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MINISTRY OF HEALTH
BRUNEI DARUSSALAM

DENTAL INFECTION CONTROL MANUAL

Infection Control Unit,
Health and Safety Division,
Department of Dental Services,
Ministry of Health,
Brunei Darussalam

The aim of the Dental Infection Control Unit is to promote and implement excellence in the practice of infection control in the Dental Services, Negara Brunei Darussalam.

OBJECTIVES

1. To increase awareness on infection control among dental healthcare personnel
2. To set up and implement protocol on the practice of infection control
3. To ensure adequate infection control training of all dental healthcare personnel
4. To monitor, evaluate and audit infection control practice in the Dental Department
5. To regularly update the infection control protocol with the latest guidelines
6. To work concurrently with the Infection Control Unit, Ministry of Health

Infection Control Unit
Health and Safety Division
Department of Dental Services
Ministry of Health
Negara Brunei Darussalam

TABLE OF CONTENTS

INTRODUCTION

It is the responsibility of all dental practices to adopt a safe working system to avoid cross infection and safeguard patients and all members of the dental team, both clinical and non-clinical. All dental healthcare personnel have a duty of care to their patients to ensure adequate infection control procedures are carried out.

Dental healthcare personnel have an obligation to provide a set standard of care to all dental patients regardless of their status of infection. Therefore, Standard Infection Control Precautions must be adopted, whereby every patient contact is assumed to present a possible risk of transmission.

The principles of good hand hygiene, avoidance of cross contamination of surfaces not directly related to treatment and also safe handling of sharps are of equal importance in maintaining good infection control practice.

The adoption of single-use items for all equipment(s) would be a gold standard but this is neither practical nor financially feasible. Good decontamination facilities and processes must be in place to ensure quality decontamination and sterilization procedures for reprocessing of instruments after use, as part of good infection control practice.

These infection control work practice guidelines apply to all dental healthcare personnel who are subject to occupational exposure. All personnel should be properly educated and trained on infection control procedures. Furthermore these guidelines on safe and realistic infection control procedures will be regularly updated, routinely monitored and audited.

SECTION 1: INFECTION CONTROL WORK PRACTICE GUIDELINES

The infection control work practice guidelines are aimed at protecting both patient and staff alike. These guidelines will therefore apply to all dental healthcare personnel who may come into clinical contact with patients or their blood, body fluids and tissues. The guidelines were formulated based on the 'Standard Precautions' concept.

1.1 CONCEPT OF 'STANDARD PRECAUTIONS'

Originally known as 'Universal Precautions', this 'Standard Precautions' concept are the minimum infection control practices that apply to ALL patient care, at ALL times in every healthcare setting, regardless of their diagnosis. It is designed to prevent the occupational transmission of all blood-borne viruses as well as airborne infections and those infections transmitted by excretions and secretions. The precautions are based on the assumption that **all blood, body fluids and tissues should be treated as infectious**, because patients might be asymptomatic and unaware that they are infected. Hence, same infection control precautions are applied to all dental patients.

Standard precautions apply to contact with:

- Blood
- All body fluids including saliva, secretions, excretions regardless of whether they contain blood with the exception of sweat.
- Mucous membranes
- Non-intact skin

In general, standard infection control precautions are designed to prevent the transmission of diseases through:

- Direct contact with blood, oral fluids, or other patient materials
- Indirect contact with contaminated objects (e.g. instruments, equipment, or environmental surfaces)
- Contact of conjunctiva, nasal or oral mucosa with droplets (e.g. splatter) containing microorganisms generated from an infected person and propelled a short distance (e.g. by coughing, sneezing, or talking)
- Inhalation of airborne microorganisms that can remain suspended in the air for long periods

Standard infection control precautions that reduce the exposure of patients, the clinical dental team, laboratory staff, maintenance engineers and the general public to blood and other body fluids and oral mucosa are explained in various sections of this guideline as stated below:

1. **Clinical Uniform**
2. **Personal Protective Equipment (PPE)**
3. **Hand Hygiene**
4. **Organisation and Preparation of the Clinical Area**
5. **Infection Control during Patient Treatment**
6. **Infection Control after Treatment is Completed**
7. **Decontamination and Sterilization of Instruments**

8. **Clinical Waste Disposal and Management of Body Fluid Spillage**
9. **Handling of Clinical Specimens**
10. **Infection Control and Dental Radiography**
11. **Infection Control in the Dental Laboratory**
12. **Special Circumstances**
13. **Body Fluid Exposures**

1.2 GENERAL PRINCIPLES IN INFECTION CONTROL

- Adequate training of infection control practice is important. A documented training protocol should be in operation with individual training records for all staff engaged in infection control and decontamination.
- Standard Precautions should be applied to the care of ALL patients at ALL times.
- All dental healthcare personnel should be aware of the safe handling of sharps, clinical and hazardous waste.
- All clinical personnel should be vaccinated against Hepatitis B virus and their response to the vaccine confirmed by Occupational Health Unit, Health and Safety Division, Department of Dental Services.
- Appropriate PPE should be worn for all clinical procedures.
- Single use items are gold standard in infection control and their use should be encouraged where practically possible.
- Disposable impervious barriers should be used whenever practically possible.
- A 'Body Fluid Exposure' guideline and protocol must be in place to manage percutaneous exposure to potentially infectious agents.
- Infection control should be taken into consideration when any new procedure is adopted.
- When new equipment or materials are purchased, infection control implications should be considered as well. Alternative purchases should be considered if the equipment or materials cannot be used in conjunction with good infection control principles.
- All infection control guidelines and procedures should be regularly reviewed, monitored and audited.

- Eating and drinking are prohibited in the clinical areas, dental laboratory and decontamination area except where water is necessary for the welfare of the healthcare workers and patients (in case of medical emergency).

1.3 DESIGNATED AREAS WITHIN THE HOSPITAL AND HEALTH CENTRES

In order to reduce the risk of cross contamination, all dental personnel must be familiar with the designated areas within their working place, as follows:

1) Clinical area refers to dental treatment rooms (i.e. surgery and cubicle).
2) Immediate clinical area includes associated corridors connecting clinics within each block, sterilizing rooms, x-ray rooms.
3) Non-clinical area includes the reception area, patient's records room, dental store, clean instruments room, dental laboratory, offices, main lobby, dining areas, conference and lecture rooms, library, restrooms and prayer room.

SECTION 2: UNIFORM

The Ministry of Health, Brunei Darussalam has allocated uniforms for some dental personnel (see Fig. 2a). Uniforms must be worn within the hospital building and health centres. For dental personnel who wear their uniform from home such as the Dental Hygienist/Therapist, Dental Nurses and Dental Surgery Assistants, it is recommended to wear a separate clinical tunic.

Fig. 2a Dental personnel wearing clinical uniforms provided by the Ministry of Health, Brunei Darussalam

Uniforms and clinical tunics should be washed daily and when visibly soiled. It is important that freshly laundered uniforms are worn everyday. They should be washed with laundry detergent in a washing machine (separate to other items), at the hottest temperature suitable for the fabric (to reduce any potential microbial contamination), dried as quickly as possible and ironed.

Open-topped and open-toed court shoes, and sandals must not be worn during clinical procedures as the exposed tops and in-step areas of feet are at risk of percutaneous sharps injuries from dropped instruments (see Fig. 2b & 2c). Separate clinical shoes are recommended and they should fully cover at least the front part of the foot and can be easily cleaned (see Fig. 2d).

Fig. 2b Open-toed and open-topped shoes

Fig. 2c Open-topped shoes

Fig. 2d Clinical shoes with fully-covered front part are recommended

Jewellery such as rings, watches (see Fig. 2e), bracelets, drop/dangling earrings should be removed. Stud earrings and plain band rings (see Fig. 2f) are acceptable. Long hair must be tied back in a way that prevents it falling onto the patient when the clinician is leaning over during clinical session (see Fig. 2g). Headscarves should be made of cloth without beadings, extensions or dangling accessories, close fitting and kept tucked into

clinical tunic (see Fig 2i & 2j). Beards should be trimmed neatly and kept within a net or mesh and clinical mask during clinical care.

Nails must be clean and short (see Fig. 2h). Hair and nails are known to harbour higher levels of microorganisms than skin. Long nails are more difficult to clean and may potentially pierce gloves. Artificial nails have been implicated in disease transmission from staff to patients. Injured or cracked skin on hands and arms must be covered with a waterproof dressing until the lesions have healed.

Fig. 2e Rings and watches should be removed

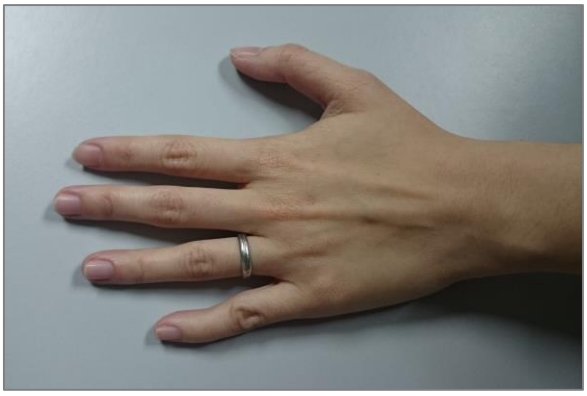


Fig. 2f Plain band rings are acceptable

Fig. 2g Long hair must be tied back

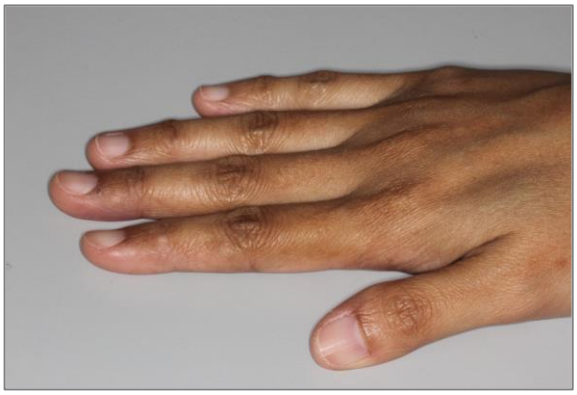


Fig. 2h Nails must be clean and short

Fig. 2i Headscarf must be tucked into clinical tunic

Fig. 2j Headscarf should not fall outside the tunic collar

SECTION 3: PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE is used to prevent the patient's body fluids from primarily contacting the staff's hands, eyes and mouth. It is designed to protect healthcare personnel from exposure to or contact with potentially infectious agents. PPE should be worn by all staff directly involved with a clinical procedure including the clinician, dental surgery assistant, clinical supervisor. Any parent or caregiver who assists the patient during the procedure may be provided with protective glasses and plastic bibs.

Full PPE for all clinical procedures (where spray, splatter or aerosol could be produced) include:

- Single-use, disposable gloves
- Eye protection (protective glasses or face visor)
- Disposable face mask
- Disposable plastic apron; or disposable long-sleeve gown

Disposable plastic apron is mandatory to be worn over uniform and clinical tunic as the uniform and clinical tunic are not sufficient to be used as PPE for most dental procedures where aerosol, spray, splatter, debris and dust will be generated. Aerosol, spray, splatter, debris or dust may be generated during the following procedures:

- Administration of a local anaesthetic
- Use of a 3-in-1 air/water syringe
- Use of a hand piece in the clinical or laboratory setting

- Any surgical operations, including extractions of teeth
- Endodontic therapy
- Periodontal therapy especially scaling and polishing
- During tooth cleaning (brushing and prophylaxis)

Full PPE must be worn whenever coughing, gagging and/or retching is anticipated during certain dental procedures. For example, during impression taking, orthodontic band/bracket placements, jaw registration, radiography, fitting prostheses and even during simple examination in patients with a history of hyperactive gag reflexes.

Disposable PPE items like gloves, face mask and apron (or long-sleeve gown) should ideally be disposed after each patients. Face visor and protective glasses must be disinfected after each patient. As the purpose of PPE is to protect us during patient contact, it is recommended that PPE be removed when not in use. PPE must **not** be worn in the non-clinical areas like the reception area, patient's records room, dental store, clean instruments room, offices, main lobby, dining areas, conference and lecture rooms, library, restrooms and prayer room.

As for dental technicians, personal protective equipment **must** be worn when working in the dental laboratory (refer to Section 12).

3.1 GLOVES

Many different types of gloves are available for clinical use. Gloves should be worn for all clinical procedures, when setting up and cleaning down the clinical area, handling clinical waste and dealing with any spillage.

Gloves worn should be correctly fitting, single-use and disposable. Ideally, all disposable clinical gloves used in the practice should be Certificate Excellence (CE)-marked, low in extractable proteins (<50 µg/g), low in residual chemicals and powder-free (see Fig. 3.1a). Medical examination gloves must conform to standards and sterility assurance established by United States (US) Food and Drug Administration (FDA).

Fig. 3.1a Latex examination gloves

Fig. 3.1b Nitrile (latex-free) examination gloves

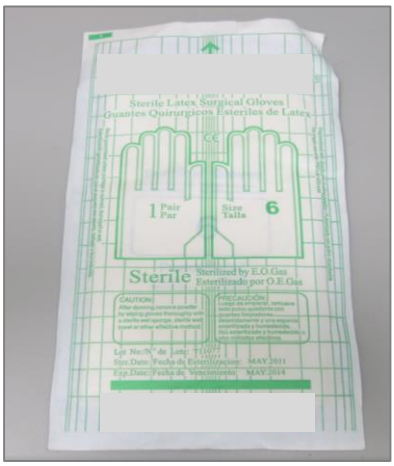


Fig. 3.1c Sterile surgical gloves

Individuals with latex allergy or other chemicals in gloves should seek advice from the Occupational Health Unit, Health and Safety Division, Department of Dental Services. Latex-free nitrile disposable gloves (see Fig. 3.1b) should be made available to staff. Disposable sterile surgical gloves must be used during surgical treatments (see Fig 3.1c).

Wear a new pair of gloves for each patient. When gloves need to be removed, discard them into yellow clinical waste bags. Never reuse gloves after taking them off, sanitise hands (or hand washing if visibly soiled) and wear a new pair of gloves. Gloves should **not** touch non-sterilisable dental equipment or materials without a barrier. Never wear gloves even clean ones when handling notes, radiographs, keyboards, pens or telephone (see Fig. 3.1d).

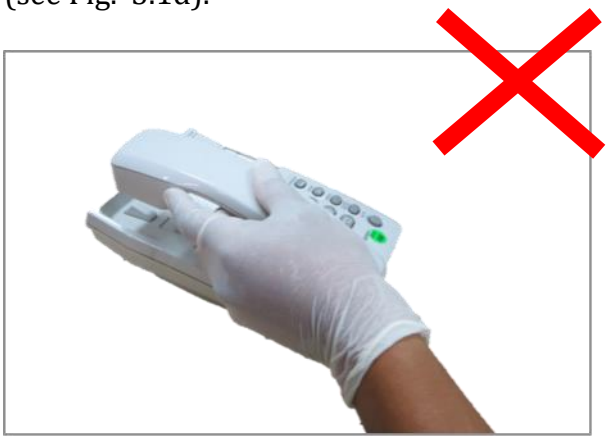


Fig. 3.1d DO NOT handle telephone with gloved hands

Fig. 3.1e DO NOT open drawers with gloved hands

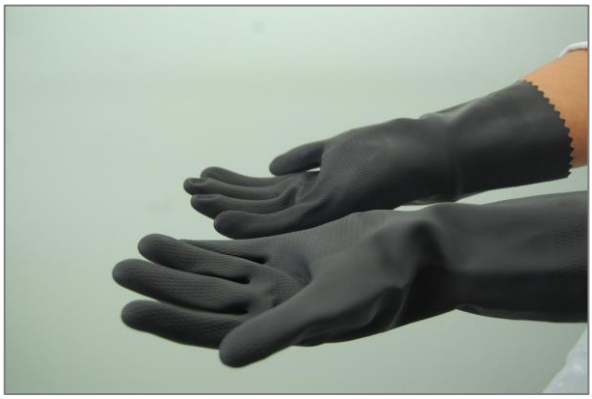


Fig. 3.1f Sturdy, unlined utility gloves should be used for cleaning and disinfection procedures

Drawers, cupboards or doors should **not** be opened with gloved hands (see Fig. 3.1e). It is mandatory to remove gloves (and all other PPE) before leaving the clinical and immediate clinical areas.

Sturdy, unlined utility gloves can be used for cleaning and disinfection of instruments, dental units and work surfaces (see Fig. 3.1f). These must be disinfected with an appropriate disinfectant after each use.

3.2 PROTECTIVE GLASSES, VISORS AND MASKS

Mask and eye protection or face shield are designed to protect the mucous membranes of the eyes, nose and mouth for procedures that are likely to generate sprays of blood, body fluids, secretions and excretions. Small eyewear (normal prescription glasses) do not provide adequate protection for the eyes and should be covered by standard protective glasses (see Fig. 3.2a) or face shield provided (see Fig. 3.2b). They should be disinfected when it becomes dirty and/or end of each session.

Fig. 3.2a Standard protective glasses

Fig. 3.2b Face shield

Eye protection should be worn by dental surgery assistants, patients and their carers whenever they help in assisting any clinical procedure. (see Fig. 3.2c and Fig. 3.2d)

Fig. 3.2c Eye protection for carer

Fig. 3.2d Eye protection for patient & carer

Clinical staff should wear eye protection when cleaning the surgery and during any local decontamination procedures. Laboratory personnel should also wear eye protection when performing laboratory work. The protective glasses and/or face shields should be disinfected after use, taking care to handle them with gloved hands until they have been disinfected.

Masks (see Fig. 3.2e) protect the face, mouth and nose from projected particulate matter that may be produced during clinical and laboratory procedure. Ideally, a new disposable mask must be used for each patient treatment session. When not in use, take off mask and discard into yellow clinical waste bags. Masks must **not** be placed on the forehead or left hanging around the neck (see Fig. 3.2f). Masks should **not** be worn outside of the immediate clinical area.

Fig. 3.2e Mask

Fig. 3.2f Mask must NOT be left hanging around the neck

For all simple oral procedures where no spray, splatter or aerosol is involved and a full face visor is being worn then a mask is not required. Such circumstances include:

- Simple visual examination with only a mouth mirror
- When treating young children with severe dental phobia as masks may appear intimidating

This strictly applies to full face visors only. If protective glasses are used, then masks should be worn as well.

3.3 HEADLIGHTS AND LOUPES

Ensure loupes are used with protective glasses that have a 'wrap around' design or integral protective side-wings (see Fig. 3.3a). Loupes and headlights (see Fig. 3.3b) should be thoroughly cleaned (according to manufacturer's instructions) between every patient.

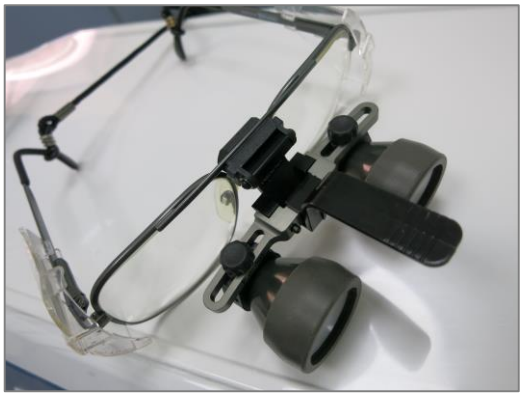


Fig. 3.3a Loupes with protective side- wings

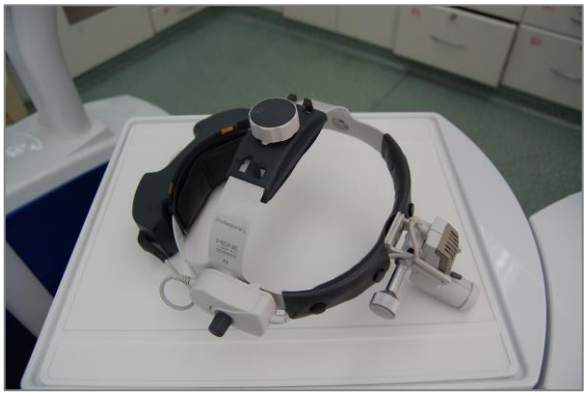


Fig. 3.3b Headlights

3.4 DISPOSABLE SINGLE-USE APRONS AND GOWNS

The uniform or clinical tunic is not sufficient to be used as PPE as most dental procedures will generate aerosol, spray, splatter, debris and dust. Single-use disposable plastic apron (see Fig. 3.4a) is mandatory to be worn over uniform and clinical tunic. Disposable long-sleeve gowns (see Fig. 3.4b) can also be used in place of aprons. Where forearms must be covered, single-use disposable plastic forearms sleeves (see Fig. 3.4c) can be worn. However, they should be rolled up when performing hand hygiene. Aprons should be disposed as clinical waste, ideally after each patient or when visibly soiled.

Fig. 3.4a Single-use disposable apron

Fig. 3.4b Disposable long-sleeve gown

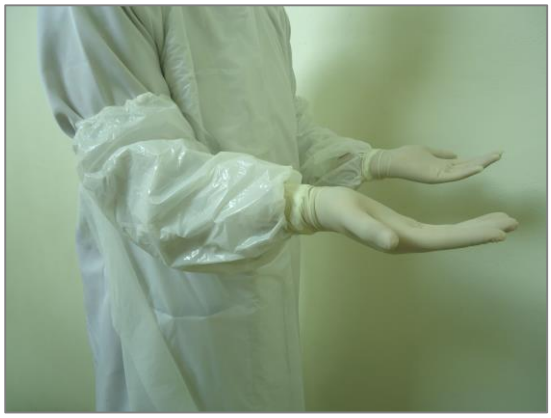


Fig. 3.4c Single-use disposable plastic forearm sleeves

Recommended sequence for wearing the Personal Protective Equipment is shown below (see Fig. 3.4d).

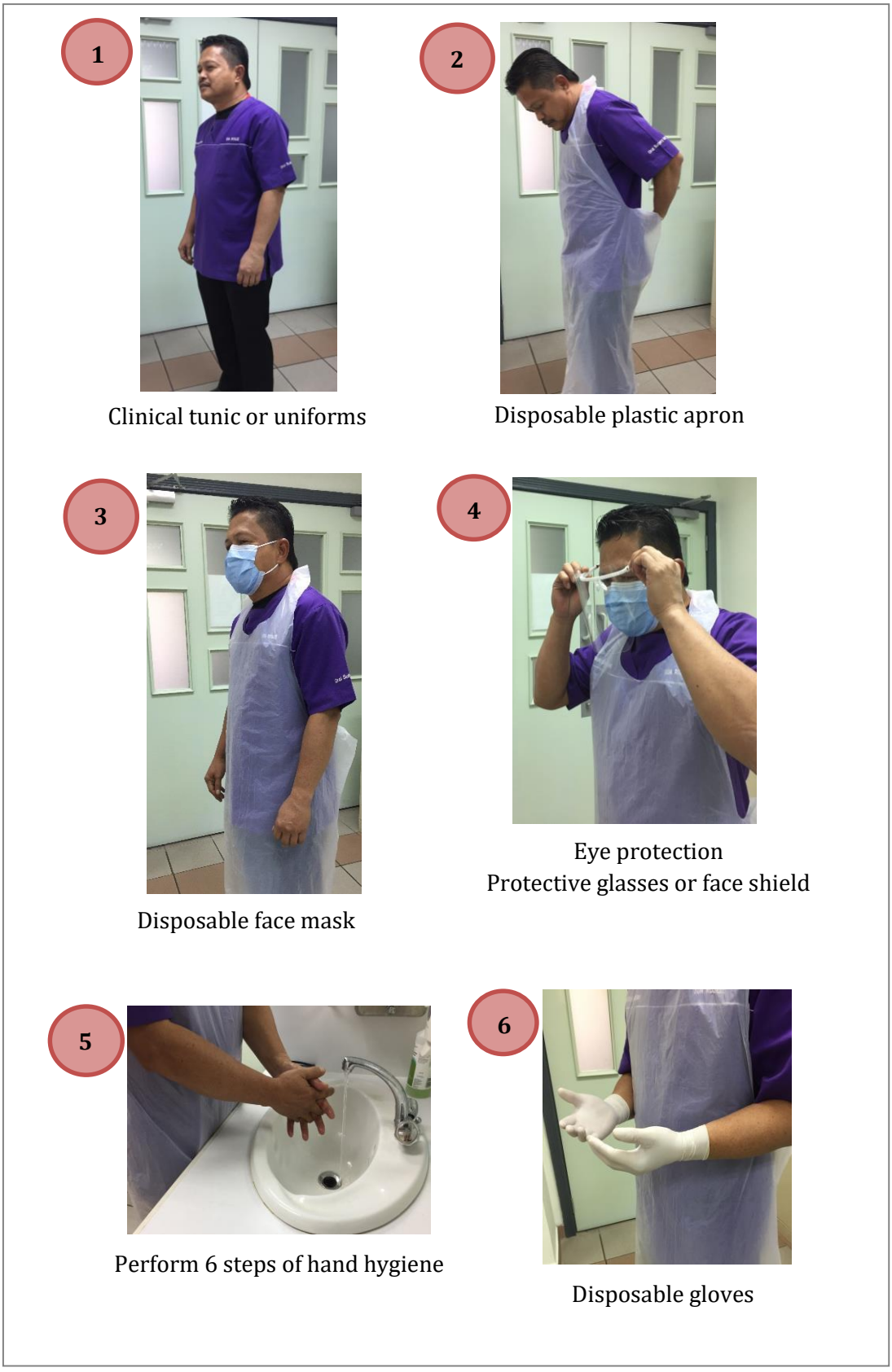


Fig. 3.4d Sequence for wearing PPE

SECTION 4: HAND HYGIENE

Effective hand hygiene is the single most important measure in the prevention of spread of infection in many healthcare settings. It is the basis of all good infection control practice. Broken skin must be covered with waterproof dressings during clinical treatment. The term hand hygiene covers not only hand washing, but also alternative and additional measures such as hand disinfection using antibacterial-based hand-rubs (or gels).

Dedicated hand-washing facilities should be provided and should be separated from the decontamination sinks.

Training in hand hygiene should be part of staff induction and it should be provided to all relevant staff within dental practices periodically throughout the year.

Hand washing with a detergent or liquid soap is mandatory:

- At the beginning and end of each clinical session
- Before and/or after treating a clinical treatment episode (unless alcohol gel is used)
- Before wearing PPE and after the removal of PPE
- After the washing of dental instruments
- Before contact with instruments (packed or unpacked) that have been steam-sterilized

- After cleaning or maintaining decontamination devices or dental instruments
- After decontamination work
- When hands are visibly soiled or dirty
- If hands become contaminated with a body fluid (e.g. saliva)
- After several uses of alcohol gel if residue builds up on your hands
- Before and after eating and drinking
- Before and after going to the toilet
- After blowing your nose, coughing or sneezing

Effective drying of hands after hand hygiene procedure is important as wet surfaces transfer microorganisms more easily than when they are dry. Inadequately dried hands are also prone to skin damage. Use of disposable paper towels is recommended.

