WHAT'S NEW IN ENDOSCOPE REPROCESSING

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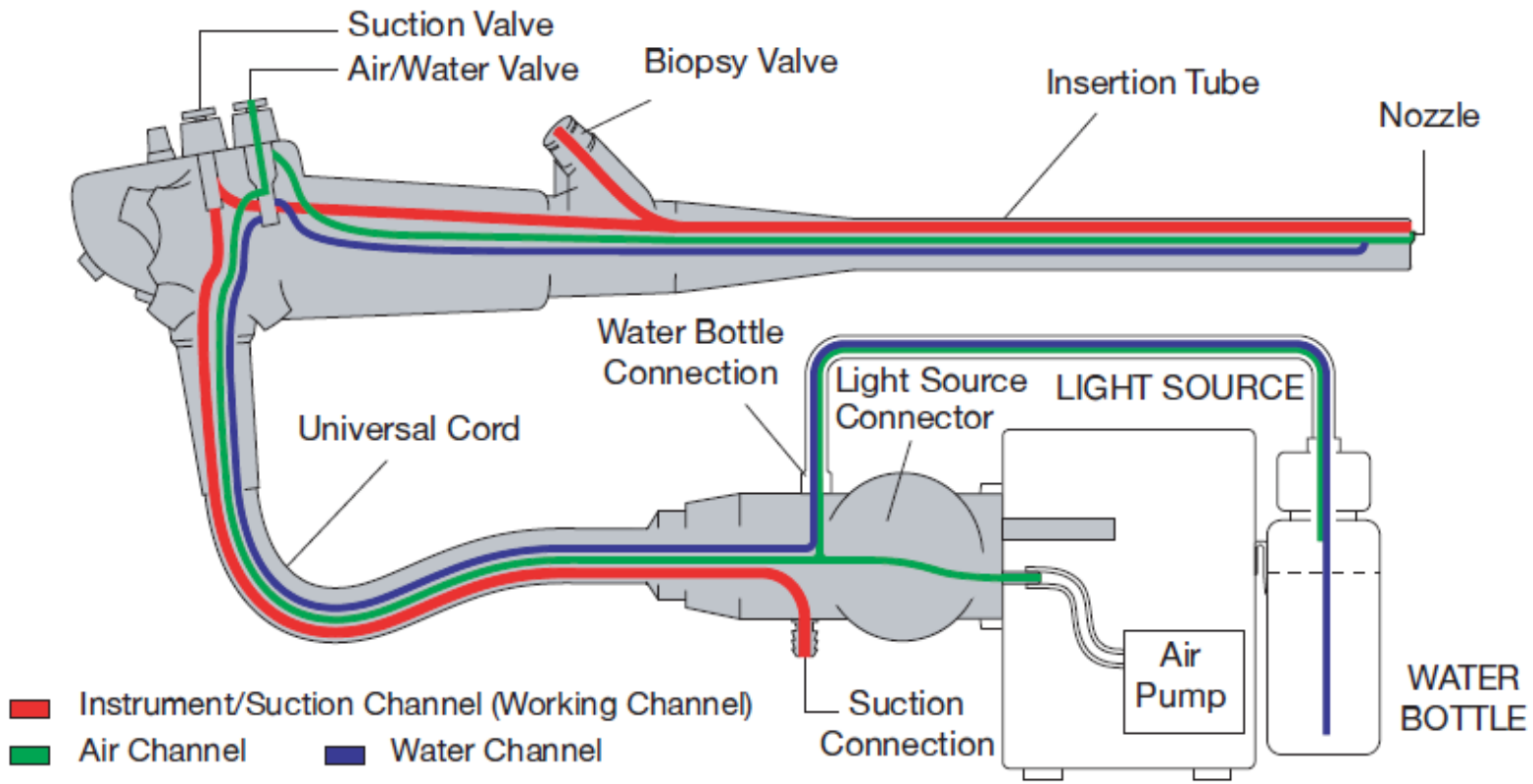
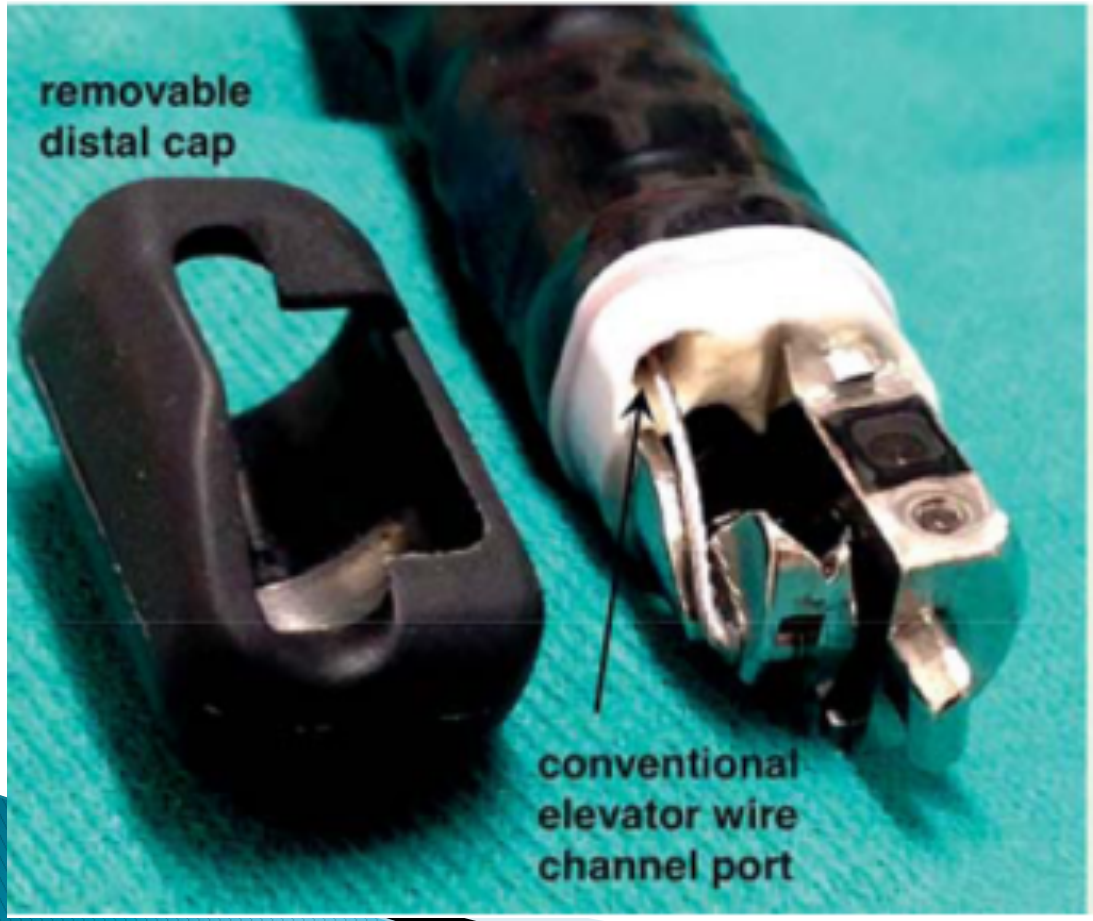
ENDOSCOPES ARE CHALLENGING!

