DECONTAMINATION PROCESS MANUAL
(IN DENTAL PRACTICES)

(FIRST EDITION)

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Acknowledgement

This is the First edition of the Decontamination Process Manual. The purpose of the book is to guide you through sterilization room procedures in an easy, gradual process.

I would like to extend my sincere appreciation to all my colleagues who in one way or another contributed and extended their valuable assistance in the preparation and completion of this manual.

Sincerely,

Dr. Ghaneema Al-Dakhil

First Edition - 2014
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**Introduction:**

The decontamination area has been established to provide a support service to the clinics. This area is responsible for collecting and receiving the instruments and devices used during patient care, and for processing, storing and distributing them to dental clinics.

This manual presents evidence-based recommendations on the preferred methods for cleaning, disinfection and sterilization of patient-care medical devices, so dental health-care workers (DHCW) should adhere strictly to it.

**Immunization Schedule:**

All sterilization technicians should be immunized by Hepatitis vaccine.

Schedule for Hepatitis B vaccine:

<table>
<thead>
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<th>Dose</th>
<th>Schedule</th>
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<tbody>
<tr>
<td>1st dose</td>
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</tr>
<tr>
<td>3rd dose</td>
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Hand Hygiene:

Hand washing is the single most effective way to prevent the spread of infections.
The use of gloves is not a substitute for hand washing.

Hands must be cleaned before and after

- Handling contaminated items
- Using the washroom
- On entering and leaving the decontamination room
- Eating or handling food.
- Blowing your nose
- Anytime hands are visibly soiled with dirt
- Heavily contaminated with blood, secretions, or microorganisms.
Steps in Hand Washing

1. Wet hands with water
2. Rub hands palm to palm
3. right palm over left dorsum with interlaced fingers and vice versa
4. palm to palm with fingers interlaced
5. backs of fingers to opposing palms with fingers interlocked
6. rotational rubbing of left thumb clasped in right palm and vice versa
7. rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa.
8. Rinse hands with water
9. dry thoroughly with a single use towel
10. use towel to turn off faucet
11. ...and your hands are safe.
**Personal Protective Equipment**:

**Gloves**: Heavy duty utility gloves should be used for handling contaminated instruments during cleaning.

**Mask**: Wear facemasks or full-length face shields with facemasks whenever splashes, spray, splatter or droplets of blood could be generated. If your mask becomes damp during use, discard the mask as soon as possible, and put on a fresh mask.

**Eye protection**: Wear eye protection whenever performing any work. Eye protection can be eyeglasses with solid side shields, goggles or full-face shields.

**Gown**: Gowns that are high-necked, long-sleeved and of sufficient length and size, and is of a material that will not allow body fluids to pass through under normal conditions are to be used. This gown must be worn whenever there is likely to be exposure to infectious fluids or contaminated materials.
Donning of PPE

1. Hand hygiene
2. Gown
3. Mask
4. Protective eyewear
5. Wear gloves

Removal of PPE

1. Gloves
2. Protective eyewear
3. Gown
4. Face mask
5. Hand hygiene
Decontamination process:

Decontamination is the process by which microorganisms are removed or destroyed in order to make an object safe for use. It includes Cleaning, Disinfection and Sterilization.

1. **Cleaning**: Cleaning is physically removing debris and reducing the number of microorganisms present. Cleaning is the basic first step in all decontamination procedures. All instruments and equipment should be cleaned before sterilization or disinfection. Cleaning before sterilization or disinfection is sometimes called "pre-cleaning".

2. **Disinfection**: is killing all vegetative forms or micro-organisms but not spores.

3. **Sterilization**: is the total destruction or inactivation of all micro-organisms including viruses, vegetative and spore forms of bacteria.

Design of sterilization room:

Ideally the Sterilization room is divided into 3 areas. Sometimes there is a single room or two rooms.

- **Dirty area**: Receiving instruments from clinics to cleaning them manually or mechanically (Ultrasonic / Washer disinfector) is done in this area.

- **Clean area**: After cleaning, the instruments are received in this area for inspection, reassembling, packaging and sterilization.

- **Storage area**: The sterile instruments are stored in this area until required for use.
Equipment in the sterilization room:

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<td>Shelves</td>
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<tr>
<td></td>
<td></td>
<td>Tracing system</td>
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N.B.:

Two types of water distiller are available for the sterilization room.

