utilize five frequencies that graphically display the apical foramen in 0.1-mm increments. An audible chime also sounds when the foramen is reached. The unit retails for \$1295 (\$841.75

government) and further information is available at (800) 346-3636, (714) 516-7911 FAX, or www.endodont.com.

(Lt Col Roberts)

ICB (Intracoronaral Bristle) Brushes are small, 4-mm long brushes designed for use in slow-speed, latch-type, contra-angle handpieces. They can be used for pedodontic prophies and for adult prophies where access is limited. The brushes can also be used for cleaning around orthodontic brackets and inside cavity preparations prior to bonding procedures. They are available in 30- and 100-count packs. The 100-count packs (ref/up 1077) can be purchased from Ultradent (800) 793-5216, (801) 572-4200, (801) 553-4915 FAX for \$149.00 (retail) and \$126.65 (government).

(Col Charlton)



Excite Adhesive is a new, ethanol-based, fifth-generation (ie, "one-component") bonding agent from Vivadent. It is only one of two bonding agents filled with nanometer-size filler particles (the other is Prime & Bond NT from Dentsply/Caulk).

Because the fillers are so small, they purportedly can penetrate the etched dentin surface to become part of the hybrid layer. Also, they do not increase the film thickness, which is said to be so minimal that the bonding agent can be applied to a preparation and light activated prior to luting a restoration with a resin cement. Among its other advantages, Vivadent claims that Excite is able to cover tooth structure with only one application, reduce post-treatment sensitivity, and produce consistently strong bonds. The product is supplied in traditional bottle form but is also available in an innovative unit-dose capsule called a SoftTouch™ Vessel that enhances infection control because it is discarded after use. The SoftTouch™ Vessels Standard Kit (item 6556609) can be purchased from Vivadent (800) 533-6825, (716) 691-0010, (716) 691-2285 FAX, www.ivoclarna.com for \$99.00 (retail) and \$27.98 (government).



(Col Charlton)

Ceramic Repair Kit from Vivadent is a kit containing a group of dental materials used for the repair of porcelain, resin composite, as well as IPS Empress and Targis Vectris restorations. The kit contains the components organized sequentially to make it easy for the user to identify the order in which they are applied. Included in the kit are Total Etch (a 37% phosphoric acid etchant), Monobond-S silane solution, Monopaque to mask any exposed metal, Heliobond unfilled resin, and 3 shades of Tetric Ceram resin composite. Vivadent claims the product produces strong repair bonds and saves the user time



because all repair components are in one kit. The kit (item number 551905) is available from Vivadent (800) 533-6825, (716) 691-0010, (716) 691-2285 FAX, www.ivoclarna.com for \$239.95 (retail) and \$73.54 (government).

(Col Charlton)

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.

YOU GOTTA' FIND ANOTHER REASON FOR YOUR MEMORY GETTING WORSE...

Alzheimer's disease, dental amalgam and mercury. Saxe SR, Wekstein MW, Kryscio RJ, Henry RG, *et al.* J Am Dent Assoc 1999;130:191-199.

Excess mercury exposure is documented as a factor in neurotoxicity and has been implicated in the pathogenesis of Alzheimer's disease. Mercury release from dental amalgam has been suggested as a possible causative factor in Alzheimer's disease. In this study, the authors examined 68 patients with Alzheimer's disease and 33 control patients without the disease. As part of the examination, the patients' dental history and the number and approximate surface area of their existing amalgam restorations were recorded. Complete neuropathological evaluations were performed and mercury levels in multiple brain regions were measured at autopsy. The authors found no significant association between Alzheimer's disease and the presence of amalgam restorations. They also found no significant differences in brain mercury levels between patients with Alzheimer's disease and control patients. Moreover, brain mercury levels were not associated with dental amalgam history. **Mercury in dental amalgam restorations does not appear to be a neurotoxic factor in the pathogenesis of Alzheimer's disease. Dental amalgam restorations do not appear to be associated with brain mercury levels.**

SOME MOUTHRINSES MAY NOT BE SO GOOD...

