INFECTION CONTROL INFORMATION

October 2004

DENTAL INFECTION CONTROL SAFETY COURSE

The next co-sponsored Organization for Safety and Asepsis Procedures (OSAP)/Federal Services Dental Infection Control course is scheduled for Monday, 24 January—Thursday, 27 January 2005 in Atlanta, Ga. We will be covering a broad range of topics and have guest speakers from the Centers for Disease Control and Prevention, dental schools, and the Federal Services again this year. As in previous years, OSAP will handle registration issues. There will be a limited number of USAF command sponsored quotas that will be assigned by the MAJCOMS. Registration information can be found by visiting www.osap.org. For additional information, the USAF DIS point of contact is Lt Col Jennifer Harte at DSN 792-7668, commercial (847) 688-7668, or jaharte@nidbr.med.navy.mil.

PRODUCT EVALUATIONS

The following product evaluations have been recently posted on the DIS Web site (www.brooks.af.mil/dis/productevaluations.htm):

- Lines™ waterline treatment product, Micrylium Laboratories Inc. (10/04)
- The Synopsis of Dental Unit Waterline Treatment Products and Devices has been updated.

NEW INFECTION CONTROL PRODUCTS

New and innovative products are marketed each month and DIS is unable to evaluate all of them. 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 visit http://www.brooks.af.mil/dis/newproducts.htm or the manufacturer's Web site for more information on the following products.

- **Large QUIKcaps**, barrier covers for computer keyboards (Practicon Dental, www.practicon.com)
- **Smart Can™**, a touch-free waste receptacle (Bosworth Company, www.bosworth.com)
- **Sterilox™**, a dental unit waterline treatment product (Ultradent Products, Inc., www.ultradent.com)
- **Vista DayTab™**, dental waterline irrigant tablets (Vista Research Group, www.vistaresearchgroup.com)
- **Instrument cassette holders** (Paradise Dental Technologies, www.pdtdental.com)

FREQUENTLY ASKED QUESTIONS

Question: We are in the process of repainting our dental clinic. Can we use latex paint in our "latex-safe" operatory?

Answer: According to the American Academy of Allergy Asthma and Immunology and the American Latex Allergy Association, most latex paints are not a problem since they do not contain natural latex. The type of latex found in latex paint is synthetic and is not the same type of latex (i.e., natural rubber latex) commonly found in consumer products or medical and dental supplies.

Selected References:

American Academy of Allergy Asthma and Immunology. *Patient/Public Education: Fast Facts: Latex Allergy*. Available at: www.aaaai.org/patients/resources/fastfacts/latex.stm. Accessed October 2004.

American Dental Association. *Oral Health Topics A–Z Latex Allergies (Allergies to Rubber Latex).* Available at: www.ada.org/public/topics/latex_allergy.asp. Accessed October 2004.

American Latex Allergy Association. *Frequently Asked Questions: Does latex paint contain natural rubber latex (NRL)?* Available at: www.latexallergyresources.org/FAQ/paint.cfm. Accessed October 2004.

Rubber Dams and Long-Sleeved Protective Clothing

Question: Is it acceptable to wear short-sleeved clothing when doing operative dentistry with a rubber dam in place?

Answer: No. The Occupational Safety and Health Administration (OSHA) requires the use of long-sleeved protective clothing for procedures in which exposure of the forearms to blood or OPIM is reasonably anticipated to occur. Although OSHA standards are performance based, handpieces and air/water syringes are used during operative procedures, and both of these devices create a visible spray that contains primarily large particle droplets of water, saliva, blood, microorganisms, and other debris. A rubber dam, under ideal conditions (e.g., tightly adapted to all teeth, no holes or tears present), can be considered an engineering control that **minimizes** the generation of spray and spatter of blood and other potentially infectious materials (OPIM), which includes saliva. However, the rubber dam is not in place during local anesthetic procedures, and is usually removed when finishing and/or polishing restorations. After administering local anesthesia frequently an air/water syringe is used to rinse the patient and after removing the rubber dam, it is common to use an air/water syringe to rinse the teeth and/or use a handpiece. During both these procedures, the potential exists for contamination with blood or OPIM. In a 1992 publication, OSHA did mention that a rubber dam was an example of an engineering control, however it did not state that using a rubber dam eliminated the need for personal protective equipment. Furthermore, OSHA publication 3129 has been replaced by OSHA publications 3186-06R 2003 and 3187-09R 2003 which do not mention the rubber dam. Finally, there are no published infection-control related articles, textbooks, or guidelines that support the use of short-sleeved clothing when using a rubber dam.

