

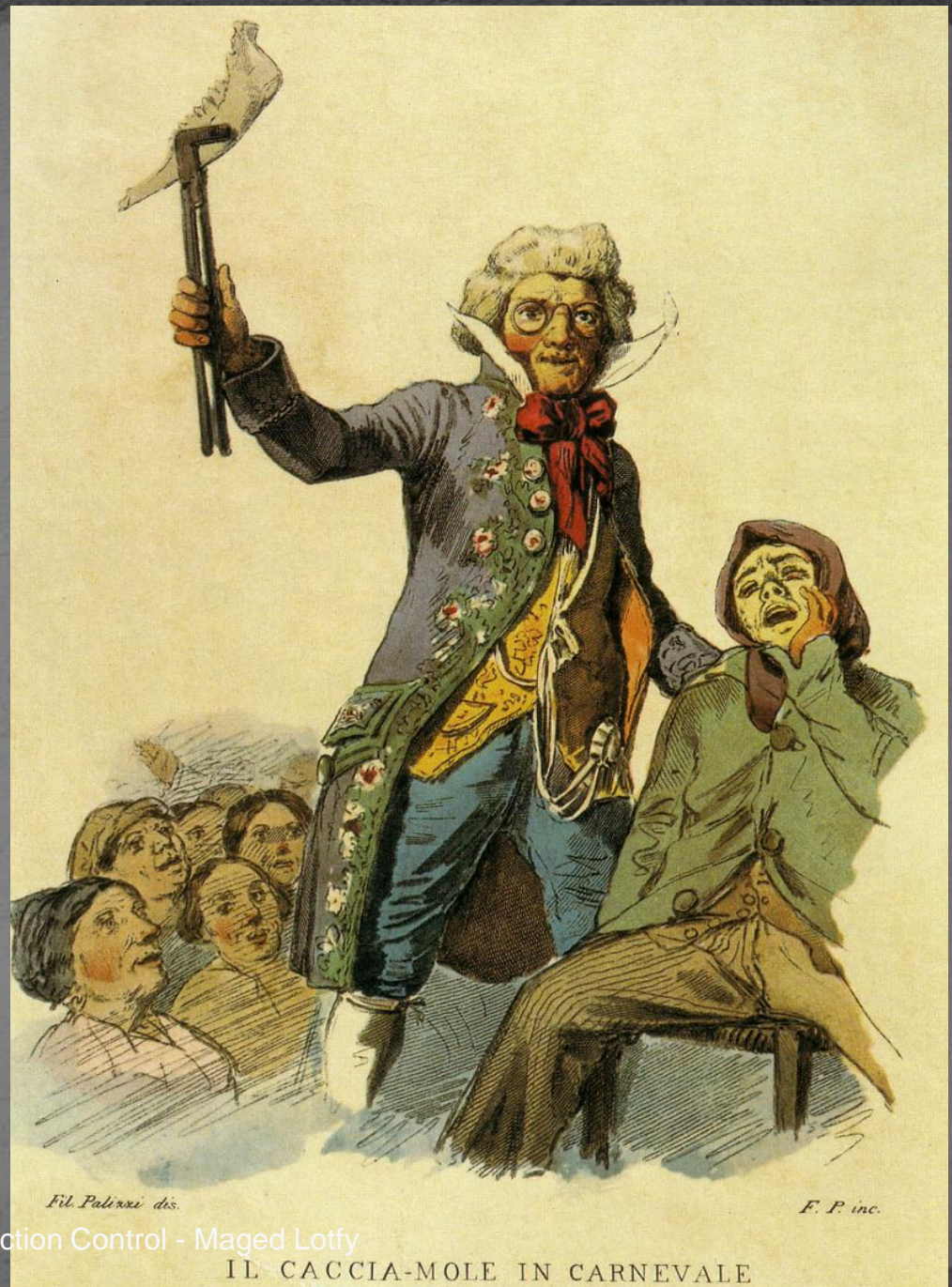
INFECTION CONTROL IN DENTAL PRACTICE

MAGED LOTFY

Part I

This was how the society
see the dentist in the 18th
and the beginning of the
19th centuries

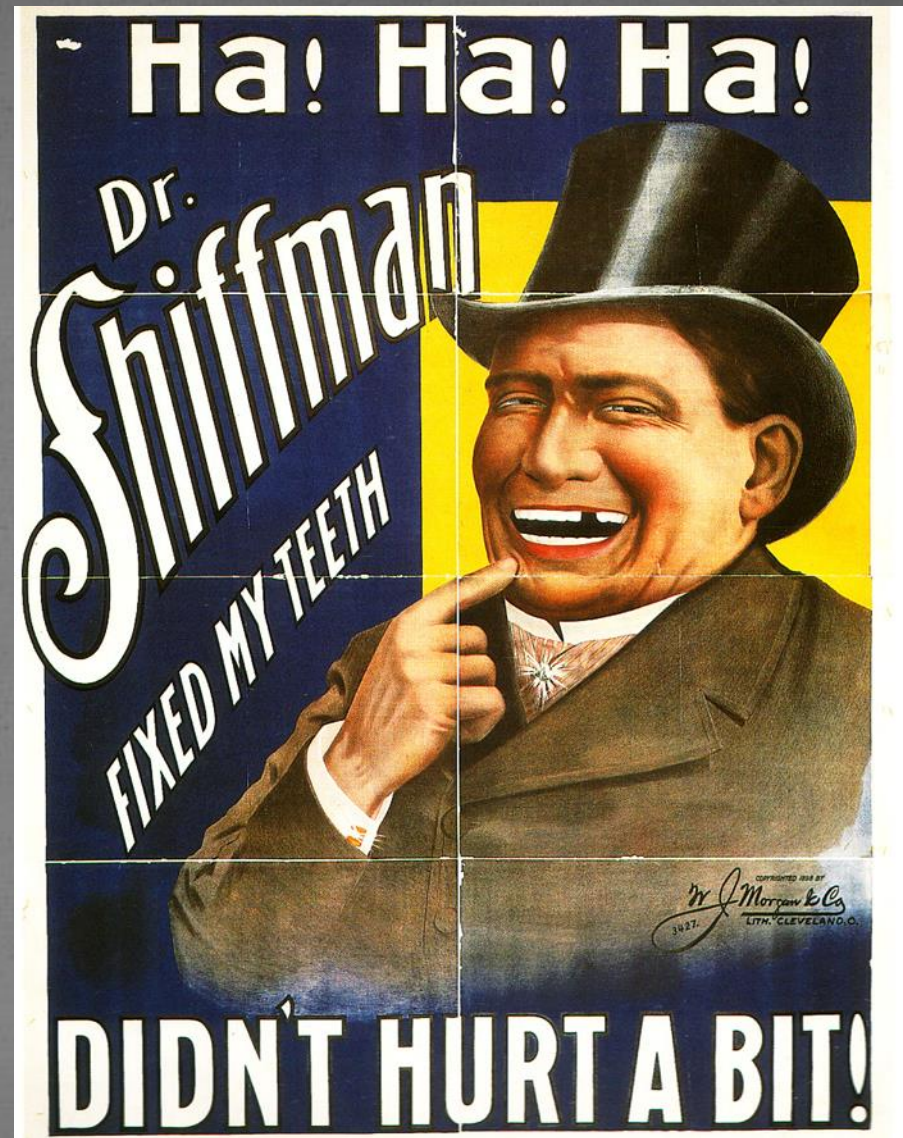
- Very cruel person
- Do his work on the village
market
- No trial is done to prevent
any contamination



This is an advertising that was Very common in the late years of the 19th century and early years of the 20th century.

It emphasis that **“Dr Shiffman Fixed his teeth with out any hurt”**

PAIN



The main concern of patient at this time was to avoid the pain that is believed to associated with any dental treatment

