2019 Oregon Dental Conference®
Course Handout

Terre Harris
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1:30 - 4:30 pm
Infection control

Oregon Dental Conference

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“It’s Not Just OSHA Anymore!”

Good Morning,

In 2018, when the Oregon Board of Dentistry adopted the rule that the Board may consider current infection control guidelines such as those of the CDC and the American Dental Association in determining what constitutes unacceptable patient care with respect to infection control, the standards of practice for Oregon dental professionals expanded beyond OSHA compliance standards.

OSHA looks to the CDC guidelines because they establish industry-recognized dental hazards and effective means of abatement. OSHA has said that it “expects workplace infection control/occupational health programs based on CDC recommendations” to be implemented in all dental offices.

This means that you now look at the CDC guidelines as more than just something you can choose to implement or not to implement; they are rules by which all Oregon dental practices must abide. It means that in addition to the many regulations already being enforced by OSHA, you must apply the CDC guidelines as “Standards of Practice.”

The reason for the Board’s rule however is simple and straightforward. When contact with blood, oral and respiratory secretions, contamination and associated hazards occur. Dental professionals and patients, alike, can suffer exposures to the bloodborne pathogens. Only proper safety procedures and particular attention to the CDC’s recommendations can prevent infections among staff members and the patients they treat.

Additionally, infection control is a growing concern of our patients. They understand – more now than ever before – that their health may well depend on the infection control procedures used in your practice. Studies have shown that patients will stop going to a practice in which attention to infection control is less than they expect.

It’s very important to both dental care professionals and their patients that we learn, understand, and implement strong infection control programs just as we have the OSHA rules and regulations. It’s now more important than ever before.

Thank you for being here this morning

Terre L. Harris, President/CEO
HARRISBIOMEDICAL
Oregon Standards of Practice
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Infection Control Guidelines

In determining what constitutes unacceptable patient care with respect to infection control, the Board may consider current infection control guidelines such as those of the Centers for Disease Control and Prevention and the American Dental Association.

(1) Additionally, licensees must comply with the following requirements:

(a) Disposable gloves shall be worn whenever placing fingers into the mouth of a patient or when handling blood or saliva contaminated instruments or equipment. Appropriate hand hygiene shall be performed prior to gloving.

(b) Masks and protective eyewear or chin-length shields shall be worn by licensees and other dental care workers when spattering of blood or other body fluids is likely.

(c) Between each patient use, instruments or other equipment that come in contact with body fluids shall be sterilized.

(d) Environmental surfaces that are contaminated by blood or saliva shall be disinfected with a chemical germicide which is mycobactericidal at use.

(e) Impervious backed paper, aluminum foil, or plastic wrap may be used to cover surfaces that may be contaminated by blood or saliva and are difficult or impossible to disinfect. The cover shall be replaced between patients.

(f) All contaminated wastes and sharps shall be disposed of according to any governmental requirements.

(2) Licensees must comply with the requirement that heat sterilizing devices shall be tested for proper function by means of a biological monitoring system that indicates micro-organisms kill each calendar week in which scheduled patients are treated. Testing results shall be retained by the licensee for the current calendar year and the two preceding calendar years.
The Evolution of Infection Control in Dentistry

Antony Van Leeuwenhoek - 1675

Discovered Bacteria

Van Leeuwenhoek was a Dutch tradesman he made simple microscopes with which he discovered bacteria, blood cells, microscopic nematodes, and much more. In 1683, Leeuwenhoek wrote about his observations, with his microscope, of “a little white matter” between the teeth of two old men who had never cleaned their teeth in their lives, reporting “many very little living animalcules. a-moving, in such enormous numbers, that all the water seemed to be alive.” These were the first observations on living bacteria ever recorded.

John Pringle - 1750

Pioneered Antiseptics

Pringle was a British physician, who began experimenting with different substances that would halt putrefaction of meat. He published three papers on “Experiments on Septic and Antiseptic Substances” and, in 1752 published his book, Observations on the Diseases of the Army in Camp and Garrison. He is acknowledged as the founder of modern military medicine.

Edward Jenner - 1796

Developed Smallpox Vaccine

In the 18th century, smallpox was treated by the often-fatal procedure of inoculating healthy persons with abscess substances taken from those who had mild cases of the disease. Jenner observed that those who had been exposed to the much milder disease, cowpox were completely resistant to these inoculations.

In 1796 he inoculated an eight-year-old boy with cowpox virus. Six weeks after the boy's reaction Jenner re-inoculated him with smallpox virus, finding the result negative. His procedure was soon accepted, and mortality due to smallpox plunged. Seven years later Louis Pasteur, drawing on Jenner’s work, discovered of modern preventive vaccines. Jenner published his findings, in which he also introduced the term virus.

