Wish:

Wash, IUSS, Sterilization and High level disinfection insights to improve performance

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EXCELLENTIA

Objectives

The participant will be able to:

- List key steps in the sterilization/ high-level disinfection process
- Recognize sterilization/ high-level disinfection irregularities
- Identify cause of instrument discoloration

INTRODUCTION

- Healthy People 2020: https://www.healthypeople.gov/2020/topics-objectives/topic/healthcare-associated-infections

- National action plan to prevent health care-associated infections: Road Map to Elimination : https://health.gov/hcq/prevent-hai-action-plan.asp?_ga=1.87129296.999411510.1481313804

WASH

- Most important step in decontamination process
- Removes rather than kills micro-organisms
  - Not microbicidal
  - Remove visible debris
  - Results in low bio-burden; vital to subsequent processes
- Remaining organic residue can inactivate chemical disinfectants or sterilants or protect micro-organisms from destruction
- Debris may become dislodged causing health risks

WASH

Where do we begin?

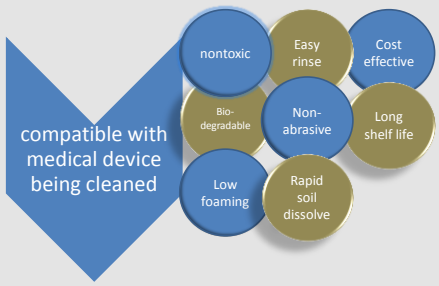
- Free of gross soil during surgery/ procedure
- Point of use
- Separate instruments
- Disassemble
- Fully open jointed instruments
- Follow manufacturer IFU

WASH

- Detergent or detergent/ enzymatic solutions
  - Consult manufacturer IFU
- Blood adheres to surfaces
- Must be mechanically removed
- Proteinaceous blood components become insoluble when exposed to thermal or chemical means

WASH

Choosing a cleaning agent:



WASH

Method of cleaning depends on device IFU
Manual Cleaning:

- Recommended for delicate / complex devices
- Cleaned under water
- Brush of appropriate size, length, bristle type and material
- Flushed w/ cleaning solution, then flushed with treated water
- Monitor temperature
- Rinse remove debris /detergent residue

WASH

Mechanical Cleaning:

- Remove soil and micro-organisms
- Mechanical cleaning equipment includes:
  - Utensil washers and cart washers
  - Washer-sanitizers,
  - Pasteurization equipment
  - Washer-disinfectors
  - Washer-decontaminators
  - Washer-sterilizers

WASH

Washer Disinfector

Removes soil and provides at least 1,000-fold reduction in # of organisms present on instrument by use of hot water (180-200◦ F) or chemical disinfectant cycle

WASH

Washer Disinfector –quality check

- Ensure equipment functioning properly
  - Temperature should be monitored and documented.
  - Spray arms should be checked daily
    - Arms free-turning
    - Spray nozzles are not clogged.
  - Strainers cleaned daily or visible debris.

WASH

Mechanical Cleaning:

- Ultrasonic cleaners for fine cleaning
  - Used only after gross soil removed
  - Not disinfection/ sterilization
  - Degassing –follow IFU - document
  - Check IFU to validate U/S cleaner compatible
  - Change cleaning solution before it becomes heavily soiled
  - Thorough rinsing
  - Preventative maintenance per IFU and document

WASH

Rinsing:

- Removes loosened debris and detergents
- Copious amounts of tap water
- Final rinse:
  - Treated water
  - DO NOT USE SALINE –
    - Salts cause instrument deterioration
    - May interfere with sterilization

WASH

Verification:

- Visual inspection with lighted magnifier
  - Preventative maintenance per IFU
- Measure organic residue:
  - ATP
  - Residual carbohydrates, glucose, heme

WASH

Light or Dark Water Spots

WASH

Light or Dark Water Spots

Cause:
- Air dried instruments
- Mineral content in tap water or condensate in sterilizer

Solution:
- Purified water through reverse osmosis or deionization

WASH

Rust colored deposits:

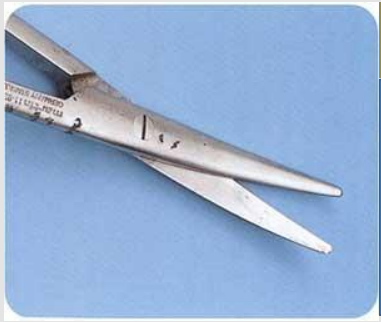
WASH

Rust colored deposits:

Cause:
- Inadequate cleaning or drying
- Inappropriate water used for rinsing
- Incomplete rinse
- Electrolyte deposits underneath chipped chrome plating on stainless steel
- Presence of chlorides

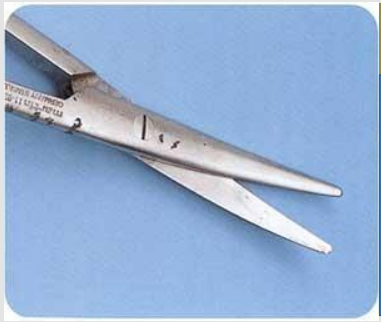
Solution:
- Correct loading of autoclave trays
- Repair and replace the chrome plating

