



DEPARTMENT OF THE NAVY
BUREAU OF MEDICINE AND SURGERY
2300 E STREET NW
WASHINGTON DC 20372-5300

IN REPLY REFER TO
BUMEDINST 6600.10A CH-2
BUMED-631
3 Jan 96

BUMED INSTRUCTION 6600.10A CHANGE TRANSMITTAL 2

From: Chief, Bureau of Medicine and Surgery
To: Ships and Stations Having Dental Personnel

Subj: DENTAL INFECTION CONTROL PROGRAM

Ref: (a) BUMEDINST 6280.1A

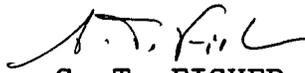
Encl: (1) Revised Pages 1 and 2 of the Basic Instruction;
Revised Pages 1-3 through 1-8; Revised Page 2-1,
Replacement Page 2-2; Revised Pages 2-7 through
2-9; Replacement Page 4-3, Revised Page 4-4

1. Purpose. To clarify conflicting terminology between the basic instruction and reference (a) concerning infectious waste disposal.

2. Action

a. Remove pages 1 and 2, 1-3 through 1-8, 2-1 and 2-2, 2-7 through 2-9, and 4-3 and 4-4 of the basic instruction and replace with like-numbered pages of enclosure (1) of this change transmittal.

b. Retain this change transmittal in front of the basic instruction.


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BUMEDINST 6600.10A CH-1
BUMED-631
23 Jun 93

BUMED INSTRUCTION 6600.10A CHANGE TRANSMITTAL 1

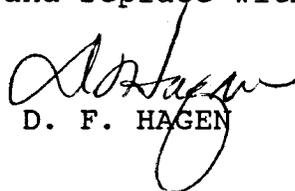
From: Chief, Bureau of Medicine and Surgery
To: Ships and Stations Having Dental Personnel

Subj: DENTAL INFECTION CONTROL PROGRAM

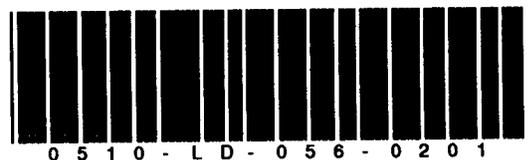
Encl: (1) Revised Page for Appendix E

1. Purpose. To extend the shelf-life of certain paper, nylon, and plastic peel sterile instrumentation packs. Retain this change transmittal in front of the basic instruction.

2. Action. Remove appendix E and replace with enclosure (1).


D. F. HAGEN

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IN REPLY REFER TO

BUMEDINST 6600.10A CH-2
BUMED-63
3 Jan 96

BUMED INSTRUCTION 6600.10A CHANGE TRANSMITTAL 2

From: Chief, Bureau of Medicine and Surgery
To: Ships and Stations Having Dental Personnel

Subj: DENTAL INFECTION CONTROL PROGRAM

Ref: (a) Bloodborne Pathogens: Final Rule 29 CFR 1910.1030 (R)
(b) Navy Environmental Health Center Technical Manual, NEHC-TM89-2, Nosocomial Infection Control Manual for Ambulatory Care Facilities
(c) BUMEDINST 6280.1A (NOTAL) (R)
(d) JCAHO Ambulatory Health Care Standards Manual (NOTAL)
(e) BUMEDINST 6010.13
(f) NAVMEDCOMINST 6230.1A (R)
(g) NAVMEDCOMINST 6230.3 (R)
(h) SECNAVINST 5300.30C (R)
(i) OPNAVINST 5102.1C (R)
(j) OPNAVINST 5100.23D (R)
(k) NAVMED P-5132 (NOTAL) (R)
(l) BUMEDINST 6220.9 (R)
(m) OSHA Rules on Occupational Exposures to Bloodborne Pathogens 3129, 1992 (R)

Encl: (1) Dental Infection Control Manual

1. Purpose. To provide policy and standardized procedures for proper infection control practices for Navy dentistry per enclosure (1).

2. Cancellation. BUMEDINST 6600.10.

3. Background. The emergence of the human immunodeficiency virus (HIV) epidemic, along with recent reports about health care workers who have acquired an HIV infection through occupational exposure, has generated much fear and worry within all the health professions, including dentistry. Health care personnel are caught in a conflict between concern for their patient's needs on the one hand and worry about acquiring an HIV infection from them on the other. Adding to this dilemma is the problem of hepatitis B virus (HBV) infection, the major infectious occupational health hazard in all the health care professions. These concerns have led to a renewed interest in the problem of infection control in the dental health care environment.

a. Reference (a), the standard to protect health care workers against all infectious diseases, including several viruses that infect the upper respiratory tract, is the first such action by the Labor Department's Occupational Safety and Health Administration (OSHA). This reference is the result of an exemplary cooperative effort by the Labor Department, the Department of Health and Human Services' Centers for Disease Control (CDC), organized labor, and the health care industry.

b. While the guidance in this instruction cannot guarantee against occupational transmission of HIV, HBV, and other infectious agents, it can effectively and significantly lower the risk of exposure and infection. Therefore, the proposed program is not a panacea for dental personnel's concerns, but a rational way of managing the risk of infection while continuing to provide quality patient care.

c. The prevalence of serologic markers for HBV in dental health care personnel has increased dramatically in the United States over the past several years. Each year approximately 18,000 health care workers become infected with the virus, and CDC estimates that HBV infection in health care personnel actually results in some 600 hospitalizations and 200 deaths annually. These statistics suggest that there is room for improvement in today's dental infection control practices.

4. Policy

a. Commanding officers and officers in charge (COs and OICs) must develop and implement universal protocols of infection control strategies to prevent transmission of HBV and other bloodborne pathogens. The ability of HBV to survive in the environment, coupled with its high titers in the blood, makes it an excellent model for infection control practices.

b. COs and OICs must appoint in writing an infection control officer (ICO) to assist in implementing the infection control program. Reference (b) provides guidance concerning the objectives of the program and the duties of the ICO.

5. Adaptability. COs and OICs may adapt the policies and procedures in this instruction and the references to meet local conditions or criteria. Compliance with this instruction is mandatory. When significant variations occur, the ICO must document in the infection control manual the reasons for those changes.

R) 6. Action. All dental personnel must be aware of sources and methods of transmission of pathogenic micro-organisms and infectious diseases. Commands must develop standard infection control policies and written protocols following this instruction, references (a) through (m), and the standards of care in the profession and practice of dentistry. In a small or isolated facility, under

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field conditions, and onboard some ships, compliance with portions of this directive may be difficult because of facility, equipment, material, or manpower constraints. In those instances, document the constraints and forward up the chain of command for resolution.



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Chapter 1

GENERAL INFORMATION

1. Introduction. Infection control involves taking steps to prevent the spread of infectious agents. Although it is not difficult, developing a good infection control plan does require learning some of the basics about infectious diseases and the way in which they are spread in the dental environment. This knowledge provides the background necessary for making responsible decisions about infection control issues. Reference (a) requires that employers make an exposure determination to identify personnel at risk for exposure. Employers are also required to develop a written exposure control plan. For the purposes of this instruction, the employer is the United States Navy. This instruction is the exposure control plan.

2. Exposure Determination. There is a reasonable risk to dental personnel, of skin, eye, mucous membrane, or parenteral contact with blood or other infectious material when protective attire is not used. Reference (a) defines this contact as an occupational exposure. This exposure occurs directly through contact with patient's blood and saliva and indirectly by contact with contaminated instruments, equipment, laundry, trash, and infectious waste.

a. Job classifications in which all personnel have, or may have, occupational exposure are those which require training in any aspect of dental treatment, including equipment repair and the prosthetic laboratory.

b. Job classifications in which all personnel may have occupational exposure are housekeeping, laundry, maintenance, infectious waste management, and others identified by the CO.

c. Tasks which are performed by some personnel with job classifications listed in 2b above are:

(1) Handling contaminated laundry and infectious waste.

(2) Cleaning spills of infectious waste.

(3) Cleaning and disinfecting contaminated work surfaces and equipment within a DTR, radiology, prosthetic laboratory, sterilization rooms, and equipment repair shops.

(4) Repair or maintenance procedures on equipment or plumbing which may have been contaminated by blood or infectious waste such as the high volume evacuation system (HVE), etc.

(5) Other tasks identified by COs or OICs.

3. Definitions

a. Asepsis. The process of preventing the access of micro-organisms.

b. Automated Washer Processor. Washer, sterilizer, dishwasher, or other mechanical washing device.

c. Barrier Technique. The use of rubber, plastic, paper, foil, or other fluid resistant materials to cover surfaces and protect them from contamination.

d. Bioburden. The number of micro-organisms contaminating an object. Also known as bioload or microbial load.

e. Biological Control. An unprocessed biological monitor from the same lot as the test monitor. When cultured, serves as a control by verifying the viability of the unexposed organisms.

f. Biological Monitor. A bacterial endospore test designed to assess whether sterilization has actually occurred. Also known as biological indicator or biological spore test.

g. Bloodborne Pathogens. Pathogenic micro-organisms that are present in human blood and capable of causing disease in humans.

h. Bowie-Dick Test. A diagnostic test of a prevacuum sterilizer's ability to remove air from the chamber and prevent air reentrant. This is not a sterility assurance test.

i. Chemical Disinfection. The destruction or inhibition of most viruses and bacteria while in their active growth phase. The process does not necessarily kill all spores nor can it be verified by a monitor.

j. Chemical Indicator. Chemical dyes used to determine whether the conditions required for sterilization are met. Also known as chemical monitor, dosage indicator, or process indicator.

k. Contaminated. The presence or reasonably expected presence of blood or other potentially infectious material on an item or surface.

l. Contaminated Laundry. Laundry that has been visibly soiled with blood or other potentially infectious materials or may contain contaminated sharps.

m. Culture. The propagation and growth of micro-organisms or living tissue cells in or on a nutrient medium.

n. Dental Item Classification. Dental items are classified as critical, semicritical, or noncritical based on the pathways through which cross contamination may occur and the location and technique of instrument use.

(1) Critical Items. Instruments and materials that penetrate the skin, mucous membranes, or bone. These items must be sterile before use. Examples include surgical instruments, periodontal knives, and suture needles.

(2) Semicritical Items. Instruments, equipment, or materials that frequently contact mucous membrane but cannot be sterilized due to their design or inability to withstand heat. At a minimum, these items require high-level disinfection. Examples include radiographic positioning devices and plastic impression trays.