Thomas Alcock - 1827

Introduced Disinfectants

Alcock published early works in which he recommended Sodium and Calcium hypochlorites for disinfecting and deodorizing hospitals, workshops, stables, toilets, reservoirs, sewers and areas contaminated with blood or other body fluids. At about the same time a health commission in Marseille recommended hypochlorite for disinfection of hands, clothes and drinking water. History credits Alcock for introducing disinfectants.

Ignaz Semmelweis - 1840

Initiated Antiseptic Prophylaxis (Handwashing)

In Austria in the 1840s, Semmelweis found that puerperal, abacterial infection after childbirth, was taking the lives of up to 30% of the women giving birth in hospital wards while, women who gave birth at home remained relatively unaffected. He also noticed that women examined by student doctors who had not washed their hands after leaving the autopsy room had much higher mortality rates. By ordering students to wash their hands with chlorinated lime before examining patients, he reduced the maternal mortality rate from 12.24% to 1.27% in two years. He is credited with introducing hand hygiene.
Louis Pasteur - 1860
Introduced Germ Theory
Pasteur's believed that the origin and development of disease arises from germs attacking the body from outside, just as unwanted microorganisms invade milk and cause fermentation. This concept, called the “germ theory of disease”, was strongly debated by physicians and scientists around the world who argued that the notion that tiny organisms could kill vastly larger ones seemed ridiculous. Pasteur’s studies convinced him that he was right, however, and in the course of his career he extended the germ theory to explain the causes of many diseases.

Joseph Lister - 1865
Initiated Antiseptic Surgery
Lister recognized the relationship between Pasteur’s research and his own. He considered that microbes in the air were likely causing putrefaction and had to be destroyed before they entered a wound. In the previous year Lister had heard that carbolic acid was being used to treat sewage and that fields treated with it were free of a parasite causing disease in cattle. Joseph Lister pioneered the practice of using carbolic acid in treating compound fractures at Glasgow, thus inaugurating the era of antiseptic surgery. Lister is considered the “father of clean surgery”.

Alexander Fleming - 1928
Discovered Penicillin
In 1828, while cleaning Petri dishes he’s used to grow bacteria, Fleming noticed that mold was growing on one of the dishes and, all around the mold, the staph bacteria had been killed. He took a sample of the mold and found that it was from the penicillium family. He subsequently published a report on penicillin and its potential uses and by 1943 when the U.S. entered World War II, Penicillin's benefits were known,. From January to May 1943, only 400 million units of penicillin had been made; by the time the war ended, U.S. companies were making 650 billion units a month.

CDC Created - 1946
Centers for Disease Control Founded
The Centers for Disease Control was established as the lead agency to protect the health and safety of people throughout the world

American Dental Association - 1978
Recommends “Infection Control in Dental Offices”
In 1978, the ADA, using the CDC recommendations published recommendations for infection control in the dental office.

AIDS Appears - 1981
CDC Releases report on “strange outbreak”
In the June 5, 1981, the CDC reported a strange outbreak of killer pneumonia striking homosexual men. That was the beginning to the AIDS epidemic.
Hepatitis B Vaccine - 1982
CDC Recommends use of HBV Vaccine
In June 1982, the Advisory Committee on Immunization Practices (ACIP) published the first official recommendations on the use of hepatitis B vaccine.

Bloodborne Pathogens Standard - 1992
OSHA’s new standard
The Occupational Safety and Health Administration began enforcing the newly adopted Bloodborne Pathogen Standard that applied to all employees with occupational exposure.

CDC’s Infection Control Guidelines – 2003
“Guidelines for Infection Control in Dental Health-Care Settings”
The new recommendations were the CDC’s first for dental infection control in over 10 years.

CDC’s Infection Control Guidelines - 2016
Basic Expectations for Safe Care
This document, a “Summary of Infection Control Prevention Practices in Dental Settings”, was published as a summary guide of basic infection prevention recommendations for all dental health care settings.

CDC Guidelines
An Overview
The CDC guidelines, issued in December of 2003, and the 2016 Summary, consolidate recommendations for preventing and controlling infectious diseases and managing personnel health and safety concerns related to infection control in dental settings. In doing so, the CDC (a) updated and revised previous CDC recommendations regarding infection control in dental settings; (b) incorporated relevant infection-control measures from other CDC guidelines; and (c) included issue concerns not previously addressed in its recommendations for dentistry.

