INFECTION CONTROL MANUAL

Vishnu Dental College
Vishnupur, Bhimavaram,
W. G. Dist. 534 202 AP, India.
www.vdc.edu.in; vishnudentalcollege@yahoo.com
Ph: +91 8816 250893; Fax: +91 8816 250894

CONTENTS

DEFINITIONS

Alcohol-based hand rub: An alcohol-containing preparation designed for reducing the number of viable microorganisms on the hands.

Antimicrobial soap: A detergent containing an antiseptic agent.

Antiseptic: A germicide used on skin or living tissue for the purpose of inhibiting or destroying microorganisms (e.g., alcohols, chlorhexidine, chlorine, hexachlorophene, iodine, chloroxylenol [PCMX], quaternary ammonium compounds, and triclosan).

Bioburden: Microbiological load (i.e., number of viable organisms in or on an object or surface) or organic material on a surface or object before decontamination, or sterilization. Also known as bioload or microbial load.

Colony-forming unit (CFU): The minimum number (i.e., tens of millions) of separable cells on the surface of or in semisolid agar medium that give rise to a visible colony of progeny. CFUs can consist of pairs, chains, clusters, or as single cellsand are often expressed as colony-forming units per milliliter (CFUs/mL).

Decontamination: Use of physical or chemical means to remove, inactivate, or destroy pathogens on a surface or item so that they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

Disinfectant: A chemical agent used on inanimate objects(e.g., floors, walls, or sinks) to destroy virtually all recognized pathogenic microorganisms, but not necessarily all microbial forms (e.g., bacterial endospores). The U.S. Environmental Protection Agency (EPA) groups disinfectants on the basis of whether the product label claims limited, general, or hospital disinfectant capabilities.

Disinfection: Destruction of pathogenic and other kinds of microorganisms by physical or chemical means. Disinfection is less lethal than sterilization, because it destroys the majority of recognized pathogenic microorganisms, but not necessarily all microbial forms (e.g., bacterial spores). Disinfection does not ensure the degree of safety associated with sterilization processes.

Droplet nuclei: Particles <5 μm in diameter formed by dehydration of airborne droplets containing microorganisms that can remain suspended in the air for long periods of time.

Droplets: Small particles of moisture (e.g., spatter) generated when a person coughs or sneezes, or when water is converted to a fine mist by an aerator or shower head. These particles, intermediate in size between drops and droplet nuclei, can contain infectious microorganisms and tend to quickly settle from the air such that risk of disease transmission is usually limited to persons in close proximity to the droplet source.

Endotoxin: The lipopolysaccharide of gram-negative bacteria, the toxic character of which resides in the lipid protein. Endotoxins can produce pyrogenic reactions in persons exposed to their bacterial component.

Germicide: An agent that destroys microorganisms, especially pathogenic organisms. Terms with the same suffix (e.g., virucide, fungicide, bactericide, tuberculocide, and sporicide)

indicate agents that destroy the specific microorganism identified by the prefix. Germicides can be used to inactivate microorganisms in or on living tissue (i.e., antiseptics) or on environmental surfaces (i.e., disinfectants).

Hand hygiene: General term that applies to handwashing, antiseptic handwash, antiseptic hand rub, or surgical hand antisepsis.

Health-care–associated infection: Any infection associated with a medical or surgical intervention. The term health-care– associated replaces nosocomial, which is limited to adverse infectious outcomes occurring in hospitals.

High-level disinfection: Disinfection process that inactivates vegetative bacteria, mycobacteria, fungi, and viruses but not necessarily high numbers of bacterial spores. FDA further defines a high-level disinfectant as a sterilant used for a shorter contact time.

Hospital disinfectant: Germicide registered by EPA for use on inanimate objects in hospitals, clinics, dental offices, and other medical-related facilities. Efficacy is demonstrated against Salmonella choleraesuis, Staphylococcus aureus, and Pseudomonas aeruginosa.

Iatrogenic: Induced inadvertently by HCP, medical (including dental) treatment, or diagnostic procedures. Used particularly in reference to an infectious disease or other complication of treatment.

Immunization: Process by which a person becomes immune, or protected against a disease. Vaccination is defined as the process of administering a killed or weakened infectious organism or a toxoid; however, vaccination does not always result in immunity.

Implantable device: Device placed into a surgically or naturally formed cavity of the human body and intended to remain there for >30 days.

Intermediate-level disinfection: Disinfection process that inactivates vegetative bacteria, the majority of fungi, mycobacteria, and the majority of viruses (particularly enveloped viruses) but not bacterial spores.

Intermediate-level disinfectant: Liquid chemical germicide registered with EPA as a hospital disinfectant and with a label claim of potency as tuberculocidal (Appendix A).

Latex: Milky white fluid extracted from the rubber tree Hevea brasiliensis that contains the rubber material cis-1,4 polyisoprene.

Low-level disinfection: Process that inactivates the majority of vegetative bacteria, certain fungi, and certain viruses, but cannot be relied on to inactivate resistant microorganisms (e.g., mycobacteria or bacterial spores).

Low-level disinfectant: Liquid chemical germicide registered with EPA as a hospital disinfectant. OSHA requires low-level hospital disinfectants also to have a label claim for potency against HIV and HBV if used for disinfecting clinical contact surfaces.

Occupational exposure: Reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or OPIM that can result from the performance of an employee's duties.

Parenteral: Means of piercing mucous membranes or skin barrier through such events as needle sticks, human bites, cuts, and abrasions.

Prion: Protein particle lacking nucleic acid that has been implicated as the cause of certain neurodegenerative diseases (e.g., scrapie, CJD, and bovine spongiform encephalopathy [BSE]).

Sterile: Free from all living microorganisms; usually described as a probability (e.g., the probability of a surviving microorganism being 1 in 1 million).

Sterilization: Use of a physical or chemical procedure to destroy all microorganisms including substantial numbers of resistant bacteria spores.

Ultrasonic cleaner: Device that removes debris by a process called cavitation, in which waves of acoustic energy are propagated in aqueous solutions to disrupt the bonds that hold particulate matter to surfaces.

INTRODUCTION

Infection Control in a health care facility is the prevention of the spread of microorganisms from patient to patient, patient to staff member and staff member to patient. This manual provides dental health care workers information regarding concerning methods and means of disinfection and sterilization of dental environments, instruments and materials. Various safeguards and controlled professional standards are required to protect the health and welfare of persons receiving treatment. Effective prevention and control of healthcare associated infections has to be embedded into everyday practice and applied consistently by everyone. All measures are aimed at reducing the risks of transfer of infection, elimination of bacterial, viral and fungal reservoirs and establishing discipline for asepsis. All dental staff working in a clinical environment is reminded of the main risks of infection i.e. through sharps injuries, aerosol spray from high speed hand pieces, triple syringes, ultrasonic scalers and the routes of infection through eyes, mouth, and nose and skin abrasions. 'Infection Control needs to include all aspects of dental practice from attention to personal hygiene-hand washing, masks, protective clothing to the cleaning and sterilization of instruments and maintenance of the equipment.

These recommendations are applicable to all levels and fields of dental practice and all persons involved in providing dental care directly or indirectly including dentists, dental assistants, dental nurses, dental technicians and students. This document will be updated regularly based on new risks and possible control measures for the risks.

OBJECTIVES OF INFECTION CONTROL

When a patient consents to dental treatment they expect the standard of infection control to be impeccable and to put them above any conceivable risk

Following proper infection control protocol can:

- Prevent post procedure infections including surgical-site infections;
- Provide high-quality, safe services;
- Prevent infections in staff;
- Protect the community from infections that may originate in health care facilities;
- Prevent or reduce the transmission of antimicrobial-resistant microorganisms; and
- Lower the costs of health care services, since prevention is more economical than treatment.

GOALS OF INFECTION CONTROL

- Reduce the number of pathogens
- Break the cycle of infection
- Treat every patient/instrument as capable of transmitting disease
- Protect patients and personnel from infection & consequences.

STANDARD OPERATING PROCEDURES FOR INFECTION CONTROL

I. Hand hygiene
II. Personnel protective equipment
III. Environmental infection control
IV. Patient screening
V. Immunization and health status
VI. Sharp injury protection program
VII. Instrument sterilization and disinfection
VIII. Radiation safety
IX. Asepsis related to Dental laboratory procedures
X. Disposal of contaminated wastes
XI. Education and training programs

HAND WASHING AND HAND CARE

Hand washing is the single most important procedure for preventing health care associated infections. Transient microorganisms present on the hands of health care workers can be spread and have the potential to cause harm to clients.

Hands should be washed frequently. They should always be washed:

- At the start and finish of your shift and breaks;
- Before and after any direct patient care or contact eg: dressings, toileting, showering;
- Between different procedures on the same patient;
- Before and after delivering an injection;
- After contact with blood or body substances;
- After handling soiled equipment, clothing or bed linen;
- After the removal of gloves;
- Before contact with any immunosuppressed clients;
- Before and after activities such as going to the toilet, eating, handling food or coughing or sneezing;
- Before and after working with computer mouse and keyboard;

There are two types of hand washes and are referred to as:

• Clinical hand wash

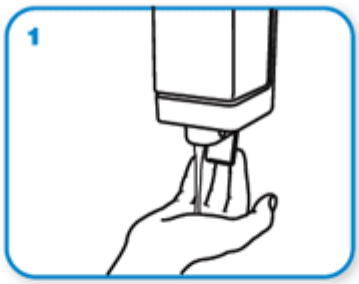
• Surgical hand wash

CLINICAL HAND WASH

A clinical hand wash is used before clinical procedures on patients, when a patient is being managed in isolation, or in outbreak situations. An anti-microbial soap, containing an antiseptic agent, is used. Remove rings, watches and wrist jewellery; It is recommended that the fingernails be kept clean and short and nail polish is discouraged.

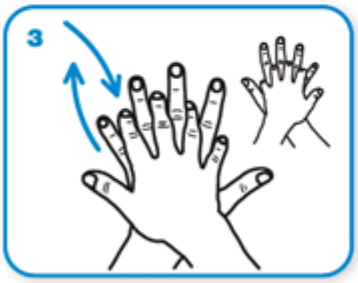
Standard operating procedure for clinical hand wash is as follows:

Wet hands with water

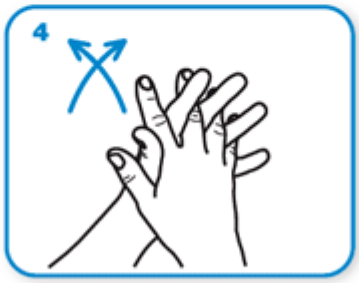


apply enough soap to cover all hand surfaces.

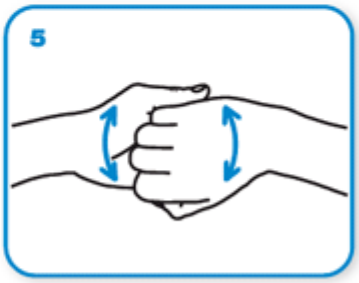
Rub hands palm to palm



right palm over left dorsum with interlaced fingers and vice versa

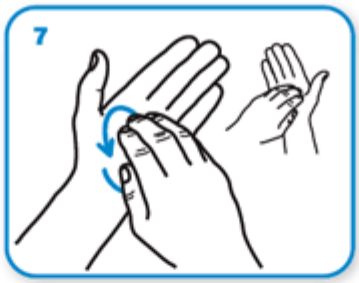


palm to palm with fingers interlaced

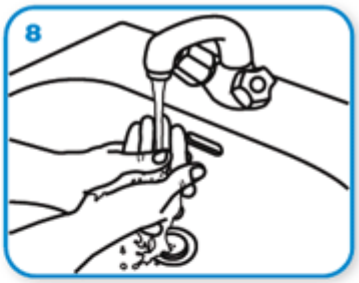


backs of fingers to opposing palms with fingers interlocked

rotational rubbing of left thumb clasped in right palm and vice versa

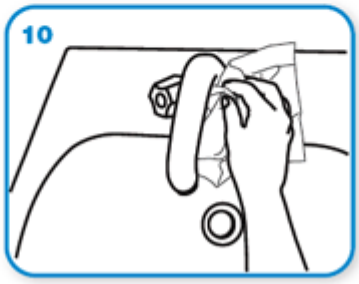


rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa.



Rinse hands with water

dry thoroughly with a single use towel



use towel to turn off faucet

...and your hands are safe.

SURGICAL HAND WASH

A surgical hand wash is required before any invasive or surgical procedure requiring the use of sterile gloves. An antimicrobial skin cleanser, usually containing chlorhexidine or detergent-based povidone-iodine, is used. Remove rings, watches and wrist jewellery;

Standard operating procedure for surgical hand wash is as follows:

The handrubbing technique for surgical hand preparation must be performed on perfectly clean, dry hands.
On arrival in the operating theatre and after having donned theatre clothing (cap/hat/bonnet and mask), hands must be washed with soap and water.
After the operation when removing gloves, hands must be rubbed with an alcohol-based formulation or washed with soap and water if any residual talc or biological fluids are present (e.g. the glove is punctured).