- Bench top
- Wall mounted
**Decontamination cycle:**

Correct sorting, cleaning, drying, packaging, sterilizer loading procedures and sterilization methods should be followed to ensure that all instruments are adequately processed and safe for reuse on patients.

The instrument processing area should have clear separation of clean and dirty areas.

![Workflow diagram: Dirty → Clean]

All employees are responsible for maintaining and protecting each area for the function that was assigned to it and for respecting the established circulation.
Decontamination Cycle - Flowchart

Instrument decontamination

- Transport instruments from clinic to sterilization room using closed containers and trolley

Automated cleaning

- Washer disinfector
- Ultrasonic cleaner

Manual cleaning

- Arrange instruments in suspended basket (for other accessories)
- Immerse in enzymatic detergent and brush

Cleaning

- Rinsing with tap water
- Drying with lint free towel

Inspection for cleaning

- Not clean
- Clean

Packaging / Barcode for tracing if available

- Arrange in sterilizer loading basket and run the steam sterilization cycle

Not clean

- Unload the sterilizer and leave the packages to cool
- Store in closed cabinet or clean shelves
- Transport to clinics using clean trolly
**Dirty area**

**Receiving, cleaning and decontamination:**

Reusable contaminated instruments should be received, sorted, cleaned and rinsed in one section of the processing area.

**Transportation:**

- Always wear PPE
- Use a rigid, durable, leak proof container that has a tight fitting lid which is easy to clean and disinfect to transport dirty instruments. Ensure it is clearly labeled as containing contaminated instruments.
- Use trolley if it is too far
- Make sure to clean & disinfect both container and trolley regularly.
- Central sterile services department should always be located far from clinics.

**Cleaning and decontamination:**

Cleaning involves the removal of debris (e.g. organic and inorganic matter). This is achieved either by scrubbing with detergent and water, or by an automated process (e.g. ultrasonic cleaner or washer disinfector). All joint or hinged instruments should be opened during the cleaning process. If the device comprises of more than one part, it should be disassembled. After cleaning, instruments should be rinsed with water to remove detergent residue and visually inspected to ensure all debris have been removed.
3 types of cleaning:

1. Manual wash

2. Ultrasonic cleaner

3. Washer disinfector

1. Manual Wash: (2 sinks required)

- Always wear protective personal attire.

- Rinse the instruments in cold or Luke warm water

- The instruments are then completely immersed in a mixture of warm water and non-foaming detergent, inside a dedicated deep sink (sink 1).

- Using the special long handled, nylon bristles brush, clean the instruments by brushing in one direction, with the instruments totally immersed in water inside the sink to prevent splatter and splash.

- Rinse the instruments in a separate sink under hot water (sink 2).

- Irrigate hollow instruments with spray gun.

- Visually inspect instrument for residual debris or blood after cleaning and repeat the process if necessary.

- Dry the instrument using disposable lint free towels.
2. Ultrasonic cleaner

- Rinse off blood or other debris on the instruments under running water, if necessary.

- Fill the ultrasonic bath with water and enzymatic detergent (Follow manufacturer's instructions).

- Leave the machine to work for a little while for degassing, before placing instruments.

- Place the instruments in suspended tray. Don’t overlap the instruments.

- Use the beakers for placing burs and root canal instruments.

- Only operate with the lid on to avoid aerosol contamination.

- Rinse thoroughly to remove detergent residues by immersing in clean water.

- Remove the instruments only after the full clean cycle.

- Ultrasonic bath solution becomes contaminated with debris so empty the bath when the solution becomes visibly and heavily contaminated.

- Empty, clean and dry the bath at the end of the day.

- Ultrasonic machine is used for cleaning of Stainless steel or plastic instruments only (not rubber or wood).

**STOP**

Don’t put the handpieces in ultrasonic cleaner.
Validation test (Aluminum foil test) : Weekly

- Turn the machine to 5 min.
- Aluminum strips of 5 cm\(^2\) are suspended in the bath for 15 seconds.
- Inspect the foil. The edges of the foil should be serrated with pitting and/or perforation of centre of the strip. Record the test results in the machine log book
- Get the bath regularly serviced and tested
3. **Thermal washer disinfectors**: Two types available –

1. **Bench Top**

2. **Free stand (Single door & double door)**:
   Free stand single door washer disinfectors are more appropriate for single sterilization rooms, double door washer disinfectors between clean and dirty decontamination rooms.

