

*Operational Guide for School
Oral Health Program*

Cross Infection Control

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o Introduction

Sterilization and barrier techniques are intended to minimize the risk of cross-infection, between patients, patient and operator and patient and dental assistant. All dental health care workers are exposed to a wide variety of micro-organisms such as tuberculosis (T.B), human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), Herpes and pneumonia in dental practice. Most carriers of viruses such as HBV, HCV and HIV are unaware of their condition. So it is mandatory that all the patients should be treated as potential carriers. Operative dental procedures generate a high level of potentially infected splash and aerosol. High standard clinical techniques are therefore required for all operating staff, their assistants and sterilization staff to avoid transmission of any infection.

o Vaccination against Hepatitis B:

Dental health care workers are at a greater risk for acquiring hepatitis B, through contact with patients, instruments and infected surfaces. It is the policy of SOHP that all dentists & their staff should be vaccinated against hepatitis B immediately once they join the program.

Infection Control in Dental Clinics:

1. Critical precautions before each procedure:

1.1 Hands Hygiene: for standard procedures hands should be washed with a liquid disinfectant soap for 15 seconds

- Before and after treating each patient.
- Prior to wearing gloves
- After removing protective wears.
- After touching any contaminated object.
- Before leaving the work place.

Disposable paper towels should be used to dry the hands.

1.2 Proper technique for hand washing₈

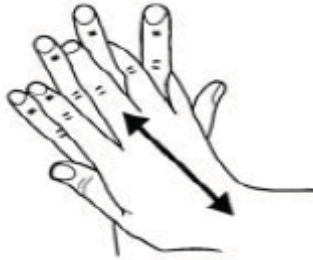
(Ensure hands are held higher than the elbow)

Step 1: Apply cleansing agent on wet hands, lather hands and wrist using rotary motions. (Fig. 26)



(Fig. 26)

Step 2: Rub palms over backs of palms. (Fig. 27)



(Fig. 27)

Step 3: Rub palms together with fingers linked. (Fig. 28)



(Fig. 28)

Sep 4: Link fists together and rub backs of fingers in a circular motion. (Fig. 29)



(Fig. 29)

Step 5: Wash thumbs in palms in a circular motion. (Fig. 30)



(Fig.30)

Step 6: Rub tips of fingers across palms. (Fig. 31)



(Fig. 31)

1.3 Recommendations for hand care during clinical sessions include:–(Table 1)

- Removal of rings, jewellery and watches.
- Covering all cuts and abrasions with waterproof adhesive dressings.
- Methodical hand washing using a good quality liquid soap preferably containing a disinfectant – a full hand wash and thorough drying is recommended before donning gloves.
- Removing gloves and washing hands after each patient (gives the hands time to recover from being covered).
- Regular use of an emollient hand cream to prevent the skin from drying, especially after every clinical session.

1.4 Barrier protection should be worn in the form of surgical gloves, eye glasses, masks, full-face shields, and protective clothing's to protect against any foreign bodies, splatter and aerosols, which may arise during operative procedures.

1.5 Gloves must be worn routinely by all persons who are in direct patient contact and those who are handling body fluids, tissues or objects contaminated with the above materials. A new pair of gloves should be worn for each patient.

1.6 Patients must also be given eyeglasses to protect against possible injury and splash.

1.7 When any operative procedure is undertaken, surgical facemasks of the pleated fiber type or papier maché dome type and face shield should be worn. If masks become wet during procedures, they should be discarded and put a new mask.

1.8 Protective clothing, which covers areas likely to be contaminated, should be worn. Sleeves must be long and have about 5cm. of elasticized cuff and gloves can be drawn over this. The clothing material should be of sufficient quality to withstand the complete hottest cycle wash at 95°C, in an automatic washing machine.

2. Preparation of the clinic before each procedure:

2.1 Work surface, equipments and other furniture should be cleaned and disinfected with a disinfectant solution used for the purpose of cleaning. Alcohol and glutaraldehyde are not recommended for surface disinfections.