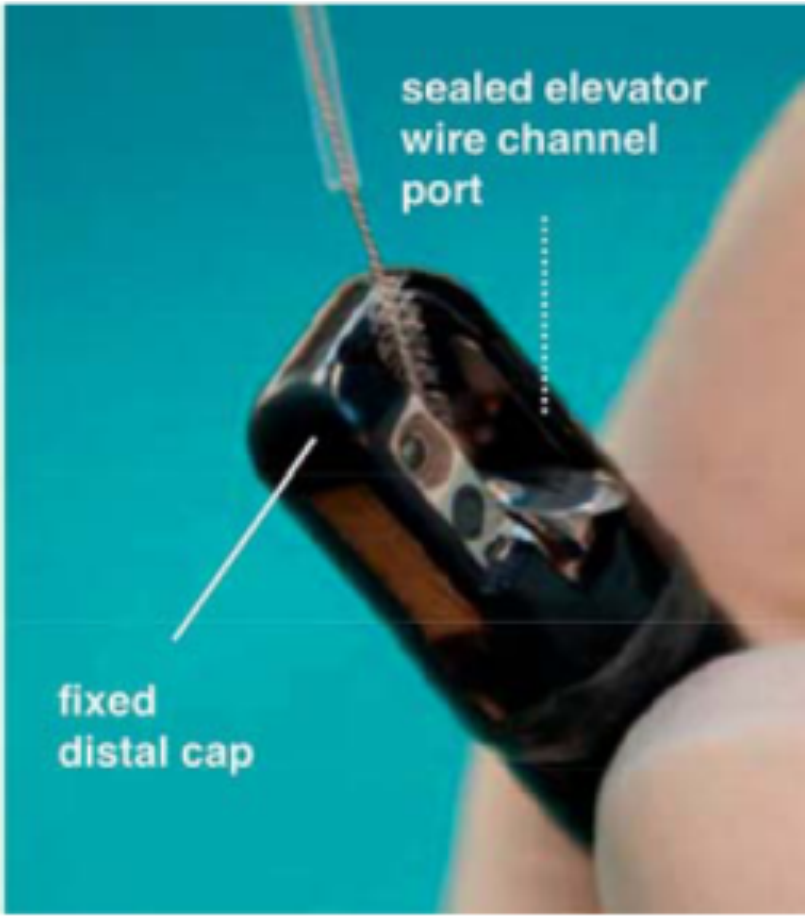
ENDOSCOPES ARE COMPLEX DEVICES!