Selected References

OSHA. Controlling Occupational Exposure to Bloodborne Pathogens in Dentistry. OSHA 3129 1992.

OSHA. Medical and Dental Offices: A Guide to Compliance with OSHA Standards. OSHA 3187-09R 2003. Available at: www.osha.gov/Publications/osha3187.pdf. Accessed October 2004.

OSHA. Model Plans and Programs for the OSHA Bloodborne Pathogens and Hazard Communications Standards. OSHA 3186-06R 2003. Available at: www.osha.gov/Publications/osha3186.pdf. Accessed October 2004.

FROM THE LITERATURE

Dental Unit Waterline Solutions and Bond Strength

von Fraunhofer JA, Kelley JI, DePaola LG, Meiller TF. Effect of a dental unit waterline treatment solution on composite-dentin shear bond strengths. J Clin Dent. 2004;15(1):28-32.

This study evaluated the possible effects of an antimicrobial dental unit waterline (DUWL) treatment solution on the adhesion of composite resin to dentin using shear bond strength (SBS) testing. Forty teeth were evaluated using two different dentin-bonding agents. The control group was treated with water and the test group with a DUWL treatment (ICX™) solution. Shear bond strength testing was performed with a universal test machine at the default cross-head speed of 0.1 mm/min. A set of teeth, sectioned, mounted and etched as above but rinsed with a 0.01% mineral oil/water mix prior to conditioning and bonding, was used as the negative control. **The findings of this study demonstrate that exposure of an etched**

dentin surface to a water-based DUWL treatment mixture (ICX™) has no adverse effects on subsequent adhesion strength.

DIS Comment: Studies have demonstrated that DUWL can become colonized with microorganisms, including bacteria, fungi, and protozoa. Periodic or continuous treatment of DUWL using chemical germicides has been proven effective. Continuous treatment offers the advantages of potentially suppressing bacterial contamination in the treatment water as well as in the aerosols and spatter generated by dental rotary and ultrasonic instruments. However, concerns have been expressed regarding possible adverse effects on dentin bond strengths. While the present study demonstrated that there were no adverse effects on bond strength when using the ICX™ product, several studies have evaluated the effect of other DUWL treatment products on the shear bond strength of resin composite to tooth structure with somewhat equivocal results.[1-3] Further research is warranted, as the clinical implications for the long-term effects on the restoration are uncertain at this time. Additionally, since the ICX™ solution contains sodium percarbonate, an oxidizing agent, corrosion studies were performed to evaluate the risk of damage to metallic components with the dental unit. The data indicated that the solution exhibits minimal risk of corrosion.

References:

1. Roberts HW, Karpay RI, Mills SE. Dental unit waterline antimicrobial agents' effect on dentin bond strength. J Am Dent Assoc 2000;131:179–183.
2. Knight JS, Davis SB, McRoberts JG. The effect of dental unit waterline treatment regimen on the shear bond strength of resin-based composite. J Am Dent Assoc 2001;132:615–619.
3. Taylor-Hardy TL, Leonard RH, Mauriello SM, Swift EJ. Effect of dental unit waterline biocides on enamel bond strengths. Gen Dent 2001;421–425.

Nonlatex Surgical Gloves

Korniewicz DM, Garzon L, Seltzer J, Feinleib M. Failure rates in nonlatex surgical gloves. Am J Infect Control 2004;32:268–273.

The purpose of this study was to compare the frequency of glove defects for nonlatex surgical gloves while surgeons performed routine surgery and to evaluate surgeons' satisfaction with nonlatex sterile gloves. Two brands of latex gloves and six brands of nonlatex gloves were tested. Gloves were collected at the end of each surgical procedure and tested for visual defects and barrier integrity using an automated calibrated water test machine consistent with the U.S. Food and Drug Administration's recommended standards. A total of 6,386 gloves used by 101 surgeons and 164 residents representing 15 surgical services were included in the analysis. Higher after-use defect rates occurred in nonlatex surgical gloves than in latex gloves. Higher times of use were related to higher defect rates for some surgical specialties, and both surgeons and residents were less satisfied with nonlatex surgical gloves. **Intact latex and nonlatex surgical gloves provide adequate barrier protection. Nonlatex surgical gloves have higher failure rates and lower user satisfaction than latex gloves do. Both nonlatex and latex gloves should be changed after 2 to 3 hours of use because the barrier of either type of glove becomes compromised with extended use.**