The main concern of patients nowadays is

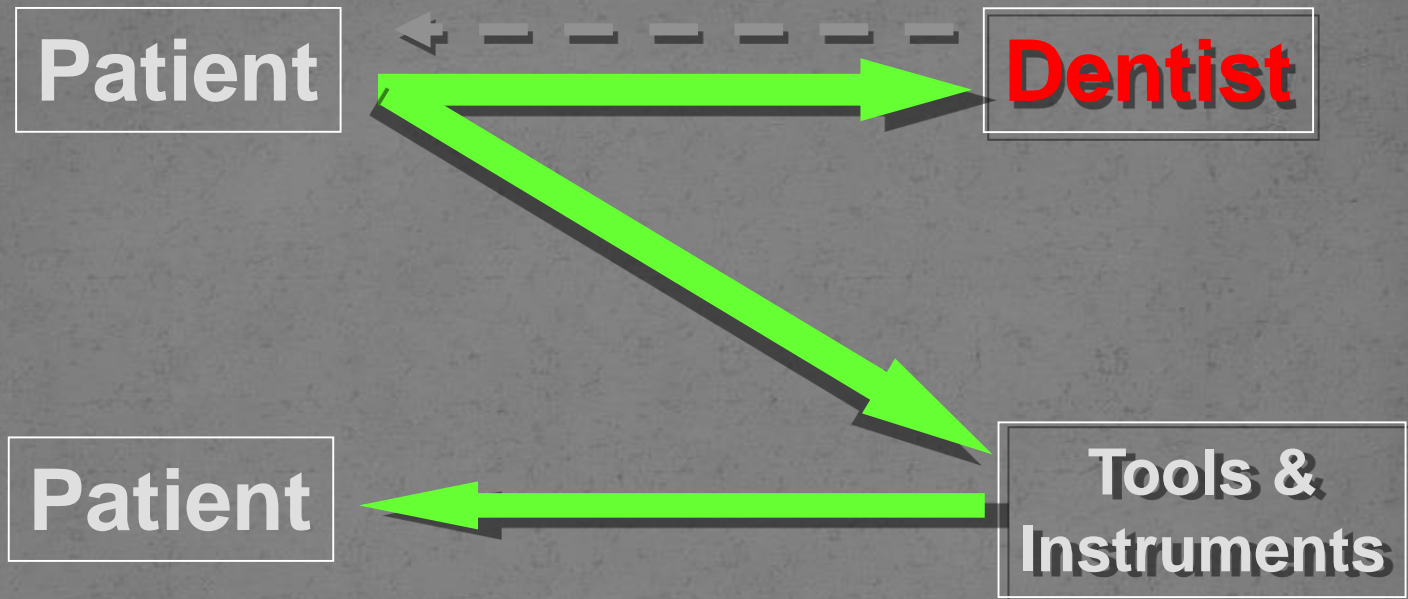
CROSS INFECTION



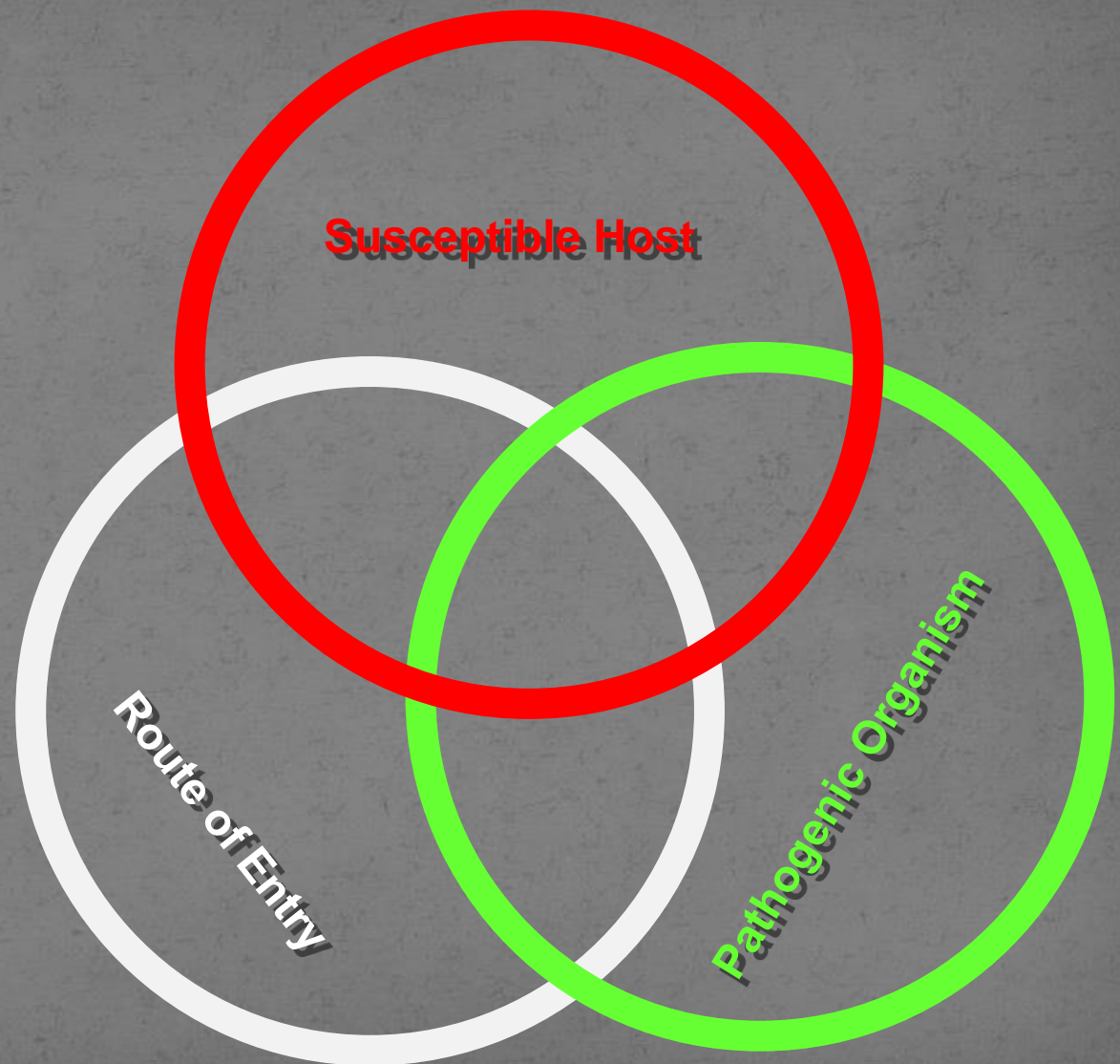
This is another drawing from the same era representing what we can consider a dental office ... Note the following

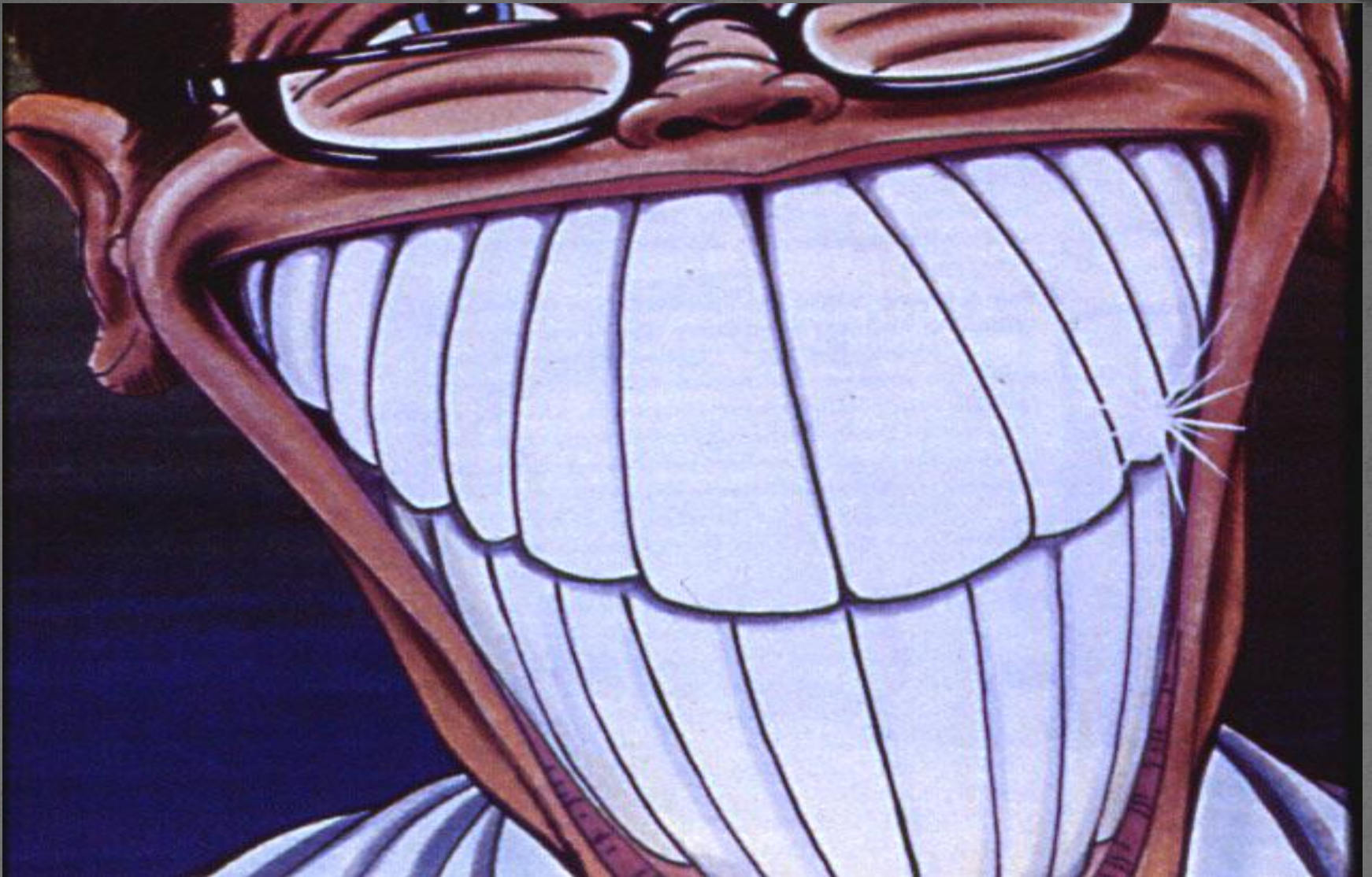
- No patients privacy
- No measures for infection control what so ever (masks, gloves, gowns)

Cross-Infection



Chain of Infection





We are no longer treating teeth in patients but rather patients who have teeth

Patients Today are Different

- Patients with Hepatitis
- Patients with AIDS
- Patients with TB
- Patients with renal failure, dialysis and renal transplant
- Patients with diabetes
- Patients with joint transplant

Many of the diseases that were considered fatal few years ago can now be controlled

Diseases that Can be Transmitted in Dental Clinic

- Hepatitis B & C
- AIDS
- Tuberculosis
- Herpes Simplex type 1 & 2
- Organisms causing Upper Respiratory Tract infection