A water-based hand cream should be used to avoid cracked or chapped skin due to repeated hand hygiene procedures. Any staff that develop eczema, dermatitis or any other skin condition should seek advice from the Occupational Health Unit, Ministry of Health as soon as possible and report to Health and Safety unit, Dental Department.

It is imperative that the wrists and lower forearm be accessible for decontamination or hand hygiene procedures (see Fig. 4). Remove all jewellery and wristwatches prior to hand washing.

Fig. 4

4.1 FIVE MOMENTS OF HAND HYGIENE IN DENTISTRY

"Five moments of hand hygiene" campaign was developed by the World Health Organisation (WHO) with the aim to improve and sustain hand hygiene practices of health care providers at the right times and in the right way to help reduce the spread of potentially life-threatening infections in health care facilities.

It defines the key moments when health care providers should perform the hand hygiene. This evidence-based, field-tested, user-centred approach is designed to be easy to learn, logical and applicable in a wide range of settings.

Dental health care providers are required to perform hand hygiene at specific times in patient care, and not just focusing on hand hygiene before and after patient care. There are five areas that dental health care workers should focus on (see Appendix 1).

The five-point concept incorporates the need to perform hand hygiene as close as possible to where delivery of care takes place. The hand washing sinks should be placed as close as possible to patient care areas and should be in an easily accessible area. Soap dispensers should be as close as possible to the sink.

4.2 TECHNIQUE FOR ROUTINE HAND WASHING

Recommended sequence for hand washing is shown below:

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

For surgical procedure, it is mandatory to clean up to elbow level

Rinse hands with water

Dry hands thoroughly with a single use towel

Use towel or elbow to turn off faucet

Your hands are now clean

Points to remember during hand washing

- ***Remove all jewellery and wrist watches prior to hand washing.***
- ***Continue hand washing for as long as required to ensure hands are clean.***
- ***World Health Organisation (WHO) has recommended the duration of the hand wash scrubbing is 15-20 seconds and the duration of entire procedure is 40-60 seconds ('How to Hand wash' poster by WHO, 2012).***
- ***Pay particular attention to areas between fingers, fingertips, wrists, palm and around the base of thumb.***
- ***Hands should be rubbed together vigorously using friction on all surfaces.***
- ***All surfaces of hands and forearms must be rinsed thoroughly. However, splashing onto either clothing or the floor must be avoided.***
- ***Hands must be thoroughly dried with clean disposable paper towels.***
- ***Use a clean paper towel to protect hands when turning off taps. Otherwise the taps must be turned off by using elbow.***
- ***Apply moisturising hand creams at regular intervals, and at the end of a clinical session to protect the skin of your hand. Rashes and eczema on the hands and forearms should be reported to the Occupational Health Unit, Department of Dental Services.***
- ***Only use antiseptic washes (4% chlorhexidine) for 'scrubbing-up' procedures in theatres.***
- ***If nailbrush use is advocated, the brush should be single-use only and then discarded.***

Antibacterial liquid soap (see Fig. 4.1a) can be used for hand washing, however antimicrobial liquid soap has been found to have no added benefit over normal soap.

Fig. 4.1a Antibacterial liquid soap

Liquid soap containing 4% Chlorhexidine is recommended for scrubbing before a surgical procedure. For surgical hand washing, Centers for Disease Control and Prevention (CDC) has recommended using either:

a) An antimicrobial soap; scrub hands and forearms for 2 to 6 minutes; or
b) An alcohol-based surgical hand-scrub; prewash hands with a non-antimicrobial soap, dry completely, then apply alcohol hand-scrub and allow hands to dry thoroughly before donning sterile gloves.

4.3 DECONTAMINATION USING ALCOHOL

Another way that can improve the compliance for hand hygiene procedures is the use of hand sanitizers provided that the hands are not visibly soiled (free from debris). They are easy to use and they help prevent skin conditions that can be worsened by repeated traditional hand washing and drying. Hand sanitizers containing 60% to 95% isopropanol or ethanol have been shown to be effective, but they are not good cleaning agents and cannot penetrate debris.

Decontamination with alcohol gel (see Fig. 4.3a & 4.3b) can be used for the purpose of decontamination before and after each patient contact. Provided that the hands are not visibly soiled, the 'gel in- gel out' concept can also be used in the following situation;

- when entering clinical areas from outside
- between old and new glove use if hands have become decontaminated (within the same patient treatment episode)
- before putting on another pair of gloves if a glove becomes damaged during treatment (unless hands visibly soiled in which case hand washing is mandatory)

The same technique used for hand washing must also be used with alcohol gel, and the duration of the entire procedure is 20-30 seconds. The dispensed amount of gel (or follow manufacturer's instructions) must be just enough to 'wet' the skin thoroughly. The hands must then be allowed to dry for 2 minutes. Drying effect and time is essential as the organism will die when the alcohol gel dries.

Fig. 4.3a Wall-mounted hand sanitiser

Fig. 4.3b Disinfectant handrub

When supervising large groups of students a clinical demonstrator will decontaminate their hands after patient contact. If a demonstrator then moves immediately to another bay without touching anything then a new pair of gloves may be put on prior to patient contact.

However, any contact occurring between the last use of hand gel and the next patient contact would require a new hand decontamination procedure (gel or wash depending on the condition of hands).

SECTION 5: ORGANISATION AND PREPARATION OF THE CLINICAL AREA

Before commencement of any dental treatment the following should be taken into consideration;

- The preoperative assessment of the clinical environment
- The preoperative organisation of the clinical area
- The preoperative cleaning and disinfection of the clinical area
- The identification and isolation of clinical high risk areas (zoning)
- Preoperative preparation of the equipment and instruments necessary for the clinical procedures

5.1 THE PREOPERATIVE ASSESSMENT AND ORGANISATION OF THE DENTAL SURGERY

Areas for administration should be separated from clinical areas. The clinical area must be kept tidy and clutter-free. Within the clinical areas, there must be separate areas for operating, storage for clean instruments, equipments and materials; and decontamination respectively.

Where decontamination work is done in the same room as the clinical treatment room, the decontamination area should be as far from the dental chair as practically possible (refer to Section 8). For 'best practice', decontamination room should be separated from the clinical treatment room.

5.2 THE PREOPERATIVE CLEANING AND DISINFECTION OF THE CLINICAL AREA

(a) Preparation for clinical sessions - cleaning and disinfection of surfaces

All clinical surfaces listed below should be disinfected with EPA-registered hospital disinfectants or disinfectants with label claims for use in health care settings (such as Unisepta Foam®) prior to a clinical session (see Fig. 5.2a-i, 5.2a-ii, 5.2a-iii, & 5.2a-iv):

- Arm rest, cushion, back rest and head rest of the dental chair
- Dental light, light-handle and switch
- Bracket table surface, handle and any switches
- Any hand buttons of dental chair
- All hand-piece connectors and leads
- Suction connectors
- The 3-in-1 air/water syringe
- Spittoon (outside before inside, then discard disposable disinfecting cloth)
- Dental unit surfaces and worktops
- Waste bin entrances and doors
- Sink and tap controls

Fig. 5.2a-i Arm rest, cushion, back rest & head rest of the dental chair.

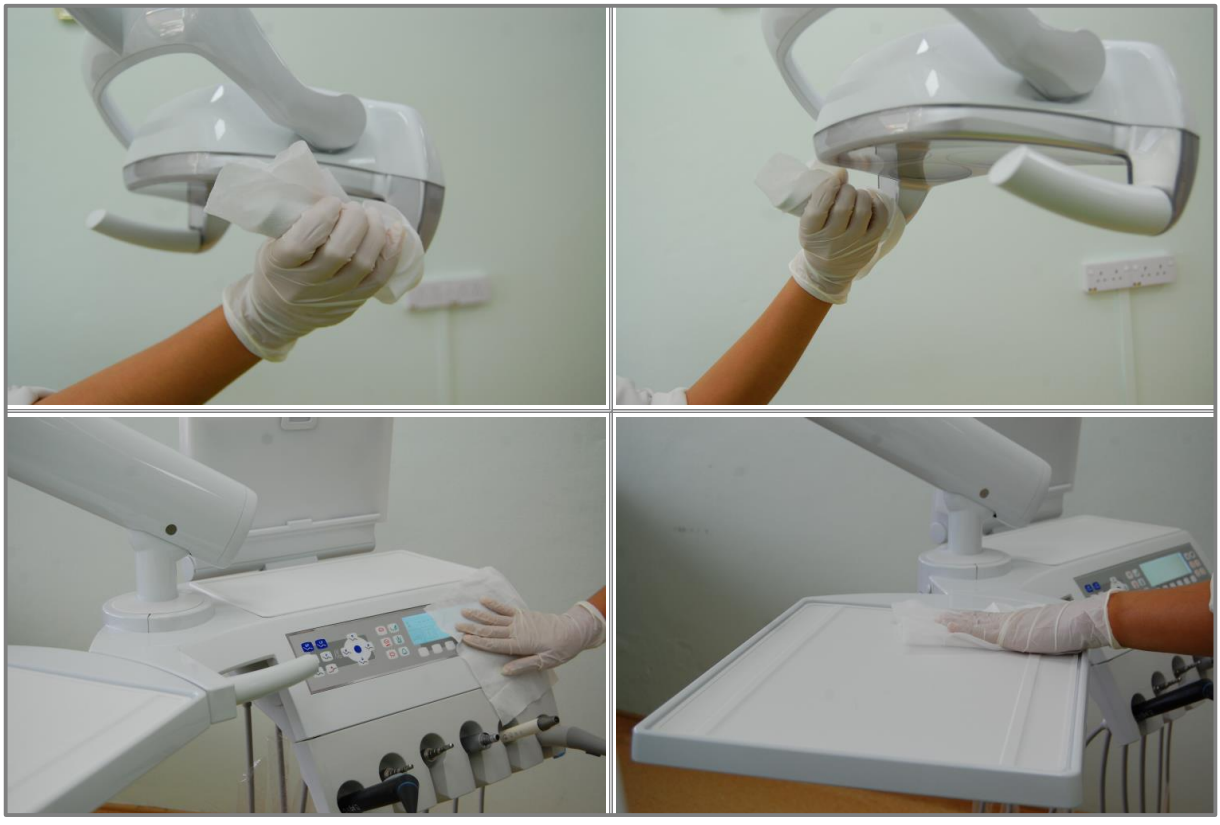


Fig. 5.2a-ii Dental light, light handle & light switch (those without sensor); Bracket table, handle and any switches.

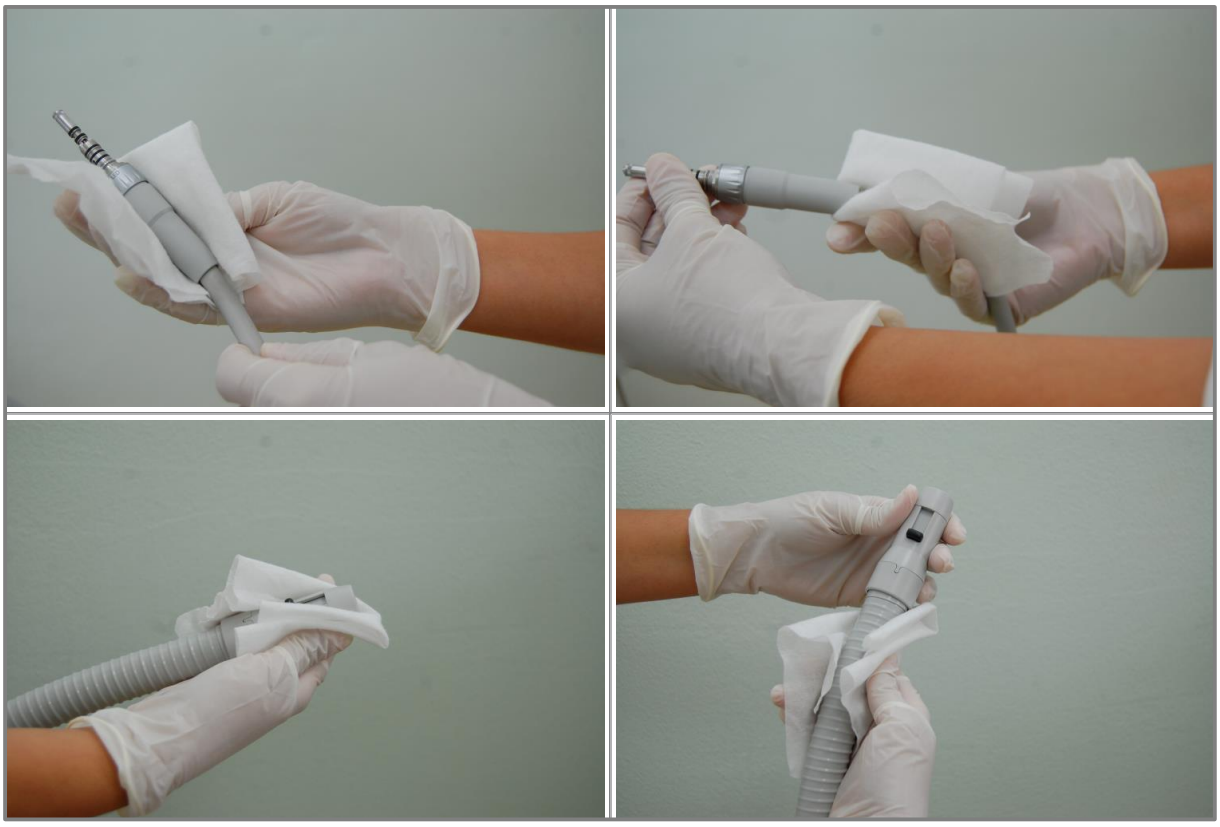


Fig. 5.2a-iii All hand-piece coupling & suction connectors, leads & tubing.

Fig. 5.2a-iv Spittoon (outside before inside then discard disposable disinfecting cloth).

When contaminated or visibly soiled, the surfaces should be cleaned and wiped with an appropriate disinfectant. One should refer to the manufacturer's instructions regarding which disinfectant can be used for the given item or equipment. For example, some of the newer generation of dental chairs must not be wiped with alcohol-based disinfectant as this may damage the covering of the dental chair.

Once the clinician is satisfied that the clinical surfaces are clean then the area should be 'zoned' (refer Section 5.3).

(b) Dental Unit Water Lines (DUWLs)

Most dental operatory units have bottled water systems that supply water to the hand pieces and 3-in-1 air/water syringe. Ensure fresh distilled water is used daily and drained down at the end of working day. Use sterile water in surgical handpieces. Press the foot pedal and run the DUWLs with the empty bottle in place until the unit water lines are dry (1 minute to clear the line) at the end of the day to reduce stagnation and biofilm build up within the lines.

The reservoir bottle should also be disinfected daily (or when visible contamination is present) with 5000ppm sodium hypochlorite (1 in 10 dilution of household bleach), then rinsed with distilled water, left open to air for drying overnight and stored inverted. They should **not** be upturned in the sink or spittoon bowl. It should never be left attached to the water line overnight.

The water that resides in the fine tubing that runs through dental unit water lines can become contaminated if left to stagnate. The tubes build up a biofilm internally that discharge bacteria into the residual water. The water must be flushed before use each day. This is especially important after a break in service such as after a holiday period or on a Saturday and Monday morning. You cannot totally remove the biofilm but

flushing reduces the count of bacterial 'colony forming units' to below acceptable limits. Water regulations require drinking water to contain less than 100 cfu/ml.

Flush the water lines for at least **1 minute** (or as instructed by manufacturer's instructions) at the start and end of the day and at least **30 seconds** (or as instructed by manufacturer's instructions) between patients; ensure there are no hand pieces attached when flushing the water lines (see Fig. 5.2b-i). Some dental chair units (A-dec Performer, A-dec & Belmont CLESTA) have 'toggle flush switch' situated underneath or behind the bracket table (Fig. 5.2b-ii). This toggle switch will run water only (without air) through DUWLs when activated. The dental unit water lines are all air lines (air rotor, slow speed hand piece and ultrasonic hand piece), 3-in-1 air/water syringe and drinking/rinsing cup filler. Some do not have the toggle switch and the water lines are flushed in a different manner e.g., Belmont CLESTA II & Belmont tbCompass (see Fig 5.2b-iii to 5.2b-xvi) and KAVO E70 (see Appendix 2).

Fig. 5.2b-i No handpieces attached when flushing the water lines

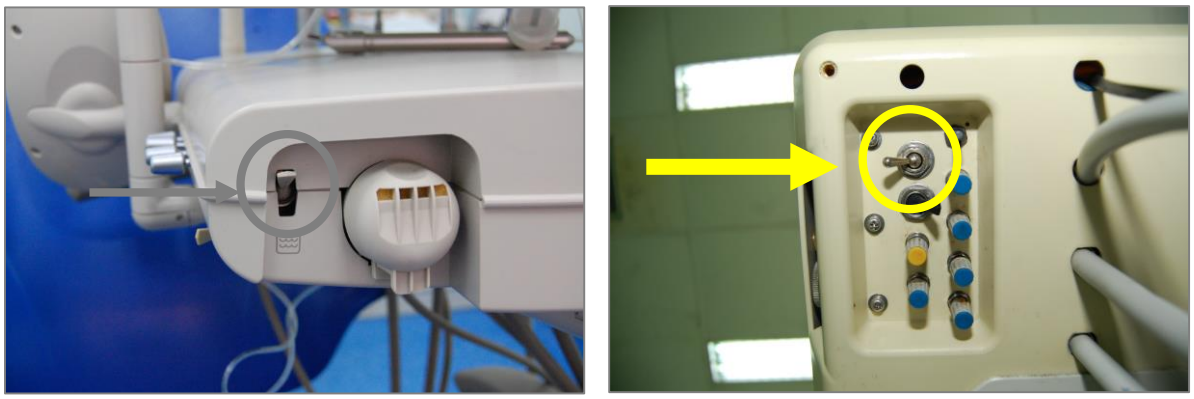


Fig. 5.2b-ii Toggle flush switch (circled) on A-dec Dental chair (left) and Belmont CLESTA (right).

For dental chairs such as Belmont CLESTA II & Belmont tbCompass, the flushing procedures at the start of each day are in the following order:

Fig. 5.2b-iii Press F (function switch) three times & press the (+) switch

Fig. 5.2b-iv Handpiece water lines to be flushed

Fig. 5.2b-v Pick up the handpiece waterlines to be flushed at the same time and set them over the spitoon bowl

Fig. 5.2b-vi Time taken for full flush out will be displayed (5 minutes)

Fig. 5.2b-vii Tap foot controller pedal once to start the process

Fig. 5.2b-viii The water jets out of the handpiece waterlines for 5 minutes

Fig. 5.2b-ix Upon termination of handpiece waterlines flushout, water is delivered out of the cupfiller and spitoon nozzles simultaneously for 5 minutes

Fig. 5.2b-x The residual time to the end of flush out is displayed

Meanwhile, flushing procedures in between patients are as follows:

Fig. 5.2b-xi Press F (function switch) three times & press the (-) switch

Fig. 5.2b-xii Time taken for full flush out will be displayed (40 seconds)

Fig. 5.2b-xiii Pick up the handpiece waterlines to be flushed

Fig. 5.2b-xiv Press the foot-controlled pedal once and release the pedal

Fig. 5.2b-xv The water jets out of the handpiece waterlines for 40 seconds

Fig. 5.2b-xvi The residual time to the end of flush out is displayed

For KaVo ESTETICA® dental chairs e.g. E70, it is recommended to follow the manufacturer's instruction (see Appendix 2) for flushing, cleaning and disinfecting the dental chair, waterlines and suction systems.

(c) Evacuation systems

The evacuation systems used in dentistry are the high-volume evacuation and low-volume saliva ejector/s. They play an important part in most dental procedures as they assist in keeping the operating field visible by removing saliva and irrigants.

Studies have reported that these evacuation systems could potentially be a source of cross-contamination between patients due to the backflow of micro-organisms from the saliva ejector lines. Backflow can occur when a seal around the saliva ejector is created (e.g., if a patient sucks or closes their lips around the saliva ejector). Other instances are such as when suction tip and line are held above the patient's mouth which creates a reversal of pressure and if both high volume suction and saliva ejector is used at the same time.

Although there have been no reports on the adverse health effects associated with these suction lines, they should still be cleaned and disinfected daily with an appropriate evacuation system disinfectant according to the manufacturer's instructions. The agent used to perform cleaning and disinfection must be able to remove both organic and inorganic material or debris, non-corrosive, effective against bacteria, fungi and viruses as well as have low foaming characteristics.

An example is Orotol® Plus (see Fig. 5.2c-i) which is used on Belmont and A-dec chairs and contains a mixture of halogenated alkyl and aryl phenols. It is recommended to carry out daily cleaning and disinfection once or twice a day, preferably after the end of clinical sessions.

The procedures for Orotol® Plus are as follows:

1) Place 10g (1 dosing spoon) of Orotol® Plus into 1 litre of lukewarm water (~30°C)

2) Plug suction hoses onto care system and aspirate solution (see Fig. 5.2c-i)

3) Pour the remaining 250ml solution into the spittoon bowl.

4) Rinse disinfected suction system with water.

*After a surgical procedures, aspirate a glass of cold water intermittently.

Fig. 5.2c-i Cleaning of suction hoses using Orotol® Plus

5.3 THE IDENTIFICATION AND ISOLATION OF CLINICAL HIGH RISK AREAS

Once the clinical surfaces are disinfected and all water lines are flushed, then the area should be 'zoned'.

(a) Zoning

Zoning is the identification of areas within the working environment which guides the level of cleaning and disinfection of surfaces that is required before and after use. It allows the clinicians to limit the number of clinical surfaces that can become contaminated during a clinical procedure. It also identifies surfaces to be covered with barrier coverings, such as cling wrap, that can greatly reduce the contamination of a surface.

The two main zoning categories used are 'Clean' and 'Dirty'. These terms only indicate that an area is either likely or unlikely to become contaminated during treatment, not whether an area is clean or unclean. Therefore, the terms high risk and low risk zones might be a better classification. There are no 'Risk-free' zones as any area may become accidentally contaminated.

The practice of zoning should be strictly adhered to. As such, if an item of equipment or instrument has been used during treatment, and becomes contaminated, that item must remain in the high risk zone and not return to a low risk zone. For example, when an impression tray or hand instrument brought from clean instrument area and

subsequently used on a patient, the used item cannot be returned back to the clean instrument area (low risk zone). The item must now be placed on the bracket table (high risk zone) until it is cleared away.

High Risk Zones

These are areas anticipated to be highly touched or contaminated by splashes of patient's body fluids during clinical procedure. All items in these areas should either be single-used items or be able to be sterilized. Therefore items that cannot be sterilized, should be cleaned and disinfected then subsequently covered with disposable single-use barrier coverings, such as cling film or purpose made covers and sleeves, prior to start of clinical procedure (see Fig. 5.3.a-i). All used barrier coverings should be discarded after each patient and all clinical surfaces disinfected then covered appropriately before seeing the next patient.

<u>High Risk Zone Areas</u>

- ***The head rest of the chair***
- ***Dental light, light-handle and switch***
- ***Bracket table surface, handle and any switches***
- ***The hand piece attachments, motors and tubing***
- ***The suction devices and tubing***
- ***Specifically designated surfaces upon which contaminated items of equipment or materials may be placed, for example trolleys or work surfaces used as accessory bracket tables.***
- ***The spittoon (No barrier is required for this)***

Fig. 5.3a-i Dental light handles, head rest, 3-in-1 air/water syringe conduit, bracket table surface surface, handles & switches; suction tubing, and all handpieces connectors.

Medium Risk Zones

Zones immediately adjacent to high risk zones could be viewed as medium risk. These are not expected to be in direct contact with used gloves or instruments but may be affected by splatter or aerosols. This allows a 'buffer zone' to be placed between the high and low risk areas in which non-disinfectable item should be placed. These areas should be cleaned and disinfected at the end of clinical sessions.

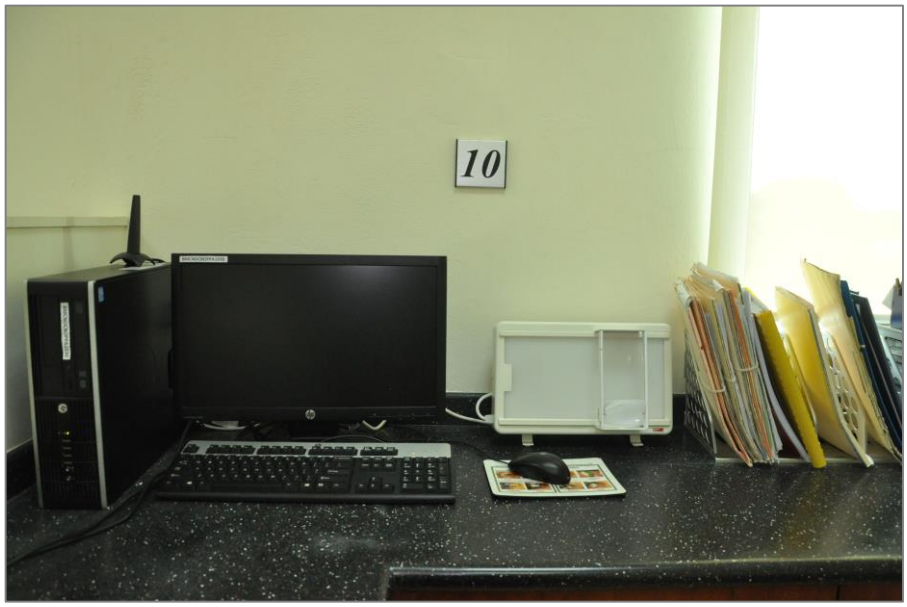


Fig. 5.3a-ii An example of low-risk zone

Low Risk Zones

This is the area of the surgery where equipment such as computers, xray viewers and materials are stored, notes are kept and non-clinical duties (administration) are carried out. This area is not expected to become contaminated by patient's body fluids (see Fig. 5.3a-ii).

Clean instrument zone

This is a specifically designated clinical area which is set up for a patient's procedure that is to remain uncontaminated. It is used to place clean equipment and dental materials prior to use (see Fig. 5.3a-iii). The area can be covered by disposable, clean paper towels, cling films, or disposable paper trays. It may be

Items in this clean zone must not be handled by used gloves. Similarly, a used/contaminated item **must not** be returned to this clean zone. For example, the

dental surgery assistant may hand the dentist a composite dispensing gun during the placement of a composite restoration. The gun will have come from a low risk 'clean' zone. Once used, it must stay in the high risk zone and must be cleaned and disinfected before returning to the clean zone.

Zoning Variations

Some dental procedures required large number of instruments that would not fit on the bracket table (e.g. impression trays or bite registration materials use in the mouth). Hence another supplemental high risk zone or surface should be allocated to put these contaminated instruments. The supplemental high risk zone is selected based on the ease of post-operative cleaning and disinfection such as a large empty surface area without any clutters. Disinfectable items that were originally sitting on the surface area chosen must be cleared away to a low risk zone where contamination risks are low.