Surgical procedures may be carried out one after the other without the need for handwashing, provided that the handrubbing technique for surgical hand preparation is followed (Images 1 to 17).

1

Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your left hand, using the elbow of your other arm to operate the dispenser

2

Dip the fingertips of your right hand in the handrub to decontaminate under the nails (5 seconds)

3

Images 3–7: Smear the handrub on the right forearm up to the elbow. Ensure that the whole skin area is covered by using circular movements around the forearm until the handrub has fully evaporated (10-15 seconds)

4

See legend for Image 3

5

See legend for Image 3

6

See legend for Image 3

7

See legend for Image 3

8

Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your right hand, using the elbow of your other arm to operate the dispenser

9

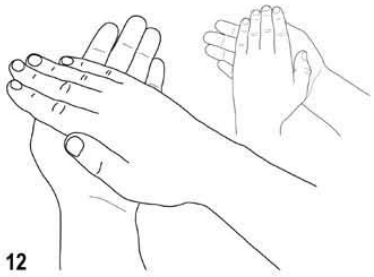
Dip the fingertips of your left hand in the handrub to decontaminate under the nails (5 seconds)

10

Smear the handrub on the left forearm up to the elbow. Ensure that the whole skin area is covered by using circular movements around the forearm until the handrub has fully evaporated (10-15 seconds)

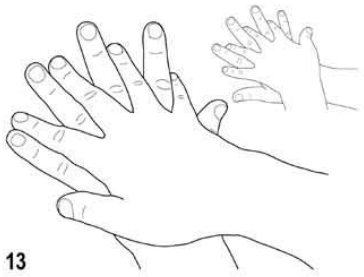
11

Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your left hand, using the elbow of your other arm to operate the distributor. Rub both hands at the same time up to the wrists, and ensure that all the steps re-presented in Images 12-17 are followed (20-30 seconds)



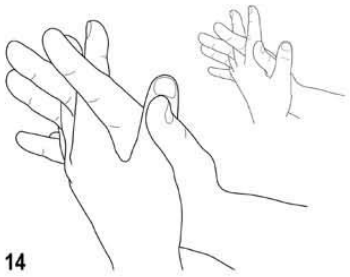
12

Cover the whole surface of the hands up to the wrist with alcohol-based han-drub, rubbing palm against palm with a rotating movement



13

Rub the back of the left hand, including the wrist, moving the right palm back and forth, and vice-versa

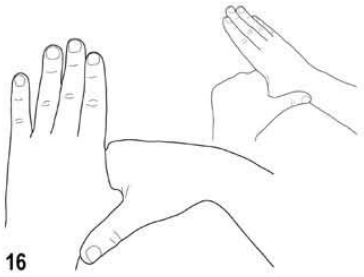


14

Rub palm against palm back and forth with fingers interlinked

15

Rub the back of the fingers by holding them in the palm of the other hand with a sideways back and forth movement



16

Rub the thumb of the left hand by rota-ting it in the clasped palm of the right hand and vice versa

17

When the hands are dry, sterile surgical clothing and gloves can be donned

Repeat the above-illustrated sequence (average duration, 60 sec) according to the number of times corresponding to the total duration recommended by the manufacturer for surgical hand preparation with an alcohol-based handrub.

Standard operating procedure for alcohol hand rubs:

Total duration: 20-30sec

1. Inspect hands first. If visible dirt is present wash hands with soap and water first.
2. If hands are visibly clean, proceed to using alcohol hand rub.
3. Ensure that the hand is dry prior to using the hand rub.
4. Take enough quantity of hand rub in palm of one hand to cover all surfaces of both hands
5. Spread the liquid over all hands and rub palm to palm.
6. Perform the same steps as for hand washing with soap and water until hands are dry.

BARRIER TECHNIQUES (PERSONAL PROTECTIVE EQUIPMENT)

What is the purpose of personal protective equipment (PPE)?

Personal protective equipment (PPE) is specialized clothing or equipment worn for protection against a hazard. PPE is designed to protect the skin and the mucous membranes of the eyes, nose, and mouth of dental health-care personnel from exposure to blood or other potentially infectious material. A visible spray is created during the use of rotary dental and surgical instruments (e.g., handpieces, ultrasonic scalers) and air-water syringes. This spray primarily consists of a large-particle spatter of water, saliva, blood, microorganisms, and other debris. Spatter travels only a short distance and settles out quickly, landing either on the floor, nearby equipment and operatory surfaces, dental health-care personnel, or the patient. The spray may also contain some aerosol (i.e., particles of respirable size: 10 microns). Aerosols take considerable energy to generate and are not typically visible to the naked eye. Aerosols can remain airborne for extended periods and can be inhaled. However, they should not be confused with the large-particle spatter that makes up the bulk of the spray from handpieces and ultrasonic scalers. Appropriate work practices such as the use of dental dams and high-velocity air evacuation should minimize droplets, spatter, and aerosols.

OSHA mandates that dental health care workers wear gloves, surgical masks, protective eyewear, and protective clothing in specified circumstances to reduce the risk of exposures to blood borne pathogens. The primary PPE used in dental offices includes gloves, masks, protective eyewear, face shields and protective apparel. The selection of appropriate PPE requires judgment based on the procedure being performed and the possibility of exposure. In selecting PPE, the goal should be to prevent blood or other potentially infectious materials from reaching the individual's clothes or skin, eyes, mouth or other mucous membranes. PPE should be changed when it becomes visibly soiled and removed immediately, or as soon as feasible, if it is penetrated by blood or other potentially infectious fluids. All PPE should be removed before leaving the work area.

The order in which the PPE is to be worn is as follows:
Surgical gown/Apron →Head cap →Mask →Protective eyewear →Gloves

The removal of PPE is in the reverse order of wearing it:
Remove gloves→ Remove Mask→ Remove Eye wear→ Remove head cap →Remove gown

1. **Protective clothing**

When should protective clothing be worn?

Various types of protective clothing (e.g., gowns, jackets) are worn to prevent contamination of street clothing and to protect the skin of personnel from exposure to blood and body fluids. When the gown is worn as personal protective equipment (i.e., when spatter and spray of blood, saliva, or other potentially infectious material is anticipated), the sleeves should be long enough to protect the forearms. Aprons, either reusable or disposable, must be worn in the dental clinic. They should be changed when visibly soiled or penetrated by fluids and they should not be worn outside the work area.

2. **Mouth masks**

When should a surgical mask be worn?

Dental health-care personnel should wear a surgical mask that covers both their nose and mouth during procedures and patient-care activities that are likely to generate splashes or sprays of blood or body fluids. A surgical mask protects the patient against microorganisms generated by the wearer and also protects dental health care personnel from large-particle droplet spatter that may contain blood borne pathogens or other infectious microorganisms. When a surgical mask is used, it should be changed between patients or during patient treatment if it becomes wet or soiled.

The following are standard operating procedures to be followed in relation to masks.
They must:

- Be fitted and worn according to the manufacturer's instructions;
- Cover both the nose and mouth;
- Be removed as soon as practicable after becoming moist or visibly soiled and it is recommended, where possible, that the mask be changed after 20 minutes in an aerosol environment;
- Be removed by touching the strings and loops only; and
- Be removed and discarded after every patient.

They must not:

- Be touched by the hands while being worn; or

- Be worn loosely around the neck while the dental care provider or dental staff member walks around the premises, but be removed and discarded as soon as practicable after use.

3. **Protective eye wear**

When should protective eye wear be worn?

Dental health care personnel should wear protective eyewear with solid side shields or a face shield during procedures and patient-care activities likely to generate splashes or sprays of blood or body fluids. Protective eyewear protects the mucous membranes of the eyes from contact with microorganisms. Protective eyewear for patients also can protect their eyes from spatter or debris generated during dental procedures. Reusable protective eyewear should be cleaned with soap and water, and when visibly soiled, disinfected between patients.

4. **Gloves**

When should Dental health care personnel wear gloves?

Dental health care personnel wear gloves to prevent contamination of their hands when touching mucous membranes, blood, saliva, or other potentially infectious materials and to reduce the likelihood that microorganisms on their hands will be transmitted to patients during dental patient-care procedures.

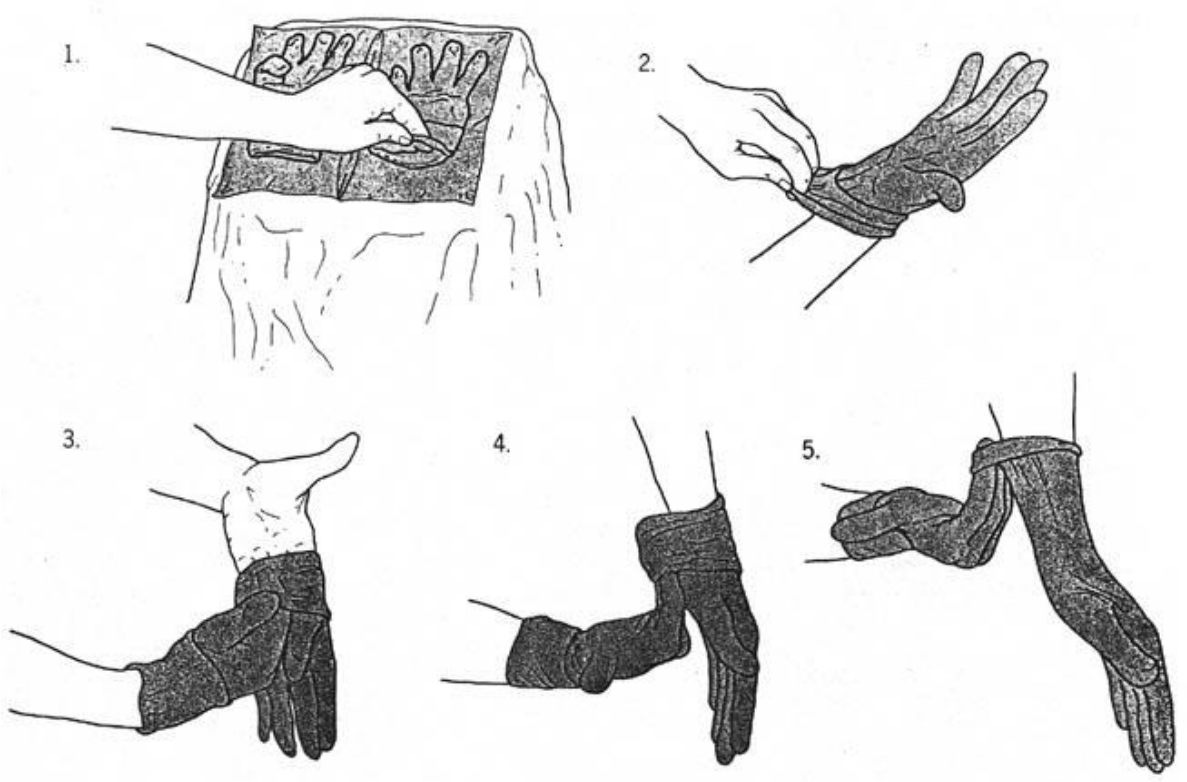
- Must be worn when skin contacts with body fluids, mucous membranes or contaminated items and surfaces is anticipated.
- Sterile gloves must be worn
- Gloves must be removed as soon as clinical treatment is complete and hands washed/decontaminated immediately to avoid the transfer of micro-organisms to other patients or environments
- Latex or vinyl gloves should be used for patient examinations and procedures.

Types of gloves

The type of glove used should be based upon the type of procedure to be performed (e.g., surgical vs. nonsurgical, housekeeping procedures). Medical-grade nonsterile examination gloves and sterile surgical gloves are medical devices regulated by the U.S. Food and Drug Administration (FDA). General-purpose utility gloves are not regulated by the FDA because they are not promoted for medical use. Sterile surgical gloves must meet standards for sterility assurance established by the FDA and are less likely than nonsterile examination gloves to harbor pathogens that may contaminate an operative wound.

Glove Type	Indications	Comments	Common Glove Materials
Patient examination gloves	Examinations and other nonsurgical procedures involving contact with mucous membranes; laboratory procedures	Medical device regulated by the FDA. Nonsterile and sterile, single-use disposable. Use for one patient and discard appropriately.	Natural rubber latex (NRL) Nitrile Polyvinyl chloride (vinyl) and other synthetics Polyethylene (plastic)
Surgeon's gloves	Surgical procedures	Medical device regulated by the FDA. Sterile and single-use disposable. Use for one patient and discard appropriately.	Natural rubber latex (NRL) Nitrile Combinations of latex and/or synthetics
Non medical gloves	Housekeeping procedures (e.g., cleaning and disinfection) Handling contaminated sharps or chemicals Not for use during patient care	Not a medical device regulated by the FDA. General purpose utility gloves that are puncture or chemical resistant. Sanitize after use.	NRL and nitrile or chloroprene blends Neoprene Nitrile Butyl Rubber

Standard operating procedure for gloving:



1. Do a sterile scrub for your hands and forearms using a scrub brush before putting on the gloves.

2. Place the sterile gloves on a clean dry surface so that the cuffed end of the gloves are facing towards you and open the glove package .