WASH



Blue-gray staining:

WASH



Blue-gray staining:

Cause:
- Chemical solutions
- Cold sterilant solution

Solution:
- Verify type and concentration of chemistries

WASH

Purple-Black Staining

WASH

Purple-Black Staining

Cause:
- Chlorides/detergent in steam lines
- Exposure to saline, blood, potassium
- 2 types of metal placed in u/s together

Solution:
- Clean steam lines
- Verify instrument compatibility

PACKAGING

PACKAGE SELECTION

Sterilization Packaging Characteristics:
- Non-linting
- Barrier to microorganisms
- Resist tearing/ puncture
- Allows sterilant to penetrate, contact item and then be removed
- Suitable for items being sterilized
- Free of toxic ingredients & non-fast dyes
- Complete & secure closure/seal; tamper-evident
- Maintain sterility until pkg opened
- Ease of aseptic presentation
- Cost-effective
- Obtain & keep on file mfr's test data, IFU, care & handling instructions
- P&P based on manufacturer's written IFU

PACKAGING

SELECTION:
- Tensile strength = fabric resistance to breaking when pulled apart
  - Higher # = increased resistance to breaking

Wrap Weight	Ave. Grab Tensile Strength
Very heavy weight	110.8
Heavy weight	8.8
Moderate to heavy weight	81.7
Light to moderate weight	65.2
Light weight	45.2
Very light weight	42.1

Source: Cardinal Health

PACKAGING

PACKAGE PREPARATION

- Clean, dust free and away from fluorescent/ UV light
- Room temperature with humidity between 30-60% for at least 2 hours
- First in, first out rotation
- Examine for defects – discard
- Items being wrapped must be clean/ dry
- Disposable wraps: one and done
- Reusable textile wrap must be laundered between use

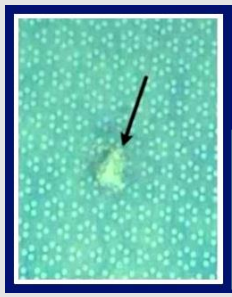
PACKAGING

PACKAGE PREPARATION

- P&P for packaging techniques based on IFU
  - Sequential double-wrapping
  - Simultaneous double-wrapping
    - Wrappers kept snug to prevent low spots
- ✓ Manufacturer IFU for recommended technique

PACKAGING

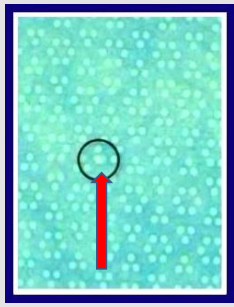
PACKAGING



ABRASION HOLE

Extreme abrasion with holes in one or both layers of wrap

PACKAGING



PIN HOLE

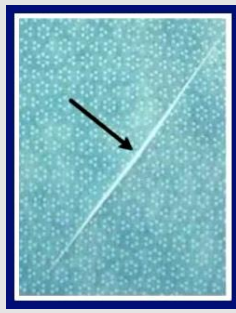
A very small hole

PACKAGING

RUPTURED SEAL

- Long fingernails rupture pkg
- Overstuffed storage can cause pack to become crushed, bent or compressed
- Dropped packages are ALWAYS considered contaminated

PACKAGING

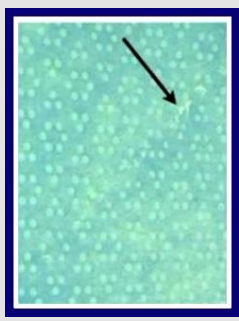


KNIFE CUT

Cause:
Knife used to open box of wrap

- Straight with clean edges
- Appear intact when pulled together

PACKAGING



SNAG CUT

Straight cut with a small line of cuts or holes

PACKAGING

SNAG HOLE

Triangular shaped hole

PACKAGING

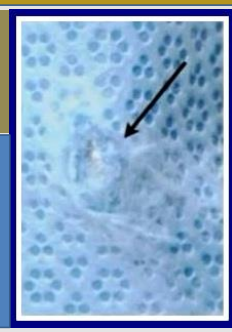
PRESSURE HOLE

A small hole or cut less than 2mm in length

PACKAGING

PUNCTURE HOLE

Frayed or loose fibers attached to the edges



PACKAGING

MELTED HOLE

Large round or irregular hole with hard welded edges

PACKAGING

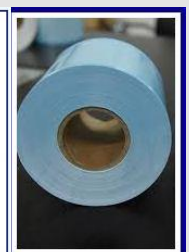
WET PACK

Related to:
- Steam supply
- Poorly maintained condensation return
- Low steam pressure
- Seasonal changes

PACKAGING

APPROPRIATE TRAY HANDLING

PACKAGING



Peel Pack

PACKAGING

Loading

- Stand on edge
- All face same direction
- None touching

PACKAGING

What's wrong with this picture?