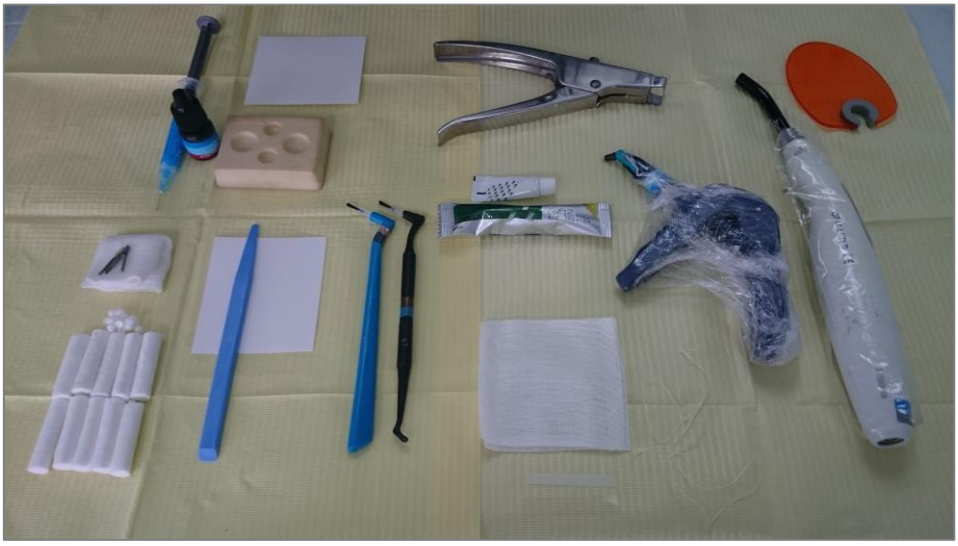


Fig. 5.3a-iii An example of instruments set up in clean instrument zone

(b) Barrier coverings

Barrier coverings prevent contamination of surfaces with micro-organisms in a similar way that gloves prevent contamination of the skin. It reduces the potential microbial load to the surface and allows surface cleaning agents and disinfectants to work more efficiently. This is particularly important in areas which can be difficult to clean such as clinical surfaces and equipment with presence of minor cracks and crevices. Cling film or proprietary sleeves may be used as barrier coverings (see Fig. 5.3b-i & 5.3b-ii).

Fig. 5.3b-i An example of barrier coverings

Fig. 5.3b-ii Cling film

Clinical equipments likely to be touched by contaminated gloved hands but cannot be autoclaved or sterilized should also be covered by barrier coverings. This includes the light cure units, handles of apex locators, impression guns and 3-in-1 air/water syringe.

An example of organisation of clinical area after 'zoning' and barrier coverings is shown in figure 5.3b-iii below; where high risk (red) and medium risk (orange) zones are expected to be within 1-1.8m radius. All personnel who are working within these areas during patient procedure must have their PPE on. Single-used items are recommended in these areas, otherwise all instruments should be sterilized after use. Non-autoclavable items should have barrier coverings on and changed in between patients.

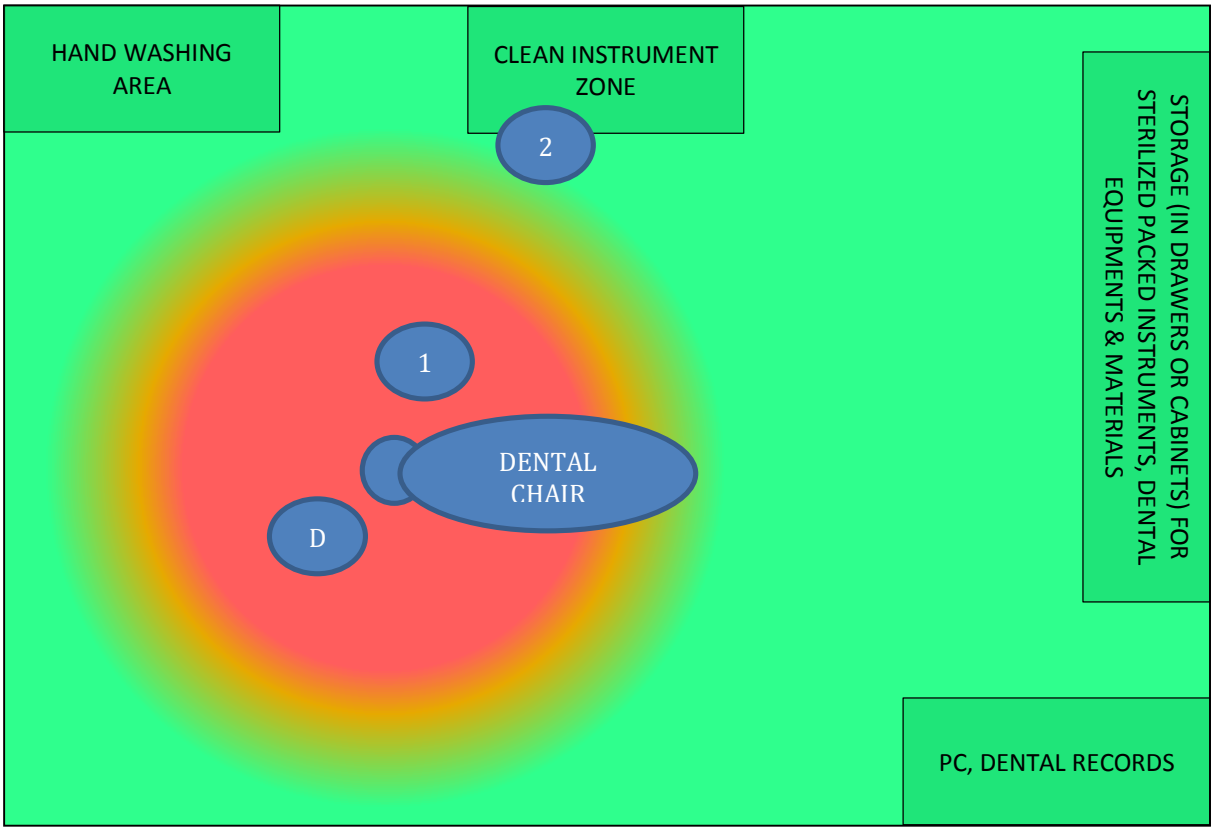


Fig. 5.3b-iii 'Zoning'; **Red** area indicates High Risk Zone, **Orange** area indicates Medium Risk Zone & **Green** areas indicate Low Risk Zones.

Key: **'D'** – Dentist, **1** – 1st Dental Surgery Assistant, **2** - 2nd Dental surgery assistant (if available).

5.4 PRE-OPERATIVE PREPARATION OF EQUIPMENT AND INSTRUMENTS NECESSARY FOR CLINICAL PROCEDURES

All clinical items, equipments and materials, necessary for a clinical procedure should be assembled and set up prior to starting the procedure. This will greatly reduce unnecessary contamination in the clean 'storage' zone. It is the duty of the dental surgery assistant to be on alert of the clinical procedure likely to be carried out by the dentist and anticipate all the equipments, instruments and materials necessary for the procedure.

It is advisable to standardize tray lists (see Fig. 5.4a, 5.4b & 5.4c) for each procedure so we may not miss out on any required instrument during treatment. This is especially ideal when only two-handed dentistry is possible. Pre-operative preparation prevents the need to move outside the operating area, thus optimizes good infection control practice.

Fig. 5.4a Oral examination kit

Fig. 5.4b Periodontal kit: hand curettes

Fig. 5.4c Restorative kit

Whenever feasible, single-use items should be considered as an alternative to processing reusable items. Single-use means that a device can be used on a single patient during one treatment session and then discarded. It is not intended to be reprocessed and used again, even on the same patient, at a later session. Single- use alternatives, if available, should also be considered where instruments are difficult to clean. Some examples of single-use items and instruments in dentistry are as follows (see Fig. 5.4d):

- Needles and anaesthetic cartridges
- Scalpel blades
- Plastic cups
- Cotton wool rolls
- 3-in-1 tips
- Saliva ejectors
- Matrix bands
- Wooden interdental wedges
- Endodontic files
- 'Compules' of filling materials
- Gloves
- Face masks

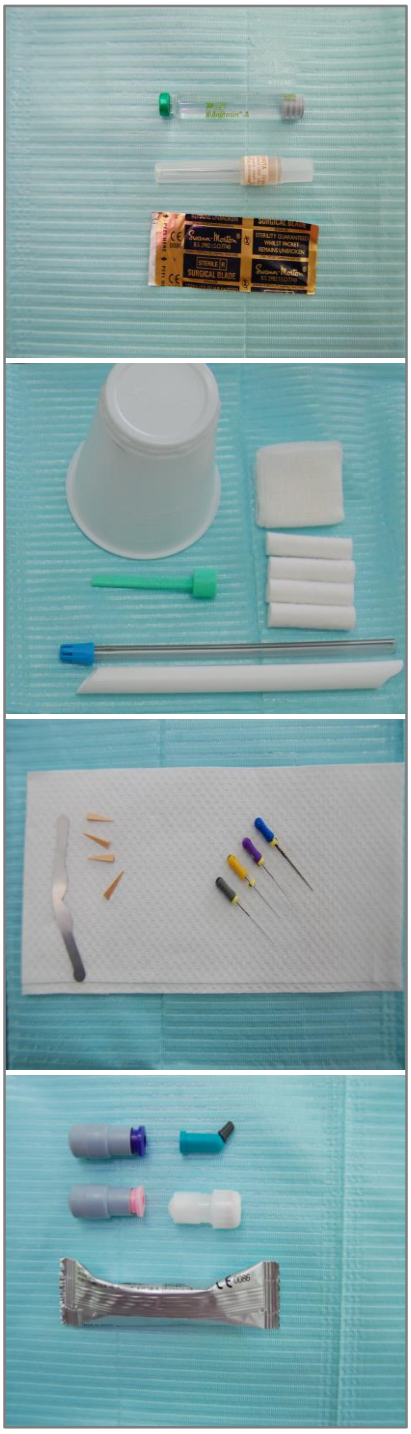


Fig. 5.4d Some of the single-use items in dentistry

SECTION 6: INFECTION CONTROL DURING PATIENT TREATMENT

The most important concept to remember is that anything that enters the high risk zone during patient treatment should not be subsequently returned to a low risk zone, it should be placed on the bracket table.

Gloved hands can be an important source of transmission of infection if the clinician does not control what he/she touches after contact with patients. It is not a good infection control practice to pick up pens, notes, telephones, radiographs or touch other items such as chairs and work tops after working in the mouth as this will cross contaminate that surface. Common habits such as adjusting spectacles, head scarves and masks or flicking hair out of the way must also be resisted.

PPE such as gloves, masks, gowns and aprons must be discarded and hand hygiene performed before leaving the surgery. PPE should not be worn outside the immediate clinical areas (see Fig. 6a & 6b). Similarly, patients sitting in waiting area or walking around the clinical area should not be allowed to wear PPE except when patient is going for x-ray during endodontic cases.

Fig. 6a Remove PPE upon leaving surgery

Fig. 6b PPE is **not** allowed in the reception area

6.1 TRANSFER PROTOCOLS - THE TRANSFER OF DENTAL EQUIPMENT BETWEEN DENTIST AND ASSISTANT

Cross contamination may occur during treatment where items of equipment, instruments and materials are passed between dentist and the dental surgery assistant. The dentist must ensure good infection control practice to avoid cross contamination and reduce hazards and risks relating to poor infection control.

A common example where cross contamination may occur is during impression taking. This can be prevented if the following procedure is practiced:

- When taking an impression, the dentist may try the impression tray in the patient's mouth beforehand to check tray size and fit. This tray is now contaminated with the patient's saliva. In such circumstances, if the tray now needs to be coated with an adhesive, a spray type adhesive should be used. The dental assistant can hold the spray can whilst the dentist holds the tray.
- During mixing of impression material, two separate spatulas must be available (see Fig. 6.1a). Both the spatula and measuring scoop which are meant for transferring alginate powder from a designated container to a mixing bowl, should be kept in the alginate container after use.
- Next, a separate spatula should be used to mix the alginate, and this spatula should only be restricted for mixing alginate and loading the patient's impression tray.

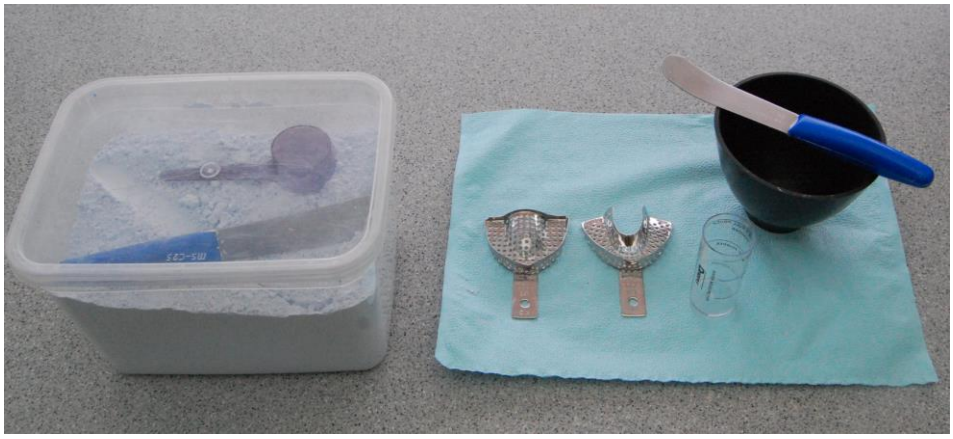


Fig. 6.1a Spatula used for mixing must be separated from the one in the alginate container. It is also recommended to place items or impression trays on disposable paper towel.

Other examples of equipments / apparatus used in dentistry where cross contamination can occur due to poor infection control practices are as follows

- Dispensing guns, for example for impressions materials, temporary crown materials and composite restorations
- Light curing equipment
- Apex locators
- Electronic pulp testers
- Clinical cameras, mirrors and retractors
- Clinical magnification loupes and microscopes
- Amalgam mixers and carriers
- Dentist and dental surgery assistant's stools/seats

6.2 SHARPS INJURY AVOIDANCE

Local anaesthetic needles should only be re-sheathed using a one-handed technique (see Fig. 6.2a). Use safety devices for needle re-sheathing, such as 'Jenker'. Do not leave the local anaesthetic (LA) needle standing in the 'Jenker' (see Fig. 6.2b). Another type of needle re-sheathing device is shown in Fig 6.2c.

It is a good practice to dispose all sharps into sharps container immediately after use (see Fig. 6.2d). Keep the instrument tray tidy and place sharps such as scalpel blades and suture needles in plain view if they cannot be disposed immediately. Ensure that sharp instruments are not hidden under debris.

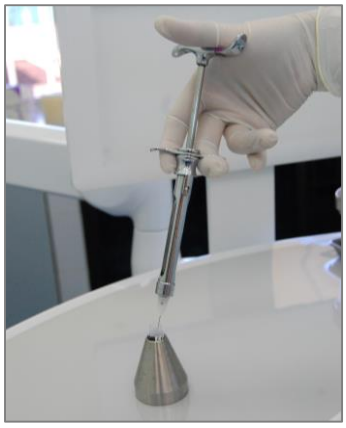


Fig.6.2a Single-handed technique

Fig. 6.2b DO NOT leave LA needle standing in jenker

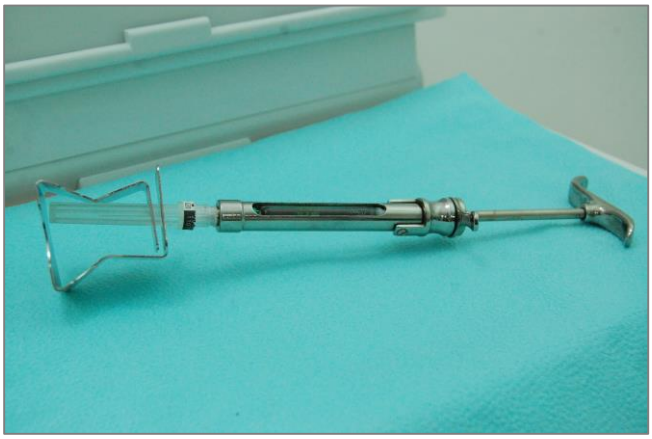


Fig. 6.2c Another type of needle re-sheathing device

Fig. 6.2d Sharps container

Keep gloved fingers behind the cutting edges of scalpels and elevators, or the points of probes, needles and periodontal scalers. Retract soft tissues with an instrument rather than a finger where possible.

Sharps injury can occur during cleaning and transportation of used instruments. Burs and ultrasonic tips in hand pieces should not be left attached to the unit as they can catch arms and legs.

Fig. 6.2e Burs and ultrasonic tip should not be left attached to the unit when not in use

Important points to remember regarding sharps containers

- ***Sharps containers must be available & accessible in every clinical area.***
- ***The containers should be placed in a visible location, within easy horizontal reach and below eye level. The container should also be placed away from any obstructed areas, such as next to doors, under sinks, near light switches, etc.***
- ***The containers must not be left on the floor and should not be in a position where they may be easily knocked over.***
- ***Always check that the containers are assembled correctly. The containers should be upright and easy to operate while preventing the contents from spilling.***
- ***Protective eye wear must be worn when removing scalpel blades.***
- ***Dispose needles and syringes as near to the point of use as possible, directly into the containers.***
- ***Items should never be left protruding from any container.***
- ***When the containers are ¾ full, close cover and secure firmly prior to transporting.***

Source*: National Institute for Occupational Safety and Health (NIOSH)*

6.3 AEROSOL AND SPLATTER PRODUCTION

Good surgery ventilation and efficient high volume aspirators will reduce the risk of disease transmission by eliminating aerosols. High volume aspiration (see Fig. 6.3a) should be used during procedures that create aerosols, such as drilling and ultrasonic scaling.

Rubber dam isolation (see Fig. 6.3b) of teeth offers substantial advantages and should be used whenever practicable. It enhances the quality of the operative environment and virtually eliminates saliva and blood contaminated splatter. When working without rubber dam, the use of high volume aspiration is essential.

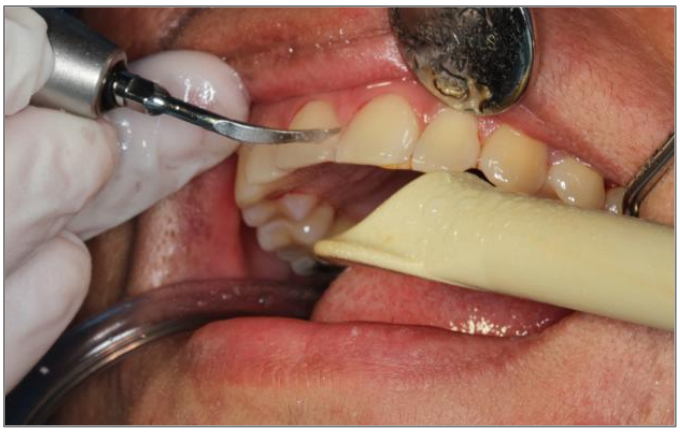


Fig. 6.3a High volume aspiration

Fig. 6.3b Rubber dam isolation

6.4 LEAVING THE CLINICAL AREA DURING TREATMENT

Before leaving the clinical area, PPE must be removed (refer to Section 7) and hand hygiene performed.

When removing PPE, take gloves off first, followed by protective apron, protective glasses/face shield, and lastly mask. The mask must be removed by holding the tie or ear loops. Perform hand hygiene immediately after removal of PPE by washing hands with soap and water or by handrubbing using alcohol-based handrub.

SECTION 7: INFECTION CONTROL AFTER TREATMENT IS COMPLETED

Safe and effective clearing and cleaning are important for good infection control. Potentially infectious agents can be transmitted between zones, clinical areas and outside clinical areas if infection control practice is not maintained at this stage.

Once patient's treatment is completed, all single use items as part of PPE such as used masks, gloves and aprons must be removed and disposed of in the yellow clinical waste bags. Protective eye wear must also be removed for decontamination. Perform hand hygiene procedure immediately after removal of PPE.

PPE should be removed in the following order:

1. **Single-use, disposable gloves** - ensuring that the gloves end up inside out and the hands do not become contaminated.
2. **Disposable plastic aprons & long-sleeve gowns** – For aprons, by breaking the neck straps and gathering the apron together **touching the inside** only. For disposable long-sleeve gowns, by grabbing the gown's neck and breaking the ties behind, then rolling it outwards without touching the exterior ('De-gowning').
3. **Eye protection (full face visor)** - taking care not to touch the outer surface.
4. **Disposable face mask** - by breaking the tie or unhooking the ear loops, and avoiding touching of the outer surface. Mask should never be allowed to hang around neck.

However, if a full face visor is worn instead of protective glasses, then PPE should be removed in the following order: Gloves, Apron, Eye protection and Mask as shown in Fig. 7.

Single-use, disposable gloves

Disposable plastic apron

Eye protection (protective glasses or face visor)

Disposable face mask

Fig. 7 Sequence of removal of PPE

7.1 CLEARING THE CLINICAL AREA

Appropriate PPE, including protective eye wear, gloves, masks and protective apron, must be worn when clearing and cleaning the clinical area (see Fig. 7.1). The bracket table needs to be cleared safely. Sharps and needle-stick injury can occur during the process of clearing. Instruments for decontamination and sterilization must be transferred safely to the decontamination area (refer to Section 7.4).

Fig. 7.1 Wearing PPE during clearing and cleaning the clinical area

7.2 CLINICAL WASTE DISPOSAL

Single use items that are contaminated with blood, saliva or other fluids are regarded as clinical waste. Non-sharps clinical waste, such as masks, gloves, aprons and contaminated paper towels are disposed of in yellow clinical waste bags (see Fig 7.2). Paper towels used for drying hands after washing are not regarded as clinical waste and can be disposed of in black waste bags (see Fig 7.2). The standard operating procedure (SOP) flowchart for clinical waste management in dental clinic can be found in Appendix 3. Recommendations on proper handling of waste bags and sharps containers for cleaners can be found in Appendix 4.

Sharps are disposed of in yellow clinical sharps containers. Sharps can be defined as anything that could pierce a yellow bag. Some examples of sharps are:

- Needles
- Local anaesthetic cartridges
- Disposable syringes
- Scalpels
- Orthodontic wires, ligatures and brackets; including parts of disassembled Orthodontic appliances (such as Nance button, Transpalatal arch)
- Broken instruments
- Disposable 3-in-1 air/water tips
- High and low volume suction tips or saliva ejectors
- Plastic impression nozzles
- Rusty metal impression tray handles
- Micro brushes and applicators
- Matrix bands
- Composite and glass-ionomer compules
- Burs and prophylaxis cups
- Toothbrushes, toothpicks and floss-picks

Fig. 7.2 Yellow clinical waste bin (left) & black waste bin (right)

- Wooden spatulas
- Teeth (including teeth without metal restorations) and roots
- Wooden interdental wedges

7.3 CLEANING THE CLINICAL AREA

A strict system of zoning aids and simplifies the cleaning process. After treatment is completed, all barrier coverings and paper towels used as covers must be removed first, and disposed off in the yellow clinical waste bag.

Any visibly soiled areas must then be cleaned with detergent. This can then be followed by wiping with an appropriate disinfectant. All work surfaces, including chair head rest, handles and buttons, should be thoroughly wiped. Clean and disinfect the spittoon last, starting with the outside and finishing with the inside. The cleaning procedure is similar to the procedure in Section 5.2a (see Fig. 5.2a-i to -iv).

All cleaning and disinfecting cloths must be disposed as clinical waste. Gloves must then be removed and appropriate hand hygiene procedure must be carried out prior to placing new barrier coverings for the next patient.

7.4 IMPRESSIONS AND LABORATORY WORK

The responsibility for ensuring impressions, prostheses and appliances have been cleaned and disinfected prior to being dispatched to the laboratory lies solely on the dentist. All disinfected items must also be labelled to indicate disinfected status.

Fig. 7.4a Remove saliva, blood, debris with water

Fig. 7.4b Immerse in disinfecting solution for not more than 10 minutes depending on manufacturer's instructions

Fig. 7.4c Clean disinfectant with water

Fig. 7.4d Place in a sealed bag and label as 'Disinfected'

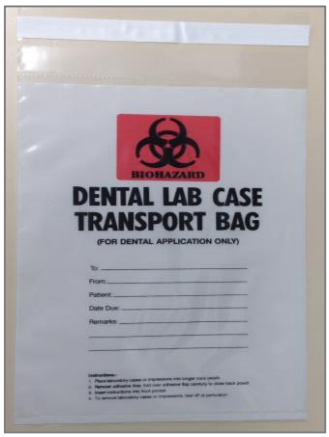


Fig. 7.4e All denture cases must be placed in the new 'Dental lab case transport bag'

Upon removal from the mouth, the item should be cleaned with water to remove saliva, blood and debris (see Fig. 7.4a). When the item is visibly clean, it should then be disinfected by immersion in a suitable disinfecting solution such as 1% (1 in 5 dilution of 5.25%) sodium hypochlorite for not more than 10 minutes (see Fig. 7.4b). Following disinfection, the item must be thoroughly rinsed in water then kept in a sealed bag and labelled as 'disinfected' (see Fig. 7.4c & 7.4d) before sending to the laboratory. Items received from the laboratory should also be disinfected. Use of transport bag (see Fig. 7.4e) is recommended for all cases going into and out of the dental laboratory.

Cast stone models can also be disinfected with 0.5% (1 in 10 dilution of 5.25%) sodium hypochlorite solution as there may be chance of cross contamination during the clinical session.

Important points to remember regarding impression trays

Metal impression trays

- *Reusable*
- *Should be processed as other metal devices (cleaned, ultrasonic bath or thermal wash disinfector then steam sterilized)*

Plastic impression trays

- *Single use items*
- *Disposed as clinical waste*

7.5 TRANSPORTATION OF INSTRUMENTS TO DECONTAMINATION AREAS

Instruments for decontamination should be transferred as soon as possible after use to the decontamination area in order to avoid the risk of drying. Portable water immersion or the use of commercial gels (or sprays) may be considered if a delay in reprocessing is unavoidable. Then, prompt decontamination is appropriate.

Instruments should be transferred safely to the decontamination area to prevent contamination of the surrounding during transportation. If decontamination area is separate from the treatment area, use of transport containers on a trolley (see Fig. 7.5) may be considered.

Transport containers should be:

- Leak-proof
- Easy to clean
- Rigid (to prevent instruments from becoming sharps hazard to anyone handling and to protect from accidental damage)
- Capable of being closed securely

Containers for transport of instruments for decontamination and of sterilized instruments should be clearly marked as for each function and should not be used interchangeably.

Containers and trolleys should be kept visibly clean and dry. They should be wiped and disinfected after each use.

Fig. 7.5 Trolley for transporting containers of instruments

SECTION 8: DECONTAMINATION AND STERILIZATION

All instruments contaminated with oral and other body fluids must be thoroughly cleaned, disinfected and sterilized after use. This makes any re-usable item safe for further use on patients and handling by the staff.

A systematic approach to the decontamination of instruments can help to ensure the dirty instruments are segregated from the clean. The cleaning, disinfection and sterilization process flow is shown below.

