Protecting the Performance and Integrity of Rigid & Flexible Endoscopes

Purpose

- Protecting the Hospital’s Financial Investment in these Important Patient Care Assets
- Protecting the Quality, Performance and Integrity of Endoscopes for Ensuring Consistent Standard of Care and Patient Safety.

Agenda

Understanding the Anatomy of Endoscopes
A Day in the Life of Endoscopes
Recommended Proper Care & Handling Practices
“Endo Scope, MD” ~ Diagnosis of Endoscopes
Summary & Conclusion
Questions

Anatomy of Rigid Endoscopes

Understanding the Anatomy of Endoscopes
Recommended Practices for the Proper Care & Handling of Endoscopes

**Transport to the OR**
- Select an appropriate transportation device
- Protective containers
- Wrapping material
- Proper handling

**Use of Rigid Endoscopes in the OR**
- Inspect before use
- Do not drop
- Do not torque during procedure
- Take care with scope warmers
- After use, flush lumens and wipe off surface with damp cloth

**Transport to Decontamination**

**Decontamination: General Principles**
- Thorough cleaning of devices prior to sterilization
- Organic or inorganic matter can interfere with sterilization or high-level disinfection process
- You can clean and not sterilize but never sterilize without cleaning.
- Reduction of bioburden minimizes potential for pyogenic reactions
Decontamination: General Principles

- Manual and automated methods
- Manufacturer’s instructions
- FDA requirements

Decontamination of Rigid Endoscopes

- Submerge in neutral pH enzymatic solution
- Wash
- Rinse thoroughly with distilled water
- Dry

Inspection

- Visual Physical Inspection
- Optical Inspection
Visual Inspection

- **Eyepiece**
  - Identify model number and degree
  - Excessive wear
    - The eyepiece is where the Grasping Mechanism of the Camera connects to the endoscope.
  - Inspect Proximal Window
    - Window should be flush with the eyepiece cup.

- **Light Post / Light Concentrator Cone**
  - Remove light guide adapters
  - Identify the color band in relationship to degree
  - Examine for polished fibers
  - Look for pitting
  - Are the correct light guides being used?
    - < 5mm Endoscopes
      - Arthroscopes, Cystoscopes, Hysteroscopes
    - ≥ 5mm Endoscopes
      - Laparoscopes

- **Block Assembly**
  - Eyepiece alignment correct
  - Shaft connection
    - 5mm and smaller have a laser weld
    - 10mm have two set screws

- **Shaft Assembly**
  - Identify the serial number or date code
  - Inspection for dents / shaft damage
    - Fiber damage
    - Optical damage
    - Inspection for straightness

- **Distal Tip Assembly**
  - Electrode arching, Shaver damage
  - Sharp / burred edges
  - Inspect distal window
    - Laser solder
    - Missing optical elements
    - Protruding objective assembly

- **Dirty Distal Window**
  "If it's not clean, it can't be sterile."
Optical Inspection

• Initial Optical inspection
  → Wipe off distal and proximal end with alcohol swab
  → Look at type written letter from a distance of 5 to 8 cm
    • Inspect the entire field of view

Example of a Broken Scope

Using the loupe to evaluate the rod lenses.

Chipped Rod Lens  Broken Rod Lens

“Scope Dust” or Debris
Optical Inspection

- Light fiber inspection
  - Point the light post towards the light and examine distal tip of the endoscope
  - White fibers good
  - Gray fibers damaged
  - Black fibers broken

Check Accessory Items

- Check for smooth fit with accessory items
- Force should never need to be applied

Scope Polishing

- Cotton Tip Applicators
- Endoscope Paste
- Alcohol Swab

Polishing Areas can include:

1. Eyepiece
2. Light Post
3. Distal Lens
Scope Polishing

Sterilization

- Steam sterilization is the preferred method of sterilization (Pre-Vac Wrapped)
- Other sterilization methods
  - EtO
  - Gas Plasma (Sterrad/V-Pro)
  - Liquid Chemical (Steris 1E)
- High-level disinfection
- Manufacturer’s instructions

Flexible Endoscopes

PRODUCT OVERVIEW

“SCREEN DOOR EFFECT”

Flexible Video Scope
Flexible Fiber Scope

Anatomy of Flexible Fiber Scope

Anatomy of a Digital/Video Cystoscope

Video Connecting Port
Light Source Connector
Distal Tip
Sheath
Handpiece
Deflection Lever
User Buttons
Care and Handling of Flexible Endoscopes

- Transport to the OR
- Use in the OR
- Leak testing
- Decontamination
- Leak testing and inspection
- Sterilization/high-level disinfection

Transport to the OR

- Secure containers
- Protection from trauma

Use of Flexible Endoscopes in the OR

- Inspect before use
- Do not drop
- Place active section in neutral position
- Do not torque during procedure
- Protect from sharp objects
- After use, flush lumens and wipe off surface with damp cloth
- Do not pass laser fibers or instruments through instrument channel with the endoscope deflected

Transport to Decontamination

Leak Testing

- Leak test before cleaning and after cleaning.
- A leak test is the single most important process that has the largest effect on patient safety.