Routes of Disease Transmission

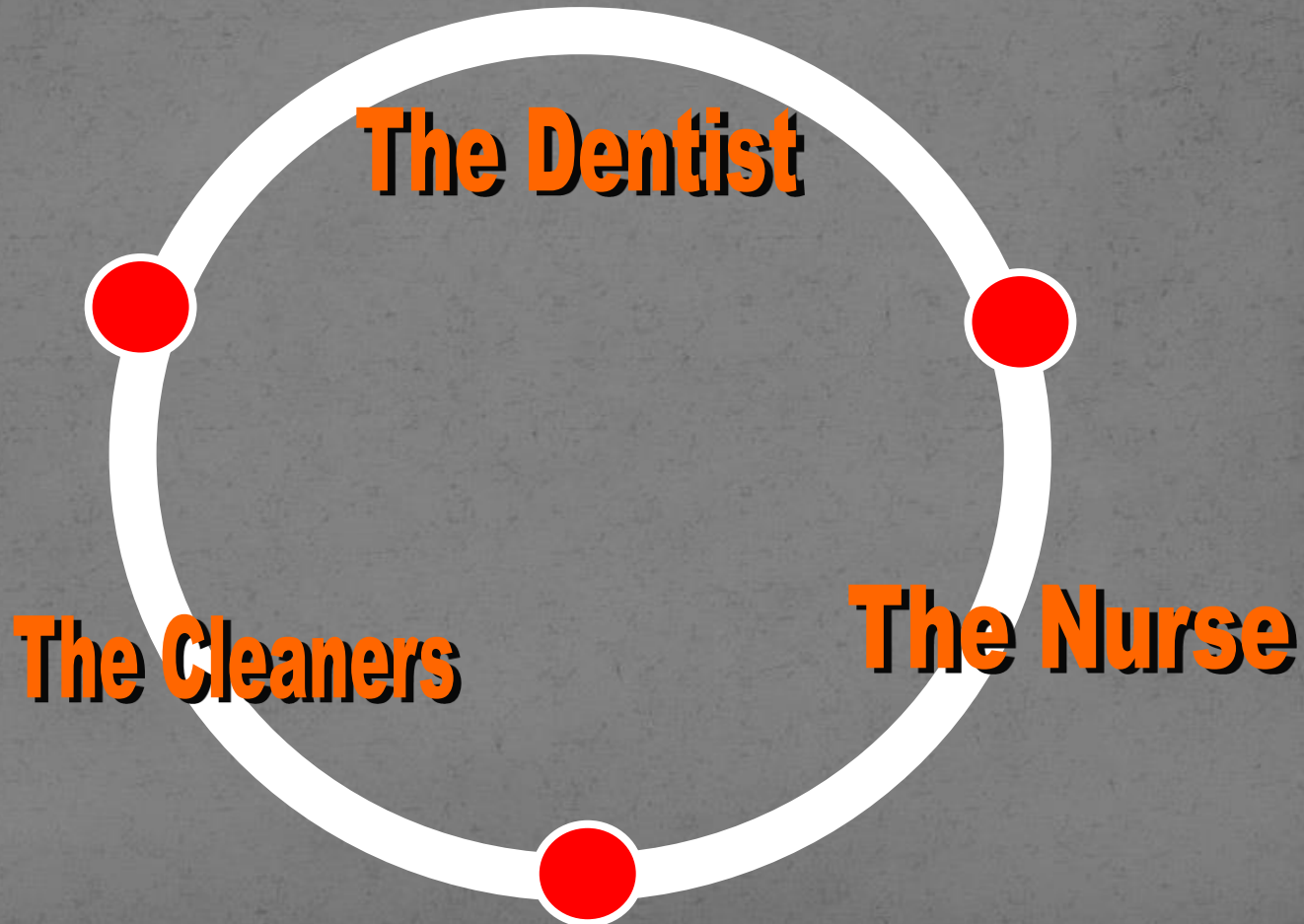
- **Direct Route:**
 - Direct contact with patient's blood, saliva and tissue fluids
- **Indirect Route:**
 - Contact with contaminated materials

Infection Control Modalities

- Vaccination
- Protective & barrier technique
- Care of hands
- Sterilization of instruments
- Cleaning and disinfection of dental unit and environmental surfaces
- Sterilization of hand pieces

Infection Control is a Team Work

Infection control is the responsibility of all DHCWs as a team any break is the team the whole infection control process will fail



I. Vaccination

**All dental health care workers (DHCWs)
must be vaccinated against**

Hepatitis B

II. Protection & Barrier Technique

A. Medical Gloves

- **Surgical gloves (Sterile)** Used in surgery and invasive procedures including single tooth extraction and deep scaling

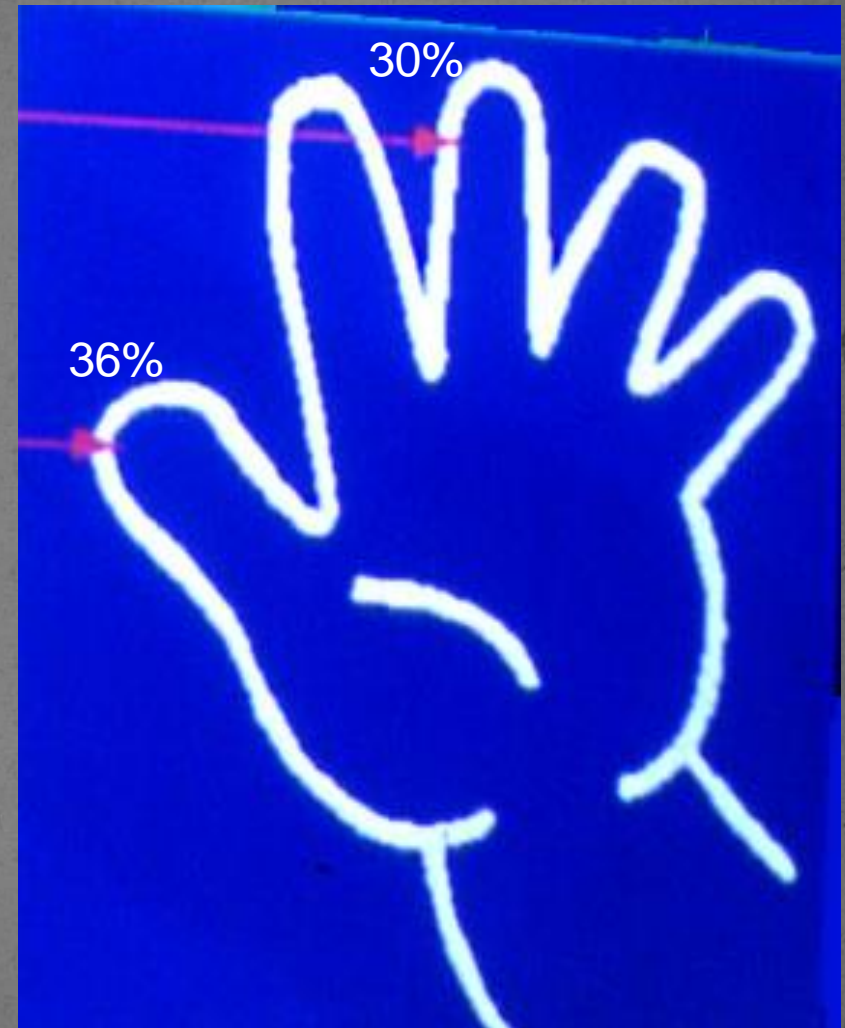


- **Non-Surgical Examination gloves (Non-Sterile):** Used for examination and noninvasive procedures as filling, prosthodontic and orthodontic work



Multiuse of Gloves

- Micro perforations occur on the gloves
- Even with prolonged use micro perforations occur in 13% of cases



Instructions for Using Gloves

- Wash hands before wearing gloves
- Do not wash hands while wearing gloves
- After treatment discard gloves and wash hands again
- Gloves should not be reused
- If glove torned, punctured or cut during treatment it must be changed

B. Face Protection

This is achieved by using:

- Chin Length plastic face shield ... or
- Face Mask & Protective Eye Glasses
 - The mask is changed between patients
 - The eye glasses are disinfected between patients





Wrong use of the mask The mask do not cover the nose of the operator



Wrong use of the gloves The operator is wearing her watch under the examination gloves

C. Clothes Protection

- For surgical procedures scrub suit and sterile gowns are used
- Gowns are changed after every patients



- In theater room complete clothes and face protection are essential and should be changed after every operation
- All gloves and gowns used must be sterilized



In 1960,s and early 70,s it was accepted to do examination for patients without wearing gloves

Now This is Completely UNACCEPTED



- For noninvasive procedures white coat is used and is changed when apparently not clean

INFECTION CONTROL IN DENTAL PRACTICE

MAGED LOTFY

Part II

III. Care of Hands

- Before and after nonsurgical procedures, hands are washed with water and soap
- Before and after surgical procedure hands are washed with antimicrobial agents as Betadin
- Rings, watches, braces and similar items are not allowed during gloving
- See next slide for proper hand washing technique.



Wet hands with water;



Apply enough soap to cover all hand surfaces;



Rub hands palm to palm;



Right palm over left dorsum with interlaced fingers and vice versa;



Palm to palm with fingers interlaced;



Backs of fingers to opposing palms with fingers interlocked;



Rotational rubbing of left thumb clasped in right palm and vice versa;



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;



Rinse hands with water;



Dry hands thoroughly with a single use towel;



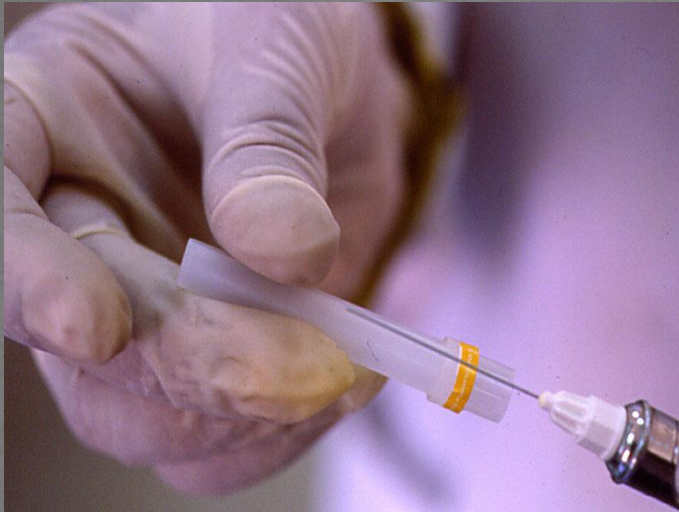
Use towel to turn off faucet;



Your hands are now safe.

