Lecture 3 •

Sterilization

performed by:

Dr: Basim Kareem

M.Sc. Conservative

Sterilization

- Is a term referring to any process that eliminates or removes or kills all forms of microbial life.
- Including transmissible agents (fungi ,bacteria ,virus ……)
- **Disinfection** :process of destruction or removal of organism , capable of giving rise to infection, these are capable to kill bacteria ,fungi, virus and less effect on resistant bacteria spores.
- **Antisepsis**: destruction or inhibition of microorganism in living tissues there by limiting or preventing harmful effects of infection.

Methods of sterilization

There are five accepted methods of sterilization:

1-steam pressure sterilization (Autoclave)

2-chemical vapor pressure sterilization (Autoclave)

3-dry heat sterilization (dry-clave)

4-Ethylene oxide sterilization

5-Hydrogen peroxide plasma

Autoclaving

- The time required at 250 F (121 C) is a minimum of 15 mins at 15 Ibs pressure
- Time of wrapped instruments can be reduced to 7 mins if the temperature is raised to 273 F (134 c) and pressure 30 Ibs.

Advantage of autoclave

1-autoclaving is the most rapid and effective method for sterilizing cloth surgical packs and towel packs.

2-other methods are not suitable for processing cloth packs

Disadvantage:

1-items sensitive to the elevated temperature cannot be autoclave

2-autoclaving tends to rust carbon steel instruments and burs.

3-stream appears to corrode the steel neck and shank portions of some diamond instruments and carbide burs.

chemiclaving

Advantage :

Carbon steel and other corrosion-sensitive d to be sterilized burs, instruments and pliers are said to be sterilized with out rust or corrosion.

Disadvantage

1-items sensitive to the elevated temperature will be damage

2-Instruments must be slightly package in bags obtained from the sterilizer manufacture.

3-towel and heavy cloth wrappings of surgical instruments may not be penetrated to provide sterilization.

Dry heat sterilization (ovens)

Advantage:

1-carbon steel instruments and burs do not rust , corrode .

2-repid cycles are possible at high temperature.

Disadvantage:

1-high temperature may damage more heat-sensitive items such as rubber or plastic goods.

2-sterilization cycles are prolonged at the lower temperature .

3-heavy loads of instruments ,crowding of packs and heavy wrapping easily defeat sterilization.

Boiling water

- It is done for 10-30 mins
- Kill bacteria and spores but is inactive against viruses.
- It is not recommended for sterilization of instruments for surgical procedure as it is ineffective against many bacterial and fungal spores

New methods of sterilization

- The microwave oven has major limitations for sterilization metal items with out dam aging the machine and reaching all sides of the instruments.
- Use of peroxide vapor sterilization is under development
- Ultraviolet light is not highly effective against RNA virus such as HIV and is not very effective against bacterial spores.

Vaccines for dental health-care workers

- The possibility of transmission of blood borne infections from dental workers to patients is considered to be small , it is recommends that all dental workers ,who may be exposed to blood contaminated substance in an occupational setting be vaccinated for HBV also other vaccine-preventable diseases ,vaccination against influenza ,H5N! Influenza virus ,H1N1influenza virus ,measles ,mumps ,rubella ,and tetanus

