APSIC Dental Infection Prevention and Control (IPC) Guidelines

2022

The Asia Pacific Society of Infection Control (APSIC) would like to acknowledge the contribution and expertise of the following experts who developed this document:

Chairperson:

A/Prof Moi Lin Ling, Singapore – Director, Infection Prevention and Epidemiology, Singapore General Hospital; and President of APSIC

Members:

1. Ms Patricia Ching, Principal Nurse, WHO Collaborating Centre for Infectious Disease Epidemiology and Infection Control, School of Public Health, The University of Hong Kong
2. Dr Johnson Cheng, Dean and Professor, College of Oral Medicine, Taipei Medical University
3. Ms Lily Lang, Infection Control, Nurse Manager, Dental Services, National Healthcare Group Polyclinics, Singapore
4. A/Prof Sharon Liberali, Specialist, Special Needs Dentistry Director, Special Needs Unit, Adelaide Dental Hospital, SA Dental Service; Program Convenor, Special Needs Dentistry, School of Dentistry, University of Adelaide, Australia.
5. Dr Philip Poon, Specialist in Paediatric Dentistry, Chairman of Quality Assurance Committee, Member of Infection Control Standing Committee, Dental Services, Department of Health, Hong Kong, China
6. Dr Yurim Shin, Dentist, Minish Dental Hospital, International Relations Counsel of Korean Academy of Infection Control in Dentistry (KAICD), South Korea
7. Dr Chelsia Sim, Chairperson, Infection Prevention and Control, National Dental Centre, Singapore

With support from 3M Asia Pacific

Endorsed by:

1. Hong Kong Infection Control Nurses Association (HKICNA), Hong Kong
2. Infection Control Association of Singapore (ICAS), Singapore
3. Japanese Society for Infection Prevention and Control (JSIPC), Japan
4. Korean Society of Health-associated Infection Control (KOSHIC), South Korea
5. National Nosocomial Infection Group of Thailand, Thailand
6. Nursing Association for Prevention & Control of Infection, Thailand (ThaiNAPCI)
7. Philippine Hospital infection Control Society, (PHICS), Philippines
8. Infection Control Society of Taiwan (ICST)
9. Malaysian Society of Infection Control and Infectious Disease (MyICID), Malaysia
10. Indonesian Society of Infection Control (INASIC), Indonesia

Acknowledgment:

APSIC acknowledges the help of Emeritus Professor Laurence J Walsh of the University of Queensland School of Dentistry, Australia; and Dr Young Sun Kwon, Goodface Dental Group, International Relations Counsel of Korean Academy of Infection Control in Dentistry (KAICD) for reviewing the document and giving their valuable comments and feedback.

Contents

Chapter 1 Infection Prevention and Control 6
Chapter 2 Transmission-based Precautions 12
VZV, measles and TB patient management 14
Chapter 3 Asepsis and surgical management 16
Aseptic technique 16
Standard aseptic technique 16
Surgical aseptic technique 16
Surgical procedures 16
Surgical hand hygiene 17
Steps prior to commencing surgical hand preparation 18
Chapter 4 Dental Environment 24
Chapter 5 Special procedures and IPC issues 38
A. Dental Laboratory 38
B. Radiography room 39
C. Spray and aerosol generating procedures 40
D. Dental OPD surgeries: 40
Chapter 6 Instruments handling and reprocessing 44
Introduction 44
Cleaning and disinfection of contaminated instruments 45
Methods of cleaning reusable dental instruments 46
Cleaning verification 48
Packaging of instruments 48
Sterilisation Failure 54
Chapter 7 Incident and outbreak management 56
A. Sharp injury and blood borne disease 56
B. Sterilisation failure 56
C. Exposure management 57
Chapter 8 Education and Training 61
Chapter 9 Pandemic preparedness 63
Appendix 67
Chapter 10 Design specifications 68
Introduction 68
Functional areas 68
1. Entry / Reception and Waiting areas 69
2. Dental treatment areas 69

3. Hand hygiene stations 69
4. Instrument reprocessing area 70
5. Dental Plant room 72
6. Staff support areas 73
Appendix: Categories for strength of each recommendation 74
Recommendations 75

Chapter 1 Infection Prevention and Control

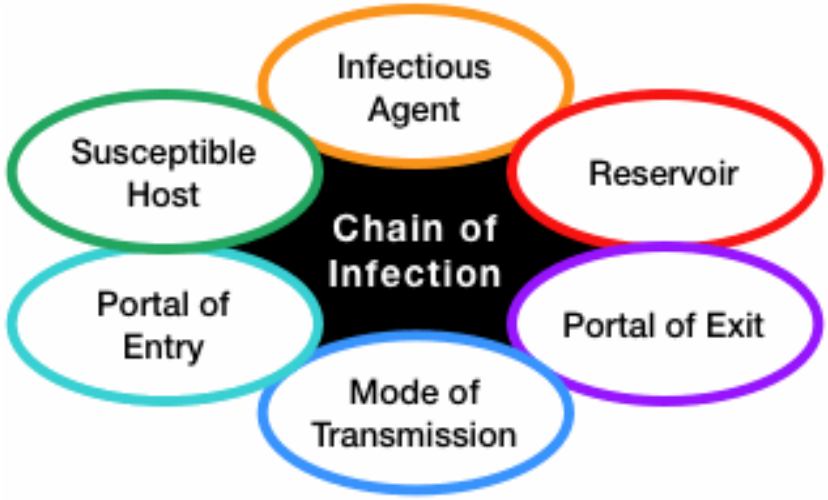
Every patient reserves the right to be treated in an infection-free, standardized medical/dental treatment environment. Infection prevention is a practical method to prevent spread of chain of infection. As a health care worker, spread of infection should be at the best minimized and prevented.

In dental clinic settings, infection prevention and control (IPC) aims to minimize cross infection between the dental care practitioner and the patient. Particularly in dental treatment settings, practitioners are often exposed to contacts with patients, blood and bodily fluids. Additionally, the use of sharp instruments significantly increases the risk of exposure to infection, and as dental treatment is a type of outpatient, invasive treatment, effective controls for outpatient-derived infections are essential.

Infection chain

An infection occurs when an agent leaves its reservoir or host through a portal of exit, is transmitted through a mode of transmission, and enters a susceptible host through an appropriate portal of entry. In this process, each step may be viewed as independent, but if it is possible to break any of the connections in the chain, the infection can be prevented.

Figure 1 Chain of Infection



Standard Precautions

In the dental care settings, various transmission mechanisms are possible - contact with body-derived substances and contaminated environments, droplet transmission, and airborne transmission by aerosols, etc. Effective precautions are essential since both patients and staff are at risk of exposure to blood-borne pathogens while performing health care or nursing. Each circumstance potentially contains infectious microorganisms. Hence, it should be assumed that every instance of exposure to blood, bodily fluid or substance involves a potential risk of infection. Standard Precautions are a minimal set of preventive measures applicable to all patient in any medical setting, regardless of whether a blood-borne infection has been confirmed. Such methods are designed to protect medical staff and to prevent transmission from medical staff to patients. Standard Precautions include the following:

- Hand hygiene
- Use of personal protective equipment (e.g., gloves, masks, eyewear)
- Respiratory hygiene / cough etiquette
- Sharps safety and safe injections
- Cleaning and disinfection of environmental surfaces
- Environmental hygiene
- Waste management

Hand Hygiene

Hand hygiene is a critical measure to break the infection chain. Refer to Chapter 3 for more details on hand hygiene.

Personal Protective Equipment

Personal protective equipment (PPE) refers to wearable equipment to protect dental health care professionals (DHCPs) from pathogens viz. gloves, face masks, protective eye wear, face shields and protective clothing (e.g., reusable or disposable gown, jacket,

laboratory coat). In addition, same gloves cannot be used for more than one patient, gloves cannot be washed for reuse, after removing gloves wash hands should be performed.

The appropriate PPE shall be selected in consideration of possible interactions between medical service providers and patients and/or types of infection sources (risks of pathogenic organism transmission) as well as affected procedures.

General principles in use of appropriate PPE

- Provide sufficient and adequate PPE for all DHCPs
- Educate staff on proper selection and use of PPE
- Gloves are used for potential contact with blood, body fluid, mucous membranes, non-intact skin or contaminated equipment
- Protective clothing needs to cover-exposed skin
- Mouth, nose, and eye protection

Respiratory Hygiene/Cough Etiquette

Respiratory hygiene and cough etiquette aim at preventing respiratory pathogens transmitted through droplets or air.

DHCPs should be educated on preventing the spread of respiratory pathogen. At the point of arrival, posters should be seen at the entrance; including to cover their mouth/noses when coughing or sneezing, use and dispose tissue, perform hand hygiene.

Recommendations regarding respiratory hygiene/cough etiquette in dental settings include:

- Measures to manage respiratory secretion shall be maintained while patients who show symptoms and signs of respiratory infection and their caregivers stay at the facilities.
- For patients with symptoms of respiratory infection, a signage with following words shall be posted at the entrance e.g.

    - "*When spitting or sneezing, please cover your mouth/nose*."
    - "*Please dispose tissue paper properly after using it*."
    - "*Please practice hand hygiene after your hand comes into contact with respiratory secretion*."
- A waste bin that needs no contact with a hand for tissue paper disposal is to be provided.
- A place for hand hygiene is to be provided in or near the waiting room.
- Masks are to be provided for those who cough and have other respiratory symptoms.
- It is recommended that those with symptoms of respiratory infection be seated as far as possible from others, and a space made available for them. If possible, a separate space may be provided for such patients waiting for examination at the hospital.

Sharps Safety and Safe Injections

Burs, needles and other sharp instruments causes most percutaneous injuries. Staff should be aware of the risk of injury when handling sharp instruments viz. while using sharps, during set-up, during clean-up and during disposal. Safety devices may be considered and staff are to be trained in proper use of these

Puncture-resistant specific disposable container should be used to dispose the used disposable syringes, needles, scalpel blades and other sharp items. Sharps disposal containers should be disposed according to local regulated medical waste rules by the law.

Safe injection practices are implemented to prevent infectious disease transmission between patients or between a patient and a dental professional while an intravenous injection or intramuscular injection is prepared and administered. The needle and cartridge set containing the local anaesthetic shall be used only for one patient, and the used dental cartridge injector shall be cleaned and sterilized.

Principles for Sharps safety and Safe Injection in dental setting include:

- Consider all contaminated sharp items as potentially infective and that it may cause injury
- One-handed scoop technique is recommended for recapping needles, if required
- Place used sharp items in appropriate puncture-resistant sharps disposal container that is located within reach
- Prepare injections using aseptic technique
- Disinfect the rubber septum with alcohol before piercing
- Needles and syringes are single use items meant for one patient use
- Single-dose medication vials, ampules and bags or bottles of intravenous solution are to be used only by a patient and not shared with other patients

Waste Management

Medical/dental waste refer to wastes disposed from health care/medical centres, dental facilities, testing/inspection facilities as well as human materials and corpses of experimental animals, etc. DHCPs are obligated to treat such medical waste in a legitimate manner. DHCPs should be familiar with national or state waste management regulations.

Medical waste with no sharp edges is classified as a mixed medical waste and thus, shall be kept in a corrugated cardboard container dedicated to medical waste. Medical waste with sharp edges (e.g. needles, scalpels, fixing bands, broken metallic instruments, burs, etc.) and other damageable waste shall be kept in containers dedicated to synthetic resin materials. The containers are not to be overfilled, stored in a safe place and properly sealed during disposal.

Recommendations

1. Standard Precautions are to be complied with by all dental staff. [A1]

References

1. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B. Transmission routes of 2019-nCoV and controls in dental practice. International Journal of Oral Science 2020 Mar-1;12(1):9.
2. Infection prevention and control of epidemic and pandemic-prone acute respiratory infections in health care, WHO guidelines. World Health Organization; Available from https://www.who.int/publications/i/item/infection-prevention-and-control-of-epidemic-and-pandemic-prone-acute-respiratory-infections-in-health-care. Accessed on 24 March 2021.
3. Standard Precautions. Centers for Disease Control and Prevention; Available from https://www.cdc.gov/oralhealth/infectioncontrol/summary-infection-prevention-practices/standard-precautions.html. Accessed on 24 March 2021.
4. World Health Organization (WHO). Hand hygiene in outpatient and hone-based care and long-term care facilities: a guide to the application of the WHO multimodal hand hygiene improvement strategy and the “My Five Moments for Hand Hygiene” approach. WHO; 2021. 1-71 p.
5. Healthcare Infection Control Practices Advisory Committee. Core Infection Prevention and Control Practices for Safe Healthcare Delivery in All Settings–Recommendations of the Healthcare Infection Control Practices Advisory Committee (HICPAC). HICPAC; 2017.

Chapter 2 Transmission-based Precautions

Transmission-based precautions are required as additional work practices in situations where standard precautions alone may be insufficient to prevent transmission of infectious microorganisms. Transmission-based precautions are tailored to the particular infectious microorganism involved and its mode of transmission. Transmission-based precautions are in addition to standard precautions, required where the patient is known or suspected of having a highly transmissible infection. These highly transmissible infections may be spread by one or more routes such as Airborne, Droplet and Contact transmission.