(3) Noncritical Items. Instruments, equipment, or materials that do not normally penetrate or contact mucous membranes but which are exposed to splatter, spray, or splashing of blood, or are touched by contaminated hands. These items require intermediate-level disinfection. Examples include the dental unit and chair.

o. Exposure Incident. A specific eye, mouth, or other mucous membrane, nonintact skin, or percutaneous exposure to blood or other potentially infectious materials.

p. Exposure Time. The total continuous elapsed time during which the sterilizer is operating at preselected sterilizing parameters, such as temperature and pressure.

q. Engineering Controls. Equipment or methods which isolate or remove bloodborne pathogens from the workplace. For example: use of the rubber dam, use of the high volume evacuator during production of splash, splatter, and aerosols, adequate ventilation and air circulation, puncture proof sharps containers, closing the lid of ultrasonic cleaners during operation, use of cassettes to minimize handling of instruments during transport and sterilizing process, etc. (R)

r. Infectious Microorganisms. Organisms capable of producing disease in appropriate hosts.

s. Infectious Waste. Termed "Regulated Waste" in reference (a), defined as: liquid or semi-liquid blood or other potentially infectious materials (OPIM); contaminated items that would release blood or OPIM in a liquid or semi-liquid state if compressed; items caked with dried blood or OPIM and are capable of releasing those materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or OPIM. Reference (a) includes as OPIM saliva in dental procedures, any body fluid that is (R)

visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids.

t. Invasive Procedure. A surgical entry into the tissues, cavities, organs, or repair of major traumatic injuries. This includes the manipulation, cutting, or removal of any oral or perioral tissue during which bleeding occurs, or the potential for bleeding exists. Routine restorative or related dental procedures are not invasive procedures.

u. Micro-organisms. Bacteria, fungi, viruses, and bacterial spores.

R) v. Nosocomial Infection. An infection originating in the environment of a hospital or freestanding dental treatment facility (DTF). Reference (1) provides policies and guidelines for establishing nosocomial infection control programs.

w. Personal Protective Attire. Specialized barrier attire worn by an employee to protect against a hazard.

x. Occupational Exposure. Reasonably anticipated skin, eye, mucous membrane or parenteral exposure to blood or other potentially infectious materials that may result from performance of ones duties, without regard to using protective attire or equipment.

y. Saturated Steam Sterilization. A process which uses steam heat under pressure for sufficient length of time to kill all forms of micro-organisms.

z. Sanitary Sewer System. A sewer system connected to a sewage treatment plant.

aa. Spray-Wipe-Spray. An acceptable method of cleaning and disinfecting. Presently there is no agent on the market with Environmental Protection Agency (EPA) registration that cleans and disinfects in one step. Therefore, the importance of cleaning as a separate step from disinfection and sterilization cannot be overemphasized.

bb. Sterile, Sterility. Free from all living micro-organisms.

cc. Sterilization. Process which destroys all types and forms of micro-organisms.

dd. Sterilization Area. The area of a health care facility designed for housing sterilization equipment and conducting sterilization procedures.

ee. Sterilizer (Gravity Displacement Type). A type of sterilizer in which incoming steam displaces the residual air through a port or drain usually in or near the bottom of the sterilizer chamber. Accepted exposure techniques: 30 minutes at 121-123°C (250-254°F) and 15 to 17 pounds per square inch (psi) or 15 minutes at 132-135°C (270-274°F) and 30 to 32 psi.

ff. Sterilizer (Prevacuum Type). A type of sterilizer which relies on one or more pressure and vacuum excursions at the beginning or end of the cycle. This method of operation results in shorter cycle times due to the rapid removal of air from the chamber and the load by a vacuum system. Operating temperatures are 132-135°C.

gg. Unit Dose. The quantity of materials or supplies required to treat a single patient.

hh. Universal Precautions. A protocol for infection control that treats all human blood and body fluids as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

ii. Work Practice Controls. Controls that reduce the likelihood of exposure by altering the way one performs a task such as having patients brush their teeth or use an antiseptic mouthwash before beginning a procedure; use the rubber dam whenever possible, disinfecting the isolated teeth, and use of a disinfectant mouthwash before application and after it's removal; use heavy, puncture-proof gloves to handle instruments while cleaning and disinfecting instruments during the sterilization process; use an accepted and safe technique for recapping needles; disposal of sharps before beginning cleanup procedures at conclusion of treatment, etc.

4. Command Oversight Program

a. When developing command inspection and oversight programs, COs and OICs must include infection control as a top priority in all quality assurance and risk management and occupational health and safety programs. Due to the dynamics and volume of clinical activity, program management requires designated oversight, surveillance, and documentation. Reference (b) provides additional guidance. The requirements and intent of the Bureau of Medicine and Surgery's Dental Quality Assurance and Risk Management Program must be incorporated into command infection control program management.

b. COs and OICs must place major emphasis on support of proper infection control practices, strict infection tracking and reporting procedures, special project development and funding, investment equipment procurement and repair, and preventive maintenance programs.

c. COs and OICs will appoint, in writing, an ICO tasked with overall local program development, implementation, and management. The ICO must have credentials or experience documenting knowledge of infection control. The ICO's duties include, but are not limited to:

(1) Ensuring that infection control functions are addressed at least quarterly as part of the command quality assurance program.

(2) Developing a practical mechanism for reporting, treating, referring, and monitoring all odontogenic infections which have extended beyond the alveolar process and vestibular region, and all post-surgical infections. References (d) and (e) pertain. Appendix A is an example of an infection report format.

(3) Establishing a medical surveillance program per reference (a) that records the circumstances of an occupational exposure incident and medical history as it relates to HBV vaccination, HIV testing, and if protective attire or equipment was worn at the time of the exposure. The program must include protocols for:

(a) First aid.

(b) Medical evaluation and testing for HBV and HIV antibodies; followup testing at 6 weeks, 12 weeks, and 6 months.

(c) A mechanism of reporting the incident to the quality assurance and risk management coordinator.

(4) Ensuring an ongoing review and evaluating all aseptic, isolation, and sanitation techniques employed by the command.

(5) Reviewing and revising all infection control policies and procedures at least annually.

(6) Including a briefing in the command orientation for all new employees and staff on infection control policies and infectious disease hazards in the workplace per reference (e).

(7) Ensuring ongoing staff training in proper infection control practices.

(8) Maintaining minutes of all committee meetings, including conclusions, recommendations, actions, and followup monitoring.

(9) Developing and implementing a practical program for tracking infectious waste. This program, as a minimum, must include collection, transfer, and final disposal per reference (c), and State and local regulations.

5. Personnel Training in Infection Control Practices

a. BUMED (MED-54) directs continuous review and upgrade of the sterilization and infection control syllabus at the Naval School of Dental Assisting and Technology (NSDAT) for the dental technician, basic "A" school.

b. Commands must review and upgrade their staff and new employee orientation presentations as directed under reference (a). As a minimum, all personnel will receive initial training within 90 days of reporting onboard and at least annually thereafter. The training program must explain:

- (1) The epidemiology and symptoms of bloodborne diseases.
- (2) The modes of transmitting bloodborne pathogens and infectious diseases.
- (3) The local infection control program.
- (4) The tasks and other activities that may involve exposure to blood and other potentially infectious materials.
- (5) The use and limitations of practices that will prevent or reduce exposure, including proper engineering controls, work practice controls, and personal protective attire and equipment.
- (6) The types, basis for selection, proper use, location, removal, handling, decontamination, and disposal of personal protective attire and equipment.
- (7) The procedures to follow when an occupational exposure occurs, including reporting and medical followup procedures.

c. All personnel assigned duties in sterilization areas or functioning as surgical assistants will receive additional documented training in aseptic and sterilization techniques. Personnel must forward training requests through the appropriate chain of command.

d. Commands must document infection control training sessions with names of persons attending and conducting, dates, and a summary of the contents of the training. Maintain these records for at least 3 years.

e. Dental health care providers with exudative lesions, weeping dermatitis, or other open skin lesions on their hands, faces, or upper extremities should refrain from direct patient care until the condition resolves or cover with an occlusive dressing or long sleeve protective attire if the lesions are on the arms. Use a face shield if lesions are on the face.

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f. Ensure that pregnant dental health care workers are aware that bloodborne pathogens can be transmitted to their unborn children.

g. Although saliva has not been implicated in HIV transmission, commands must take measures to minimize the need for emergency mouth-to-mouth resuscitation. Mouthpieces, resuscitation bags, or other ventilation devices must be available for use in areas where the need for resuscitation is predictable.

6. The Planning, Programming, and Budgeting System (PPBS). Commands must use the PPBS, through the appropriate chain of command, to identify total resources required to meet the guidelines of this directive and those of OSHA and the EPA.

Chapter 2

UNIVERSAL PRECAUTIONS

1. Introduction. Identifying potentially infectious patients by medical history, physical examination, or readily available laboratory tests is not always possible. A period of up to several weeks often exists between the time a person becomes infected with a virus and the time when laboratory tests can detect the antigens or antibodies to it. In HIV infected individuals, this period may be months or years. Consequently, even if a patient tests negative, he or she may still be infectious. Dental personnel must assume that all body fluids and contaminated instruments and materials are infectious and routinely use universal precautions to protect themselves and the patients.

2. Discussion. Approximately 80 percent of patients with HIV or HBV show no symptoms and may be unaware of their infectious disease state. Even with a complete physical examination and full disclosure of medical history, most HIV and HBV patients may go unidentified. Therefore, the same infection control practices must be used with all patients. This approach is known as "Universal Precautions." In the dental setting, because contamination by blood and saliva may occur, precautions must be taken. Since HBV is presently the standard model for infection control practices and is more infectious than HIV, those established procedures known to prevent the spread of HBV serve as the basis for universal precautions.

3. Immunization and HIV Testing. Dental personnel providing direct patient care, including civilian employees, volunteers, dental laboratory, and repair personnel who are directly exposed to blood and saliva, must receive HBV vaccine per references (f) and (g). Also, reference (h) mandates that all active duty health care personnel receive HIV testing on an annual basis during each calendar year. (R)

4. Medical History Review. A thorough review of each patient's current medical history is mandatory before initiating any dental examination or treatment procedure. Medical consultation may be in order when a provider elicits or suspects a history of active infection or systemic disease. Patients with acute infectious diseases or those in the end stages of acquired immune deficiency syndrome (AIDS) require consultation with the appropriate medical specialist before elective treatment. Emergency treatment for relief of pain or treatment of trauma or infection may preclude prior medical consultation. In these situations, well considered judgement must prevail.

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5. Protective Attire and Barrier Techniques

a. Wear gloves for all patient contact activity. Complete all treatment on each patient and wash and reglove before beginning treatment procedures on another patient. Gloves torn or punctured during patient treatment should be replaced immediately. Since washing increases the porosity of gloves up to 60 percent, repeated use of a single pair of gloves is not permitted.

b. Wear reusable or disposable clinical apparel, such as smocks, scrubs, laboratory coats, or other personal protective attire, when treating patients or working in areas where contaminated or potentially contaminated materials may be present. When surgical procedures are performed involving large quantities of blood (e.g., trauma surgery) additional personnel protective equipment or apparel, such as long sleeved gowns, is required. Forearms must be covered if one reasonably assumes that they will be splattered with saliva or blood. Since the maintenance of all linen is a command responsibility, COs and OICs must request funding through the appropriate chain of command to purchase and maintain personal protective attire. On-site laundering must follow OSHA guidelines, see section 12d. Personnel must:

- (1) Wear clinic apparel only in the DTF.
- (2) Change clinic apparel daily and when visibly soiled.
- (3) Turn in soiled linen at the end of the work period. Do not leave dirty clinic attire in personal clothing lockers or spaces overnight.

c. Wear face masks or full length face shields with face masks during any patient treatment. Wear masks in the DTR and central sterilization room (CSR) where aerosols are a problem, especially on the dirty side of the CSR. Personnel must change face masks after each patient or when visibly soiled and when involved in other activities such as prosthetic laboratory and equipment repair procedures where airborne particles or dust is produced, when sorting laundry, during decontaminating procedures, cleaning spills of infectious waste, etc.

d. Wear protective eyewear when assisting or providing treatment or other procedures which may cause splash, splatter or airborne particles. Eyewear or goggles must have solid side shields to provide maximum protection. Patients must be provided approved protective eyewear. Disinfect patient eyewear after treatment.

e. Wear disposable protective headwear during surgical procedures.

f. Since aerosol particles can remain airborne long after a procedure is completed, staff and patients must not eat or drink in DTRs.