Leukoplakia of the maxillary vestibule—an association with Viadent? Damm DD, Curran A, White DK, Drummond JF. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1999;87:61-66.

This report investigated a possible correlation between chronic use of Viadent products and subsequent development of leukoplakia in the maxillary vestibule. The study was initiated after two patients presented to an oral surgeon with specific isolated areas of leukoplakia in the maxillary vestibule. One patient firmly believed the lesion was secondary to use of Viadent rinse and toothpaste, and the second patient revealed a positive history of Viadent use. A retrospective review of 88 patients with diagnosed leukoplakia in the maxillary vestibule was initiated. Prevalence of Viadent use in this group was determined and compared to a group of 100 randomly selected adults who presented for dental screening at a dental school. Results found that 84.1 percent of the patients with leukoplakia in the maxillary vestibule had a positive history of Viadent use, whereas the prevalence of use was only three percent in the randomly selected group. **The authors concluded that use of Viadent products appears to be associated with an increased prevalence of leukoplakia in the maxillary vestibule.**

HEPATITIS C: THE NEW DANGER

Risk and prevention of hepatitis C virus infection: implications for dentistry. Cleveland JL, Gooch BF, Shearer BG. J Am Dent Assoc 1999;130:641-647.

This article provides an excellent overview describing the latest information on hepatitis C with clinical implications for dental providers. Published reports have warned dental health care workers about the potential risk of infection with bloodborne pathogens (including the hepatitis C virus [HCV]) during patient treatment. HCV is a major cause of chronic liver disease in the United States resulting in 8,000 to 10,000 deaths annually. The most efficient mode of HCV transmission is through percutaneous exposure. Most studies suggest the prevalence of HCV infection in dentistry is about 1 to 2 percent, indicating that the occupational risk is very low. There is no effective vaccine for hepatitis C due to the virus' ability to escape the immune system through mutations. The CDC does not recommend immune globulin for postexposure prophylaxis at this time. **Prevention of occupational transmission of HCV in dentistry continues to rely on the use of universal precautions, including the appropriate use**

of barrier precautions and the safe handling of sharp instruments. Currently no recommendations exist regarding practice restrictions for health providers with hepatitis C.

PERCUTANEOUS INJURIES: WHO'S TRULY AT GREATEST RISK?

Percutaneous injuries among dental health care workers. Kerr SP, Blank LW. Gen Dent 1999;47:146-151.

Percutaneous injuries have the potential to transmit bloodborne pathogens in the dental health care environment. The risk of bloodborne transmission is dependent upon the type of injury, amount of blood, virus titer, resistance of health care worker, response to environment, virulence of pathogen, and procedure during which the injury occurred. Prevention still remains the best method of reducing occupational transmission. There are limited reports on percutaneous injuries in dentistry, with no prospective studies involving the entire dental team in a variety of private practice settings. The purpose of this study was to determine whether a difference exists in the rate of percutaneous injuries among dentists, dental hygienists, and dental assistants in generalized and specialty private practices. Also this study compared the number of extraoral and intraoral percutaneous injuries among dental health care workers as a whole, and within each occupational group. **The findings were that dental assistants reported the highest number of percutaneous injuries. Extraoral injuries occurred with greater frequency (90 percent) than intraoral percutaneous injuries for all occupational groups and as a whole.**

A PINCH BETWEEN THE CHEEKS AND GUMS

Oral leukoplakia status six weeks after cessation of smokeless tobacco use. Martin GC, Brown JP, Eifler CW, Houston G. J Am Dent Association 1999;130:945-954.