Dental settings are not typically designed to carry out all of the transmission based precautions recommended for hospital or ambulatory settings. However, dental providers should develop and carry out policies and procedures for early detection and management of potentially infectious patients in dental settings. Non-urgent dental care should be rescheduled after the patient is no longer infectious, or a referral to a dental setting with appropriate infection prevention precautions when emergency or urgent treatment is necessary.

Airborne precautions are used for patients known or suspected to be infected with microorganisms transmitted from person to person by the airborne route. Airborne transmission may occur through small - particle aerosols. These are created during talking, coughing, sneezing and use of dental high speed and sonic instruments. Aerosols containing microorganisms can be dispersed over long distances by air currents and inhaled by individuals, some of whom may be susceptible to infection. Examples of microorganisms transmitted by aerosols are *Mycobacterium tuberculosis* and measles (Rubeola virus) and Chicken Pox (varicella-zoster). Airborne precautions include special ventilated room with negative pressure and staff must wear N95 or FFP2/FFP3 respirators as well as face shield if splashing is indicated.

Droplet precautions are used for patients known or suspected to be infected with microorganisms transmitted over short distances by large respiratory droplets. This can occur when an infected person coughs, sneezes or talks and during certain procedures. The respiratory droplet may transmit infection when they travel directly from the respiratory tract of

an infected person to a susceptible mucosal surface (nasal, conjunctiva or oral) of another person, generally over short distances. They can contaminate surfaces in the treatment zone which can then be involved in onward transmission from the surface by contact transmission e.g. influenza, mumps virus, SARS CoV-1 and SARS CoV-2. Droplet precautions include staff wearing a surgical mask on entering the room. However, where aerosol generating procedures are frequently performed in dental setting, fine aerosols may be generated and could be transmitted via airborne route, whereupon airborne infection isolation precautions will need to be added on top of the droplet precautions taken.

Contact Precautions, in a dental clinic, are indicated only for patients who have uncontrolled wound drainage or other syndromes representing increased risk of contact transmission. Strict enforcement of Standard Precautions, including wearing gloves and protective clothing when contact with uncontrolled secretions and other potentially infectious body fluids is anticipated, is considered adequate in most situations. The gown and gloves should be donned upon entering and removed before exiting the dental treatment room. In dental care settings, place patients requiring Contact Precautions in a treatment room or operatory as soon as possible after they arrive at the dental office to limit the number of people exposed in the waiting area.

Transmission-based precautions are risk based and used in addition to Standard Precautions when required. Non-urgent treatment must always be deferred particularly when droplet or airborne precautions are necessary. If the patient requires urgent treatment, the dentist must minimize the risk of exposing staff and other patients to infection and may need to seek advice from infection control specialists as appropriate.

Patients who may be suspected of having infections transmitted by respiratory droplets such as influenza must be rescheduled until the period of communicability is over.

In emergency situations, persons who are known or suspected of having infections that can be transmitted by respiratory droplets should be offered a mask and hand hygiene upon arrival, and ideally, maintain a distance of 1-2 m from others in the waiting area.

The use of dental hygiene instruments such as ultrasonic scalers, handpieces, air polishers and the air/water syringes may create sprays, droplets or spatter. Every effort is to be made to reduce the spread by using a high-volume suction or a dental dam. Using these items will also reduce the possibility of the patient ingesting or inhaling contaminated material and/or debris.

VZV, measles and TB patient management

Infections by airborne transmission of respiratory secretions can occur with pulmonary tuberculosis, chicken pox and measles. Patients suspected of having infections transmitted by airborne route should be rescheduled until the period of communicability is over.

In emergency situations and procedures are unavoidable, the patient should preferably be seen as the last patient of the day, with appropriate barrier precautions used and staff assisting in the dental treatment must be aware of their immune status for the relevant infectious disease of the patient. The use of dental dam, where possible, for restorative work is recommended to reduce exposure of dental practitioners and clinical support staff to potentially infected aerosols. When treating these patients, it would also be prudent for clinical staff to wear well-fitted masks or respirators with high filtration capabilities such as N95 or equivalent respirators. It would also be prudent to use pre-procedural mouth rinses and appropriate disinfectant for surface cleaning and disinfection at the end of the appointment.

Recommendations

1. Transmission-based precautions (airborne, droplet and contact precautions) should be practised in addition to Standard Precautions where appropriate. [AI]
2. Airborne precautions include use of a special ventilated room with negative pressure and staff must wear N95 or FFP2/FFP3 respirators. [BI]
3. Droplet precautions include staff wearing a surgical mask on entering the room. [BI]
4. Contact precautions include the use of gloves and gown. [BI]
5. Reschedule patients with pulmonary tuberculosis, chicken pox and measles. [BI]

6. Perform emergency procedures in well ventilated room and reduce exposure by use of dental dam and avoid aerosol generation. [BI]
7. DHCPs must wear well-fitted masks or respirators with high filtration capabilities such as N95 or equivalent surgical respirators. [BI]

References

1. Centers for Disease Control and Prevention. Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care. Atlanta, GA: Centers for Disease Control and Prevention, US Dept of Health and Human Services; October 2016.
2. Guidelines for Infection Control in Dental Health-Care Settings – 2003. Available from https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5217a1.htm. Accessed on 24 March 2021.
3. Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. Available from www.cdc.gov/hicpac/pdf/isolation/Isolation2007.pdf. Accessed on 24 March 2021.
4. Guideline for Infection Control in Healthcare Personnel, 1998 www.cdc.gov/hicpac/pdf/InfectControl98.pdf. Accessed on 24 March 2021.
5. Guidelines for Infection Control. Third Edition, 2015. Australian Dental Association. https://www.ada.org.au/Dental-Professionals/Publications/Infection-Control/Guidelines-for-Infection-Control/1ADA_GuidelinesforInfectionControl_3.aspx. Accessed on 24 March 2021.

Chapter 3 Asepsis and surgical management

Aseptic technique

Aseptic technique protects patients during invasive clinical procedures by employing IPC measures that minimise, as far as practicably possible, the presence of pathogenic microorganisms. Aseptic technique aims to prevent the introduction of micro-organisms from hands, surfaces and equipment to a susceptible sterile site.

Aseptic fields are important in providing a controlled aseptic working space to help promote or ensure the integrity of asepsis during clinical procedures. The aseptic fields are increased in size with sterilized drapes added based on procedure complexity.

Standard aseptic technique

Clinical procedures managed with standard aseptic technique will characteristically be technically simple and short in duration (approximately <20 minutes). Standard aseptic technique requires a main general aseptic field and typically use of sterile gloves.

Surgical aseptic technique

Surgical aseptic technique is demanded when procedures are technically complex, and longer in duration. A main critical aseptic field and sterile gloves and protective barriers (e.g. drapes) are required.

Surgical procedures

The principles of sterile aseptic technique must be applied to all surgical procedures where entry into sterile tissue is undertaken including incision into mucosal soft tissues, surgical penetration of bone or elevation of a mucoperiosteal flap. Primarily, this includes minor oral surgery, dental implant placement as well as endodontic and periodontic surgery.

The requirements for surgical procedures using aseptic technique include use of sterile gloves, sterile drapes, sterile instruments, and surgical hand hygiene.

Supplies for use during oral surgery, such as sterile cotton pellets and gauze can be sterilised in the dental practice using a cycle for porous loads, or purchased as sterile items. It is recommended that items such as dressings and bandages be obtained sterile from commercial sources as ready for use items.

Key issues for aseptic technique include:

- Maintain excellent general hygiene. Hair should be tied back and covered. Beards must also be covered.
- Staff perform surgical hand preparation, and wear sterile gloves.
- Clinician and assisting staff wear sterile surgical gloves, gown and other appropriate PPE
- There is a defined working field, with sterile drapes.
- All instruments that enter tissue are sterile at the point of use, and have been wrapped, with the use of batch control identification.
- Sterile supplies such as sterile dressings and gauze and any irrigation solutions used during surgery (e.g. saline as a coolant) are sterile.

Surgical hand hygiene

A surgical hand scrub is required prior to any aseptic task or procedure. Surgical hand preparation reduces the release of skin bacteria from the hands of the surgical team for the duration of the procedure; eliminating transient flora and reducing the resident flora.

WHO guidelines recommend the use of an alcohol-based formulation for preoperative surgical hand preparation, given its superior antimicrobial efficacy compared to other methods.

There are also specific high potency alcohol-based hand rub (ABHR) agents designed for surgical hand decontamination, which replace antimicrobial soaps used in a surgical scrub. Such products are specifically labelled as being for surgical hand preparation.

Steps prior to commencing surgical hand preparation

Surgical hand preparation should reduce the release of skin bacteria from the hands of the surgical team for the duration of the procedure in case of an unnoticed puncture of the surgical glove releasing bacteria to the open wound. In contrast to the hygienic handwash or handrub, surgical hand preparation must eliminate the transient and reduce the resident flora, and should also inhibit growth of bacteria under the gloved hand.

1. Keep nails short and pay attention to them when washing your hands – most microbes on hands come from beneath the fingernails.
2. Do not wear artificial nails or nail polish.
3. Remove all jewellery (rings, watches, bracelets) from the hands and wrists.

How to perform surgical hand scrub

1. Wash hands and arms using an anti-microbial handwashing solution.
2. Clean subungual areas with a nail file only when cleaning hands before the first case. Nailbrushes should not be used as they may damage the skin and encourage shedding of cells. If used, nailbrushes must be sterile, once only (single use). Reusable autoclavable nail brushes are on the market.
3. Start timing. Scrub each side of each finger, between the fingers, and the back and front of the hand for 2 minutes.

4. Proceed to scrub the arms, keeping the hand higher than the arm at all times. This helps to avoid recontamination of the hands by water from the elbows and prevents bacteria-laden soap and water from contaminating the hands.
5. Wash each side of the arm from wrist to the elbow for 1 minute.
6. Repeat the process on the other hand and arm, keeping hands above elbows at all times. If the hand touches anything at any time, the scrub must be lengthened by 1 minute for the area that has been contaminated.
7. Rinse hands and arms by passing them through the water in one direction only, from fingertips to elbow. Do not move the arm back and forth through the water.
8. Proceed to the operating theatre holding hands above elbows.
9. At all times during the scrub procedure, care should be taken not to splash water onto surgical attire.
10. Hands and arms should be dried using a sterile towel and aseptic technique practised when donning gown and gloves.

How to perform surgical hand rub

1. Ensure that the hands are dry.
2. Apply the institution-approved pre-operative surgical hand preparation product onto the palm, using the manufacturer's recommended amount (1 - 3 ml).
3. Rub hands together so that the solution comes into contact with all surfaces of the hands, paying particular attention to the tips of the fingers and thumbs.
4. Use the product for the stipulated time (as advised by the manufacturer), rubbing vigorously. At the end, the hands are dry.
5. Place on sterile PPE (gown and gloves)

6. At the end of the procedure, after removing the sterile gloves, perform regular hand hygiene.

7. A water-based moisturiser that is compatible with the alcohol-based handrub agent is used as often as required (at least 3 times a day).

Fig 1 Surgical hand rub technique (WHO)

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

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

1
Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your left hand, using the elbow of your other arm to operate the dispenser

2
Dip the fingertips of your right hand in the handrub to decontaminate under the nails (5 seconds)

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

4
See legend for Image 3

5
See legend for Image 3

6
See legend for Image 3

7
See legend for Image 3

8
Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your right hand, using the elbow of your other arm to operate the dispenser

9
Dip the fingertips of your left hand in the handrub to decontaminate under the nails (5 seconds)

Recommendations

1. The principles of IPC and Standard Aseptic Technique must be applied to all dental procedures, specifically those which are technically simple and short in duration (approximately < 20 minutes). [A1]
2. The principles of IPC and Surgical Aseptic Technique must be applied to all surgical dental procedures, particularly those where there is a planned penetration of the oral mucosa.[A1]
3. Effective hand hygiene is an essential part of Aseptic Technique. [A1]
4. A surgical hand scrub using an antimicrobial handwashing solution, or an alcohol based hand rub (ABHR) approved for surgical hand decontamination, is required for Surgical Aseptic Technique [A1]
5. Sterile gloves must be used for Surgical Aseptic Technique [A1]
6. An aseptic field is necessary to provide a controlled aseptic working space to help maintain the integrity of asepsis during surgical procedures. [A1]

References

1. Australian Guidelines for the Prevention and Control of Infection in Healthcare, Canberra: National Health and Medical Research Council (2019). Aseptic Technique; Section 3.1.6 Page 91. https://www.nhmrc.gov.au/about-us/publications/australian-guidelines-prevention-and-control-infection-healthcare-2019. Accessed on 22 Dec 2020.