3. Grab the glove by the folded back cuff (that will be to the inside once it is on your hand).

4. Slip your other hand into the glove while keeping your fingers & the glove pointed downward (this keeps the finger holes open so it's easier for your hand to fit inside properly & firmly).

5. Pick up the second glove with your gloved hand. You can do this by sliding your fingertips under the cuff of the second glove that will be on the outside of the glove once it's on your hand.

6. Slide your ungloved hand into the glove, Wiggle your fingers into the correct holes until the gloves fit comfortably.

Standard operating procedure for degloving:

1. With the right hand, grasp the glove in the left hand at the wrist area taking care not to touch bare skin or gown with the glove. Remove the left glove by pulling it off in a way that it turns inside out.

2. Hold the removed glove in the right gloved hand and deglove the right hand ensuring that the first glove is rolled into a ball and is present inside the right glove when degloving is complete.
3. Discard the gloves into the appropriate colour coded waste bag.
4. Inspect the skin of the hands for contamination by blood and body fluids
5. Wash hands with soap and water.

Does wearing gloves replace the need for hand washing?

Wearing gloves does not replace the need for hand washing. Personnel should wash their hands immediately before donning gloves. Gloves may have small, unapparent defects or may be torn during use, and hands can become contaminated during removal of gloves. In addition, bacteria can multiply rapidly in moist environments underneath gloves; thus, personnel should dry their hands thoroughly before donning gloves and wash immediately after removing the gloves. If the integrity of a glove is compromised (e.g., if the glove is punctured), the glove should be changed as soon as possible.

Are gloves affected by dental materials?

Gloves may be affected by different dental materials. Exposure to glutaraldehyde, hydrogen peroxide, and alcohol preparations may weaken latex, vinyl, nitrile, and other synthetic glove materials. Other chemicals associated with dental materials that may weaken gloves include acrylic monomer, chloroform, orange solvent, eugenol, cavity varnish, acid etch, and dimethacrylates. Because of the diverse selection of dental materials on the market, glove users should consult glove manufacturer about the compatibility of glove material with various chemicals.

ENVIRONMENTAL INFECTION CONTROL

Clean and contaminated zones

- The boundaries of the operating field need to be clearly defined during dental treatment and the spread of droplets and aerosols contained within that field.
- Within the dental surgery, clean and contaminated zones must be clearly demarcated.
- Every person must understand the zones, the requirements for each zone and adhere to the outlined protocols.
- The operating field and areas where contaminated instruments are placed are regarded as contaminated zones whereas clean areas include those surfaces and drawers where clean or sterilized instruments are stored and which never come in contact with contaminated instruments or equipment.
- Dental care providers and dental staff should not bring personal effects, changes of clothing or bags into the clinical areas where cross-contamination is likely to occur.
- All surfaces and items within the operating field must be deemed contaminated by the treatment in progress.
- The surfaces must be cleaned and other items removed, cleaned and sterilized before the next patient is treated.

CHAIRSIDE DISINFECTION

Standard operating procedures for chair side disinfection:

The total duration of chair side disinfection should not exceed 3-4 minutes

1. Chair should be disinfected from top to bottom.
2. Use examination gloves for disinfecting the chair along with disinfectant soaked cotton or gauze.
3. Start with wiping the chair lights and its controls, including switches and handles.(approx 30 seconds)
4. Use a different piece to wipe the chair controls (approx 1 minute) including the chair movement buttons, instrument console and spittoon/tumbler switch using a different piece.
5. Wipe the suction tubing and other closely related areas(approx 30 seconds)
6. Flush the water lines, if used, for a period of 1 minute after every patient.
7. Suctions need to be evacuated by sucking out at least 3-4 glasses of water..
8. Discard gloves and use alcohol hand rub before operating.

SURFACE BARRIERS

Surface barriers are a practical and an easy way to contain cross-contamination. Barriers can be sterile or non-sterile depending on whether they are used for a surgical or a non-surgical routine dental care.

Items to be covered routinely in a dental operatory

Items	Recommended covering
Dental Unit Light handles	Plastic/Foil
Dental Unit electrical or mechanical controls	Plastic/Foil
Dental Chair Head Rest	Plastic/Foil
Dental Chair Arm Rests	Plastic/Foil
Dental Unit controls including the Bracket Table	Plastic/Foil
Highspeed Handpiece couplings and hose (extended 6 inches below the coupling covering the hoses)	Plastic/Foil
Slow speed motor, coupling and hose (extended 6 inches below the coupling covering the hoses)	Plastic/Foil
Air/water syringe and hose (extended 6 inches below coupling covering the hose)	Plastic/Foil
Saliva ejector handpiece and hose (extended 6 inches below coupling covering the hose)	Plastic/Foil
X-ray unit handles and cone	Plastic/Foil
X-ray Unit controls	Plastic/Foil
Bite Block of the Panoramic X-ray Unit	Plastic/Foil
Intra Oral Digital Sensors	Plastic/Foil
RVG equipments	Plastic/Foil
Apex locators	Plastic/Foil
Endosonic Ultrasonic Units	Plastic/Foil
NITI Torque control hand pieces	Plastic/Foil

Waterlines and water quality

- Most dental unit waterlines contain biofilm, which acts as a reservoir of microbial contamination.
- All waterlines and air lines must be fitted with non-return (anti-retraction) valves to help prevent retrograde contamination of the lines.
- Routine maintenance of these valves is necessary to ensure their effectiveness.
- An independent water supply can help to reduce the accumulation of biofilm.
- Biofilm levels in dental equipment can be minimized by using a range of measures, including
    - Chemical dosing (e.g., hydrogen peroxide, silver ions and peroxygen compounds),
    - Flushing lines (e.g., triple syringe and hand pieces) after each patient use, and
    - Flushing waterlines at the start of the day to reduce overnight or weekend biofilm accumulation.
- This is particularly important after periods of non-use (such as vacations and long weekends).
- Waterlines must be cleaned and disinfected in accordance with the manufacturer's instructions.
- Air and waterlines from any device connected to the dental water system that enters the patient's mouth (e.g., hand pieces, ultrasonic scalers, and air/water syringes) must be flushed for a minimum of two minutes at the start of the day and for 30 seconds between patients.

Water quality

- Water for tooth irrigation during cavity preparation and for ultrasonic scaling should be of no less than potable standard (< 500 CFU/mL).
- It may be wise to use water in which the number of colony forming units (CFU) per mL is less than 200 when treating immunocompromised patients.
- CFU levels can be tested using commercially available test strips.
- Sterile irrigants such as sterile water or sterile saline must be used for surgical procedures.

Environmental surface cleaning

The floor mopping has to be performed after chair cleaning. Cleaning the floor as the last of cleaning session enables complete cleaning of the operatories. Manual mopping needs to be done as per the Standard Operating Procedure as follows;

1. Always ensure that any blood and body fluid spills have been cleaned before beginning to mop with a disinfectant. Cleaning of blood spills has to be done using a 0.1% dilution of sodium hypochlorite prior to using the regular disinfectant.
2. Make sure that gross dust, debris and waste has been removed before wet mopping a chair area.
3. Mopping must be performed using the wet mop provided to each department.The disinfectant must be loaded onto the hand spray bottle in correct dilution and sprayed on the floor surface liberally to ensure even distribution of the disinfectant on the floor surface.
4. After spraying the surface, ensure that the disinfectant remains in contact with the surface for a period of 5 minutes.
5. Use the mop to wipe the disinfectant off the floor in a unidirectional manner.
6. Do not pass the mop over a mopped surface in the reverse direction.
7. Sequence for mopping:

   a. Mop from "in-to-out". Do not go back into the mopped area.

   b. OT: Mop the area around the table first and then work radially outward. Mop area around the entrance the last.

   c. Equipment: always mop from top to bottom i.e., upper surfaces first. Do not go back to mopped area.

Fogging of the departments:

Environmental cleaning using fogging machines ensure the application of the disinfectant to inaccessible surfaces and reduce aerosol contamination of the dental operatory. Fogging is mandated every 2-3 weeks in all departments according to the Standard Operating Procedure;

Protocol for fogging:

Instructions: The fogging machine helps in delivering high level disinfectants to different areas of the dental office including air disinfection and housekeeping surfaces. The fogging

must be carried out once in every 2 weeks in every department. A quantity of 400ml of liquid to be dispersed every 1000 cu.ft area.

1. Ensure the machine and the air filter (white cap at the back)is clean.

2. Prepare the solution to be fogged in correct concentration as mentioned by the manufacturer.

3. Wet wipe all the electronic equipment first with the same solution.

4. Cover the electronic equipment with a water proof cover before fogging.

5. Keep the selector knob on the machine midway between high and low.

6. Start the machine and spray the ceiling and upper walls. Wear a mask.

7. Then place the machine on a stool (3-4 feet above the floor) and direct the spray towards the center of the room.

8. Observe the room from the outside and check whether a fog develops in the room.

9. Once the fog develops stop the machine, remove it from the room and keep the room closed until the fog settles completely or all the surfaces are dry.

Care of the fogger machine:

1. After each use, empty the tank completely, rinse with plain clean water, fill the tank with approx half to one litre of water and run the machine for a few minutes.

2. Wash the air filter with soap water at least once a week.

PATIENT SCREENING

Care from the Patient's Perspective: Anticipation of patient needs during treatment is essential to the delivery of adequate treatment in a safe environment. Students usually know at the time they schedule a patient what the treatment procedure will be during that visit. This provides an opportunity for the student to review all aspects of delivering that service to the patient in a competent and professional manner.

A. Preparing for Treatment of a Patient

a) Inspect the entire dental unit for dust, stains and other potentially contaminating debris.

b) While wearing gloves, clean any visibly stained areas with detergent from the soap dispenser, remove the detergent with towel soaked in tap water, and dry wet surfaces with a disposable paper towels.

c) Wipe the treatment focus area and adjacent surfaces with disinfectant including exposed surfaces of the air-water syringe, the saliva ejector and the high-speed evacuation system (HVS) hoses. Then beginning with the area first wiped, allow each surface to dry and then rewipe.

e) Before starting patient treatment, activate the water syringe and the hand piece water sprays for at least 20 seconds. When appropriate, cover all work surfaces with disposable barriers.

f) Place the disposable head rest cover and the barrier cover on the dental lamp handle.

NOTE: Do not break the seal on the sterile instrument system tray or the prepackaged disposable set-up until after your patient has arrived.

B. Receiving Your Patient

a) Greet your patient in the reception area. Be sure the patient is dressed comfortably

b) Seat the patient and make necessary chair adjustments for patient comfort.

c) Place patient's drape.

d) Open instrument tray and arrange instruments on appropriate work surface.

e) Review patient's record and place radiographs on viewer.

C. Patient Treatment

a) Provide the patient with a pair of safety glasses to be worn during the procedure.

b) Wash hands and wrists at the unit and don gloves. Once gloved, touch only the patient and barrier covered areas or areas that have been cleaned and disinfected.

c) Disposable treatment gloves must be worn whenever touching the mucous membranes, blood and/or saliva of the patient.

d) After touching the patient's mucosal surface or saliva the treatment gloves becomes contaminated.

e) Be continually conscious of restricting contamination to the treatment focus area.

f) Do not touch the case sheet or radiographs with contaminated gloves. If an entry has to be made in the record during treatment, remove treatment gloves or an appropriate barrier must be used on the pen and over the portion of the case sheet that may become contaminated.

g) A rubber dam should be used whenever possible in tooth preparation.

h) High-speed evacuation should be used at all possible times when using the high speed hand piece, water spray, or ultrasonic scaler or during a procedure that could cause spatter.

i) Dropped instruments are not to be picked-up or reused; if the instrument is critical to the treatment being provided obtain a sterilized replacement instrument.

j) Disposable item should be discarded immediately to avoid contamination of other items.

k) Contaminated patient-related items should be cleaned and disinfected prior to the removal from clinic areas.

D. After Your Patient Is Dismissed

a) Rinse all sterilizable instruments, removing visible debris, etc. Do not hand scrub instruments.

b) Decontaminate and clean the patient’s goggles.

c) Wipe stained areas of the treatment focus area with detergent from the unit dispenser and remove detergent with towel soaked in water.

d) Wipe-dry-wipe hand contact work areas and other treatment focus area surfaces with disinfectant towels.

e) Dispose waste in the trash receptacle near the dental unit. Never discard sharps, metals, or cartridges into general trash. Dispose these into the sharps container.

f) Place chair upright and bring it to its highest position, and align the dental lamp.

g) After completing the above steps, wash your hands before leaving the treatment area.

IMMUNIZATION OF PERSONNEL INVOLVED IN DENTAL CARE

Dental practitioners and clinical support staff are at risk of exposure to many common vaccine-preventable diseases (VPDs) through contact with patients and the general community. Immunizations substantially reduce the potential for acquisition of disease, thereby limiting further transmission to other dental staff and patients. All dental practitioners and clinical support staff are to be advised to have immunizations.