2.2 Cotton rolls, cotton pellets and sundries should be provided in small quantities to avoid excessive exposure to contamination as the treatment

Table 1. Hand-hygiene methods and indications

| <i>Method</i> | <i>Agent</i> | <i>Purpose</i> | <i>Duration (Minimum)</i> | <i>Indications</i> |
|-----------------------------|--|--|---|--|
| Routine handwash | Water and nonantimicrobial soap (e.g., plain soap) | Remove soil and transient microorganisms | 15 seconds | Before and after treating each patient (e.g., before glove placement and after glove removal). |
| Antiseptic handwash | Water and antimicrobial soap (e.g., chlorhexidine, iodine and iodophors, chloroxylenol [PCMX], triclosan) | Remove or destroy transient microorganisms and reduce resident flora | 15 seconds | After barehanded touching of inanimate objects likely to be contaminated by blood or saliva. Before leaving the dental operatory or the dental laboratory. When visibly soiled. |
| Antiseptic hand rub | Alcohol-based hand rub | Remove or destroy transient microorganisms and reduce resident flora | Rub hands until the agent is dry | Before regloving, after removing gloves that are torn, cut, or punctured. |
| Surgical antiseptics | Water and antimicrobial soap (e.g., chlorhexidine, iodine and iodophors, chloroxylenol [PCMX], triclosan). Water and non-antimicrobial soap (e.g., plain soap†) followed by an alcohol-based surgical hand-scrub product with persistent activity | Remove or destroy transient microorganisms and reduce resident flora (persistent effect) | 2–6 minutes Follow manufacturer instructions for surgical hand scrub product with persistent activity. | Before donning sterile surgeon's gloves for surgical procedures |

involves a number of sessions.

2.3 The dental assistant should conduct the patient to the chair, seat them and place protective covering such as eyeglasses and bibs and wash his or her hands according to the procedure explained above and put on treatment gloves.

3. Important concerns during the procedure:

3.1 A good medical history is essential and assists in identifying patients who require special care. Direct questioning and discussion between patient/parent and dentist must support medical history sheets. The history should be reviewed during each subsequent recall.

3.2 Ensure that barrier techniques remain unimpaired. Check for tears or excessive contamination of masks, gloves, eyeglasses and protective clothing.

3.3 Ensure that the high-speed evacuation system functions effectively to remove aerosol sprays, saliva, blood and other contaminated materials.

Sharp instruments and needles

3.4 Needles, scalpel blades, burs, endodontic files and other sharp instruments should be considered as potentially infective and must be handled with extreme care. Needles should not be recapped by hand. Custom devices are made for this purpose and used when available. Alternatively, recap the needle single handedly by scooping up the cap with the end of the needle and then firmly clicking the cap into place with the other hand.

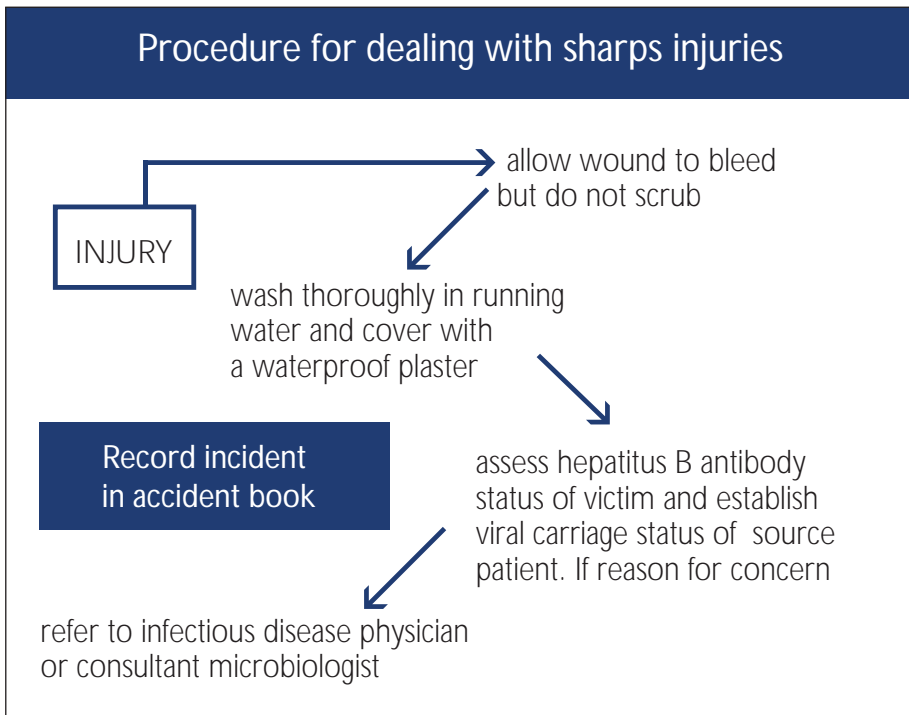
3.5 Inoculation injuries (Fig. 32)