**Instructions for use**:

- Clean the washer from outside with a clean damp cloth or wet wipes.
- Always check spray nozzles for any block and the arms for free movement before operating.
- Use liquid or powder detergent depending on the type of washer.
- Using rinse aid in the washer helps prevent formation of water droplets.
Instructions for placing instruments in the basket:

- Hand pieces and instruments with lumen like suction tips or syringes should be separated from other instruments. Special cleaning instructions should be followed.

- All Hinged instruments should be opened / unlocked. The instruments should be arranged in the basket.

- Small and fine instruments like Burs and Root canal instruments should be placed only in the basket with small holes (meshed tray).

- Load the instruments in washer disinfector in manner whereby exposure is maximized; any hinges, joints, or hidden features made accessible to cleaning (disassemble, loosen or unlock as necessary).

- Heavy instruments should be placed in the lower shelf while the lighter instruments go into the top shelf. Don’t overload the washer. (Follow instrument lists if available)

Instructions for placing the basket in the Washer:

- Place the baskets properly into their racks so as to ensure that the instrument basket is not tipped or the contents shifted once the process starts.

- It is also important to ensure that the basket or its contents don’t obstruct the movement of the arms of the washer.
• Any instruments used on a known infectious patient should be placed in the lowest rack of the washer.

Steps of cleaning / disinfection process in washer disinfector :

1. Pre rinse: Initial rinsing of the load with cold water. A major part of the soils are flushed away. The temperature should not exceed 35°C.

2. Main wash : Rinse instruments with water and detergent at 45°C - 55°C.

3. Final rinse : It helps in disinfection. Instruments are rinsed with water at 90 - 95°C for approximately 1 - 10 minutes. Time and temperature will depend on the load.

4. Dry cycle : The instruments are then dried with hot air.

Washer Validation test

• Do weekly test by using Load Check

• Ensure the holder and the hands are clean and dry.

• Place one Load Check indicator in the holder ensuring it is centrally placed and not protruding from either side.

• Place a device (holder with indicator) into each tray or basket.

• After running a complete cycle, inspect the indicator for evidence of soil by placing the plastic film against a white background.

• If evidence of soil remains on the indicator, cleaning of the load should be considered inadequate and the engineering department should be called for maintenance.
Clean area:

In clean area, cleaned instruments should be inspected, assembled into sets or trays, and packaged for sterilization. Critical and semi-critical instruments should be processed in a manner that will maintain sterility during storage.

- Clean area should be isolated from dirty area.
- All surfaces (tables, cabinets, equipment, etc) in the department should be cleaned at the start of the day and in between each batch of instruments received with disinfectant solutions.
- All surfaces should be clean and dry before receiving the clean instruments.
- The instruments can be received into the clean area from a batch window (if present) after cleaning and disinfection in the dirty area.
- All the instruments collected, should then be inspected and arranged in the baskets or sterilization pouches for sterilization.

Sterilization technicians:

- Must work exclusively for this area
- Before dealing with clean instruments, hands must be washed (hand washing technique) and dried thoroughly. PPE must be worn.
- Handle sharp instruments with care.
- In the event of a sharp injury, stop work and perform first aid. Then inform the concerned department.
Inspecting Instruments:

- Inspect the instruments with a magnifying glass or direct eye under good lighting. (Pay more attention to serrations and joints)
- Be sure that the instruments are devoid of soil, blood or tissue.
- If there is any soil on the instruments return them to the dirty area for re-cleaning.
- Differentiate between blood and rust.
- Discard and replace instruments which are damaged or not working.
- Hinged instruments should be opened / unlocked.
- Lubricate hand pieces before packing. (Follow special instructions)
- Remove excess oil from hand pieces. Note that excess use of oil or unsuitable oil may affect the sterilization process.
- Leave instruments for a while to dry before packing or use a dryer if present.
- Ensure that the instruments are totally dry before packing.

Packaging:

Aim of packaging:

- Maintain the sterility of instruments.
- Withstand handling & storage
- To protect instruments from mishandling or damage during transportation and cross contamination.
Materials used during packing

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<th>Wrapping papers (different sizes)</th>
<th>Sterilization bags (different sizes)</th>
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<td>chemical indicator strips</td>
<td>Pouches reel</td>
</tr>
<tr>
<td>Sterilization tape</td>
<td>Printing applicator / Labeling pen</td>
</tr>
<tr>
<td>Protective sheet</td>
<td></td>
</tr>
</tbody>
</table>

Procedure of Packaging:

1. Wrapping:

2 layers of wrapping papers used.