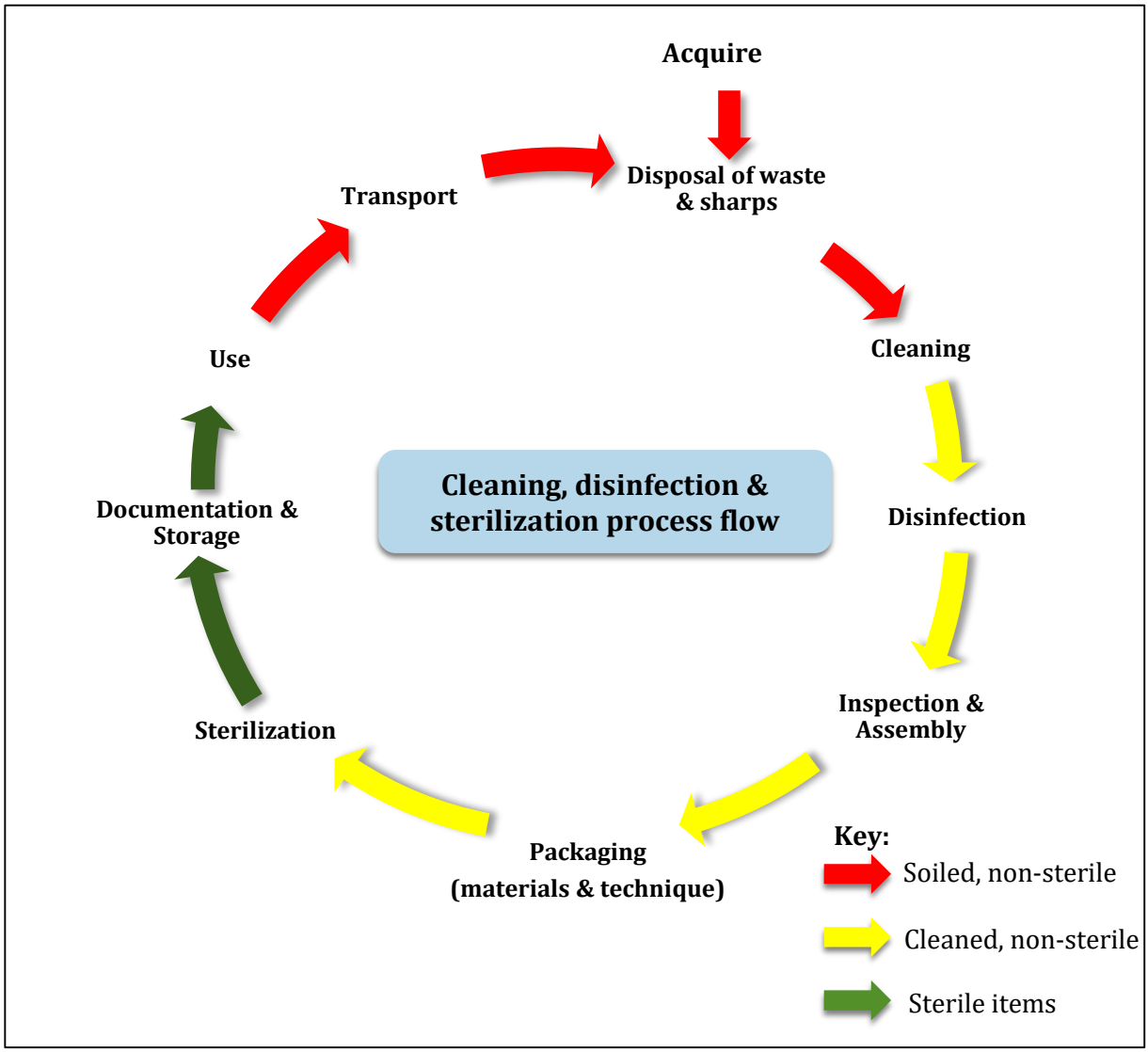


Fig. 8 Cleaning, disinfection and sterilization process flow.

There is a clear need to separate decontamination work from clinical treatment area. Where instruments are cleaned and decontaminated in the same room as patient treatment area, decontamination area should be as far from the dental chair as possible. As the practice moves towards higher standards, decontamination process should be done in a separate room.

8.1 CLEANING AND INSPECTION

Effective cleaning of instruments is an essential prerequisite before sterilization and will reduce the risk of transmission of infectious agents.

Cleaning involves the removal of saliva and blood, calculus and tissue, and adherent dental materials. This process is important, **as effective sterilization cannot be achieved when there is a barrier of blood, tissue or dental material on the instruments**. Unfortunately, Creutzfeld-Jacob Disease; CJD and variant CJD (vCJD) is transmitted by an agent that is very resistant to disinfection and sterilization. Furthermore, the carriers of the disease cannot be detected until they are symptomatic.

Cleaning of instruments should be done as soon as possible after use. When working with substances that can harden on instruments (for example, cements), the hardened substances should be scraped and removed immediately. Instruments that cannot be cleaned should be discarded.

Instruments should be immediately soaked in water, detergent or an enzymatic cleaner (see Fig. 8.1) to prevent drying of patient's body fluids, and make manual cleaning safer, easier and less time consuming. Do not immerse handpieces in the enzymatic cleaner. Instruments that consist of more than one component (e.g., Amalgam carrier) should be dismantled to allow each part to be adequately cleaned.

Currently available primary cleaning methods are a) washer-disinfector; b) manual combined with ultrasonic cleaning; and c) manual cleaning. Wherever possible, cleaning should be performed by using an automated and validated washer-disinfector in preference to manual cleaning. Within the best-practice framework, manual cleaning should be considered only where manufacturer specifies that the device is not compatible with automated process or when washer disinfector is temporarily unavailable (e.g., for repair or validation).

Regardless of the method of cleaning used, all instruments should be visually inspected for cleanliness and checked for wear or damage before sterilization. The use of simple magnifying device with task lighting can help in visual inspection. Instruments found to be faulty or damaged should be taken out of use. If they are to be sent for repair, they should be decontaminated fully. All instruments should be dried using non-linting cloths.

Fig. 8.1 An example of enzymatic cleaner is Alkazyme®

Fig. 8.1 Picture of ultrasonic cleaner

(a) Automated cleaning: washer-disinfectors

The 'gold standard' for cleaning and decontamination is the automated washer-disinfector (see Fig. 8.1a-i). It offers the best option for the control and reproducibility of cleaning. It works by using hot temperature of about 80-90 degree Celsius which comes into direct contact with instruments for a specified amount of time. This reduces viable microorganisms but may not kill bacteria spores/virus hence items are not completely sterile. Cleaning process can be validated under European Norms (EN) ISO 15883.

Fig. 8.1a-I Washer disinfector

A typical washer-disinfector cycle includes five stages:

1. **Flush** - removes gross contamination using a water temperature of less than 45^0C. This is to prevent coagulation of protein and fixing of soil to instruments.
2. **Wash** - removes staining soil using detergents specified by the manufacturer.
3. **Rinse** - removes detergents.

4. **Thermal disinfection** – Temperature is raised and maintained at the pre-set disinfection temperature for required disinfection holding time.

5. **Drying** – Chamber loaded with heated air to remove residual moisture.

Users must follow manufacturer's instruction for all operational aspects of using a washer-disinfector. This will include details on water quality/type to be used and types of detergents and/or disinfectants recommended for use with the device.

How to load instruments effectively

- ***Do not overload instrument carriers or overlap instruments***
- ***Open instruments hinges and joints fully (see Fig. 8.1a-ii)***
- ***Attach instruments that require irrigation to the irrigation system correctly, ensuring filters are in place if required (for example for handpieces, if specified by manufacturers)***

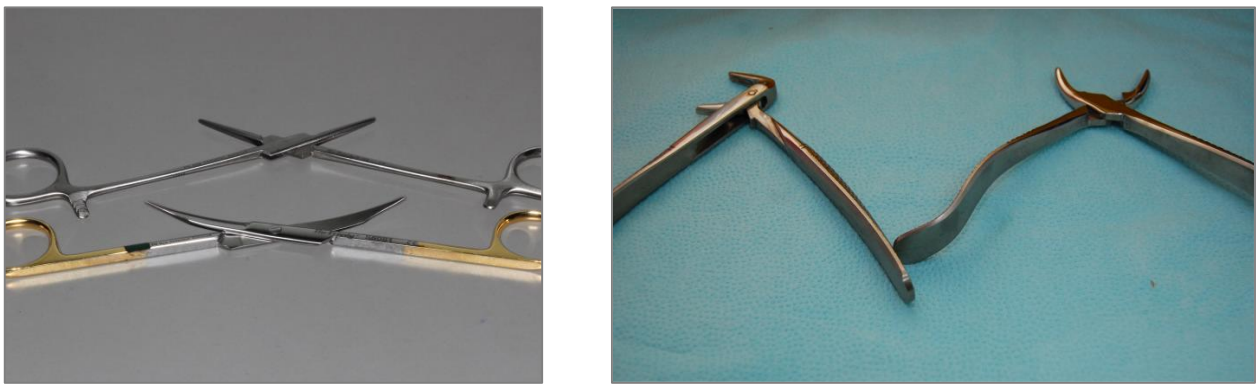


Fig. 8.1a-ii Open hinges & joints fully

After cleaning, visual inspection should be done with simple magnifying device with task lighting.

Washer-disinfector logbooks and records should be kept by the Infection Control link persons. Records should include cycle parameters, routine testing and maintenance of equipment used. Records should be maintained for not less than 2 years.

Maintenance and servicing should be carried out according to manufacturer's instructions.

Validation is needed for new equipment at installation, annually thereafter and after any major repairs has been carried out. Manufacturer's guidance on validation should be followed, alternatively use the validation protocol suggested (see Appendix 5).

Periodic test using Health Technical Memorandum (HTM) 01-05 test schedule (see Appendix 6) is recommended. Additional tests defined by the manufacturer should also be performed.

Staff should be trained in the correct operation of a washer-disinfector, performing daily tests and housekeeping tasks. Records of training and the achievements of staff should be maintained.

(b) Ultrasonic cleaners

The use of ultrasonic cleaners has been shown to be an effective means of cleaning stainless steel and metal instruments that are heavily soiled e.g. with dental cement. It is important to note that ultrasonic bath only cleans, **not** disinfect. The ultrasonic cleaners must be operated according to manufacturer's instructions.

The ultrasonic cleaning solution must be compatible with dental instruments and other items to be cleaned, and the tank or chamber where instruments are placed. Most ultrasonic solutions are of neutral pH or alkaline which are effective cleaners and non-damaging to the metals typically used for dental instruments. However, an alkaline solution is the product of choice in areas where there is hard water since it is more effective at managing mineral deposits.

Sometimes a disinfecting solution is mistakenly used in the ultrasonic, which may not be of desirable pH. This could damage instruments and the ultrasonic unit. The only solution that should ever be used in an ultrasonic cleaner is an ultrasonic cleaning solution for e.g. Dürr ID 211, 212, 213. Some ultrasonic cleaning solutions also contain rust inhibitors to protect instruments, especially hinged instruments. Ultrasonic solutions should be changed according to manufacturer's instructions or sooner if they become cloudy or contain a great deal of debris. Since the solution is contaminated, items should never be placed into the solution or removed with bare hands. Also, the lid to the ultrasonic unit should always be closed when the unit is running to prevent any aerosolization of the solution.

Ultrasonic cleaning procedures should be followed:

1. Immerse instruments briefly in cold water (detergent or enzymatic cleaner) to remove some of the blood and other visible soiled before ultrasonic cleaning. PPE should be worn to prevent inoculation injury. Care should be taken to minimise aerosol production.

2. Ensure joints or hinges are opened fully. Instruments that consist of parts should be fully disassembled before immersing into the solution.

3. Place instruments in a suspended basket and fully immerse in the cleaning solution, ensuring all surfaces are in contact with the solution.

4. Do not overload the basket or overlap instruments.

5. Set the timer to the correct setting as per manufacturer's instructions (usually between 5 and 10 minutes for most units).

6. Close the lid and do not open until the cycle is complete.

7. Once cycle is complete, drain the basket of instruments before rinsing the instruments.

Instruments that CANNOT be cleaned with ultrasonic cleaner

- ***high speed and slow speed handpieces***
- ***rubber and plastic instruments***
- ***polishing tips***
- ***scaler handpieces & ultrasonic scaler inserts***

After each cycle of ultrasonic cleaner, **rinse instruments thoroughly with distilled water** to remove soil and detergent residues. Drain and inspect instruments for cleanliness, and wear (or damage) before sterilization. Dry the instruments thoroughly with clean disposable paper towels before packaging. Instruments should be sterilized as soon as possible to avoid air-drying which can induce microbial growth and corrosion.

Maintenance and servicing should be carried out according to manufacturer's recommendations. Validation is needed for new equipment at installation, annually thereafter and after any major repairs have been carried out. Manufacturer's guidance on validation should be followed, alternatively use the validation protocol suggested (see Appendix 7).

In order to ensure the ultrasonic unit is functional, periodic testing must be carried out by either User (U), Competent Person (CP) or Service Engineer according to Health Technical Memorandum (HTM) 01-05 periodic test schedule (see Appendix 8) or according to manufacturer's instruction of use.

(c) Manual cleaning

Manual cleaning carries a greater risk of inoculation injury when compared with other cleaning methods. Although simple to set up, manual cleaning is difficult to validate as it is not possible to ensure that it is carried out effectively each time.

Personal protective equipment should always be used when performing manual cleaning. This includes protective eyewear, utility gloves, face mask and disposable plastic aprons (see Fig. 8.1c-i). As there is higher risk of penetrating sharps injury with the use of examination gloves, durable heavy duty rubber gloves are encouraged.

Fig. 8.1c-i Use of PPE during manual cleaning

Manual cleaning should be performed by following the steps below:

1. Fill the sink up with water to 8-10cm of depth (see Fig. 8.1c-ii) followed by two pump doses of plain detergent. Always use detergents specifically made for the manual cleaning of instruments. **Avoid hot water of more than 45 degree Celsius** as the high temperature will coagulate proteins and inhibit removal. Always put the water in first then detergent, or foaming will occur obscuring view of the instruments and increasing the risk of a sharps injury.

Fig. 8.1c-ii Sink filled with water

Fig. 8.1c-iii Instruments immersed fully in water

2. Immerse the instruments fully in water (see Fig. 8.1c-iii). Do not put too many instruments in the sink at once. Add more water as required.

3. Using the utility gloves, brush the instruments under the water until they appear clean (see Fig. 8.1c-iv). Care should be taken to minimise splashes or aerosol production. Long-handled brush **must** be used for manual cleaning to keep the hands as far away as possible from sharp instruments.

4. Remove the instruments from the sink and visually inspect the instruments making sure that they are free of residual debris or blood (see Fig. 8.1c-v).

After cleaning, instruments should be rinsed in another sink filled with **distilled water** to remove chemical residue.

Fig. 8.1c-iv Long-handled brush is used

Fig. 8.1c-v Remove instruments & inspect visually

Requirements of manual cleaning

- ***All staff undertaking manual cleaning must wear the appropriate PPE.***
- ***If a dedicated double sink is available for the manual cleaning of instruments, the first basin is to be used for cleaning instruments and the second basin is using for rinsing instruments with distilled water only.***
- ***A supply of cleaning implements, materials and accessories should be provided, for example long-handle brush. The cleaning implements themselves should be routinely decontaminated, sterilized or discarded if single-use.***
- ***Water temperature for initial immersion of devices must not exceed 45^{0}C.***
- ***The detergent to be used must be measured accurately according to the manufacturer's recommendations.***
- ***Always visually inspect the instruments to be free of residual debris and blood before transporting them for disinfection / sterilization. Use of simple magnifying glass with task lighting is recommended.***
- ***Thoroughly dry the instruments with clean paper towel before sterilization.***

8.2 CLEANING OF DENTAL HANDPIECES

Cleaning of dental handpieces can be done by either using automated or manual cleaning. Manual cleaning is performed when dental handpiece cleaning machines are not available. The external and internal surfaces of handpieces are cleaned as well as lubricated physically. **Never clean and immerse in disinfectant or detergents containing chlorine as it will damage the handpieces.** In addition, **do not put dental handpieces in the ultrasonic cleaners**. Personal protective equipment should be worn when carrying out the cleaning procedures.

(a) External cleaning

Procedures for manual cleaning is as follows (see Fig 8.2a-i to –vi).

Fig 8.2a-i Remove bur or rotary instrument

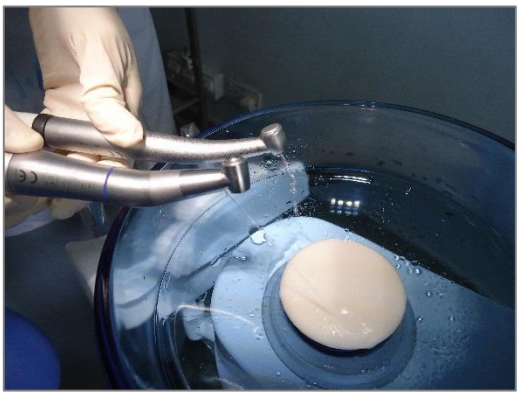


Fig 8.2a-ii Flush handpiece with water for 20 seconds before removing from coupling

Fig 8.2a-iii Remove handpiece from coupling

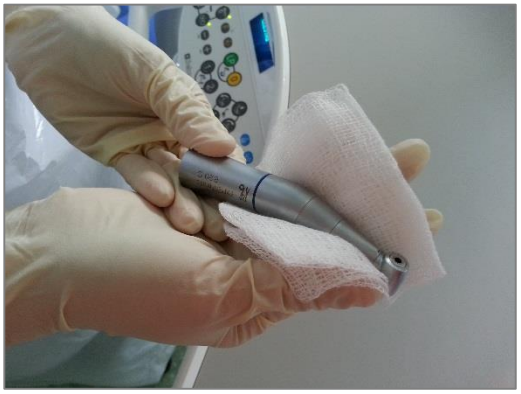


Fig 8.2a-iv Carefully wipe outer surface of handpiece with Methylated Spirit® and allow air dry

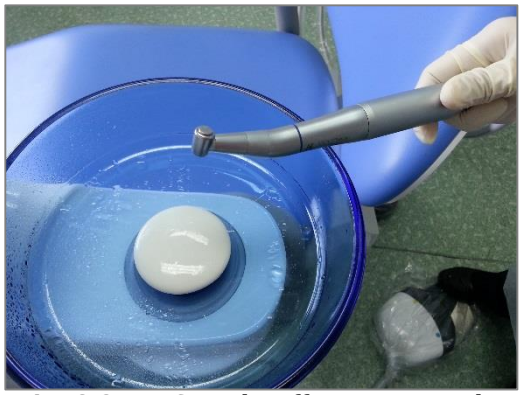


Fig 8.2a-v Switch off water supply, reconnect the handpiece to the coupling and operate it for 20 seconds only with air

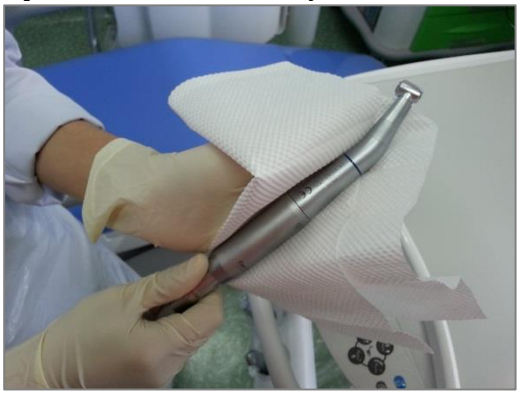


Fig 8.2a-vi Dry outer casing with a non-linting cloth

(b) Automated internal cleaning

The machine KaVo QUATTROcare (see Figure 8.2a-i) is used to clean and lubricate the internal components of dental handpieces. It works by cleaning the air and water channels of handpieces with a detergent spray solution, then lubricating the bearings and gears with oil. The excess oil is purged. The whole process takes about 35-40 seconds.

Fig 8.2b-i Automated Internal Cleaning - KaVo QUATTROcare

Guidelines on proper use of dental handpiece cleaning machine:

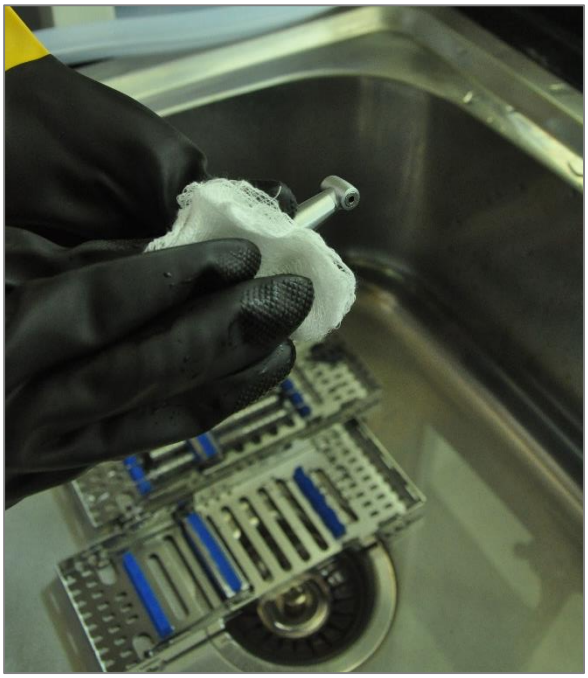


Fig 8.2b-ii After disengaging handpieces from chair, wipe surfaces with alcohol and allow to air dry

Fig 8.2b-iii Attach handpieces to the machine as shown

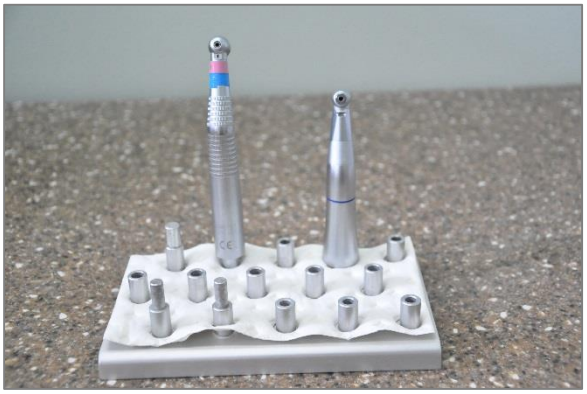


Fig 8.2b-iv Use of cellulose pads to absorb the excess lubricant oil

Fig 8.2b-v Wipe with clean paper towel to remove any excess oil before packing.

Fig 8.2b-vi Pack dry handpieces & send for sterilization

b) Manual internal cleaning

Internal cleaning can also be done manually as follows:

Check that the service oil canister has the correct nozzle attachment for the handpiece.

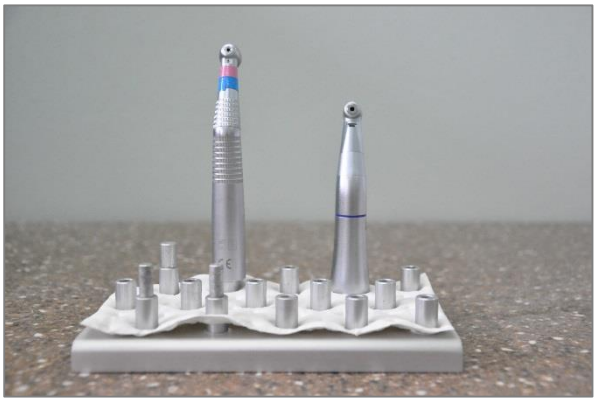
A specific nozzle can only fit its respective handpieces

Shake the oil can vigorously so that it mixes the oil, cleaning solvent and propellant mixture

Place oil can on a flat hard surface. Hold a soft absorbent paper towel around the head of the handpiece and insert the nozzle to spray into the front of the chuck system for 1-2 seconds.

Use a new disposable paper towel and hold it around the head of the handpiece. Spray service oil once (approximately 3 seconds) through the attachment or lumen.

Place handpieces on cellulose pads to drain off excess oil



8.3 DISINFECTION

Levels of disinfection can be classified as **high**, **intermediate**, or **low level** based on the contact time and the biocidal activity of the agent.

An ideal disinfectant should be non-corrosive, non-flammable, non-bleaching and contains no phosphates, phenolics, chlorine or dangerous glutaraldehydes. Although there are many new products available in the market, many do still contain the said ingredients.

High level disinfection kills all bacteria and viruses, but not necessarily all bacterial spores. It is difficult to monitor its effectiveness and manufacturer's instructions for use must be followed strictly. An example of heat-automated high level disinfectant is washer disinfector. High level disinfectants can also be in the form of liquid immersion e.g., glutaraldehyde, glutaraldehyde with phenol, hydrogen peroxide with peracetic acid, orthopthalaldehyde. High level disinfectants are to be used for heat-sensitive semi-critical patient-care items, and **not** for environmental surfaces. High level disinfectant such as Virusolve+® can be used to disinfect dental instruments that cannot be sterilized, meanwhile Unident Impre® can be used to disinfect impressions and laboratory items. Contact time varies according to manufacturer's instruction of use.

Intermediate level disinfection kills vegetative bacteria and the majority of fungi and viruses, but not necessarily capable of killing bacterial spores. It should render

pathogenic microorganisms, such as the Herpes family, HIV and the Hepatitis viruses non-infective. Usually, the contact time is 10 minutes in order for most surface intermediate disinfection to be effective. However this depends on the degree of contamination of the surface, the amount of organic debris present, the contact time of the solution, and the type and concentration of the disinfectant. These liquid disinfectants such as chlorine containing products, quaternary ammonium compounds with alcohol, phenolics, iodophors are used as surface disinfectants in dentistry. An example of a surface disinfectant is Unisepta Foam®.

The least effective disinfection process is through **low level** disinfection. It destroys the majority of vegetative bacteria, certain fungi and viruses and does not inactivate Mycobacterium bovis. Low-level disinfectants are **not** used to disinfect patient-care surfaces, but they are used for non-critical area with no visible blood or patients' body fluids and house-keeping areas such as floors and walls. Examples of disinfectants are quarternary ammonium compounds, some phenolics and some iodophors. Proprietary liquid detergents are the most common type of low-level disinfectant used in dentistry.

8.4 STERILIZATION

The aim of sterilization is to kill all microorganisms including spores. Effective sterilization requires steam to contact all surfaces of the instrument. Direct contact is prevented by material left on the instruments such as blood and dental materials as well as inadequate removal of air within the chamber, complicated instrument design and a narrow lumen.

(a) Steam Heat Sterilization

There are three types of benchtop sterilizers used within the healthcare setting:

- ***Type B*** (Fig. 8.4a-i)***:*** These **vacuum bench-top sterilizers** have an active air removal cycle prior to the sterilization cycle. This is designed for hollow, air-retentive and packaged loads.

- ***Type N:*** These **steam displacement bench-top sterilizers** passively remove air by downward displacement of steam. This is designed for non-wrapped, non-hollow and non-retentive solid instruments. Sterilization bags or pouches for instruments should not be used in downward displacement sterilizers.

- ***Type S:*** These sterilizers are specially designed to reprocess specific load types, as defined by the manufacturer

Type B and N are most frequently used in dental practices. In Brunei, type B sterilizers are commonly used.