STANDARD CHANNELS - AIR, WATER & SUCTION

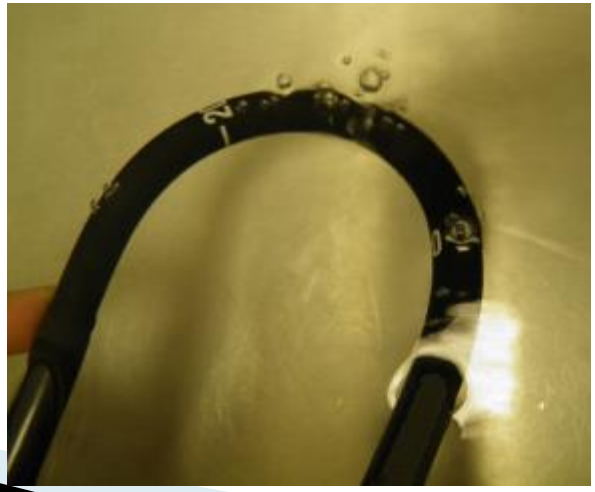


ENDOSCOPES ARE DIFFICULT CREATURES!

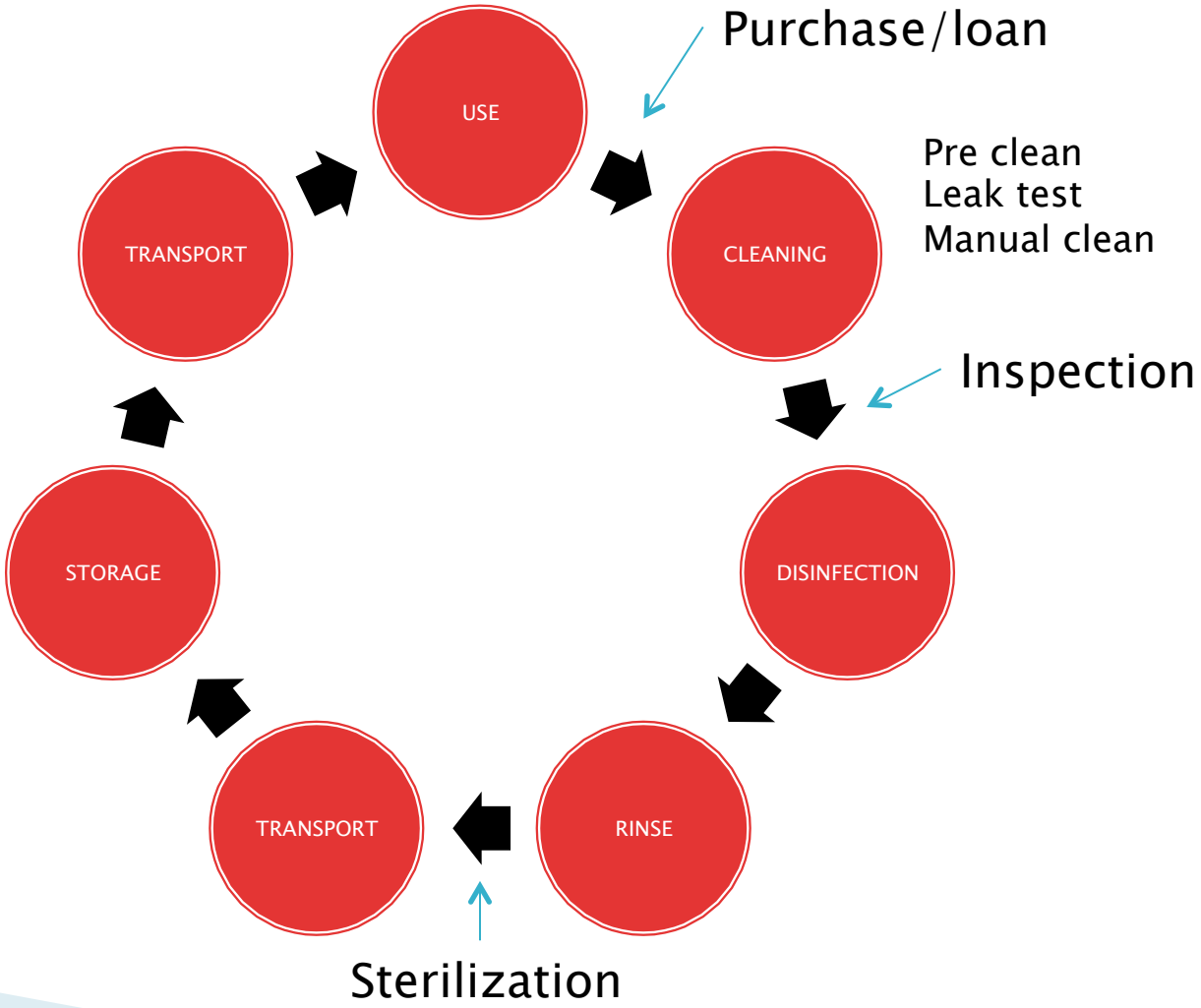




BAD HANDLING OF ENDOSCOPES



THE REUSABLE FLEXIBLE ENDOSCOPE CYCLE

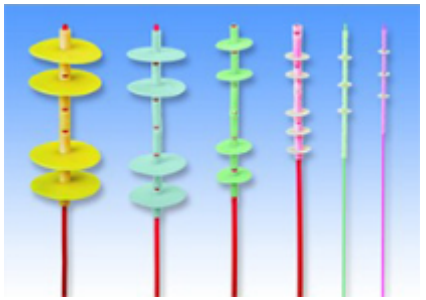


PRE-CLEAN

- Essential part of the decontamination procedure
  - removes readily detachable material
- Bed side kits now widely used
- Assurance of procedure taking place
- Easier to audit

MANUAL CLEANING

- Move away from enzymatic detergents
- Alternatives to brushes now available
- Single use vs reusable
- Automated pumps now available for flushing channels



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Occupational asthma and rhinitis due to detergent enzymes in healthcare

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Background The use of proteolytic enzymes to improve the cleaning efficacy of washing powders was introduced in the mid 1960s. Many microbial enzymes are known to be potent respiratory sensitizers but previously there has been only one case of occupational asthma associated with workplace exposure in a healthcare worker.

Aims To report two cases of occupational asthma associated with exposure to biological enzymes in healthcare workers and related occupational cases.

Methods Reporting of clinical case reports from three different work places.

Results One case of occupational asthma and three other cases with work-related asthma or rhinitis occurred in one workplace. A single case of probable occupational asthma presented at a second workplace with another case of work-related asthma at a third workplace. Exposures occurred in areas used for cleaning medical instruments and endoscopy suites. Hygiene measurements confirmed the potential for exposure. Control measures were not in place and recognition of the hazard was missing in these workplaces.

