INFECTION CONTROL **IN PRACTICE**

Continuing Education

CONTINUING EDUCATION:
INFECTION CONTROL IN PRACTICE

DESCRIPTION
This seminar introduces infection control principals and best practices pertaining to sterilization and disinfection of patient care items as well as dental unit waterlines, in accordance with the CDC guidelines.

OBJECTIVES
You will learn strategies to assist you in maximizing safety and efficiency of instrument processing. In addition, you will learn how to optimize the quality of water that you deliver to your patients.

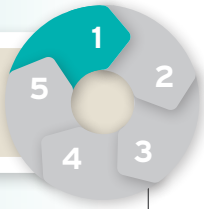
WHAT ARE THE CDC GUIDELINES?
- Consolidated recommendations for preventing and controlling infectious diseases
- Strategies designed to protect patients and health care workers
- Guidelines only, not government regulations

To access guidelines visit:
CDC.Gov/mmwr/preview/mmwrhtml/rr5217a1.htm

STANDARD PRECAUTIONS TO PREVENT DISEASE TRANSMISSION INCLUDE:
- Hand washing
- Use of Personal Protective Equipment (PPE)
- Cleaning and decontamination with PPE
- Cleaning and disinfection of environmental surfaces
- Injury prevention

MODULE 1:
5 STEPS OF INSTRUMENT PROCESSING

STEP 1: TRANSPORTATION



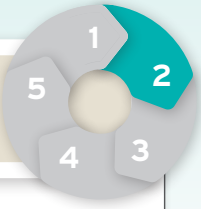
"Minimize handling of loose contaminated instruments during transport to the instrument processing area. Use work practice controls (e.g., carry instruments in a covered container) to minimize exposure potential."

– CDC MMWR 2003; 52 (No.RR-17), VI, C1

TRANSPORTATION CONSIDERATIONS: STERILIZATION CASSETTES
- Organize instruments and accessories per procedure

BENEFITS
- Increases chair-side efficiency
- Improves office flow
- Faster instrument processing and set-up/tear down (no sorting instruments, prepping tray)
- Improves safety
  - › Less injury potential due to reduced handling of contaminated instruments
- Reduces costs
  - › Less potential to lose or damage instruments due to being secured tightly in cassettes
  - › Less counter space required
- Makes staff training easy

STEP 2: RECEIVING, CLEANING & DECONTAMINATION



"Designate a central processing area. Divide the instrument processing area, physically or, at a minimum, spatially, into distinct areas for:

1. Receiving, Cleaning and Decontamination
2. Preparation and Packaging
3. Sterilization
4. Storage

Do not store instruments in an area where contaminated instruments are held or cleaned."

– CDC MMWR 2003; 52 (No.RR-17), VI, B1

"Use automated cleaning equipment (e.g., ultrasonic cleaner or washer-disinfector) to remove debris to improve cleaning effectiveness and decrease worker exposure to blood."

– CDC MMWR 2003; 52 (No.RR-17), VI, C2

REQUIRED PRACTICES IN INSTRUMENT PROCESSING AREA

- Wear appropriate PPE (utility gloves, mask, glasses, gown)
- Use automated cleaning equipment
- Follow processing guidelines of equipment manufacturers

PROPER USE OF AN ULTRASONIC

- Use only correct solution; change daily or more often
- Never overload; follow weight limits
- Submerge all instruments and keep lid on during use
- Conduct monthly foil test to determine cleaning effectiveness

ENZYMATIC ULTRASONIC CLEANING SOLUTION

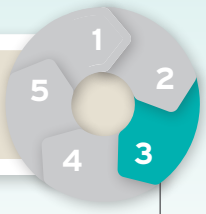
- Include proteolytic enzymes which break up bioburden and debris more rapidly than non-enzymatic solutions
  - › Shown to reduce the need, if any, for hand scrubbing
- Dual enzyme cleaners include multiple enzymes for better cleaning
  - › Protease – protein enzyme that breaks down blood
  - › Amylase – enzyme that breaks down plaque and starches

DENTAL INSTRUMENT WASHERS*

- More effective, efficient, streamlined infection control process than manual cleaning
- Less exposure to blood and body fluids, exposure to sharps
- Must be used according to manufacturer's instructions – no mixing of metals.

*Dental Instrument Washers are not the same as Dishwashers. Dishwashers are not FDA approved for cleaning dental instruments.

STEP 3: PREPARATION & PACKAGING



"Instruments are to be inspected for cleanliness; then wrapped or placed in containers designed to maintain sterility during storage."