2. ADA's Guidelines for Infection control, 3rd Edition (2015). Surgical procedures and aseptic technique, page 9. https://www.ada.org.au/Dental-Professionals/Publications/Infection-Control/Guidelines-for-Infection-Control/1ADA_GuidelinesforInfectionControl_3.aspx. Accessed on 22 Dec 2020.

3. The APSIC Guidelines for the prevention of surgical site infections. Surgical attire, page 33. https://apsic-apac.org/wp-content/uploads/2019/02/APSIC-SSI-Prevention-guideline-Feb-2019.pdf. Accessed on 22 Dec 2020.

4. WHO Guidelines on Hand Hygiene in Health Care: First Global Patient Safety Challenge Clean Care Is Safer Care. Geneva: World Health Organization; 2009. 13, Surgical hand preparation: state-of-the-art. Available from: https://www.ncbi.nlm.nih.gov/books/NBK144036/. Accessed on 22 Dec 2020.

5. The APSIC Guidelines for the prevention of surgical site infections. Surgical hand/forearm preparation, page 23. https://apsic-apac.org/wp-content/uploads/2019/02/APSIC-SSI-Prevention-guideline-Feb-2019.pdf. Accessed on 22 Dec 2020.

6. Leaper DJ, Edmiston CE. WHO: Global Guidelines for the Prevention of Surgical Site Infection. World Health Organization 2016. https://www.who.int/gpsc/ssi-prevention-guidelines/en/. Accessed on 22 Dec 2020.

Chapter 4 Dental Environment

Routine cleaning of the clinical area is necessary to maintain safe environment because dust soil and microbes on the environment surfaces can transmit infection. Cleaning methods must avoid the generation of aerosols. Damp dusting, dust-retaining mops and vacuum cleaners with air filtration of the exhaust are recommended. Brooms when used can disperse dust and bacteria into the air. For this reason, brooms must not be used in clinical area.

Use approved cleaning solution e.g. neutral detergent or combines detergent with disinfectant and follow manufacturer instruction for use. The cleaning solution must be freshly prepared. Mop and cloths must be cleaned after use and allowed to dry before reuse. Alternatively, single-use, disposable mop heads or cloths may be used. Mops used in public contact area should not be used in clinical contact areas. The bucket used should be emptied, washed and dried prior to refilling for subsequent use.

General work surfaces in the dental operatory outside the contaminated zone must be cleaned after each session especially high touch surfaces or when they become visibly soiled. Sinks and wash basins must be cleaned at least daily, or more frequently as appropriate. The spittoon should be cleaned after each patient use.

Develop written protocols for cleaning different areas (e.g., floors, sinks, window sills, door handles, telephone handsets, waiting areas). This should include methods and frequency of cleaning. Practice Standard Precautions and this include hand hygiene, wearing of appropriate PPE when cleaning the surfaces in the treatment area.

When selecting equipment, consider the ease with which the surfaces can be cleaned and disinfected. Compatibility with commonly used disinfectants should be checked also.

Clean zone

The clean zones of the dental practices are where there is no patient care activities viz. staff room, office area, waiting and reception areas, storage supply area and sterilised instruments and equipment. In these areas, the risk of microorganism transmission is minimal as they normally do not come in contact with blood and saliva. Inanimate objects such as toys if any can act as fomites and infection can be spread by indirect contact. Therefore, it is important to use appropriate wipes to reduce the transient organism. To minimize the risk to patients and staff, any soiled clothing (laboratory coats/gowns worn during treatment) and PPE must be removed after leaving treatment rooms and before the clean zone.

Computer keyboards in the dental operatory may harbour microorganisms and may be covered with a barrier for easy regular cleaning and disinfection with alcohol-impregnated wipes between patient appointments.

Staff must know and take measures to prevent environmental contamination of patient hard copy notes or computer key board. Eating and drinking beverages are not allowed in the dental operatory area and the dental laboratory. Staff need to adhere to work health and safety regulations. Food must not be stored together in the refrigerator with dental materials, sealed clinical specimens or medical products such as drugs or blood because of the risk of cross contamination.

Contaminated zone

Within the dental operatory area, the contaminated zones must be clearly defined as this has implications for surface management and placement of equipment. The goal during dental treatment is to confine and contain contamination within this zone. This is done by determining what is touched and where the droplets, splash or spatter has spread. Aerosols generated from patient care may extend further than splashed material (up to approximately 1.8 m). The contaminated zone also includes contaminated material from patient care and instrument.

The use of dental dam, pre-procedural antiseptic mouth rinses, high volume evacuation and correct patient positioning can reduce the extent of contamination in the dental operatory. Dental dam minimises the spread of blood or saliva. When dental dam is not applied, high volume becomes essential.

During dental treatment, all the surfaces and items within the contaminated zone are considered contaminated. Thorough cleaning and disinfection should be done including those apparently uncontaminated surfaces. Instruments placed in the contaminated zone for treatment but not used during the session must be regarded as contaminated. These instruments or equipment if considered contaminated should not be placed back in the clean areas. For this reason, all bulk supplies such as opened boxes of gloves, mask, cotton rolls or gauze must be stored away from the contaminated zone and be protected from splashes and aerosols contamination.

Clinical contact surfaces in the contaminated zone not barrier protected must be cleaned after each patient. For difficult to clean equipment, a disposable impervious covering such as a plastic wrap can be considered. These may include:

- Operating light handle and its hand operated switch
- X-ray head, tubing for suction, triplex syringe and instrument cradles
- Polymerising light, intraoral camera and fibreoptic illuminator
- Bracket table and handle

Used surface barriers should be disposed of in general waste after each patient treatment, and replaced with new barrier. Following barrier removal, check to ensure the underlying surfaces do not become contaminated. If contaminated, the area should be cleaned and disinfected. If barriers are not used, a documented cleaning protocol should be developed and adhered to. Spittoon should be cleaned after each patient.

Clean pair of gloves are used when cleaning the work surfaces during the changeover between the patients rather than using contaminated gloves used from assisting the previous patient. These surfaces must be cleaned and the items be disposed of, decontaminated, or

cleaned and sterilised before use on the next patient. At the end of the day all the barriers are removed and the surfaces are cleaned.

Dispensing / Retrieving Dental Materials

Within the dental operatory, clean area include surfaces and drawers where clean, disinfected or sterilised instruments are stored and do not come in contact with contaminated instruments or equipment. Where possible, pre-dispensed materials such as cotton rolls, dental floss, gingival retraction cord and restorative materials from bulk supplies that are kept in drawers or containers. These keep the bulk supplies clean and prevent contamination of the bulk supplies from splashes or aerosols.

If additional instruments and materials have to be retrieved from outside the contaminated zone during a patient treatment, it must be by a method that does not contaminate other instruments or materials in the drawers. The options include:

- Open drawers by elbow touch;
- Use transfer tweezers to retrieve instruments and materials with a no-touch technique;
- If transfer tweezers are used, these must be kept separate from other instruments;
- Use over-gloves or single-use barriers on drawer handles;
- Gloves must be removed and hands decontaminated with ABHR before dispensing additional materials.

When moving from the contaminated zone to a clean zone to touch non-clinical items without a barrier, gloves must be removed and hands washed or decontaminated with ABHR before touching the item. The individual must then perform hand hygiene (e.g., with ABHR) and re-glove before re-entering the contaminated zone.

Store local anaesthetic cartridges appropriately to prevent environmental contamination by aerosols, splatter and droplets generated. The cartridges should be kept in their individual bubble packs until use to protect them from contamination by dust, aerosols,

and droplets. They must never be stored loose out of their blister packaging in cardboard containers as these absorb water and cannot be cleaned.

Containers of medicaments, including topical anaesthetic tubes or jars and endodontic medicaments must be kept free of environmental contamination. Used glass local anaesthetic cartridges or carpules are classified as sharps and must be disposed as sharps waste. If they are polymer, they must be emptied of all remaining local anaesthetic solution, into the sink if permitted by local regulations, before disposing into the regular waste. Polymer carpules can also be placed into the sharps waste if preferred.

Managing Clinical Waste

Management of medical and related waste (also referred to as contaminated waste) must conform to national and institution regulations.

- Develop a waste management program according to the national and institutional regulation and guide. Ensure staff who handle and dispose regulated waste are trained in proper handling and methods of disposal.
- In most instances, items such as gauze, cotton rolls and examination gloves that have come in contact with blood, saliva or other bodily fluids are usually NOT classified as biomedical waste.
- Separate the waste according to its category (medical or non-medical) at the point of generation.
- Use leak-proof thick yellow bags and resistant proof sharp container labelled with biohazard symbol.
- Bags and containers for medical waste should be appropriately colour coded and labelled as biohazard or medical waste.
- Place sharp items (e.g., needles, scalpel blades, orthodontic bands, broken metal instruments, burs and local anaesthetic cartridges) in an appropriate sharp container (e.g., puncture resistant, color-coded, and leakproof), at point of use.

- Waste placed in bag and sharp resistant container must not be more than three quarter full.
- Close container securely or tie bag securely before removal to prevent spillage or protrusion of contents during handling, storage or transport.
- Standard precautions and appropriate PPE (e.g., gloves, mask, and apron or gown) to be worn when handling biohazard waste bags and containers
- Medical waste and sharps containers must be stored securely before collection by licensed waste contractors for final disposal using approved technologies by licensed/accredited contractors.
- Pour blood, suctioned fluids or other liquid waste carefully into a drain connected to a sanitary sewer system, if local sewage discharge requirements are met and the country has declared this an acceptable method of disposal.

Amalgam waste

Amalgam is typically 50% mercury by weight. However, the mercury in amalgam chemically combines with other metals to render the mercury stable and safe for use in dental applications. As dental amalgam contains mercury, the amalgam should be safely disposed in a screw tight labelled container. It should be stored in container kept under water or under used radiographic fixer (sodium thiosulphate). Ensure it does not inadvertently become incinerated or disposed of in a way that would release mercury into the environment in a free form. The amalgam waste is finally disposed of by licensed waste collector according to the national and local institutional regulation.

Extracted teeth

Extracted teeth are not classified as biomedical waste and should be handled differently. Extracted teeth may be returned to the patient without any special considerations, other than simple cleaning of visible blood and gross debris. Extracted teeth without amalgam

fillings may be disposed as general waste. Extracted teeth with amalgam fillings should be disposed in accordance to national or institution regulation.

Extracted teeth being collected for use in pre-clinical education training should be cleaned of visible blood and gross debris, and maintained in a hydrated state in a closed container during transportation.

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 dichloroisocyanurate granules.

The dental health care worker who deals with the spillage must wear appropriate protective clothing, which will include gloves, protective eyewear and a disposable gown/apron and, in the case of an extensive floor spillage, protective footwear.

IPC Audit

The environment should be clean, free from dust, dirt and body fluid stains and spillages. Compliance with safe care and safe working environment is the key to quality care. The use of audit check list to conduct regular audits help identify discrepancies between standards and the actual practices among the team. The audit check lists include high risk area which is identified using risk stratification tool. Area of audit could include the following:

1. Policies and procedures on cleaning and disinfection of environmental surfaces (clinical contact and housekeeping)
2. Dental healthcare professional performing environment infection prevention procedures receive job specific training upon hire, when procedures changed and housekeeping surfaces and at least annually.
3. Equipment are available to ensure appropriate PPE is used.

4. Cleaning, disinfection and use of surface barriers are periodically monitored to ensure they are consistently and correctly performed.
5. Procedures are in place for decontamination of blood spill and other fluid.

In the event of non-compliances, action plans should be developed and implemented in timely manner to close the gaps identified.

Dental Unit Waterline

Dental unit waterlines (DUWL) consist of several meters of very narrow-bore dental tubing where the water flows very slowly and has a tendency to stagnate. The narrow diameter of DUWL increases the surface area available for biofilm growth relative to the volume of water in the lines, leading to levels of microbial contamination in effluent water that may exceed 1,000,000 colony forming units per millilitre (CFU/mL).

Studies on dental unit waterline from UK, USA and Europe confirmed that when there is no flushing of dental unit waterline and no chemical additives, the bacteria level is very high. On the other hand, when there was continuous chemical treatment of water combined with periodic shock treatments and water testing, the levels of bacteria were very low.

The long narrow bore tubing of several meters, inconsistent flow rates and potential retraction of oral fluids promote bacterial growth and formation of biofilm. For the cup filled spittoon, the lines are larger in diameter and this allow more water to pass the line at a higher flow rate. Thus, it tends to show lower levels of biofilm as compared to the lines with the small diameter tubing.

Most dental unit waterlines contain biofilm, which acts as a reservoir of microbial contamination. Biofilm in dental unit waterlines may be a source of known pathogens (e.g. *Pseudomonas aeruginosa*, non-tuberculous *Mycobacterium* spp., and *Legionella* spp.).

There are several conditions linked to dental unit waterline biofilms. *Legionella pneumophila* can cause Legionnaire's disease, as well as a milder condition called Pontiac fever that many people mistook for viral influenza. Colonization of microorganisms within the

waterlines may not pose a concern for healthy individuals, but the most at-risk patients for these infections have a compromised immune system. They could be elderly, diabetics or smokers. They are more prone to infections from aerosols that are generated by ultrasonic scaler and high speed handpieces. These aerosols transmit microorganisms from the dental unit waterlines into the air. Both patients and staff inhale this aerosols, and potentially get infected if there is no active chemical treatment of the water treatment.