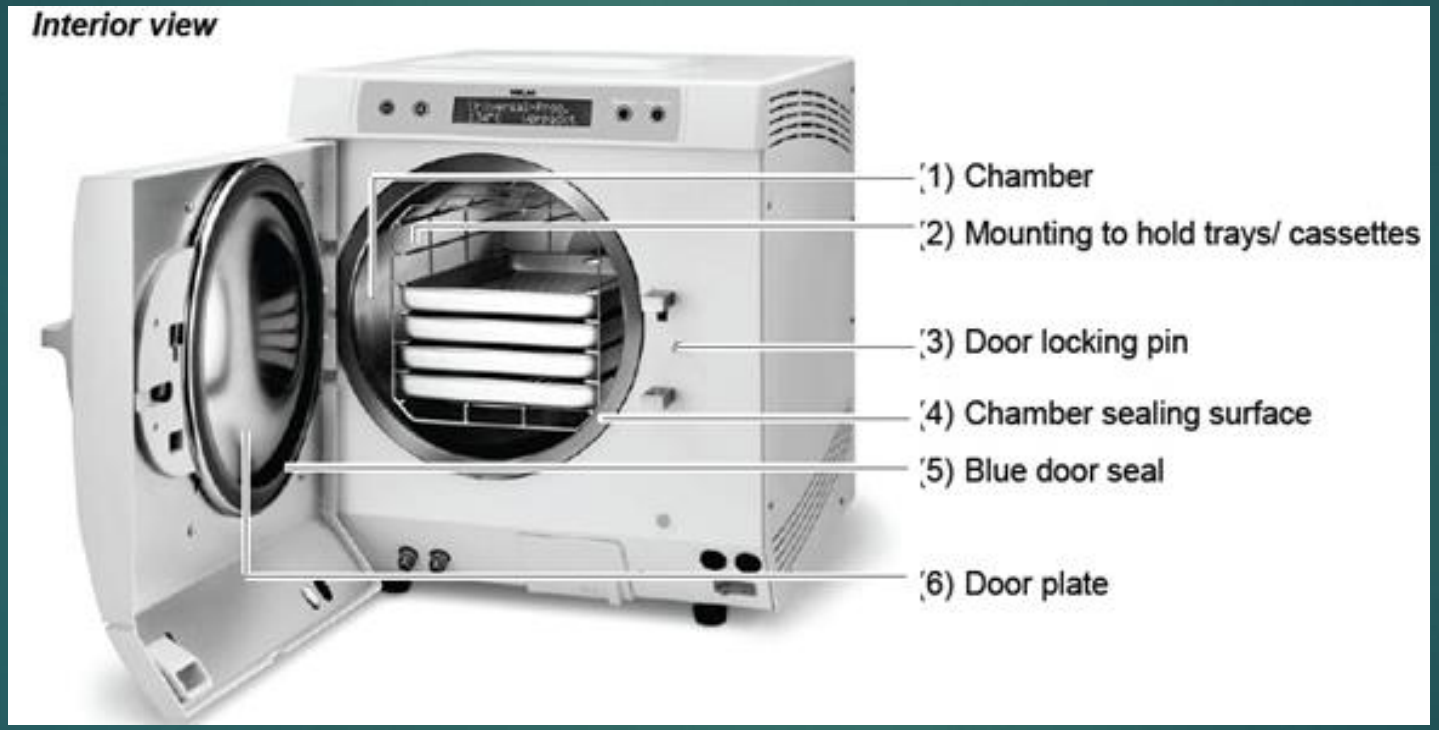
Method of sterilization or Disinfection of instruments

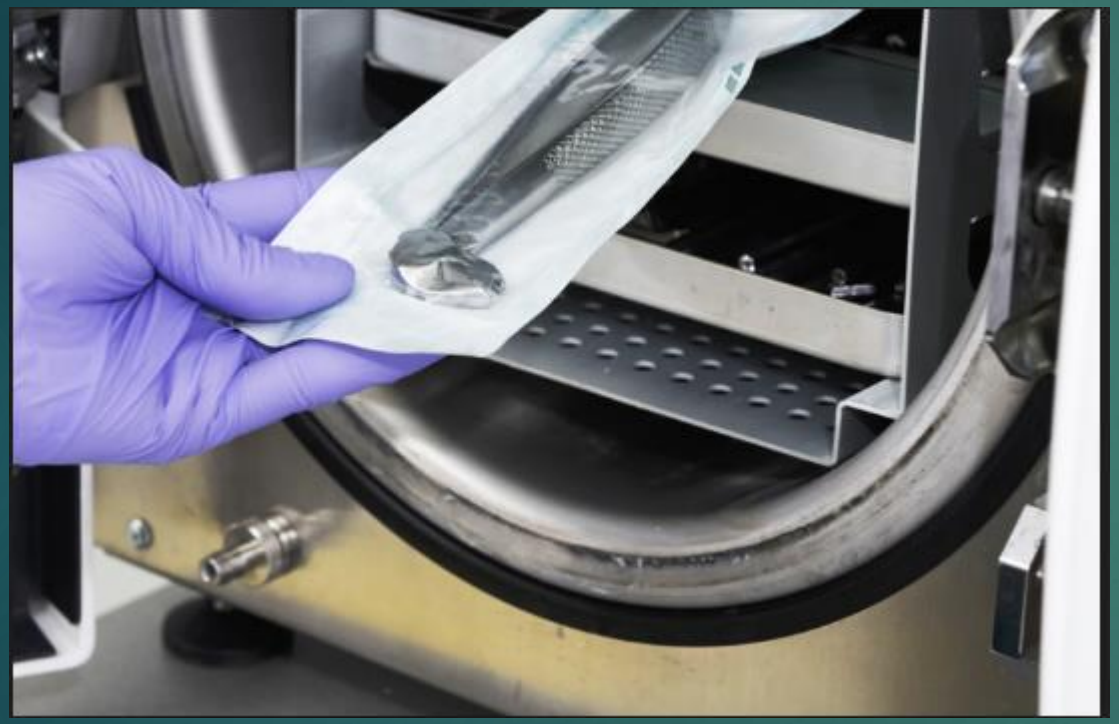
- Before sterilization instruments should be cleaned to remove debris.
- Persons involved in cleaning and reprocessing instruments should wear heavy-duty gloves to lessen the risk of hand injuries
- Placing instrument into container of water after use will prevent drying of patient material and make cleaning easier and more efficient
- All critical or semi critical dental instruments that are heat stable should be sterilized routinely between uses by autoclaving ,dry heat or chemical vapor ,following instructions of the manufacturers of the instruments and the sterilizers .