Inoculation injuries are the most likely route for transmission of bloodborne viral infections in dentistry. The definition of an inoculation injury includes all incidents where a contaminated object or substance breaches the integrity of the skin or mucous membranes or comes into contact with the eyes. The following are typical examples: –

- Sticking or stabbing with a used needle or other instrument.
- Splashes with a contaminated substance to the eye or open lesion.
- Cuts with contaminated equipment.
- Bites or scratches inflicted by patients.

Inoculation injuries must be dealt with promptly and correctly. After an occupational blood exposure, first aid should be administered as necessary. Puncture wounds and other injuries to the skin should be washed with soap

and water; mucous membranes should be flushed with water. No evidence exists that using antiseptics for wound care or expressing fluid by squeezing the wound further reduces the risk of bloodborne pathogen transmission; however, use of antiseptics is not contraindicated. The application of caustic agents (e.g., bleach) or the injection of antiseptics or disinfectants into the wound is not recommended.



Source: BDA advice sheet A12, *Infection control in dentistry*, Feb 2003, Page:14

(Fig. 32)

Exposed Dental Health Care Provider (DHCP) should immediately report the exposure to the infection-control coordinator or other designated person, who should initiate referral to the qualified health-care professional and complete necessary reports. Because multiple factors contribute to the risk of infection after an occupational exposure to blood, the following information should be included in the exposure report, recorded in the exposed person's confidential medical record, and provided to the qualified health-care professional:

- Date and time of exposure.
- Details of the procedure being performed, including where and how

the exposure occurred and whether the exposure involved a sharp device, the type and brand of device, and how and when during its handling the exposure occurred.

- Details of the exposure, including its severity and the type and amount of fluid or material. For a percutaneous injury, severity might be measured by the depth of the wound, gauge of the needle, and whether fluid was injected; for a skin or mucous membrane exposure, the estimated volume of material, duration of contact, and the condition of the skin (e.g., chapped, abraded, or intact) should be noted.
- Details regarding whether the source material was known to contain HIV or other bloodborne pathogens, and, if the source was infected with HIV, the stage of disease, history of antiretroviral therapy, and viral load, if known.
- Details regarding the exposed person (e.g., hepatitis B vaccination and vaccine-response status).

The risk of acquiring HIV infection following an inoculation injury is small. If the injury is risk-assessed as significant for transmission of HIV and the source patient is HIV infected, the use of antiretroviral drugs taken prophylactically as soon as possible after exposure – ideally within one hour – is recommended. Post-exposure prophylaxis (PEP) involves the use of a short course (four weeks) of treatment with anti-retroviral drugs in an attempt to reduce even further the risk of infection with HIV following exposure.

3.6 Disposable needles, root canal files and scalpel blades should be placed into puncture resistant sharps container and disposed off at an approved disposal areas. Containers should be filled only up to the maximum level (3/4th) marked on it.

3.7 Where centralized evacuation systems are not installed, blood, suctioned fluids and other liquid wastes should be carefully poured into a drain connected to a sanitary sewerage system. (Toilet bowl)

4. Clinic disinfection after each procedure:

4.1 Between clinical sessions all work surfaces including those apparently uncontaminated, should be thoroughly cleaned and decontaminated using the disinfectant solution provided. Protective gloves must be worn and care is taken to minimize the inhalation and direct contact with the disinfectants.

4.2 The suction system should be cleaned at the end of treating each patient. The outer surfaces should be disinfected with a proprietary cleaner and the

interior should be cleaned by flushing warm water for 20 to 30 seconds by the dental assistant. He/She should wear a facemask during this procedure. At the end of each session aspirate a mixture of water and aspirator cleanser (Purevac).

4.3 Hand pieces should be brushed with a brush having nylon bristles and rinsed under running water to remove the debris. Any dental device connected to the dental air/water system that enters the patient's mouth should be run to discharge water, air, or a combination for a minimum of 20--30 seconds after each patient. This procedure is intended to help physically flush out patient material that might have entered the turbine and air and waterlines. Dry, lubricate and autoclave at 134°C. (Cycle 1)

4.4 Containers holding cotton rolls, pellets and sundries should be cleaned using a mild detergent solution and sterilized with an instrument disinfectant once a week.