Conclusions Detergent enzymes when used in healthcare settings should be recognized as potential respiratory sensitizers. Healthcare institutions and professional bodies that recommend the use of detergent enzymes should review their risk assessments to ensure that the most appropriate methods for preventing or reducing exposure are in place.

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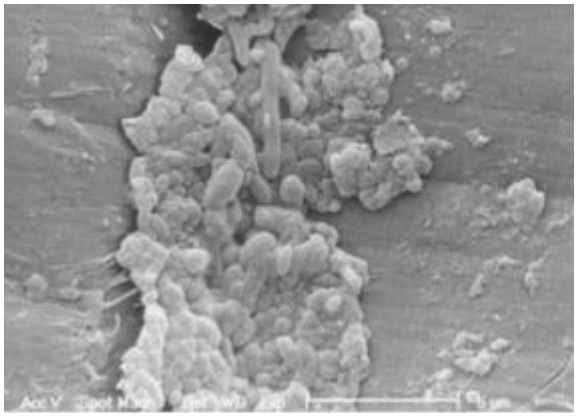

Is biofilm accumulation on endoscope tubing a contributor to the failure of cleaning and decontamination?☆

A. Pajkos, K. Vickery*, Y. Cossart

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Summary We predicted that biofilm would form on surfaces of endoscope tubing in contact with fluids, and may be difficult to remove by current washing procedures. Its presence may protect micro-organisms from disinfectant action and contribute to failure of decontamination prior to re-use. Tubing samples removed from 13 endoscopes that had been sent to an endoscope-servicing centre were examined for the presence of biofilm and bacteria by scanning electron microscopy. Biological deposits were present on all samples tested. Biofilm (bacteria plus exopolysaccharides matrix) was present on the suction/biopsy channels of five of 13 instruments, and was very extensive on one of these. Bacteria and microcolonies were often but not necessarily associated with surface defects on the tubing. All 12 air/water channels examined showed biofilm, and this was extensive on nine samples. Routine cleaning procedures do not remove biofilm reliably from endoscope channels, and this may explain the unexpected failure of decontamination encountered in practice despite good adherence to infection control guidelines.

Original article

Persistent residual contamination in endoscope channels; a fluorescence epimicroscopy study

Authors Rodolphe C. Hervé, Charles W. Keevil

Institution Environmental Healthcare Unit, Centre of Biological Sciences, University of Southampton, Southampton, UK