DIS Comment: Latex has been the traditional material of choice for surgical gloves, protecting both health-care personnel (HCP) and patients from the transmission of bloodborne infections. However, increased use of latex gloves has been accompanied by more reports of allergic reactions to natural-rubber latex between HCP and patients. This was the first clinical trial to test the barrier integrity of nonlatex sterile surgical gloves after use in the operating room. In addition to testing latex gloves, the study also included nitrile and neoprene gloves. Gloves used during oral and dental surgeries were included in this study.

Limited studies of the penetrability of different glove materials under conditions of use have been conducted in the dental environment. Consistent with observations in clinical medicine, leakage rates vary by glove material (e.g., latex, vinyl, and nitrile), duration of use, and type of procedure performed[1-6], as

well as by manufacturer.[7-9] The current study supports these findings. The frequency of perforations in surgeon's gloves used during outpatient oral surgical procedures has been previously reported to range from 6% to 16%.[10-13] Studies have demonstrated that HCP and dental health-care personnel are frequently unaware of minute tears in gloves that occur during use.[3,5,6,14] These studies determined that gloves developed defects in 30 minutes–3 hours, depending on type of glove and procedure, however investigators did not determine an optimal time for changing gloves during procedures.

In the present study, the overall surgical glove defect rates were 5.6% for latex and 7.5% for nonlatex. Of the nonlatex gloves used, the surgeons preferred the neoprene to the nitrile material. Problems reported when using nitrile gloves included: inflexibility of glove material, hand fatigue, excessive sweating, and inappropriate fit (too tight or too large even with appropriate sizing). The authors concluded that oral, plastic, dental, and cardiac surgeries represented high-risk specialties and therefore had an increased risk of exposure to bloodborne pathogens. The authors also recommend that practicing surgeons may need to change gloves within 2 to 3 hours so as not to exceed defect rates of 5%.

References

1. Burke FJ, Wilson NH. The incidence of undiagnosed punctures in non-sterile gloves. Br Dent J 1990;168:67–71.
2. Nikawa H, Hamada T, Tamamoto M, Abekura H, Murata H. Perforation of dental gloves during prosthodontic treatments as assessed by the conductivity and water inflation tests. Int J Prosthodont 1996;9:362–366.
3. Otis LL, Cottone JA. Prevalence of perforations in disposable latex gloves during routine dental treatment. J Am Dent Assoc 1989;118:321–324.
4. Morgan DJ, Adams D. Permeability studies on protective gloves used in dental practice. Br Dent J 1989;166:11–13.
5. Albin MS, Bunegin L, Duke ES, Ritter RR, Page CP. Anatomy of a defective barrier: sequential glove leak detection in a surgical and dental environment. Crit Care Med 1992;20:170–184.
6. Merchant VA, Molinari JA, Pickett T. Microbial penetration of gloves following usage in routine dental procedures. Am J Dent 1992;5:95–96.
7. Pitten FA, Herdemann G, Kramer A. The integrity of latex gloves in clinical dental practice. Infection 2000;28:388–392.
8. Jamal A, Wilkinson S. The mechanical and microbiological integrity of surgical gloves. ANZ J Surg 2003;73:140–143.
9. Korniewicz DM, El-Masri MM, Broyles JM, Martin CD, O'Connell KP. A laboratory-based study to assess the performance of surgical gloves. AORN J 2003;77:772–779.
10. Burke FJ, Baggett FJ, Lomax AM. Assessment of the risk of glove puncture during oral surgery procedures. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1996;82:18–21.
11. Avery CM, Hjort A, Walsh S, Johnson PA. Glove perforation during surgical extraction of wisdom teeth. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1998;86:23–25.
12. Schwimmer A, Massoumi M, Barr CE. Efficacy of double gloving to prevent inner glove perforation during outpatient oral surgical procedures. J Am Dent Assoc 1994;125:196–198.
13. Patton LL, Campbell TL, Evers SP. Prevalence of glove perforations during double-gloving for dental procedures. Gen Dent 1995;43:22–26.
14. Gerberding JL, Littell C, Tarkington A, Brown A, Schecter WP. Risk of exposure of surgical personnel to patients' blood during surgery at San Francisco General Hospital. N Engl J Med 1990;322:1788–1793.