The expectations for all healthcare workers and thus for dental practitioners and clinical support staff is immunization to HBV; varicella (if seronegative); measles – mumps – rubella (if non-immune); pertussis (whooping cough); and annual immunisation for viral influenza.

All dental practitioners and clinical support staff should be vaccinated against HBV if they have no documented evidence of pre-existing immunity (from natural infection or prior vaccination) and ensure they are assessed for immunity post-vaccination.

Healthcare Personnel Vaccination Recommendations

	Primary dose	Booster dose
Hepatitis B	• Give 3-dose series • 1st dose now • Give IM	• 2nd dose – after 4 weeks • 3rd dose – 5 months after 2nd • Obtain anti-HBs serologic testing 1–2 months after dose #3.
Influenza	• Give 1 dose of influenza vaccine annually. • Give inactivated injectable influenza vaccine intramuscularly or live attenuated influenza vaccine (LAIV) intranasally.	
MMR	• Give 2 doses of MMR, 4 weeks apart.	-
Varicella	• For HCP who have no serologic proof of immunity, prior vaccination, or history of varicella disease, **(chickenpox)** give 2 doses of varicella vaccine, 4 weeks apart. Give SC.	-
Tetanus, diphtheria, Pertussis	• Two doses of tetanus diphtheria vaccine 4 to 8 weeks apart • Give IM.	• First booster – 6 to 12 months later • Give Td boosters every 10 years thereafter
Meningococcal	• Give 1 dose to microbiologists who are routinely exposed to isolates of N. meningitidis. • Give IM or SC.	-

CDC. Immunization of Health-Care Personnel: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR*, 2011; 60(RR-7).

SHARP INJURY PROTECTION PROGRAM

The dental practitioner and staff are continuously exposed to potential percutaneous injury by beveled tubular needles or sharp hand instruments that have been contaminated by blood or saliva. This danger cannot be eliminated, but adherence to the following recommendations will limit the occurrence of injury.

Most needlestick injuries occur during the following activities:

• Recapping, bending, or breaking needles;
• Inserting a needle into a test tube or specimen container and missing the target;
• Injury from a person carrying unprotected sharps;
• Sharps those are present in unexpected places, like linens;
• During complex surgical procedures;
• Handling or disposing of waste that contains used sharps, and;
• Patients moving suddenly during injections

Note: 38% of sharp injuries occur during use, 42% occur after use before disposal.

Work-practice controls for needles and other sharps include

1. Placing used disposable syringes and needles, scalpel blades, and other sharp items in appropriate puncture-resistant containers located as close as feasible to where the items were used .In addition, used needles should never be recapped or otherwise manipulated by using both hands, or any other technique that involves directing the point of a needle toward any part of the body .
2. A one-handed scoop technique, a mechanical device designed for holding the needle cap to facilitate one-handed recapping, or an engineered sharps injury protection device (e.g., needles with resheathing mechanisms) should be employed for recapping needles between uses and before disposal.

One-hand Recapping ("Scoop") Technique

Many accidental needl esticks occur when staff recaps needles. Recapping is a dangerous practice: If at all possible, dispose of needles immediately without recapping them. If it is necessary to recap a needle (for example, to avoid carrying an unprotected sharp when immediate disposal is not possible), do not bend or break the needle or remove the needle from the syringe by hand.

To safely recap needles use "the one-hand" technique:

Step 1: Place the cap on a flat surface, then remove your hand from the cap.

Step 2: With one hand, hold the syringe and use the needle to "scoop up" the cap.

Step 3: When the cap covers the needle completely, use the other hand to secure the cap on the needle hub. Be careful to handle the cap at the bottom only (near the hub).

Hands-free Technique for Passing Sharps

Health care personnel can accidentally stick each other when passing sharps during a procedure. Always pass sharps in such a way that the surgeon and assistant are never touching the item at the same time. This is known as the "hands-free" technique.

To use the hands-free technique:

• The assistant puts the sharp in a sterile kidney basin or other "safe zone" in the sterile field.

• The assistant tells the service provider that the sharp is in the safe zone.

• The provider picks up the sharp item, uses it, and returns it to the safe zone.

3. DHCP (Dental Health Care Professionals) should never bend or break needles before disposal because this practice requires unnecessary manipulation. Before attempting to remove needles from non disposable aspirating syringes, DHCP should recap them to prevent injuries. For procedures involving multiple injections with a single needle, the practitioner should recap the needle between injections by using a one-handed technique or use a device with a needle-resheathing mechanism. Passing a syringe with an unsheathed needle should be avoided because of the potential for injury

Disposal of Single Use Sharp-edge Devices

All sharp-edge devices contaminated during patient treatment must be discarded into the sharps container so that patients, dental assistants and housekeeping staff are protected

from inadvertent or negligent percutaneous injury. Restorative matrix bands, stainless steel crowns, pre-formed bands, copper bands, full-crown matrices, precast posts, burs, orthodontic wires and other similar devices that are contaminated by blood and/or saliva when they are tried in the mouth should never be returned directly to the dispensing box. Broken instruments should be returned to the dispensary for replacement. The contaminated item must be at least intermediate-level disinfected and returned to the dispensary for sterilization. Transfer of any of these items for try-in or use on another patient without proper cleaning and disinfection is potentially hazardous to the health of the second patient.

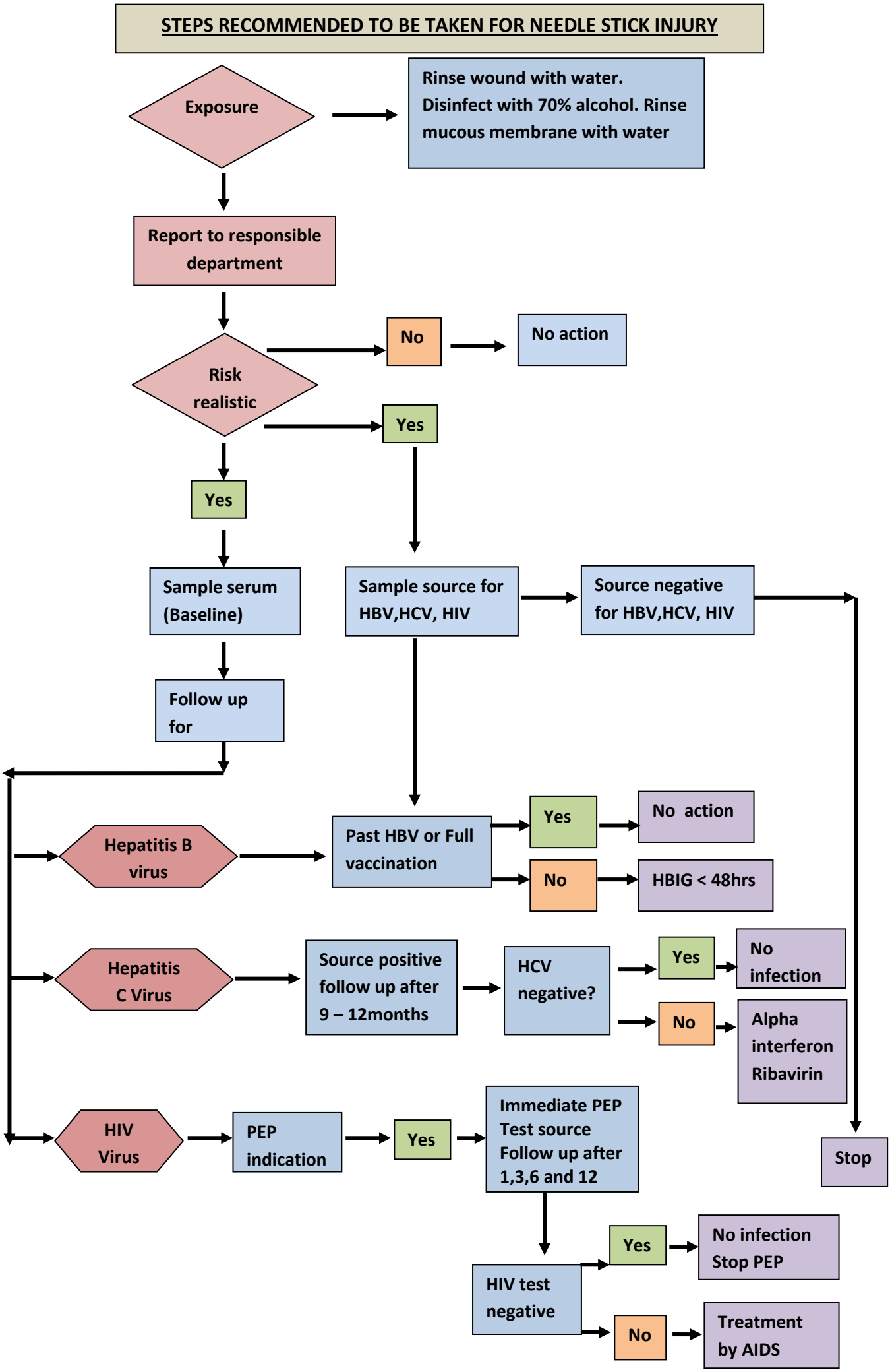
Maintenance of the Sharps Container:

The following recommendations should be followed when the sharps containers are used:

a) Never place water or any other liquid into the container. Micro-organisms cannot grow in the absence of water, or other moisture.

b) Never place cotton rolls, gauze sponges, paper products, or any non-sharp items into the sharps container.

c) Be certain that the metal needle adapter that is part of the anesthetic syringe is not inadvertently removed and discarded with the needle.


STEPS RECOMMENDED TO BE TAKEN FOR NEEDLE STICK INJURY
Exposure
Rinse wound with water. Disinfect with 70% alcohol. Rinse mucous membrane with water
Report to responsible department
Risk realistic
No
No action
Yes
Yes
Sample serum (Baseline)
Sample source for HBV,HCV, HIV
Source negative for HBV,HCV, HIV
Follow up for
Hepatitis B virus
Past HBV or Full vaccination
Yes
No action
No
HBIG < 48hrs
Hepatitis C Virus
Source positive follow up after 9 – 12months
HCV negative?
Yes
No infection
No
Alpha interferon Ribavirin
HIV Virus
PEP indication
Yes
Immediate PEP Test source Follow up after 1,3,6 and 12
Stop
Yes
No infection Stop PEP
HIV test negative
No
Treatment by AIDS

CLEANING, DISINFECTION AND STERILIZATION PROTOCOL FOR REUSABLE DENTAL INSTRUMENTS

Instrument reprocessing is the most important aspect of Dental Infection Control as it deals with items that have the greatest potential for disease transmission during dental care. Contaminated instruments can transmit infections to patients if used during clinical procedures and the adequate reprocessing of instruments between each patient use is essential to prevent the transmission of infection from one patient to another. The type of instrument and its intended use will determine the method of reprocessing and, as a general rule; if an instrument cannot be cleaned it cannot be safely reprocessed. Any dental instrument that enters the oral cavity is classified as critical or semi critical surfaces per Spaulding's Classification and must be sterilized.

Single use items: Dental items designated as single use by the manufacturer must not be reprocessed and reused on another patient, but must be discarded after use.

1. Categories of instruments: infection risk relative to instrument use

The Spaulding classification describes three instrument/risk categories (critical, semi-critical and non-critical), each of which has specific reprocessing requirements.

Category of instrument	Reprocessing requirements
CRITICAL: Where there is entry or penetration into Highest risk sterile tissue, cavity or bloodstream (i.e., invasive and surgical dental procedures). **Examples**: dental forceps and elevators, flap retractors and surgical burs, instruments used in the placement of implants, implantable items including mini implants, surgical dental handpieces	1. These instruments must be sterile at the time of use and must be either 'single use disposable' or capable of being steam sterilized. 2. They must be used immediately after sterilization or bagged prior to sterilization and kept stored in bags until used. Instruments stored in bags which are found to be damaged must be resterilized before use. 3. It may be appropriate to track these instruments.
SEMI-CRITICAL: Where there is contact with intact non-sterile mucosa or non-intact skin. **Examples**: mouth mirrors, restorative	1. Instruments must be sterilized where possible and when not possible a barrier must be placed (e.g., curing light tip). 2. Instruments should be 'single use disposable' or

instruments, endodontic instruments, dental tweezers and probes, metal impression trays, and other non-critical items when used occassionally in the mouth (e.g., Le Cron carver).	sterilized after use. 3. After processing, semi-critical instruments should be stored in a way to prevent contamination prior to use by being kept bagged in closed drawers or in dedicated closed containers. 4. Instruments used in semi-critical procedures need to be sterilized between patients but do not need to be tracked back to a steam sterilizer cycle and are not required to be sterile at the point of use. 5. In some rare instances thermal disinfection using heat and water is acceptable and professional judgement needs to be exercised (e.g., thermal disinfection of denture polishing buffs may be appropriate as they are unlikely to be contaminated with blood).
NON-CRITICAL: Where there is contact with intact skin. Lowest risk **Examples:** prosthetic gauges and measuring devices, face bows, protective eyewear, bib chains and dappen dishes, Willis gauges.	Cleaning alone with detergent and water is generally sufficient but in some cases thermal disinfection with heat and water is appropriate. After processing, these instruments should be stored in the same way as semi-critical instruments to prevent contamination prior to use.