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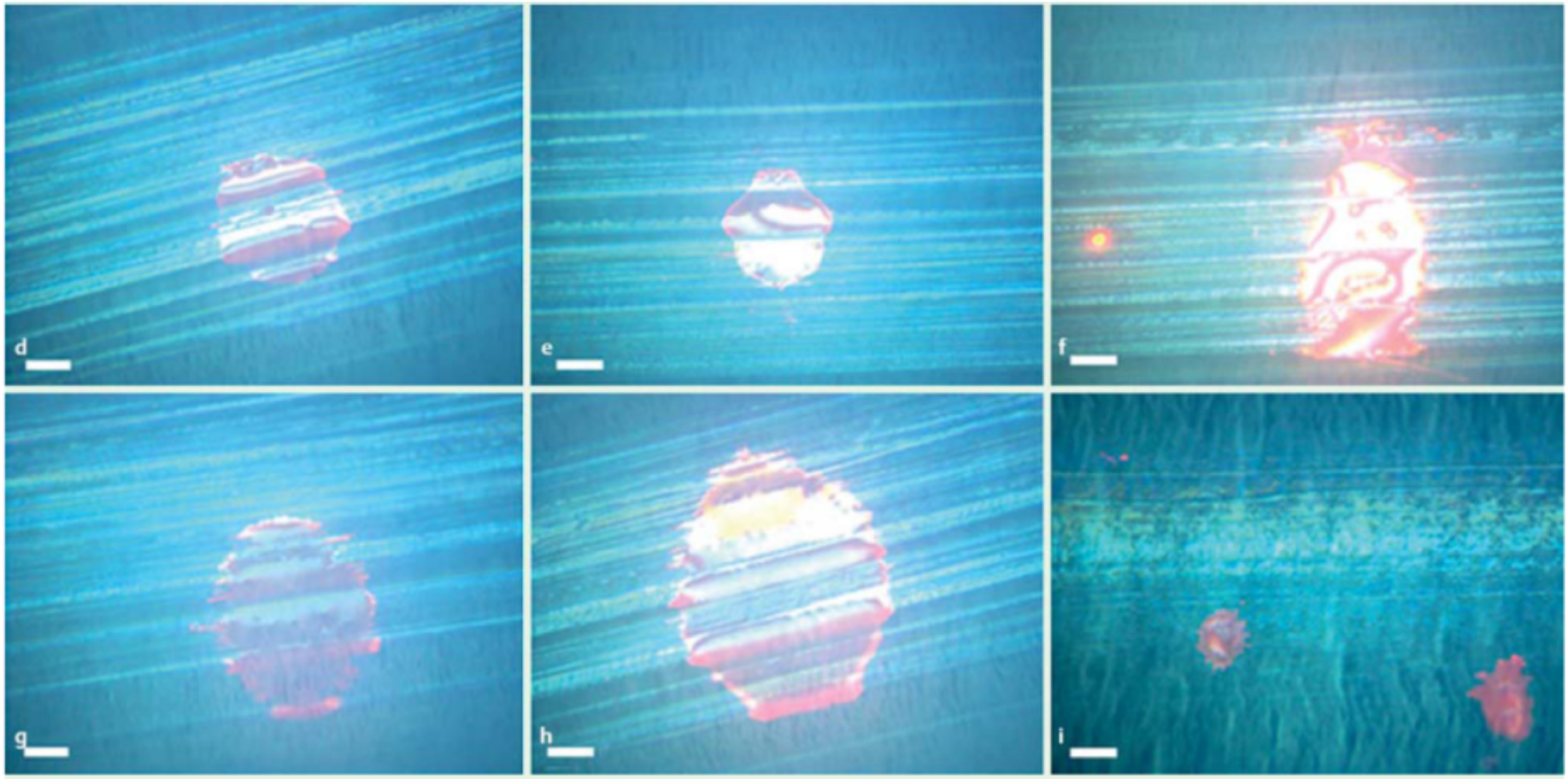
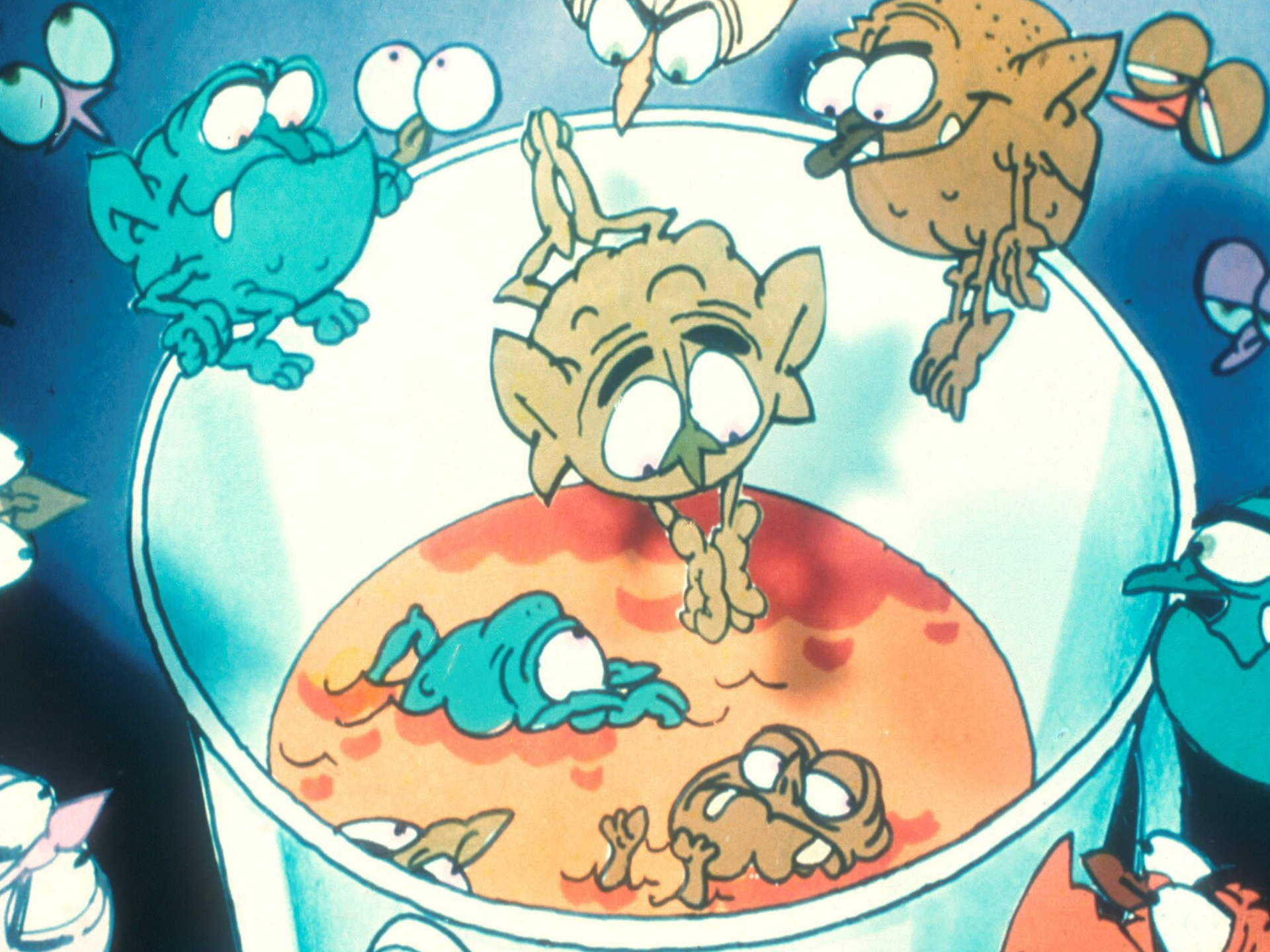
Endoscopy