4.5 Contaminated solid waste should be placed in double plastic bags, labeled as "biohazard" and disposed off in a regulation disposal area.

4.6 Floor spillage of blood and other body fluids should be mopped off and the surface should be cleaned with surface disinfectant.

5. Instrument sterilization after each procedure: (Fig. 33)

5.1 Designate a central processing area. Divide the instrument processing area, physically or, at a minimum, spatially, into distinct areas for 1) receiving, cleaning, and decontamination; 2) preparation and packaging; 3) sterilization; and 4) storage. Do not store instruments in an area where contaminated instruments are held or cleaned

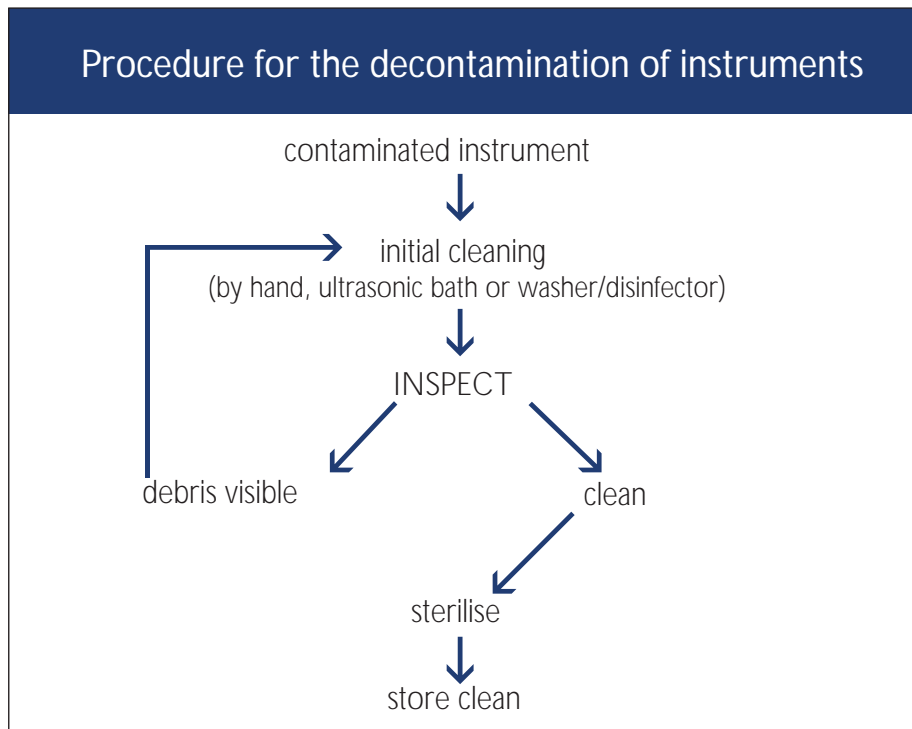
5.2 Clean all visible blood and other contamination from dental instruments and devices before sterilization or disinfection procedures. Use automated cleaning equipment (e.g., ultrasonic cleaner or washer-disinfector) to remove debris to improve cleaning effectiveness and decrease worker exposure to blood. Use work-practice controls that minimize contact with sharp instruments if manual cleaning is necessary (e.g., long-handled brush). Wear puncture- and chemical-resistant/heavy-duty utility gloves for instrument cleaning and decontamination procedures.

5.3 Instruments are then dried, packed and sealed for steam sterilization. Place the packages in the autoclave at 134°C and 2.2 bars pressure. The date and the operator name have to be recorded on each pouch.

5.4 Rotary instruments such as burs should be cleaned with a wire brush to remove all visible debris. Cleaned root canal instruments, burs and used

stainless steel crowns should be then treated in an ultrasonic cleaner. Root canal files and burs are arranged on an autoclavable root canal tray and bur holder, sealed with pressure sensitive tape, and sterilized in the autoclave.