Handling Sharp Instruments

Needles, Scalpels, Disposable Syringes



Stick with needle contaminated with blood of hepatitis carrier increases risk of transmitting the diseases by 10-30%



- **Never use two hands technique to recap the needle**
- **Always use one hand technique to recap the needle with or without the aid of simple device**

Remember

- Use **one hand** technique when recapping the needle
- The needle should be recapped **before its removal** from the syringe
- Used needles, scalpels, plastic syringes and similar items should be discarded in a **puncture resistant container** that should be labeled with danger biomaterials label

IV. Sterilization of Dental Items

- Critical Items **Sterilization**
 - Skin or Mucous membrane penetrating instruments
- Semi Critical Items **High-level Disinfection**
 - Non penetrating instruments
- Non Critical Items **Low-Level Disinfection**
 - Instruments that will not come in contact with blood or saliva or other body secretions

Definitions

Sterilization

- Killing of all forms of microorganisms from an instrument or surface
- It is a matter of yes or no No thing can be **half sterilized**

Disinfection

- Killing of some of the pathogenic microorganisms
But not necessary all organisms from a surface
- Disinfection can be high, intermediate or low level

A golden role for infection controle

If A Disposable Is Available Use It



Aprons, Suction tips, 3-way Syringe Disposable Tips or Sleeves
Mirrors, Probes, Tweezers, Endodontic Instruments, and others

Critical Items

Sterilization

- Extraction forceps
- Surgical instruments
- Periodontal scalars
- Ultrasonic scales tips
- Surgical burs
- Endodontic instruments

Semi-Critical Items

High-Level Disinfection

- Examination instruments
- Operative instruments
- Impression trays
- Burs and stones (non-surgical)
- Orthodontic instruments
- Saliva ejectors and water syringe tips
- Removable and fixed prosthesis when first com from lab

Non-Critical Items

Intermediate or low-Level Disinfection

- X-ray tube
- Head rest
- Instruments table
- Handles of saliva ejector and suction
- Handle of light
- The spittoon

V. Cleaning & Disinfection of Environmental Surfaces

The **purpose** is to remove the patients materials that may possibly contaminated the dental unit and the environmental surfaces

Methods

- Disposable cover for the head rest
- Aluminum foils or plastic covers used to cover light handles, control buttons.....
- Germicide spray is used to spry the dental chair and instrument table
- Germicide powder is used to disinfect the tubes of the saliva ejector and suctions

An Inexpensive Method

$\frac{1}{2}$ Cup
Sodium Hypochloride
Solution



1 Gallon
 H_2O

Swap the surfaces with the solution



Intermediate Level of Disinfection

VI. Sterilization of Hand Pieces

- After each patient allow the HP to work for 20-30 seconds to expel water and air and remove any contaminated materials
- After removal from the unit the HP is cleaned, lubricated, packed and placed in the autoclave



In Dental Practice

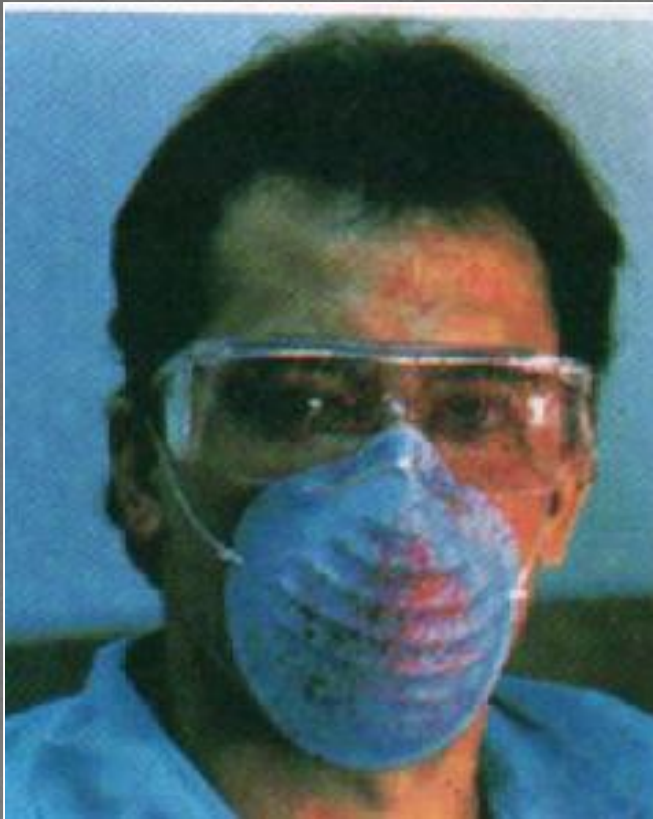


- The dentist and his assistant are using the appropriate barrier technique.



- A red dye, simulating saliva, is used to demonstrate areas of contamination during single class II cavity preparation on lower molar. The dye was found to splash on the face, hair, gloves and chest of both the dentist and his assistant.

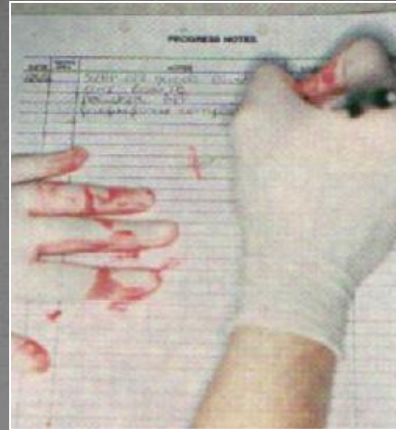
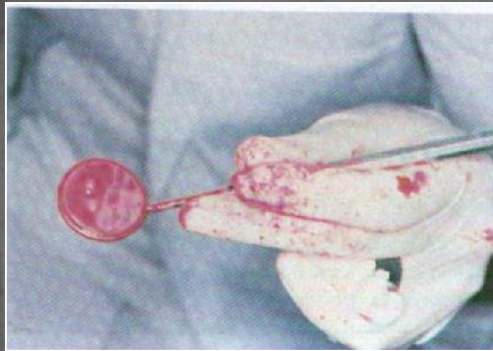
After Completing Cavity Preparation



- The dentist, note the splash on his mask.
- The assistant, note the contamination on her chest and gloves.



- The use of a fluorescent light more dramatically demonstrated the contamination that occurred from the red-dyed saliva after completing a single cavity preparation..



- Contaminated hands transmit saliva to the mask, glasses and face of the operator or his assistant as well as to the environmental surfaces

METHODS OF STERILIZATION AND DISINFECTION AVAILABLE IN DENTAL PRACTICE

1. Dry Hot Oven

Heated

160°C

Instruments are left inside for

120 min

Heating time not included

Disadvantages

- Long time for sterilization
- The presence of cold spots at which temperature do not reach 160°C
- No drying cycle and instruments corrosion may occur

2. Steam Autoclave

Steam Under Pressure

Steam Under Pressure with Vacuum

135°C

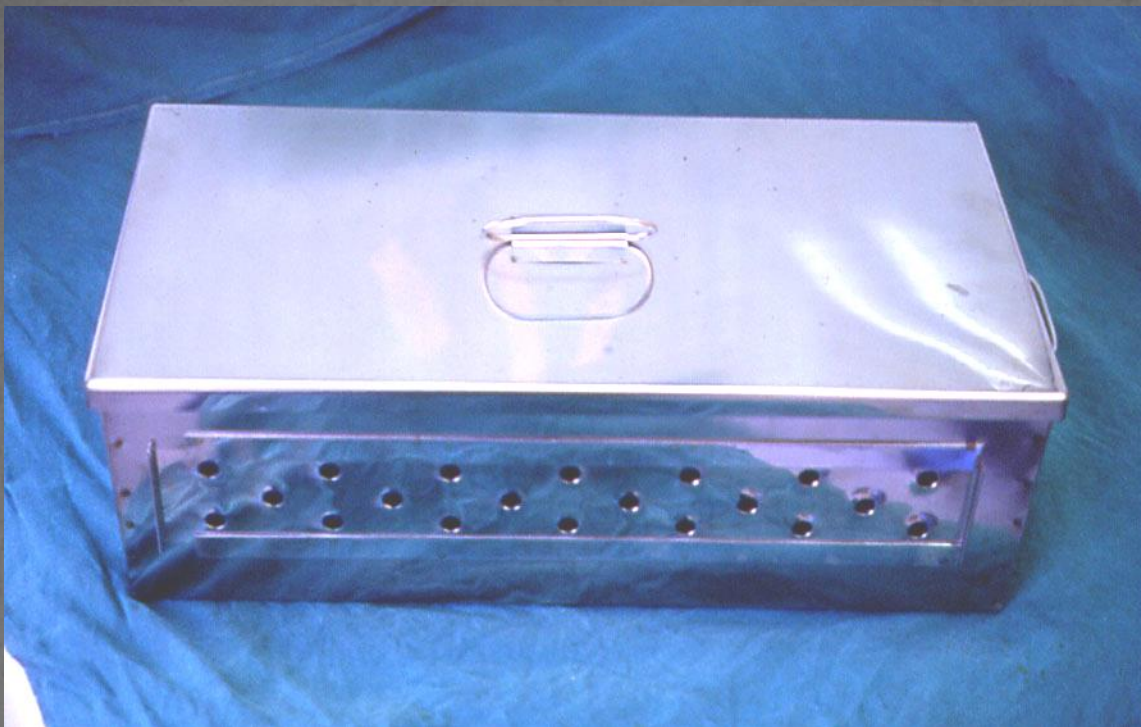
Instruments are left inside for

15-20 min

Instruments should be packed



A modern steam autoclave



A sample for an old fashion container that was used for sterilization of the surgical instruments

The holes in the sides of the box are opened when placed in the autoclave and closed by a sliding piece of metal to keep the instruments sterile for sometime