6. Preparation of the DTR

a. Unit Water Supply System

(1) At the beginning of each workday, flush each of the unit water lines and hoses for at least 1 minute, beginning with the cup filler and cuspidor even if their use is not anticipated. Potable water supplies may contain up to 100 colony forming units per millimeter (cfu/ml), and water in dental units, at times, can contain in excess of 1,000,000 cfu/ml. This microbial contamination comes from the retraction of contaminated water and saliva through the dental handpiece and the latent growth of bacteria in the unit water lines. Although most incoming water is chlorinated, chlorine loses its potency as the water lies stagnant in the narrowbore unit tubing. Under the right circumstances, these bacteria will proliferate and may become pathogenic.

(2) After each patient, remove handpiece, lubricate and run for 30 seconds. (This will also serve to purge the tubing as stated in 6a(1)). Then disinfect the handpiece if not sterilizable or remove the handpiece and transport to CSR. This procedure will remove any potentially infectious material from retraction of coolant water during previous treatment. Dental units purchased in the future must contain antiretraction devices.

b. Open instrument trays, packs, or cassettes and leave wrapping material underneath as a barrier for the work surface. Use impervious backed paper, aluminum foil, or clear plastic wrap to protect surfaces against contamination by blood and to cover areas that are difficult to disinfect, such as light handles or x-ray tube heads. After completing treatment, remove and discard the coverings or barriers, rewrap instruments and transport to CSR while gloved to protect against an exposure incident. After disinfecting the high touch and other contaminated areas, remove gloves, wash hands, and prepare for the next patient. Plan this process carefully for efficient use of time, conservative use of barrier material, gloves, and disinfectant. Only high touch areas and those areas contaminated by splash and splatter need to be covered during treatment or disinfected between patients.

c. Adhere to unit dose guidelines when dispensing disposable items. Preferably, include these items in instrument packs. Store all items used in patient care in closed cabinets or drawers.

d. Use autoclavable handpieces whenever possible; for non-autoclavable handpieces follow disinfection procedure in paragraph 8i. Flush handpiece tubing for 1 minute at the beginning of each day and for 30 seconds between patients to purge tubing of

contaminants. Lubricate sterilized or disinfected handpieces and run for 15 seconds directing the spray into the HVE. Flushing the tubing and running the sterilized or disinfected handpiece after lubrication cannot be combined without the possibility of contaminating it with pathogens from the last patient. Future handpiece purchases must be autoclavable.

7. Treatment

a. Aerosols in the work environment present a potential health hazard for both the dental staff and patient. Dental procedures usually generate aerosol particles that average 1.3 microns in diameter. When inhaled, particles less than 5 microns in diameter can penetrate directly to the terminal bronchioles and alveoli of the lungs. The long-term effect is cumulative and may be harmful. Reducing the volume of aerosols produced, decreasing the level of micro-organisms in the aerosols, and protecting personnel exposed to such aerosols will minimize the potential risk.

b. Having patients brush their teeth or rinse with a mouthwash before treatment reduces the microbial concentration of their oral flora. Three 10-second rinses will temporarily reduce a patient's microbial count by up to 97 percent. Use of a 0.12 percent chlorhexidine gluconate preoperative rinse significantly decreases the infectivity of an aerosol.

c. Providers must wash their hands before donning and after removal of gloves. Chapter 3 provides detailed guidelines for handwashing.

d. Wear sterile gloves for all invasive surgical procedures. Use of nonsterile gloves for examinations and other nonsurgical dental procedures is acceptable.

e. Use a rubber dam whenever possible. Swabbing isolated teeth with antimicrobial mouthwash reduces aerosolization of oral bacteria.

f. Use high volume evacuators during all procedures generating aerosols. Debriding cavity preparations with water or judicious air and water combinations, reducing levels of water coolant in handpieces, and covering ultrasonic tanks when in use will also lower aerosol levels. Disposable suction, saliva ejector, and irrigation tips are preferable.

g. Autoclave all instruments that can withstand heat sterilization.

h. Sterilize rotary cutting instruments such as burs and diamonds before use. Dry heat sterilization is preferable. Chapters 4 and 5 provide additional guidance.

i. Use of the unit dose concept is mandatory when dispensing supplies for each treatment setup.

(1) Use sterilized cassettes, tray sets, or packs for instruments. If appropriate, place proper amount of supplies in each setup or cassette before sterilizing. Consider making up separate packages of supplies and store in DTR for unit dose dispensing.

(2) Store opened packages of supplies in closed drawers or cabinets in DTR (in a covered container if practical).

(3) Use clean forceps to dispense only enough supplies for immediate use.

(4) Never use hands to dispense items from bulk storage containers.

j. Using opened, properly decanted irrigation solutions is acceptable for up to 1 week for nonsurgical use. When used for surgical procedures it is considered sterile for only 1 day. Record the expiration date on all opened containers.

k. Before leaving the DTR, remove and discard gloves and mask worn during patient treatment except when transporting contaminated items to CSR or to the prosthetic laboratory.

l. Notate dental records, view radiographs, and take photographs after removing gloves and washing the hands unless cover gloves are worn. This prevents transfer of secretions to and contamination of the patient's chart.

m. Place biopsy specimens in sturdy, properly labeled, leak-proof containers. If the outside of the container becomes visibly contaminated while collecting specimens, clean and disinfect it or place the container in an impervious bag.

8. Disinfecting the DTR Between Patients

a. Wear gloves while handling contaminated materials and instruments or cleaning contaminated surfaces.

b. Place all disposable sharps in sharps container. Rewrap cassettes, packs, or trays in original wrap and place individually packaged instruments in a covered container. Then transport to CSR while wearing gloves. This will prevent the possibility of injury during transport or to CSR personnel from loose instruments or instruments protruding from cassettes.

c. Take all metal and heat stable items to CSR for sterilizing.

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d. Place all contaminated, nonsharp, disposable materials in designated containers lined with plastic bags. Foot operate these containers if they have lids.

e. Decant liquid infectious wastes into the sanitary sewer system through clinical sinks (not handwashing sinks) or unit cuspidors unless local or State regulations prohibit this practice.

f. Treat used disposable sharps, such as needles and scalpel blades, carpules, disposable syringes, used burs, and broken instruments as infectious waste. Handle these items with extreme care to prevent unintentional injury and possible spread of bloodborne disease. Place used disposable sharps in puncture resistant containers specifically designed for needles and other sharp items. The universal symbol for biohazard must appear on these containers. Locate the containers in the DTR. Do not recap, bend, break, or otherwise manipulate needles by hand. In the dental setting, because a patient may require a second injection of local anesthetic, and most syringes are not disposable, recapping is sometimes necessary. Never recap a needle using a two-handed technique. Instead, use one of the commercially available sheath holders or the "scoop" technique. In this technique, the cap is scooped up from the tray with the needle tip using only one hand. Never allow uncovered needles to remain on the instrument tray. Do not inventory used or contaminated needles.

g. Sterilizable or disposable syringe tips are recommended. For nonsterilizable tips, flush water syringe for 30 seconds. Disinfect by wiping with a high-level disinfectant to clean, then wrap with disinfectant saturated gauze for 10 minutes.

h. Wipe autoclavable handpieces to remove gross contaminants. Remove the handpieces from the couplings and lubricate following the manufacturer's instructions. Transport to the CSR for sterilization.

i. For the nonautoclavable handpiece, while wearing gloves, submerge two gauze sponges per handpiece in a high-level, EPA-registered disinfectant. Squeeze out any excess. Use one sponge to wipe the handpiece thoroughly and discard. Wrap the second sponge around the handpiece and return the handpiece to the holder for the period of time specified by the manufacturer. Before reuse, wipe the handpiece thoroughly with potable water to remove residual disinfectant.

j. Remove all disposable coverings.

k. Using the spray-wipe-spray technique, clean and disinfect all unprotected "high touch" areas with an intermediate-level, EPA-registered disinfectant. Remove all debris and particulate matter

before disinfection. To be effective the disinfectant must remain in contact with surfaces for the time specified by the manufacturer. Do not use 2 percent glutaraldehyde as a surface disinfectant because of caustic vapors.

1. Remove gloves and wash hands and other exposed skin surfaces with an antimicrobial soap.

m. When discarding a face mask after removing gloves and washing hands, handle it only by the elastic or cloth tie strings. Never touch the mask itself.

9. Exposure Incident. Dental personnel who sustain percutaneous inoculation of serum or saliva by accidental puncture while handling instruments must receive immediate medical evaluation to comply with the local medical treatment facility's (MTF) guidelines. Refer to reference (b). Report the incident as a mishap to the command safety officer per reference (i). (R)

10. Securing the DTR at the End of the Day

a. Follow steps 8a through 8m.

b. Flush the high volume evacuator system with at least one quart of water. Clean the system with an HVE system cleaner at least once each week. Use more often if indicated by problems. When the HVE system is used for surgical care, use the system cleaner daily.

c. Spray-wipe-spray the countertops, dental unit, chair, and light.

d. Flush each unit water line and hose for 30 seconds.

11. Housekeeping. Although micro-organisms are normal contaminants of walls and floors, these surfaces are rarely associated with transmitting infection to staff and patients; however, all facilities must remain clean. Any infection control instruction will determine and implement a written schedule for cleaning and method of disinfection based upon location within the facility, type of surface, type of contaminant present, and tasks or procedures performed in a given area.

a. Properly clean and disinfect with a detergent and an EPA-registered disinfectant all working surfaces and equipment that come into contact with blood and other potentially infectious materials.

b. Clean uncarpeted floors and other horizontal surfaces regularly and when spills occur. Use launderable mops with a detergent and an EPA-registered disinfectant or a detergent with

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sodium hypochlorite 1:100 dilution. Mops must not be used for more than 1 day without laundering.

c. Clean walls, blinds, and curtains only if they are visibly soiled.

d. Inspect, clean, and disinfect, on a regular basis, all bins, pails, cans, and similar receptacles intended for reuse and having the potential for contamination with blood or other potentially infectious materials. Clean and disinfect these containers immediately or as soon as possible upon visible contamination.

e. Noninfectious waste refuse containers do not appear to be overt infection control hazards. Line them with a plastic liner bag, leave them uncovered and do not allow them to overflow. Remove hinged doors on cabinet refuse containers and hinged lids on freestanding containers since they present increased potential for cross contamination.

f. Do not pick up broken glassware directly with the hands. Instead, use mechanical means, such as a brush and dust pan, vacuum cleaner, tongs, cotton swabs, or forceps.

