Cleaning & Disinfection Instruments

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Disinfection and Sterilization?

- Sterilization: killing of all MicroOrganism mainly by Heat or Gaz Sterilzation
- Disinfection: Killing of MicroOrganism by using chemicals (Disinfectants)
- Cleaning: is removing dirts only.
Instruments

- All instruments that penetrate the body through the skin and cause injury and mixed with blood circulation has to be sterilize.
- All instruments that penetrate the body without causing injury or mix with blood circulation needs high level disinfection.
- All instruments that comes in contact with the skin without penetrating the body needs low level disinfection.
Types of Instruments

* Surgical and ward instruments: drillers, scissors, tongs, scalpels

* Rigid and flexible endoscopes

* Intensive care and anaesthesia materials: (plastic, rubber)
Disinfection of Instruments

Two standard applications

* Washing machines
  chemo-temperature treatment

* Immersion procedure (manual processing)
Instruments

• We must clean instruments before disinfection?

• Why?????
HBV-contamination: Success (failure) in disinfection

Study with angioscopes after contamination with duck-HBV

Disinfection: GDA, 2%ig
Sterilization: Ethylenoxid, 6h

Influence of cleaning

Mechanical pre-cleaning of the channels with an adequate brush
Influence of cleaning

Application time

Blood removal

Circulation procedure in room temperature, 1% solution of cleaner, dried blood, (BODE-internal investigation 1999)

Dried blood removes very slowly!

Clean immediately after use!

0 20 40 60 80 100
0 2 4 6 8

Soil of blood [%]

Time [Min]
Influence of cleaning

Interaction of blood with cleaner and disinfectant

Glass capillary:
left: cleaned with Bodedex forte, disininfected with a glutaraldehyde containing disinfectant and rinsed with water
	right: cleaned and disinfected with a glutaraldehyde containing disinfectant and rinsed with water

Working without cleaner, blood coagulates and cannot removed from channel systems
Bacteria within biofilms are very resistant to disinfectants! A good pre-cleaning is important!
Influence of cleaning

Other influences of a good cleaning:

Low foaming property
Neutralize hard water
Good compatibility with all materials
Neutral pH-value
# Disinfection of Instruments

## Active ingredients

<table>
<thead>
<tr>
<th></th>
<th>Gram neg. Bacteria</th>
<th>Gram pos. Bacteria</th>
<th>Mycobacteria</th>
<th>Fungi</th>
<th>Spores</th>
<th>Virus envelopped (HBV/HIV Vaccinia, Herpes)</th>
<th>Virus not envelopped (Polio Rota, Papova, Adeno)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
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<tr>
<td>Peracetic acid</td>
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<td>Phenole</td>
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Aldehydes und Peracetic acid have the best microbicidal spectrum, but...
Fixing blood

model of soil with dried blood on metal plates

The metal plates had been disinfected (15 minutes), then cleaned with a alcaline cleaner (5 minutes)
Disinfection of Instruments

**Fixing blood - optical results**

model of soil with dried blood on metal plates, some examples

Influence on blood of an aldehydic product

Influence on blood with products based on peracetic acid

These two product-types have a fixing effect of proteins. Peracetic acid decolourize the blood!
Disinfection of Instruments

Fixing blood - optical results

model of soil with dried blood on metal plates, some examples

Influence on blood of a product with QAC and a alkylamin

Influence on blood with a phenolic product

These two product-types havn't any fixing effect on proteins. All soils are removed!
Disinfection of Instruments

Fixing blood - situation unter practical conditions

Some exemples of channels from endoskopes which had been reprocessed under different conditions

Automatic chemo-thermic reprocessing with a aldehydic product, manuell precleaning

The channels are normally clean
Fixing blood - situation unter practical conditions

Some examples of channels from endoscopes which had been reprocessed under different conditions

Manuell reprocessing under aldehydic conditions
Disinfection of Instruments

Practical issues / endoscopes

- Ensure that all surfaces and hollow cavities are completely wetted by the disinfectant solution. Air bubbles must be eliminated.

- The prescribed concentrations and contact times must be adhered to.

- Particular care must be given to the cleaning and disinfection of the channel systems. Attention must be paid to both the biopsy channel and the air and rinse channels, the storage container for rinse solutions and the relevant tubing.

- After disinfection, rinse thoroughly with demineralised water or water at least of drinking water quality, and dry.

- Danger of recontamination! Store endoscopes only when dry, and protect against recontamination until re-use!
Disinfection of Instruments

Summary

Aldehydes are fixing proteins

QAC and Alkylamines haven't any fixing effect

Safety by careful cleaning

Peracetic acid is fixing proteins

Phenolic, amines substances haven't any fixing effect
Thank you and wish you all the best