3. Chemicals (Cold Sterilization) e.g. Cidex

Should be freshly prepared

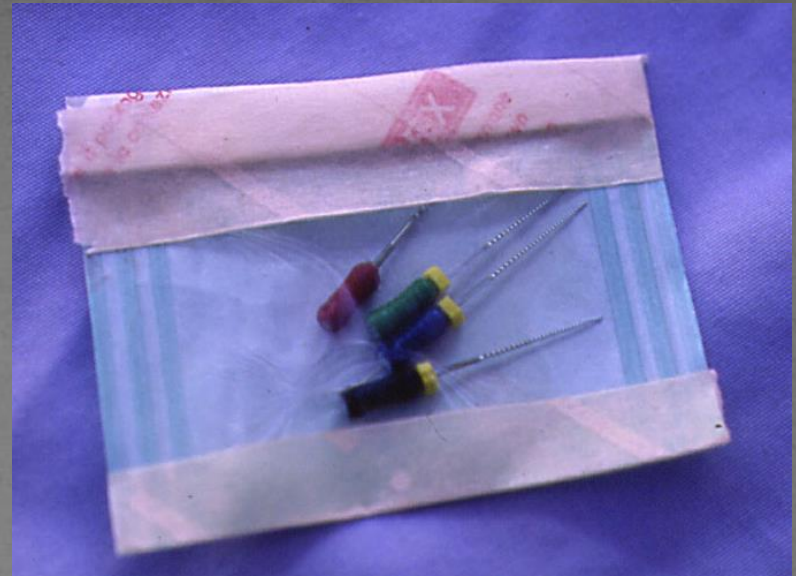
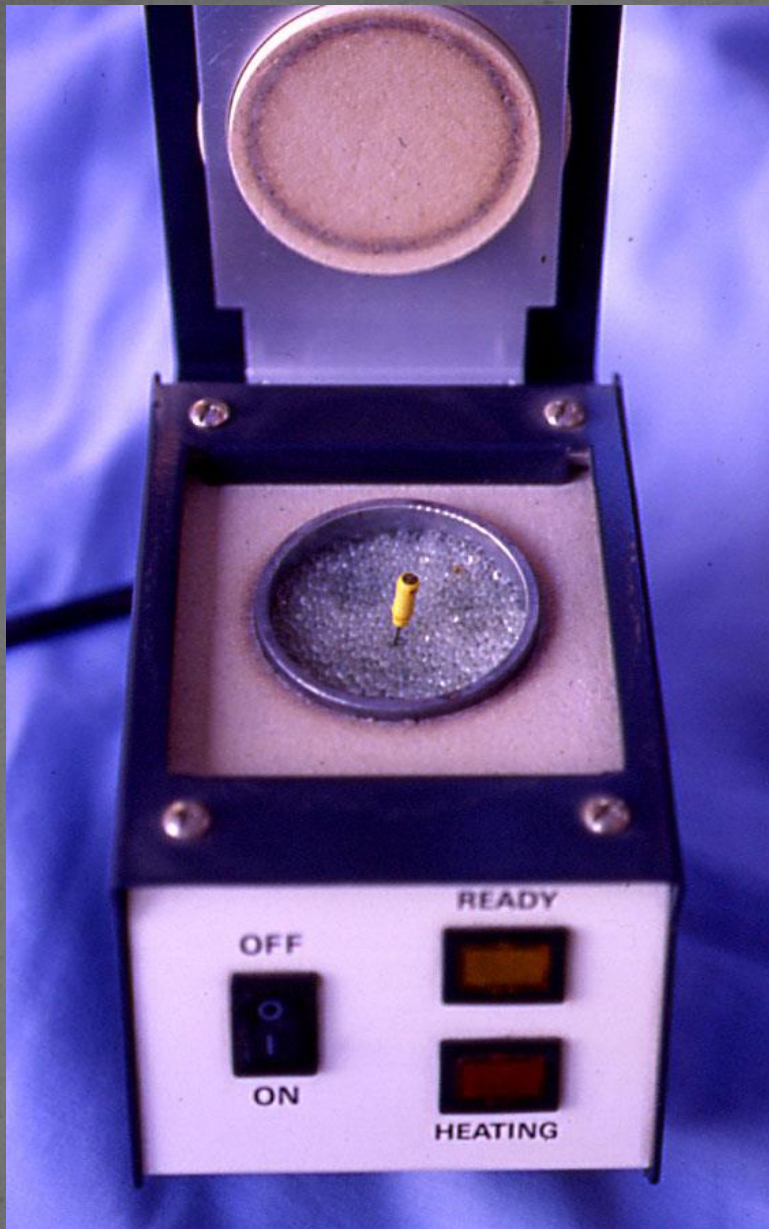
The solution is prepared by adding an activator powder to the solution in a ratio given by the manufacture

For sterilization Instruments are left inside for

12 Hours

Less than 12 hours some level of disinfection is obtained but not sterilization





- This old fashion glass bead sterilizer was in common use few years ago.
- It was claimed that placing the instrument in this hot balls of glass affect sterilization in few seconds
- It was mainly used for sterilization of endodontic files
- Researches proved that sterilization can not be affected by using this apparatus



After using the instruments it should be placed in a disinfectant solution until time is suitable for cleaning which can be done using a brush or an ultrasonic cleaner.

Why ?

- To make cleaning easier and more efficient by preventing drying of patients material.
- Reduces the level of airborne contaminants by including them in liquids
- The Holding solution begin the cleaning process by reducing the level of contamination of the instruments



Why ?

•To Protect items and maintain sterility

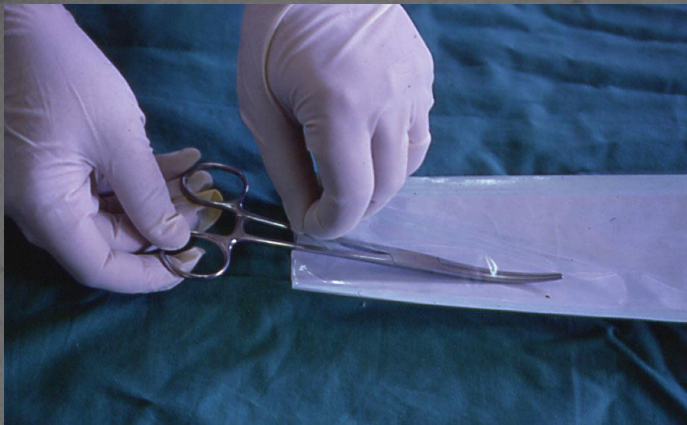
Unpacked
Items

Should be

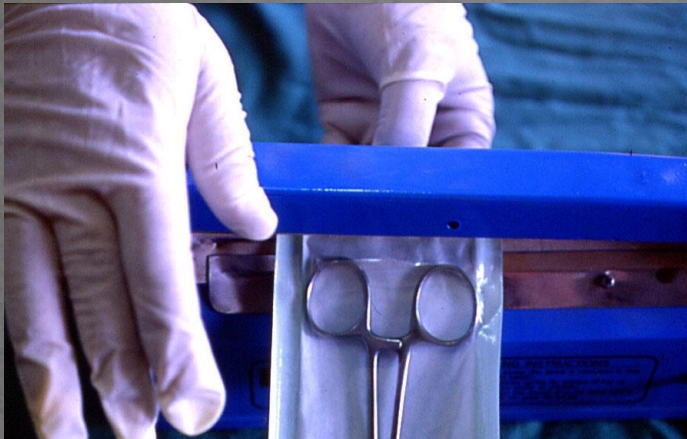
Used
Immediately

Exposed to environment and may be contaminated by dust aerosols, improper handling or contact with contaminated surfaces

- The packing papers may be supplied in the form of rolls of different width and length.
- The pack have an color indicator that changes color when in subjected to temperature in the autoclave
- The date at which the pack is placed in the autoclave should be registered on the pack as instruments that has not been used for one month after sterilization should be repacked and re- sterilaized



■ The pack should be sealed (air-tight) after placing the tool inside and before placing it in the autoclave



■ Sealing can be done using a sealing machine that seal the pack on three successive lines to ensure air-tight sealing



■ Sealing tape can also be used



Packing and sealing machine

Infection Control In Dental Practice

Instruments Recirculation

Maged Lotfy

Head of OMS Dept, Director of OMRSU

Ain Shams Dental School

Treasurer of EAOMS

1. Protective Equipment



- Gloves
- Face mask
- Protective eyeglasses
- Gown

Why ?

To protect dental workers and patients against infectious hazards

How ?

Wash Hands and Forearms Before Glove Placement and After Glove Removal

1. Wash hands and rinse twice for at least 15 seconds
 - Use soap and tap water
 - Pay attention to fingertips
 - Avoid splashing
 - Keep nails short
2. Gloves: Use the proper glove for the proper purpose
3. Eyeglasses: Should include side shield or face shield
4. Mask: High filtration and close facial fit
5. Head and shoe covering: Essential in the steri-center area
6. Wear Personal Protective equipment for the entire sterilization procedure

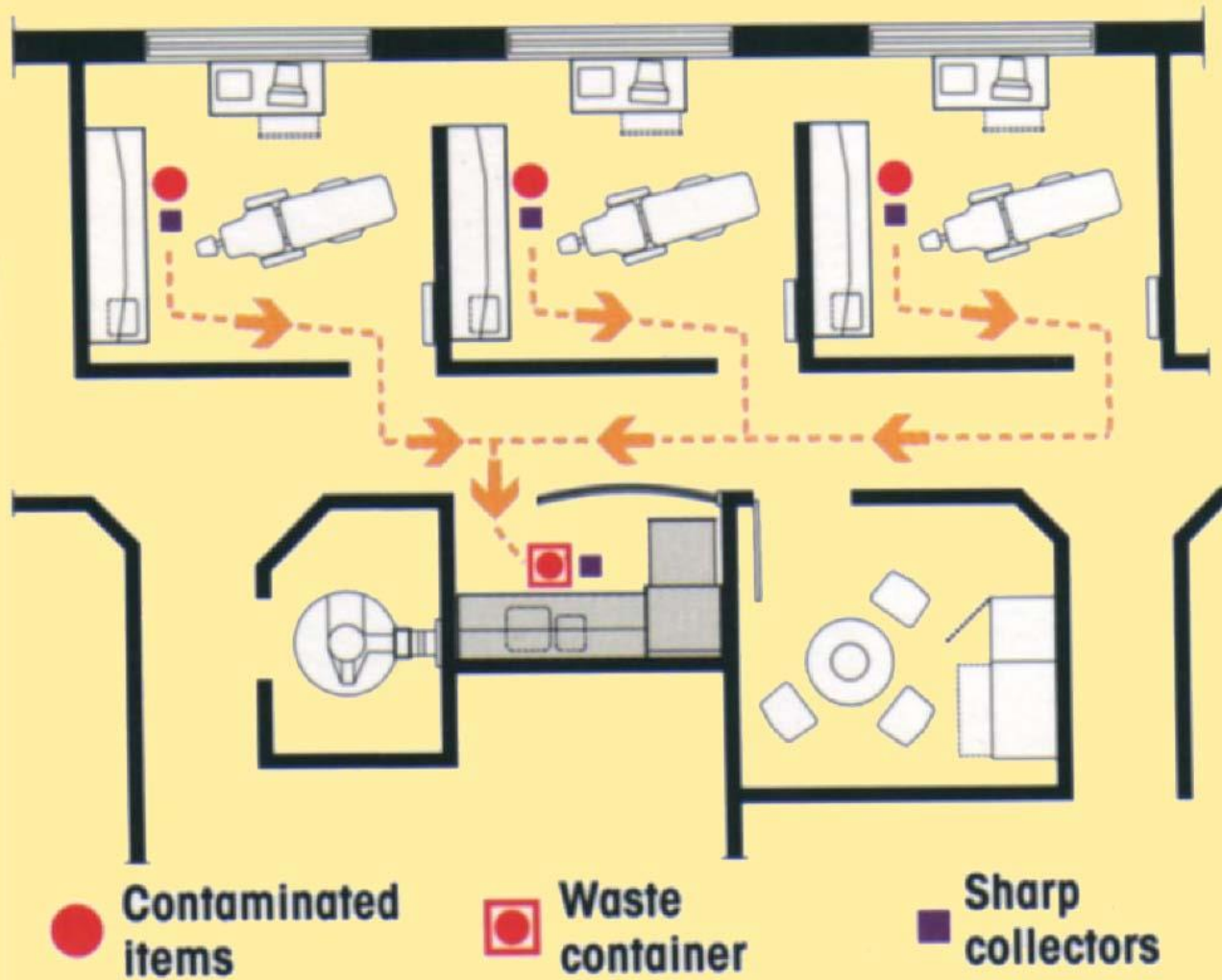


Waste Management

Why ?