Leak Test Procedure

Step 1

Step 2

Step 3
Decontamination of Flexible Endoscopes

- Submerge in neutral pH enzymatic solution
- Clean the outer shaft
- Clean the channel(s), rinse, dry with forced air
- Clean objective lens, eyepiece, and light post connectors
- Dry the outer shaft

A Common Over-Looked Step!

Visual Inspection

- Eyepiece
  - Identify serial number
  - Excessive wear
    - The eyepiece is where the grasping mechanism of the camera connects to the endoscope.
  - Inspect Proximal Window
    - Window should be flush with the eyepiece cup.

- Handle
  - Identify part number
  - Deflection lever
    - The deflection lever should be deflected in both directions paying attention to the distal end.
    - Movement should be smooth not gritty
  - Light post
    - Look for black fibers/areas
    - If 1/3 of fibers black insufficient light may be transmitted
    - Replace adaptors

- T-luer/Working Port
  - Should be clear of debris

Visual Inspection

- Passive Shaft
  - Examine for any dents or creases
  - Examine to make sure that the shaft is free of any defects.
Visual Inspection

• Active Deflection Segment
  – Examine for dents or creases
  – Examine for any defects in structural integrity
    • Thermal damage
    • Punctures
    • Trunking

• Distal Tip
  – Examine for thermal damage

Optical Inspection

• Look through the scope and examine fibers
  – White are good fibers
  – Gray are damaged fibers
  – Black are broken fibers

Pressure Compensation Cap

• Cap should be in place for ETO, Sterrad™ sterilization and shipping.
• Cap should not be in place during liquid chemical disinfection/sterilization.

Sterilization/High-Level Disinfection

• Gaseous chemical sterilization processes
• Gas Plasma (Sterrad/V-Pro)
• Liquid chemical sterilization processes
• Liquid chemical high-level disinfection processes

Diagnosis of Endoscopes

Importance of Leak Testing:
Fluid Invasion = Patient Cross Contamination & Internal Scope Corrosion

Routine Inspections:
Physical & Optical

Routine Inspections:
Fluid Invasion = Patient Cross Contamination & Internal Scope Corrosion
Most Damage to Endoscopes Occurs?

During the surgical procedure due to improper use or application:
Excessive torque or flexing - or use for a purpose or procedure other than for which it was designed.

During post-procedure OR Turn-over due to hurrying (and carelessness):
Tossing on the mayo stand, back table, or in a basin or metal instrument tray; placed in trays with sharp items; heavy trays or items placed on top of the endoscope; or the endoscope shaft is placed ‘dangling’ over the edges of the tray or sticking out of a cart.

During post-procedure transport to SPD:
The endoscopes are not safely isolated and secured and subjected to rattling, sliding around, or falling during transport; or they are improperly held by the shaft and not carefully carried by staff.

Most Damage to Endoscopes Occurs?
During cleaning / decontamination:
Due to improper cleaning techniques (such as the use of metal wire brushes, or placing sharp or heavy items or instruments on top of them in a sink, or placing them in an ultrasonic cleaner; or the use of improper cleaning agents that cause damage

Due to improper containerization & protection:
Due to the wrong container type, or containers with no securing mechanisms; or scopes that are too short causing flexing or kinking of the endoscope shaft

Due to improper sterilization methods

Examples:

Examples:
Examples:

Working Channel Damage by Laser

The objective end tip (distal head) assembly is melted
Steel braid within the working channel is melted

Damage from a Leak

Angle Cover Cuts

Crushed Shaft
Factors Effecting Frequency of Repairs

- **Proper Care & Handling Processes and Practices** – Stopping incidents of damage from occurring at the source.
- **Inventory to Procedure Volume Ratio** - Fewer assets supporting high case volumes results in greater wear & tear due to high frequency usage and reprocessing.
- **Proper Inspection & Preventative Maintenance** – Evaluating and preserving the functions, performance and integrity of the endoscope.
- **Proper Cleaning Agents and Sterilization Methods** – Ensuring these important activities are consistently performed to ensure efficacy and to preserve the endoscope.

QUESTIONS?