These microorganisms colonize and replicate on the interior surfaces of the waterline tubing forming biofilms. Biofilms can serve as a reservoir, amplifying the numbers of free-floating microorganisms in the water.

The US Centers for Disease Control and Prevention (CDC) recommends that dental unit water used in nonsurgical procedures measure ≤500 CFU/ml. This is the standard set for drinking water by the Environmental Protection Agency (EPA). To deliver water of this quality, dental unit waterline systems must be regularly maintained, via water treatment and monitoring, and performed according to the manufacturer's instruction.

A range of measures used to minimise the biofilm levels in the dental unit water line include:

- Water treatments using ozonation, periodic shock treatments or electrochemical activation,
- Chemical dosing of water (e.g., with hydrogen peroxide, peroxygen compounds, silver ions, iodine, chloramines or nanoparticle silver
- Automated germicide metering or slow-release devices which may also include filtration technology that can be used with independent reservoirs or municipal water connections.
- Anti-retraction valves
- Shocking or sanitization of the dental unit waterline
- Use of water sources separate from the public water system

Flushing dental lines

The CDC recommends that any devices that enter a patient's mouth (e.g. handpieces, ultrasonic scalers, or air/water syringes) should be connected to the waterline and flushed for at least 20 seconds between patients. Flushing lines after every patient and at the start of the day reduce overnight or weekend biofilm accumulation. This is particularly important after periods of non-use (such as vacations and long weekends). Flushing each day has been shown to reduce levels of bacteria in dental unit waterlines.

In addition, warming dental unit water (with the intent of improving patient comfort) should be avoided because it can increase biofilm formation.

All waterline must be fitted with non-return (anti-retraction) valves to help prevent retrograde contamination of the lines by fluid from oral cavity.

Cleaning Dental Unit Waterlines

Check with dental unit manufacturer for recommendations on how to clean the waterlines, even if an independent water source is used. Manufacturer may suggest options such as filtration or use of chemicals or a combination of these. Guidance differs depending on factors. Be sure to know that a particular reagent is appropriate for the specific dental unit. Once the process identified fits its needs and is compatible with the dental unit (per the manufacturer) establish a schedule for waterline maintenance as well as an individual designated for this responsibility.

Monitoring of dental unit water quality

All dental units should use systems that treat water to meet drinking water standards (i.e., ≤ 500 CFU/ mL of heterotrophic water bacteria). Independent reservoirs or water-bottle systems alone are not sufficient.

To ensure effectiveness of dental unit waterline cleaning regimen is to test the water discharging from the unit. Regular monitoring dental unit water quality and inspection can help identify problems with water quality management including but not limited to:

- Staff non-compliance with directions for use.
- Dental unit or device design variables such as dead legs that compromise water quality management.
- Units with excessive biofilm growth that may be refractory to treatment.
- Incompatibility of water treatment products or devices with dental units or other devices.
- Contaminated source water.

Follow recommendations for monitoring water quality provided by the manufacturer of the unit or waterline treatment product.

Establish protocol and educate staff on the importance of maintaining and sustaining the quality of dental unit water. Simply treating waterlines may not be sufficient to ensure water quality. Successful management of water quality is subject to many variables. This include dental unit design characteristics, efficacy and compatibility of germicidal or cleaning products, input water quality, and staff compliance. This inherent complexity can lead to treatment failure even with products that have shown excellent results in laboratory or controlled clinical settings.

Delivery of Sterile Surgical Irrigation

The US CDC defines oral surgical procedures as those that involve the incision, excision, or reflection of tissue that exposes normally sterile areas of the oral cavity. These include procedures such as gingivectomy, extraction of an impacted third molar, soft-tissue biopsy, and bone re-contouring.

Use only sterile water or sterile saline when irrigating open surgical sites and whenever bone is cut during invasive surgical procedures. This reduces the risk of localised or systemic infection. *A*ppropriate delivery device, such as a sterile bulb syringes or sterile single-use disposable products should be used to deliver sterile irrigation solutions. For offices using

closed or other water delivery systems. The manufacturer's instructions related to dental units and equipment must be followed for daily and weekly maintenance.

Recommendations

1. Establish policies and procedures for routine cleaning and disinfection of the environmental surfaces in dental healthcare settings. [AIII]
    a. If surface barriers are used to protect clinical contact surfaces (e.g., switches on dental chairs, computer equipment) change surface barriers between patients.
    b. Clean and disinfect clinical contact surfaces that are not barrier-protected with approved hospital grade disinfectant at the start of the day and after each patient. [BIII]
2. Select EPA-registered disinfectants or detergents with label claims for use in health care settings. [AIII]
3. Follow manufacturer instructions for use of cleaners and EPA-registered disinfectants (e.g. amount, dilution, contact time, safe use, disposal). [BIII]
4. Follow national and institutional regulation on managing different types of waste. [BII]
5. Use water that meets the CDC recommended limit for dental procedural water (i.e., ≤ 500 CFU/mL of heterotrophic water bacteria) for routine dental treatment output water. Adopt appropriate infection control procedures for dental unit waterlines. These include flushing dental unit waterline, use of germicidal product, biofilm prevention and monitoring of water quality from the Dental Unit waterline. [AII]
6. Use only sterile saline or sterile water as a coolant/irrigant when performing surgical procedures. [AI]

References

1. Centers for Disease Control and Prevention. Guidelines for Infection Control in Dental Health-Care Settings — 2003 (December 19, 2003 / Vol. 52 / No. RR-17). U.S. Department of Health and Human Services 2003.
2. Centers for Disease Control and Prevention. Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care. Atlanta, GA: Centers for Disease Control and Prevention, US Dept of Health and Human Services; October 2016
3. College of Dental Hygienist of Ontario, CDHO Infection Prevention and Control (IPAC) Guidelines. September 2019.
4. Infection Prevention and Control in the Dental Office. Royal College of Dental Surgeons of Ontario, 2018.
5. Advice Sheet, Infection Control in dentistry, British Dental Association, BDA , February 2003.
6. Walsh LJ (ed), Australian Dental Association, Guidelines for Infection Control, 3rd Edition, 2015.
7. Ricci ML, Fontana S, Pinci F, et al. Pneumonia associated with a dental unit waterline. Lancet 2012;379(9816):684.
8. Cobb CM, Martel CR, McKnight SA 3rd, Pasley-Mowry C, Ferguson BL, Williams K. How does time-dependent dental unit waterline flushing affect planktonic bacteria levels? J Dent Educ. 2002; 66(4):549-55.
9. Watanabe E, Agostinho AM, Matsumoto W, Ito I. Dental unit water: bacterial decontamination of old and new dental units by flushing water. Int J Dent Hyg. 2008; 6(1):56-62.
10. Dental Unit Waterlines. American Dental Association, March 20, 2019. Available from https://www.ada.org/en/member-center/oral-health-topics/dental-unit-waterlines. Accessed on 24 March 2021.

11. Shannon E. Mills, DDS, Concord, NH and et al, Dental Unit Water Quality: Organization for Safety Asepsis and Prevention, White Paper and Recommendations 2018

Chapter 5 Special procedures and IPC issues

A. Dental Laboratory

All impressions, occlusal rims, prosthesis, face bow forks or bite registrations should be thoroughly cleaned and rinsed of all debris before being handled in the on-site laboratory or sent to an off-site laboratory. Following rinsing, detergent is sprayed onto impression or it may be immersed in a detergent or detergent combined with disinfectant. If chlorhexidine gluconate is used, please note the potential risk of allergy, damage to fibrobasts and disruption of healing process. “Wet” impressions or appliances should be placed in an impervious bag prior to transportation to an off-site laboratory.

A separate receiving and disinfecting area should be established in the on-site laboratory to reduce contamination.

The dental on-site laboratory staff should wear appropriate PPE (mask, gloves and protective eyewear) to perform disinfection and follow manufacturers’ instructions regarding the compatibility of specific materials.

Heat-tolerant items used in the mouth must be cleaned and heat sterilized before being used on another patient. Items that do not normally contact the patient, but frequently become contaminated and cannot withstand heat sterilisation should be cleaned and disinfected with intermediate-level disinfectants between patients, according to the manufacturer's instructions. Pressure pots and water baths should be cleaned and disinfected between patients. Environmental surfaces should be barrier-protected or cleaned and disinfected with low-level disinfectants in the same manner as in the dental treatment area.

Waste generated in the on-site dental laboratory may be discarded as general waste unless municipal bylaws indicate otherwise. Sharp items should dispose of in puncture-resistant containers.

Appliances and prosthesis delivered to the patient should be free of contamination. New and old dentures should be disinfected and rinsed by treated water.

A separate polishing area must be established for new dentures (never been inserted into the oral cavity) and existing dentures (has been previously inserted into the oral cavity). If a two-sided polishing lathe is used for this procedure, a suction or closed vacuum must be used to consider the two sides separate. If no suction or vacuum exists, a separate polishing area with a different lathe is required. The use of eye protection, masks and gowns is advised when polishing as the aerosols produced can be harmful and/or contain pathogens.

B. Radiography room

With the increasing popularity of digital radiography, DHCPs are faced with new challenges of preventing cross-contamination of the digital sensor and computer equipment in the treatment room. Of concern is the digital sensor that is used instead of radiographic film, because currently it can't be heat sterilized. Additionally, disinfection or barrier protection of associated computer equipment in the treatment room must not be overlooked.

Just as with operative, surgical, periodontal, prosthodontic, or endodontic procedures, IPC measures to protect both patient and DHCP staff are necessary during radiographic procedures. DHCPs must wash hands before gloving, and after removing. A surgical mask, protective eyewear and gown also should be considered if spattering of blood or other body fluids is likely.

Surface barriers are effective in preventing contamination of these clinical contact surfaces, and must be changed between patients. If barrier is not used, equipment that is contaminated must be cleaner and disinfected by intermediate level disinfectant viz. an agent that destroys vegetative bacteria, mycobacteria, most viruses, most fungi but not bacterial spores e.g. chlorine-based products, improved hydrogen peroxide exposure times of at least 1 minute. When the surface is visibly contaminated with blood or saliva, intermediate level disinfectant should be used. Lead aprons and thyroid collars should be cleaned and disinfected before use on next patient, if contaminated.

Radiography equipment that have come into contact with DHCP's gloved hands or contaminated Phosphor Storage Plates (PSP) or sensors/film packets should be cleaned and disinfected with low level disinfectant after each patient use or should be protected with surface barriers.

Computer equipment used for digital radiography or other procedures should be covered with plastic barrier. Reusable form fitted barriers are available for keyboards. If the barrier is disposable, it should be changed between each patient use.

C. Spray and aerosol generating procedures

1. **Procedures with high speed hand piece**

The exposure may be preventable by routine practices, which include hand hygiene, and use PPE, such as gloves, surgical masks (N95 respirator, if needed), protective eyewear or face shields and protective gown. Engineering design of the dental unit to shield burs on handpieces. High volume evacuation must be used in such a heavy aerosol environment, for example: with ultrasonic use and high-speed handpieces. It is also recommended to place a medical grade air filter.

2. **Scaling**:

The exposure may be preventable by routine practices, which include hand hygiene, and use PPE such as gloves, surgical masks (N95 respirator, if needed), protective eyewear or face shields and protective gown.

D. Dental OPD surgeries:

Such as Implant surgery, tooth extraction, periodontal surgery, endodontic apical surgery should have pre-procedural mouth rinses (hydrogen peroxide, povidone-iodine or

ozonated water rinses) for all surgical patients to decrease the number of microorganisms during invasive dental procedures.

For those patients that cannot rinse or spit, antimicrobial solution may be given for brushing or swabbed in the mouth prior to beginning oral health care treatment.

The exposure may be prevented with use of practices that include surgical hand hygiene, and use of appropriate PPE, such as sterile gloves, surgical masks (N95 respirator, if needed), protective eyewear or face shields and sterile surgical gown. High volume evacuation must be used in such a heavy aerosol environment, e.g. with ultrasonic use and high-speed handpieces. It is recommended to place a medical grade air filter for environment. Extracted teeth may be returned to the patient following cleaning of visible blood and debris. If being discarded, extracted teeth without amalgam fillings may be disposed as general office waste. General office waste is no more infective than residential waste and should be treated in the same format. Extracted teeth containing dental amalgam should be placed in an amalgam waste container, as they cannot be incinerated with general or biomedical waste.

Extracted teeth to be used for educational purposes must be cleaned of visible blood and debris and immersed in a 10% formalin solution or sodium hypochlorite 0.5% for at least 2 weeks. Provincial and municipal regulations for shipping biohazard materials must be followed. If being sent to a dental laboratory for shade or size comparisons, extracted teeth must be cleaned, disinfected with an appropriate intermediate-level disinfectant and transported in a sealed container.