Fig. 8.4a-i Type B sterilizers

(b) The correct use of bench top steam sterilizers

Each sterilizer will have a reservoir chamber from which the water is delivered for steam generation. This should be filled, at least daily, using distilled water. All instruments should be thoroughly cleaned automatically or manually and thoroughly dried before sterilization. Dirty instruments cannot be guaranteed to be sterile.

Perforated instrument trays should only be used to allow complete intimate contact of steam with the surface of the instruments. Sterilization bags or pouches for instruments should not be used in downward displacement sterilizers. This is because air may remain within the pouch preventing intimate contact of the steam with the surface. Any bowls should be placed upside down. This is to allow the air to "fall out" of the bowl as the steam rises.

Porous articles and equipment with small lumens, for example dental hand pieces, should not be autoclaved in downward displacement (also called Type N) autoclaves as it is possible that the steam will not penetrate the lumen.

Dental hand pieces are not suitable for steam displacement sterilizers but it is accepted that prevention of cross infection is best achieved by using these Type N sterilizers where porous load sterilizers are not available.

Sterilization in dentistry is usually maintained at 134 - 137^{0}C and at a pressure of 250kPa with a holding time of 3 to 3.5 minutes; or follow manufacturer's instruction of use (refer Appendix 9).

Cycle Type	**Cycle Parameters**			**Drying Time (min)**	**Items to be Sterilized**
	Temperature (^{o}C)	**Time (min)**	**Pressure (kPa)**		
Unwrapped	132	3	186	30	• Instruments loose on tray • Open glass or metal canisters
Pouches	132	5	186	30	• Pouched or loosely wrapped instruments • Multiple layers of instruments separated by fabric • Wrapped trays of loose instruments • Wrapped cassettes
Packs	121	30	104	30	• Textiles and surgical packs wrapped for sterilization
Handpieces	132	6	186	30	• Dental handpieces (wrapped or unwrapped)

(**Source**: *Midmark Corporation 2013*)

<u>Important points to remember regarding sterilization</u>

- ***Open all hinged instruments (see Fig. 8.1a-ii & -iii).***
- ***Oil hand pieces and remove burs prior to placing in the autoclave.***
- ***All instruments must be cleaned, rinsed, dried and packed before placing them on an autoclave tray. Instruments can be loaded without packing for flash cycles however storage time will be different (refer Section 8.6).***
- ***Ensure that there is enough space around each instrument to allow steam to circulate.***
- ***Ensure the sterile water level is adequate and seal the door.***
- ***Once the cycle is complete, allow the instruments to dry and cool.***
- ***Remove instruments when the sterilization cycle is complete.***
- ***Store the instruments safely once dried and cooled.***
- ***If wrapped sterilization pouches appeared wet upon removal from sterilizer, the instruments are no longer sterile and needs re-sterilization.***
- ***The water in the reservoir has to be removed at the end of the day to prevent build-up of biofilm.***
- ***Sterilizers should be cleaned, dried, and left empty at the end of the day.***
- ***Sterilizers require daily, weekly, quarterly and annual testing.***

(c) Cleaning & maintenance of sterilizers

An example of Type B sterilizers which are widely available in the government dental practices is Midmark M9 Autoclaves® (Fig. 8.4a-i) and they are designed for hollow, air-retentive and packaged loads (refer Section 8.4a). Cleaning and maintenance should be done according to manufacturer's instructions (see Fig 8.4c-i to c–vi). The life of a sterilizer is 10 years or 10,000 cycles.

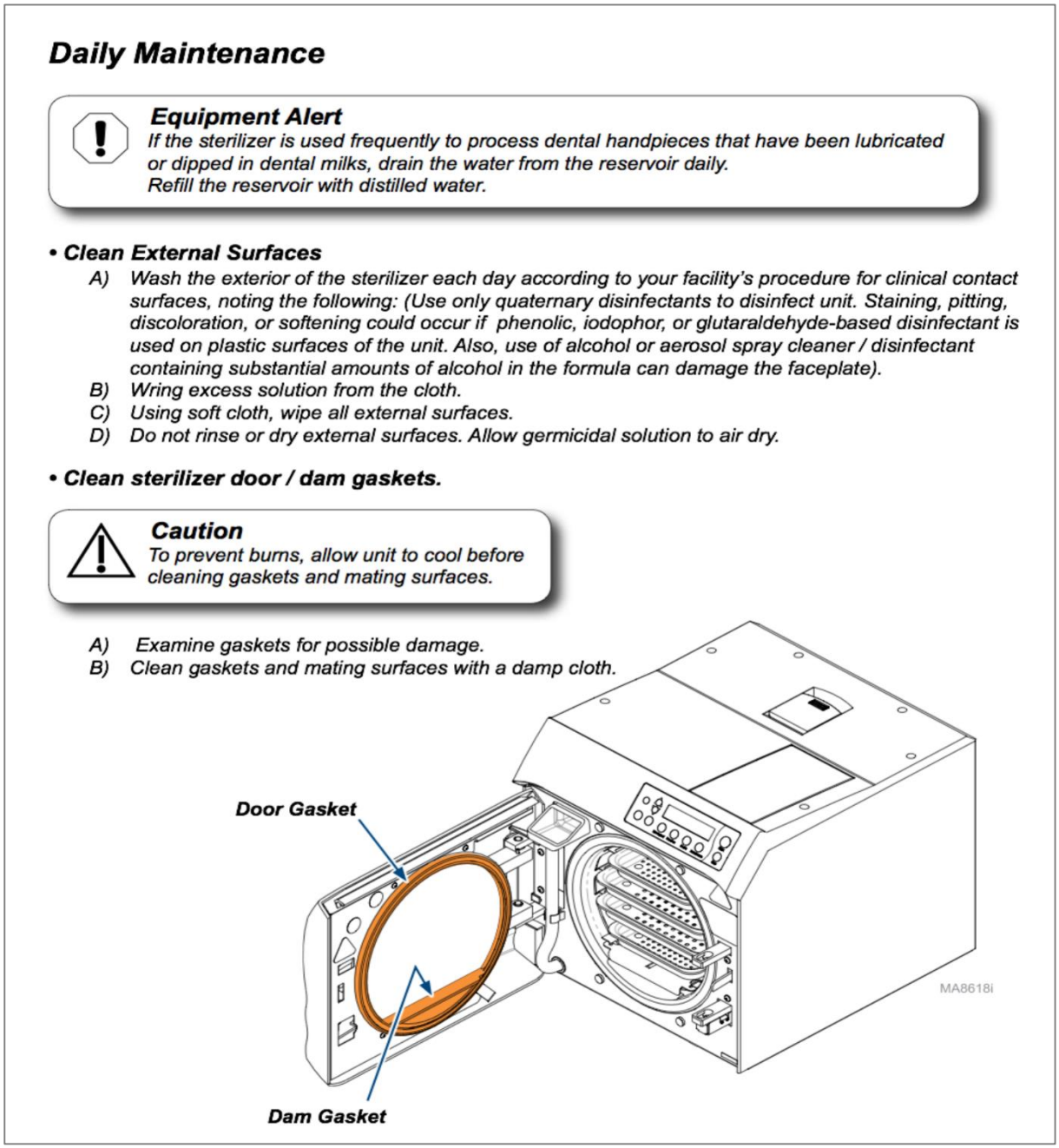


Fig. 8.4c-i Adopted from Midmark M9 Autoclaves® instruction of use.

Weekly Maintenance

Equipment Alert
Failure to change water may result in sterilizer malfunction.

Do not use bleaching agents or any abrasive materials / substances in chamber (i.e. bleach, steel wool, wire brush, scouring powder, etc.).
Failure to comply may result in damage to the chamber and/or other components.

Note

Every seven days, the autoclave will automatically display the PERFORM WEEKLY MAINTENANCE message. If power is disconnected, the cycle of weekly messages will be reset.

- ***Clean Chamber / Trays (including Rack and Plate)***
  - *A) Disconnect the upper portion of the reservoir drain tube from the panel clips, bend it downward, and drain the reservoir water into a suitable container, e.g. a bucket, and dispose of the water.*
  - *B) Remove the trays, tray rack, and tray plate from the sterilizer. (Refer to the following page for instructions on removing / installing the tray rack and tray plate).*
  - *C) Wash trays, rack, plate, and inside of chamber with mild soap or Speed-Clean and distilled water.*
  - *D) Refill reservoir with distilled water.*

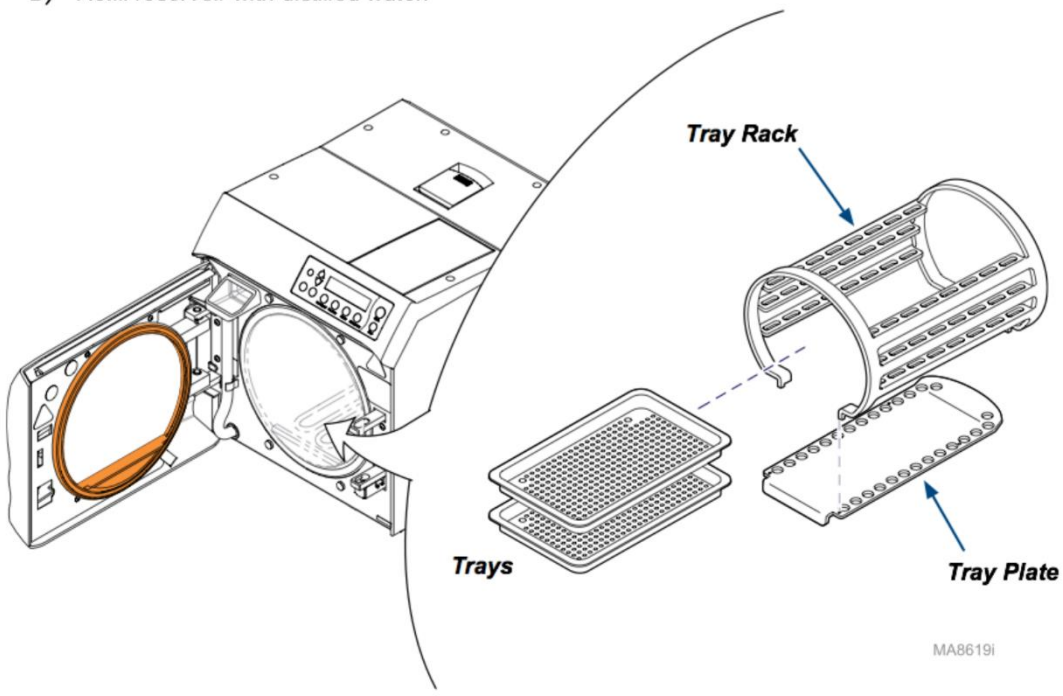
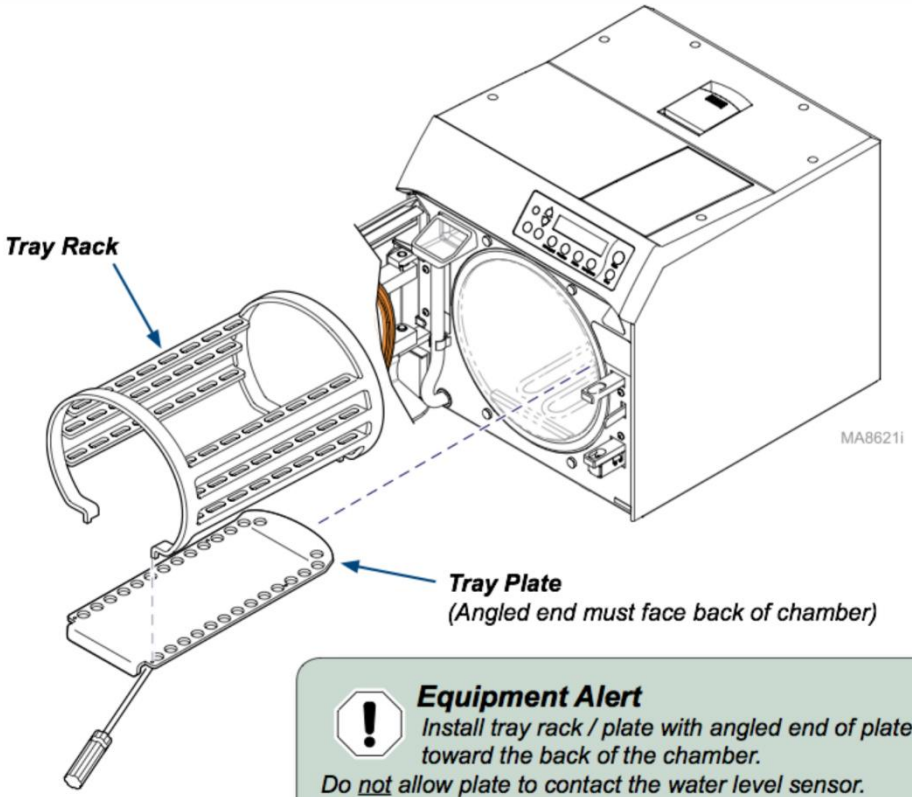


Fig. 8.4c-ii Adopted from Midmark M9 Autoclaves® instruction of use.

Weekly Maintenance - continued

WARNING
Allow unit to cool before removing or installing tray rack and plate. Handle metal tray rack carefully to avoid injury. Do not run sterilizer without tray plate in place.

To remove tray rack / plate...
A) Remove trays.
B) Using a screwdriver, pry plate up while pulling tray rack / plate out of chamber.



Equipment Alert
Install tray rack / plate with angled end of plate toward the back of the chamber.
Do not allow plate to contact the water level sensor.

To install tray rack / plate...
A) Insert the tray rack into the tray plate.
B) Place back of tray plate in chamber.
C) Press down on tray rack, while sliding into chamber.

Fig. 8.4c-iii Adopted from Midmark M9 Autoclaves® instruction of use.

Monthly Maintenance

WARNING
Do not process instruments while flushing system.

Note
Every 28 days, the sterilizer will automatically display the PERFORM MONTHLY MAINTENANCE message. This is a more thorough cleaning of the unit and involves multiple steps. If power is disconnected, the cycle of monthly messages will be reset.

- **Clean Chamber / Plumbing**

A) With a cooled chamber, drain the sterilizer's reservoir and refill with clean, distilled water. Add one ounce of SpeedClean sterilizer cleaner directly to the bottom of chamber.

B) Run one **Pouches** cycle.

C) Press **Stop** button when Dry Cycle begins.

(It is not necessary for the dry cycle to run during this maintenance.)

D) Drain reservoir and refill a second time with clean, distilled water for the rinse cycle.

E) Rinse by running one **Unwrapped** cycle, but push the "Stop" button when the drying cycle begins.

F) Drain and refill reservoir with clean distilled water, then allow sterilizer to cool.

G) Remove trays and tray rack. Wipe off with a damp cloth.

H) Remove and clean filters. The filters are intended to prevent debris from causing valve failures. Between regular monthly cleanings if the fill or vent times become too long or items will not dry the filters should be cleaned.

I) Refer to the illustration for location of filter screens.

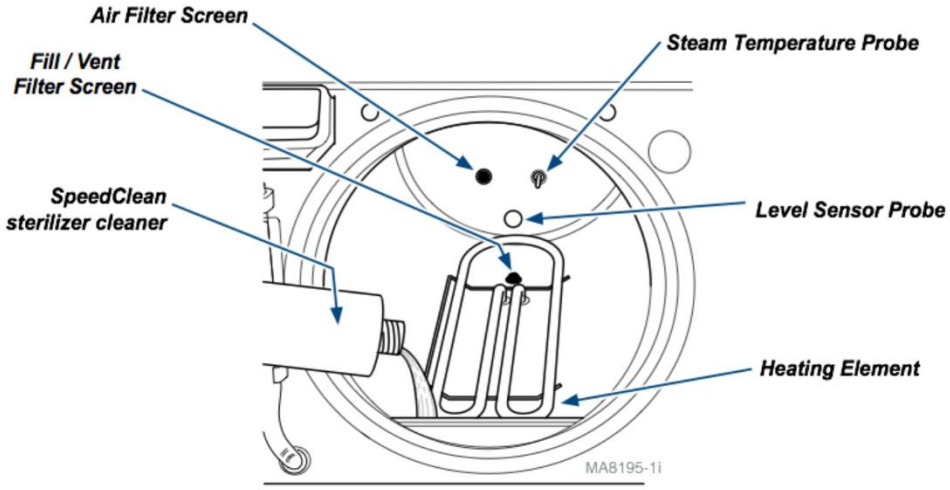


Fig. 8.4c-iv Adopted from Midmark M9 Autoclaves® instruction of use.

Monthly Maintenance - *continued*

J) *Grasp filter and gently pull away from chamber wall while twisting slightly. (If necessary, pliers may be used to remove filters)*

K) *Clean filters with SpeedClean and distilled water. A small stiff bristled brush or ultrasonic cleaner may be helpful. Rinse filters with distilled water. (Note: Replace filter(s) if debris cannot be remvoved by cleaning).*

Equipment Alert
Use care when wiping the inside of the chamber. Failure to comply may result in damage to the heating element, steam temperature probe, and/or level sensor probe.

L) *Wipe out the inside of chamber.*

Equipment Alert
Do not operate sterilizer without filters in place.

M) *Install filters. (Press inward, toward chamber wall while twisting slightly).*

N) *Install tray plate, rack, and trays.*

- ***Remove / Clean Door & Dam Gaskets***

A) *Remove door and dam gaskets from chamber door, then remove the gasket ring from the door gasket.*

B) *Clean gaskets and ring with SpeedClean, distilled water, and a soft brush.*

C) *Inspect gaskets for damage / shrinking / swelling. Replace gaskets if damage is apparent.*

D) *Press gasket ring into the channel in the door gasket and reinstall the gasket in the door.*

E) *Install dam gasket.*

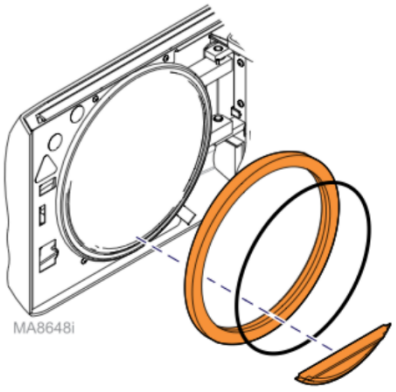


Fig. 8.4c-v Adopted from Midmark M9 Autoclaves® instruction of use.

Monthly Maintenance *- continued*

- ***Check Pressure Relief Valve*** *(must be checked each month to assure it functions properly)*

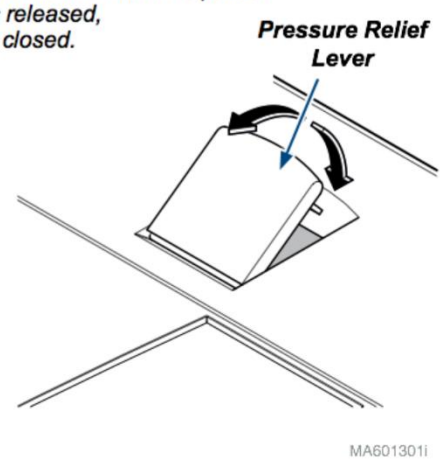
  *A) Press **Unwrapped** button*

  *B) Press **Start** button*

> ***Caution***
> *During the pressure relief valve check, steam will be vented from under the sterilizer. To keep from being burned, place a steam barrier (a rolled up towel) around the bottom of the sterilizer.*

C) Wait until pressure in chamber reaches 20 PSI (138 kPa).

D) Pull upward firmly on the pressure relief lever for approximately 3 seconds, then release. (Steam should discharge freely from beneath rear of unit when lever is pulled. If the valve does not close completely when lever is released, pull lever again and release quickly so that it snaps closed. Repeat this until valve seats properly).



*E) Press **Stop** button*

(This aborts the cycle to prevent overheating).

> ***Equipment Alert***
> *If excessive force is required to open the pressure relief valve, or if the valve will not reseat properly, the valve must be replaced. (Refer to "Calling for Service" in this manual).*

MA601301i

Fig. 8.4c-vi Adopted from Midmark M9 Autoclaves® instruction of use.

d) Periodic tests for sterilizers

It is important for the safety of the dental staff and patients that materials processed in a sterilizer have been exposed to adequate conditions for sterilization. Therefore, sterilizer should be tested regularly to ensure that it is operating at optimum conditions, which will kill all microorganisms effectively. This can be achieved through several monitoring procedures, including:

- Physical monitoring through the sterilizer's gauges, displays or print-outs
- Chemical monitoring with chemical indicators
- Biological indicators with the use of spore testing
- Operational testing of the sterilizer

Physical indicators

Physical monitoring includes time, temperature and pressure-recording devices and gauges which act as the first line of defense because gross malfunction can be identified as soon as it occurs. The data for these parameters can be easily obtained from printouts that document the cycle time, temperature and pressure.

For sterilizer without a data logger or printer, an **Automatic Control Test (ACT)** should be performed. Manual test method for ACT is performed by **placing a test load in chamber to undergo a routine cycle**. The critical parameters are observed at approximate **mid point of hold time** for all of the key cycle stages (disinfection, cleaning, sterilizing). The **temperature, chamber pressure** and **elapsed time** are recorded. Test is considered satisfactory when temperature, pressure and time elapsed

are within stated validated ranges specified by manufacturers. The sterilizer should also present a cycle complete indication with no other anomalies detected.

It is important to note that correct readings do not ensure sterility of instruments but incorrect readings could be the first indication that a problem has occurred during the sterilization.

Records of physical tests should be maintained in the sterilization logbook.

Chemical indicators

Chemical indicators are one of the methods used to monitor conditions in the sterilizer chamber were adequate to achieve sterilization. They help to distinguish whether instruments have been through the sterilizer.

There are 6 types of chemical indicators:

Type 1	Process indicators are intended for use with individual items, e.g., containers, to indicate that the unit has been directly exposed to the sterilization process and to distinguish between processed and unprocessed items. **Indicator tapes**, **indicator labels** and **indicators** on pouches are examples of externally visible chemical indicators that are on the outside on the packages.

Type 2	Indicators are intended for use in specific test procedures as defined in relevant sterilizer/sterilization standards. **Bowie-Dicks** are one type of specific testing most are familiar with. These are used to show the efficacy of air removal and steam penetration.
Type 3	A single variable indicator that is designed to solely show the exposure to one sterilization process at a stated value (SV) of the chosen variable. One example of a single variable is a **temperature tube** that houses a chemical pellet which melts at a specific temperature.
Type 4	These are considered as multiple variable indicators. They are designed to react with two or more of the critical variables and are intended to indicate exposure to a sterilization cycle at SVs of the chosen variable. Examples of these type 4s would be the paper strips with a color change chemical indicator. These are usually used **inside each package**.
Type 5	Integrating indicators are designed to react with all critical variables. These can be used as internal chemical indicators in all packs and containers for pack control monitoring. These are also known as **'chemical biological' indicators**.

Type 6	These are called emulating Indicators which are cycle verification indicators which are designed to react to all critical variables for specified sterilization cycles. In other words they are considered to be indicative of a complete cycle by showing the presence or absence of specific time and temperature parameters during a cycle.

Bowie-Dick test (for porous loads)

Bowie-Dick test is required **daily** for all pre-vacuum sterilizers (Type B autoclaves) in porous loads. It is used to detect air leaks and test the ability of sterilizers to remove air from the chamber.

Test is carried out on **the very first cycle** of the morning and should be performed in an empty chamber. A Bowie-Dick test pack comprises of a chemical indicator in the form of an adhesive tape. The tape is fixed at the center of folded cotton surgical towels that are clean and preconditioned. The test should be placed **on a perforated tray at least 100mm from the door**. The test is considered acceptable if the indicator inside test sheet shows a uniform colour change. On the other hand, air that is not removed from the chamber will cause a spot to appear on the test sheet, due to the inability of the steam to penetrate the chemical indicator.

If the sterilizer fails the Bowie- Dick test, do not use the sterilizer until it is inspected and passes the Bowie-Dick test.

Biological indicators

Biological indicators usually in the form of spore tests are by far, the most ideal method of demonstrating sterilization because they directly assess whether highly resistant bacterial spores have been killed during the sterilization process and not by merely testing the physical and chemical parameters necessary for sterilization. If the spores are killed, it may be assumed that all other microorganisms have also been killed. Biological monitoring of a sterilizer should be performed at least weekly.

Typical biological indicator systems consist of a vial with spore strips or ampoules that contain a large, known quantity of highly resistant spores (e.g. *Geobacillus* or *Bacillus* species*)*, a growth medium and pH indicator dye.

If a spore test result is positive, the sterilizer should be retested immediately and items especially implantable devices should be recalled if possible. The sterilizer in question should not be used until it has been inspected or corrected and repeated with spore tests in three consecutive empty chamber sterilization cycles. Results from the spore tests may differ with different systems, so always refer to manufacturer's instructions for use. Similarly, results of biological monitoring should be recorded in the sterilization logbook.

Operational testing for Type B sterilisers

(i) Air leak rate test (weekly)

This test is intended to check that air will not leak into the sterilizer during periods of vacuum, at a rate greater than that specified by sterilizer manufacturer. Presence of air will impairs penetration of load by steam which prevent sterilization. The air leaking into the chamber will not be sterile as it will not have passed through the bacteria retentive filter hence, recontaminating the load.

Method: Establish a vacuum in the chamber of the sterilizer by closing all valves leading to chamber. Then observe the chamber pressure for a set period (as indicated in instruction manual). If the reading on pressure valve rises i.e. from negative to zero, this indicates chamber is leaking. Most sterilizers have automatic program setting for leak rate test, refer to manufacturer's operating manual for details.

(ii) Air detector function test (weekly)

This test is carried out with an air detector commonly fitted to sterilizers. The purpose of air detector is to automatically check the process at the end of air removal stage, and before the heating stage, to ensure that an adequate amount of air has been removed to prevent sterilization being affected.

In an ideal situation, the air detector, when correctly set up will cause a process to fail if residual air is present at the air removal stage. Hence the function test is carried out to provide assurance that the air detector remains functional and will cause a cycle to fail when presented with too much air.

Method: A cycle is run with a small load with an induced leak of air into the chamber at a controlled rate. The test is acceptable if air detector causes the cycle to automatically fail.

A testing protocol schedule for sterilizers can be found in Appendix 10.

Each steriliser should have a logbook (see Appendix 11) in which details of maintenance, validation, faults, modifications, periodic tests and daily production log sheet can be recorded. Each record must be dated and signed by operator. This permanent record provides evidence that it was/is functioning correctly and achieving sterilizing conditions consistently. Recorded data should be maintained for at least 7 years.

8.5 PACKAGING

For Type B and S sterilizers, instruments should be **cleaned** and **dried** before being packed with purpose-designed materials compatible with sterilization process. These materials should conform to BS EN ISO 11607 (Type B sterilizers) or manufacturer's standard stated (Type S sterilizers).

With a Type N sterilizer, instruments are not to be packed prior to sterilization. Immediately after removal from sterilizer, instruments should be aseptically packed using suitable sealed view packs. Use of clean forceps and clean gloves is appropriate to maintain sterility of instruments.