- To prevent access to medical waste by unauthorized persons
- To prevent destruction or spillage of waste
- To protect waste from insects

Centralization of waste



Maintain integrity of containers & Prevents odor

Instrument Recirculation - Maged Lotfy

How ?

1. Sharp Items & Human Tissues: Should be discarded in the operatory room in a special non-puncture container

- Minimize movements with sharp items and biological material

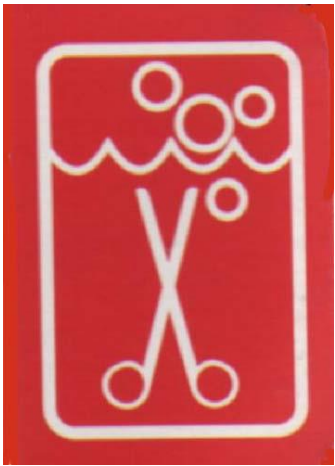
2. Contaminated Items & Biological materials: Should always kept out of sight and discarded immediately according to proper requirements.



Hands-Free knee opening waste container



**High-capacity waste
container with
disposable collector
for sharps and bio-
waste**



3. Pre-Soaking

Why ?

- To make cleaning easier and more efficient by preventing drying of patients material.
- Reduces the level of airborne contaminants by including them in liquids
- The Holding solution begin the cleaning process by reducing the level of contamination of the instruments

How ?

1. Use a NO-TOUCH technique: To handle instruments for the entire sterilization process by using transfer baskets or cassettes
2. Keep instruments in holding solution: Until time is available for full cleaning
3. Drain the holding solution and change it daily



Transfer basket for no-touch technique



**Transfer basket can be
used for chemical
sterilization-disinfection
and for impression tray
and lab appliances
disinfection**

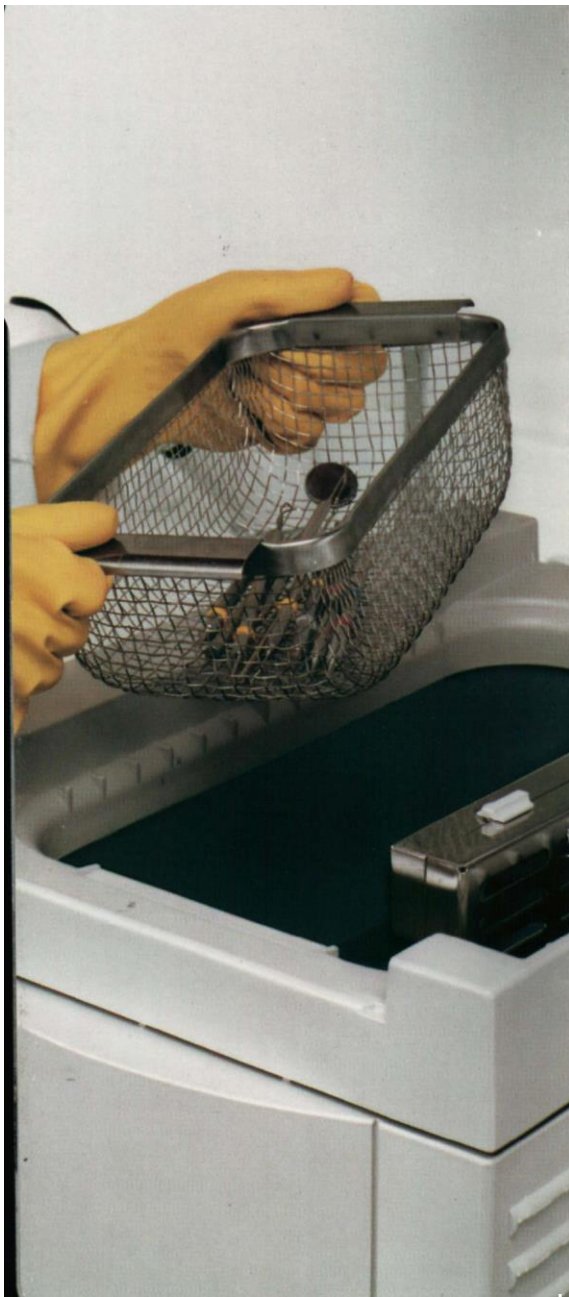
Instruments Cassette



4. Ultrasonic Cleaning

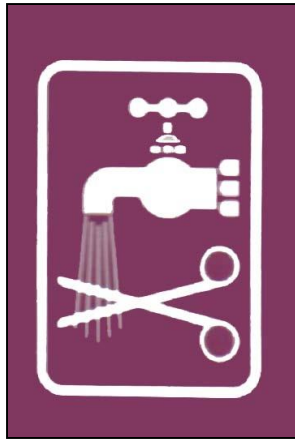
Why ?

- To remove blood saliva, tissue and other complex proteins that may interfere with disinfection or sterilization
- Ultrasonic is recommended as it increases cleaning efficiency and avoid possible splatter during manual brushing



How ?

- 1. Use basket or cassette: to
suspend instruments in tank**
- 2. Always cover tank: To
prevent splatter and sonic
induced aerosol**
- 3. Drain solution: And
disinfect chamber daily**

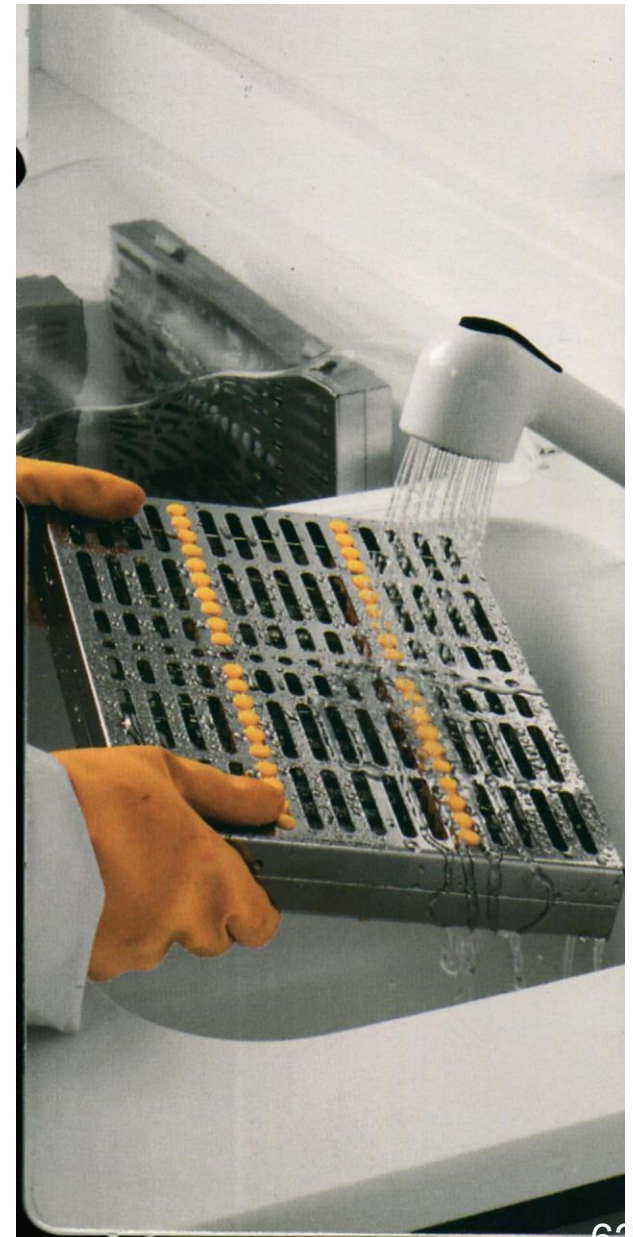


5. Rinsing

Why ?

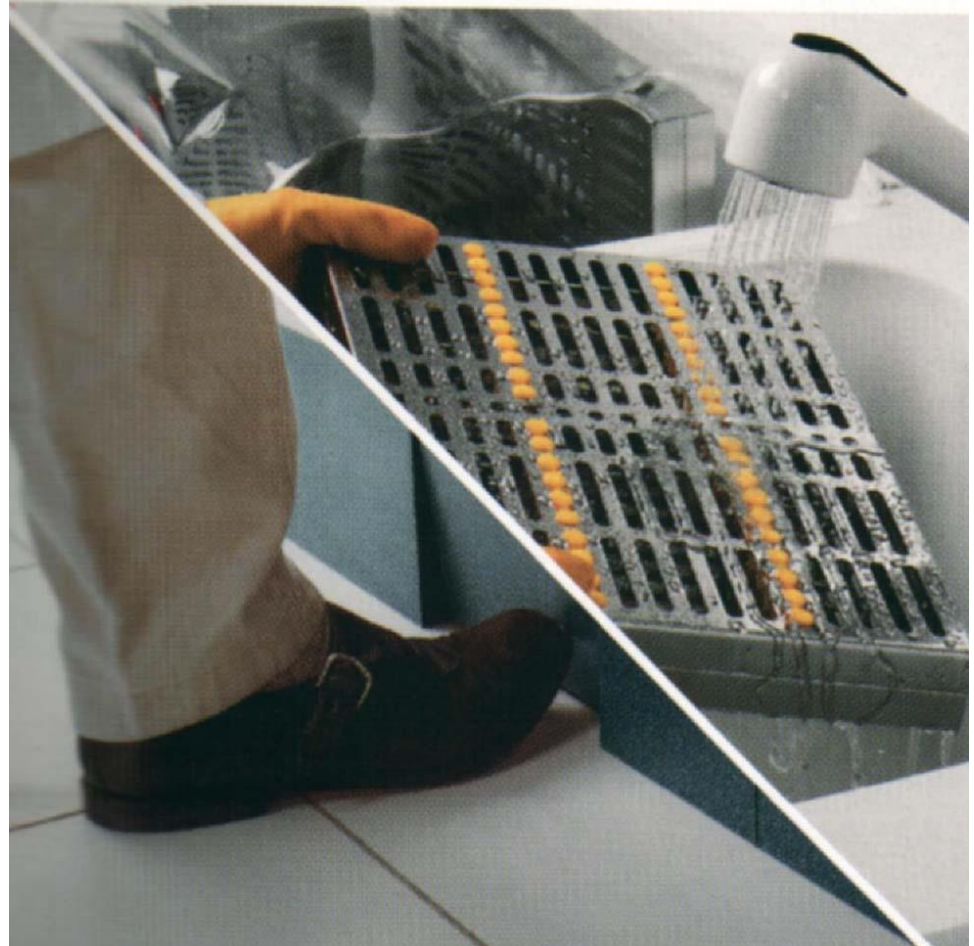
- To remove dislodged debris, microorganisms, detergent and residual cleaning solution