– CDC MMWR 2003; 52 (No. RR-17), VI D2

INTERNAL CHEMICAL INDICATOR

- Place into every package

EXTERNAL CHEMICAL INDICATOR

- Use when internal indicator cannot be seen from outside

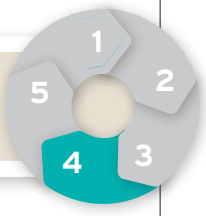
HINGED INSTRUMENTS

- Process open and unlocked

CHOOSE AN EFFECTIVE POST-CLEANING PACKAGING MATERIAL*

- Allows penetration of the sterilizing agent
- Maintains sterility after sterilization
- Provides an adequate barrier to microorganisms
- Puncture and tear-resistant
- Low linting, free of toxic elements and dyes
- Cost effective

STEP 4: STERILIZATION & MONITORING



HEAT STERILIZATION OF CRITICAL AND SEMI-CRITICAL ITEMS

- Critical: Anything that touches soft tissue or bone
- Semi-Critical: Anything that touches soft tissue or non-intact skin

TYPES OF HEAT-BASED STERILIZATION

- Steam under pressure (Autoclaving)
- Dry heat
- Unsaturated chemical vapor

STERILIZATION CYCLE COMPONENTS

- Heat-up period – must reach sterilizing temperature
- Exposure interval – time required for sterilization of load
- Cool-down period – allow for sufficient cooling prior to handling
  - › Remove excess moisture – important for handpiece sterilization and function
  - › Do NOT remove packs early

*Practical Infection Control in Dentistry, Third Edition, John A. Molinari, Jennifer A Harte, page 226, Table 16-3

CONSIDERATIONS FOR STERILIZERS*

- Use only FDA cleared medical devices
- Allow to dry in the sterilizer before handling to avoid contamination
- Arrange to permit free circulation of the sterilizing agent
  - › Follow manufacturer's instructions
  - › Do NOT overload
  - › Observe weight limits

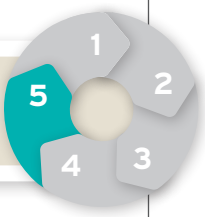
"The ability of equipment to attain physical parameters required to achieve sterilization should be monitored by mechanical, chemical, and biological indicators."

– CDC MMWR 2003; 52 (No.RR-17), Sterilization

STERILIZATION MONITORING

1. Mechanical Indicators (each load)
   - Observe the gauges or displays on the sterilizer to assess time, temperature and pressure
2. Chemical Indicators (each load)
   - Change in color upon reaching physical parameter
3. Biological Indicators/Spore Tests (At least weekly. Refer to state and local guidelines.)
   - When sterilizing an implantable device, it needs to be completed with each load.
   - Assesses the sterilization process directly
     - › Uses the most heat resistant microorganisms
     - › Indicates other potential pathogens have been destroyed
   - If there is a failure, remove sterilizer from service. Ensure sterilization process was followed in order to rule out "operator" error. Correct any procedural errors, re-test the sterilizer using biological, mechanical, and chemical indicators.
     - › If repeat spore tests are negative, return sterilizer to service

STEP 5: STORAGE



STORAGE**

- Use "event" or "date" related shelf life practices
  - › For event related, place date of sterilization on outside of packaging material. Note which sterilizer was used.
- Examine wrapped items carefully prior to use
- If the packaging of sterile items is damaged:
  - › Re-clean, re-wrap, re-sterilize
- Store sterile items in closed or covered cabinets (also dry area)

PATIENT PERCEPTION

- Keep instruments wrapped until patient treatment
- The pay off: Patients note sterile packages (perception and reality)

*CDC MMWR 2003; 52 (No.RR-17) Sterilization, **CDC MMWR 2003; 52 (No.RR-17), Storage

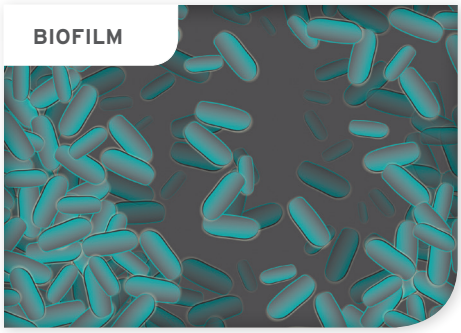
MODULE 2: DENTAL WATERLINE UNITS

BIOFILM

BIOFILM: A coating or covering on the surface of a living or nonliving substrate composed of microorganisms such as bacteria, protozoa, and algae (i.e., plaque).