Smokeless tobacco (ST) use has significantly increased over the past 25 years. The literature reports the association between ST use and oral and pharyngeal cancer, and notes that snuff use causes a greater variety and severity of epithelial changes than chewing tobacco. Leukoplakia is the most common oral mucosal lesion associated with ST use and studies have shown that 2 to 6 percent undergo malignant transformation. The objectives of this study were to estimate the prevalence of ST use among new United States Air Force recruits (3,051 males), evaluate the recruits' risk of developing oral leukoplakia associated with ST use, and describe the response of leukoplakic lesions after six weeks of involuntary tobacco use cessation. Results showed that 9.9 percent of the study population were identified as current ST users. Among current ST users, 39.4 percent presented with leukoplakic lesions. At the end of the involuntary cessation period, 97.5 percent of these leukoplakic lesions showed complete clinical resolution. **This investigation found that with six weeks of tobacco cessation, most leukoplakic lesions will resolve clinically in the young, healthy male population.**

BLEACH THOSE LINES

Combining periodic and continuous sodium hypochlorite treatment to control biofilms in dental unit water systems. Karpay RI, Plamondon TJ, Mills SE, Dove SB. J Am Dent Association 1998;130:957-965.

Microbial colonization known as biofilm formation continues to be intensively investigated. This is due in part to the American Dental Association (ADA) recommendations for dental unit water lines. In 1995 the ADA tasked the dental industry and research community to devise methods of delivering unfiltered output water at levels less than 200 colony-forming units per milliliter (CFUs/mL). Many methods have been evaluated to improve dental unit water including mechanical flushing, filters, and treatment with sodium hypochlorite (NaClO), chlorhexidine gluconate, and hydrogen peroxide. Recent studies have supported the efficacy of intermittent treatment with diluted household bleach to reduce bacterial levels in dental units. Past studies have shown that chlorine compounds can react with organic materials in biofilms to produce trihalomethanes which are listed as suspected human carcinogens. The purpose of this study was to evaluate the use of water chlorinated to 3 ppm as the source water, when used in combination with weekly 5,000 ppm chlorine treatment, and to assay for the presence of trihalomethanes in dental treatment water. Results showed that all tested dental units consistently delivered water with less than 10 CFUs/mL. Trihalomethanes were detected in the output water, but all samples were below the Environmental Protection Agency's limits for drinking water. **Weekly treatment with 5.25 percent NaClO diluted 1:10, and concomitant use of chlorinated treatment water (3 ppm)**

consistently attained the proposed ADA goal of fewer than 200 CFUs/mL in the unfiltered output.

ELASTOMERS CAN BE DISINFECTED

Effect of disinfectant agents on dimensional stability of elastomeric impression materials. Adabo GL, Zanorotti E, Fonseca RG, dos Santos Cruz CA. J Prosthet Dent 1999;81:621-624.

Dental impressions are a potential source of cross-contamination between patients and providers/dental laboratory personnel. It is recommended that impression be disinfected prior to processing, and studies have shown that disinfectants may adversely affect impression materials. This study investigated the effect of two methods of disinfection on the dimensional stability of six elastomeric impression materials. The impression materials were submitted to the following: immersion in 5.25 percent sodium hypochlorite for 10 minutes; immersion in 2 percent glutaraldehyde for 30 minutes; or no immersion (control). The different elastomeric impression materials included: polysulfide, addition silicone, condensation silicone, and polyether. The impressions were poured and casts were measured compared to a master model. **The data indicated that the disinfection treatment did not cause any changes in the elastomers compared with the control group.**

GENERAL DENTISTRY

58-11 SureFil High Density Posterior Restorative

(Project 98-56)

According to its manufacturer (Dentsply/Caulk), SureFil is a resin composite suitable for use as an amalgam alternative. It is one of several recently-introduced resin composites that are described by their manufacturers as "condensible" or "packable." They purportedly exhibit resistance to condensation because they are relatively highly filled with particles that have been modified in shape or texture.



Dentsply claims that SureFil's packability, carvability, polishability, resistance to slumping, and low polymerization shrinkage are the result of a synergistic linking of the product's filler particles with its urethane-modified Bis-GMA resin. This linking is purportedly made possible because of a technology developed by Dentsply that is called the "Interlocking Particle Technology (IPT)." Beneficial properties also result, to some degree, because SureFil is filled to 82% by weight (65% by volume) with a blend of fumed silica and barium fluoro alumino borosilicate glasses. Average particle size is 0.8 microns. According to Dentsply, SureFil's IPT, in combination with its filler particle morphology and size distribution, is responsible for the product's amalgam-like handling characteristics (e.g., condensibility and carvability).