An internal chemical indicator should be placed in every package, and an external chemical indicator (e.g. chemical indicator tape) should be used (see Fig. 8.4a).

Never write on the packaging directly. Use of sticker label is recommended (see Fig. 8.4b). Label on packaging should include:

- Date of sterilisation
- Sterilizer ID
- Contents
- Operator's name and initial

If multiple sterilizers are used in the facility, the sterilizer used should be indicated on the outside of the packaging material to facilitate retrieval of processed items in the event of a sterilization failure.

Fig. 8.4a External indicator on packaging

Fig. 8.4b Label on packaging

8.6 STORAGE AND TRANSPORT OF STERILIZED INSTRUMENTS

Instruments should be stored in an environment which is:

- protected against heat
- secure, dry and in cool conditions
- appropriately designed to prevent damage to instruments
- easily cleaned
- ten inches above floor level
- away from direct sunlight and water

If stored in areas used for clinical work, it has to be as far from the dental chair as reasonably practicable. If instruments that are not scheduled for current used, it is best practice to store in a separate environment, e.g. clean area of a separate decontamination room.

Guidelines for storage of packed and unpacked instruments are as follows:

i) **Packed** instruments: maximum storage is **1 year**.

ii) **Unpacked** instruments in **clinical area**: maximum storage is **1 day**.

a. Instruments should be dry, and protected from contamination. For example, use of mini racks placed in cupboards or in covered drawer inserts.

b. **Do not store on open work surfaces**. Prepare the instruments needed before treatment commences in order to avoid the need to open cupboard or drawers during patient treatment. Remove glove, clean hands and use new gloves before handling unwrapped sterile instruments.

c. All instruments laid out on high- and medium- risk zones are considered contaminated regardless whether they have been used.

d. All unpacked instruments should be reprocessed at the end of the working day regardless of whether they have been used.

iii) Unpacked instruments in **non-clinical area** (e.g. separate decontamination room): maximum storage is **1 week**.

Records of sterilized instruments going into and out of storage must be maintained to track the number of instruments available for use as well as to monitor storage times. First-in first-out (FIFO) principle should be used when taking instruments out of storage. Storage practices should also be event-related where the product should remain sterile indefinitely unless an event causes it to become contaminated (e.g. torn or wet packaging). If packaging is compromised, cleaning of the instruments should be repeated, packaged in new pouches and re-sterilized again.

Containers used to transport sterilized instruments must be wiped with a disinfectant before and after use.

Before being used, instruments should be checked to ensure that:

- Date of sterilization is within the recommended period.
- Packaging is still intact; packaging with wet marks and stains should be re-packaged and re-sterilized.
- Sterilization indicator confirms the pack has been subjected to appropriate sterilization process.
- If a covered container is used, the instruments inside have remained unopened.
- Visible contamination is absent.

SECTION 9: SPILLAGES

A spillage is a spill or leak of a contaminated fluid that may come into contact with others. All spillages are potentially dangerous and must be removed as soon as possible by the person put in responsible (trained cleaners or infection control link person), or by the person who discovers the spillage. However, if the person who discovers the spillage cannot remove the spillage, it is his or her responsibility to arrange for the removal.

While waiting for removal, it is important to ensure that no one comes into contact with the spillage. Appropriate signage must also be put up to avoid any unnecessary accidents. Gloves, masks, protective eyewear and aprons must be worn when dealing with spillages. Managing spillages guideline has been provided by the Infection Control Unit, Health and Safety Division, Department of Dental Services (see Appendix 11).

(a) Splashes, spots & spillages

- Cover area with disposable paper towels to limit spread
- Apply 1% sodium hypochlorite (10,000ppm) solution (1 in 5 dilution of 5.25% sodium hypochlorite solution)
- Leave on for 5 minutes to wait for spill to absorb
- Discard the contaminated paper towels into the yellow waste bags

- Clean dirty area with disposable paper towels using 1% sodium hypochlorite solution
- Rinse off with clean water to avoid corrosion of surface
- Dry surface with disposable paper towels
- Remove gloves immediately and perform hand hygiene by washing hands with soap and water thoroughly

(b) Vomits

- Cover immediately with disposable paper towels to prevent spread of potentially infectious agent via aerosol
- Apply 1% sodium hypochlorite (10,000ppm) solution (1 in 5 dilution of 5.25% sodium hypochlorite solution)
- For large amount of vomit, debulk by removing with paper towels before applying sodium hypochlorite solution
- Leave on for 5 minutes to allow for spill to be absorbed
- Discard the contaminated paper towels into the yellow waste bags
- Clean dirty area with disposable paper towels using 1% sodium hypochlorite solution
- Rinse off with clean water to avoid corrosion of surface
- Dry surface with disposable paper towels

- Remove gloves immediately and perform hand hygiene by washing hands with soap and water thoroughly

All paper towels and personal protective equipment such as gloves must then be disposed into the yellow clinical waste bags after cleaning up splashes, spots, spillages and vomits.

SECTION 10: HANDLING OF CLINICAL SPECIMENS

Safety and decontamination measures protect the specimen collector, laboratory personnel and patients from risks associated with specimen collection. They also reduce the risk of contaminating the samples. All clinical specimen should be handled as if they were infectious through the practice of Standard Precautions.

Personal protective equipment should be worn and safe working practices followed to reduce exposure to potentially infective material.

a) Handling of biopsy specimens

In general, each biopsy specimen should be placed in a sturdy container with a secure lid to prevent leaking during transportation. Care should also be taken when collecting specimens to avoid contamination of the outside of the container. If the outside of the container is visibly contaminated, it should be cleaned and disinfected or placed in an impervious bag.

b) Use of extracted teeth in dental educational settings

Extracted teeth used for educational purposes should be considered infective and classified as clinical specimens because they contain blood. The same precautions as for biopsy specimens should be adhered too.

Before extracted teeth are used in dental educational settings, the teeth should first be cleaned of adherent patient material by scrubbing with detergent and water. To reduce bacterial accumulation during storage, teeth should be immersed in 0.5% sodium hypochlorite (e.g. 5.25% sodium hypochlorite diluted in the ratio of 1 in 10 diution) or any liquid chemical germicide suitable for clinical specimen fixation for seven days.

This is then followed by either autoclaving (121°C, 15lbs psi) the extracted teeth for 40 minutes or immersing them in 10% formalin for two weeks. These two methods have been reported to be the most effective in disinfecting or sterilizing extracted human teeth (Center for Disease Control and Prevention, 2013). With regards to autoclaving, extracted teeth with amalgam restorations should not be heat sterilized due to the potential health hazard associated with possible mercury vaporization and exposure.

Anyone handling extracted teeth should wear complete PPE. Gloves should be disposed of properly and hands must be washed after completion of work activities. Work surfaces and equipment should be cleaned and decontaminated appropriately after completion of work activities.

SECTION 11: INFECTION CONTROL AND DENTAL RADIOGRAPHY

Infection by salivary contamination of work surfaces and equipment during x-ray taking and film processing can be minimized through good infection control practices. PPE (disposable gloves, protective eyewear and masks) must be worn by the person taking and processing radiographs.

Guidelines DURING Intra-Oral Radiography

1. ***Cover equipment controls with cling film/barrier (see Fig. 11a-i)***
2. ***Place the X-ray request form away from work area or order through Bruhims.***
3. ***With clean gloves, set up all film packets and all film holders required for the patient on a disposable paper towel before the procedure.***
4. ***Identify the high risk zone in the work area.***
5. ***Seat the patient in the chair. If the patient needs to remove his denture or any intraoral appliance, place it on a disposable paper towel and place them in the high risk zone.***
6. ***Wear appropriate PPE (gloves, masks and protective eye wear) when taking the requested radiograph.***
7. ***Do not touch uncovered exposure selector and timer buttons with gloved hands that have been in the patient's mouth***

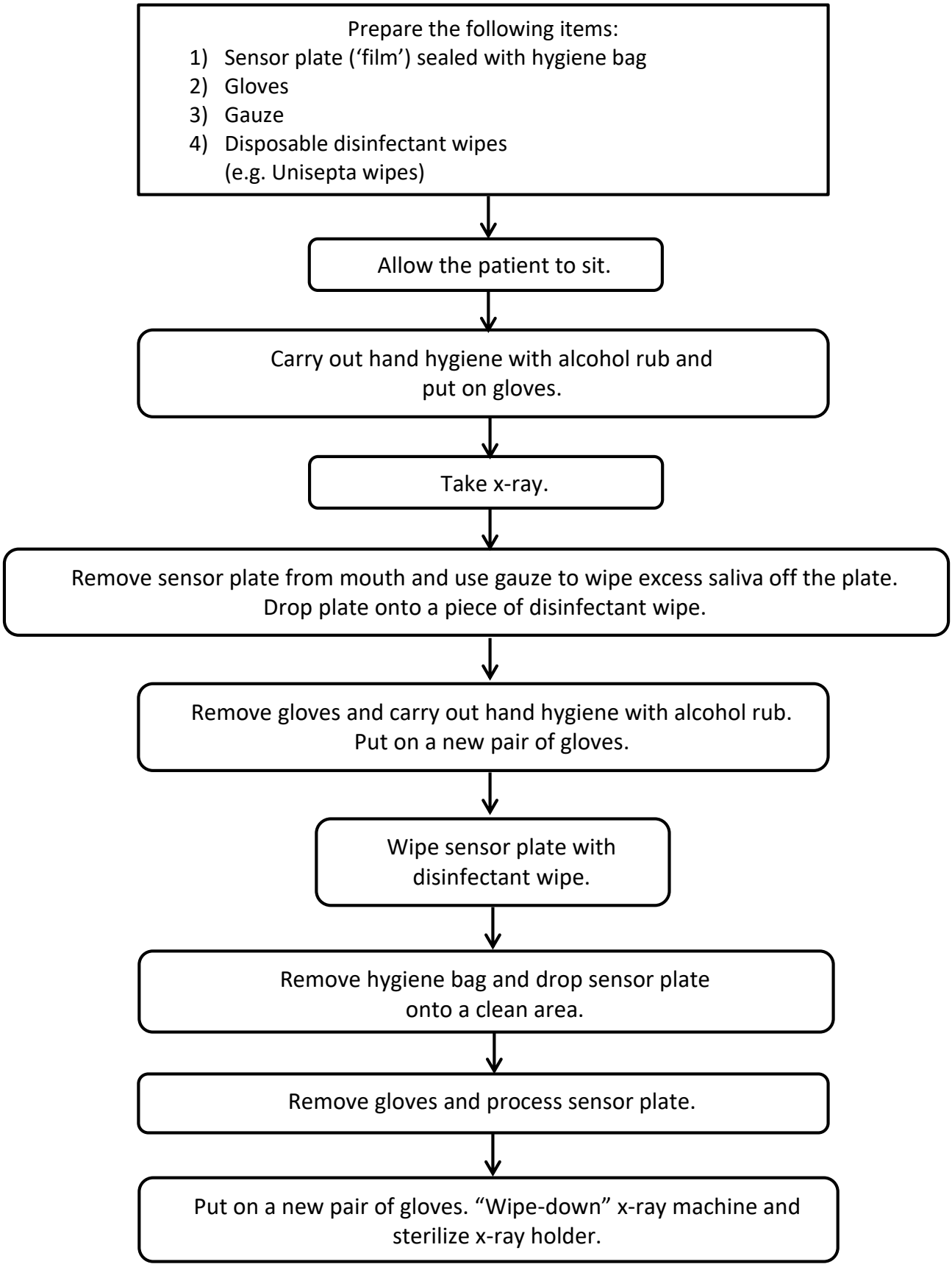
Fig. 11a-i Cling film covering on radiograph equipments

<u>Guidelines AFTER Intra-Oral Radiography</u>

1. ***Ensure that all contaminated film packets and film holders are placed on the designated high risk zone.***
2. ***Film holders, beam aiming devices and panoramic bite pegs are placed in the used instrument storage for decontamination and sterilization.***
3. ***The exterior of the film packets should be decontaminated with a surface disinfectant prior to opening.***
4. ***Dispose the plastic covering in yellow clinical waste bags.***
5. ***Dispose film packets (aluminium wrapping and black paper, where applicable) in yellow clinical waste bags.***
6. ***Saliva contaminated film packets and gloved hands must not be placed in or on the film processors.***
7. ***Do not take unprocessed 'clean' radiographs or processed films/images to the high risk zone or handle with gloved hands.***
8. ***Contaminated items (chair headrest, x-ray tube, control panels and exposure timer button) must be wiped down (refer Section 5.2) after removal of any barrier coverings.***

Intra-oral radiology film and devices used in digital radiology imaging are potential sources of cross infection. Where reusable devices are used, they should be decontaminated in accordance with manufacturer's instructions.

FLOWCHART FOR TAKING DIGITAL INTRA-ORAL RADIOGRAPH



SECTION 12: INFECTION CONTROL IN THE DENTAL LABORATORY

Infection control must also be practised in dental laboratories as dental technicians are susceptible to the transmission of infectious microorganisms from incoming impressions, casts and appliances received from dental clinics. Therefore, infection control guidelines need to be implemented in the dental laboratory to prevent cross contamination and transmission of potentially infectious agents through indirect contact between patients, clinicians, dental surgery assistants and dental technicians.

As part of good infection control practice, eating or drinking is prohibited in the dental laboratory.

12.1 PERSONAL PROTECTIVE EQUIPMENT AND HAND HYGIENE

Similar to clinical dental staff, cross-infection control procedures should also apply to dental laboratory staff. This involves routine hand washing and the use of appropriate PPE which can act as barriers to prevent transmission of potentially infectious agents (refer to Section 4).

(a) Personal Protective Equipment

This will need to be worn before starting work in the lab and removed when leaving work area.

1) Laboratory gown (as clinical uniform).
2) Disposable aprons.
3) Disposable gloves when handling impressions, casting models, polishing denture and repairing dentures.
4) N95 Face mask (For procedures involving trimming, de-investing and mixing acrylic resins)
5) Eye protection (either face shield or safety glasses) when doing procedures involving aerosol, sprays or splatters.
6) Ear defenders (For procedures involving trimming).
7) Closed toe shoes.

(b) Hand hygiene

This will need to be done by washing hands with soap and water:

- prior to wearing personal protective equipment
- immediately after removal of gloves
- after hand contact with blood or other potentially infectious materials and items

If not visibly soiled, alcohol hand-rub can be used (refer to Section 4).

12.2 HANDLING INCOMING AND OUTGOING ITEMS

Dental clinicians and dental surgery assistants are required to disinfect all items before dispatch to the laboratory (refer Section 7.4). Use of transport bag (see Fig. 7.4e) is recommended for all cases going into and out of the dental laboratory.

These items include:

1) Impressions
2) Appliances such as bite registration material, occlusal wax rim, wax try-in, cobalt chrome appliance are being tried on patients in the clinic
3) Dentures for repair.

Although dental clinicians are expected to disinfect all items before dispatching to the laboratory, it is assumed that compliance may not be 100%. Hence, it is recommended that technicians disinfect these items so as to prevent cross contamination prior to working on them.

(a) Types of disinfectants

- 0.5% (5250ppm) sodium hypochlorite solution (e.g. 1 in 10 dilution of household bleach); soaking time: **10 to 15 minutes**.
- Solution containing 2% glutaraldehyde; soaking time: **15 minutes**. There are health concerns with regards to glutaraldehyde exposure. Proper training, specialised equipment, adequate ventilation and specific PPE need to be considered in order to help minimize harmful occupational exposure to glutaraldehyde.

- Algisept® spray – 35g 1-propanol, 20g ethanol and 0.2g phenol derivatives could be used to disinfect stone cast models. However, there is a limitation to its usage whereby it is less effective compared to immersion formulation.

(b) Incoming items from clinics

Methods of disinfecting impressions/appliances/dentures are as follow:

1) Rinse and brush items with water to remove blood, saliva and debris.
2) Immerse items into disinfectant solution for 10-15 minutes or according to manufacturer's instructions.
3) Rinse items with water to remove any residual disinfectant.

Cast stone models could also be disinfected with spray disinfectant (0.5% Sodium hypochlorite solution) as there may be a risk of cross contamination during the clinical session.

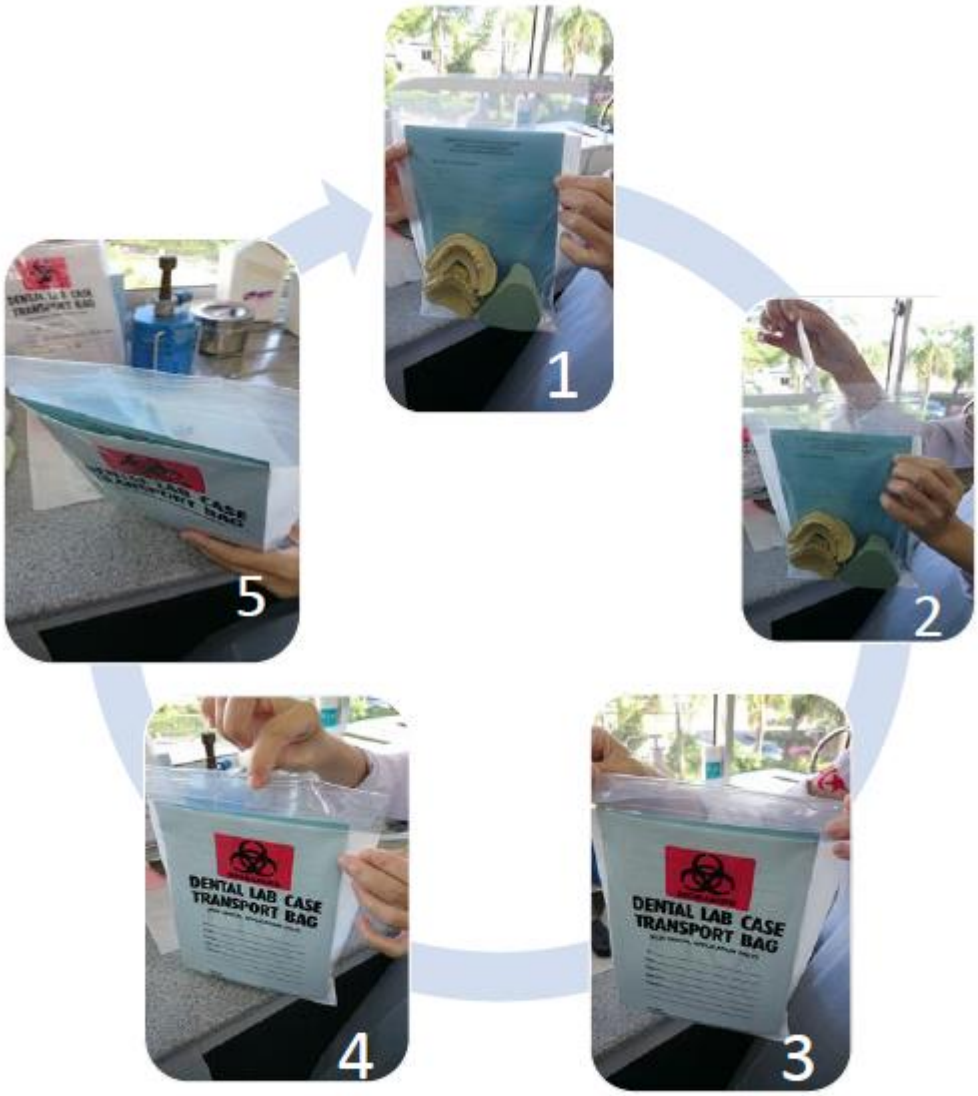
(c) Outgoing items to the clinics

Dental technicians are required to disinfect items prior to dispatch to the dental clinics.

Before dispatching items to respective clinics (see fig 12.2c-i),

1) Place the item inside a sealed plastic bag labelled with patient's details.
2) Store the finished case in the container provided for every patient.
3) Mark the item as "**Disinfected**".

Fig 12.2c-i


1
2
3
DENTAL LAB CASE
TRANSPORT BAG
4
DENTAL LAB CASE
TRANSPORT BAG
5

12.3 ORGANISATION OF THE DENTAL LABORATORY

(a) Receiving area

Any items received from clinics need to be kept away from the production area so as to minimize any risks of contamination.

(b) Working areas

Sanitation of working areas in the dental laboratory is important as it helps to protect all employees in the laboratory areas. These procedures can help to reduce cross contamination of instruments and materials. This can be done using appropriate cleaning and disinfection procedures(refer to Section 5.2).

1. Individual working area

- Each technician is responsible for keeping their work area tidy, clean and clutter-free.
- At the end of the day, all cases will need to be kept neatly in their boxes at the individual working area
- The working area should be sprayed with surface disinfection at the end of each working day.

2. General working area

- Sinks and bench tops are to be cleaned and disinfected at the start and end of the day or when obviously soiled.
- Disinfection of reusable items such as utility gloves, protective eye wear, case pans, pumice pans, polymerization (pressure) pots, and ultrasonic units should be carried out after use and the end of working day.
- Spillages, if any, must be immediately handled and managed (refer Section 9).

12.4 DISINFECTION AND STERILIZATION OF INSTRUMENTS

Dental laboratory instruments used on patients cases may harbour microorganism and may be a source for spread of infection. The ultimate disinfection procedure would be sterilisation, however not all items and equipment can be sterilized. Therefore, disinfection or heat-sterilization will need to be carried out after use (refer Section 8).

These procedures are indicated for instruments such as in the example below:

Disinfection *(with 0.5% sodium hypochlorite, or 2% glutaradehyde)*	**Heat-sterilization** (Autoclave)
• Articulators • Brush and plastic rag wheels	• Hand instrument kits (including knives and carvers) • Burs (applicable to stainless steel) Sterilization should be done at the end of the day.

12.5 DISINFECTION OF LABORATORY EQUIPMENT

(a) Polishing unit

It has been documented in some research studies that pumice can harbour harmful micro-organisms. Therefore to prevent cross-contamination, the following procedures should be followed:

- Use two separate polishing machines; one used for new appliances and the other for repair or repolishing of patient's existing appliances.
- Liquid disinfectant 0.25% sodium hypochlorite solution (1 in 20 dilution) can be added to the pumice mix (with three parts of glycerine to keep the mix suspended).

For new appliances,

- Replace the pumice daily.

For repair denture/appliance cases,

- Pumice needs to be discarded and replaced after every case
- Machine needs to be cleaned and disinfected after each use.

(b) Polymerization (pressure) pot

- At the end of the day, existing water should be discarded. The pot must be cleaned & disinfected with 0.5% sodium hypochlorite solution (1 in 10 dilution).
- For repair of appliances, water should also be replaced and pot disinfected as described above.

12.6 LABORATORY WASTE MANAGEMENT

Waste materials include:

- Used waxes
- Excess acrylic
- Plastic impression trays
- Stone plaster cast models
- Sharp items (e.g. wires)
- Stone/plaster/gypsum material
- Pumice
- Residual cast metal (from casting spruces)
- Acrylic teeth
- Alginate or secondary impressions

Similar to the clinical setting, all waste associated with biohazard materials must be discarded in the yellow clinical waste bags and transferred to dedicated areas in the building for collection. Sharps must be discarded in the sharps bins. (refer to Section 7.2).

As part of good infection control practice, it is important to note that all materials such as pink wax used for each patient case must not be re-used so as to prevent cross-contamination.

SECTION 13: SPECIAL CIRCUMSTANCES

13.1 INFECTION CONTROL AND TUBERCULOSIS

Active tuberculosis (TB) is highly contagious and all elective dental treatment should be postponed. Urgent treatment would not be considered until the patient has undergone at least 3 weeks of drug treatment and further testing and assessment. The patient's specialist physician must be consulted before any dental treatment.

Specialised personal protective respirator masks (PPRs), the N95 type/FFP masks must be used during any emergency dental treatment, along with other appropriate PPE.

13.2 PANDEMIC OUTBREAK PROTOCOL

Spread of bird-flu virus to domestic poultry and the emergence of bird-flu cases in humans are major concern worldwide.

Influenza can be transmitted through direct or indirect contact with an infected person's respiratory secretions, or when a person at close contact breathes in the droplets produced when an infective person coughs or sneezes. A person may be able to infect others within 24 hours of acquiring the virus and is contagious for three to five days following the onset of symptoms. More worryingly, people can also be contagious 24 to 72 hours before the appearance of any symptoms.

The following infection control measures for workplaces are recommended;

1. Employee Education

Staff must be educated on the disease and its mode of transmission. They should also be informed on the infection control measures and preventive procedures in place during period of pandemic outbreak.

Good hygiene in the workplace should be encouraged. Strict adherence to hand washing protocols is the most successful preventive action during a pandemic.

Staffs who are feeling unwell are advised not to come to work and encouraged to seek immediate medical help.

2. Temperature Checks for Staff

Regular temperature checks for staff must be implemented. Monitoring staff for symptoms and directing those who are unwell to seek medical help are also of equal importance.

3. Temperature Checks for Visitors

The temperatures of all visitors should also be checked. Anyone with symptoms should not be allowed into the premises, and should be advised to seek medical help.

The name and identity card number of the visitor, the date and time of visit, the contact number of the visitor, and the location/surgery/room the visitor will be going to, must be recorded for tracing purposes.

When carrying out temperature screening for visitors, N95 masks are recommended. Frequent hand washing following removal of gloves must be practiced. The N95 masks and other personal protective equipment should be discarded if it becomes damaged. Disposable ear thermometer covers should be used when using ear thermometers.

4. Staff Put on Home Quarantine

Staff exhibiting flu-like symptoms with history of travel to affected areas or who has had contact with an infected person should be home quarantined according to medical physician's advice.

Those put on home quarantine must

- Stay at home at all times
- Minimise contact with relatives and friends
- Check for signs of fever three times daily
- Wear a face mask at all times
- Maintain good personal hygiene

5. Personal Protective Equipment (PPE)

The following guides on the use of PPE should be observed

- N95 masks should be customised and should fit snugly over the face, and should fully cover the nose, mouth and the chin
- Repeated adjusting of the mask while wearing must be avoided to prevent infection due to contamination of hands with droplets gathered on the mask
- Mask should be discarded and changed if it becomes damaged, wet or soiled by secretions or body fluid
- Mask should be disposed of as biohazard waste
- Hands should be washed immediately after gloves are removed

- All disposable items must be discarded in a securely sealed and labeled yellow clinical waste bags

6. Environmental Disinfection

The transmission of virus through environmental surfaces can be minimised through maintenance of environmental cleanliness. Cleaning frequency should be increased as influenza viruses may live up to 2 days on contaminated non-porous, hard surface.

Daily cleaning of all surfaces, including floors and common facilities such as toilets and conference rooms, with a disinfectant should be performed. The daily cleaning routines should be recorded in a logbook to promote consistency in cleaning methods and areas.

Cleaning equipment such as wiping cloths and mops, used in one room should ideally be disinfected before using for other rooms. The cleaning personnel should wear disposable gloves during cleaning, and gloves should be removed and discarded if they become soiled or damaged. Additionally, cleaning personnel should wash their hands after carrying out cleaning to minimise risks of transmission.