5.5 Autoclaved instruments are stored according to their use. Instruments should remain bagged until opened for use.



Source: BDA advice sheet A12, Infection control in dentistry, Feb 2003, Page:12 (Fig. 33)

6. Environmental management:

6.1 Floors and walls of clinics and sterilizing rooms should be cleaned with a detergent solution and disinfected with surface disinfectant once in three months or more than once if necessary.

6.2 Colored disposable thrash bags are used to dispose off the contaminated materials.

- Yellow labeled plastic bags- for disposable items that may contain blood or other body fluids such as gloves, bibs, rubber dam etc. (inside clinic)

- Red labeled plastic bags- (toilets).
- Non-hazardous wastes are disposed in blue or black labeled plastic bags.
- Blue labeled plastic bags- (in office).
- Black labeled plastic bags- (less important areas like kitchen).

6.3 Staff, particularly cleaners, who deal with disposal of waste materials, should wear protective clothing consisting of heavy-duty gloves (use the same color that of thrash bag used) and plastic aprons.

7. Sterilization monitoring program:

7.1 Sterilization is best monitored using a combination of mechanical, chemical, and biological indicators.

A complete monitoring program includes

- Use of rapid change indicators on the outer side of each instrument pack,
- Daily use of a slow change integrator inside the pack of instruments.
- Daily Bowie-Dick test
- Regular biological monitoring.

Details of the monitoring process to be used in SHOP are given below.

1. Mechanical monitoring

7.2 Record cycle time, temperature, and pressure as displayed on the sterilizer gauges for each instrument load.

2. Chemical monitoring

7.3 Chemical monitoring involves the use of:

1. Rapid change indicators.
2. Slow change or integrator indicators.
3. Bowie-Dick type test.

7.4 Rapid change indicators, (autoclave tapes and special markings outside the autoclave bags and pouches) are used on the outer side of every pouch that is processed through the autoclave. The purpose of rapid change indicator is to eliminate the possibility of using non-sterile instruments.

7.5 A slow-change or integrator strip should be used once daily. The integrator strip is placed inside a pouch together with instruments and packed. The pouch should be placed in the middle of the autoclave along with a typical load and processed under standard conditions. After processing, the strip should be removed from the pouch and evaluated for color change. If the strip has changed color, the autoclave can be considered safe to use. If the strip has not changed color; evaluate the processing steps and using another strip retest the autoclave unit. **DO NOT** use the instruments processed in that load until they are processed again. If the second strip fails to change color; do not sterilize any more instruments in that autoclave. Call headquarters and report the malfunction.

7.6 Bowie-Dick pack is designed to be used for testing air removal efficiency of pre-vacuum steam sterilizers. Bowie-Dick pack contains a test sheet that is printed with a chemical indicator which changes from light yellow to dark brown/black when processed according to the instructions. The test must be carried out each day the sterilizer is used, before the first processed load. A shortened cycle (without post vacuum drying) should be run first to properly heat up the sterilizer. If the sterilizer is in use for 24 hrs per day, the test may be made at any time, but should be made at the same time every day. Place the test pack in the horizontal position with label facing up in an empty pre-vacuum sterilizer chamber. Run the sterilizer for not more than 3.5 minutes at 134^o C. A *satisfactory* test is indicated by a test sheet that shows uniform dark brown/black color development. A non-uniform color indicates incomplete air removal from the chamber and the *failure* of the cycle. Sterilizer should not be used until examined for possible malfunction. If the test sheet have a grey or silvery appearance, overexposure is indicated; a retest is required since the test is invalid.³⁸

Biological monitoring

7.7 Biological test pack- It is a disposable test pack with biological indicator for use in monitoring pre vacuum and gravity displaced autoclaves.

Basic principle: The test pack is placed on the bottom shelf near the door in a normally loaded autoclave and an appropriate sterilization cycle is run at 134^oC. Following the cycle, the test pack is opened and the chemical indicator is examined. The biological indicator is removed from the pack and processed according to manufacturer's instruction. Appearance of color change from purple to yellow shows bacterial growth. All control vials should be yellow color within 48 hrs and all test (autoclaved) vials should remain purple. If test vials demonstrate a positive test, report this sterilization failure immediately.

Dispose used biological indicators after autoclaving at 134⁰ C for 15 minutes.

8. Storage of sterilized items and clean dental supplies

8.1 The storage area should contain enclosed storage for sterile items and disposable (single-use) items. Packages containing sterile supplies should be inspected before use to verify barrier integrity and dryness.