- Highly complex microbial structural entity
- Exists in all environments, including water and solids

BIOFILM



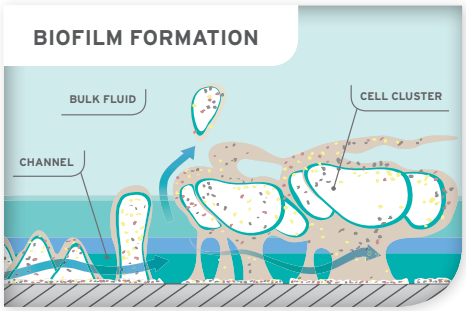
COLONIZATION SEQUENCE

- Organisms attach to surface of walls
- They grow, thicken and reproduce
- Creates greater resistance to chemical penetration

DUWL & BIOFILM

- Microorganisms form on internal waterline surfaces
- As the rushing water comes into contact with the established biofilm, pieces break off
- Contaminates patient treatment

BIOFILM FORMATION



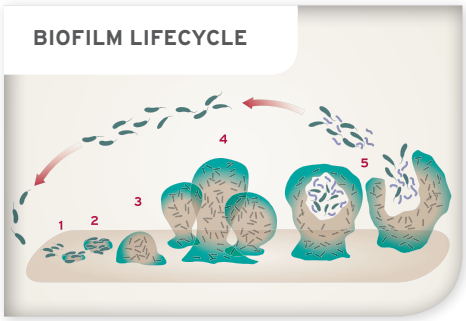
RAPID GROWTH OF MICROORGANISMS IS CAUSED BY:

- Small diameters of waterlines and slow water flow
- Low volume of water used
- Water warms to room temperature
- Low usage

BOTTLES DO NOT SOLVE THE PROBLEM

- Can make microbial growth worse unless regularly maintained

BIOFILM LIFECYCLE



RECOMMENDATIONS

- CDC – Dental treatment output water should meet regulatory standards for drinking water (<500CFU/ml of heterotrophic water bacteria)*
- ADA recommends < 200 CFU/ml of heterotrophic water bateria**

SOURCES OF BACTERIA AND CONTAMINATION INCLUDE:

- Treatment plant, exposed tubing, quick disconnect, handpiece connectors, etc.
- Incoming municipal water
  - › Is sanitized, but can have up to 500 cfu/ml
  - › Biofilm will develop if not properly cleaned and maintained
- Patient's mouth
  - › Negative pressure can cause fluid from the patients mouth to be "retracted" back into the line
  - › Anti-retraction valves are installed on modern dental equipment to help prevent this situation – but can fail

*CDC MMWR 2003; 52 (No.RR-17), Dental Unit Waterlines, **ADA Statement on Dental Unit Waterlines, 1995

DENTAL UNIT WATER QUALITY*

- Municipal water supply is primary source of microorganisms
- Research shows microbial counts can be < 200,000 cfu/ml within 5 days of new DUW installation.
- Using water of uncertain quality is inconsistent with infection control principles.
- Untreated dental units cannot reliably produce water that meets drinking
- It is unacceptable to use highly colonized water for any kind of dental treatment

TREATING DENTAL UNIT WATERLINES

Complete dental unit waterline systems include use of an antimicrobial cleaner and a maintenance product

- Over time, bacteria can overwhelm the waterline environment
- Cleaning with registered antimicrobial is key to removing microbial deposits
- Using a proper maintenance product is also necessary to keep tubing surfaces clean between antimicrobial treatments
  - › Prevents waterborne organisms from attaching, colonizing, proliferating in tubing

TREATING DENTAL UNIT WATER

Use of an EPA registered antimicrobial cleaner is recommended.
Product Example: HU-FRIEDY'S VISTA TAB ANTIMICROBIAL CLEANER

- Cleans lines of microbial contaminants (periodic)
- Non-corrosive solution 7x more effective than bleach
- Environmentally friendly – no heavy metals
- Easy to use – requires only 5 minutes a month
- Non-corrosive; no harmful byproducts

VISTACLEAN – DAILY MAINTENANCE PRODUCT

- Dissolves waterline contaminants
- Maintains lines daily
- Derived from organic, citrus botanicals – safe for use on patients
- Environmentally friendly
- Easy to use
- No effect on bond strength

MONITORING OPTIONS**

- Water testing using a professional laboratory
- In-office testing with self-contained kits
- Follow recommendations provided by the manufacturer for use of the dental unit or waterline treatment product

*CDC MMWR 2003; 52 (No.RR-17), Dental Unit Waterlines, **CDC MMWR 2003; 52 (No.RR-17), Dental Unit Waterlines