If a room or area was exposed to a case, the area should be sealed and immediately cleaned and disinfected. The cleaning personnel carrying out the cleaning of the area should;

1) Wear disposable gloves, disposable gowns, goggles and N95 mask or face mask

2) Open window for ventilation
3) Mop floor with 1% sodium hypochlorite solution
4) Wipe all frequently touched areas such as doorknobs with a suitable disinfectant
5) Wipe down walls up to 3 meters in height as well as blinds with a disinfectant
6) Remove curtains for washing
7) Disinfect cleaning equipment used with 1% (10,000ppm or 1 in 5 dilution of 5.25%) sodium hypochlorite solution before using in other rooms
8) Disposable PPE should be removed and discarded after cleaning activities are completed
9) Wash hands immediately after removing PPE

Spray type disinfectants should be avoided as spraying promote production of aerosols. Similarly, a steady sweeping motion should be used when cleaning floors or horizontal surfaces to prevent creation of aerosols or splashing.

Once cleaned, the area/room should not be used for at least 24 hours.

13.3 WHEN TO AVOID PATIENT CONTACT

Any member of staff with the following condition must avoid patient contact to minimize risk of transmission to patients.

1) ***Herpetic whitlow*** - Staff must stay off duty until the lesion is dry with a scab.

2) ***Shingles*** (recurrent herpes zoster infection) until the lesions are dry.

3) ***Impetigo and other highly infectious skin conditions*** (including rugby associated 'scrum pox').

4) ***Acute exacerbations of psoriasis or eczema.***

5) ***Severe constitutional upset***, such as fever, diarrhoea or vomiting.

6) ***Acute transmissible disease*** when treating immuno-compromised patients.

7) Any member of staff who has had contact with a person with a communicable disease must be advised by Occupational Health before attending work.

SECTION 14: BODY FLUID EXPOSURES

Body fluid exposure (BFE) can occur during any type of treatment to any member of the dental team. Unfamiliarity and lack of experience can put any staff at higher risk of body fluid exposure incidents, such as during local anaesthetic injections and the use of sharp instruments.

Incidents with sharp instruments can occur during their use, when clearing away, decontamination or during disposal. It is important that clinicians identify individual hazards and take action to avoid or minimize the risks of inoculation or splash injuries with patient's body fluid (risk assessment).

Preventing Body Fluid Exposure

- ***Cover cuts and abrasions with waterproof plasters***
- ***Always use a single-handed technique with a needle-safe device when re-sheathing local anaesthetic needles***
- ***Do not leave burs, Gates-Glidden drills, ultra-sonic tips in the hand pieces when not in use***
- ***Always keep the bracket table organized and clutter-free***
- ***Always keep sharp items (needles, scalpels) in a defined area of the bracket table***
- ***Never push items into sharps bins with your fingers***
- ***Seal two-third full sharp bins, and use a new one***
- ***Never pass unprotected needles/syringes between members of the dental team***
- ***Always use needle holders to remove scalpel blades from their handles***
- ***Always wear eye protection for every clinical contact***

14.1 TYPES OF INJURY

Percutaneous injuries are puncture injuries, through the skin or mucosa, by needles, instruments, bone fragments and others.

Mucocutaneous injuries are splash injuries causing exposure of broken skin (such as previous abrasions, cuts or eczema) or mucous membranes of the eye, nose and mouth. This can be by high risk body fluids or infected particulate matter.

14.2 WHAT TO DO FOLLOWING BODY FLUID EXPOSURE?

The risk of transmission can occur in the following:

1) Injury from used sharp instrument or needle
2) Splash of body fluid (blood or saliva) to mucous membranes of the mouth and/or eyes
3) Contamination with body fluid to wounds and areas of open or cut skin, for example eczema or dermatitis

Please refer to Fig 14.2a-i for the management of sharps injury and body fluid exposure.

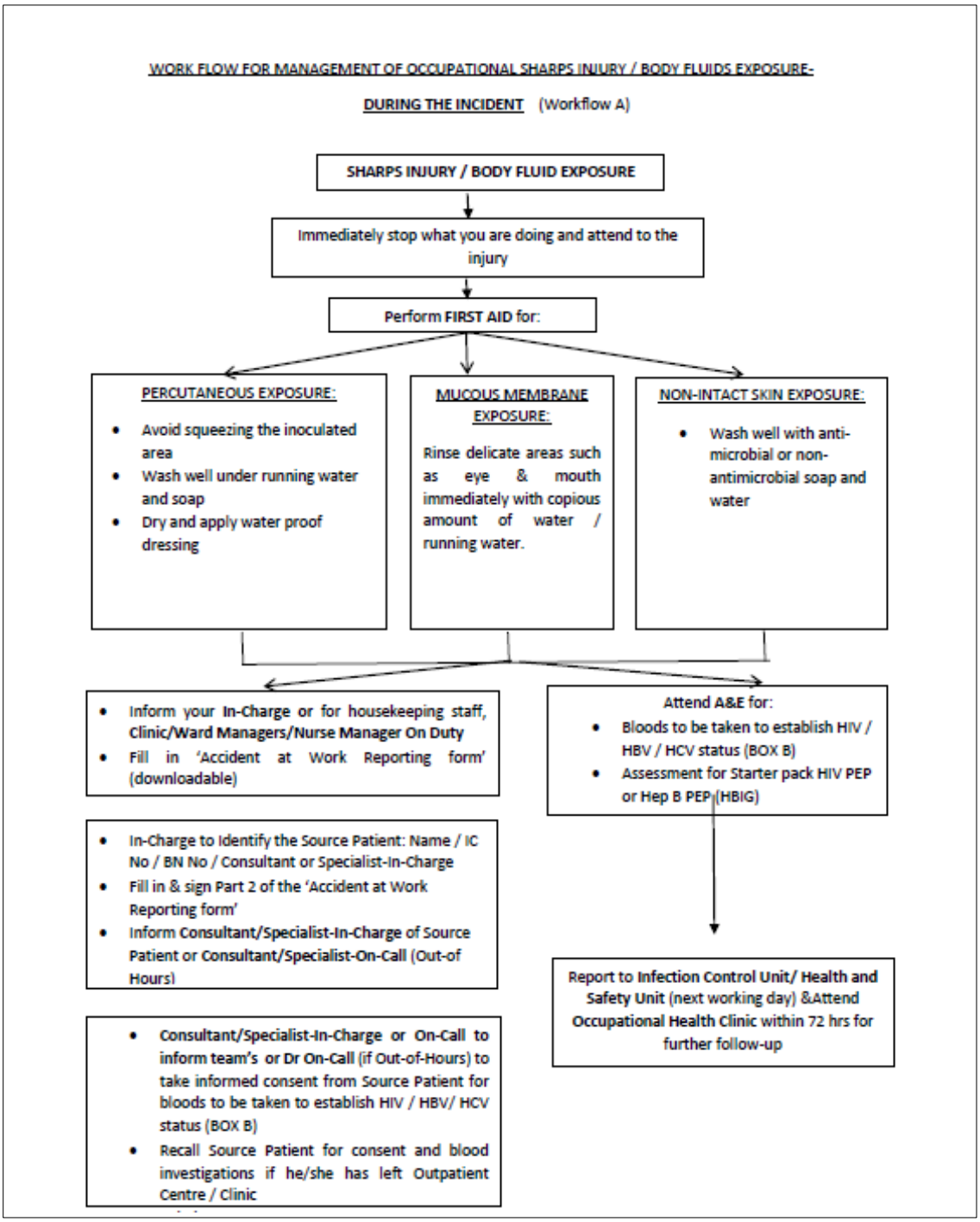


Fig 14.2a-i **Source:** Brunei Occupational Health Unit, Ministry of Health

After first aid measures has been performed, the following must be carried out:

1. Assess the risks associated with the patient and the injury. If there is a reason to be concerned about the possibility of transmission of infection, the injured person should seek urgent advice from the Occupational Health Unit, Ministry of Health. The Occupational Health Unit 'Accident at Work Reporting Form' (see Appendix 13) must be filled in and submitted to the unit promptly.

2. Make a full record of the incident, including details of who is injured, how the incident occurred, what action was taken, and the name of the patient being treated. Both the injured person and the person in charge must countersign the record.

14.3 CONFIDENTIALITY

All health care workers are bound by patient's right of confidentiality. Confidential information must not be revealed to people who are not directly concerned with the patient's care.

However, following a body fluid exposure, sufficient information will need to be obtained from the source patient to enable appropriate action to be taken. Although this is meant to safeguard the recipient, the source patient has to give the information voluntarily. Source patients have the right to withhold information if they wish to do so.

However, health care workers have a legal obligation to inform Occupational Health in regard to the source patient's information.

14.4 RISK ASSESSMENT

Following any body fluid exposure incident, a thorough assessment must be made to aid the decision making processes following the incident, and also to help prevent future occurrences.

The risk assessment should include:

1) The nature and severity of the exposure
2) The risk factors of the source patient for blood borne viruses
3) The circumstances that preceded the exposure
4) The factors that may have predisposed to the incident
5) The probabilities of the incident recurring
6) How the hazards could be avoided and the risks avoided or minimised in the future

14.5 INFECTION RISK OF HEALTH CARE WORKERS OCCUPATIONALLY EXPOSED TO BLOOD BORNE VIRUSES

Following percutaneous exposure to HIV infected blood, the risk of being infected is 0.3% (about 3 per 1000 injuries). The risk is lesser following mucous membrane exposure, approximately 0.1%.

The risk of sero-conversion is greater, 30%, following percutaneous exposure to Hepatitis B infected blood in an unvaccinated recipient. As for Hepatitis C, the risk is about 3%.

Many studies have shown that there is no risk when there is blood contact with an intact skin. According to CDC, studies have shown that HIV seroconversion decreases by 81% when post exposure prophylaxis is initiated promptly after the incident.

14.6 SHARPS INJURIES DURING PROCEDURE ON EXTRACTED TEETH

Staff and trainees that acquire a percutaneous body fluid exposure when performing restorative procedures on extracted teeth should carry out first aid management as outlined for any body fluid exposure, and then attend Occupational Health Unit, Ministry of Health.

In the decontamination process of extracted teeth, the risk of transmission of infection during this event is very low. Occupation health should still be informed of the injury and steps taken to ensure that the staff and trainee's current antibody status to Hepatitis B is sufficient. Serum for storage along with a reference blood sample from the recipient of the injury should be obtained.

14.7 VACCINATION

All members of the dental team involved in clinical procedures must be vaccinated against Hepatitis B. They should also be assessed for their HBV antibody status prior to employment and re-vaccinated if necessary. Personnel who are not at risk to blood and body fluids on the job (e.g. billing staff and general office workers) do not need to be vaccinated.

The Hepatitis B vaccine is effective in preventing infection in individuals who produce specific antibodies to the Hepatitis B surface antigen (anti-HBs). The vaccine is administered in a properly spaced 3- dose series at 0, 1 and 6 months. Antibody levels should be checked one to two months after completion of primary course of vaccination. Responders with levels of 10mlU/ml or more do not require any further doses or testing.

Although, anti-HBs that was once measured adequate might become low or decline below detectable levels, substantial evidence have shown that immunologic memory lasts for at least 20 years and protects immunocompetent people against clinical illness and chronic HBV infection. Currently, there is no need for a routine booster dose for healthcare professionals who have documentation of receiving 3-dose series of Hepatitis B vaccine and are tested positive for anti-HBs (defined as anti-HBs of 10mIU/ml or higher) following full vaccination.

On the other hand, those tested negative (anti-HBs less than 10mIU/mL) after a course of primary vaccination should receive 3 additional doses of hepatitis B vaccine on the

routine schedule, followed by a post vaccination testing 1-2 months later. A vaccine whose anti-HBs remains less than 10mIU/mL after 6 doses is considered a "non-responder."

Non-responders are not protected against HBV infection and should be considered susceptible. They should receive proper counselling about the standard precautions to prevent HBV exposure as well as transmission to others. It is also important to obtain Hepatitis B immune globulin prophylaxis for any known or possible parenteral exposure to HBV infected blood or blood with unknown Hepatitis B status.

If an inoculation injury is sustained before completion of a full course of Hepatitis B vaccination, follow up action including initial baseline tests for Hepatitis B markers and further serologic testing 6 months later is essential. For further details, Occupational Health, Ministry of Health will be able to advice and manage such injury. Additionally, they can also offer information on immunization against Polio, Rubella, Tetanus and TB.

14.8 POST EXPOSURE PROPHYLAXIS

The two factors that will influence the decision to recommend post exposure prophylaxis following a body fluid exposure are:

- **The source patient**
- **The nature of the injury**

The Occupational Health Unit will give a relative risk value to the injury and the source patient. The relative risk of transmission is increased in the following situation;

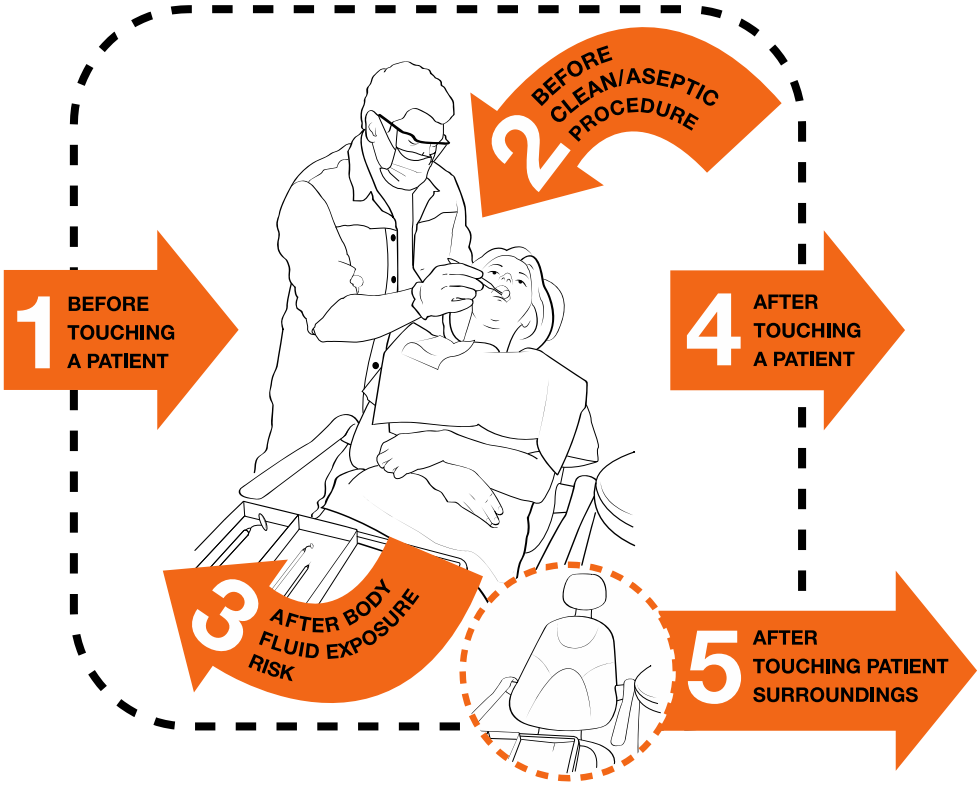
- **The source patient has multiple risk factors**
- **The tissue injury is deep and extensive**
- **The volume of fluid exposure is large**
- **The fluid exposure is obviously blood stained or contaminated**
- **The patient has a high viral load**

If the HIV status of the source patient is unknown, then an assessment of possible infectivity becomes necessary. However, if the risk assessment cannot be made within an hour following body fluid exposure, then the affected health care worker may be given the first dose of post exposure prophylaxis drugs until the risk assessment is made. Once the risk assessment has been carried out, the decision to continue or discontinue the drugs will then depend on the risk assessment and the discussion with the affected health care worker.

APPENDIX 1

Your 5 Moments for Hand Hygiene

Dental Care



1	BEFORE TOUCHING A PATIENT	WHEN?	Clean your hands before touching a patient.
		WHY?	To protect the patient against harmful germs carried on your hands.
2	BEFORE CLEAN/ ASEPTIC PROCEDURE	WHEN?	Clean your hands immediately before performing a clean/aseptic procedure.
		WHY?	To protect the patient against harmful germs, including the patient's own, from entering his/her body.
3	AFTER BODY FLUID EXPOSURE RISK	WHEN?	Clean your hands immediately after a procedure involving exposure risk to body fluids (and after glove removal).
		WHY?	To protect yourself and the environment from harmful patient germs.
4	AFTER TOUCHING A PATIENT	WHEN?	Clean your hands after touching the patient at the end of the encounter or when the encounter is interrupted.
		WHY?	To protect yourself and the environment from harmful patient germs.
5	AFTER TOUCHING PATIENT SURROUNDINGS	WHEN?	Clean your hands after touching any object or furniture in the patient surroundings when a specific *zone* is temporarily and exclusively dedicated to a patient - even if the patient has not been touched.
		WHY?	To protect yourself and the environment from harmful patient germs.

World Health Organization

SAVE LIVES
Clean **Your** Hands

WHO acknowledges the Ministry of Health of Spain and the Hôpitaux Universitaires de Genève (Infection Control programme) for their active participation in developing this material.

March 2012

APPENDIX 2

Hygiene plan for ESTETICA® E70/E80 Vision treatment units.

When ?	What ?	How ?
After each treatment 	■ Flushing of suction tubes (inside) and suction system ■ Rinsing of instrument tubes (inside) and water supply system ■ Cleaning of suction system and spittoon	▶ Start cleaning programme „After treatment" in tap "Cleaning"
	■ Cleaning and disinfecting of device surfaces, upholstery and operating light	▶ Manual cleaning and disinfecting by wiping
	■ Cleaning and disinfecting of handles at dentist element and operating light KaVoLUX	▶ White handles are removable and thermo-disinfectable, grey handles are removable and sterilisable
	■ Cleaning and disinfecting of spittoon and filter cover	▶ Manual cleaning and disinfecting by wiping inside and outside. Spittoon is removable. Porcellain spittoon is thermodisinfectable. Filter inserts are removable and thermodisinfectable.
In the morning 	■ Rinsing of instrument tubes (inside) and water supply system ■ Flushing of suction tubes (inside) and suction system ■ Cleaning of suction system and spittoon	▶ Start cleaning programme „Morning" in tap "Cleaning"
In the evenings 	■ Rinsing of instrument tubes (inside) and water supply system ■ Cleaning and disinfecting of suction tubes (inside), suction system and spittoon	▶ Start cleaning programme „Evening" in tap "Cleaning"
	■ Suction tubes (outside) and instrument tubes (outside)	▶ Manual cleaning and disinfecting by wiping
	■ Suction hose connectors	▶ Connecting pieces are removable and thermodisinfectable
	■ Control suction filter inserts	▶ Control filter, if required change filter
Weekly and after long downtimes 	■ Cleaning and disinfecting of: – instrument tubes (inside) – water supply system – suction tubes (outside) – suction system – spittoon	▶ Start cleaning programme „After treatment" in tap "Cleaning"
As required 	■ Control return air filter of turbine	▶ Control filter, if required change filter
	■ Silicone pads	▶ Silicone pads and adapter of the hygiene centre are removable and sterilisable
	■ Cup filler and cup rest	▶ Cup filler and cup rest are removable Manual cleaning and disinfecting by wiping Cup filler is thermodisinfectable
	■ Intrument holder	▶ Instrument holder is removable Manual cleaning and disinfecting by wiping
	■ Amalgam separator	▶ Change / deplete collection container and removal of waste according manufacturing instruction

Please use only KaVo approved disinfectants!

This hygiene plan only contains the essential operating functions. They do not replace the instructions for use included with a delivery.
They must be followed to avoid malfunctions and injury.

Allowed disinfectants:
- Mikrozid Liquid (Schülke & Mayr)
- FD 322 (Dürr)
- Incidin Liquid (Ecolab)

KaVo. Dental Excellence.

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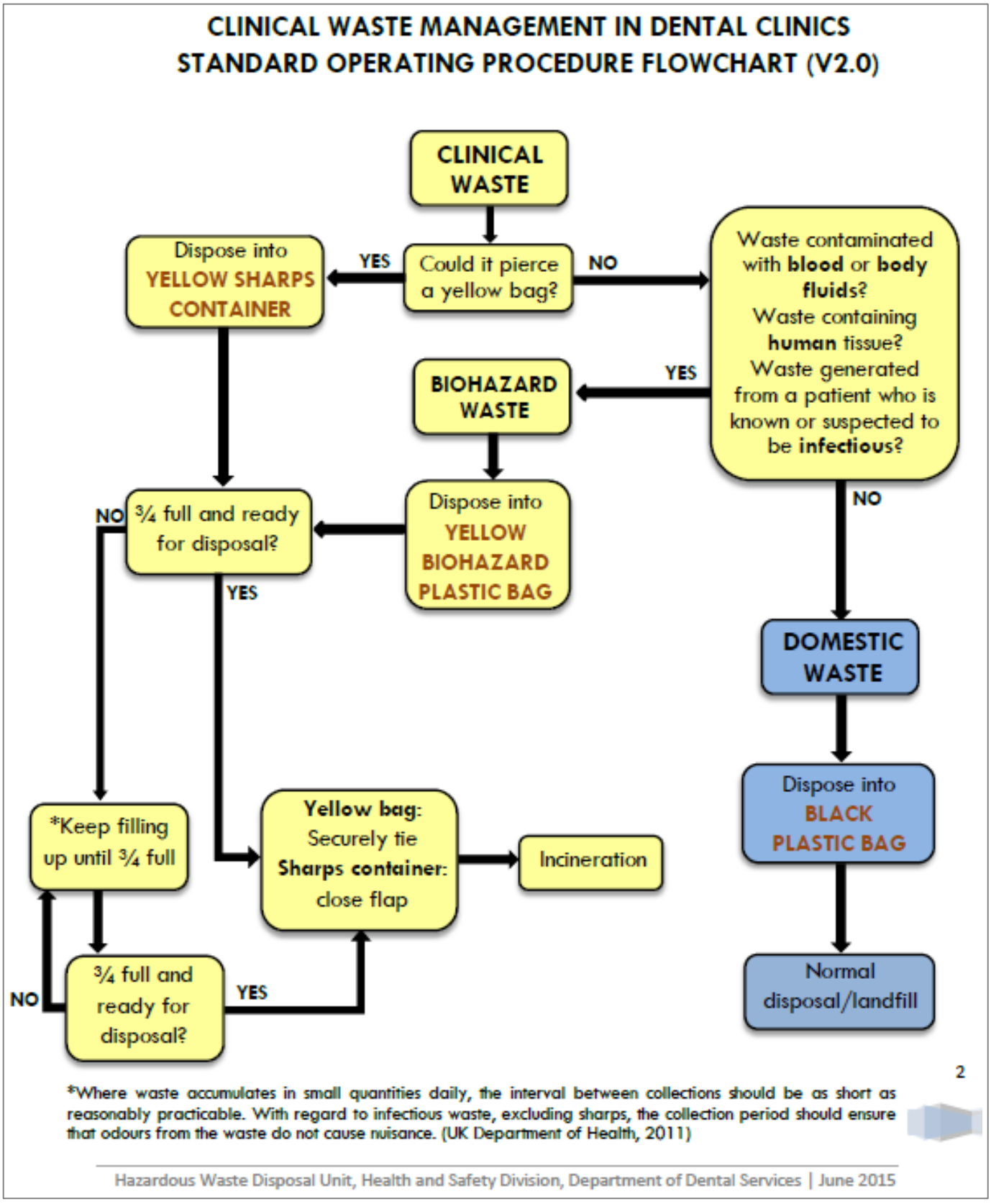
APPENDIX 3



Standard operating procedure flowchart for Clinical Waste Management in dental clinics
(Courtesy of Hazardous Waste Disposal Unit, Health and Safety Division, Department of Dental Services, updated June 2015).

APPENDIX 4

Recommendations for cleaners on handling of waste bags and sharps containers

(1) Handling of waste bags

- Please remove waste bags when they are ¾ **full** or at the **end of the day.**
- **NEVER** transfer the contents of one waste bag into another.
- **NEVER** mix waste from yellow bags (for clinical waste only) and waste from black bags (for domestic waste only).
- Prior to removal, waste bags should be tightly closed or sealed by tying the neck.
- Waste bags **should not** be closed by stapling.
- **DO NOT** touch any clean surface including door knobs, desk and chair with **gloved hands**.
- When transferring waste bags:
  - Pick up the waste bags **by the neck only.**
  - Place them so that they can be picked up by the neck again during further handling.
  - **Do not** clasp bags against your body.
  - **Do not** attempt to carry too many at a time.
  - Try to **avoid** waste bags from hitting your body when being carried.
  - **Do not** throw or drop waste bags to avoid damage.
- Waste bags should then be stored in specified storage areas prior to collection.
- Please wash your hands after handling waste.

(2) Handling of sharps containers

- **NEVER** take off the lid of sharps containers.
- **NEVER** take out the contents of sharps containers.
- **NEVER** transfer the contents of one sharps container into another.
- **When transferring sharps containers:**
  - Close and lock the lid.
  - Pick up and carry the containers **by the handle** provided as sharps can pierce the sides and bottoms of polypropylene containers.
- Sharps containers which are ¾ full should be stored in specified storage areas prior to collection.

Recommendations for cleaners on handling of waste bags and sharp containers
(Courtesy of Hazardous Waste Disposal Unit, Health and Safety Division, Department of Dental Services, updated June 2015).

APPENDIX 5

Test	Description	Performed by	Reference
Verification of calibration	The accuracy of indicating and recording instruments is checked against certificated source instruments	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Automatic control test	The values of cycle time and temperature are noted at relevant stages of the cycle so that a fingerprint of the automatic cycle can be made.	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Rinse-water quality test	Indicates acceptable values for all critical chemical purity parameters	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Pipework	Ensures free-flowing drainage	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Doors and door interlocks	Confirms safety to operator and exposure to complete cycle only	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Fluid emission	Confirms door-seal prevents contamination to surroundings	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Detergent dosing test	Confirms repeatable detergent addition	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Cleaning efficacy test	Using an artificial soil to clean a worst-case load, chamber walls and load carriers to confirm the exposure to cleaning parameters is sufficient to remove soil	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Thermometric test	Thermocouples are attached to worst-case load, chamber walls and load carriers to confirm that disinfection parameters are acceptable	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Load carriers	Confirms mechanical alignment of all load carriers	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2

Suggested Validation protocol for washer-disinfector (Adopted from HTM 01-05).
Key: CP- competent person (Infection Control link person).

