

# Surgical Hygiene

# The development of surgery

- Development of anaesthetic techniques
- Development of surgical techniques
- Rehabilitation, postoperative treatment
- **Development of surgical hygiene**

# Dates from the history of surgical hygiene 1.

- 1786 Hôtel Dieu, Lyon: 2000 beds, 4800 patients
- 1841 Berlin: 60 % of amputations fatal
- 1874 80 % had gangrene
- 1878 Billroth, Vienna: dissection 7-8, operation 8-10 on the same table!
- 1917 Godlee: he was despised for wearing a clean coat

# Dates from the history of surgical hygiene 2.

- 1847 Ignaz Semmelweis: chlorine water principles of **ASEPSIS**
- 1867 Joseph Lister: carbolic acid principles of **ANTISEPSIS**
- 1874 Louis Pasteur: infected substance in 200 °C for 20 mins became sterile  
**HOT AIR STERILISATION**

# Dates from the history of surgical hygiene 3.

1883 Robert Koch: Spores cannot be killed by “Pasteur’s heating”

Henle-Koch triad:

1. The same bacteria can always be isolated from the same disease
2. They can be cultivated on a substance
3. They can be transferred

# Dates from the history of surgical hygiene 4.

1888 Schimmelbusch and Redard created the first autoclave: STEAM IN OVERPRESSURE

1892 surgical gloves, masks, caps are used

# Antisepsis and asepsis

Antisepsis - disinfection

Bacteria are present outside or inside the organism. We try to kill or reduce their number.

Asepsis – sterility

Bacteria are kept off. They are not left in the operation area. They are kept far from wounds, instruments, etc.

# Sterilisation

- All living organisms are killed
- Everything that can be, must be sterilized
- The patient and the surgeon cannot be sterilized.
- If something cannot be sterilized we disinfect it.

# Requirements of sterilization

1. To kill all micro-organisms in a short time
2. Not to damage instruments and materials
3. To store instruments in a box or cloth
4. To be economical and simple to use
5. To be 'fool proof'

# Sterilization methods

- Mechanical
- Physical
- Physical and chemical
- Chemical

# Autoclave

- Overpressure steam
- Advantage: -not just surface effect, but deeper layers are effected as well
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- Disadvantage: expensive

# Hot air sterilizer

- Dry hot air
- Advantages:
  - Does not damage instruments
  - cheap
- Disadvantages:
  - only for 'heat resistant' materials
  - too slow
  - does not kill spores
  - sterile only until the first opening
- Most dentists have hot air sterilizers, because they are cheap.

# Gas sterilizer

- Two gases:
  - ethylene oxide (prohibited, carcinogenic)
  - formaldehyde
- Advantages:
  - low temperature
  - quick
  - does not harm instruments
- Disadvantage:
  - carcinogenic
  -

# Disinfection

- Only for non-sterilizable objects
- often used in dentistry
- various agents

# Disinfectant agents 1.

1. Oxidizing agents – hydrogen peroxide  
3% kills anaerobic bacteria  
  
10% decrease bleeding  
  
mechanical cleaning
2. Halogens
  - chlorine
  - iodine (eg. Betadine)

# Disinfectant agents 2.

## 3. Alcohols

ethyl alcohol: most effective in a 70 %  
solution

isopropyl alcohol: kills mycobacteria  
as well

## 4. Aldehydes

formaldehyde: in gas sterilization

# Disinfectant agents 3.

## 5. Organic compounds

- phenol
- hexachlorophen (Ritosept)

## 6. Heavy metal salts

- $\text{AgNO}_3$
- $\text{HgCl}$  (sublimate)

## 7. Soaps, invert soaps

# Surgical handwash 1.

1. Semmelweis

2. Fürbinger-Ahlfeld method

- twice with soap, hot water for 10 mins
- disinfectant solution (alcohol)

3. Spasokukochky-Kochergin method

- twice for 3 mins in 2 litres of 0.5 % ammonium water
- does not need running water
- does not have disinfectant effect

# Surgical handwash 2.

## 4. Hexachlorophen compounds

- 3 mins hot running water + soap + brush  
2 mins 10 ml Hexachlorophen + brush  
3 mins 10 ml Hexachlorophen without brush
- bactericid for a long time
- it does not kill TB bacteria

## 5. Today

- various methods, eg:  
3 mins with soap without brush  
3x1 min disinfectant solution

**Thank you for your  
kind attention!**