Discussion points today include the following:

1. Administrative Measures
2. Standard Precautions;
3. Sharps Safety
4. Safe Injection Practices/ Aseptic techniques
5. Hand-hygiene;
6. Respiratory Hygiene/Cough Etiquette
7. Personal Protective Equipment
8. Patient Care Items
9. Sterilization of Patient-Care Items and Devices;
10. Instrument Sterilization Process
11. Environmental Infection Prevention
12. Dental Unit Water-quality
13. Dental Radiation
14. Education and Training
Administrative Measures
Infection Control Program

Ultimately, the goal of an infection control program is to provide a safe working environment that reduces the risk of infections among patients and occupational exposure among dental staff members. Administratively, is accomplished by adopting policies and procedures that ensure the infection control program is working and that the procedures are being carried out as directed.

A successful infection-control program depends on:

1. Developing operating procedures based on Standard Precautions,
2. Providing supplies to respond to the needs of the program,
3. Establish systems to ensure early detection of potentially infectious persons,
4. Routinely documenting adverse outcomes (e.g., occupational exposures to blood) and work-related illnesses in dental health care workers.

According to the CDC, program evaluation is an essential component, and “systematic way” “to ensure that infection control procedures are useful, feasible, ethical, and accurate.”

Strategies and tools to evaluate your infection control program can include the following:

1. Periodic observational assessment,
2. Checklists to document procedures
3. Routine review of occupational exposures to bloodborne pathogens
4. Constructive review and feedback to staff.

Standard Precautions

Previous CDC recommendations on infection control for dentistry (1986, 1993, 2003) focused on the use of Universal Precautions to prevent transmission of bloodborne pathogens. Universal Precautions were based on the concept that all blood and blood products should be treated as infectious because it is impossible to know who may be carrying a bloodborne virus. Thus, Universal Precautions should apply to all patients.

In 1996 the relevance of Universal Precautions applied to other potentially infectious materials was recognized, and, CDC replaced Universal Precautions with Standard Precautions. Standard Precautions integrate and expand Universal Precautions to include organisms spread by:

1. Blood.
2. All body fluids, secretions, and excretions except sweat, regardless of whether they contain blood
3. Non-intact skin.
4. Mucous membranes.
5. Saliva
Standard Precautions include:
1. Hand hygiene
2. The use of personal protective appropriate equipment,
3. Respiratory hygiene / Cough etiquette,
4. Sharps safety,
5. Safe injection practices,
6. Sterile instruments and devices,
7. Clean and disinfection of environmental surfaces.

Sharps Safety

Although OSHA’s Needlestick Safety and Prevention Act was specifically designed to reduce the frequency and number of needlesticks and cuts, sharps injuries (exposure incident) continue to occur and present the risk of bloodborne pathogen transmission from patient to dental staff.

Most exposure incidents can be prevented by attention to the basics of engineering and work practice controls and written procedures addressing sharps injuries. Engineering designed to remove or reduce exposures (but aren’t limited to) include:
1. Safety scalpels,
2. Sharps containers, and
3. Needle recapping devices

Work-practice controls that reduce the risk of exposure by changing the ways tasks are preformed include:
1. One-handed scoop to recap needles,
2. Not bending or breaking needles before disposal,
3. Removing burs before disassembling the handpiece,
4. Using instruments instead of fingers for tissue retraction or palpitation

Disposable sharps such as needles, scalpel blades, and other sharps items should be placed in sharps waste containers – that must be located in each area where they are used (operatories). Additionally, employers should involve employees in identifying, evaluating, and consider implementing safer sharps devices as they become available.

Safe Injection Practices

Aseptic Technique for Parenteral Medications

Safe injection practices are intended to prevent transmission of infectious diseases between patients, or between the dental staff person(s) and the patients. Safe handling of parenteral medications and fluid infusion systems is required to prevent health-care-associated infections among patients undergoing conscious sedation.

Single-dose ampules, vials or prefilled syringes, and multi-dose vials, used for more than one patient should be handled with aseptic techniques to prevent contamination.
Single-dose vials, recommended to be used for parenteral medications whenever possible, pose a risk for contamination if they are punctured repeatedly. The leftover contents of a single-dose vial should be discarded and never combined with medications for use on another patient. Medication from a single-dose syringe should not be administered to multiple patients, even if the needle on the syringe is changed.

The overall risk for extrinsic contamination of multi-dose vials is probably minimal, although the consequences of contamination might result in life-threatening infection. If a multi-dose vial is necessary, its access diaphragm should be cleansed with 70% alcohol before inserting a sterile device into the vial. A multi-dose vial should be discarded if sterility is compromised.