Dentsply recommends SureFil for restoring Class I and II lesions in the posterior quadrant and for fabricating inlays and onlays. It is available in three non-Vita shades designated A, B, and C and is packaged in individual-dose, light-opaque plastic cups called spills that are attached in strips by shade. SureFil is placed in the cavity preparation after the tooth structure has been etched and treated with Prime & Bond 2.1 which is provided in the kit. According to Dentsply, SureFil can be placed in bulk up to 5 mm and light cured. The product and accessories are packaged in a flip-top cardboard box. All components in the kit (resin composite, etchant, bonding agent) are clearly identified and have expiration dates stamped on them. A plastic, graphics-containing instruction card comes with SureFil.

Manufacturer:

L.D. Caulk
L.D. Caulk Division
Dentsply International, Inc.
P.O. Box 359
Milford, DE 19963-0359
(800) 532-2855
(302) 422-4511
(800) 788-4110 FAX
www.caulk.com

Suggested Retail Price:

\$210.65 SureFil Restorative Introductory Kit (item number 645000) contains:
-ten blister packs each of shades A,B,C (five 2-spills of 0.28 g, five 3-spills of 0.4 g); total

- of 30 blister packs
- one 4.5-mL bottle of Prime & Bond 2.1
- one 3-mL syringe of Tooth Conditioner Gel
- plastic applicator handle with disposable brush tips
- plastic-tipped amalgam carrier

Government Price:

\$115.85 SureFil Restorative Introductory Kit (contents and item number as listed above)

ADVANTAGES:

- + Placement procedure is straightforward and simple.
- + More packable than standard resin composites which facilitates achieving acceptable interproximal contacts.
- + Adequate working time; not overly sensitive to ambient light.
- + Supplied with easy-to-use bonding agent (Prime & Bond 2.1)
- + Polishability and overall esthetics were rated highly by evaluators.
- + Is sufficiently radiopaque to ensure easy detection on a radiograph.
- + Is comparable in hardness to several popular resin-based restorative materials (e.g., Prodigy, F2000, Hytac, élan)
- + Provided with a laminated instruction card that uses graphics to depict product use.
- + Expiration dates are provided for all items in kit.
- + Provided with all appropriate Material Safety Data Sheets (MSDS).

DISADVANTAGES:

- Is not adequately polymerized when placed in bulk (i.e., a 5-mm thickness).
- Is not as condensible as amalgam.
- Evaluators did not find the material to be carvable as the manufacturer claims.
- Spill-type packaging leads to waste of material.
- Not available in unit-dose capsules.
- Non-Vita shade designations (A, B, C) were not useful in selecting shade.
- Is from 8% to 100% more expensive (per gram of refill material) than several popular resin composites.

SUMMARY AND CONCLUSIONS:

SureFil was judged by the majority of our clinical evaluators to be easy to place and it produced esthetic restorations. Although the material is more viscous and can be packed more easily than standard resin composites, it is not condensible like amalgam. Therefore, burnishing the matrix band and proper wedging is crucial to achieving a satisfactory interproximal contact when using SureFil. The material is also not carvable as Dentsply claims. Too much material is provided in the spill blister packs which leads to waste. While not the most expensive packable resin composite on the market, SureFil is more expensive than popular resin composites such as Herculite XRV, Prodigy, Spectrum TPH, and Z100. It is very important to note that DIS testing did not confirm Dentsply's claim that SureFil can be adequately light activated when placed in a 5-mm thickness. As a result, it should not be placed in a thickness greater than 2 mm before being light activated. In summary, although SureFil is somewhat easier to place, the current literature and this evaluation indicate it offers no important advantages over traditional resin composites and is more expensive. **SureFil** is rated **Marginal** for use by the federal dental services.

(Col Charlton)

58-12 Principal Compomer Cement

(Project 98-49)

Principle Compomer Cement is a hand-mixed, powder/liquid luting agent marketed by the