Recommendations

1. All impressions and appliances should be thoroughly cleaned and rinsed of all debris before being handled in the on-site laboratory or sent to an off-site laboratory. [BII]
2. The dental on-site laboratory staff should wear appropriate PPE (mask, gloves and protective eyewear) to perform disinfection [AI]

3. Heat-tolerant items used in the mouth must be cleaned and heat sterilized before being used on another patient [AI]
4. Environmental surfaces should be barrier-protected or cleaned and disinfected with low-level disinfectants [AI]
5. Appliances and prosthesis delivered to the patient should be free of contamination. New and old dentures should be disinfected and rinsed by treated water. [AI]
6. In radiography room, when the surface is visibly contaminated with blood or saliva, intermediate level disinfectant should be used. [AI]
7. Radiography equipment should be cleaned and disinfected with low level disinfectant after each patient use or should be protected with surface barriers. [BII]
8. In heavy aerosol environment, high volume evacuation must be used as routine practices, and preventable by routine practices [BII]
9. Critical OPD surgery should have pre-procedural mouth rinses for patients to decrease the number of microorganisms during invasive dental procedures. [AI]

References

1. Infection Prevention and Control Standards in the Oral Health Care Facility. Saskatchewan Oral Health Professions. June 1, 2019.
2. Infection Prevention and Control in the Dental Office. Royal College of Dental Surgeons of Ontario. Nov 2018.
3. John A. Molinari, Jennifer A. Harte. Cottone's Practical Infection Control in Dentistry. Third Edition. Philadelphiaa: Lippincott Williams & Wilkins. 2010
4. Chris H. Miller. Infection Control and Management of Hazardous Materials for the Dental Team. 5th edition. St. Louis: Mosby Inc. 2014.
5. Rutala WA and Weber DJ. Disinfection and sterilization: An overview. Am J Infect Control 41 (2013) S2-S5.

6. FDA drug safety communicaitons: FDA warns about rare but serious allergic reactions with the skin antiseptic hlorhexidine gluconate. U.S. Food & Drug Administration Published Feb 9, 2017 Https://www.fda.gov/drugs/drug-safety-and-availability/fda-drug-safety -communication-fda-warns-about-rare-serious-allergic-reactions-skin-antiseptic
7. Polimeni G, Xiropaidis AV, Wikesjo UME. Biology and principles of periodontal wound healing/regenration. Periodontol 2000, 2006;41:30-47

Chapter 6 Instruments handling and reprocessing

Introduction

Every dental practice, both private and institution-based practices, must set out policies and procedures for cleaning, disinfection and sterilisation of used dental instruments. Cleaning, disinfection and sterilisation of dental equipment should be assigned to DHCPs with training in the required reprocessing steps to ensure reprocessing results in a device that can be safely used for patient care. In accordance to the APSIC Guidelines for Disinfection and Sterilisation of Instruments in Health Care Facilities 2017, proper procedures must be in place for containing, transporting and handling instruments and equipment that maybe contaminated with blood or body fluids. Training should also include the appropriate use of PPE necessary for safe handling of contaminated equipment. Manufacturer's instructions for reprocessing reusable dental instruments and equipment should be readily available - ideally in or near the reprocessing area. Most single-use devices are labelled by the manufacturer for only a single use and do not have reprocessing instructions. Use single-use devices for one patient only and dispose of appropriately. DHCP must go for regular refresher courses for cleaning, disinfection and sterilisation processes.

Not all patient-care items (e.g., dental instruments, devices, and equipment) need to be sterilized. These patient care items are categorized as critical, semi-critical, or noncritical, depending on the potential risk for infection-associated with their intended use.

A. Critical items, such as surgical instruments and periodontal scalers, are those used to penetrate soft tissue or bone. They have the greatest risk of transmitting infection and should always be sterilized using heat.
B. Semi-critical items (e.g., mouth mirrors, amalgam condensers, reusable dental impression trays) are those that come in contact with mucous membranes or non-intact skin (e.g., exposed skin that is chapped, abraded, or has dermatitis). These items have a lower risk of transmission. Because the majority of semi-critical items in dentistry are heat-tolerant, they should also be sterilized using heat such as steam under pressure in a steam sterilizer (autoclave). Heat sensitive items can be sterilized using compact

hydrogen peroxide plasma sterilizers. If a semi-critical item is heat-sensitive, DHCP should replace it with a heat-tolerant or disposable alternative. If none are available, it should, at a minimum, be processed using high-level disinfection e.g. thermal disinfector/instrument washer or approved instrument level disinfectant. Dental handpieces and associated attachments, including low-speed motors and reusable prophylaxis angles, should always be heat sterilized between patients. No high-level or surface disinfection is allowed. Digital radiography sensors are also considered semi-critical and should be protected with a barrier to reduce contamination during use, followed by cleaning and heat-sterilisation or high-level disinfection between patients. If the item cannot tolerate these procedures then, at a minimum, protect with an FDA-cleared barrier. In addition, clean and disinfect with a hospital-grade disinfectant between patients. Because these items vary by manufacturer and their ability to be sterilized or high-level disinfected also vary, refer to manufacturer instructions for reprocessing.

C. Noncritical patient-care items (e.g., radiograph head/cone, blood pressure cuff, facebow) are those that only contact intact skin. These items pose the least risk of transmission of infection. If these items can be protected by disposable barriers, that is most preferred. In the majority of cases, cleaning, or if visibly soiled, cleaning followed by disinfection with hospital-grade disinfectant is adequate.

Cleaning and disinfection of contaminated instruments

Pre-sterilisation cleaning is an irreplaceable step. It ensures the removal of organic remnants that the microbes are embedded in. If this organic layer is not removed properly, it can shield the microorganisms and potentially compromise the disinfection or sterilisation process. If cleaning is delayed, the soiled instruments can be kept in liquid solution which could be any proprietary product for pre-cleaning. Drying out of the uncleaned debris will make subsequent cleaning more difficult. Separation of dirty and clean zones must be clearly

demarcated to ensure no mixing of contaminated instruments from cleaned/disinfected instruments before sterilisation.

Methods of cleaning reusable dental instruments

Automated cleaning equipment (e.g., ultrasonic cleaner, washer disinfector) should be used to remove debris to improve cleaning effectiveness and decrease worker exposure to blood. After cleaning, dried instruments should be inspected, wrapped, packaged, or placed into container systems before heat sterilisation. In dentistry, low-speed as well as high-speed handpieces must be carefully clean and disinfected according to manufacturers' recommendations, using appropriate handpiece adaptors.

A. Washer-disinfectors

Washer-disinfectors are a better alternative as the cleaning process can be validated and instruments can be considered as disinfected at the end of the cycle. In the event that a washer-disinfectors are not available, other alternatives must be used viz. ultrasonic cleaning or manual cleaning. Unless stipulated by manufacturer's instructions, all instruments should be cleaned in a Washer Disinfector.

B. Ultrasonic cleaning

Ultrasonic cleaners may be used for pre-sterilisation cleaning. Such practice cuts down the need for hand processing and minimises the chance of getting injured by contaminated instruments or sharps. The manufacturer's instructions on its proper operation, routine cleaning and maintenance such as de-gassing should be followed. The ultrasonic cleaning solution should be changed daily or more frequently if it becomes visibly soiled or if the manufacturer recommends more frequent changes.

C. Manual Cleaning

This should be only be performed if there are no washer-disinfectors or ultrasonic cleaners available. Manual cleaning should be performed in an enclosed area, away from the clinical area.

Cleaned instruments should be rinsed thoroughly in warm water to get rid of all remaining cleansing agent. They should then be checked for residual debris and hand-cleaned as necessary. To avoid sharps injury, heavy duty utility gloves, protective eyewear, face mask and protective clothing should be worn in the process. Being more puncture resistant and less affected by chemicals, utility gloves provide better protection than examination gloves. Utility gloves should be cleaned at the end of the day and can be reused unless they are worn out. Washed Instruments must be dried (and oiled, if necessary) before sterilisation. Most hand instruments can be towelled dry. For hinged instruments or instruments with inaccessible small parts, they can be blown dry with compressed air. The vaporisation of water on wet instruments takes extra time. More importantly, water trapped in small spaces such as the hinges of instruments may be unable to vaporise completely. Effective sterilisation may not be achieved within the set time. The chance of corrosion is also increased.

Lubrication of handpieces

Most handpieces cannot withstand ultrasonic cleaning. Their inner recesses, however, have to be cleaned prior to sterilisation because oral debris/microbes may be retracted into the turbine space and waterline. It is important that pre-cleaning of the handpieces before sterilisation is performed thoroughly according to manufacturer's recommendations. General guidelines on handpiece pre-cleaning procedure are as follows:

a. Leave the handpiece attached after patient treatment. Remove visible debris from the handpiece. Run, to flush the waterlines, for 20-30 seconds into a container or absorbent material.
b. Remove it from the coupling and clean the outer surface thoroughly with water or disinfectant, rinse and dry. Do not soak unless recommended by the manufacturer.

c. Clean/lubricate the inner recesses as recommended by the manufacturer. Some handpieces require lubrication before, after, or before and after sterilisation, or not at all. Check with the manufacturer's instruction. Use separate cans of lubricants for pre- and post-sterilisation lubrication.
d. Wipe residual lubricant away from the outer surface. For handpieces fitted with fibre-optics, be sure not to leave any lubricant on the fibre-optic contact.
e. Package in pouch, bag or container.
f. Follow the manufacturer's recommendations on sterilisation.
g. If post-sterilisation lubrication is required, handle the sterilised handpiece aseptically.

Cleaning verification

Cleaning verification by users must be performed to assess instrument surfaces. This can be done by mainly visual inspection with the aid of lighted magnifying lens if needed. Other verification methods (e.g. ATP, protein residue, etc.) if deemed necessary can also be used. Cleaning processes must be audited on a regular basis on selected samples, on daily basis whenever possible.

Packaging of instruments

Before disinfection by washer-disinfector or sterilisation, all instruments should be handled as contaminated. Packaging of washed instruments should be done in designated area unless the contaminated instruments are disinfected by washer-disinfector. There should be a unidirectional flow during the reprocessing of soiled instruments. Packages should be labelled to show the steriliser used, the cycle or load number, the date of sterilisation, and, if applicable, the expiration date. This information can help in retrieving processed items in the event of an instrument processing/sterilisation failure.

Critical instruments not for immediate use should be packaged to prevent re-contamination after sterilisation. Operative hand instruments that are used frequently can be put in perforated aluminium trays with or without wrapping (tray-system). Handpieces can be packaged in pouches or perforated trays. All packages must be dated and clearly stating the load number and steriliser number if more than one steriliser is used. The autoclave used for each package should be identifiable to facilitate recall when ineffective sterilisation is presumed in the event of spore test failure.

Sterilisation

For effective sterilisation to be achieved, the chamber of the autoclave should not be overloaded and regular monitoring is necessary to ensure efficacy of the machine. All critical and heat tolerant semi-critical instruments should be autoclaved. It is important to operate and maintain the autoclaves in accordance with the users' manuals. Do not take short-cuts in any case.

For the gravity displacement models, air is displaced by steam physically. Improper packaging and loading could prevent the escape of air, leading to ineffective sterilisation. Their use should only be limited to sterilisation of unwrapped solid items. In pre-vacuum autoclaves, air is first drawn out (to create a vacuum) before the chamber is filled with steam. Effective steam penetration could thus be attained for different types of loads including solid, hollow and porous, pouched, and single/double wrapped items.

Storage of sterilized items

Sterilised items should be properly stored to ensure sterility. Storage condition is vital. The sterility of wrapped items can be maintained indefinitely unless an occurrence (e.g. torn or wet wrapping) causes contamination. Instruments with compromised wrappings should be re-cleaned, repackaged and re-sterilised promptly.

For unwrapped frequently used operative items, they should be stored in covered containers with no perforations, or cabinets with tight doors. Instruments autoclaved and kept in perforated trays should also be considered as unwrapped items.

Sterilisation monitoring

Many factors can cause sterilisation failure - from procedural errors that are easily remedied, like overloading, to mechanical problems that can take a steriliser out of service until repairs can be made. Since this variety of factors can influence successful sterilisation, dentists are encouraged to regularly assess the efficiency of the in-office sterilisers. In addition, state or local regulations may exist regarding frequency and record-keeping issues related to steriliser monitoring. Check with the national regulatory body for regulatory information. The ability of a steriliser to reach conditions necessary to achieve sterilisation should be monitored using a combination of physical, biological and chemical indicators.

It is important to note that physical and chemical indicators do not guarantee sterilisation; however, they help detect procedural errors and equipment malfunctions.

Physical monitoring

Physical monitoring involves checking the steriliser gauges, computer displays, or printouts; and documenting the sterilisation pressure, temperature, and exposure time in your sterilisation records. Since these parameters can be observed during the sterilisation cycle, this might be the first indication of a problem.