Key recommendations for safe injection practices, as published in the CDC’s 2016 “Summary”, include:

1. Prepare injections using aseptic technique in a clean area.
2. Disinfect the rubber septum on a medication vial with alcohol before piercing.
3. Do not use needles or syringes for more than one patient.
4. Medication containers (single and multi-dose vials, ampules, and bags) are entered with a new needle and new syringe, even when obtaining additional doses for the same patient.
5. Use single-dose vials for parenteral medications when possible.
6. Do not use single-dose (single-use) medication vials, ampules, and bags or bottles of intravenous solution for more than one patient.
7. Do not combine the leftover contents of single-use vials for later use.
8. The following apply if multi-dose vials are used—
   a. Dedicate multi-dose vials to a single patient whenever possible.
   b. If multi-dose vials will be used for more than one patient, they should not enter the immediate patient treatment area (e.g., dental operatory) so as to prevent inadvertent contamination.
   c. If a multi-dose vial enters the immediate patient treatment area, it should be dedicated for single-patient use and discarded immediately after use.
   d. Date multi-dose vials when first opened and discard within 28 days, unless the manufacturer specifies a shorter or longer date for that opened vial.
9. Do not use fluid infusion or administration sets (e.g., IV bags, tubings, or connections) for more than one patient.

**Hand Hygiene**

Proper hand hygiene is acknowledged as the most critical element of an adequate infection control program in the oral healthcare setting. It is the single most important factor in preventing the spread of infectious diseases in dental setting.

Hand hygiene is considered the single most important way to reduce the risk of disease transmission in the dental setting. Hand contamination has long been cited as the primary culprit in hospital-associated infections and a major cornerstone of infection control because:
1. Hands are the most common mode of pathogen transmission
2. Hand hygiene can reduce the spread of antibiotic resistance in health care settings and the likelihood of health care-associated infections.

For routine or nonsurgical dental procedures workers should wash visibly soiled hands with soap (either antimicrobial or non-antimicrobial) and water. If hands are visibly soiled, antimicrobial soap and water, plain soap and water should be used. Proper hand hygiene procedures are indicated in the following situations in dentistry:

1. When they are visibly dirty,
2. Bare-handed touching of inanimate contaminated objects,
3. Before and after treating each patient,
4. Before donning gloves,
5. Immediately after removing gloves,

**Alcohol-based Hand Rubs**
One of the major changes over previous CDC infection control recommendations is the inclusion of alcohol-based hand rubs as part of the hand hygiene program. Plain soap has long been recognized as good for reducing bacterial counts, but the use of antimicrobial soap is recognized as better. Alcohol-based hand rubs are now recommended as the best method because they provide activity that prevents or inhibits survival of microorganisms after the product is applied.

**Glove Compatibility**
It's important to consider the compatibility of lotion and antiseptic products and the effect of petroleum or other oil emollients on the integrity of gloves when selecting and using them.

**Fingernails and Jewelry**
Short nails are more easily cleaned and may reduce premature glove tearing. Artificial nails can harbor pathogens and should be avoided. During surgical procedures, hand or arm jewelry can harbor microorganisms and increase risk of glove failure.

**Hand Hygiene in Practice**
As stated above, proper hand hygiene is considered the single most important activity to reduce the risk of disease transmission. It is important, therefore, to use the proper technique for the particular situation:

**Respiratory Hygiene / Cough Etiquette**
Respiratory hygiene/cough etiquette measures were added to standard precautions in 2007 and are designed to reduce the transmission of respiratory pathogens spread by droplet or airborne routes. Dental staff need to be educated on preventing the spread of respiratory pathogens when in contact with individuals with symptoms of respiratory illness.

Of primary concern, and the primary focus of “cough etiquette”, centers on patients - and/or individuals accompanying patients - to the dental office. In particular, those persons who might have undiagnosed transmissible respiratory infections, in addition to anyone (including staff members) who display signs of illness such as cough, congestion, runny nose, or increased production of respiratory secretions.
CDC recommended efforts to limit exposure to staff and patients include:

1. Post signs at entrances with instructions to patients with symptoms to:
   a. Cover their mouth/noses when coughing or sneezing,
   b. Use and dispose of tissues,
   c. Clean hands after hands have been in contact with secretions,
2. Provide tissues and no-touch receptacles for disposal of tissues,
3. Provide directions to the nearest restroom to clean hands,
4. Offer masks to coughing patients / other persons
5. Provide a space for symptomatic persons to sit away from others

**Personal Protective Equipment**

Personal Protective Equipment (PPE) is a major component of Standard Precautions. It is specialized clothing or equipment worn by an employee for protection against any chemical or bloodborne pathogen exposure. It is designed to protect the employee’s skin, eyes, nose, mouth and clothing and is worn in all exposure-potential procedures.