Inner layer (Envelope fold) to maintain sterility & outer (square fold) acts as a dust barrier.

![Envelope fold diagram](image)
2. **Sealing**: Types of sealing machines available.

1. Sealing machine with cutter

2. Sealing machine without cutter

3. Sealing machine with labeling and tracing system:
SEAL CHECK TEST:

Sealing using the machine :

- Bag is moved between the heating elements on the conveyor.
- While sealing, ensure that the colored part of the sterilization bag comes directly into contact with the rollers.
- Always support the bag while sealing.
- Sealing high number of bags with high speed will cause a great drop in temperature & cause failure.
- Always watch the thermostat temperature.

Sealing using the sterilization tape :

- Sterilization bag – minimum 3 folds after turning the corner of the bag.
- Depth of the third fold does not exceed 3cms
- Use enough length of sterilization tape
- See through pouches preferred
- Tape around all the edges making sure it seals completely.
Note:

- While using 2 layers of wrapping paper, the inner paper should be smaller than the outer paper.
- Avoid overloading instruments in the pouches.
- Use protectors for sharp instruments if present.
- Allow sufficient space at the end for ease of opening the package.
- All packs should be labeled prior to sterilization by special printing applicator, with the date, cycle number and the sterilization technician name.

Instrument Tracking Technology:

Electronic instrument tracking have become more important than ever in helping dental healthcare workers (DHCW) practice highly effective infection control, manage accurate instrument and patient records. Such technology can not only save time and money over the long term; but also provide quality and accuracy of the facilities’ sterile processing functions and ultimately help provide the optimal patient outcomes.

Laser-marked instruments for individual tracking
Advantages Of Electronic Instrument Tracking:

- Ensure that the dental clinic has the right instruments at the right time in the right condition
- Achieve 100% tray accuracy with faster assembly times
- Rapidly identify affected cases and instruments for recalls
- Eliminate the chance of losing instruments
- Prevent accumulation of paper records and the need for one to be responsible for organizing, managing and storing these records.
- Facilitate staff training, reporting and improving productivity
- Create the foundation for Patient Safety in the dental practice

Arranging the sealed packages in the autoclave basket:

- Items made from different materials (stainless steel, carbon, etc.) must be placed in separate baskets.
- Do not overload the basket
- The instruments shouldn’t be left protruding from the basket.
- Packages should be able to lie flat in a single layer.
- Place packs or packages on edge to facilitate steam penetration of packaging materials and to allow the steam to contact all surfaces.
In a steam sterilizer, if paper packages are placed flat in a single layer, place them paper side down. Placing paper/poly packaging plastic side down may cause condensation of water inside the pouch resulting in a wet pack, which must then be considered contaminated.

Pouches should be positioned standing on edge, paper to plastic, to facilitate circulation of the steam around items.

Loading the baskets into the sterilizer (Autoclave):

- Do not overload the sterilizer chamber. This will cause the sterilizer to take much longer to heat to a temperature sufficient for sterilization resulting in inadequately sterilized load.
- Only packages that require the same sterilization time, temperature and drying time should be run in a load together.
- Mesh-bottom or perforated trays containing instruments should be placed flat on the sterilizer shelf.
- Empty containers or non perforated trays must be placed upside down to prevent accumulation of water.
- Heavy instrument sets (which generate large quantities of liquid condensate) should be placed on lower shelves. This may avoid wetting of other packs.
- If a sterilization container or cassette system is used, the manufacturer's recommendations for loading should be followed.
- Refer to the sterilizer manufacturer's written instructions for recommended load size and loading procedure.
Autoclave (Steam sterilization):

- Clean the outer surface of the autoclave with Acetic acid 6 % when still cold.
- Ensure that the device is connected to the electric supply, steam supply and compressed air.
- Put the graph paper in the specified slot (Free stand).
- Check the load to make sure it is properly distributed for maximum steam penetration.
- Chemical and biological indicators may be added to validate the effectiveness of the cycle.
- The door is then closed and sealed.
- Select a program as required.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Cycle selection</th>
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<tr>
<td>Bowie &amp; Dick (B&amp;D) test</td>
<td>Helix or B&amp;D Cycle</td>
</tr>
<tr>
<td>Wrapped solid instruments</td>
<td>134°C wrapped cycle</td>
</tr>
<tr>
<td>Hand pieces or Hollow instruments</td>
<td>134°C porous load cycle</td>
</tr>
<tr>
<td>Rubber instruments</td>
<td>121°C wrapped cycle</td>
</tr>
</tbody>
</table>

If the sterilizer has a safety-locking mechanism, this is automatically engaged as soon as the cycle begins. It will not release until the load has finished processing and cooled to a safe temperature.
Steam sterilization - Monitoring:

A complete monitoring program for steam sterilization includes physical, chemical and biological monitoring which lead to sterility assurance in dental health care facilities.