Chemical monitoring

Chemical monitoring uses sensitive chemicals that change colour when exposed to high temperatures or combinations of time and temperature. Examples include chemical indicator tapes, strips or tabs, and special markings on packaging materials. Chemical monitoring results are obtained immediately following the sterilisation cycle and therefore can provide more timely information about the sterilisation cycle than a spore test. However,

chemical indicators should not replace biological indicators, as only a biological indicator consisting of bacterial endospores can measure the microbial killing power of the sterilisation process.

A chemical indicator should be placed inside every package to verify that the sterilizing agent (e.g., steam) has penetrated the package and reached the instruments inside. If the internal chemical indicator (e.g. Types 3, 4, 5, 6) is not visible from the outside of the package, an external indicator should also be used. External indicators (e.g. Type 1) can be inspected immediately when removing packages from the steriliser. If the appropriate colour change did not occur, do not use the instruments. Chemical indicators also help to differentiate between processed and unprocessed items, eliminating the possibility of using instruments that have not been sterilized. For pre-vacuum sterilisation, Bowie Dick test should be performed. For loads containing implants, a PCD containing a biological indicator and chemical indicator Type 5 (integrating indicator) must be included in each load.

Table 1 International Classification of Chemical Indicators

Type	Category	Description	Intended use
1	e1	Exposure or process indicator	Indicates exposure to a process, allows differentiation between unprocessed and processed, i.e. indicator tapes or labels
2	s2	Special indicator	Indicators for use in special applications, i.e. Bowie-Dick test
3	i3	Internal single variable indicator to indicate 1 critical variable	For pack control – but not as useful as Type 4 or 5 CI; for exposure control monitoring, i.e. temperature tubes for dry heat sterilising

Type	Category	Description	Intended use
4	i4	Internal multi-variable indicator that reacts to more than 1 critical variable in sterilisation cycle	For pack control, i.e. chemical impregnated paper strips
5	i5	Internal integrating indicator that reacts to all critical variables in the sterilisation process (i.e. for steam sterilisation – time, temperature, presence of steam) and has stated values that correlate to a BI at 3 time/temperature relationships	For pack control or as additional monitoring for loads that contain implants, i.e. PCD containing a Type 5 CI
6	i6	Internal emulating indicator that reacts to all critical variables in the sterilisation process (i.e. for steam sterilisation – time, temperature, presence of steam) for specified sterilisation cycle	For pack control, i.e. chemical impregnated paper strip

A single-parameter internal chemical indicator provides information regarding only one sterilisation parameter (e.g., time or temperature). Multi-parameter internal chemical indicators are designed to react to ≥ 2 parameters (e.g., time and temperature; or time, temperature, and

the presence of steam) and can provide a more reliable indication that sterilisation conditions have been met. Sterilisation monitoring (e.g., biological, mechanical, chemical monitoring) and equipment maintenance records are required. Bowie Dick test should be used for pre-vacuum sterilisation.

Biological Monitoring

Biological indicators (BI) are the most accepted method for monitoring the sterilisation process because they assess the sterilisation process directly by killing known highly resistant microorganisms (e.g., *Geobacillus* or *Bacillus* species). The BI should be incubated according to the BI manufacturer's instructions.

The recommended frequency of BI testing for steam sterilisation is daily whilst for gaseous sterilisation is for BI testing with every load. If BI tests are only performed periodically (e.g., once a week, once a day) and the results are usually not obtained immediately, physical and chemical monitoring should also be performed. Most BIs require up to 48 hours of incubation before the test is complete. However, in the recent times, there are rapid readout BIs that can provide BI results within an hour. These indicators detect enzymes of *Geobacillus stearothermophilus* (the test organism for steam sterilisers) by reading a fluorescent product produced by the enzymatic breakdown of a non-fluorescent substrate.

Maintaining accurate records ensures cycle parameters have been met and establishes accountability. In addition, if there is a problem with a steriliser (e.g., unchanged chemical indicator, positive spore test), documentation helps to determine if an instrument recall is necessary. Ideally, sterile instruments and supplies should be stored in covered or closed cabinets. Wrapped packages of sterilized instruments should be inspected before opening and use to ensure the packaging material has not been compromised (e.g., wet, torn, punctured) during storage. The contents of any compromised packs should be reprocessed (i.e., cleaned, packaged, and heat sterilized again) before use on a patient.

Sterilisation Failure

A positive BI test result, physical monitoring parameters unmet and/or chemical indicator failure indicates a failed sterilisation process. A product recall must be activated. In addition, the use of the steriliser be stopped immediately. The process of sterilisation must be reviewed to rule out the possibility of operator error. If there is any procedural error/failure identified, this should be rectified and subsequently retest the steriliser, performing the physical, biological and chemical monitoring.

Before the steriliser can be returned to service, the biological indicator should return negative results for tests conducted during three consecutive empty-chamber sterilisation cycles to ensure that the problem has been corrected. If the repeat biological indicator test is negative and the other test results fall within normal limits, the steriliser can be returned to service.

Maintain records of all BI test results according to the requirements of the national regulatory body.

Recommendations

1. Proper cleaning, disinfection and sterilisation processes must be clearly stated in all dental clinics and preferably be carried out by trained dental healthcare professionals. [BI]

2. Proper sterilisation of dental handpieces and all dental instruments is important and should follow the manufacturer instructions. It is important that proper sterilisation is performed to prevent transmission of microorganisms. [AI]

References

1. Guidelines for Infection Control in Dental Health-Care Settings (2003); MMWR 2003
2. Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care (2016). Available from https://www.cdc.gov/oralhealth/infectioncontrol/summary-infection-prevention-practices/index.html. Accessed on 24 March 2021.
3. The Basic Protocol - IC Guidelines for the Dental Services, Department of Health, HKSAR Government, Infection Control Standing Committee Dental Service (2019)
4. The APSIC Guidelines for Disinfection and Sterilisation of Instruments in Healthcare Facilities.

Chapter 7 Incident and outbreak management

A. Sharp injury and blood borne disease

Exposure to blood or saliva by percutaneous injury with sharp injury is the greatest risk for acquiring a blood-borne pathogen in the dental health-care setting. Baseline assessment (hepatitis B, hepatitis C and HIV) with appropriate monitoring and follow-up is done for injured staff. Significant exposures must be dealt with immediately, and exist when any of the following events occurs:

a. Percutaneous injury, where the skin of a DHCP is punctured by a contaminated needle or sharp instrument (blood is released).
b. Blood, saliva or other body fluid is splashed onto non-intact skin (dermatitis, cuts or abrasions).
c. Blood, saliva or other body fluid is splashed onto mucosa of the eyes, the mouth or the nose.

Exposure management protocol

1 Remove gloves or immediate clothing, if necessary, to assess the extent of the injury.

2 Immediately allow wound to bleed freely but do not squeeze it. Then wash the area, including the puncture or wound using soap and water. Exposed eye, mouth or nose mucosa should be flushed with copious amounts of sterile water. Do not apply caustic agents such as bleach or inject antiseptic agents into the wound.

3 Report the injury to the facility IPC Officer. A report is filed and the DHCP is to seek medical attention as a designated centre e.g. emergency department or Staff Clinic.

B. Sterilisation failure

If the incubation result of the processed biological indicator is positive, oral health care facility must recall all processed packages since last negative biological indicator. And then reprocess all items again. Recall procedure and recall report should be completed. If the items

were used on patients, it will need to monitor for 1 month if no implant devices were used, and 1 year if implant devices were used.

C. Exposure management

1. Blood borne disease

Every significant exposure must be immediately evaluated to assess the potential to transmit an infectious disease. The assessment of risk to transmit an infectious disease:

- The type and amount of body fluid or tissue involved.
- The nature of the exposure (percutaneous injury, mucous membrane or non-intact skin exposure).
- The known or unknown infection status of the source.
- The susceptibility of the exposed person.

Documentation should include:

- The name of the exposed person, and details regarding the exposed person's vaccination status.
- The date and time of the exposure.
- The nature of the exposure, including the dental procedure being performed, the extent of the exposure, and the immediate action taken.
- The name and health status of the source person, including details regarding any infectious diseases known or suspected.
- All communication (oral or written) in regard to the injury must be documented.
- Copies of all documentation must be retained in the employee's personnel file
- The employer must be advised of the incident and confirmed exposure management and protocol following exposure protocol were followed.
- The oral health care facility must report the injury to relative health authority according to local regulation.

- Further consideration: An incident report will be completed within the relative health authority. Follow-up counselling and post-exposure management may be required.
- DHCP should delay entry into the facility until a sufficient time has elapsed for enough air changes to remove potentially infectious particles. Both hand hygiene and the cleaning and disinfection of environmental surfaces are fundamental practices to reduce the incidence of healthcare-associated infections.

2. Water borne disease

Legionnaires' disease and Pontiac fever outbreaks occur when two or more people are exposed to Legionella in the same place and get sick at about the same time. Outbreaks are commonly associated with buildings or structures that have complex water systems. Once dental health officials have determined that they need to conduct a full investigation, there is a series of steps that should take place. During the full investigation, dental health officials will need to:

- Perform a retrospective review of the cases to identify earlier cases with possible exposures to the same setting or geographic area
- Develop a line listing of cases associated with the common exposure setting or geographic area
- Work with appropriate parties to identify additional cases (e.g., through retrospective review of medical or laboratory records) and facilitate testing for *Legionella* using both culture of lower respiratory secretions on media that supports growth of *Legionella* and the *Legionella* urinary antigen test
- Obtain post-mortem specimens, when applicable
- Consider recommendations for restricting water exposures or other immediate control measures
- Facilitate environmental assessment to evaluate possible environmental exposures
- Facilitate environmental sampling, as indicated by the environmental assessment

- Make recommendations for remediation of possible environmental source(s), if indicated
- Develop a risk communications plan
- Determine how long heightened disease surveillance and environmental sampling should continue to ensure the outbreak is over
- Work with appropriate parties to develop or review and possibly revise the water management program
- Subtype and compare clinical and environmental isolates, if available
- Follow up to assess the effectiveness of implemented measures to control the hazard.

Recommendations

1. There should be a process of notification of supervisors, senior management and IPC. [AIII]
2. A procedure should be established for the recall of improperly reprocessed medical equipment/devices. [AIII]

References

1. ANSI/AAMI St79: Comprehensive guide to steam sterilization and sterility assurance in health care facilities.
2. *Legionella* (Legionnaires' disease and Pontiac Fever. US CDC Things to Consider: Outbreak Investigations. https://www.cdc.gov/legionella/health-depts/epi-resources/outbreak-investigations.html Accessed 19 March 2021.
3. *Legionella* (Legionnaires' disease and Pontiac Fever. Outbreaks. https://www.cdc.gov/legionella/outbreaks.html Accessed 19 March 2021.
4. Guidance for Dental Settings. Interim Infection Prevention and Control Guidance for Dental Settings During the Coronavirus Disease 2-19 (COVID-19) Pandemic.

https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html#section-2 Accessed 19 March 2021.

Chapter 8 Education and Training

Infection prevention education and training with ongoing program for DHCPs are critical for ensuring that infection prevention policies and procedures are understood and followed. DHCPs receive education in IPC in their professional programs. It is their responsibility to ensure that current scientifically accepted practices are in place and followed. The supervisor need to ensure:

- IPC education and training, such as hand hygiene, use of PPE, appropriate to their position and responsibilities is provided upon hire, at least annually, and whenever new equipment or processes are introduced.
- Education on the basic principles and practices for preventing the spread of infections should be provided to all DHCPs.
- Training should include both DHCP safety (e.g., OSHA blood-borne pathogens training) and patient safety (e.g. dental instrument sterilization and disinfection training course)
- Regular refresher training is also appropriate to ensure the necessary infection control measures are being complied with and understood
- Regular continuing education is required and be supported, as well as encouraged
- There are regular documented internal audits to assess the competency of staff involved in IPC procedures
- IPC policies are reviewed by all staff members and updated at least annually.

Recommendations

1. There is a written policy regarding immunizing DHCP, with immunization program. [CI]
2. Develop and maintain regularly updated immunization/health records for dental staff. [BI]
3. Provide job- or task-specific infection prevention education and training to all DHCPs. [BI]
4. Provide training during orientation and at regular intervals (e.g., annually). [BI]

5. Maintain training records according to state and national requirements. (IB)

References

1. Health-Care Personnel: Recommendations of the Advisory Committee on Immunization Practices (ACIP) (available at: http://www.cdc.gov/mmwr/pdf/rr/rr6007.pdf)
2. Centers for Disease Control and Prevention. Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care. Atlanta, GA: Centers for Disease Control and Prevention, US Dept of Health and Human Services; October 2016.
3. Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings www.cdc.gov/hicpac/pdf/isolation/Isolation2007.pdf. Accessed on 24 March 2021.
4. ADA's Guidelines for Infection Control Third Edition ©2015, Authorised by Dr Rick Olive AM RFD, Federal President, Australian Dental Association
5. Gould D, Chamberlain A. The use of a ward-based educational teaching package to enhance nurses' compliance with infection control procedures. J Clin Nurs 1997;6(1):55-67.