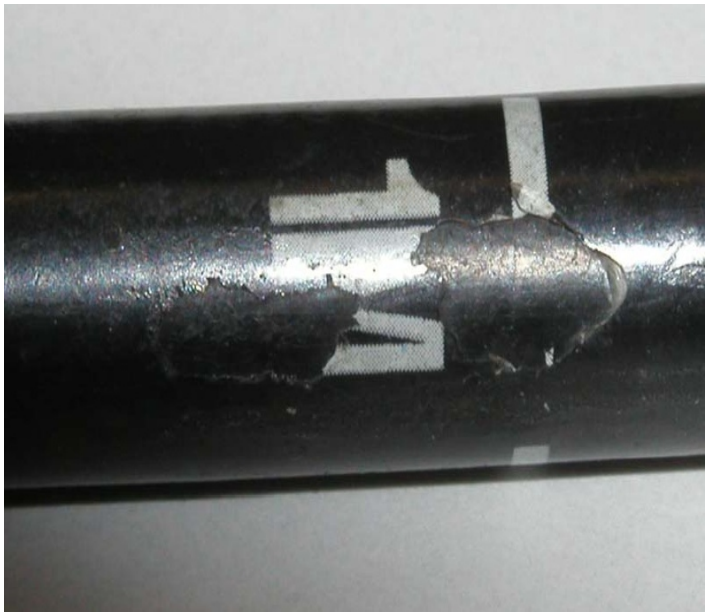


DISINFECTION

- Manual vs automated
- Standardisation of process
- Alternatives to glutaraldehyde now being used due to
  - Fixative properties
  - Occupational asthma and contact dermatitis
  - Microbial resistance e.g. atypical mycobacteria
  - Glutaraldehyde residues
- Oxidising agents e.g. peracetic acid now widely used
- Single use disinfectant
  - To avoid over dilution if reused

DISINFECTANT COMPATIBILITY

- Blistering of outer coating



ENDOSCOPE WASHER DISINFECTORS

ENDOSCOPE WASHER DISINFECTORS

- Provide a standardised method of decontamination.
- Manual cleaning is essential prior to automated processing.
- Maintenance of the EWD is important to prevent contamination of internal pipework.
- Have to establish that all channels of the endoscopes are irrigated during a cycle.
- EWD's must be tested on installation and at regular intervals e.g. weekly, quarterly, annually.