12. Laundry. Bed linens, towels, smocks, trousers, and other protective attire are considered ordinary laundry per reference (a), unless they are visibly soiled by blood or other potentially infectious material. Ordinary laundry will be sorted wearing gloves and processed in the usual manner. Contaminated laundry is visibly soiled by blood or other infectious material and will be packed in a red biohazard container or bag, or in a plastic bag with a biohazard label, before shipment to the laundry. An alternative method is to autoclave the contaminated articles and treat as ordinary laundry.

a. When sorting laundry, wear gloves and other appropriate personal protective attire.

b. Bag contaminated laundry at the location of use. Do not sort or reuse soiled laundry in patient care areas.

c. Transport contaminated laundry in leakproof bags labelled or color coded per paragraph 2(g)(1)(i) of reference (a).

R) d. Contaminated laundry may be laundered on-site if OSHA and CDC guidelines are followed (reference (m)).

(1) A wash cycle must be of at least 25 minutes duration with a water temperature of at least 160 degrees Fahrenheit (70 degrees C).

(2) No specific recommendations regarding detergents; chlorine bleach may be added for extra microbial activity.

(3) Washer and dryer must not be located in any patient care area.

(4) A separate washer, specifically used for contaminated articles, is not required. It is recommended that contaminated and soiled laundry not be combined within the same washer load.

e. By using a washer within a dental clinic which adheres to universal infection control policies, contaminated laundry must be placed in appropriately labeled bags or containers. All personnel must be appropriately trained to recognize that the bags contain contaminated laundry. This would eliminate the purchase of red or biohazard labeled bags.

13. Infectious Waste Disposal

(R)

a. Infectious waste, now termed "regulated waste" in reference (a), is defined in paragraph 1s. In the dental operator, this definition means any disposable material with blood or saliva on it which, if handled, would release or express the blood or saliva. If there is doubt as to the infectiousness of a material, it should be considered infectious.

b. Infectious waste must be placed in closable, leak-proof containers or bags that are labeled as a biohazard. The container may either be in the operator or in a central area in the clinic. If a centralized area is the infectious waste depository for the clinic, the infectious waste from each operator must be transported in closable, leak-proof containers or bags that are labeled as a biohazard. If head rest covers are used for transportation, they must be closable and identified with a biohazard label.

c. It is imperative that all operatories within a clinic and all clinics within a command handle infectious waste in a uniform manner, where ever practical.

d. Reference (c):

(1) Defines proper record keeping required for documentation purposes.

(2) Is the final authority on infectious waste management.

e. On-site decontamination will be performed on all contaminated equipment before servicing or shipping. A readily observable label per paragraph 2(g)(1)(i)(h) of reference (a) must be attached to shipped equipment where decontamination procedures are not feasible.

Chapter 3

HANDWASHING

1. Introduction. Handwashing is one of the most important procedures in preventing the transfer of micro-organisms from one person to another. The purpose of handwashing is to remove these micro-organisms from the folds and grooves of the skin by lifting and rinsing them from the skin surface. Good handwashing technique and use of gloves are essential before anticipated exposure to patients' blood or body fluids.

2. Skin Flora. The skin harbors two types of flora, resident and transient. Resident organisms can survive and multiply on the skin, can be cultured repeatedly from the skin, are usually of low virulence and are not easily removed. Conversely, transient bacteria do not survive and multiply on the skin and are not firmly attached. The mere mechanical action of rubbing the hands together and rinsing them under running water is effective in removing transient bacteria.

3. Handwashing Agents

a. Water-based Cleaning Agents. Products which include chlorhexidine, iodophors, and alcohol among the active antimicrobial ingredients are approved for handwashing. Products which use aqueous quaternary ammonium compounds, such as those containing dilute benzalkonium chloride, are not approved. Outbreaks of nosocomial infection associated with the use of aqueous quaternary ammonium compounds have been documented.

(1) Iodophors. These are water soluble complexes of iodine with organic compounds which are effective against all gram positive and gram negative bacteria and viruses. Iodophors usually do not have a long acting germicidal action and, if used frequently, may cause severe drying of the skin.

(2) Chlorhexidine Gluconate. This antiseptic is usually marketed as 4 percent chlorhexidine gluconate with 4 percent isopropyl alcohol in a sudsy base. Chlorhexidine gluconate is an effective antiseptic for reducing transient and resident microbial hand flora, has a sustained antimicrobial effect and does not appear to affect the skin adversely. It is also approved as a surgical scrub.

b. Waterless Handwashing Agents. Seventy percent isopropyl alcohol virtually disinfects the skin in 20 seconds. It is effective against bacteria, tubercle bacilli, fungi, and viruses. Unfortunately, it is volatile, flammable, evaporates quickly, and dries the skin. Alcohol-based, waterless handwashing agents may be

used in areas where handwashing sinks are not readily available. If the hands become visibly soiled, wash them with soap and water as quickly as possible.

4. Handwashing Equipment and Soap Dispensers

a. Sinks should have electronic elbow, foot, or knee action faucet controls for asepsis and ease of function.

b. Empty, disassemble, and clean weekly all refillable hand cleansing agent dispensers. Do not use bar soaps in bathrooms or clinical and common areas.

c. Nonhand actuated dispenser controls are preferable.

5. Handwashing Guidelines. All personnel involved in patient care must wash their hands, wrists, and forearms with a disinfectant soap and water:

a. At the beginning of each day.

b. Between patients, before and after going to lunch, taking a break, or using the bathroom, or anytime they become contaminated.

c. Before gloving, after degloving, and before regloving.

d. At the end of the day.

6. Handwashing Techniques. Dental staff personnel involved in patient care must follow a rigid handwashing protocol by:

a. Removing all jewelry and other ornaments from the hands and wrists.

b. Trimming the fingernails and cuticles. Nails should be no longer than the finger tips to avoid puncturing the gloves. Do not use false fingernails since contamination may occur from fungal growth between the false and natural nails. Also, do not wear nail polish since micro-organisms can hide in small cracks in the finish.

c. Wetting the hands under warm, running water and applying the amount of antimicrobial soap required to work up a lather. Vigorously rub the hands together, fingers entwined. This creates friction and loosens dirt and micro-organisms. Clean under the fingernails using the fingernails on the opposite hand. Continue scrubbing the wrists and lower forearms.

(1) Visibly soiled hands may require more time.

(2) Surgical teams must scrub their hands up to the elbows with an antimicrobial surgical product for the time specified by the manufacturer. After scrubbing, dry with a sterile towel.

(3) When washing times are too short or technique is poor, several problems may occur:

(a) Fingertips, thumbs, and the areas between the fingers are washed poorly or may be skipped entirely.

(b) The dominant hand is generally washed less thoroughly than the nondominant hand.

(c) Microbe counts under the fingernails have been found to remain high even after surgical scrubs.

d. Rinsing soap off by placing hands under warm, running water. If the sides of the sink are touched, repeat handwashing.

e. Drying hands with paper towels.

f. Using a paper towel when turning off the faucet, if the sink does not have an electronic elbow, foot, or knee action faucet control.

Chapter 4

STERILIZATION

1. Introduction. Concerns about transmitting infectious agents, such as HBV and HIV, have caused us all to become more aware of the need to sterilize and disinfect instruments, materials, and other equipment to protect providers and patients. A variety of sterilization methods and many types of liquid chemical disinfecting agents are available. Heat sterilization is preferable for all equipment and materials that can withstand high temperatures. Heat sterilization is effective, relatively easy to use, comparatively inexpensive, and readily monitored for effectiveness. Sterilization and the availability of sterile products for use in dental health care delivery depend on many factors. The most critical are:

- a. Proper and efficient sterilization facility design.
- b. Sound infection control practices before, during, and after sterilization.
- c. The efficacy of the actual sterilization process.

2. Physical Design. DTFs must have a CSR or central sterilization area. Centralization of sterilization activity is safer, provides more efficient use of materials and personnel, and standardizes execution and monitoring procedures. The critical elements of CSR area design are:

a. Dedicated Work Areas. The design and outfitting of a sterilization area must include work areas for receiving, cleaning, processing, sterilizing, storing, and issuing.

b. Functional Flow of the Sterilization Process. Do not process contaminated instruments, materials, or equipment in an area or on a surface common to the handling of sterilized items. Materials and equipment must pass from receipt to issue without physically retracing or impinging on a preceding step or area. Personnel must comply with the functional flow guidance shown in appendix B.

c. Traffic Control. Controlled access to the presterilization and sterilization areas minimizes the potential for transfer of micro-organisms between contaminated items, patients, and staff. These areas must be off limits to anyone not involved in the sterilization process.

d. Receiving and Cleaning. Ideally, this area will be physically separate from the remainder of the sterilization area. If physical separation is not obtainable, proper outfitting and

equipment selection are critical. When programming for replacement or upgrade of facilities, select equipment that minimizes handling of contaminated materials and instruments. Also, when planning and designing this area, include a space equipped with the utilities necessary for operating dental handpieces.

e. Processing. Ample work surface for the volume of materials processed is critical. All inspecting, sorting, wrapping, and packaging of contaminated materials occur here. The height and overall dimensions of the work surface, plus a clear surrounding area, are important considerations when planning a functional processing area.

f. Sterilization. Size of and sufficient access for loading, unloading, and servicing the sterilizer are the determinants of the space requirements for this area.

g. Sterile Storage and Issue. To protect and maintain all sterile items, storage and issue areas should not be in the immediate vicinity of the contaminated processing areas.

3. The Sterilization Process

a. Management of Contaminated Instruments. Following the completion of a patient's treatment, take the contaminated instruments directly to the receiving section of the sterilization area. Do not rinse, scrub, or unnecessarily handle contaminated instruments or materials in the DTRs or other patient treatment areas. In the most extenuating of circumstances, only the CO, or designee, the ICO, under written direction, may make exceptions to this requirement.

b. Instrument Cleaning. Wear heavy, puncture proof gloves while handling all potentially contaminated items. Break down all packs and place disposable items and contaminated linens in appropriate containers. All contaminated, reusable items must be decontaminated by immersion in an EPA-registered disinfectant before further handling. This step can be eliminated if these items are cleaned in an ultrasonic cleaner with an EPA-registered disinfectant which also is approved as an ultrasonic cleaner. Process instruments using one of the following methods, listed in order of preference:

(1) Automated Washer Processor. The automated washer is the safest and provides an effective cleaning process.

(2) Ultrasonic Cleaning. This process is safer and more effective than manual scrubbing. Always use baskets in the ultrasonic unit to reduce instrument handling and improve cleaning efficiency. Covers must be in place when using this equipment to

reduce aerosol production. Solutions must be capable of removing protein, blood, and other organic debris. Change the solutions daily or when visibly soiled.