Dry heat sterilization (oven)

Autoclave glass B system

Parts of Autoclave:





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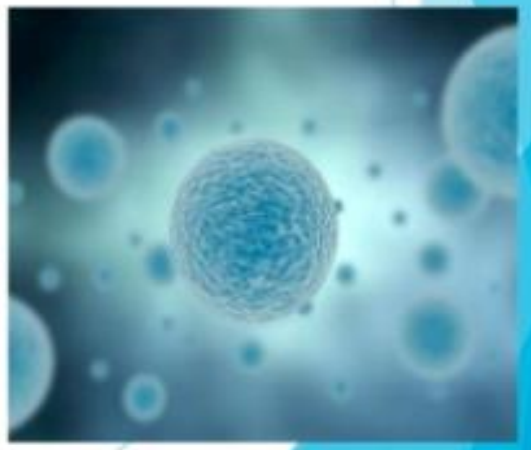
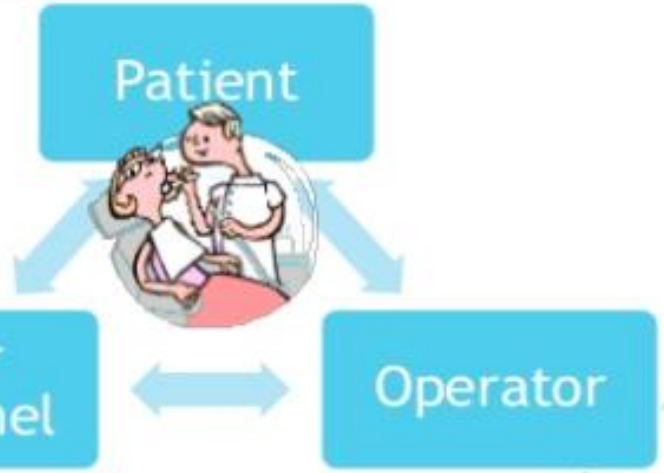
INFECTION AND INFECTION CONTROL



BASIC CONCEPT OF INFECTION CONTROL

- Prevent spread of infection from the Clinician to the patient
- Prevent the spread of infection from the Patient to the Clinician
- Prevent the spread of infection from one patient to another




Hand Hygiene Procedure
Before washing hands, wet them under running water and apply sufficient liquid soap to obtain a good lather
1
2
3
4
5
6
After washing hands, rinse them thoroughly under running water and dry thoroughly using paper towels

- Hegde *et al* in their study stated that the bar soap under the "in use" condition is a reservoir of microorganisms and washing hands with such a soap may lead to spread of infection. (*Microbial contamination of "in use" bar soaps in dental clinics. Indian J Dent Res 2006;17:70-3*)

Masks

- Types:

1. Surgical masks (required to have fluid-resistant properties).
1. Procedure/isolation masks

- Made up from a melt blown placed between non-woven fabric

Layers of a Mask

1. an outer layer
2. a microfiber middle layer - filter large wearer-generated particles
3. a soft, absorbent inner layer - absorbs moisture.

- Available in 2 sizes: regular and petite.

Eye wear

- CAUSES OF EYE DAMAGE:

1. Aerosols and spatter may transmit infection
2. Sharp debris projected from mouth while using air turbine handpiece, ultrasonic scaler may cause eye injury.
3. Injuries to eyes of patients caused by sharp instruments especially in supine position

Footwear

- Most hospitals have their own policies regarding footwear.
- Footwear with open heels and/or holes across the top can increase the risk of harm to the person wearing them due to more direct exposure to blood/body fluids or of sharps being dropped for examples.

COLOUR CODES

COLOUR	TYPE OF CONTAINER	WASTE CATEGORY	TREATMENT OPTIONS
YELLOW 	PLASTIC BAGS	Human and animal wastes, Microbial and Biological wastes and soiled Wastes, eg. human tissues, body parts, organs, lab cultures, specimens, items contaminated with blood	Incineration, deep burial
RED 	DISINFECTED CONTAINER/PLASTIC BAGS	Microbiological and Biological wastes, Soiled wastes, Solid waste, eg. Disposable items like catheters, IV	Autoclave, microwave, chemical burial

COLOUR CODE	TYPE OF CONTAINER	WASTE CATEGORY	TREATMENT OPTIONS
BLUE/WHITE TRANSPARENT 	PLASTIC BAG,PUNCTURE PROOF CONTAINER	Waste sharps and solid waste, eg. .Sharps, needles , scalpels, disposable items like catheter, IV set etc	Autoclave/ Microwave / Chemical Treatment Destructio n
BLACK 	PLASTIC BAG	Discarded medicines, incinerated ashes, chemicals used for disinfection etc.	DISPOSAL IN SECURED LAND FILLS

Thank you