APPENDIX 6

Test	Description	Performed by	Reference
DAILY			
Remove and clean strainers and filters	Ensures filters and strainers are clean	User or, by delegation, Operator	BS EN ISO 15883:1 and BS EN ISO 15883:2
Cleaning efficacy	Visual examination of all load items	User or, by delegation, Operator	BS EN ISO 15883:1 and BS EN ISO 15883:2
WEEKLY including daily tests plus:			
Protein residue test	Confirms that cleaning process retains the capability of removing protein	User or, by delegation, Operator	BS EN ISO 15883:1 and BS EN ISO 15883:2
Safety checks	Check condition of door seal	User or, by delegation, Operator	Manufacturer
QUARTERLY (or to manufacturers' recommendations) including weekly tests plus:			
Safety checks	Check safe operation of doors and door interlocks	CP(D)/service engineer	Paragraphs 15.14–15.18
Automatic control test		CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Cleaning efficacy test		CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Chemical dosing	Confirm delivery of detergent (and any other additives) is repeatable and the machine reacts correctly to low levels of any additive	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Thermometric disinfection test	Use of thermocouples on worst-case load to confirm disinfection parameters are acceptable	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
ANNUALLY including quarterly tests plus:			
Completion of all validation tests above		CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2

Testing protocol for washer-disinfector (Adopted from HTM 01-05).
Key: CP- competent person (Infection Control link person).

APPENDIX 7

Test	Description	Performed by	Reference
Verification of calibration	The accuracy of indicating and recording instruments is checked against certificated source instruments	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Automatic control test	The values of cycle time and temperature are noted at relevant stages of the cycle so that a fingerprint of the automatic cycle can be made.	CP(D)/service engineer	Paragraphs 15.3–15.5
Drainage test (where applicable)	Ensures free-flowing drainage	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Lid (ie door) interlock	Confirms safety to operator and exposure to complete cycle only	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Fluid emission	Confirms door-seal prevents contamination to surroundings	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Chemical dosing test (where automated)	Confirms repeatable detergent addition	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Cleaning efficacy test	Using an artificial soil to clean a worst-case load, the exposure to ultrasonic activity for a sufficient time period is confirmed	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Thermometric test (where machine also disinfects)	Thermocouples are attached to worst-case load to confirm that disinfection parameters are acceptable	CP(D)/service engineer	BS EN ISO 15883:1 and BS EN ISO 15883:2
Ultrasonic activity test	The use of aluminium foil within the cleaner tank indicates a uniform distribution of ultrasonic activity A wand meter may be used as long as points of measurement are compatible with the foil test and are fully recorded	CP(D)/service engineer	Paragraphs 15.6–15.13

Validation protocol for ultrasonic cleaners (Adopted from HTM 01-05).
Key: CP- competent person (Infection Control link person).

APPENDIX 8

Test	Description	Performed by	Reference
DAILY			
Remove and clean strainers and filters	Ensures filters and strainers are clean	User or, by delegation, Operator	Manufacturer
Drain machine at end of day/ session	Ensures contaminated water is not stored in tank	User or, by delegation, Operator	Manufacturer
Cleaning efficacy	Visual examination of all load items	User or, by delegation, Operator	Manufacturer
WEEKLY including daily tests plus:			
Safety checks	Check condition of door-seal	User or, by delegation, Operator	Manufacturer Paragraphs 15.14–15.18
Protein residue test	Confirms that cleaning process retains the capability of removing protein	User or, by delegation, Operator	BS EN ISO 15883:1
QUARTERLY (or to manufacturers' recommendations) including weekly tests plus:			
Automatic control test		CP(D)/service engineer	BS EN ISO 15883:1
Verification of calibration		CP(D)/service engineer	BS EN ISO 15883:1
Cleaning efficacy test		CP(D)/service engineer	BS EN ISO 15883:1
Ultrasonic activity test		CP(D)/service engineer	BS EN ISO 15883:1
ANNUALLY including quarterly tests plus:			
Completion of all validation tests above		CP(D)/service engineer	As above

Note
For cleaning efficacy tests and protein residue tests, where the cycle does not have a rinse stage, items should be rinsed as a normal procedure before these tests are carried out, otherwise the tests could return false positives.

Periodic testing for ultrasonic cleaners (Adopted from HTM 01-05).
Key: CP- competent person (Infection Control link person).

APPENDIX 9

Cycle Type	Cycle Parameters			Drying Time [2]	Items to be Sterilized *(Always consult the item manufacturer's recommendations for sterilization.)*
	Temp. (Min.)	Time	Press.[1] (Ref.)		
Unwrapped	270°F (132°C)	3 min.	27.1 psi (186 kPa)	30 min.	• Instruments loose on a tray. • Open glass or metal canisters. • Tubing not used in surgical procedures. *(Max. length - 40" & Min. inside diameter - .187")* • Loose items manufacturers recommend for exposure at 270°F (132°C) for 3 minutes. *Note: The sterility of unwrapped items is compromised on exposure to a non-sterile environment.*
Pouches	270°F (132°C)	5 min.	27.1 psi (186 kPa)	30 min.	• Pouched or loosely wrapped instruments. • Multiple layers of instruments separated by fabric. • Wrapped trays of loose instruments. • Wrapped cassettes. • Tubing not used in surgical procedures. • Wrapped items manufacturers recommend for exposure at 270°F (132°C) for 5 minutes.
Packs	250°F (121°C)	30 min.	15 psi (104 kPa)	30 min.	• Textiles and surgical packs wrapped for sterilization. • Items, except liquids, manufacturers recommend for exposure at 250°F (121°C) for 30 minutes.
Handpieces	270°F (132°C)	6 min.	27.1 psi (186 kPa)	30 min.	• Dental handpieces (wrapped or unwrapped). *Note: Verify acceptability of sterilization parameters with handpiece manufacturer.*
1 2 Programmable User Defined	230°F (110°C) to 275°F (135°C)	3 min. to 90 min.	6 psi (41 kPa) to 31 psi (214 kPa)	30 min.	• Items appropriate for user's defined parameters. Caution All material processed in these cycles must be validated by the user to ensure sterility of the processed load. Programmable cycles 1 & 2 are provided for those applications requiring sterilization parameters different than the preset cycles. It is important to properly coordinate sterilization temperature with cycle time to achieve sterilization. Sterilization temperature can be adjusted from 230° to 275°F (110° to 135°C). Permitted temperature range for proper sterilization is 250° to 275°F (121° to 135°C). Temperatures set below 250°F (121°C) should not be used for sterilization, unless required by the device manufacturer. Temperatures below 250°F (121°C) are provided for disinfection only.

1. *The pressure shown in this table is for reference only. It's the ideal pressure of saturated steam at the sterilization temperature. The pressure shown on the sterilizer display may be higher or lower.*
2. *Dry time can be changed from 0 to 60 minutes. Refer to Cycle Operation.*

Sterilizer parameters for different cycle type and instruments
(Adopted from Midmark M9 Autoclaves® instruction of use)

APPENDIX 10

Test	Type	Performed by	Reference
DAILY			
Steam penetration	B S	User or, by delegation, Operator	MDA DB 2002(06)
Automatic control test	B N S	User or, by delegation, operator	Paragraphs 15.3–15.5
WEEKLY including daily tests plus:			
Air leakage	B S	User or, by delegation, Operator	MDA DB 2002(06)
Residual air test	S N	User or, by delegation, Operator	MDA DB 2002(06)
QUARTERLY (or to manufacturers' recommendations) including weekly tests plus:			
Thermometric tests	B N S	CP(D)/service engineer	MDA DB 9804
ANNUALLY including quarterly tests plus:			
Steam generator overheat cut-out test	B N S	CP(D)/service engineer	MDA DB 9804
Thermometric tests Small load Large load	B N S	CP(D)/service engineer	EN 13060
Dryness tests Small load Large load	B S	CP(D)/service engineer	EN 13060

Periodic testing for sterilizers (Adopted from HTM 01-05).
Key: CP- competent person (Infection Control link person).

APPENDIX 11

Logbook templates for sterilizers (Adopted from HTM 01-05)

DAILY TEST SHEET

AUTOCLAVE DETAILS	
Hospital/Location:	Serial No.
Department:	

		During sterilizing hold period		Sterilizing hold time	ACT test Pass/Fail	Steam penetration test Pass/Fail	Name	Signature
Date	Cycle No.	Temp	Pressure bar	Min: sec				

WEEKLY TEST SHEET

AUTOCLAVE DETAILS	
Hospital/Location:	Serial No.
Department:	

Week	Cycle no.	Air leakage test Pass/Fail	Air detector function test Pass/Fail	ACT result Pass/Fail	Steam penetration test Pass/Fail	Weekly safety checks Satisfactory (S)/ Unsatisfactory (U)	Name & Signature

PRODUCTION LOG SHEET

AUTOCLAVE DETAILS	
Hospital/Location:	Serial No.
Department:	

Date	Cycle no.	Cycle start time	Cycle selected	Description of load	Cycle pass Yes/No	Name	Signature

FAULTS RECORD

AUTOCLAVE DETAILS	
Hospital/Location:	Serial No.
Department:	

Date	Cycle No.	Details of fault	Actions taken	Name & Signature

APPENDIX 12

Managing Spillages

Blood stains, body fluids, vomits

1. •**WEAR** Personal Protective Equipments: aprons, disposable mask, protective glasses, **WASH YOUR HANDS**, gloves
2. •**COVER** area of spills with paper towels
   •For vomit in **LARGE** amount, remove with paper towels first before applying bleach
3. •**APPLY** or **POUR** bleach solution, onto the covered area
4. •**LEAVE** for 5 minutes
5. •**THROW** dirty towels to yellow waste bags
6. •**CLEAN** dirty area with bleach solution then **RINSE OFF** with water
7. •**DRY** area with paper towels
8. •**THROW** dirty towels to yellow waste bags
9. •**REMOVE** PPE: gloves, apron and mask, throw into yellow waste bags
   •**REMOVE** glasses
10. •**WASH YOUR HANDS**

Note: Bleach solution = 1 in 5 dilution of household bleach (e.g. Chlorox)

APPENDIX 13

OCCUPATIONAL HEALTH UNIT
DEPARTMENT OF HEALTH SERVICES
MINISTRY OF HEALTH

Accident at Work Reporting Form

Date of reporting : ☐☐/☐☐/☐☐☐☐

Case ref : .....

Name : .....
Sex : *Male / Female*
Date of birth : ☐☐/☐☐/☐☐☐☐ I/C. No: ☐☐☐☐☐☐ Colour: ☐Y ☐P ☐G
Residential address:

Place of work: ..... Date of employment : ☐☐/☐☐/☐☐☐☐

Job designation: .....

Contact number: (Home) ☐☐☐☐☐☐☐ (Office) ☐☐☐☐☐☐☐
(Mobile) ☐☐☐☐☐☐☐ (Pager) ☐☐☐☐☐☐☐

PART 1: TO BE FILLED BY THE INJURED EMPLOYEE

1. a. Date of accident : ☐☐/☐☐/☐☐
   b. Time of accident : ☐☐:☐☐ am
   ☐☐:☐☐ pm
   Please state if it occured during ;
   ☐ Normal Working Hours
   ☐ Shift (Please state shift time) ☐☐:☐☐ am
   ☐☐:☐☐ pm
2. Place of accident.
   State the following conditions :
   ☐ Floors - Dry/Slippery / Wet
   ☐ Noise - Loud/Quiet
   ☐ Lighting - Good/Fair/Poor
   ☐ Environment - Air conditioned/Not
   ☐ Others- Please specify

1

3. Please explain how did the accident occur and the state / the type of machine / instrument / objects involved (if used).

4. Nature of injuries.

5.a) If the injuries involved sharps (needles, blades, etc) / instruments, please state whether they were :

☐ sterile
☐ contaminated (Please state body fluid, blood, others).....

b) If sharps (needles, blades, etc) / instrument were contaminated is the source patient known?

☐ No

☐ Yes

If yes , please state

Name :.....
Date of birth : ☐☐/☐☐/☐☐☐☐
I.C No. ☐☐☐☐☐☐ Colour: ☐Y ☐P ☐G
MRN No. ☐☐☐☐☐☐☐
Any medical condition(s) of the source patient.

6. Please state if any personal protective equipment were used (if appropriate).

☐ No
☐ Yes Please elaborate

7. Are you up to date with your vaccinations? (e.g. Hepatitis B, Tetanus).
   - ☐ No
   - ☐ Yes Please elaborate

8. Are you suffering from any medical condition?
   - ☐ No
   - ☐ Yes Please explain

9. Were there any other personnel involved in the accident?

10. What was his/her injury? Please give details

11. Are you aware of occupational health and safety hazards related to your job?
   - ☐ No
   - ☐ Yes Please explain

12. Have you been informed about safety precautions during your job training and before commencing your employment.

Signature of Injured employee : .....

Date : ☐☐/☐☐/☐☐☐☐
Time: ☐☐:☐☐ am
☐☐:☐☐ pm

PART 2: TO BE FILLED BY THE SUPERVISOR ON DUTY

I Verify that the above accident and the injuries sustained by the above named employee are true.

Name :.....
Designation :.....
I/C No. : ☐☐☐☐☐☐ Colour: ☐Y ☐P ☐G

Date : ☐☐/☐☐/☐☐☐☐
Time : ☐☐:☐☐ am
☐☐:☐☐ pm

.....
Signature and Stamp

PART 3: TO BE FILLED BY THE ATTENDING PHYSICIAN

1. Any additional relevant history of accident.
   - ☐ No
   - ☐ Yes - Detail

2. Clinical findings

3. Investigations done
   - ☐ No
   - ☐ Yes - Detail

4. Treatment given
   - ☐ No
   - ☐ Yes - Detail

5. Admitted to?
   - ☐ No
   - ☐ Yes - Detail

6. Referred to?
   - ☐ No
   - ☐ Yes - Detail

7. Any follow up?
   - ☐ No
   - ☐ Yes - Detail

8. Medical leave?..... Days

Signature:..... Date seen: ☐☐/☐☐/☐☐☐☐ Time seen: ☐☐:☐☐ ☐☐:☐☐

Name of attending physician:.....

Designation:..... Department:.....

ALL COMPLETED FORMS MUST BE PROMPTLY SUBMITTED TO THE:

OCCUPATIONAL HEALTH UNIT
Department of Health Services, Ministry of Health
Block 2G, Unit 5 - 03
Bandar Seri Begawan Health Centre
Jalan Ong Sum Ping BA 1311
Brunei Darussalam
Tel: 2230043, Fax: 2230044

PART 4: FOR OFFICE USE ONLY

Patient investigations

a) Additional history:

b) Results of clinical examinations / investigations:

c) Accident site investigation (if applicable)

	Y	N
d) Healing complete	☐	☐
e) Residual disability	☐	☐
f) Return to work		
i. Original position	☐	☐
ii. To another position	☐	☐

g) Recommendations / Comments :

Signature: .....

Name of investigator : ..... Date investigated : ☐☐/☐☐/☐☐☐☐

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Glossary

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GLOSSARY

A

Aerosol: particles of respirable size (<10 μm) generated by both humans and environmental sources that can remain viable and airborne for extended periods in the indoor environment; commonly generated in dentistry during use of handpieces, ultrasonic scalers, and air/water syringes.

Airborne transmission: a means of spreading infection in which airborne droplet nuclei are inhaled by the susceptible host.

Air abrasion: the application of a mixture of small abrasive particles by air blast to prepare a cavity in a tooth or remove deposits from teeth.

Alcohol-based gel: an alcohol-containing preparation designed for application to the hands for reducing the number of viable microorganisms on the hands. In the United States, such preparations usually contain 60%--95% ethanol or isopropanol. These are waterless antiseptic agents not requiring the use of exogenous water. After applying such an agent, the hands are rubbed together until the agent has dried.

Allergic contact dermatitis: a type IV or delayed- hypersensitivity reaction resulting from contact with a chemical allergen (e.g., poison ivy, certain components of patient care gloves), generally localized to the contact area. Reactions occur slowly over 12-48 hours.

Antimicrobial soap: a soap (i.e., detergent) containing an antiseptic agent.

Antiseptic: a germicide that is used on skin or living tissue for the purpose of inhibiting or destroying microorganisms. Examples include alcohols, chlorhexidine,

chlorine, hexachlorophene, iodine, chloroxylenol (PCMX), quaternary ammonium compounds, and triclosan.

Antiseptic handwash: washing hands with water and soap or detergents containing an antiseptic agent.

Antiseptic hand rub: the process of applying an antiseptic hand-rub product to all surfaces of the hands to reduce the number of microorganisms present.

B

Bacterial count: a method of estimating the number of bacteria per unit sample. The term also refers to the estimated number of bacteria per unit sample, usually expressed as colony-forming units (CFUs) per square centimeter (cm2) per milliliter (ml). **Bacterial endocarditis**: a bacterial induced inflammation of the lining of the heart and its valves.

Biological indicator: a device to monitor the sterilization process that consists of a standardized population bacterial spores known to be resistant to the mode of sterilization being monitored. Biological indicators indicate that all the parameters necessary for sterilization were present.

Bloodborne virus: disease-producing virus spread by contact with blood or other body fluids contaminated with blood from an infected person.

Body fluids: Body fluids are liquids originating from inside the bodies of living humans. They include fluids that are excreted or secreted from the body. Human blood,

body fluids, and other body tissues are widely recognised as vehicles for the transmission of human disease.

C

Chemical indicator: a device to monitor the sterilization process that changes color or form with exposure to one or more of the physical conditions within the sterilizing chamber (e.g., temperature, steam). Chemical indicators are intended to detect potential sterilization failures that could result from incorrect packaging, incorrect loading of the sterilizer, or malfunctions of the sterilizer. A "pass" response does not verify that the items are sterile. E.g. autoclave tape

Colony-forming unit (CFU): the minimum number of separable cells on the surface of or in semi-solid agar medium which gives rise to a visible colony of progeny is on the order of tens of millions. CFUs may consist of pairs, chains, and clusters as well as single cells and are often expressed as colony-forming units per milliliter (CFU/ml).

Creutzfeldt-Jakob disease (CJD): a degenerative neurological disorder of humans thought to be transmitted by abnormal isoforms of neural proteins called prions. CJD is one of a group of related diseases known as transmissible spongiform encephalopathies (TSEs).

Critical devices/instruments: the category of medical devices or instruments that are introduced directly into the human body, either into or in contact with the bloodstream or normally sterile areas of the body (e.g., surgical scalpel) These items are so called because of the substantial risk of acquiring infection if the item is contaminated with microorganisms at the time of use.

D

Decontamination: a process or treatment that renders a medical device, instrument, or environmental surface safe to handle. According to Occupational Safety Health Act (United States), "the use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal".

Detergents: compounds that possess a cleaning action and have hydrophilic and lipophilic parts. Although products used for handwashing or antiseptic handwash in a health-care setting represent various types of detergents, the term "soap" is used to refer to such detergents in this guideline. Detergents make no antimicrobial claims on the label.

Direct Contact Transmission: physical transfer of microorganisms between a susceptible host and an infected or colonized person.

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

Disinfection: the destruction of pathogenic and other kinds of microorganisms by physical or chemical means. Disinfection is less lethal than sterilization, because it destroys most recognized pathogenic microorganisms, but not necessarily all microbial

forms, such as bacterial spores. Disinfection does not ensure the margin of safety associated with sterilization processes.

Distilled water: water heated to the boiling point, vaporized, cooled, condensed, and collected so that no impurities are reintroduced.

Droplet nuclei: particles 5μm diameter or less that are 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) that may be generated when a person coughs or sneezes or when water is converted to a fine mist by an aerator or shower head. Intermediate in size between drops and droplet nuclei, these particles, although they may still contain infectious microorganisms, tend to quickly settle out from the air so that any risk of disease transmission is generally limited to persons in close proximity to the droplet source.

E

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

Event-related packaging: a storage practice that recognizes that a package and its contents should remain sterile until some event causes the item(s) to become contaminated.

Exposure time: period of time during a sterilization or disinfection process in which items are exposed to the sterilant or disinfectant at the parameters specified by the manufacturer (e.g., time, concentration, temperature, pressure).

G

Germicide: an agent that destroys microorganisms, especially pathogenic organisms. Other terms with the suffix "–cide" (e.g., virucide, fungicide, bactericide, tuberculocide, sporicide) indicate an agent that destroys the microorganism identified by the prefix. Germicides may be used to inactivate microorganisms in or on living tissue (antiseptic) or on environmental surfaces (disinfectants).

H

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

Hand Sanitisers: A hand sanitizer or hand antiseptic is a supplement or alternative to hand wash with soap and water. Many preparations are available, including gel, foam, and liquid solutions. The active ingredient in hand sanitizers may be isopropyl alcohol (isopropanol), ethanol, n-propanol, or povidone-iodine .

Health-care-associated infection: any infection associated with a medical or surgical intervention.

Heterotrophic bacteria: those bacteria that require an organic carbon source for growth (i.e., they derive energy and carbon from organic compounds). The modifier

"mesophilic" describes bacteria that grow best within the middle ranges of environmental temperature.

High-level disinfectant: high-level disinfectant as a sterilant used under the same contact conditions except for a shorter contact time.

Hospital disinfectant: a germicide that is registered by Environmental Protection Agency (EPA) for use on inanimate objects in hospitals, clinics, dental offices, or any other medical-related facility. Efficacy is demonstrated against Salmonella choleraesuis, Staphylococcus aureus, and Pseudomonas aeruginosa.

High-level disinfection: a disinfection process that inactivates vegetative bacteria, mycobacteria, fungi, and viruses but not necessarily high numbers of bacterial spores.

I

Immunization: the process by which a person becomes immune, or protected, against a disease. This term is often used interchangeably with vaccination or inoculation. However, the term "vaccination" is defined as the injection of a killed or weakened infectious organism in order to prevent the disease. Thus, vaccination, by inoculation with a vaccine, does not always result in immunity.

Implantable device: according to the Food and Drug Administration (FDA), "device that is placed into a surgically or naturally formed cavity of the human body if it is intended to remain there for a period of 30 days or more".

Independent water reservoir: a container used to hold water or other solutions and supply it to handpieces and air/water syringes attached to a dental unit. The

independent reservoir, which isolates the unit from the public water system, may be provided as original equipment or as a retrofit device on all modern dental units.

Indirect Contact Transmission: contact of a susceptible host with a contaminated, intermediate object, usually inanimate.

Infectious microorganisms: microorganisms capable of producing infection in susceptible hosts.

Intermediate-level disinfectant: a liquid chemical germicide registered by the Environmental Protection Agency (EPA) as hospital disinfectant and with a label claim of potency as a tuberculocidal.

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

Irritant contact dermatitis: the development of dry, itchy, irritated areas on the skin, which can result from frequent handwashing and gloving as well as exposure to chemicals. This condition is not an allergic reaction.

L

Latex allergy: a type I or immediate anaphylactic hypersensitivity reaction to the proteins found in natural rubber latex.

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

Low-level disinfection: a process that will inactivate most vegetative bacteria, some fungi, and some viruses but cannot be relied on to inactivate resistant microorganisms (e.g., mycobacteria or bacterial spores).

M

Mechanical indicator: devices (e.g., gauges, meter, display, printout) that display an element of the sterilization process (e.g., time, temperature, pressure).

Medical waste (Regulated): waste sufficiently capable of causing infection during handling and disposal (e.g., blood-or saliva-soaked cotton rolls, extracted teeth, sharp items, surgically-removed hard- and soft-tissues) to merit special handling and disposal.

N

N-95 respirator: one of nine types of disposable particulate respirators. "95" refers to the percentage of particles filtered. (see "particulate respirator").

Noncritical: the category of medical items or surfaces that carry the least risk of disease transmission. This category has been expanded to include not only noncritical medical devices but also environmental surfaces. Noncritical medical devices touch only unbroken (nonintact) skin (e.g., blood pressure cuff). Noncritical environmental surfaces can be further divided into clinical contact surfaces (e.g., light handle) and housekeeping surfaces (e.g., floors, countertops).

Nosocomial: describes an infection acquired in a hospital as a result of medical care (see definition for **health-care-associated infection**).

O

Occupational exposure: a reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

Opportunistic infection: an infection caused by a microorganism that does not ordinarily cause disease but is capable of doing so, under certain host conditions (e.g., impaired immune response).

P

Percutaneous injury: an injury that penetrates the skin (e.g., needlestick, or cut with a sharp object).

Personal protective equipment (PPE): is specialized clothing or equipment worn by an employee for protection against a hazard (e.g., gloves, masks, protective eyewear, gowns). General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

Plain or non-antimicrobial soap: soaps or detergents that do not contain antimicrobial agents or contain very low concentrations of such agents that are effective solely as preservatives.

Postexposure prophylaxis: the administration of medications following an occupational exposure in an attempt to prevent infection.

PPM (Parts per million): a measure of concentration in solution. For example, a 5.25% chlorine bleach solution (undiluted as supplied by the manufacturer) contains approximately 52,500 parts per million of free available chlorine.

Prion: a protein particle that lacks nucleic acid and has been implicated as the cause of various neurodegenerative diseases (as Scrapie, Creutzfeldt-Jakob disease, and Bovine Spongiform Encephalopathy). It is a pathogenic form of a neural protein that is both less soluble and more resistant to enzyme degradation than the normal form.

R

Regulated waste: liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.

Retraction: the entry of oral fluids and microorganisms into waterlines through negative water pressure.

S

Semicritical: the category of medical devices or instruments (e.g., mouth mirror) that come into contact with mucous membranes and do not ordinarily penetrate body surfaces.

Splatter: visible drops of liquid or body fluid that are expelled forcibly into the air and settle out quickly, as distinguished from particles of an aerosol, which remain airborne indefinitely.

Spaulding classification: a strategy for sterilization or disinfection of inanimate objects and surfaces based on the degree of risk involved in their use. The three categories are critical, semicritical, or noncritical. The system also established three levels of germicidal activity for disinfection (high, intermediate, and low).

Sterilant: a liquid chemical germicide that destroys all forms of microbiological life, including high numbers of resistant bacterial spores.

Sterile/sterility: state of being free from all living microorganisms. In practice, usually described as a probability function, (e.g., the probability of a surviving microorganism being 1 in 1,000,000).

Sterilization: the use of a physical or chemical procedure to destroy all microorganisms including large numbers of resistant bacterial spores.

Surfactants: surface-active agents that reduce surface tension. They help cleaning by loosening, emulsifying, and holding debris, which can then be more readily rinsed away.

Surgical hand scrub: an antiseptic-containing preparation that substantially reduces the number of microorganisms on intact skin; it is broad-spectrum, fast-acting, and persistent.

U

Ultrasonic cleaner: a device that uses waves of acoustic energy (a process known as "cavitation") to loosen and break up debris on instruments.

V

Vaccination: the term "vaccination" is defined as the injection of a killed or weakened infectious organism in order to prevent the disease. Thus, vaccination, by inoculation with a vaccine, does not always result in immunity.

Vaccine: a product that produces immunity therefore protecting the body from the disease. Vaccines are administered through needle injections, by mouth and by aerosol.

Variant Creutzfeldt-Jakob Disease (CJD): a rare and fatal human neurodegenerative condition which is classified as a Transmissible Spongiform Encephalopathy (TSE) because of its ability to be transmitted and the characteristic spongy degeneration of the brain that it causes.

W

Washer-disinfector: an automatic unit designed to clean and thermally disinfect instruments. The unit uses a high-temperature cycle rather than a chemical bath.

Z

Zoning: defined as demarcating the clinical area to reduce cross contamination in dental surgery and facilitate dirty to clean workflow .This will reduce the risk of clean instruments coming into contact with dirty instruments.

Source: Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion (2013)

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