(3) Manual Scrubbing. Although manual scrubbing is time consuming and presents increased potential for contamination injury, this method is effective for cleaning instruments. Triple sink modules allow personnel to perform in an orderly sequence multiple functions such as prerinsing, soaking, washing, and final rinsing. While wearing general purpose utility rubber gloves, face mask, plastic apron, and eye protection, place instruments in a disinfecting solution, allow them to soak and then scrub. Avoid aerosol production.

c. Presterilization Processing

(1) Inspection and Sorting of Instruments. Inspect items closely for wear, breakage, and cleanliness and sort according to sets or packs.

(2) Wrapping and Packaging. See appendices C and D. Before terminal sterilization, wrap or package all critical and semicritical items individually or in sets. The practical use of some semicritical items may preclude wrapping or packing. Basic guidance in proper wrapping technique includes:

(a) Using trays or cassettes to reduce the possibility of puncturing the wrapping material and the risk of injury during post treatment handling.

(b) Wrapping loosely to allow steam to circulate freely throughout the pack. Arrange items so that all surfaces receive direct exposure to the sterilizing agent.

(c) Opening all hinged instruments to allow steam to penetrate these areas.

(d) Using proper wrapping material for instrument sets. Double wrap items not in heat sealed packages. Launder muslin wraps after each use. Follow the appropriate time-temperature profile for the type of wrapping material used.

(e) Using internal and external chemical indicators.

(f) Labeling packs with the identification number of the sterilizer and the dates of sterilization and expiration. See appendix E.

d. Sterilization Methods

(1) Steam Heat Sterilization. Steam under pressure is the most effective means of sterilization for almost all items used in dentistry. To achieve sterility, moist heat under pressure must

come into contact with all surfaces of all items for the appropriate length of time. Basic guidance for proper sterilization includes:

(a) Arranging packs loosely in the sterilizer chamber. Avoid overloading to allow steam to circulate freely among the packs.

(b) Using perforated or mesh bottom trays and proper loading technique to facilitate steam penetration and air and condensate removal.

(c) Following the manufacturer's instructions on sterilizers and sterilizing agents. Minimum exposure times and temperatures vary depending on the type of sterilizer and wrapping material used.

(d) Biological monitoring of the sterilization process at least weekly.

(e) Performing the Bowie-Dick test weekly when using prevacuum sterilizers.

(f) When recording capability is available, maintaining sterilization records (time and temperature recordings) for each cycle. Sterilizers purchased in the future must have recording capability.

R) (g) Maintaining a consolidated sterilization log for each sterilizer. Each log must contain, at a minimum, the sterilizer identification number, sterilization dates, duration, and temperature of sterilization cycles (if not on recording charts or records), operator's name, biological monitoring results, repair and preventive maintenance dates, and a synopsis of actions taken. Reference (k) pertains.

(h) Allowing sterile instruments and packs to cool before moving to storage areas. Placing warm, wrapped, sterilized items on cool surfaces can induce condensate formation and result in contamination. Handle packs carefully and as little as possible. Store in well ventilated areas with controlled temperature and humidity. Closed cabinets rather than open shelving are preferable for storage.

(2) Dry Heat Sterilization. Dry heat at temperatures above 320°F will achieve sterilization. Dry heat sterilizing ovens may use conduction (direct contact with a heat source), radiation (long electromagnetic waves), or convection (heated air) to achieve sterilization depending on the location and type of heating elements. Sterilization time for dry heat depends on the temperature. A typical dry heat cycle is 90 minutes at 320-345°F, plus the time required to bring the load up to sterilization temperature. Be sure to follow the manufacturer's instructions.

(3) Chemical Vapor Sterilization. A mixture of alcohols, formaldehyde, water, and other chemicals heated under pressure forms a gas that can achieve sterilization. Sterilization requires 20 minutes at 270°F, when instruments are either unwrapped or bagged following the manufacturer's specifications.

(4) Ethylene Oxide Sterilization. Sterilization at relatively low temperatures is possible with ethylene oxide gas. Using a heated unit, sterilization can be achieved in 2-3 hours at 120°F. Follow manufacturer's instructions. It should be noted that ethylene oxide is a serious OSHA problem and may not survive in today's dental health care environment. COs should not purchase new ethylene oxide equipment.

(5) Liquid Chemical Sterilization. EPA classifies chemical disinfectants that are sporicidal as disinfectant or sterilants. Since it is virtually impossible to monitor liquid sterilization processes, treat these products as high-level disinfectants rather than sterilants. Be sure to follow the manufacturer's directions exactly.

(6) Bead Sterilizers. Use bead sterilizers only for intra-appointment sterilization of clean metallic instruments. Do not use them to sterilize instruments between patients. Clean contaminated instruments with an alcohol saturated gauze to remove blood and debris before inserting into the bead sterilizer. Monitor and record at least weekly the temperature in the sterilizer well. If using salt, line the well with aluminum foil to prevent corrosion.

4. Examples of Critical Category Items Requiring Sterilization

a. Surgical instruments

b. Handpieces, low-speed motor attachments, and sonic scalers and tips.

(1) Follow manufacturer's instructions.

(2) Autoclave bags reduce the cosmetic damage to the finish of handpieces and angles. Cleaning both ends of the fiber optic bundle with isopropyl alcohol after autoclaving extends the life of the bundle.

c. Burs and Diamonds. Clean in an ultrasonic cleaner and dry before sterilizing. Informal investigations and clinical studies show that dry heat is the preferable method of sterilization and imparts the least damage to cutting surfaces. Place burs and diamonds in a screw cap glass test tube or an aluminum foil wrapped bur block and dry heat sterilize for 90 minutes at 320-345°F. Place chemical indicator in each tube and in each foil wrapped

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bur block. At least weekly, place a biomonitor in one tube or foil wrapped block, the first load of the day, retrieve and send for culture testing following manufacturer's recommendations.

d. Endodontic Files and Gates-Glidden Burs. Arrange sets in gauze packs and seal in peel packs before autoclaving. When additional files or burs are necessary, take them from a new package or from a file storage box and sterilize them in a bead sterilizer before use. Restock and dryclave file storage boxes at least weekly. Use endodontic broaches once and discard into a sharps container.

e. Rubber Products. Sterilize nonheat stable rubber products using ethylene oxide or chemical sterilization following manufacturer's instructions. Sterilize heat stable rubber products using steam or dry heat. Use rubber prophylaxis cups once and discard.

Note: All critical category items require sterilization. See appendix F. Also, sterilize critical category items before turning them in for service or repair.

5. Sterilization Monitoring. Heat sterilization methods are generally reliable and effective. Nevertheless, regular monitoring of sterilization cycles is necessary to detect inadequate process conditions caused by human error or equipment malfunction.

a. Types of Sterilization Monitors. Commands should base selection of sterilization monitors on reliability, appropriateness to the process, safety, and cost effectiveness.

(1) Biological Monitors. Monitors designed to assess whether sterilization actually occurred. These systems consist of bacterial endospores impregnated in paper strips or sealed in glass ampules or plastic vials.

(2) Dosage Indicators. Chemical dyes that change color when exposed to steam, dry heat, or chemical vapor for a specified period of time. When placed inside an instrument pack, they determine whether the conditions necessary for sterilization have been met.

(3) Process Indicators. Chemical dyes that change color upon short exposure to sterilizing conditions. They are generally printed on packaging materials or supplied in tape form and are necessary to distinguish processed packages from those that have not been cycled.

b. Guidelines for Biological Monitoring

(1) Frequency. As a minimum, perform biological monitoring weekly.

(2) Test Procedure. Since biological monitoring systems are designed for specific sterilization methods, be sure to use a system compatible with the sterilization method used. While processing a normal load, place biological and chemical monitors in a test instrument pack. A test pack is the most practical. It is made by placing the monitors between several layers of folded wrapping material and is then double wrapped in the normal manner. Follow the monitor manufacturer's directions for placement of the test pack. In the absence of directions, place the test pack in the center of the load and subject to a normal sterilizing cycle. For each test use an unprocessed monitor for a control.

(3) Evaluation Criteria. After completion of the cycle, open test pack and evaluate the dosage indicator for pass or fail. If it passes, distribute the sterile goods and continue the biotest procedure. If it fails, follow the procedure in 5c.

(4) Positive Results. When positive biological monitoring occurs:

(a) Notify the ICO and record results in the log.

(b) If another sterilizer is available:

1. Retrieve and resterilize all items sterilized since the last negative test of that sterilizer.

2. Process a test pack with both a chemical and biological monitor and secure sterilizer from further use until the results of the biotest is read.

3. If the results of the biotest indicate negative growth or pass of the sterilization test, the sterilizer can be placed into service.

4. If the results still indicate positive growth or failure of sterilization, the sterilizer must be secured and repair personnel notified.

(c) If another sterilizer is not available:

1. Notify repair personnel.

2. Retrieve and resterilize all items processed since the last negative test. Use a test pack with a biological and chemical monitor in each load.

3. If chemical monitor in test pack indicates "pass" of sterilization test, these loads can be distributed if necessary. The ideal is to have adequate instruments, etc., to be able to hold these items until after a negative biological test at 48 hours and then distribute.

4. If the biotest again fails, secure the sterilizer and notify repair personnel, and the ICO.

(d) Make a narrative entry in the log of each action taken and the results as they occur.

(e) Retest the sterilizer using biological monitors.

(f) Confirm exposure of the biological monitor to the sterilization process.

(g) Review the sterilization log for recent repairs or maintenance.

c. Guidelines for Dosage and Process Indicators

(1) Use dosage indicators inside and process indicators outside each instrument pack. Screw top test tubes sterilized in dry heat must have internal indicators. When a dosage indicator of a load test pack fails, resterilize with a new test pack containing both chemical and biological monitors. Be sure to closely monitor the temperature, pressure, and sterilizing time of the load. Watch timer to be sure it does not start the timing process until the correct temperature is reached. Watch for steam leaks in the sterilizer. If dosage indicator again fails, notify the ICO, repair personnel, log the results, and secure the sterilizer from use until the results of the biological monitor can be evaluated.

(2) Follow manufacturer's instructions when reading the processed indicators.

(3) Dosage and process indicators are not replacements for biological monitoring. Only biological monitoring can tell you whether or not sterilization has actually occurred.

d. Liquid chemical disinfectant or sterilants cannot be biologically monitored.

e. Biological Monitor and Sterilizer Compatibility

<u>Form</u>	<u>Brand Name</u>	<u>Water Vapor</u>	<u>Chemical Vapor</u>	<u>Dry Heat</u>
Plastic vial	Attest 1262	yes	yes	no
	Proof	yes	yes	no
Glassine envelope	Spordi	yes	yes	yes
	Steri-L-Test	yes	yes	yes
	Steri-O-Chex	yes		
	Steri-Spor	yes	yes	yes
	Steri-Test	yes	yes	no
Glass ampule	Kilit	yes	no	no
	Chemspor	yes	no	no

Chapter 5

DISINFECTION

1. Introduction. Disinfection is a less lethal process than sterilization. Selecting an appropriate chemical germicide depends on the degree of microbial kill or deactivation required, the composition and texture of the item treated, and the technical requirements and ease of use of the available agents. Regardless of the product selected, no single chemical agent will meet all these criteria. As always, follow label directions precisely. Give strict attention to the proper use of the product regarding mixing, dilution, method and duration of application, temperature requirements, shelf-life, and, if applicable, reuse life. Design and composition of materials must always be primary considerations when purchasing new or replacement equipment.