Personal protective equipment must be appropriate to the tasks being performed. It is considered “appropriate” only if it does not permit blood or other potentially infectious materials to pass through to, or reach, the employee’s work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time for which it is being used.

Personal Protective equipment includes, but is not limited to:

**Gloves**

Appropriate gloves must be worn in all procedural situations to prevent contamination of your hands. In doing so, you reduce the likelihood that bloodborne pathogens will transfer to you hands and be transmitted to patients during their dental care.

Patient care gloves are “single use” and discarded if they are compromised in any way and when removed for any reason. Utility gloves are used during sterilization procedures and may be reused so long as the integrity of the glove has not been compromised by cracking, peeling, tears, or punctures.

**Face Masks**

Appropriate face masks must cover the nose and mouth to protect the mucous membranes. Face masks must be worn during all procedures in which the likelihood of spattering, splashing, aerosolling or spraying of bloodborne pathogens exists. Masks are always changed between patients.

**Eye Protection**

As with face masks, appropriate eye protection must be worn during all procedures in which the likelihood of spattering, splashing, aerosolling or spraying of bloodborne pathogens exists. Eye protection may be glasses or goggles with solid side shields, or chin-length face shields. Personal glasses should be large enough to cover the orb or the eye.
Protective Body Clothing

Protective body clothing must protect street clothing and skin from exposures to all body fluids. Personal protective body clothing includes:

1. Gowns, 4. Clinic jackets,
2. Aprons, 5. Scrub tops with high collar, long cuffed sleeves,

Protective over-garments must be long-sleeved garments and may be reusable or disposable. Dental health care workers are required to change protective clothing daily, when it becomes visibly soiled, or as soon as possible if penetrated by blood or other potentially infectious fluids.

Reusable garments may be laundered on-premises, by a commercial service or by a non-employee (usually the doctor). Employees are forbidden by rules in the Bloodborne Pathogens Standard to take any potentially contaminated items home to launder.

PPE and Performing Tasks

The following procedures and activities conducted by dentists, dental hygienists, dental assistants, and sterilization techs during a normal practice day which require Personal Protective Equipment (PPE):

1. Chairside procedures
2. Instrument processing
3. Operatory clean-up
4. Surface Disinfection and Asepsis
5. Processing X-rays
6. Handling / packaging infectious wastes
7. Handling and processing contaminated Laundry
8. Housekeeping

All contaminated PPE must be removed before leaving clinical areas. The clinical area is normally defined as all areas in the facility wherein dental procedures are conducted. The front office, reception area, restrooms, staff lounge or kitchen, and outside the office are not considered clinical areas and contaminated PPE should not be worn in these areas.

Patient Care Items

The Spaulding Classification

The Spaulding Classification System is a tool that can guide your infection control efforts. It outlines disinfection and sterilization needs by categorizing patient-care items depending on their intended use and the potential risk of microbe (microbial) transmission. The three categories are Critical, Semi-critical, and Non-critical.

Critical items penetrate soft tissue or contact bone, the bloodstream, or other normally sterile tissues of the mouth. They have the highest risk of transmitting infection and should be heat-sterilized between patient uses. Examples of critical items include:

1. All hand and orthodontic instruments,
2. All burs and bur changers, including contaminated laboratory burs and diamond abrasives,
3. All endodontic instruments,
4. Air-water syringe tips,
5. High-volume evacuator tips,
6. Surgical instruments,
7. Ultrasonic periodontal scalers and tips,
8. Electro-surgery tips,
9. Metal impression trays, and
10. Intra-oral radiographic equipment that can withstand heat sterilization.

**Semi-critical items** contact only mucous membranes or non-intact skin and do not penetrate soft tissues. As such, they have a lower risk of transmission. Because most items in this category are heat-tolerant, they should be heat sterilized between patient uses. For heat-sensitive instruments, high-level disinfection is appropriate.

Examples of semi-critical items include:
1. Dental Mouth mirrors, 4. Slow speed handpiece motors,
2. Amalgam condensers, 5. Digital radiography sensors,

**Note:** Dental handpieces are a special case. Although they do not penetrate soft tissue, it is difficult for chemical germicides to reach the internal parts of handpieces, so they should be heat sterilized using a steam autoclave or chemical vapor sterilizer.

**Non-critical** items contact only intact (unbroken) skin, which serves as an effective barrier to microorganisms. These items carry such a low risk of transmitting infection that they usually require only cleaning and low-level disinfection.