Separation of waste and materials

Immediately after patient care, the saturated waste (items that are soaked with blood or body fluids) must be disposed off in a red/orange biohazard labeled plastic bag. Disposable sharps must be discarded into sharps containers. Other disposable items can be discarded into regular waste. Instruments should now be taken securely to the reprocessing area and handpieces (high speed and slow speed) removed from the tray to be processed per manufacturers' instructions. All other items that need to be reprocessed must be soaked in a holding solution or in the ultrasonic machine.

Soaking or keeping bioburden moist

- Instruments used on patients need to be placed in a holding container with a detergent or an ultrasonic solution to keep bioburden moist.
- Instruments should be soaked for at least 10 minutes before sonication.
- Do not soak instruments overnight as even the best detergents can be corrosive and cause pitting.

Manual Cleaning

Manual cleaning is necessary when:

• Mechanical cleaning facilities are not available;

• Delicate instruments have to be cleaned;

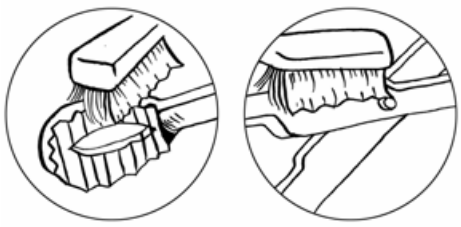
• Complex instruments need to be taken apart to be cleaned;

• Items with narrow lumens need to be cleaned (endoscopes).

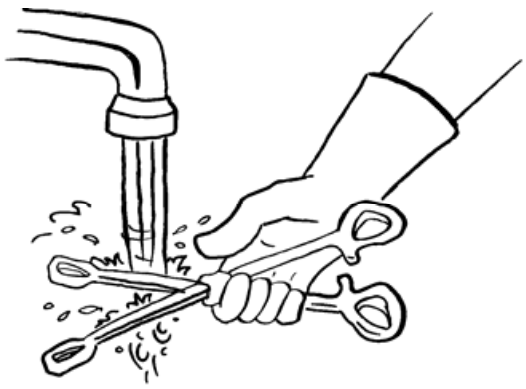
<u>Steps for cleaning</u>

1. Wear heavy-duty rubber gloves, a plastic apron, eye protection, and mask during cleaning.
2. Soak the instruments in normal tap water containing a detergent.

3. Scrub instruments and other items vigorously to completely remove all foreign material using a soft brush or old toothbrush, detergent, and water.
4. Hold items under the surface of the water while scrubbing and cleaning to avoid splashing. Disassemble instruments and other items with multiple parts, and be sure to brush in the grooves, teeth, and joints to items where organic material can collect and stick.



4. Rinse items thoroughly with clean water to remove all detergent. Any detergent left on the items can reduce the effectiveness of further processing.



6. Inspect items to confirm that they are clean.

7. Allow items to air dry or dry them with a clean towel if chemical disinfection is going to be used. This is to avoid diluting the chemical solutions used after cleaning. Items that will be high level disinfected by boiling or steaming do not need to be dried.

Remember when cleaning

• Do not use hand soap to clean instruments because fatty acids in the soap react with hard water to leave a soap scum on the instruments.

• Always wear utility gloves, a mask, and eye protection when cleaning instruments.

• Do not use abrasive materials that scratch or pit instruments.

Cleaning: Validated Ultrasonic Bath

An appropriate cleaner for use with ultrasonic baths should be used in accordance with manufacturer's instructions.

- Immerse briefly in cold water and detergent to remove visible debris
- Rinse in clean water
- Open joints or hinges and immerse fully in ultrasonic bath
- Set the timer (according to manufacturer's instructions and close the lid).
- Do not open lid during cycle.
- Rinse in clean water
- Visually check to ensure all debris is removed.
- Lubricate instruments if required

- Ultrasonic baths should also be maintained and tested in accordance with manufacturer's instructions.
- They should be subject to annual, quarterly, weekly and daily testing and the results retained in a dedicated log book.

Drying

Dry the instruments with compressed air, previously filtered or with dry cloths, lint or sterile.

Inspection

- Check the status of instruments and eliminate those with defects.
- If necessary, reassemble the instruments (Mount silicone stops)
- If the instruments are still dirty, clean them again.
- Sort out the instruments with deformities (bent instruments, twisted or untwisted) or damaged (broken, corroded) or other defects (such as the disappearance of the color code, marking) that may have consequences the strength, reliability and / or product performances.
- Examine the fragile and fine instruments using a magnifying glass to detect abnormalities or deformities.

Disinfection

- Disinfection can be carried out either by thermal or chemical processes. Thermal disinfection is preferred whenever possible. It is generally more reliable than chemical processes, leaves no residues, is more easily controlled, and is non-toxic. Heat sensitive items have to be reprocessed with a chemical disinfectant.
- Organic matter (serum, blood, pus or faecal material) interferes with the antimicrobial efficiency of either method. The larger the number of microbes present, the longer it takes to disinfect. Thus scrupulous cleaning before disinfection is of greatest importance.
- When sterilization is not available, High level disinfection is the only acceptable alternative for instruments and other items (semi-critical items) that will come into contact with the bloodstream or tissues under the skin.
- Boiling is high level disinfection, not sterilization
- For instruments that will touch mucous membranes but will not penetrate tissue or touch bone, sterilize it if it will not be damaged by heat. If it will be damaged, use high level Disinfection.

- For instruments and devices that will not be used in the mouth, and that will touch only intact skin, use intermediate- or low-level disinfection.
- For equipment surfaces that may contact intact skin, and for housekeeping surfaces (e.g., countertops, floors, walls), use intermediate- or low-level disinfection.

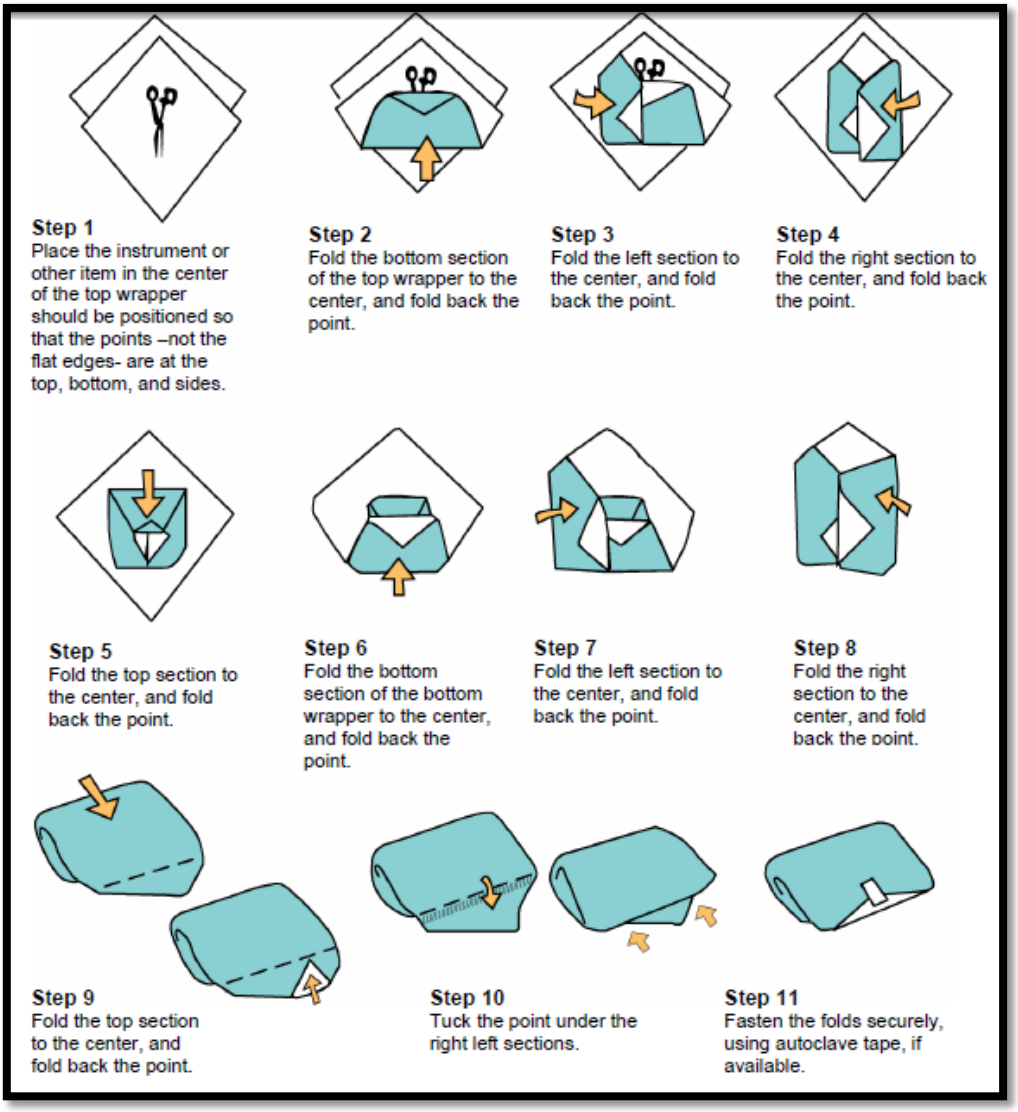
Packaging

Place the instruments in bags for sterilization as soon as possible after cleaning.

Wrapping instruments and other items for steam sterilization

- Wrapping instruments and other items before steam sterilization helps to decrease the likelihood that, after sterilization, they will be contaminated before use.
- To wrap instruments and other items for steam sterilization, use two layers of material such as paper, newsprint, or muslin or cotton fabric.
- Make points while wrapping the instruments and other items so that the packs can be easily opened without contaminating their contents.

Steps for wrapping instruments and other items



Sterilization

- Checking the success of the sterilization cycle (cycle parameters consistent with the data validation).
- Use a physicochemical indicator for each sterilization cycle.
- Every day, before the first sterilization, perform a vacuum test.
- Sterilize instruments and plastic holders following the instructions that appear on the packaging.
- Perform maintenance of the autoclave following the manufacturer's instructions.
- Avoid plastic devices that do not withstand a temperature of 135°C (275°F).
- Check the integrity of the sterilizing packaging

Parameters of Sterilization for Autoclaves

Parameters	Standard Cycle	Fast Cycle
Sterilization Time	15 - 20 minutes	3-5 minutes
Temperature	121º Celsius (250º F)	134º C (273ºF)
Pressure	15 pounds per square inch (psi)	30 pounds per square inch

Parameters of Sterilization for Dry-Heat Sterilizers

Parameter	Slow Cycle	Fast Cycle	Rapid Heat[2]
Temperature	160º C (320º F)	170º C (340º F)	190º C (375º F)
Sterilization Time	120 minutes	60 minutes	6-12 minutes

Storage

- Store the sterilized instruments in a dry and clean place.
- Protect from moisture, solar radiation, for example a closed cupboard.
- For stock management, apply the FIFO principle: First in First out

Monitoring Efficacy of Sterilizers and Maintaining records

- "**Weekly**" monitoring of the sterilizer's efficacy using Biological Equivalent monitoring devices or Sterilization Integrator (it measures whether the parameters of temperature and pressure over time) is necessary.
- The information should be recorded and maintained.
- The biological equivalents show color change when the sterilization paramenters have been met (the chemical strip changes from green to grayish black)
- "**Monthly"** sterilization monitoring for all sterilizers is necessary by either using a biological indicator such as a spore-strip containing B. stearothermophilus and B. subtilis.
- These spore-strips are used for testing the efficacy of the sterilizers and both spores are available on the same spore strip called dual strips and need to be mailed out to a monitoring service.
- When a positive growth occurs from a spore test or a biological equivalent test (failure of the sterilizer) the sterilizer must be taken out of service, tested again. The sterilizer should be reinstated only after repair and testing for efficacy.

- Each set of instruments being sterilized should have a chemical indicator (to show that the pack has been through a sterilization cycle).
- Recommended maintenance of the reprocessing equipment is essential for proper function.
- Autoclaves should use distilled water to avoid slaking and breakdown, and must be serviced per manufacturer's recommendations for proper functioning (check the sterilizer's manual).
- The chamber should be cleaned periodically using recommended methods.