2. Levels of Disinfection. EPA classifies disinfectants as high, intermediate, or low level, based on the contact time of the solution and the biocidal activity of an agent against bacterial spores, mycobacterium tuberculosis, lipid and nonlipid viruses, and vegetative bacteria.

Level of Bacterial Activity ¹	Bacterial Spores	Tubercle Bacillus	Nonlipid Viruses	Lipid Viruses	Vegetative Bacteria
High	Maybe	Yes	Yes	Yes	Yes
Intermediate	No	Yes	Yes	Yes	Yes
Low	No	No	No	Yes	Yes

¹In the absence of gross organic contamination.

3. Factors Influencing Germicidal Procedures. Factors associated with the micro-organisms, as well as those associated with the surrounding physical and chemical environment, influence the antimicrobial efficiency of germicides. These include:

a. Nature of the Material. The easiest surface to disinfect is smooth, nonporous, and cleanable. If the materials are incompatible with the disinfectant, damage or corrosion can occur.

b. Bioburden. Under a given set of circumstances, the higher the level of microbial contamination, the longer the required exposure to the disinfectant. Additionally, resistant micro-organisms require longer exposure times.

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c. Organic Debris Present. Blood, saliva, and other organic material may contribute to the failure of a germicidal process either by direct inactivation of the disinfectant or actual occlusion of the micro-organisms, thereby preventing penetration of the germicide.

d. Type and Concentration of the Germicide. Generally, when all other variables are constant, higher concentrations of a chemical agent are more effective and require a shorter time to disinfect. Use of dilutions other than those specified by the manufacturer adversely affect some intermediate-level disinfectants, specifically iodophors. In all instances, follow the manufacturer's recommendations.

4. General Categories of Liquid Chemical Agents. A large variety of liquid disinfectants are available today, and it is probable that many new ones will become available in the future. When selecting a product, make sure that the label has an EPA registration number on it. Appendix G is a noninclusive list of commercial disinfectants. As they may be subject to change, be sure to read the manufacturer's instructions before use.

a. Glutaraldehyde-Based Solutions

(1) Are available in several formulations differing in pH, concentration, use dilution, and exposure time.

(2) Are classified as high-level disinfectant or sterilants.

(3) Require proper ventilation because vapors are extremely toxic.

b. Iodophors

(1) Are available in concentrated preparations containing surfactants.

(2) Are classified as intermediate-level disinfectants if the product label claims tuberculocidal activity.

(3) Should not be used on white or pastel vinyls subject to staining from repeated exposure to iodine.

c. Chlorine Dioxide-Based Solutions

(1) Have limited use patterns because of their corrosiveness.

(2) May be used for high-level disinfection of semicritical items not subject to corrosion.

(3) Are extremely irritating to the skin and eyes.

d. Phenolics

(1) Are classified as intermediate-level disinfectants provided the product label indicates a claim for tuberculocidal activity.

(2) Are available as sprays.

(3) Are very irritating. Avoid skin and mucous membrane contact.

5. Examples of Semicritical Category Items Requiring Chemical Disinfection

a. Three-way syringe tip, HVE and saliva ejector (SE) tips, dental light handles, radiographic positioning devices, and low-speed motors.

(1) Follow manufacturer's instructions.

(2) Thoroughly wipe the item with absorbent material saturated with an EPA-registered disinfectant that is mycobactericidal at use dilution. Allow the disinfecting solution to remain in contact with the item for the length of time specified by the manufacturer.

b. Nitrous Oxide Masks. Although masks and breathing tubes fall into the semicritical category, if autoclavable, clean and sterilize them using steam heat. If not autoclavable, wipe after each use with two separate gauze pads saturated with a high-level disinfectant. If breathing tubes are not autoclavable, after each use rinse inside and outside with running water, wipe and flush with a high-level disinfectant, and rerinse with water.

Note: All semicritical category items should receive high-level disinfection. See appendix F.

6. Examples of Noncritical Category Items Requiring Chemical Disinfection

a. Dental delivery system (DDS), consisting of a chair, unit, and light; portable dental units; surgical table or chair; and x-ray apparatus.

(1) Disinfect DDS at least daily. Using disposable covers reduces the number of surfaces requiring disinfection. Change paper or plastic headrest and bracket tray covers after each patient. If headrest covers are not available, disinfect the headrest after each patient.

(2) Disinfect hand-operated controls, switches, and handles after each patient.

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(3) Follow manufacturer's instructions when disinfecting the lamp head and protective shield.

(4) Flush HVE and SE tubing and cuspidore weekly with a central evacuation system cleaner. Use more often as needed. Follow manufacturer's instructions.

b. Anesthetic Cartridges. For nonsurgical DTR use, manage anesthetic cartridges under unit dose guidelines to prevent contamination of bulk supply. Use only individual dose dental carpules and discard after use. Follow manufacturer's instructions. Since disinfectants can diffuse through the diaphragm and contaminate the anesthetic solution, do not store cartridges in these agents.

Note: All noncritical category items require at least intermediate-level disinfection. See appendix F.

Chapter 6

PROSTHODONTICS AND ORTHODONTICS

1. Introduction. Infection control in prosthodontics and orthodontics is divided into two distinctly different areas, the DTR and the dental laboratory. Each area presents unique problems requiring special consideration. Prostheses or impressions may carry a multitude of bacteria in dental plaque, blood, or saliva. To protect everyone from cross contamination and possible infection, dental personnel must use proper techniques for disinfection of material before sending it to the laboratory from the DTR and vice versa. Conversely, subjecting prosthetic materials to heat and chemicals can adversely affect the materials and compromise the precision required in prosthetic fabrication. Until new techniques and materials are available, use only disinfection and sterilization procedures proven unharmed to prosthetic materials. The key element of infection control in prosthodontics and orthodontics is preventing micro-organism transfer by breaking the chain of infection at critical transfer points.

2. Barrier Control. Place barriers wherever possible to prevent cross contamination. Establish a designated area in the dental laboratory where technicians disinfect all incoming and outgoing items.

3. DTR Infection Control

a. Items Disinfected. Wipe contaminated items such as shade guides, face bows, articulators, occlusal plane guides, boley gauges, and alcohol torches with an EPA-registered disinfectant. Also disinfect after each use pliers and other special orthodontic instruments that do not come into contact with blood and saliva. An alternate method is immersing the instruments in an EPA-registered intermediate or high-level disinfectant such as an iodophor or 2 percent glutaraldehyde.

b. Instrument Sets. When possible, use trays to allow sterilization or disinfection of multiple instruments. This reduces the chance of having to enter clean areas to obtain additional instruments during treatment procedures.

c. Unit Dose Concept. Use of the unit dose concept prevents contamination of bulk supplies. Dispense enough to complete the entire procedure when using such items as petroleum jelly, impression materials, waxes, pressure disclosing or indicator paste, disposable brushes, and orthodontic brackets and wires.

d. Processing and Transfer to the Laboratory. When possible, rinse and disinfect impressions, prostheses, and intraoral devices before transfer to the laboratory to reduce chances of cross contamination. If the integrity of the item or material is

compromised by this disinfection, a waiver should be requested through the command on the item (example - porcelain stained crown before bake). Place casts and prostheses in self-sealing plastic bags to prevent contact with adjacent materials, the shipping box, foam insulation, or paperwork. Consider everything returned from a dental laboratory as contaminated. The receiving facility must disinfect these items.

4. Prosthodontic Laboratory Infection Control

a. Access to the Dental Laboratory. Establishing a disinfection step in the receipt and distribution process of prosthetic case management protects laboratory personnel against cross contamination. Also, this additional barrier eliminates the need to disinfect laboratory equipment and instruments after each use.

(1) Impressions Received

(a) Wear gloves and personal protective attire and equipment.

(b) Thoroughly rinse and debride impressions under running water before pouring.

(c) When feasible, spray or immerse impressions in an EPA-registered disinfectant before pouring. Follow manufacturer's directions.

(d) Guide for Selection of Disinfectants*

Material	Glutaraldehyde [^]	Iodophors [^]	Sodium hypochlorite [#]
Alginate**	--	--	+
Polysulfide			
rubber base	+	+	+
Silicones	+	+	+
Polyether	--	--	+
Zinc oxide	+	?	?
Hydrocolloid	--	+	+
Compounds	--	?	+

* Exposure times are those recommended by the manufacturer.

[^] Prepared following manufacturer's instructions.

[#] 1:10 dilution of commercial bleach prepared fresh daily.

** After spraying, leave impression in a sealed bag for the recommended time.

+ Recommended.

-- Not recommended.

? Insufficient data.

(e) Prepare slurry water from fresh set stone which was not poured against an impression.

(f) Soak reusable impression trays in an EPA-registered disinfectant for 10 minutes, scrub in soapy water, and seal in peel packs before autoclaving.

(2) Prostheses Received

(a) Wear gloves and personal protective attire and equipment.

(b) Consider all prosthetic devices contaminated and scrub them with a brush using a bacteriocidal soap. Store the brush in a 2 percent glutaraldehyde solution between uses. Replace the solution as recommended by the manufacturer or at least weekly. Autoclave the brushes weekly.

(c) After scrubbing, place the prosthesis in a container filled with an EPA-registered disinfectant such as an iodophor, chlorine dioxide, or a synthetic phenol compound. Place the container in an ultrasonic cleaner for 10 minutes. Follow the manufacturer's instructions. Cover the ultrasonic cleaner to reduce aerosol spray. Change solutions daily and when visibly soiled.

(3) Casts and Miscellaneous Laboratory Items

(a) Wear gloves and personal protective attire and equipment.

(b) Disinfect casts with a spray of an iodophor or sodium hypochlorite following manufacturer's instructions.

(c) Change rag wheels, brushes, acrylic burs, and pumice for those prostheses not treated as discussed in 4(2)(b) above.

(d) Add a disinfectant to the pumice. A mixture of 5 parts sodium hypochlorite, 100 parts distilled water, and 3 parts green soap (standard stock liquid soap, stock number 7930-00-880-4454) added to the pumice provides adequate surface disinfection. Use a different pumice mixing cup for each case.

(e) Scrub and disinfect contaminated items for 10 minutes before sand or shell blasting. Allow items to dry completely before blasting.

b. Interim and New Prostheses

(1) Work with burs and instruments designated for new prostheses.