It completes the cleaning process



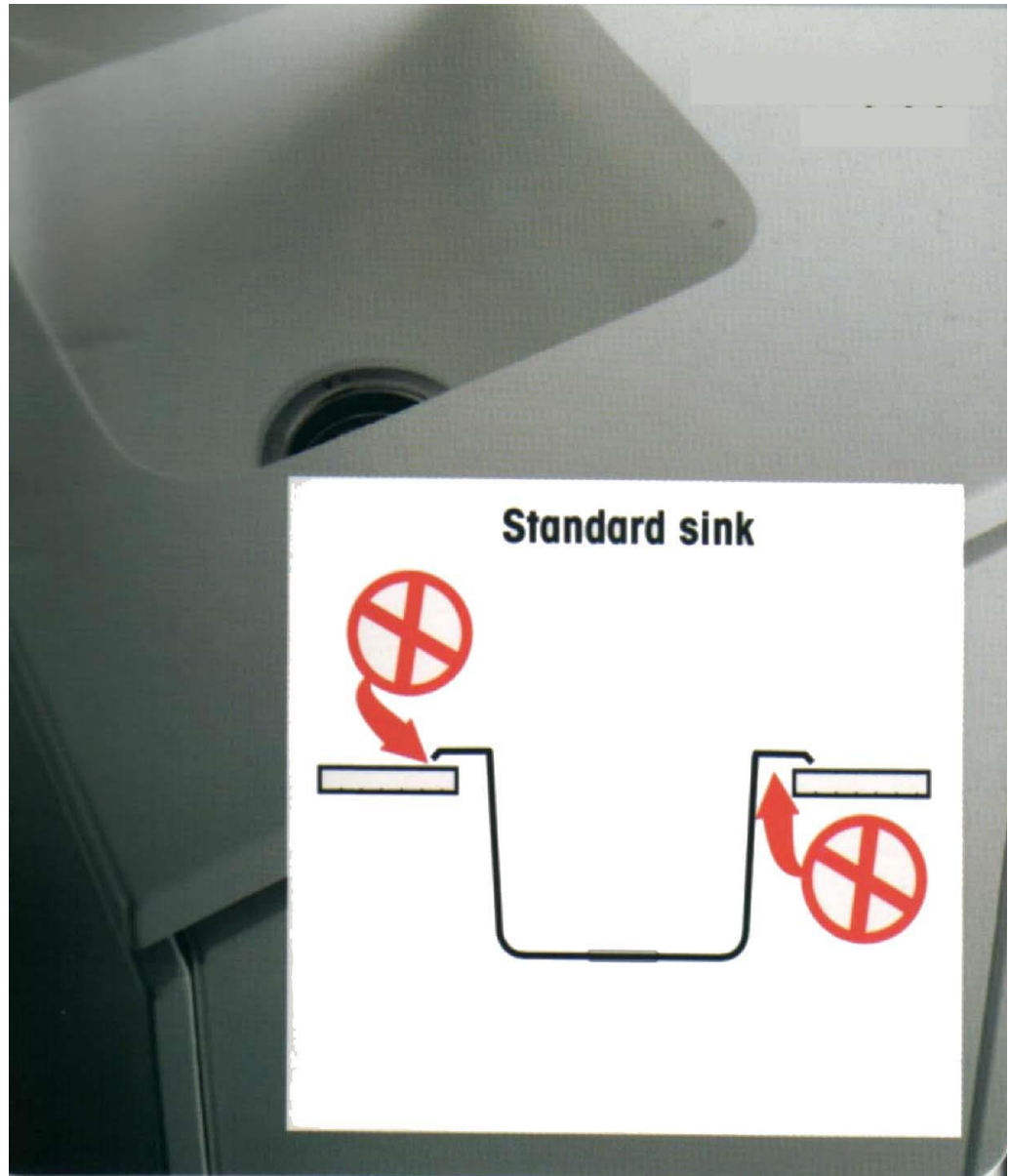
•How ?

- Run tap water
- Rinse instruments in a basket or cassette
- Avoid splashing



Water foot control

**The use of standard sink
permit harmful dirt and
bacteria deposits**





6. Drying

Why ?

- Wetness interferes with all sterilization methods

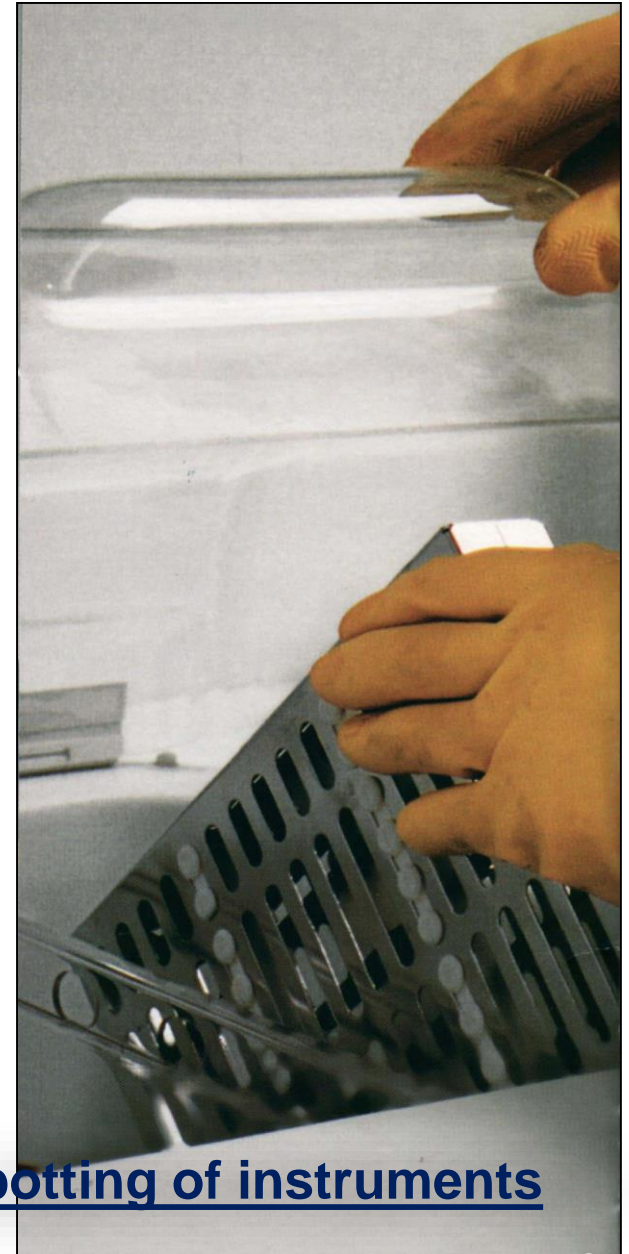
Moisture

Decrease sterilization efficiency

Decrease steam quality

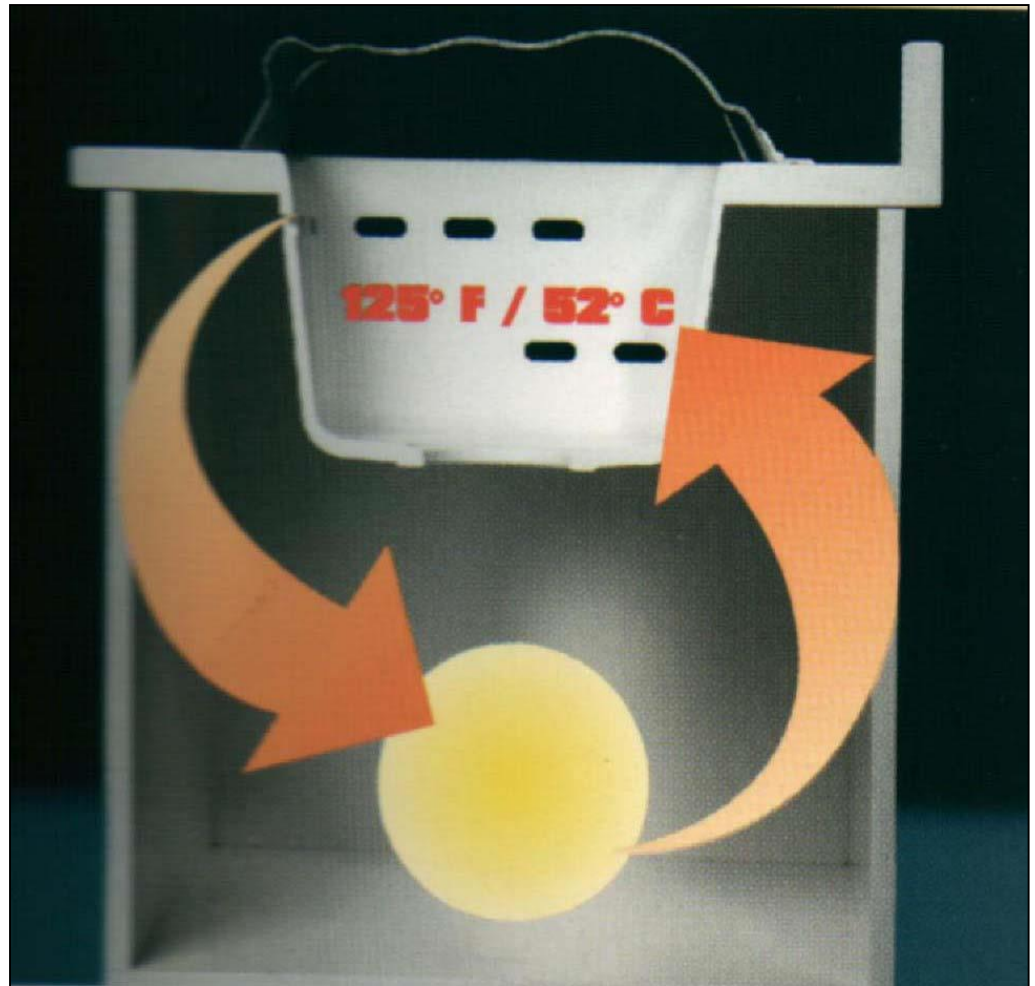
Decrease exposure of surfaces

- Prevent corrosion, rusting, dulling, spotting of instruments



How ?