GUIDELINES FOR STERILIZATION OF GENERAL INSTRUMENTS AND EQUIPMENT

Dental Cabinetry	• Wipe cupboard doors, drawer fronts and handles at the end of each session with a detergent/disinfectant wipe • Do not use alcohol based products on stainless steel.
Dental chair (including controls**)**	• Wipe and dry after each patient with detergent or disinfectant wipe. • Do not use alcohol based products on stainless steel.
Dental Instruments including hand pieces	• Clean (using a validated process) • Inspect • Autoclave and inspect again • Dry • Store in clean, dry covered conditions. **Note: Use within 21 days or re-process**
Hand pieces using manual cleaning or ultrasonic bath	**In addition to above:** • Leave bur in place during cleaning to prevent contamination of hand piece bearing • Do not immerse in water • Remove bur • Lubricate hand piece with pressurised oil as recommended by the manufacturer, until clean oil appears out of the chuck; • Clean off excess oil • Sterilise in autoclave

	• If post sterilization lubrication is required then either separate canisters must be used or the nozzles changed. • Run hand piece briefly with bur in place before use, to clear excess lubricant.
Hand pieces using a washer disinfector	• Clean outside of hand piece • Remove bur • Do not lubricate • Place in the displacement device in the washer disinfector • Lubricate before placing in the autoclave • If post sterilization lubrication is required then either separate canisters must be used or the nozzles changed. • Run hand piece briefly with bur in place before use, to clear excess lubricant
Impressions	Commonly used disinfecting solutions used for alginate impressions are 2% glutaraldehyde and 1% sodium hypochlorite. • Rinse the impression under running water on removal from the oral cavity. • Immerse them in disinfecting solution for 7-8 minutes (not more than 10 minutes) • Clean under running water to remove the disinfecting solution. • Pour the model.
Instrument Containers	• Clean with detergent, rinse and dry (Do not use sodium hypochlorite)
Operating lights	• Clean after each patient with a detergent/disinfectant wipe. • Do not use alcohol wipe on stainless steel parts.
Spittoon	• Flush between each patient and clean with detergent/disinfectant wipe • Do not use alcohol based products on stainless steel. • Remove debris from the trap at the end of the session and system clean according to manufacturers recommendations
Sinks	• Clean at the end of each session with cream cleaner and detergent wipe and leave dry. • Do not use alcohol base wipes or solution on stainless steel sinks
Suction Apparatus	• Aspirator tubing and drainage system should be cleaned at the end of each sessions according to manufacturer's instructions(Or dispose of if single use)
Water Bottles	• Empty residual water at the end of each session. • Rinse with sterile water.

	• Leave a little clean water in the bottom of the bottle to prevent air locks. • Before use empty remaining water • Rinse again and re-fill with sterile water.
Water lines	• Flush for at least 2 minutes at the beginning and end of each day and flush for 20-30 seconds between each patient.
Work surfaces	• Clean with detergent/disinfectant wipe between each patient and at the end of the session

Sterilization and Disinfection Recommendations for commonly used Examination instruments

Items	**Method recommended**
1. Diagnostic hand instruments	
a. Carbon steel	Dry heat
b. Stainless steel	Steam autoclave
2. Intraoral photography equipment	
a. Mirrors	Chemical disinfection (Glutaraldehyde 2%/ Sodiumhypochlorite1%)
b. Plastic retractors	Chemical disinfection (Glutaraldehyde 2%/ Sodiumhypochlorite1%)
c. Stainless steel retractors	Steam autoclave
3. Radiography equipment	
a. Plastic film holders	Steam autoclave
b. Collimating devices	Chemical agents (Glutaraldehyde 2%/ Sodiumhypochlorite1%)
4. Water air syringe tips	Steam autoclave

Sterilization and Disinfection Recommendations for commonly used items in Oral Medicine and Radiology

Items	**Method recommended**
Entire tube head	Chemical disinfection (Glutaraldehyde 2%/ Sodiumhypochlorite1%)
Arm rest, Chair controls, Head rest and Adjustment levers	Chemical disinfection and wrap with plastic film (Glutaraldehyde 2%/ Sodiumhypochlorite1%)
Exposure panel	Chemical disinfection and wrap with plastic film

	(Glutaraldehyde 2%/ Sodiumhypochlorite1%)
RVG sensor	Wrap with plastic film extending at least 5 inches outside the patient's mouth
Computer key board	Wrap with plastic film
Computer monitor	Screen Shade

Sterilization and Disinfection Recommendations for commonly used items in Restorative Dentistry, Prosthodontics, Endodontics and Pediatric Dentistry

Items	**Method recommended**
1. Amalgam carriers - Stainless steel	Steam autoclave
1. Burs	
a. Carbon steel	Dry heat sterilization
b. Steel	Dry heat sterilization
c. Tungsten carbide	Dry heat sterilization
2. Curing tips/ Replacements	Steam autoclave
3. Finger held endodontic instruments Broaches, Files, Reamers Pluggers, Spreaders	Dry heat sterilization Steam autoclave
4. GP Points	Chemical agents – 2.5% Naocl
5. Hand instruments	
a. Anodized aluminium	Steam autoclave
b. Carbon steel	Steam autoclave
c. Gold titanium nitride	Steam autoclave
d. Stainless steel	Steam autoclave
e. Plastic (heat resistant)	Steam autoclave
6. Hand pieces	Steam autoclave
7. Impression trays	
a. Aluminum metal	Steam autoclave
b. Chrome plated	Steam autoclave
c. Custom acrylic resin	Ethylene oxide

8. Mixing slabs	
a. Paper	Discard
b. Glass	Isopropyl alcohol
9. Needles – disposable	Discard
10. Nitrous oxide	
a. Nose piece	Steam autoclave
b. Hoses	Steam autoclave
11. Polishing wheels and disks	
a. Garnet and cuttle	Ethylene oxide
b. Rag	Steam autoclave
c. Rubber	Steam autoclave
12. Prosthesis – Removable	Chemical agents (Glutaraldehyde 2%/ Sodiumhypochlorite1%)
13. Rubber Dam equipment	
a. Rubber dam clamps	
a. Stainless steel	Steam autoclave
b. Carbon steel	Dry heat sterilization
c. Plastic	Steam autoclave
b. Metal frames	Steam autoclave
c. Plastic frames	Chemical (Glutaraldehyde 2%/ Sodiumhypochlorite1%)
d. Forceps	Steam autoclave
e. Punches	Steam autoclave
14. Spatulas	
a. Wooden handled	Chemical (Glutaraldehyde 2%/ Sodiumhypochlorite1%)
b. Sterilizable	Steam autoclave
15. Stones	
a. Diamond	Dry heat sterilization
b. Polishing	Steam autoclave

Some Methods of Decontamination In The Dental Laboratory

Items	Method recommended
Impressions & Stone Casts Surface	Disinfection or Immersion Disinfection (Glutaraldehyde 2%/ Sodium hypochlorite 1%)followed by rinsing in water
Removable Prostheses, Bite-Registration /Blocks	Surface Disinfection or Immersion Disinfection (Glutaraldehyde 2%/ Sodiumhypochlorite1%) followed by rinsing in water
Metal, Porcelain & Porcelain Fused to Metal crowns and bridges	Ultrasonic Cleaning and Sterilization
Burs/Finishing/Polishing Burs/Discs, Garnet, Cuttle etc.	Ultrasonic Cleaning and Sterilization
Hot-Water Bath/Tub for softening	Clean and disinfect (Glutaraldehyde 2%/ Sodiumhypochlorite1%) after each patient
Flame torch/Bunsen Burners etc.	Clean and disinfect (Glutaraldehyde 2%/ Sodiumhypochlorite1%) after cool down
Reusable metal impression trays	Cleaned, sonicated and sterilized
Plastic impression trays	Discarded after one use
Face-Bow	Sanitized and Disinfected (Glutaraldehyde 2%/ Sodiumhypochlorite1%)
Bite-Plane/Intra-oral Insert for Face Bow	Sanitized and Disinfected (Glutaraldehyde 2%/ Sodiumhypochlorite1%)
Articulators	Cleaned/Sanitized and Disinfected (Glutaraldehyde 2%/ Sodiumhypochlorite1%)
Rag-Wheels and Rotary Polishing Brushes	Ultrasonic cleaning and Sterilization at least once daily
Lathes, Trimmers, Work Surfaces	Sanitization and disinfection (Glutaraldehyde 2%/ Sodiumhypochlorite1%) Use of surface barriers as needed
Counter/Work Surfaces/Bench	Use of a Disposable Brown Paper (Heavy Gauge) as lab bench/ table/work-surface cover, disposed after use. Work Surface sanitized and disinfected at the end of each day

Sterilization and Disinfection Recommendations for Commonly used items in Periodontics and Preventive Dentistry

Items	Method recommended
1. Fluoride gel trays	
a. Heat resistant plastic	Steam autoclave
b. Non heat resistant plastic	Discard after use
2. Hand piece	
a. Slow speed sterilizable	Steam autoclave
3. Implant scalers	
a. Plastic scalers	Steam autoclave
b. Plastic tips	Steam autoclave
c. Stainless steel handles	Steam autoclave
4. Saliva evacuators, Ejectors	
a. Low melting plastic	Discard after use
b. High melting plastic	Steam autoclave
5. Stones	
a. Sharpening	Steam autoclave/ Dry Heat
6. Ultrasonic scaling tips	Steam autoclave

Sterilization and Disinfection Recommendations for commonly used items in Orthodontics and Surgical procedures

Items	Method recommended
1.Aspirator tips	Steam autoclave
2. Impression trays	
a. Aluminium metal	Steam autoclave
b. Chrome plated	Steam autoclave
3. Orthodontic pliers and cutters	
a. High quality stainless	Steam autoclave
4. Scalpel blades	Discard
5. Surgical instruments	
a. Stainless steel	Steam autoclave

Sterilization and Disinfection Recommendations for commonly used items in Oral Pathology

Items	Method recommended
Microscopes	Clean using a clean non threaded cloth Lens should be cleaned using lens cleaning solution (60ml of 99% ethyl alcohol in 40ml of diethyl ester)
Embedding unit	Clean using a clean non threaded cloth A non sticky solution can be used to clean the external surface of the unit
Centrifuge	Clean using a clean non threaded cloth Tubes and hollow sockets can be cleaned using sodium hypochlorite solution
Automatic processor	Clean using a clean non threaded cloth Use a non sticky solution to clean the processor
Blood testing apparatus	Clean using a detergent and dry Disinfect using sodium hypochlorite and sterilize in autoclave
Glass wear	Disinfect using sodium hypochlorite and sterilize in autoclave
Grossing room	Clean/ Mop with disinfectant at the beginning and end of each session Periodic fumigation is to be done using formalin fumes (5gm potassium permanganate in 5ml of conc. Formalin)
Decalcifier	Clean using a clean non threaded cloth Use a non sticky solution to clean and then dry
Microtome	Clean using a clean non threaded cloth after removing it part by part
Spectrophotometer	Clean using a clean non threaded cloth

Sterilization and Disinfection Recommendations for commonly used items in Oral and Maxillofacial surgery

Items	Method recommended
Extraction forceps	Steam Autoclave
Periosteal elevators	Steam Autoclave
Dental elevators	Steam Autoclave
Bone ronguers	Steam Autoclave
Mallet	Steam Autoclave
Bone files / curette	Steam Autoclave
Artery forceps	Steam Autoclave
Thump forceps	Steam Autoclave
Needle holder	Steam Autoclave
Other stainless steel surgical instruments	Steam Autoclave
Chisel/osteotome	Steam Autoclave
Surgical scissors	Steam Autoclave
Needles	Steam Autoclave
Carbon steel/steel surgical burs	Steam Autoclave
Surgical hand piece	Steam Autoclave
Mouth mirror	Steam Autoclave
Wire cutter	Steam Autoclave
Cheek/lip retractors	Steam Autoclave
BP handle	Steam Autoclave
Tweezers	Steam Autoclave

Endoscopic instruments	Formaline
Suction tubes	Formaline
Cautery cable	Formaline
Cautery points	Formaline
Laryngoscopes	Formaline
Endotracheal tubes	Disposable
Catheters	Disposable
Suturing Material	Steam Autoclave

Theatre Sterilization:

1. Daily OT floor is swept thoroughly then mopped with plain water and finally mopped with Dettol 10ml in 4 litres of water.
2. After washing, formalin fumigation should be done at least once a week; theatre should be closed for 24 hours.
3. Corridors should be fumigated with automist.
4. Complete washing of the theatre including walls, door, floors and equipment is done once a week with detergents & dettol.
5. Fans, light, watch, A/C vents inside the theatre are wiped once a week.
6. Tables, saline stands, revolving stools should be cleaned daily with antiseptic liquid concentrate (Chlorhexidine, Gluconate 75%) 10 ml should be diluted to 500ml of water or Benzalkonium chloride (10%).
7. Air conditioner filter must be cleaned once in a week.
8. Air conditioner should be sent for servicing & cleaning once in 3 months.
9. Block room, changing room, doctor's room must be cleaned daily three times with dettol.
10. Periodic culture is done once in a month from areas such as hand wash, autoclave, needles, knifes and gas sterilized items.
11. Swabs are taken from operating tables, surgeon’s hands, and sister’s hands; nail clippings to be sent for culture once in a month.
12. Slippers for toilet use and theatre are kept strictly separated.

