INFECTION CONTROL IN PRACTICE

Continuing Education
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

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
“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.
**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

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**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

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“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
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

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
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

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

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

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

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