- Better to use dryer
- Put instruments in transfer basket or cassette
- Shake instruments to remove excess water

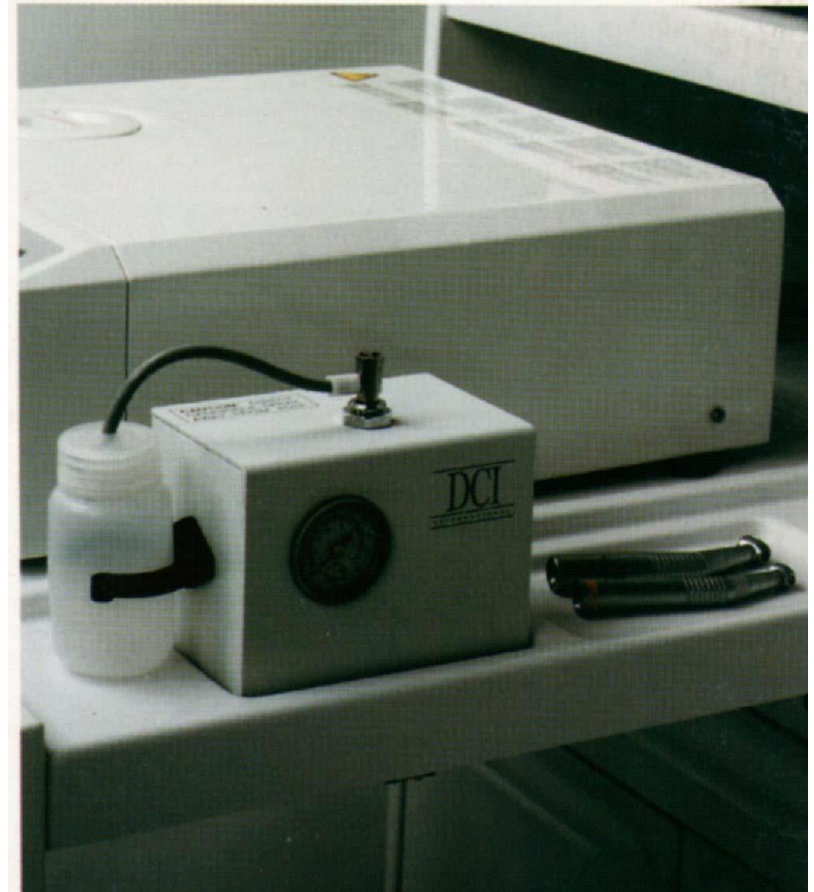




7. Lubrication

Why ?

- Ensure effectiveness
 - of sterilization and longevity of HP
- Help to remove
 - patient's material from inside the HP and add lubricant



How ?

- Disinfect the HP
- Remove burs
- Spray oil in HP
- Apply 2x2 gauze on the head
- Run HP for 20-30 sec





8. Corrosion Control

Why ?

- To Protect items from corrosion and tarnishing

How ?

- Put burs in container
- Dip burs in a beaker filled with rust inhibitor
- Drain to minimize the moisture





9. Packing

Why ?

- To Protect items and maintain sterility



Exposed to environment and may be contaminated by dust aerosols, improper handling or contact with contaminated surfaces

How ?

- Make sure that instruments are clean and dry
- Arrange instruments in functional sets to be used in a single patient
- Put chemical indicator inside and in the center of each multiple instruments pack or cassette
- Keep instruments packed until use
- Indicate on the package name of item and date of sterilization





10. Sterilization

Why ?

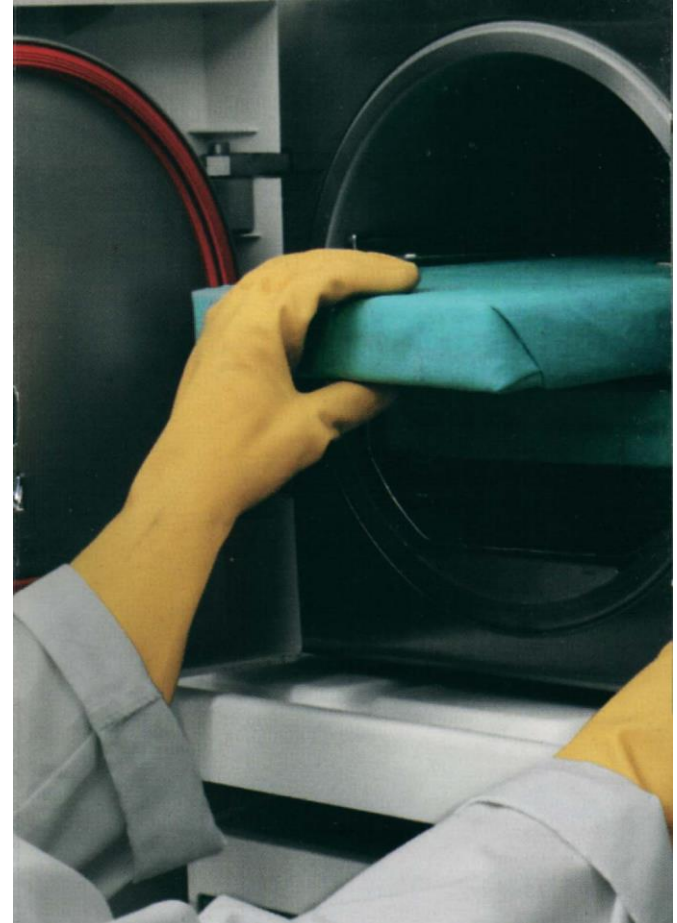
- To Protect dental personnel and patients from infection

**Critical
Items**

→ **Sterilization**

**Semi-
Critical
Items**

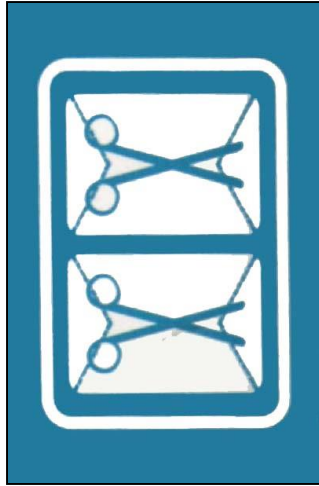
→ **High level disinfection**



How ?

- Sterilize only clean and dry items
- Operate and never interrupt a cycle
- Spore test the sterilizer weekly

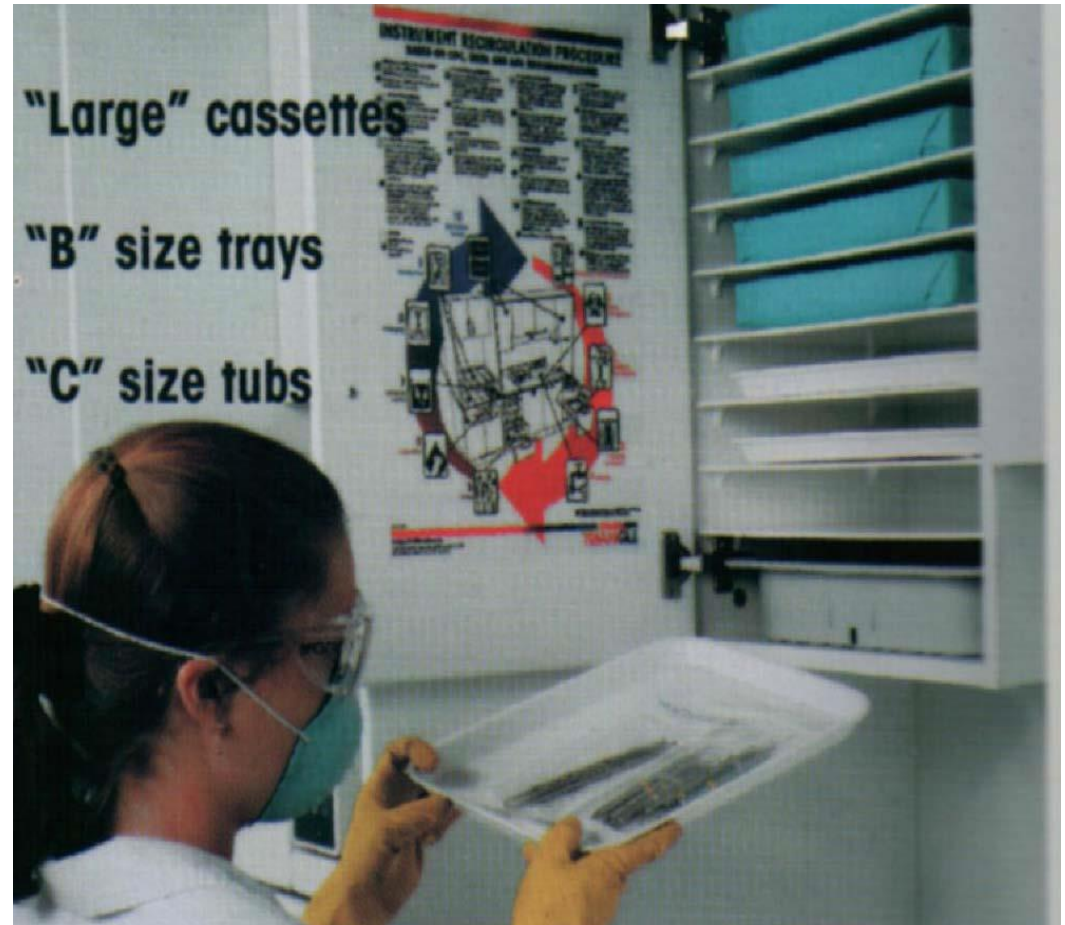




11. Storage

Why ?

- To Protect instruments from contamination
- Prevent package tear or punctures



How ?

- Storage area should be
 - dry
 - dust free
 - away from heat, water and drain
- Keep items warped until use
- Use “first-in-first-out” system
- After “One month” Resterilize unused paper warped items