13. Slippers are daily washed with detergent and dried.

14. Theatre boys to be instructed to change the dress including footwear before leaving the OT

15. Stretchers used in & out of the theatre must be separated.

16. Keep the doors of theatre always closed.

17. Garbage should be disposed after each OT session.

General use items	Disinfection
Bath water	Add savlon when necessary
Bed pans	Wash with hot water and dry Disinfect with phenol after use by infected patients Autoclave
Bowls	Wash with hot water and keep dry Autoclave
Crockery, Cutlery	Wash with hot water/detergent and keep dry
Floors	Vacuum clean; No use of broom
Furnitures	Damp dust with detergent/phenol/2% Lysol
Mattresses/Pillows	Use water impermeable cover Wash cover with detergent and keep dry Disinfect with phenol/2%lysol
Trolley tops	Wipe with warm water and detergent to remove dust and keep dry
Thermometers	Wash with warm water/detergent and keep dry
Endoscopes/ Arthroscopes/ Laparoscopes/ Fiberoptic Endoscopes	Immerse in2% Cidex solution Use latex gloves, eye protection plastic covering mask while handling Alternatively, use ethylene oxide sterilization
Endotracheal suction catheter	Should be disposable
Endotracheal tubes	Recycled after cleaning and autoclaving
Ambu Bags	Ideally heat disinfect Immerse in 2% glutaraldehyde and wash with sterile distilled water to reduce respiratory irritation

Oxygen delivery face mask	Wash and dry Use 70% isopropyl alcohol to remove mucus
Suction drainage bottles	Ideally autoclave
Ventilatory circuits, respiratory equipment in Neonatal/Pediatric unit	Heat disinfection for 800 F for 30 min Autoclave Ethylene oxide sterilization
Incubators	Clean thoroughly wiyh warm water / soap Use 70% isopropyl alcohol
Humidifiers	Empty daily refill with sterile water Disinfect when contaminated with 1% Na hypochlorite Autoclave
Urinary Catheter	Should be disposable

RADIATION SAFETY

The CDC includes saliva among its listing of potentially infectious body fluids. Following the concept of standard precautions, each patient will be managed as though potentially infectious and appropriate barriers will be utilized throughout the exposure and processing of radiographs.

Two different situations arise where radiographs are required:

(A) Intraoral Films

(B) Panoramic Radiographs.

Since the procedures require different preparation and execution, each will be described separately. Approved clinic attire, use of appropriate barriers, hand washing, and gloves are required at all times when radiologic examinations are performed.

A. **Intraoral Films**

a) The operatory must be prepared prior to seating the patient. This will be accomplished by the person taking the radiographs in the following manner.

1. Wash hands with antimicrobial hand soap as described previously.
2. Apply adhesive plastic barriers to the following:
    i. X-ray electronic exposure button,
    ii. Dental chair adjustment switches,
    iii. Designated areas on the portable lead protective shield between adjacent x-ray operatories, when applicable, and
    iv. Examination light handles.

(b) Place disposable head rest cover on headrest of dental chair.

(c) Place barrier on work surface (area on which x-ray film packets will be placed).

(d) The patient treatment sequence should be as follows:

1. Disinfect the chair with low to intermediate disinfectant
2. Seat patient and adjust the headrest with disposable headrest cover present.
3. Remove any patient ear rings, necklaces and other head and neck jewellery and eye glasses onto bench paper and intra oral removable prosthesis or appliances and have the patient place them into a denture cup.
4. Place the lead apron with the thyroid collar on the patient and adjust to ensure that all appropriate areas of the patient are shielded.(special care needed in case of children and pregnant women)

5. Put on a pair of disposable examination gloves, perform the necessary clinical examination and determine the number of radiographs required.
6. Intraoral radiograph or the CCD for digital radiograph should be covered with a disposable plastic pouch prior to gloving.
7. The areas of key board, the radiography tube head and control panel in digital radiography should be covered with a cling wrap.
8. After exposing a film packet, remove it from the patient's mouth and wipe off any saliva adhering to the barrier.
9. Remove contaminated barrier and drop film into a clean cup. During the removal of the film from the barrier bag use extreme care not to touch film or the cup with contaminated disposable examination gloves.
10. Remove the contaminated gloves and take film packets in the clean disposable cup to the processor.
11. Remove the lead apron and cervical collar from the patient.
12. Use cover gloves to disinfect any contaminated work surfaces resulting from the patient's treatment. Remove and discard all barriers. Return dental chair to lowest position. Return x-ray head and arm to rest position against the wall. Disinfect lead apron and thyroid collar.

B. Panoramic Radiographs

These radiographs are taken in rooms containing the specialized equipment required for panoramic exposures. The rooms are not equipped in the same way as the intra-oral x-ray rooms and the stepwise procedures vary slightly from those followed in taking intraoral films. Complete the procedures in the following sequence:

a. Wash hands and put on gloves.

b. Place the disposable cover over the chin rest and place the bite stick on the chin rest. Apply adhesive plastic barrier to exposure switch.

c. Position the patient and expose the film.

d. Remove and discard the bite stick and disposable (chin rest) cover.

Disinfect any contaminated areas. Remove gloves

e. Process the exposed film.

f. Dismiss the patient, re-glove and disinfect all areas that were contaminated during the procedure.

ASEPSIS RELATED TO DENTAL LABORATORY PROCEDURES

Standard precautions and safe work practices must be used in the dental laboratory. The most important phase is the thorough cleaning of material that has contacted oral tissue (e.g. impressions). Thorough rinsing with cold running water, followed by the application of a diluted detergent and further rinsing must continue until all visible contamination is removed. Manufacturers' instructions for disinfectants need to be carefully followed when cleaning and disinfecting prosthetic items and materials. Even after cleaning there may still be biological contamination present and at all stages of handling of the prosthetic item standard precautions must be applied.

Protocol prior to sending the materials to the laboratory

Dental prostheses or impressions brought into laboratory can be contaminated with bacteria, viruses and fungi. Bringing untreated items into the laboratory increases chances for cross infection. A proper system of asepsis must be established in dental laboratory to minimize such risks.

1. Dental prostheses, impressions, orthodontic appliances and other prosthodontic materials (e.g. , occlusal rims, temporary prostheses, bite registrations or extracted teeth) should be thoroughly cleaned (i.e. blood and bioburden removed), disinfected with an EPA registered hospital disinfectant with a tuberculoidal claim and thoroughly rinsed before being handled in the laboratory .
2. The impressions and casts and all materials and instruments used chair side must be disinfected at source to prevent contamination of the laboratory and its equipment.
3. All laboratory items are expected to be disinfected and rinsed before entering and prior leaving clinics and laboratories.
4. Any item that will be used intraoral is disinfected with sodium hypochlorite only as other surface disinfectants are not safe intraoral. Disinfect impressions by using 0.5 -1 % sodium hypochlorite spray and disinfect prosthesis by dipping in sodium hypochlorite for 10 minutes)
5. Equipment that can be sterilized including facebows and biteforks should be sterilized as soon as possible.
6. Articulators, Hanau torches and water baths are disinfected using surface disinfectant like sodium hypochlorite or isopropyl alcohol.

Protocol for working in the laboratory

Incorrect handling of contaminated impressions, prostheses, or appliances, therefore, offers an opportunity for transmission of microorganisms.

1) All operators in the laboratory must wear full PPE while working. This includes protective eyewear, mouth mask, head cap and an apron to prevent accidental spillage or inhalation of toxic substances.
2) A specific receiving and disinfecting area should be established in the laboratory to reduce contamination.
3) If during manipulation of material or appliance a previously undetected area of blood or bioburden becomes apparent, cleaning and disinfection procedures should be repeated.
4) If laboratory items (e.g. burs, polishing points, rag wheels, or laboratory knives) are used on contaminated appliances, prostheses, or other material, they should be heat- sterilized, disinfected between patients or discarded (i.e. disposable items should be used).
5) Items that do not normally contact the patient, prosthetic device or appliance but contaminated and cannot withstand heat sterilization (e.g., articulators, case pans, or lathes) should be cleaned and disinfected between patients using 70% ethyl alcohol (gauze soaked surgical spirit).
6) Pressure pots and water baths are particularly susceptible to contamination with microorganisms and should be cleaned and disinfected regularly.
7) In the majority of the instances, these items can be cleaned and disinfected with an intermediate level disinfectant (70 % alcohol).
8) Environmental surfaces should be barrier protected or cleaned and disinfected in the same manner as in the dental treatment area.
9) Unless waste generated in the dental laboratory (e.g., disposable trays or impression materials) fall under the category of regulated medical waste, it can be discarded with general waste.
10) Personnel should dispose of sharp items (e.g., burs, disposable blades, and orthodontic wires) in puncture- resistant containers.

MANAGEMENT OF EXPOSURE TO BLOOD AND BODY FLUIDS

Exposure Prevention Methods

*Avoiding occupational exposures to blood is the primary way to prevent transmission of HBV, HCV, and HIV, to HCP in health-care settings

Exposures occur through percutaneous injury (e.g., a needlestick or cut with a sharp object), as well as through contact between potentially infectious blood, tissues, or other body fluids and mucous membranes of the eye, nose, mouth, or nonintact skin (e.g., exposed skin that is abraded, or shows signs of dermatitis).

Percutaneous injuries among DHCP usually

- occur outside the patient's mouth, thereby posing less risk for recontact with patient tissues
- involve limited amounts of blood; and
- are caused by burs, syringe needles, laboratory knives, and other sharp instruments

Standard precautions include use of PPE (e.g., gloves, masks, protective eyewear or face shield, and gowns) intended to prevent skin and mucous membrane exposures. Other protective equipment (e.g., finger guards while suturing) might also reduce injuries during dental procedures .

Cleaning and Disinfection Strategies for Blood Spills

The majority of blood contamination events in dentistry result from spatter during dental procedures using rotary or ultrasonic instrumentation. Although no evidence supports that HBV, HCV, or HIV have been transmitted from a housekeeping surface, prompt removal and surface disinfection of an area contaminated by either blood are appropriate infection-control practices and required by OSHA

The person assigned to clean the spill should wear gloves and other PPE as needed.

Visible organic material should be removed with absorbent material (e.g., disposable paper towels discarded in a leak-proof, appropriately labeled container).

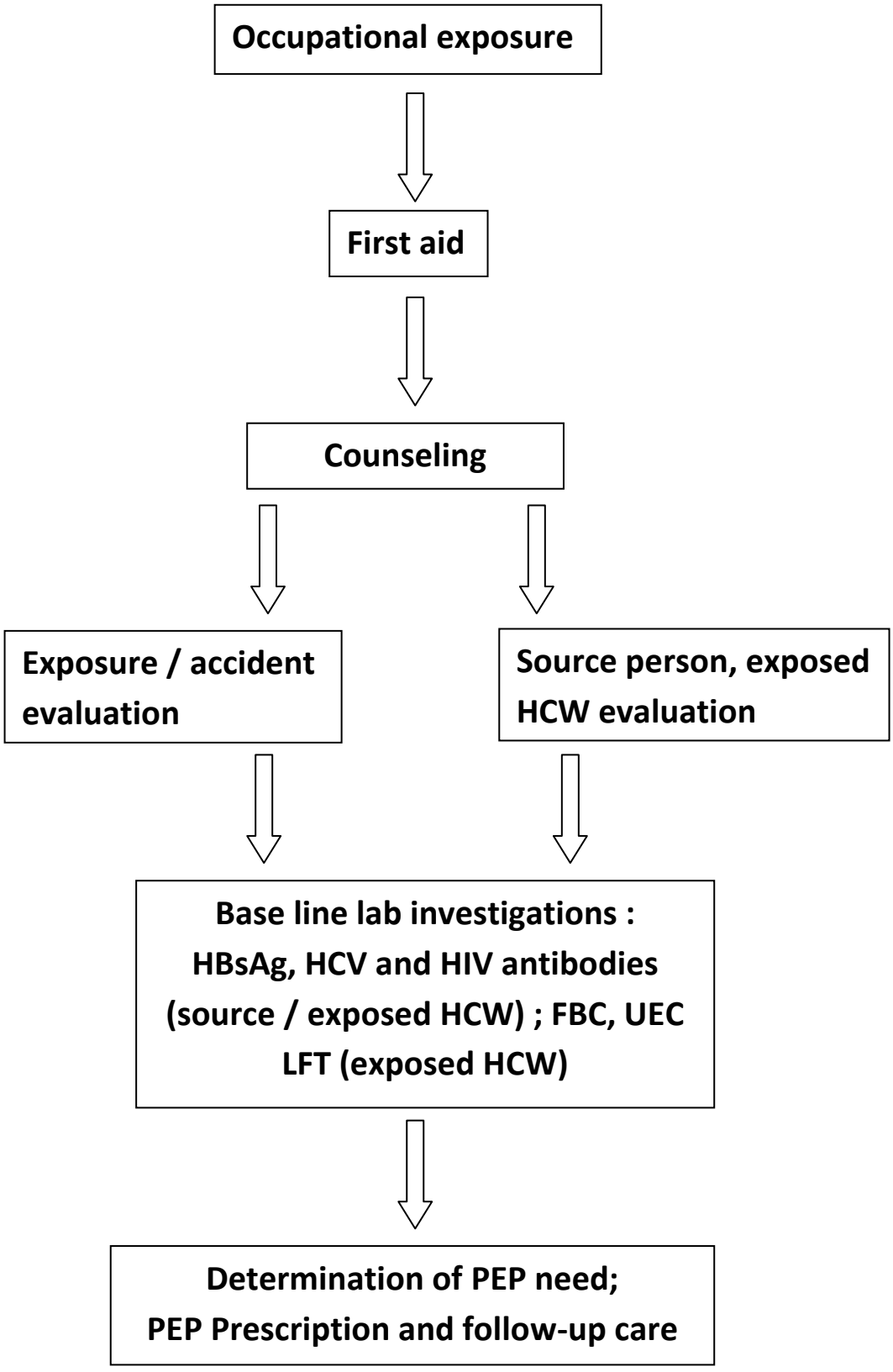
Nonporous surfaces should be cleaned and then decontaminated with either an EPA-registered hospital disinfectant effective against HBV and HIV or an EPA-registered hospital disinfectant with a tuberculocidal claim (i.e., intermediate-level disinfectant).