If the monitoring records indicate any malfunction, inform the supervisor or maintenance group.

1. Physical monitoring:

- Physical control monitors are used to verify steam, time, temperature and pressure recordings during the sterilization cycle (Save the printouts for further reference). They permit the earliest possible detection of major equipment malfunctions because they can be evaluated even while the cycle is in progress.

- Correct readings do not ensure sterilization, however, incorrect readings may be an early indication of a problem with the sterilization cycle.

2. Chemical test:

- Chemical indicators are employed to monitor one or more sterilization process parameters.

- This test should be carried out daily using the available methods, such as the chemical strips.

- Chemical indicators on packaging or autoclave tape are called process indicators to differentiate between processed or unprocessed load.
**Bowie & Dick type test pack (single use):**

**Basic principles:**

- Air removal test for daily use.
- For use in **Pre-vacuum steam sterilizer** working at 134°C for up to 3.5 minutes.
- The test is used to test the efficiency of the air removal devices on the sterilizer.

**Test frequency:**

The Bowie – Dick test must be carried out each day **in an empty sterilizer before the first processed load**. A warm up cycle should be run first to properly heat the sterilizer prior to the Bowie – Dick test.

The test should also be performed following sterilizer installation, relocation, malfunction, major repairs, and sterilization process failures.

**Test Cycle:**

Place the test pack horizontally, label side up, on the bottom shelf of the rack, over the drain in an empty, dynamic air removal steam sterilizer. Run the Bowie Dick test cycle.

**Interpretation of results:**

Remove the test pack from the sterilizer after completion of the cycle. Allow the test pack to cool; retrieve and examine the test sheet.

*Pass* – A satisfactory test result is indicated by a test sheet that shows uniform dark brown / black color development.
**Fail** – An unsatisfactory test result is indicated by a test sheet that shows non-uniform color development with a light colored area in the indicator ink pattern.

If failure is noted for the first test, retest the sterilizer. If the second test also shows failure, it should be reported immediately to the supervisor and the sterilizer should not be used.

**Helix steam penetration test:**

The device consists of a plastic tubular device with an indicator receptacle at the end and is supplied with indicator strips. According to the manufacturer’s instructions, the device must be replaced when advised.

**Procedure:**

a. Inspect the device, particularly the cap seal, for visible damage or signs of deterioration. If in doubt, replace the device.

b. Ensure that the device is dry and contains no visible wetness or moisture, and the device is not warm to touch. If in doubt, leave the device to cool with the cap removed for 15 minutes after a prior use.
c. Fold the indicator strips in half so that the yellow indicator faces inwards, then place it into the capsule of the device. The open end of the folded indicator should face the open end of the capsule.

d. Check that the indicator does not protrude from the capsule.

e. Close the device, ensuring that the cap is sealed.

f. Seal the device into a paper / plastic sterilization pouch and place it into the center of the sterilizer.

g. Process the device in an otherwise empty chamber using the Helix test cycle.

h. At the end of the cycle, remove the device from the sterilizer within 10 minutes.

i. Remove the indicator from the capsule of the device and check the indicator result:

   Yellow = Unprocessed

   Yellow/ Brown/ Green = Fail

   Blue / Purple = Pass

j. Record the indicator result in the sterilizer log book, along with the cycle details, and retain the indicator if required. Each indicator is provided with a self adhesive backing to facilitate attachment to sterilizer records.

k. If the result of the indicator is a PASS result, the air removal stage and steam penetration of the sterilizer is working properly and the sterilizer can be used.

l. Store the device with the cap removed to facilitate drying of the tubing.

m. The indicators must be stored in a cool and dark place before and after use.
3. Biological indicator

The only process indicator that directly monitors lethality of a given sterilization process as the biological indicator contains a heat resistant viable spores (Geobacillus stearothermophilus)

**Frequency of biological monitoring:**

- Routinely according to given instructions.
- Upon installation and after major repair.
- Should be used in every load containing implants.