PACKAGING

What's wrong with this picture?

Seal is 100% on plastic

PACKAGING

What's wrong with this picture?

Seal is folded at an angle causing a gap and is 100% on plastic

IUSS

Immediate Use Steam Sterilization:

- Designed for the steam sterilization
- Shortest time between sterilized items removal from the sterilizer and aseptically transfer to sterile field

- Unwrapped instruments
- Abbreviated exposure time & possibly no dry time
- Intended for immediate use; not storage
- NO implantable devices unless emergency
- NOT routine, but exception

•NOT A SUBSTITUE FOR INSUFFICIENT INSTRUMENT INVENTORY

IUSS

- Packaging system must be compatible with IUSS
- Protect item sterility

Rigid Container systems

- FDA approved
- Suitable for items
- MFR IFU
- Toxic free, low lint, odor free
- Tamper-evident seal
- Allow for ID of contents prior to opening
- Maintain sterility until opened
- Easy to use

IUSS

- Chemical indicator specific to the sterilization method; used every cycle
  - 1 on inside and 1 on outside
- Used, cleaned, inspected, repaired and maintained per MFR IFU
- Check MFR IFU for limitations
- Packaging must be labeled with instrument, sterilizer, sterilization cycle, personnel and patient
- Staff training/ competency on implementation and yearly

STERILIZATION

Steam

Definition:
- Complete elimination/ destruction all microbial life
- Physical or chemical processes

Many types: Steam, ETO, Vapor

Advantages :
- Non-toxic „
- Cycle easy to control
- Inexpensive „
- Rapidly microbicidal „
- Least affected by organic/inorganic soils „
- Rapid cycle time „
- Penetrates packaging, device lumens

STERILIZATION

Ethylene Oxide (ETO)

Advantages „
- Very effective at killing microorganisms „
- Penetrates medical packaging
- „Cycle easy to control and monitor

Disadvantages „
- „Lengthy cycle/aeration time
- ETO toxic, carcinogen and flammable
- ETO regulated by some states
- Store cartridges in flammable storage cabinet

STERILIZATION

Hydrogen Peroxide Gas Plasma

Advantages
- Safe and fast
- Leaves no toxic residuals
- Cycle time is 28-52 min
- Heat and moisture sensitive items

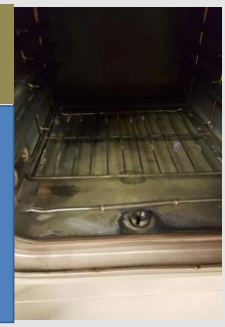
Disadvantages
- Cellulose (paper), linens and liquids cannot be processed
- Chamber is small
- Restrictions based on lumen internal diameter
- Requires synthetic packaging
- Hydrogen peroxide may be toxic at levels greater than 1ppm

Sterilization

Does the interior of your facility sterilizer look like this?

Sterilization

Does the interior of your facility sterilizer look like this?



Sterilization

What's wrong with this picture?

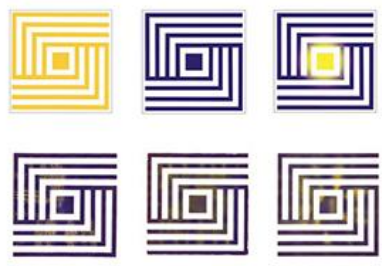
Sterilization

What's wrong with this picture?

Overloaded, improperly stacked, peel packs lying flat instead of on edge

STERILIZATION

BOWIE DICK



STERILIZATION

STERILIZATION

STERILIZATION

STERILIZATION

Biological Indicators

- Gold standard of load sterilization monitoring
- Bacterial spores – *Geobacillus stearothermophilus*
- Requires 2 test with the same lot #
- One in sterilizer. Both in incubator. The one that did not go in the sterilizer should change to a positive result

High Level Disinfection (HLD)

- Performed on semi-critical equipment
- Requires pre cleaning
- Visual inspection
- Prepared per manufacturer IFU
- Concentration tested
  - Testing strips are tested for validation
- Replaced per manufacturer IFU
- Contact time per manufacturer IFU
  - Appropriate temperature
- Allowed to dry before use
- Stored in a designated clean area to prevent contamination

WISH

References:

- ANSI/AAMI ST79: AAMI's Landmark Recommended Practice for Hospital Steam Sterilization, 2010
- Rutala WA, Weber DJ. CJD: Recommendations for disinfection and sterilization. Clin Infect Dis 2001;32:1348
- Rutala WA, Weber DJ. Disinfection and sterilization: What clinicians need to know. Clin Infect Dis 2004;39:702
- Rutala WA, Weber DJ, HICPAC. CDC guideline for disinfection and sterilization in healthcare facilities. MMWR. In press.
- CMS infection control surveyor worksheet, exhibit 351

WISH

QUESTIONS?

WASH

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