If sodium hypochlorite is chosen, an EPA-registered sodium hypochlorite product is preferred. However, if such products are unavailable, a 1:100 dilution of sodium hypochlorite (e.g., approximately ¼ cup of 5.25% household chlorine bleach to 1 gallon of water) is an inexpensive and effective disinfecting agent

GUIDELINES FOR POST EXPOSURE PROPHYLAXIS (PEP)[Hepatitis B, C,HIV]

Information about primary HIV infection indicates that systemic infection does not occur immediately after exposure, leaving a brief window of opportunity during which administration of PEP might prevent viral transmission and replication. Commencement of PEP within 2 hrs after exposure might inhibit or prevent systemic infection. After an exposure the following steps should be pursued:

Flow chart for occupational exposure and PEP



First Aid

Following any occupational exposure, the following are recommended before reporting:

1. Wash percutaneous injuries with soap under running water (tap or stored water) and allow the wound to bleed freely; do not compress to stop bleeding.
2. Use water to flush out nose, mouth or areas of the skin (broken) that have been splashed with blood.
3. Irrigate eyes when exposed with saline or clean water
4. Report and document incident immediately through supervising officer.
5. Index worker and supervisor should consult an expert or the designated persons listed immediately.

<u>Evaluate exposure risk Assessment</u>

Low risk:

- Solid needle injury
- Superficial sharps injury
- Exposure to blood/fluid from asymptomatic HIV Patient with low viral load or suppressed viral load on therapy
- Exposure to a small amount of infected blood/fluid
- Splash of blood on intact skin

High risk:

- Deep injury with hollow especially large bore needle
- Exposure to blood /fluids of patient with AIDS or advanced HIV infection or Acute sero-conversion illness
- Extensive and deep sharp injury
- Exposure to large volume of infected blood/fluid
- Splash of blood on broken skin

Evaluation of exposure source

Known source:

- Enquire wether patient is known to be infected withHIV,HBV or HCV
- Evaluate HIV infected patient's stage,performance status, CD4 cell count or (lymphocyte counts) and clinical condition
- If status unknown,test for HBs Ag, HCV and HIV antibodies using rapid HIV testing technique with informed consent[screening for HIV should not be delayed or deffered to await HBV and HCV screening]
- If source is not infected with any of the above viruses,baseline testing and further follow-up is not necessary(unless strong suspecion/possibility that he/she in the window period-should especially suspect sexually active individuals)
- If source person refuses testing,consider clinical presentation, diagnosis and history of risk behaviours;consider source infected if sexually active.

Unknown source:

- Evaluate the likelihood of exposure to a source at high risk for infection
- Consider the likelihood of infection among patients in the exposure setting

Recommended HIV/AIDS Post Exposure Prophylaxis (PEP) for Needle Stick/Sharps Injuries

Exposure	**HIV +ve source**	**Unknown status**	**Unknown source**	**HIV -ve**
Low risk	3-drug PEP recommended	No PEP recommended but 2-drug PEP can be considered for source with risk factors[or 3 – drugs in those with acute sero conversion illness]	No PEP recommended but where exposure to HIV +ve persons is likely 2-drug PEP can be given	No PEP recommended but 3-drug PEP considered in those with symptoms or suspension of acute sero conversion illness
High risk	Recommended 3-drug PEP	Consider 2-drug PEP for source with HIV risk factors[or 3-drugs in those with acute sero conversion illness]	Consider 2-drug PEP if source is suspected to be infected	No PEP recommended but 3-drug PEP considered in those with symptoms or suspicion of acute sero conversion illness

POST EXPOSURE PROPHYLAXIS FOR BLOOD SPLASH TO EYE, MUCUS MEMBRANE AND NONINTACTSKIN.

Type of exposure	HIV+ve source	Unknown status	Unknown source	HIV -ve
Small volume of blood or body fluid	2-drug PEP	PEP is optional but 2-drug PEP can be considered for source with risk factors	Consider 2-drug PEP where exposure to infected persons is likely	No PEP recommended but 2-drug PEP can be considered for sources with symptoms or suspicion of acute sero conversion illness
Large volume of blood/fluid	2-drug PEP	Consider 2-drug PEP if there are risk factors	Also consider 2-drug PEP where exposure to infected persons is likely	No PEP recommended but 2-drug PEP considered for sources with symptoms or suspicion of acute sero conversion illness

(a) 2 drug PEP:

- Stavudine 40mg po BD + Lamivudine 150mg po BD for 4 weeks
- Zidovudine 300mg po BD + Lamivudine 150mg po BD (i.e. Combivir I tab po BD) for 4 weeks
- Tenofovir 300mg po OD + Lamivudine 150mg po BD for 4 weeks

(b) **3 drug PEP:**

- Stavudine 40mg po BD + Lamivudine 150mg po BD + Lopinavir/ ritonavir 400mg/100mg po BD for 4 weeks
- Zidovudine 300mg po BD + Lamivudine 150mg po BD + Lopinavir/ ritonavir 400mg/100mg po BD for 4 weeks
- Tenofovir 300mg po OD + Lamivudine 150mg po BD + Lopinavir/ ritonavir 400mg/100mg po BD for 4 weeks

(c) Lopinavir/ ritonavir can be replaced with ritonavir boosted Indinavir or Saquinavir. Where these are unavailable Efavirenz 600mg po OD may be used as replacement;

HCWs should be informed about the possibility of short-term CNS toxicity. Efavirenz and/or Tenofovir should not be used in pregnancy

(d) In exposures where the source is suspected to have a resistant virus (i.e. a patient on ARV with poor clinical response or a high viral load), choice of PEP should take into account the source's failing regimen. All PEP for suspected resistant virus should be 3 drug and include a Protease Inhibitor at this time. In addition, if the source patient was failing on a stavudine or zidovudine containing regimen the PEP should include tenofovir.

(e) PEP for given for 4 weeks and monitoring of adverse effects recommended: baseline FBC, UEC and LFT to be repeated at 2 weeks

(e) If source person is known positive for HIV or sexually active at high risk for infection and status exposure warrants PEP, antiretroviral drugs should be started immediately without delay regardless of test results.

(f) Both source patient and HCW should be tested with rapid testing – if HCW is positive already, then PEP should not be embarked upon or should be discontinued immediately. The HCW should be appropriately referred.

(g) The HCW should be re-tested at 1, 3 and 6 months whether PEP is used or not.

Recommended Baseline Testing and Evaluation of Exposed HCW to HBV

Exposed person	**Exposure source**		
		HBsAG-ve	**Status unknown**
Un vaccinated	Give HBIG 0.06ml/kg im; Initiate HB vaccine	Initiate HB vaccine	Initiate HB vaccine and if possible,check HBsAg of source person
Vaccinated (antibody status unknown)	Measure anti-HBs on exposed person: If titre ≥ 10MIU/ml; No rx If titre <10MIU/ml or test not available,give HBIG+1 dose HB vaccine	No rx necessary	Measure anti-HBs on exposed person: If titre≥10MIU/ml; No rx If titre <10MIU/ml or test not available,give 1 dose HB vaccine(+1 dose HBIG if source high risk)

Management of HCW exposed to HCV infected patients:

Determine antibody to hepatitis C for both exposed person and, if possible, exposure source. If source +ve, follow-up HCV testing advised. No recommended prophylaxis; immune serum globulin not effective. Monitor for early infection, as therapy may reduce risk of progression to chronic hepatitis.

Management of exposure to blood/body fluids summary table

WHEN	WHAT
Immediately after exposure	First aid Relief from duty Risk assessment Post exposure prophylaxis(PEP)-if significant injury
As soon as possible(same day)	Source assessment Documentation of exposure Prevention of transmission and exposure/pre –test counselling Baseline serology if agreed to Referral to specialist physician-if PEP commenced Support significant others
1-3 Weeks	Post-test counselling with results of baseline serology Occupational health and safety review
3 Months	Pre HIV test counselling Follow up serology-HIV,HBV,HCV
6 Months	Follow up serology • HBV,HCV • HIV(if PEP taken)

MANAGEMENT OF DENTAL WASTES AND SHARPS

All waste from dental offices can be divided into 2 basic categories - regulated and non regulated.

For dental offices, there are 5 types of regulated waste. These require special handling, storage, and disposal methods, and have been shown capable of transmitting infectious diseases.

The 5 types are

(1) bulk (in a liquid or semi-liquid form) blood or blood products and other potentially infectious materials (OPIM...for dentistry, saliva is considered to be as hazardous as blood);

(2) items, such as a cotton roll, saturated with blood/saliva or OPIM that readily release fluids during handling (by squeezing or are actually dripping or caked);

(3) pathologic waste (eg, exfoliated or extracted teeth);

(4) used sharps (contaminated items that can penetrate intact skin), such as injection needles, scalpel blades, instruments, burs, and broken contaminated glass, and

(5) potential sharps, such as anesthetic carpules that can contain aspirated blood and could break and cause injury and exposure.

A regulated waste management plan contains a number of important components. These include segregation, handling and storage, labeling, disposal, and public relations

Category	Type of Waste	Treatment and Disposal Options
Category 1	Human Anatomical Waste (Human tissues, organs, body parts)	Incineration/Deep Burial
Category 2	Animal waste (Animal tissues, organs, body parts, carcasses, bleeding parts,blood and experimental animals used in research)	Incineration/Deep Burial
Category 3	Microbiology and biotechnology waste(waste from lab culture, specimens from microorganisms, vaccines, cell cultures, toxins, dishes, devices used to transfer cultures)	Local Autoclaving/ Microwaving/ Incineration
Category 4	Waste Sharps (Needles, Syringes, scalpels, blades, glass)	Chemical Disinfection Autoclaving/ Microwaving, Mutilation and Shredding
Category 5	Discarded medicines and cytotoxic drugs (outdated, contaminated, discarded drugs)	Incineration/Destruction and disposal in land fills
Category 6	Soiled waste (contaminated with blood and body fluids including cotton, dressings, soiled plaster casts, linen)	Autoclaving/ Microwaving/ Incineration
Category 7	Solid waste (tubes, catheters, IV sets)	Chemical Disinfecion/Autoclaving/ Microwaving, Mutilation and Shredding
Category 8	Liquid waste (Waste generated from laboratory and washing, cleaning, disinfection)	Disinfection by chemical treatment and discharge into the drains
Category 9	Incineration ash	Land fills
Category 10	Chemical waste	Chemical disinfection and discharge into the drains

Colour coding	Type of Container	Waste Category	Treatment options
Yellow	Plastic Bags	Human and animal wastes, Microbial and Biological wastes and soiled wastes (Cat 1,2,3 and 6)	Incineration/ Deep Burial
Red	Disinfected container/ Plastic bags	Microbiological and Biological wastes, Soiled wastes, Solid wastes (Cat 3,6,7)	Autoclave/ Microwave/ Chemical Treatment)
Blue/ White/ Transparent	Plastic bag, Puncture proof container	Waste sharps and solid waste (Cat 4 &7)	Autoclave/ Microwave/ Chemical Treatment Destruction and Shredding
Black	Plastic bag	Discarded medicines, Cytotoxic drugs, Incineration ash and chemical waste (Cat 5,9 & 10)	Disposal in secured land fills
Green	Plastic Container	General waste such as office waste, food waste & garden waste	Disposed in secured landfills

Education and training program

Dental staff must be provided with comprehensive training in the full range of infection control procedures that they are expected to know about and carry out in their day-to-day work. Regular refresher training is also appropriate to ensure that the necessary infection control measures are being complied with and understood.

New clinical dental staff should complete an induction program. This pre-service training should include the practical implementation of occupational health and safety and infection control measures used in the practice.

This induction program should comprise the following:

• General orientation to the physical environment of the practice
• Practice expectations in terms of infection control and safe working procedures
• Recommendations for vaccination prior to commencing work (HBV and others)
• Reporting requirements for sharps injuries and workplace incidents
• Policy on wearing and cleaning of uniforms
• Emergency procedures for fire and medical emergencies