8.2 Some health-care facilities date every sterilized package and use shelf-life practices, and other facilities have switched to event-related practices. This approach recognizes that the product should remain sterile indefinitely, unless an event causes it to become contaminated (e.g., torn or wet packaging). Even for event-related packaging, minimally, the date of sterilization should be placed on the package, and if multiple sterilizers are used in the facility, the sterilizer used should be indicated on the outside of the packaging material to facilitate the retrieval of processed items in the event of a sterilization failure.

8.3 If packaging is compromised, the instruments should be recleaned, packaged in new wrap, and sterilized again.

8.4 Clean supplies and instruments should be stored in closed or covered cabinets, if possible. Dental supplies and instruments should not be stored under sinks or in other locations where they might become wet.

At the end of the day

8.5 At the end of the day drain autoclave chamber and water reservoir to remove all residual water and leave to dry. The same procedure should be followed for the dental unit.

9. Infection control in the dental laboratory

9.1 Sterilization and disinfection

- Metal trays that hold impression materials inside the patient's mouth should be autoclaved after each use just like all other autoclavable dental instruments.
- Impressions which have been in the patient's mouth must be rinsed to remove saliva, blood and debris and disinfected by immersing in a compatible disinfecting solution prior to shipment to dental laboratory. It should be labeled properly to prevent duplication of the disinfection protocol. The use of disinfectant that requires time not more than 30 minutes for disinfecting is recommended.

Practices for the dental laboratory

Dental laboratories should institute appropriate infection control programs. Such programs should be coordinated with the dental office.

9.2 Receiving area: A receiving area should be established separate from the area of production. Countertops and work surfaces should be cleaned and then the receiving area is disinfected daily with an appropriate surface disinfectant.

9.3 Incoming cases: All incoming cases should be disinfected as they are received unless the laboratory employees know that the dental office has disinfected the case. Containers should be sterilized or disinfected after each use. Packing materials should be discarded to avoid cross contamination.

9.4 Production area:

1. Persons working in the production area should wear a clean uniform or laboratory coat, a facemask, protective eyewear and disposable gloves.
2. Work surfaces and equipment should be kept free of debris and disinfected daily. Any instruments, attachments or materials to be used with new prostheses/appliances should be maintained separately from those to be used with prostheses/appliances that have already been inserted in the mouth.
3. Rag wheels can be washed and autoclaved after each use.
4. Brushes and other equipment should be disinfected daily.
5. Pumice should be dispensed in small amount. The excess should be discarded. A liquid disinfectant (1:20 sodium hypochlorite) can serve, as mixing medium for pumice.

9.5 Outgoing cases: Each case should be disinfected before it is returned to the dental office. Dentists should be informed about infection control procedures used in the dental laboratory.

10. Disposal of waste materials:

10.1 Disposable materials such as gloves, masks, wipes, paper drapes and surface covers that are contaminated with body fluids should be discarded in a sturdy, impervious plastic bag to minimize the human contact.

10.2 Blood, disinfectants and sterilants are carefully poured into a drain that is connected to a sanitary sewer system. Care should be taken to ensure

compliance with applicable local regulations. It is recommended that drains be flushed or purged each night to reduce bacterial growth and accumulation.

10.3 Sharp items, such as needles and scalpel blades should be placed in puncture resistant containers marked with the biohazard label.

10.4 Human tissue may be handled in the same manner as sharp items and should not be placed in the same container.

10.5 Extracted teeth are potentially infectious material and should be disposed in medical waste containers. Extracted teeth sent to a dental laboratory for shade or size comparisons should be cleaned, surface-disinfected with an Environmental Protection Agency (EPA) registered hospital disinfectant and transported. However, extracted teeth can be returned to patients on request. Extracted teeth containing dental amalgam should not be placed in a medical waste container that uses incineration for final disposal.

10.6 Regulated medical waste (e.g. Sharps, tissues) should be disposed off according to the requirements established by state environmental regulatory agencies.

10.7 Solid waste that is soaked or saturated with body fluids should be placed in sealed, sturdy impervious bags. The bag should be disposed accordingly.