If using a low-level disinfectant, according to DOSH, it must have a label claim for killing HIV and HBV. However, if an item is visibly bloody, it should be cleaned and disinfected using an intermediate-level disinfectant before use on another patient. Examples of non-critical items include:
1. X-ray head cones 3. Pulse Oximeter
2. Face bows 4. Blood pressure cuffs

**Sterilization of Patient Care Items**

Instrument processing is central to your infection control program, and requires multiple steps using specialized equipment. Appropriate cleaning, disinfection, and sterilization of contaminated instruments and devices ensures that they can be safely used for subsequent patient care.

The sterilization area/room in which instruments are processed should be physically or spatially divided into distinct “clean” and “dirty” regions for cleaning, holding, packaging, sterilization, and storage.

Instruments are transported from the operatories to the “dirty” side and move to the “clean” side by way of the instrument processing activities necessary to ultimately deliver sterile instruments to the chairside for the next patient. The four primary areas of activity in this process are:
1. **Receiving, cleaning, and decontamination area** (*dirty side*) where reusable contaminated instruments are received, sorted, and cleaned;

2. **Preparation and packaging area** (*clean side*) to inspect, assemble, and package clean instruments in preparation for final sterilization;

3. **Sterilization area** (*clean side*) where the sterilizer is located for processing instruments;

4. **Storage area** (*clean side*) for storage of sterile items.

**Instrument Sterilization Process**

**Receiving**

After patient procedures are completed, contaminated instruments must be moved safely from the operatories to the sterilization area. Appropriate personal protective equipment must always be worn.

**Cleaning**

Cleaning is the first step in all decontamination processes and involves the physical removal of debris and reduces the number of microorganisms on an instrument or device. Automated or mechanical cleaning equipment, such as ultrasonic cleaners, instrument washers, and washer-disinfectors, are considered acceptable and commonly used to clean dental instruments. Hand scrubbing of instruments should only be employed if debris is still attached after automated cleaning.

After cleaning, instruments should be rinsed with water to remove chemical or detergent residue.

If contaminated instruments cannot be immediately cleaned or if manual cleaning is necessary, soak instruments in a rigid container filled with detergent, disinfectant / detergent, or an enzymatic cleaner. This step prevents drying of patient material and makes cleaning easier and less time consuming.

1. Do not use high-level disinfectants or sterilants as instrument-holding solutions.

2. Wear puncture-resistant, heavy-duty, utility gloves when handling or manually cleaning contaminated instruments and devices.

3. Wear a facemask, eye protection, and a gown or jacket.

After instruments are thoroughly cleaned and dried, critical and semi-critical instruments that will be stored before use should be wrapped or placed into container systems prior to heat sterilization.

1. Open or unlock hinged instruments so that all surfaces are exposed.

2. Place a chemical indicator inside each wrapped package. If the indicator cannot be seen from the outside, place another indicator (e.g., indicator tape) on the outside of the package.

3. Always wear heavy-duty, puncture-resistant utility gloves while inspecting and packaging instruments.

**Preparing and Packaging**

After cleaning, inspect the instruments and assemble them into sets or trays; then wrap, package, or place them into container systems for heat sterilization.
Packaging protects the instruments from recontamination until they are used on the next patient. Unpackaged instruments will be contaminated by dust, aerosols, improper handling, or contact with contaminated surfaces.

A chemical indicator should be placed among the instruments, inside the package or cassette.

**Sterilization**

It is critical that the sterilizer chamber be properly loaded to ensure the sterilizing agent will have sufficient access to the instruments through the packaging.

Items should be loaded on their edges or in a single layer. Laying them flat and/or stacking them in layers compromises the sterilization process.

**Heat Sterilization Methods**

1. Heat-tolerant instruments are sterilized by steam under pressure, dry heat, or unsaturated vapor sterilizer. Always follow the instructions provided by the manufacturer when using your sterilizer of choice.

2. Heat-sensitive instruments can be sterilized or high-level disinfected by soaking them in an FDA approved liquid chemical germicide (cold sterile).

**Sterilization Monitoring**

Sterilization monitoring and record keeping are essential infection control quality-assurance measures. The three primary monitoring activities include:

1. Physical monitoring of each sterilization cycle,
2. Placing chemical indicators on the inside and outside of each package or wrapped container,
3. Weekly spore testing of each sterilizer.

Proper monitoring of sterilization procedures including the following:

1. **Mechanical**: involves assessment of cycle time, temperature, and pressure,
2. **Chemical**: uses sensitive chemicals that change color when a given parameter is reached,
3. **Biological (spore testing)**: assesses the process directly by using the most heat-resistant microorganisms and not by using indicators that only test the physical and chemical conditions.