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(2) Disinfect for 10 minutes using an iodophor, glutaraldehyde, or sodium hypochlorite. Rinse and store in a sealed plastic bag.

c. Case Pans. Line or cover case pans or other holding containers with a removable plastic bag. Discard the bag upon completion of the prosthesis or clean and disinfect it between cases. Covered case pans are preferable.

d. Personnel Protection. To reduce the chances for cross contamination and infection, dental laboratory personnel must:

(1) Receive HBV immunization.

(2) Exercise meticulous personal hygiene. At a minimum, wash hands between each case using a liquid antiseptic soap.

(3) Wear gloves, face masks, and eye protection when handling contaminated items.

(4) Wear long, smock type laboratory coats. Follow the provisions of page 2-2, paragraph 5b of this instruction regarding care of this apparel.

(5) Refrain from eating, drinking, or smoking in laboratory spaces.

(6) Wash hands with an antimicrobial soap before leaving the laboratory.

e. Minor Adjustments and Rush Cases. Do not allow rush cases to jeopardize the process of separating contaminated from noncontaminated materials and instruments. When additional laboratory support is necessary while adjusting or modifying a prosthesis in the DTR, use:

(1) Barriers and Disinfectants. Depending on the disinfectant, turnaround time can be up to 20 minutes. Incoming cases can be placed in a self-sealing plastic bag in a 5.25 percent sodium hypochlorite solution. The bag is then immersed at least one minute in a 37⁰C ultrasonic bath. The case now can be considered disinfected.

(2) A unit dose polishing area physically removed from the dental laboratory. This is the ideal alternative. This isolated area contains a polishing unit, pumice catch pans enclosed in plastic for single patient use, and individually wrapped wheels, abrasive points, and polishing and grinding agents.

f. Disinfection of Laboratory Spaces, Equipment, and Instruments. Maintain separate instruments and materials for use on new prostheses. Do not use these instruments to work on prostheses contaminated in a patient's mouth.

(1) Change pumice, rag wheels, and brushes used on new prostheses daily.

(2) Use two separate polishing lathes, if available.

(3) Daily Disinfection

(a) Laboratory instruments such as spatulas, knives, and wax carvers. Follow manufacturer's instructions.

(b) Rubber mixing bowls. Spray-wipe-spray technique is acceptable.

(c) Chucks, handles, switches, tubing, air hoses, and lab handpieces.

(d) The case receiving area and plaster bench.

(4) Weekly Disinfection

(a) Work stations, including exposed equipment, drawers, and work surfaces.

(b) Sinks.

Chapter 7

ORAL RADIOLOGY

1. Introduction. It is extremely important to pay attention to infection control when taking radiographs. Both the radiographic equipment and film can become contaminated and may result in the transmission of infectious agents. To protect themselves and the patients, dental personnel must maintain infection control standards in the radiology area similar to those used in the DTR.

2. Handwashing. Follow rigid handwashing procedures when treating radiology patients. Wear gloves when placing intraoral films and handling contaminated film packets.

3. Film Positioning Devices

a. As a minimum, disinfect film positioning devices between patients by immersion in an EPA-registered chemical disinfectant such as a 2 percent glutaraldehyde. Rinse thoroughly after disinfection. Follow manufacturer's instructions for high-level disinfection.

b. When possible, sterilize film positioning devices.

4. Panoramic Unit Bite Blocks. Use a disposable panoramic unit bite block cover for each patient. When disposable covers are not available, treat bite blocks as you would a film holding device.

5. Intraoral Film Packets. Place intraoral film packets removed from a patient's mouth directly into a disposable container such as a paper cup. Transfer to the darkroom. While wearing the gloves used to take the radiograph, open the film packets and drop the film onto a clean paper towel without touching the film. Discard film wrappers directly into a lined refuse container to prevent contamination of the darkroom work surfaces. At this point, remove gloves and feed the uncontaminated film into the developer without special precautions.

6. Darkroom. Disinfect all counter surfaces daily.

7. Automatic Film Processor with Daylight Loader

a. When using an automatic film processor with a daylight loader, contamination of the fabric light shield is likely to be a problem. Since there is no practical way to disinfect this material, the following guidance will help prevent contamination:

(1) Cover film packets with disposable plastic.

(2) Alternate Method

(a) Place the exposed film in a paper cup previously set aside for this purpose.

(b) Remove soiled gloves and put on a pair of clean gloves.

(c) Place the cup through the top of the processing box and close the lid.

(d) Place gloved hands through the light shield, unwrap the film packet, and drop the film onto the surface inside the loader.

(e) Place the film wrapping into the cup. Remove the gloves, turn them inside out, and place them in the paper cup.

(f) Drop the film in the chute for developing.

(g) Remove hands from the loader, lift the lid, and dispose of paper cup and waste.

(h) Wash hands thoroughly.

b. If the fabric light shield sleeves become contaminated, they may be gas sterilized.

8. X-ray Chair. Using an EPA-registered intermediate-level disinfectant, disinfect at least daily or when visibly contaminated. Change paper or plastic headrest covers after each patient.

9. X-ray Tubehead and Controls. Cover those areas contacted by the staff and patients with plastic wrap or disposable drapes. Be careful that these coverings do not interfere with the flow of cooling air to the x-ray tubehead. Change after each patient. When wiping the tubehead and controls with liquid disinfectants, exercise care to prevent disinfectant from leaking into the tubehead seams and exposure controls.

SAMPLE INFECTION REPORT FORMAT

DATE 01 July 1992
PATIENT'S NAME Cotton, James M. BM3
SSN 106-76-9424
UNIT HSA Norfolk
TELEPHONE # 392-1527
DOCTOR'S NAME LT T. M. Blackman, DC, USNR
CLINIC Naval Station Clinic
SITE OF INFECTION Mandibular Left Second Molar, #18

ORAL TEMPERATURE 99.5° F

GRAM STAIN YES NO

CULTURE AND SENSITIVITY YES NO

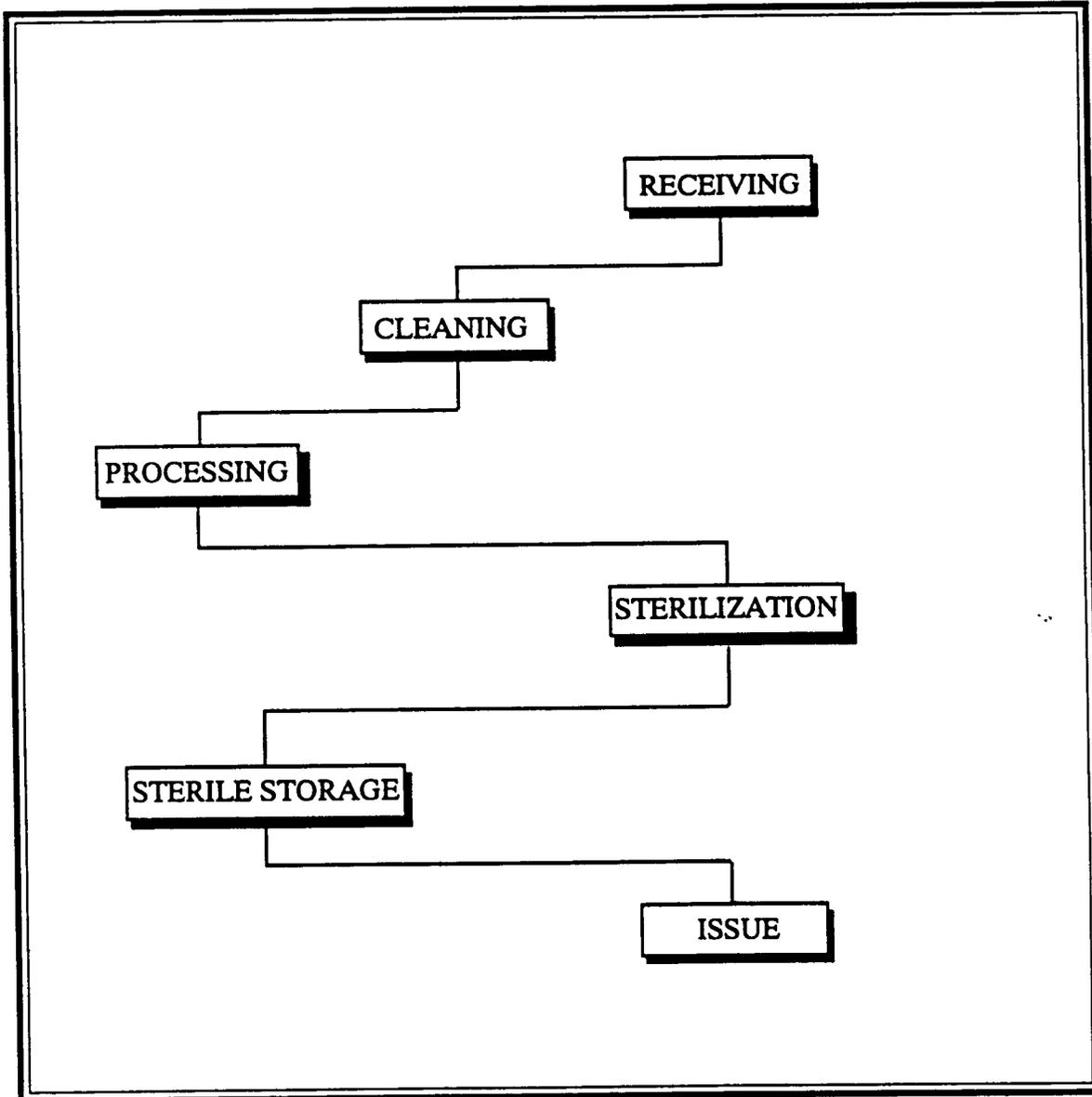
HISTORY OF PRESENT ILLNESS Pt. presented with pain and sensitivity to percussion tooth #18 and swelling in mucobuccal fold. Radiographic and EPT suggestive of pulpal pathology. Tooth #18 opened for drainage and drainage via pulp chamber unsuccessful! Pt. placed on Pen - VK tabs 500 mg q.i.d. Pt. returned the following day with increased swelling, increasing trismus, and some difficulty in swallowing. Tooth #18 extracted. Pt. returned the following day with increased pain, trismus to one finger breadth, increasing difficulty in swallowing, and moderate-severe edema to left face. Referred to oral surgery department at NH Portsmouth for I.V. antibiotics, I&D, and supportive care.

CHRONOLOGY OF TREATMENT

DATE 01 July 1992 — Pt. reports with c.c. pain, swelling tooth #18. Tooth opened for drainage. Placed on oral antibiotics.
DATE 02 July 1992 — Pt. returned with increasing symptoms. #18 extracted with local anesthetic.
DATE 03 July 1992 — Pt. returned with difficulty swallowing, increased pain and edema to left face. Referred to NH Portsmouth for I.V. antibiotic therapy, I&D, and supportive care.
DATE 04-14 July 1992 — Hospitalized for I.V. antibiotic therapy, I&D, and supportive care for left masseteric space abscess.
DATE 17 July 1992 — P.O.T. at NH Portsmouth. Left masseteric space abscess resolved. Pt. afebrile without sequella.
DATE INFECTION RESOLVED 17 July 1992

UPON COMPLETION, THIS FORM MUST BE FORWARDED TO THE COMMAND INFECTION CONTROL OFFICER VIA THE CLINIC DIRECTOR.