Chapter 9 Pandemic preparedness

Pandemics are characterized by the global spread of a novel type of virus, and may cause unusually high morbidity and mortality for an extended period. Most people are immunologically naive to the novel virus, and are therefore susceptible to infection. A severe pandemic can overwhelm the resources of a society due to the exceptional number of people affected.

Following the 2009 influenza H1N1 and the 2020/21 COVID-19 pandemics, it is clear that dental care services and clinics should have a Pandemic Preparedness Plan. Such plans shall be reviewed periodically with reference to the most updated scientific evidence and the local health authority. In addition to established engineering control of Standard Precautions, the Pandemic Plan should have the following administrative control. Transmission-based precautions may be required depending on the mode of transmission of the novel pathogen.

1. Patient Triage

Early identification and early isolation in pandemic situations are key strategies to prevent spread of infectious disease in clinical settings. There should be a patient triage station at the reception of clinic for early identification of high-risk clients. Telephone screening for all clients for symptoms consistent with pandemic infectious diseases before appointment is advisable. It is important to inform the supervisor immediately if suspected cases are identified for further actions and report.

At the triage station:

- Receptionist should assess patients and accompanying persons for conditions that require additional transmission-based precautions, for example fever, cough, breathing difficulty, sore throat, diarrhoea etc., and other signs and symptoms of pandemic infectious disease.
- Receptionist should also check travel, occupation, contact and cluster (TOCC) history of patients and accompanying persons to identify high risk individuals.

- Ensure clients' compliance to respiratory hygiene and cough etiquette.
- Clients identified with respiratory symptoms should wear a surgical mask.
- Institute social distancing in waiting area with seats placed at least 1 m apart.
- Make appropriate appointment scheduling to minimize the number of visitors in the waiting area at a time and the length of stay for patients. Patients with suspected symptoms or history requiring urgent attention should be facilitated to have early consultation and departure.

Patients suspected with a pandemic associated infection should be isolated in separate room as far as possible. If single room is not available, separate from other clients at a distant corner away from other clients. Report and arrange for immediate transfer to acute care hospital as soon as possible.

2. Postpone non-urgent patient visits

Provide dental treatment only after the clients have been assessed without obvious or identified risk of pandemic infection. Also, dental clinics need to balance both the risk to the client deferring care and the risk to DHCPs of potential transmission.

Consider postponing elective procedures and non-urgent patient visits when client reports signs and symptoms of the pandemic infection and positive history of epidemiological clues (TOCC) refer to Appendix. If possible, delay dental care until the client has ended isolation or quarantine. Consideration should be given to the seriousness of the presenting condition and to the patient's infection status such as in the order from low risk, suspect, probable or confirmed.

Appropriate PPE should be selected by staff as per risk assessment or as directed by the management and IPC team. Application should align with current risk levels of infection/transmission of pandemic associated infections.

3. Procedures for urgent patient visits of confirmed or suspect cases

The procedure should only be performed in a safe working environment, at minimum a single room with a closed door. If an aerosol generating procedure (AGP) is unavoidable, perform AGP in a negative pressure or well-ventilated room with preferably 10-air changes per hour (ACH) or neutral pressure room with the door closed. Effective high volume suction should be used at all time. If AGP is necessary for urgent dental care, ensure fourhanded dentistry, high evacuation suction and dental dams to minimize contaminated droplet spatter and aerosols. The number of DHCPs present during the procedure should be limited to only those essential for patient care and procedure support. The DHCP should wear appropriate PPE according to pandemic guideline recommendations.

Recommendations

1. Dental care services clinics should have a Pandemic Preparedness Plan with reference to the local health authority. [BI]
2. Early identification through client triage process in pandemic situations is key to prevent spread of infectious disease in clinic settings. [AI]
3. Consider if elective procedures and non-urgent patient visits be postponed when patient reports signs and symptoms of the pandemic infection and positive TOCC history. [BI]
4. Avoid AGP as far as possible. If unavoidable, AGPs should be carried out in negative pressured rooms. [BI]
5. Use fourhanded dentistry, high evacuation suction and dental dams to minimize droplet spatter and aerosols. [AI]
6. OHCP should wear appropriate PPE for standard precautions and transmission base precautions according to pandemic guideline recommendations. [BI]

7. Practices should ensure physical distancing. Good hand and respiratory hygiene measures are followed at all times throughout the practice.[BI]

References

1. Interim Infection Prevention and Control Guidance for Dental Settings during the Coronavirus Disease 2019 (COVID-19) Pandemic. Updated Dec. 4, 2020 https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html#section-1. Accessed on 24 March 2021.
2. Centers for Disease Control and Prevention. Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Oral Health; March 2016.
3. Eugenio Beltran-Aguilar et al Rational perspectives on risk and certainty for dentistry during the COVID-19 pandemic, American Journal of Infection Control 00 (2020) 1−3
4. COVID-19: Infection Prevention and Control dental appendix first published 20 October 2020 PHE publications gateway number: GW-1659.
5. The Basic Protocol – Infection Control Guidelines for the Dental Service, Department of Health, Infection Control Standing Committee, Dental Service, Department of Health, HKSAR Government. January 2019
6. HSE National Guideline for Infection Prevention and Control in HSE Dental and Orthodontic Services, Canada. November 2019.
7. Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care: WHO guidelines. Geneva: 2014 http://apps.who.int/iris/10665/112656/ Accessed on 24 March 2021.

Appendix

Epidemiological clues (TOCC)

Patient reports history of

- Travel to areas with known epidemic of potential concern (EPC) within the known or suspected incubation period (T)
- Possible occupational exposure to pathogens of potential concern (O)
- Unprotected contact with those with the EPC within the known or suspected incubation period (C)
- Being part of a rapidly spreading cluster of patients with the infection of unknown cause, including exposure to household members with the EPC (C).

Chapter 10 Design specifications

Introduction

Dental facilities described in this guideline include, but not limited to family practice, paediatric dentistry, oral surgery, and orthodontics. These are outpatient facilities where patients have less than a 24-hour stay. An operatory refers to the space in a dental office where examination and dental procedures are performed.

There should be clearly defined clean and contaminated zones. The clean zones of the dental practice include office areas, staff room, waiting and reception areas as well as those areas used for storage of supplies and sterilised instruments and equipment.

The contaminated zone is the area which becomes contaminated by splashes and droplets originating from the patient's mouth (typically within a distance of one metre). Aerosols generated from patient care may extend further than splashed material (up to approximately 1.8 metres).

The design, layout of dental surgery and treatment areas are important factors for successful infection prevention. Work areas should be well lit and ventilated with sufficient uncluttered and easily cleaned bench space to contain dental equipment. There must be a defined area for clean and contaminated zones in the dental operatory and instrument reprocessing rooms. All dental staff must understand the purpose of and requirements within each zone, and adhere to the protocols.

Functional areas

These are:

- Entry / Reception and Waiting
- Treatment Areas – including Dental Surgery Rooms, Dental Imaging Rooms, Dental Education areas
- Dental Support areas including Clean-up, Sterilisation, Laboratories, Dental Plant room

- Staff and Support Areas - Utilities, Storage, Drug storage, Staff Room, Toilets and Locker facilities.

1. Entry / Reception and Waiting areas

The waiting areas need to accommodate a range of occupants of varying mobility and should be designed for accessibility. Safe distancing measures are to be in place to ensure that patients can be seated at least 1 m apart during a pandemic.

2. Dental treatment areas

It is highly recommended that the operatory be in single room as dental procedures emit large amount of droplets and fine aerosols. A private room for the treatment of paediatric patients should be large enough to accommodate the dentist, dental assistant, parent and infant/child during treatment.

Each operatory should have a minimum clear floor area of 8 m^2, regardless of whether it is in single room or open treatment area. A minimum clearance of 2 m shall be provided on all sides including the head, of each chair.

Negative pressured anterooms may be installed in selected rooms for the management of patients with potential/confirmed airborne diseases. The anteroom should be at least -5 Pa relative to the corridor space.

3. Hand hygiene stations

Alcohol-based hand rub (ABHR) dispensers should be installed at every operatory at the point of care to facilitate easy access to hand hygiene. Recommended locations for installation include:

a) Entrance / exit of the clinic

b) Patient waiting area

c) Lift lobbies

Hand moisturiser dispensers should also be installed in the following areas:

a) Entrance / exit of the clinic

b) Staff work station

c) Staff toilet

Each operatory should have a handwashing station placed at least 2 m away from the patient or any bench where preparation is done. A splashguard may be considered as added precaution for bench areas next to a handwashing station.

The handwashing station is meant for handwashing only. A clinical sink may be installed in situations where there is any cleaning of instruments to be done. All handwashing stations should permit procedural handwashing with hands-free activation i.e. lever operated by forearm, elbow or foot. Taps should not be aligned to discharge directly into the sink drain. The sinks should not have an overflow or be capable of taking a plug. All sinks should be installed with a waterproof splash-back and equipped with liquid soap and paper towels dispenser and non-sterile gloves. The recommended dimensions for each sink are a minimum of 930 cm^2, 250 mm width or length and depth. Where a handwashing station includes casework, it should be designed to prevent storage beneath the sink. Mirrors should not be installed at sinks in the operatories except in public toilet rooms.

The dental operatory floor coverings must be non-slip and impervious with sealed joints. Welded vinyl flooring is recommended as it is long wearing and can be cleaned easily. Coved joints of the flooring with the walls are preferred for ease of cleaning. The work surfaces must be nonporous, impervious to water, smooth crevices and sealed joints to facilitate cleaning and prevent the accumulation of contaminant. Dental unit surfaces must be impervious as they may become contaminated with potentially infective material.

4. Instrument reprocessing area

This is a designated area for reprocessing reusable instruments (including cleaning, packaging and sterilising) and not used for any other purpose. Ideally, this should be a dedicated room separate from the treatment room(s) but if not possible because of limited

space, instrument reprocessing should occur well clear of the contaminated zone with good workflow processes established and where there is minimal risk of aerosol contamination of the reprocessing area.

The cleaning process should flow in one direction, from contaminated to clean. If instrument washing must take place in the clinical or laboratory area due to limitations of space, then contaminated areas and instrument washing sinks must be clearly designated. Instrument flow must be in one direction: from contaminated through to clean. The instrument reprocessing area must be appropriate in layout and size for the volume of instruments being reprocessed.

A 1-room reprocessing facility should consist of a decontamination area and a clean work area with the entrance located approximately equidistant from clean and decontamination sides of the room, allowing a one-way traffic flow. The decontamination area should be equipped with the following:

- Countertop
- Handwashing station separate from instrument washing sink, where the latter comprises a 2-basin sink for washing instruments together with 2 drainers. To prevent splash, a splash guard may be installed at least 1.5 m above the sink rim.
- Storage for supplies and PPE
- Instrument air outlet or portable compressed air for drying instruments

The clean work area should be equipped with the following:

- Countertop
- Steriliser
- Storage for supplies and PPE
- Instrument air outlet or portable compressed air for drying instruments

A 2-room re-processing facility should comprise a decontamination room and a clean workroom that are physically separated by a wall with a door or pass-through window.

Alternatively, a built-in washer-disinfector may be installed with a pass-through door or window. The decontamination area should include the following:

- Countertops
- Handwashing stations
- 3-basin sink with drainage counters
- Space for soiled containers and instruments
- Documentation area
- Instrument air outlet or portable compressed air for drying instruments
- Eyewash station
- Storage for supplies and PPE

The clean workroom should include the following:

- Countertops
- Alcohol-based hand rub station
- Storage for supplies and PPE
- Documentation area
- Instrument air outlet or portable compressed air for drying instruments
- Cooling area for sterilisation cart

In larger facilities e.g. dental unit/centre in a hospital, the re-processing area should comply with standards set for Sterile Supplies Unit if it is a stand-alone facility away from main Sterile Supplies Unit.

5. Dental Plant room

The Dental Plant Room will accommodate equipment including water filtration equipment, silver water treatment system, dental suction plant and air compressors. The room should have a minimum clear floor area of 6 m^2. The size will be dependent on the amount of equipment to be accommodated and the layout. It should be located away from treatment area

to minimise the impact of noise and heat generated by equipment. Access to the Plant Room though an external door is recommended as internal access may present noise issues.

6. Staff support areas

Rest area with lockers and toilet with handwashing station should be available for staff use. Safe distancing measures are to be observed in placement of tables and chairs.

Recommendations

1. There should be clearly defined clean and contaminated zones. [AI]
2. It is highly recommended that the operatory be in single room [BII]
3. Alcohol-based hand rub (ABHR) dispensers should be installed at every operatory at the point of care to facilitate easy access to hand hygiene. [AII]
4. The reprocessing area must be divided into distinct areas for:
    - Receiving, cleaning and decontamination
    - Preparation and packaging
    - Sterilisation and
    - Storage. [AII]

References

1. Guidelines for design and construction of outpatient facilities. 2018 edition. St Louis, Missouri, USA: The Facility Guidelines, 2018.
2. Guidelines for Infection Control. 3rd edition. 2015. St Leonards NSW, Australia: Australian Dental Association, 2015
3. Part B – Health Facility Briefing & Design 65 Dental Surgery Unit. International Health Facility Guidelines Version 4 May 2014.