11. Blood spill

If blood is spilled, either from a container or as a result of an operative procedure, the spillage should be dealt with as soon as possible. The spilled blood should be completely covered either by disposable towels, which are then treated with 10,000 ppm sodium hypochlorite solution or by sodium di-chloro-iso-cyanurate granules. At least 5 minutes must elapse before the towels etc are cleared and disposed of as clinical waste. The dental health care worker who deals with the spillage must wear appropriate protective clothing, which will include household gloves, protective eyewear and a disposable apron and, in the case of an extensive floor spillage, protective footwear. Good ventilation is essential.

12. X-Ray equipment and films

12.1 To prevent microbial contamination of equipments and controls, disposable protective coverings (plastic wrap) or disinfectants should be used.

12.2 Reusable X-ray film holders should be sterilized after each patient, while disposable ones should be disposed off immediately after each patient.

12.3 Film packets are placed in protective pouches before use. The

uncontaminated film packets can then be dropped out of the pouch each time.

12.4 Intra-orally exposed contaminated film packets should be handled carefully to prevent cross contamination. After exposure of the radiograph and before glove removal, the film should be dried with disposable gauze or a paper towel to remove blood or excess saliva and placed in a container (e.g., disposable cup) for transport to the developing area.

12.5 These packets should be opened in the dark room, using disposable gloves. The film should be dropped out of the packets without touching it. The contaminated packets should be accumulated in a disposable towel. After all packets have been opened, they should be discarded and remove the gloves.

12.6 The film can be then processed without contaminating the equipments in the darkroom.

Digital radiography:

12.7 Digital radiography sensors and other high-technology instruments (e.g., intra-oral camera, electronic periodontal probe, occlusal analyzers, and lasers) come into contact with mucous membranes and are considered semi critical devices. They should be cleaned and ideally heat-sterilized or high-level disinfected between patients.

12.8 Semi critical items that cannot be reprocessed by heat sterilization or high-level disinfection should, at a minimum, be barrier protected by using a Food and Drug Administration (FDA) cleared barrier to reduce gross contamination during use. Use of a barrier does not always protect from contamination. To minimize the potential for device-associated infections, after removing the barrier, the device should be cleaned and disinfected with an (EPA)-registered hospital disinfectant (intermediate-level) after each patient.

12.9 Manufacturers should be consulted regarding appropriate barrier and disinfection/sterilization procedures for digital radiography sensors, other high-technology intra-oral devices, and computer components.

Infection control checklist

At start of day/session

- ✓ Fill the autoclave reservoir and run the autoclave for a complete cycle
- ✓ Record the sterilisation parameters reached in your autoclave logbook
- ✓ Compare these with the manufacturer's recommended parameters
- ✓ Sterilise cleaned instruments using an autoclave and store covered
- ✓ Clean and disinfect all contaminated work surfaces
- ✓ Clean and disinfect impressions and other dental appliances before sending to laboratory
- ✓ Prepare surgery for next patient

Before patient treatment

- ✓ Ensure that all equipment has been sterilised or adequately disinfected (if it cannot be sterilised)
- ✓ Put disposable coverings in place where necessary
- ✓ Place only the appropriate instruments on bracket table
- ✓ Set out all materials and other essential instruments
- ✓ Update patient's medical history
- ✓ protective eyewear and protective clothing
- ✓ Provide eye protection for patient
- ✓ Wash hands before gloving; a new pair of gloves must be used for each patient
- ✓ Change gloves immediately if they are torn, cut or punctured
- ✓ Use rubber dam to isolate where appropriate
- ✓ Use high-volume aspiration
- ✓ Ensure good general ventilation of the treatment area
- ✓ Handle sharps carefully and only re-sheath needles using a suitable device

After patient treatment

- ✓ Dispose of sharps via the sharps container
- ✓ Segregate and dispose of clinical waste
- ✓ Disinfect the aspirator, its tubing and the spittoon
- ✓ Clean the chair and the unit
- ✓ Empty and clean ultrasonic cleaning machine and leave to dry.

During patient treatment

- ✓ Treat all patients as potentially infectious
- ✓ Wear gloves, masks and
- ✓ Clean and inspect all instruments to ensure visibly clean before placing in an ultrasonic cleaning machine or washer/disinfector

At the end of the day

- ✓ Drain autoclave chamber and water reservoir to remove all residual water and leave to dry

Source: BDA advice sheet A12, *Infection control in dentistry*, Feb 2003, Page: 7

(Fig. 34)