CSR FUNCTIONAL FLOW CHART



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WRAPPING AND STERILIZER COMPATIBILITY

MATERIAL	WATER VAPOR	CHEMICAL VAPOR	DRY HEAT
Cloth	yes	yes ¹	May char
Paper	yes	yes	May char
Nylon or plastic tubing	no ²	no ²	yes ³
Paper, plastic combination	yes	yes	no
Aluminum foil	no	no	yes
Glass container	yes ⁴	yes ⁴	yes
Metal tray	yes	yes	yes

1. Use white or well laundered cloth as dye can cause residue buildup on chamber walls and metering valve.
2. Use only as an overwrap after product has been sterilized using a different wrapping material. Heat sealed overwrapping will extend a 30 day shelf-life to 180 days.
3. Some are compatible. Check manufacturer's recommendations.
4. With lid removed.

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STERILIZATION PACKAGING MATERIALS

MATERIAL	NATURE	THICKNESS OR GRADE	SUITABLE FOR	
			STEAM	DRY HEAT
Muslin	Textile	140 count	Yes	Yes
Jean cloth	Textile	160 count	Yes	No
Broadcloth	Textile	200 count	Yes	No
Kraft brown	Paper	30-40 lb.	Yes	No
Kraft white	Paper	30-40 lb.	Yes	No
Glassine	Coated paper	30 lb.	Yes	No
Parchment	Paper	Patapar 27-2T	Yes	No
Crepe	Paper	Dennison wrap	Yes	No
Cellophane	Cellulose film	Weck sterilizable	Yes	No
Polyethylene	Plastic	1-3 mils	No	No
Polypropylene	Plastic	1-3 mils	No*	No
Polyvinyl	Plastic	1-3 mils	No	No
Nylon	Plastic	1-2 mils	No*	No
Polyamide	Plastic	1-2 mils	No*	No
Aluminum	Foil	1-2 mils	No	Yes
Peel packs	Paper with plastic		Yes	No
Test tubes	Glass with heat resistant caps		No	Yes

* Specifically not recommended due to difficulty in eliminating air from packs.

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SHELF-LIFE OF STERILIZED ITEMS

Wrapping Method	Shelf-Life*
Paper envelope**	365 days
Double muslin wrap	30 days
Double muslin wrap, plastic covered, heat sealed	365 days
Peel plastic packs, heat sealed	365 days
Peel plastic packs, tape sealed, doubled folded	365 days
Parchment paper or Dennison wrap	30 days
Glass test tubes with screw caps	indefinite

* The shelf-life of a packaged item is event related and depends on the quality of the wrapping material, the storage conditions, the conditions during transport, and the amount of handling. These expiration times are provided as a means of setting uniform standards.

** Paper envelopes are sealed with sterilization tape.

STERILIZATION AND DISINFECTION OF DENTAL INSTRUMENTS AND MATERIALS

	Steam Autoclave	Dry Heat Oven	Chemical Vapor	Ethylene Oxide	Chemical Disinfection	Other Methods / Comments
Angle attachments*	+	+	+	++	+	
Burs						
Carbon steel	—	++	++	++	—	
Steel	+	++	++	++	+	
Tungsten-carbide	+	++	+	++	+	
Condensers	++	++	++	++	+	
Dappen dishes	++	+	+	++	+	
Endodontic instruments (broaches, files, reamers)						Hot salt or glass bead sterilizer for 10 - 20 seconds at 218°C (425°F)
Stainless steel handles	+	++	++	++	+	
Stainless with plastic handles	++	++	—	++	—	
Fluoride gel trays						
Heat-resistant plastic	++	—	—	++	—	
Non-heat resistant plastic	—	—	—	++	—	Discard (++)
Glass slabs	++	++	++	++	+	
Hand instruments						
Carbon steel	—	++	++	++	—	
Stainless steel	++	++	++	++	+	
Handpieces*						Autoclavable preferably
Autoclavable*	(++)*	—	(+)*	++	—	
Contra-angles*	—	—	—	++	+	
Nonautoclavable*	—	—	—	++	+	Combination synthetic phenolics or iodophors (—)
Prophylaxis angles*	+	+	+	+	+	
Impression trays						
Aluminum metal	++	+	++	++	—	
Chrome-plated	++	++	++	++	+	
Custom acrylic resin	—	—	—	++	+	
Plastic	—	—	—	++	+	Discard (++) , preferred
Instruments in packs	++	+	++	++	—	
		Small packs		Small packs		
Instrument tray setups						
Restorative or surgical	+	+	+	++	—	
	Size limit		Size limit	Size limit		
Mirrors	—	++	++	++	+	
Needles						
Disposable	—	—	—	—	—	Discard (++) , Do not reuse
Nitrous oxide						
Nose piece	(++)*	—	(++)*	++	(+)*	
Hoses	(++)*	—	(++)*	++	(+)*	
Orthodontic pliers						
High quality stainless	++	++	++	++	+	
Low quality stainless	—	++	++	++	—	
With plastic parts	—	—	—	++	+	
Pluggers	++	++	++	++	+	
Polishing wheels and disks						
Garnet and cuttle	—	—	—	++	—	
Rag	++	—	+	++	—	
Rubber	+	—	—	++	+	
Prostheses, removable						
Rubber dam equipment						
Carbon steel clamps	—	++	++	++	—	
Metal frames	++	++	++	++	+	
Plastic frames	—	—	—	++	+	
Punches	—	++	++	++	+	
Stainless steel clamps	++	++	++	++	+	
Rubber items						
Prophylaxis cups	—	—	—	++	—	Discard (++)
Saliva evacuators, ejectors						
Low melting plastic	—	—	—	++	+	Discard (++)
High melting plastic	++	+	+	++	+	
Stones						
Diamond	+	++	++	++	+	
Polishing	++	+	++	++	—	
Sharpening	++	++	++	—	—	
Surgical instruments						
Stainless steel	++	++	++	++	+	
Ultrasonic scaling tips	+	—	—	++	+	
Water-air syringe tips	++	++	++	++	+	
X-ray equipment						
Plastic film holders	(++)*	—	(+)*	++	+	
Collimating	—	—	—	++	+	

The table is adapted from Accepted Dental Therapeutics and Dentist's Desk Reference: Materials, Instruments and Equipment.

* As manufacturers use a variety of alloys and materials in these products, confirmation with the equipment manufacturers is recommended, especially for handpieces and attachments.

++ Effective and preferred method.

+ Effective and acceptable method.

— Effective method, but risk of damage to materials.

— ineffective method with risk of damage to materials.

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GUIDE TO CHEMICAL AGENTS FOR DISINFECTION AND STERILIZATION

Chemical Classifications Products	Disinfectant ^{1,2}			Sterilant ^{1,2}
	Dilution	Time	Temperature (20°C = 68°F) (25°C = 77°F)	Dilution, Time, Temperature
<u>Surface or Immersion</u>				
Chlorine compounds				
Alcide LD	10:1:1	3 minutes	20°C	NA ⁴
Exspor	4:1:1	3 minutes	20°C	4:1:1, 6 hours, 20°C
Bleach (5.25% sodium hypochlorite)	1:10	10 minutes	20°C	NA
Iodophors				
Biocide	1:213	10 minutes	20°C	NA
Surf-A-Cide				
ProMedyne-D	1:213	25 minutes	25°C	NA
Combination synthetic phenolics				
Multicide				
Omni II	1:32	10 minutes	20°C	NA
Vitaphene				
<u>Immersion</u>				
2% Glutaraldehyde acidic ⁵				
Banicide concentrate	1:40	30 minutes	20°C	1:10, 10 hours, 25°C
Banicide				
Sterall	1:4	30 minutes	20°C	Full strength, 10 hours, 25°C
Wavicide				
2% Glutaraldehyde neutral ⁵				
Glutarex	Full strength	----	---- ³	Full strength, 10 hours, 20°C
2% Glutaraldehyde alkaline ⁵				
Cidex activated dialdehyde	Full strength	45 minutes	25°C	Full strength, 10 hours, 25°C
Cidex 7	Full strength	90 minutes	25°C	Full strength, 10 hours, 25°C
Germ-X	Full strength	----	---- ³	Full strength, 10 hours, 20°C
Asepti-Steryl 28				
Dentacide				
Glutall				
Omnicide	Full strength	45 minutes	20°C	Full strength, 10 hours, 20°C
Orthicide				
Sporex				
Vitacide				
Steril-Ize	Full strength	45 minutes	25°C	Full strength, 10 hours, 20°C
CoeCide XL				
K-Cide				
Maxicide				
Metricide 28	Full strength	20 minutes	20°C	Full strength, 6 hours, 20°C
Procicide 14		(10 minutes)	25°C	
Procicide 30				
Protec-top				
Veratex				

1. Always use disinfectant and sterilant products according to the instructions specified on the product label.
2. The conditions listed reflect the time required for tuberculocidal activity for reused solution, if such use is possible, at the minimum temperature and maximal dilution specified on the EPA approved product label. Tuberculocidal test methods may vary. Consult label or manufacturer for specifics.
3. Data not available at time of publication.
4. Not approved for use as sterilants.
5. Alternate conditions, such as increased temperatures or fresh solution as opposed to reused solution, may decrease disinfection time. Consult label instructions for alternate uses.

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ABBREVIATIONS

AAMI	Association for the Advancement of Medical Instrumental
ADA	American Dental Association
AIDS	Acquired immune deficiency syndrome
AORN	Association of Operating Room Nurses
°C	Celsius degree of temperature measurement
CDC	Centers for Disease Control
cfu/ml	Colony forming units per millimeter
CSR	Central Sterilization Room
DDS	Dental Delivery System
DTF	Dental Treatment Facility
DTR	Dental Treatment Room
EPA	Environmental Protection Agency
°F	Fahrenheit degree of temperature measurement
HBV	Hepatitis B Virus
HIV	Human Immunodeficiency Virus
HSETC	Naval Health Sciences Education and Training Command
HTLV-III/LAV	Human T-Lymphotropic Virus Type/Lymphadenopathy-Associated Virus
HVE	High Volume Evacuation
ICO	Infection Control Officer
JADA	Journal of the American Dental Association
JCAHO	Joint Commission on Accreditation of Healthcare Organization
mils	Thickness measured in thousandths of an inch (0.001)
MMWR	Morbidity and Mortality Weekly Report
MTF	Medical treatment facility
NOTAL	Not to all
NSDAT	Naval School of Dental Assisting and Technology
OIC	Officer in Charge
OSHA	Occupational Safety and Health Administration
pH	Measurement of liquid acidity or alkalinity
PPBS	Planning, Programming and Budgeting System
psi	Pounds per square inch
SE	Saliva ejector
SSSA	Steam Sterilization and Sterility Assurance
USAF	United States Air Force