If mechanical indicators, internal or external chemical indicators indicate inadequate processing, items in the load should not be used until reprocessed.

**Storage**

The two basic approaches to storing instruments after sterilization are “event-related” storage or “shelf life” storage:

1. Event-related storage acknowledges the contents of the package will remain sterile indefinitely unless the package is damaged.
2. Shelf life storage (first in; first out) employs the practice that the first items to be sterilized are the first items to be used for the next patient.
Environmental Infection Prevention

Environmental surfaces can become contaminated with patients’ blood, saliva, and other biological fluids during patient care. Generally speaking, however, contaminated environmental surfaces do not require the stringent decontamination procedures used on patient care items. The two categories of environmental surfaces are:

1. **Clinical contact surfaces** are normally contaminated either by spray or spatter generated during dental procedures or by contact with dental health care worker’s gloved hands. They can be protected by surface barriers or disinfected. Examples of clinical contact surfaces include:
   a. Light handles   d. Bracket trays   f. Dental Chairs
   b. Counter tops   e. Door Handles

2. **Housekeeping surfaces** do not come into contact with patients or devices used in dental procedures and, therefore, present a limited risk of disease transmission. Housekeeping surfaces should be either cleaned with soap and water or an EPA-registered detergent/hospital disinfectant. Examples of housekeeping surfaces include:
   a. Walls
   b. Sinks
   c. Floors

**Barrier Protection / Surface Disinfection**

An integral part of environmental infection control centers on the disinfection or surface barrier protection of the clinical contact and housekeeping surfaces. Which to use remains the option of the dental office. Three basic options exist:

1. Barrier protect everything
2. Disinfect everything
3. Use a combination of barriers and disinfection

**Barrier protection:** When used, barriers must be changed between patients. It is not necessary to disinfect barrier protected surfaces between patients, but it is necessary to clean the surfaces at the beginning or the end of the work day.

**Disinfection:** If barriers are not used, surfaces must be cleaned and then disinfected with an EPA-registered hospital disinfectant between patients. The use of sterilants or high-level disinfectants on environmental surfaces is not recommended.

Regardless of the disinfectant product you use, you must follow the manufacturer’s instructions. When using wipes the disinfecting clinical surfaces involves three steps:

**Step 1:** Wipe / Clean the surface
**Step 2:** Discard the wipe
**Step 3:** Wipe the surface with the disinfectant.

When using a spray to apply a product that is a cleaner and disinfectant, there are three steps:

**Step 1:** Spray the surface with the cleaner,
**Step 2:** Wipe the surface clean,
**Step 3:** Spray the surface with the disinfectant.

**NOTE:** Do NOT wipe the surface after applying the disinfectant
Dental Unit Water Quality

Dental unit waterlines, the small-bore plastic tubing that carries the water from the dental unit to the high-speed handpiece, air-water syringe, and ultrasonic scaler promote bacterial growth and development of biofilm due to the presence of long, narrow-bore tubing, inconsistent flow rates, and the potential for retraction of oral fluids.

Biofilm forms in all water environments, but the structure of the narrow-bore dental lines and the typical small volume of water used in dental procedures allows the microorganisms to attach to the walls of the lines and create a slime-layered biofilm. Microbial counts in dental treatment water can reach as high as 200,000 CLU/mL within 5 days of installing new dental unit waterlines.

Untreated dental units cannot reliably produce water that meets drinking water standards of fewer than 500 CFU/mL of heterotrophic water bacteria. Even using source water containing ≤500 CFU/mL of bacteria (e.g., tap, distilled, or sterile water) in a self-contained system will not eliminate bacterial contamination if biofilms in the water system are not controlled. Removal or inactivation of dental waterline biofilms requires use of chemical germicides.

For this reason, CDC recommends that all dental units should use systems that treat water to meet regulatory standards for drinking water of fewer than 500 CFU/mL of heterotrophic water bacteria.

Commercial devices and procedures designed to improve the quality of water used in dental treatment are widely available. Examples of methods shown to be effective include the following:

1. Self-contained water systems combined with intermittent or continuous chemical treatment.
2. In-line micro-filters.
3. Combinations of these treatments.

Your practice should use available commercial devices and procedures and work with equipment professionals to ensure that your dental treatment water meets or exceeds the standards established by the EPA for drinking water. Always consult with the dental unit manufacturer for appropriate methods to maintain the recommended quality of dental water.