TRANSMISSION OF INFECTION BY FLEXIBLE GASTROINTESTINAL ENDOSCOPY AND BRONCHOSCOPY

TYPE OF FLEXIBLE ENDOSCOPIES	No. of REPORTED INFECTIONS/ OUTBREAKS	REASONS FOR FAILURE
BRONCHOSCOPY	51	• Inappropriate cleaning and disinfection – povidone iodine • Contaminated AER • Incorrect connectors • Rinsing with tap water • Hole in the endoscope sheath (no leak testing)
ERCP Endoscopic Retrograde Cholangio Pancreaticography	23	• Inappropriate cleaning and disinfection – povidone iodine, cetrimide • Contaminated AER • Incorrect connectors • Failure to irrigate all channels • Rinsing with tap water • Contaminated water bottle
UPPER GASTROINTESTINAL ENDOSCOPY	19	• Inappropriate cleaning and disinfection – povidone iodine • Contaminated AER • Incorrect connectors • Rinsing with tap water • Hole in the endoscope sheath (no leak testing)
SIGMOIDOSCOPY & COLONOSCOPY	5	• Inappropriate cleaning and disinfection – povidone iodine, BKC, cetrimide • Contaminated AER • Incorrect connectors • Contaminated water bottle • Biopsy forceps not sterilized

Kovaleva J *et al Clin Microbiol Rev* 2013;26(2):231–54

BS EN ISO 15883

Harmonised Standard to the Medical Devices Directive

- Part 1 General Requirements
- Part 2 Thermal Disinfection of Instrument, Anaesthetic Equipment, Holloware, Utensils and Glassware
- Part 3 Thermal Disinfection of Human-waste containers
- Part 4 Chemical Disinfection of Thermo-labile endoscopes
- Part 5 Test Soils
- Part 6 Thermal Disinfection of Non-Invasive, Non-Critical Medical Devices
  - Draft Part 7 Chemical disinfection of bedframes, bedside tables, transport carts, containers, surgical tables, furnishings and surgical clogs

TESTING OF EWD

- Automatic Control Test – to confirm time & temperature of each stage of the cycle
- Final rinse water
  - TVC
  - Hardness
  - Conductivity
- Residual protein/cleaning efficacy
- Disinfectant concentration
- Channel flow

EWD CONTAMINATION

Problem	Possible remedy
Inadequate disinfection of EWD	Daily machine disinfection – start of day
Static water remaining in tanks and pipework	Ensure design of machine does not allow this
Poor quality water supply	Connect machine to direct mains water supply
Inadequate maintenance of EWD	Ensure service contract is in place and time is allowed for this to take place
Inadequate maintenance of water treatment system	Ensure EWD included in maintenance schedule and is subjected to disinfection

WATER TESTING (HTM 01-06 Part E)

Table 1 Periodic final rinse-water tests: satisfactory results

Water test ***(click on link)***	**Satisfactory results**	Frequency
Total organic carbon	Less than 1 mg/L	Yearly
Appearance	Clear, bright and colourless	Yearly
pH	5.5 to 8.0	Yearly
Electrical conductivity	Less than 40 µS/cm at 25°C	Weekly
Hardness	Less than 50 mg/L CaCO3	Weekly (if appropriate)
Total viable count (see also Table 3 in HTM 01-06 Part B)	Less than 10 cfu/100 mL acceptable	Weekly
Environmental mycobacteria	Non-detected in 100 mL samples	Quarterly
Pseudomonas aeruginosa	Non-detected in 100 mL samples	Quarterly

IS THERE A PROBLEM?

Table 2 Total viable count results guide

Aerobic colony count in 100 mL	Interpretation/action	Colour grade
Less than 1	Satisfactory	Green
1–9 on a regular basis	Acceptable – indicates that bacterial numbers are under a reasonable level of control	Yellow
10–100	Risk assessment required to investigate potential problems and super-chlorinate or repeat EWD self-disinfect	Orange
Over 100	Risk assessment required to consider taking EWD out of service until water quality improved	Red

Notes:

Microbiological results from weekly tests should be plotted on a graph to give a trend. This will allow the "normal" and "unusual" results to be distinguished for a particular situation. Investigation of unusual or unsatisfactory results can then be undertaken if results demand (for example, if routine results are below 10 cfu/100 mL, occasionally some of the results may be above 10 cfu/100 mL).

If a bacterial count above 10 cfu/100 mL is obtained from test water, identification of the species is advised. If a significant proportion of the microbes appear the same species from their colonial morphology, carry out an oxidase test to presumptively identify *Pseudomonas* spp. Then if the test is positive, further investigations are required to determine whether *Pseudomonas aeruginosa* is present.

Adapted from: Willis, C. (2006). "Bacteria-free endoscopy rinse water – a realistic aim?" *Epidemiology and Infection*. Vol. 134 No. 2, pp. 279–284.


LABCAIRE


1
2
3
4
5
6
7
8

ENDOSCOPE STORAGE

- The current UK guidance is that endoscopes need to be reprocessed before reuse if they have been stored for >3 hours because of bacterial growth in damp lumens. Alcohol is not recommended due to its fixative properties.
- However, if scopes are stored in cabinets that have a constant flow of clean air through all lumens to keep them dry, the time before reprocessing can be extended depending on the individual manufacturer's recommendation.