**Two types of biological indicators are available:**

1. the conventional biological indicator that show results in 48hours

2. the new rapid readout biological indicator (RRBI) can show results in 3hours
Directions for use biological indicator steam pack:

1. Place the Steam Pack, with the label side up, in a full load, on the bottom shelf, near the door and over the drain.

2. After removing the RRBI Steam Pack from the sterilizer check to see that the chemical indicator on outside of the test pack has turned from yellow to dark brown.

3. Then open the pack for 5 minutes to dissipate heat prior to removing the RRBI. Next, allow the RRBI to cool outside the pack for an additional 10 minutes prior to crushing.

Incubation of Rapid Read Out Biological Indicator (RRBI):

Allow a 30 minute warm-up period for the Auto reader incubator before placing RRBI’s into the incubation wells. The C1 caution code will disappear when proper incubation temperature is reached.

Step 1. While wearing gloves and safety glasses, Close RRBI cap by pressing down.

Step 2. Crush the glass ampoule (containing growth media)

Step 3. Hold the RRBI by the cap and tap bottom of the vial on a tabletop until media wets spore strip at bottom of vial. Do not tap vial on unit.

Step 4. Open the cover and place the RRBI into an incubation/reader well.

Step 5. Close the cover and wait for either the red or green indicator light to signal the result.

Interpretation of Results:
A red light (+), will illuminate and an alarm will sound, as soon as a positive RRBI result is detected (Within 1h).

At the end of the specified incubation time (3 hours), if a negative RRBI result is detected, the green light (-) will illuminate indicating an acceptable sterilization process.
**Sterile storage area:**

**Unloading the Sterilizer:**

- The instruments should not be removed from the sterilizer until the full operating cycle is complete and the instruments and/or packaging is dry to prevent compromising packaging and re-contaminating the instruments.

- During the cooling process the items should not be handled or touched.

- All items that are removed from the sterilization process should remain on the sterilizer cart until adequately cooled.

- Personnel should be careful to avoid burns because the tray and the items within it will be very hot.

- The wrapped/packaged tray should be placed on a clean surface. A sterile, impervious drape, should be used to place the wrapped/packaged tray.

**Handling and inspection of items after sterilization:**

- When packages are removed from the sterilizer cart, they should be inspected visually for any tear or wetness.

- Torn or wet packages should be re-packaged and sterilized.
A Package is considered non-sterile when

1. they are incorrectly wrapped
2. they are damaged or opened
3. they are still wet after the sterilizing cycle or comes into contact with a wet surface
4. they have been placed or dropped on a dirty surface
5. they have no indication of having been through a sterilizing process
6. If an item is dropped on the floor and the integrity of its packaging is compromised, it should be returned to the decontamination area for reprocessing.

Storage of sterilized items:

- All wrapped sterile instruments and equipment must be stored in a way that ensures sterility is maintained. Instruments should be stored in a secure clean and dry environment in cleanable cupboards above floor level, away from direct sunlight and water.

- Care should be taken to ensure the packaging is not bent, crushed or punctured, or otherwise compromised.

- Seldom-used supplies should be stored in closed or covered cabinets. Instruments that are not used frequently should be packed into transparent packages and dated with the sterilization date.
• There are several factors that influence shelf life: package design, packaging material, storage and handling. The system of stock rotation should be based on the date of sterilization (First In First Out).

• **Non sterile items**: Material like wrapping papers, sterilization pouches & rolls, chemical indicator tapes etc., used for packaging and in the process of sterilization should also be stored in clean, dry and closed cabinets.

**Distribution of sterilized items:**

• Appropriate care and handling of sterile packages will help to prevent contamination of the items inside.

• All items should be inspected for integrity before being dispensed.

• Trolley should be cleaned, disinfected and dried before they are used for transporting sterile supplies.

• A covered or enclosed trolley with a solid bottom shelf should be used to transport all clean or sterile items.

• Packages should be placed securely in a flat position and should not extend beyond the edge of the cart shelf or table surface while transporting.

• Damaged or expired packages must be sent for re-sterilization.
WASTE DISPOSAL AND MANAGEMENT

Waste disposal comprises the proper segregation, storage and eventual disposal of waste in a manner that does not pose a hazard to people and the environment.