Current CDC recommendations to ensure meeting the established standards include:

1. Use water that meets EPA regulatory standards for drinking water (i.e., ≤ 500 CFU/mL of heterotrophic water bacteria),
2. Consult with the dental unit manufacturer for appropriate methods and equipment to maintain the quality of dental water,
3. Follow recommendations for monitoring water quality provided by the manufacturer of the unit or waterline treatment product, and,
4. Use sterile saline or sterile water as a coolant/irrigant when performing surgical procedures.

Monitoring Dental Water Quality

Monitoring of dental water quality may be performed using commercial self-contained test kits or commercial water-testing laboratories. In-office water-testing systems are available.
that work at room temperature using small paddles or plates of culture medium to reveal bacterial colonies after 72 or more hours.

Monitoring Guidelines
It is important that you contact both the manufacturer of the dental unit and the waterline maintenance system to ascertain the recommended monitoring schedules for the products and techniques used in your office.

1. Test water immediately before scheduled waterline treatment,
2. Use an aseptic technique to collect the water samples.
3. Consult with a water testing lab or follow the instructions with your kit,
4. Monitor whenever starting a new waterline treatment protocol, when changing an existing waterline treatment, and when new workers are given responsibility for treating dental waterlines,
5. Set up and follow a regular monitoring schedule for dental units,
6. Keep records of monitoring results.

If bacterial counts exceed 500 CFU/mL, re-evaluate the technique, re-treat the dental unit water, and retest the dental unit immediately before the next scheduled treatment interval. Continue this process until acceptable water quality is achieved.

Dental Radiology
Although, according to the CDC, there is no direct evident that disease can be transmitted by way of dental x-ray procedures, there are a variety of procedures that can potentially lead to cross contamination. Oral microorganisms can survive on X-ray equipment for at least 48 hours and can survive in developer/fixer for up to two weeks.

Even without films or processing equipment – such as in digital x-rays – the sensors in the mouth used to take filmless x-rays, the computer keyboard and mouse, x-ray sensor cords, and the portable x-ray cart can become contaminated. To be consistent with all other infection control practices within your office it is important that protocols for dental radiology be identical to those used in the operatory and throughout the clinical areas.

When taking or processing radiographs:
1. Wear gloves and other appropriate personal protective equipment as appropriate,
3. Transport and handle exposed radiographs so as to prevent cross-contamination.
4. Avoid contamination of developing equipment.

Laboratories
Effective infection control measures normally practiced within the dental office, sometimes fall short when preparing and sending the impressions to the dental laboratory. Items sent to the lab, as well as any equipment used to process impressions, appliances, and prostheses, must be handled with the same attention to infection control to protect lab technicians.

Before and after handling or manipulating prostheses, orthodontic appliances, and impressions:
1. Disinfect the item with an intermediate-level disinfectant
2. Rinse thoroughly
3. Wear gloves and other appropriate personal protective equipment (PPE)
4. If packaging items for shipment an off-site dental laboratory, package prescriptions and other paperwork separately.
5. Send the impressions in a sealed container

Communicate with the lab to ensure that correct cleaning and disinfection procedures are performed with products that are not damaging or cause distortion of the impression materials.

**Education and Training**

Infection prevention must be made a priority in every dental practice and staff training, specific to the basic principles and practices of infection control are critical to the success of infection prevention efforts. It is important that all staff members understand the direct connection between a strong, on-going educational base and the prevention of disease prevention from patient to staff, patient to patient, and staff to patient.

Training should include attention to the general safety of the patient and the task-specific needs of the dental professional. In addition to a detailed written policies and procedures program, staff should receive infection control/prevention training:

1. At initial hire,
2. When tasks change or procedures change and,
3. Annually.
Your OSHA Seminar Workbook

This workbook has been prepared for your reference in matters relating to the rules, regulations and questions relating to compliance with health and safety programs required by the Washington State Department of Labor and Industries, Division of Occupational Safety and Health. It is not a copy of the individual rules nor is it intended to qualify or substitute as the written programs required by OSHA. Please direct any question you may have to the Department of Labor and Industries or to HARRISBIOMEDICAL – 866-548-2468 or e-mail info@harrisbiomedical.net

Sources /References

Sources of information and specific details have been drawn from the American dental Association, the Oregon Board of Dentistry, Oregon Administrative Rules, the CDC “Guidelines for Infection Control recommendations for Dentistry, 2003”, the CDC “Guidelines for Disinfection and Sterilization in Healthcare Facilities, 2008, the MWC the “Updated Infection Control recommendations for Dentistry, the CDC 2016 “Summary opf Infection Prevention Practices in Dental Settings, and “From Policy to Practice: OSAP;’s Guide to the Guidelines”.

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