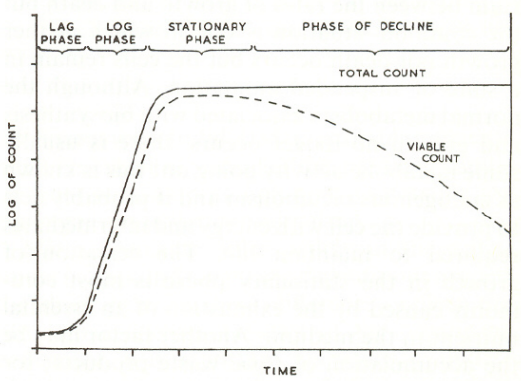


FIG. 3.1. Continuous line—total number of bacteria alive and dead. Interrupted line—total number of living bacteria.


Ascoscope
5

ENDOSCOPE FLOW

Dirty

Dirty receipt

↓

Manual cleaning and leak test

↓

Loading of EWD

↓

Clean

Unloading from EWD

↓

Storage

WHY CLEAN AND DIRTY SEPARATION?

- Reduce risk of cross contamination
  - Aerosol production
  - Hand contamination
  - No shared surfaces
- Reduce risk of using an unprocessed endoscope
  - Direct from procedure room
  - After manual cleaning prior to AER

STAFF TRAINING

TRAINING

- Few accredited courses available
- Most training delivered by industry e.g. detergent, disinfectant, endoscope and EWD companies
- Lack of training updates
- UK introducing training/competency documentation for each stage of the process e.g. cleaning, use of EWD.
  http://www.bsg.org.uk/clinical-guidance/endoscopy/guidelines-for-decontamination-of-equipment-for-gastrointestinal-endoscopy.html

ENDOSCOPE REPROCESSING METHODS; HUMAN FACTORS

- Observational and questionnaire study of endoscope reprocessing. 183 procedures analysed
- 75% employees felt pressured to work quickly
- Personnel performed all the steps required
  - manual decontamination 1 out of 69 (1.4%) processes
  - automated decontamination 86 out of 114 (75.6%)

Ofstead et al (2010) Gastroenterology Nursing **33** 54

TABLE 3. Documented Completion of Steps During Manual Cleaning With High-Level Disinfection Reprocessing

Observed Activity	Steps Completed (%) (n = 69)
Leak test performed in clear water	77
Disassemble endoscope completely	100
Brush all endoscope channels and components	43
Immerse endoscope completely in detergent	99
Immerse components completely in detergent	99
Flush endoscope with detergent	99
Rinse endoscope with water	96
Purge endoscope with air	84
Load and complete automated cycle for high-level disinfection	100
Flush endoscope with alcohol	86
Use forced air to dry endoscope	45
Wipe down external surfaces before hanging to dry	90

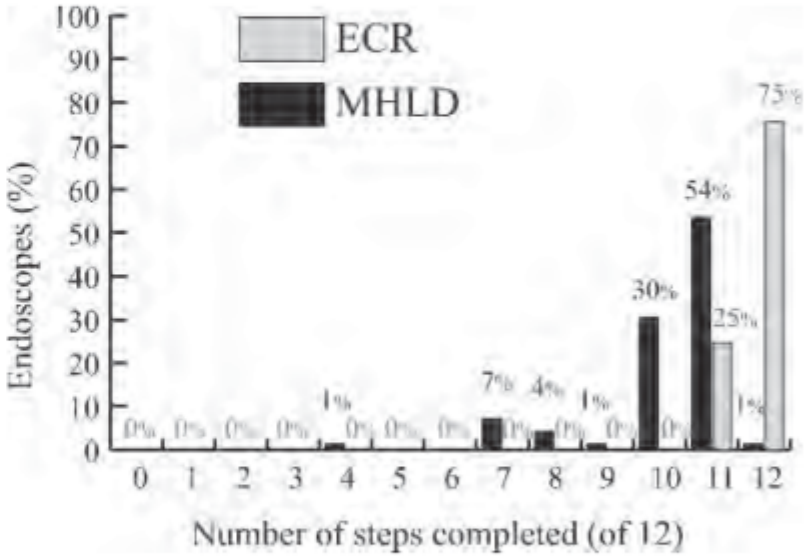


FIGURE 4. Personnel completion of endoscope reprocessing steps (p = .000).

Ofstead et al (2010)
Gastroenterology Nursing **33** 54

SUMMARY

- Staff training is essential to achieve effective endoscope decontamination. Training should include an understanding of the channel configuration of all flexible endoscopes.
- Users of endoscopes should also receive training on handling of endoscopes and selection of accessories
- Manual cleaning prior to disinfection/automated reprocessing is essential
- Validation of the process will enhance quality assurance
- Endoscopes should be stored in a manner that does not increase the risk of contamination
- The final rinse water should not recontaminate processed endoscopes
- The future for endoscope decontamination is centralisation (just like the SSD).

THANK YOU FOR LISTENING