Clinical waste:

Pathological, bio-hazardous, contaminated, infectious or medical waste, clinical waste with the potential to cause disease, includes:

- Discarded sharps
- Human tissue waste
- Visibly blood stained body fluids and visibly blood stained disposal material and equipment

Clinical waste should be segregated – placed in leak-proof bags or containers.

The waste bags should be strong enough, color coded, labeled with universal biohazard symbol. The bags should never be overfilled as this prevents closure and increases the risk of rupture in transit. The bags must be tied or sealed, then stored in a secure place for collection.

Sharps (e.g. needles, syringes with needles, scalpel blades, clinical glass) must be separated and collected in a YELLOW puncture-resistant, leak-proof container that is specifically designed for their management and labeled with the universal biohazard symbol.

Heavy duty gloves and appropriate personal protective equipment must be worn when handling clinical waste bags and containers.

General waste:

General waste includes items as: Paper, plastic, food and other items not contaminated with blood.
Appendices

Appendix 1:

Quality Assurance:

Each step in the sterile supply cycle is crucial to a good and safe use of a sterile instrument or other item during a clinical intervention. A mistake or failure in any of the steps may cause recontamination and makes the whole procedure useless. It may result in huge costs and can cause serious suffering and even endanger the life of patients and staff. That is why each step shall be subjected to vigorous monitoring. This is realized through a quality assurance system, in which each step in the cycle is analyzed, documented and monitored. It thus is a tool, to deliver a product that meets predefined quality standards which implies the provision of sterile supplies that are safe to use for patients and staff.
### Appendix 2:

# Chemicals Used in sterilization room

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Composition</th>
<th>Dilution</th>
<th>Used in</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presept</td>
<td>Intermediate to high level disinfectant tablets (2.5gm tablets)</td>
<td>Chlorine compound, Sodium Dichloro-isocyanurate</td>
<td>4 tablets in 5 Liters water</td>
<td>For surfaces, floors</td>
<td>Wipe down surfaces with disinfectant saturated disposable cloth.</td>
</tr>
<tr>
<td>Actichlor</td>
<td>Intermediate to high level disinfectant tablets (2.5gm tablets)</td>
<td>Sodium Dichloro-isocyanurate(NaDCC), Troclosene sodium.</td>
<td>For a concentration of 1000ppm, dissolve 1 tablet in 1.5 Liter of water. 7 tablets in 1 Liter of water for body fluid spills (10,000 ppm)</td>
<td>For surfaces, floors</td>
<td>10 minutes.</td>
</tr>
<tr>
<td>Optim 33TB wipes</td>
<td>Intermediate to high level disinfectant wipes</td>
<td>0.5 % Hydrogen Peroxide</td>
<td>Ready to use</td>
<td>For Surfaces</td>
<td>According to use, as specified by the manufacturer</td>
</tr>
<tr>
<td>Hibiscrub</td>
<td>Intermediate to high level disinfectant solution</td>
<td>4% Chlorhexidine</td>
<td>Ready to use</td>
<td>Hygienic handwashing and scrubbing</td>
<td>According to use and specified standards</td>
</tr>
<tr>
<td>Hibisol</td>
<td>Intermediate to high level disinfectant solution</td>
<td>0.5% Chlorhexidine gluconate &amp; 70% Ethanol.</td>
<td>Ready to use</td>
<td>Hygienic handwashing</td>
<td>According to use and specified standards</td>
</tr>
<tr>
<td>Dentasept enzymatique</td>
<td>Disinfectant and cleaning liquid</td>
<td>Quartenary ammonium propionate, Polyhexane, Enzymatic complex</td>
<td>20ml for 2 liters of water</td>
<td>For manual and ultrasonic baths</td>
<td>As specified by the manufacturer</td>
</tr>
<tr>
<td>Washer disinfectant detergent</td>
<td>Disinfectant and cleaning liquid</td>
<td>Enzymes, sequestering agents, corrosion inhibitors and surfactants.</td>
<td>Ready to use</td>
<td>For Washer-Disinfector</td>
<td>As specified by the manufacturer</td>
</tr>
<tr>
<td>Rinse aid (Zero spot)</td>
<td>For prevention of water droplet formation</td>
<td>Blend of surfactants and pH regulator</td>
<td>Ready to use</td>
<td>For Washer-Disinfector</td>
<td>As specified by the manufacturer</td>
</tr>
<tr>
<td>Acetic acid 6%</td>
<td>Disinfectant and cleaning liquid</td>
<td>6% Acetic acid</td>
<td>Ready to use</td>
<td>For cleaning salts from water distiller &amp; Autoclave chamber</td>
<td>As specified by the manufacturer</td>
</tr>
<tr>
<td>----------------</td>
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</tr>
<tr>
<td><strong>MD520</strong></td>
<td>Impression Disinfectant Solution</td>
<td>1 g glutardialdehyde 50%, 0.5 g alkyl-benzyl-dimethyl-ammoniumchloride 50%.</td>
<td>Ready to use</td>
<td>Impression disinfection</td>
<td>5 minutes</td>
</tr>
</tbody>
</table>
Appendix 3:
Sterilization of Handpieces:

1. **Cleaning:**
   a. To minimize the risk of infection always wear protective gloves when handling contaminated hand pieces.
   b. Remove the hand piece from the coupling.
   c. Remove the bur
   d. Cleaning hand piece can be performed in 4 ways:
      i. Manually (external surface)
      ii. Internally (spray gun)
      iii. Combined clean & lubricant machine (internally)
      iv. Washer disinfector (both internal & external)
e. Don’t place or immerse in disinfectant.

f. Don’t clean the handpiece in ultrasonic cleaner.

2. **Drying:**

   a. Drying handpiece use lent free towel.

3. **Lubricating:**

   Always follow the manufacturer recommendations and use the lubricating oil recommended by the manufacturer (water based lubricating oil).

   a. Lubricating hand piece can be performed in 2 ways:

      i. Manually with lubricant can.

      ii. Using combined clean and lubricant machine
i. **Manually with lubricant can:**

- Shake spray can vigorously several times
- Press hand piece firmly onto spray can
- Cover hand piece head with gauze
- Hold the oil can vertically when spraying.
- Depress the spray head for approximately 1 sec.
- Remove excess oil by cleaning the outer surface of the hand piece.
- Use separate canisters of oil for pre- and post-sterilization lubrication.

4. **Packing:**

   a. Packing the hand piece with sterilization bags

   b. Loading the hand piece in the sterilization machine in the correct position
5. **Sterilization:**

   a. Sterilize the hand piece in a type B pre-vacuum steam sterilizer up to max (134°C)

   b. Before using the handpiece again fit it into the coupling, allow it to run for several seconds (30sec) and wipe excess oil produced.

   c. The coupling should not be sterilized.
Appendix 4:

Decontamination of Ultrasonic scaler handle and tips

- Tips should be detached from scalar handle before cleaning.

- Tips should be cleaned in an ultrasonic cleaner or washer disinfector to remove all debris or if manually cleaned, soak the tips in an enzymatic detergent solution (follow manufacturer instructions for use) then clean with a soft nylon brush.

- The Handle should also be cleaned in washer disinfector or cleaned manually from outside and around the tip screw using soft nylon brush and detergent recommended by the manufacturer.

- The key also should be cleaned and autoclaved.

- After cleaning, then dry, package and autoclave.
Appendix 5:

Decontamination of Burs and Endodontic files

- Dental burs and endodontic files, as packaged by the manufacturer, are not sterile and should therefore be sterilized before first use.

- Burs and endodontic files should be cleaned in an ultrasonic cleaner or washer disinfecter to remove all debris.

- Perforated container used to hold burs or files while cleaning in either the ultrasonic bath or the washer disinfecter.

- Also need to clean and sterilize the entire burs or endodontic instrument holder and its contents if they are touched or left exposed during the procedure.

- After cleaning, then dry, package and autoclave.
References

guide to steam sterilization and sterility assurance in health care facilities.

- Health Technical Memorandum 01-05 : Decontamination in primary care
dental practices 2013.

- http://www.wfhss.com

- http://www.cdc.gov/oralhealth/infectioncontrol


- http://www.infectioncontrolservices.co.uk/

- Guidelines Infection Prevention and Control - Royal College of Dental
  Surgeons (Ontario)


- Infection Control Manual – Case Western Reserve University School of Dental
  Medicine


- Sterilization Packaging Systems, Preparation and Loading for Steam
  Sterilization-  by Rose Seavey, RN, MBA, CNOR, ACSP.

- Association for European Safety & Infection Control in Dentistry- Steam
  sterilization (February 2010)
• Sterilization of Re-usable Medical Devices (Dental Services) Policy – NHS (April 2010)

• Unloading, Storage, Distribution, Transportation and Aseptic presentation of Sterile items - by Rose Seavey, RN, MBA, CNOR, ACSP