Appendix: Categories for strength of each recommendation

Categories for strength of each recommendation	
CATEGORY	**DEFINITION**
A	Good evidence to support a recommendation for use.
B	Moderate evidence to support a recommendation for use.
C	Insufficient evidence to support a recommendation for or against use
D	Moderate evidence to support a recommendation against use.
E	Good evidence to support a recommendation against use.
Categories for quality of evidence on which recommendations are made	
GRADE	**DEFINITION**
I	Evidence from at least one properly randomized, controlled trial.
II	Evidence from at least one well-designed clinical trial without randomization, from cohort or case-controlled analytic studies, preferably from more than one centre, from multiple time series, or from dramatic results in uncontrolled experiments.
III	Evidence from opinions of respected authorities on the basis of clinical experience, descriptive studies, or reports of expert committees.

Recommendations

1. Standard Precautions are to be complied with by all dental staff. [AI]
2. Transmission-based precautions (airborne, droplet and contact precautions) should be practised in addition to Standard Precautions where appropriate. [AI]
3. Airborne precautions include use of a special ventilated room with negative pressure and staff must wear N95 or FFP2/FFP3 respirators. [BI]
4. Droplet precautions include staff wearing a surgical mask on entering the room. [BI]
5. Contact precautions include the use of gloves and gown. [BI]
6. Reschedule patients with pulmonary tuberculosis, chicken pox and measles. [BI]
7. Perform emergency procedures in well ventilated room and reduce exposure by use of dental dam and avoid aerosol generation. [BI]
8. DHCPs must wear well-fitted masks or respirators with high filtration capabilities such as N95 or equivalent surgical respirators. [BI]
9. The principles of IPC and Standard Aseptic Technique must be applied to all dental procedures, specifically those which are technically simple and short in duration (approximately < 20 minutes). [A1]
10. The principles of IPC and Surgical Aseptic Technique must be applied to all surgical dental procedures, particularly those where there is a planned penetration of the oral mucosa. [A1]
11. Effective hand hygiene is an essential part of Aseptic Technique. [A1]
12. A surgical hand scrub using an antimicrobial handwashing solution, or an alcohol based hand rub (ABHR) approved for surgical hand decontamination, is required for Surgical Aseptic Technique [A1]
13. Sterile gloves must be used for Surgical Aseptic Technique [A1]
14. An aseptic field is necessary to provide a controlled aseptic working space to help maintain the integrity of asepsis during surgical procedures. [A1]

15. Establish policies and procedures for routine cleaning and disinfection of the environmental surfaces in dental healthcare settings. [AIII]
16. If surface barriers are used to protect clinical contact surfaces (e.g., switches on dental chairs, computer equipment) and change surface barriers between patients. [BIII]
17. Clean and disinfect clinical contact surfaces that are not barrier-protected with approved hospital grade disinfectant at the start of the day and after each patient. [BIII]
18. Select EPA-registered disinfectants or detergents/disinfects with label claims for use in health care settings. [AIII]
19. Follow manufacturer instructions for use of cleaners and EPA-registered disinfectants (e.g., amount, dilution, contact time, safe use, disposal, etc). [BIII]
20. Follow national and institutional regulation on managing different types of waste. [BII]
21. Use water that meets the CDC recommended limit for dental procedural water (i.e., ≤ 500 CFU/mL of heterotrophic water bacteria) for routine dental treatment output water. Adopt appropriate infection control procedures for dental unit waterlines. These include flushing dental unit waterline, use of germicidal product, biofilm prevention and monitoring of water quality from the Dental Unit waterline. [AII]
22. Use only sterile saline or sterile water as a coolant/irrigant when performing surgical procedures. [AI]
23. All impressions and appliances should be thoroughly cleaned and rinsed of all debris before being handled in the on-site laboratory or sent to an off-site laboratory. [BII]
24. The dental on-site laboratory staff should wear appropriate PPE (mask, gloves and protective eyewear) to perform disinfection [AI]
25. Heat-tolerant items used in the mouth must be cleaned and heat sterilized before being used on another patient [AI]
26. Environmental surfaces should be barrier-protected or cleaned and disinfected with low-level disinfectants [AI]
27. Appliances and prosthesis delivered to the patient should be free of contamination. New and old dentures should be disinfected and rinsed by treated water. [AI]

28. In radiography room, when the surface is visibly contaminated with blood or saliva, intermediate level disinfectant should be used. [AI]
29. Radiography equipment should be cleaned and disinfected with low level disinfectant after each patient use or should be protected with surface barriers. [BII]
30. In heavy aerosol environment, high volume evacuation must be used as routine practices, and preventable by routine practices [BII]
31. Critical OPD surgery should have pre-procedural mouth rinses for patients to decrease the number of microorganisms during invasive dental procedures. [AI]
32. Proper cleaning, disinfection and sterilisation processes must be clearly stated in all dental clinics and preferably be carried out by trained dental healthcare professionals. [BI]
33. Proper sterilisation of dental handpieces and all dental instruments is important and should follow the manufacturer instructions. It is important that proper sterilisation is performed to prevent transmission of microorganisms. [AI]
34. There should be a process of notification of supervisors, senior management and IPC. [AIII]
35. A procedure should be established for the recall of improperly reprocessed medical equipment/devices. [AIII]
36. There is a written policy regarding immunizing DHCP, with immunization program. [CI]
37. Develop and maintain regularly updated immunization/health records for dental staff. [BI]
38. Provide job- or task-specific infection prevention education and training to all DHCPs. [BI]
39. Provide training during orientation and at regular intervals (e.g., annually). [BI]
40. Maintain training records according to state and national requirements. [IB]
41. Dental care services clinics should have a Pandemic Preparedness Plan with reference to the local health authority. [BI]
42. Early identification through client triage process in pandemic situations is key to prevent spread of infectious disease in clinic settings. [AI]
43. Consider if elective procedures and non-urgent patient visits be postponed when patient reports signs and symptoms of the pandemic infection and positive TOCC history. [BI]

44. Avoid AGP as far as possible. If unavoidable, AGPs should be carried out in negative pressured rooms. [BI]
45. Use fourhanded dentistry, high evacuation suction and dental dams to minimize droplet spatter and aerosols. [AI]
46. DHCP should wear appropriate PPE for standard precautions and transmission base precautions according to pandemic guideline recommendations. [BI]
47. Practices should ensure physical distancing. Good hand and respiratory hygiene measures are followed at all times throughout the practice.[BI]
48. There should be clearly defined clean and contaminated zones. [AI]
49. It is highly recommended that the operatory be in single room [BII]
50. Alcohol-based hand rub (ABHR) dispensers should be installed at every operatory at the point of care to facilitate easy access to hand hygiene. [AII]
51. The reprocessing area must be divided into distinct areas for:
    a. Receiving, cleaning and decontamination
    b. Preparation and packaging
    c. Sterilisation and
    d. Storage. [AII]

Dental IPC Checklist

A. Dental health care professional (DHCP) safety

		Yes/No	Action Plan
1	There is a written policy regarding DHCP immunization as recommended by the state / institution.		
2	Hepatitis B vaccination is available at no cost to all DHCP who are at risk of occupational exposure to blood or body fluids.		
3	All DHCP are offered annual influenza vaccination.		
4	There is a blood-borne pathogen post-exposure management policy.		
5	All needlestick or splash injuries are reported and managed timely according to institutional post exposure management protocol.		
6	Immunization records are kept updated for all DHCP.		
7	Safety measures are given during orientation and updated at least once a year to all DHCP.		
8	Training records are kept for each DHCP.		
9	There is a healthy workplace policy which includes a clear expectation that staff do not come into work when ill with symptoms of infection.		
10	Safety Data Sheets (SDS) for cleaning/disinfecting products are readily available and up-to-date.		

B. Administrative measures

		Yes/No	Action Plan
1	There is a process for managing patients with symptoms of infectious diseases (e.g. acute respiratory infection) to prevent transmission to others.		
2	Patients with active pulmonary tuberculosis, chicken pox and measles are rescheduled.		
3	Alcohol-based handrub agents (at least 70% alcohol) are installed at every operatory at the point of care to facilitate easy access.		
4	Emergency procedures are performed in well-ventilated rooms and potential exposure reduced with use of dental dam.		
5	Critical outpatient surgery have pre-procedural mouth rinses for patients to decrease number of microorganisms during invasive dental procedures.		
6	There is a process of notification of supervisors, senior management and Infection Prevention and Control (IPC) for significant events e.g. recall, inadvertent exposure, outbreak, etc.		
7	There are clearly defined clean and contaminated zones in the facility.		
8	The reprocessing area is divided into distinct areas for: - Receiving, cleaning and decontamination - Preparation and packaging - Sterilization and - Storage		

C. Infection Prevention precautions

		Yes/No	Action Plan
1	Policies and procedures to contain respiratory secretions in people who have signs and symptoms of a respiratory infection, beginning at the point of entry to the dental facility are implemented.		
2	DHCP receive IPC training (including prevention of blood borne virus exposure) as part of their orientation, whenever new tasks and procedures or equipment are introduced. This training is supplemented whenever necessary and reviewed at least annually.		
3	Personal protective equipment (PPE) is selected based on risk assessment i.e. may be handling blood and/or body fluids.		
4	Alcohol-based hand rub or liquid soap and water, if hands are visibly soiled, is available and accessible at point of care.		
5	Alcohol-based hand rub and liquid soap containers are clearly labelled and not refilled or topped up.		
6	DHCP are trained regarding appropriate indications for hand hygiene, including handwashing, hand antisepsis and surgical hand antisepsis.		
7	There is a process for recording and reporting of attendance at staff education and training sessions.		

D. Safe injections and sharps safety

		Yes/No	Action Plan
1	Engineering controls (e.g. self-sheathing anaesthetic needles, safety scalpels, needleless IV ports, etc.) are used to prevent injuries.		
2	Work practice controls (e.g. one-handed scoop technique for recapping needles, removing burs before disconnecting handpieces, etc.) are used to prevent injuries.		
3	All sharps are disposed of in a puncture-resistant sharps disposal container located as close as possible to the area in which the items are used.		
4	Injections are prepared using an aseptic technique in a clean area free from contaminants or contact with blood, body fluids, or contaminated equipment.		
5	Needles and syringes are used for only one patient (this includes manufactured prefilled syringes and other devices such as insulin pens).		
6	The rubber septum on a medication vial is disinfected with alcohol before piercing.		
7	Single dose (single-use) vials, ampules and bags of intravenous solutions are not combined for later use.		
8	When using multidose medication vials • Multidose vials are dedicated to individual patients whenever possible • Multidose vials are dated when first opened and discarded within 28 days unless the manufacturer specifies a shorter or longer date for that opened vial.		

7	Fluid infusion and administration sets (intravenous bags, tubings and connections) are used for one patient only and disposed appropriately.		

E. Environmental hygiene

		Yes/No	Action Plan
1	There are policies and procedures for routine cleaning and disinfection of the environmental surfaces of the dental healthcare setting.		
2	Cleaning, sterilization and disinfection are done by trained DHCP.		
3	Clinical contact surfaces that are not barrier protected are cleaned and disinfected with approved hospital grade disinfectants at the start of the day and after each patient.		
4	Manufacturer's instructions for use are followed when using cleaning and disinfectant agents (amount, dilution, contact time, safe use, disposal, etc.)		
5	Appropriate PPE (mask, gloves and protective eyewear) are used when performing disinfection.		
6	Policies and procedures are in place for maintaining dental unit water quality that meets state regulatory standards for drinking water ($\leq$ cfu/ml of heterotrophic water bacteria) for routine dental treatment output water.		
7	Policies and procedures are in place for using sterile water as an irrigant when performing surgical procedures e.g. biopsy, periodontal surgery, apical surgery, implant surgery and surgical extractions of teeth.		
8	Policies and procedures are in place for using sterile water as an irrigant when performing surgical procedures e.g. biopsy, periodontal surgery, apical surgery, implant surgery and surgical extractions of teeth.		
7	Waste is disposed of in accordance with state regulations and institutional policies.		

F. Reprocessing of dental instruments/devices

		Yes/No	Action Plan
1	Non-critical items (e.g. radiograph head/cone, BP cuff, etc.) are cleaned and low-level disinfected between used.		
2	Semi-critical items (e.g. mouth mirrors, amalgam condensers, reusable impression trays, handpieces, etc.) that come into contact with mucous membranes and critical equipment/devices (e.g. all surgical instruments, periodontal scalers, ultrasonic scaler tips, etc.) are cleaned and sterilized, as per Instruction for Use (IFU).		
3	All single-use items are disposed immediately after use.		
4	DHCP responsible for reprocessing reusable dental instruments and devices are appropriately trained • Upon hire • At least annually • Whenever new equipment or processes are introduced.		
5	Routine maintenance for sterilization equipment is • Performed according to manufacturer instructions		

	• Documented		
6	Items are thoroughly cleaned in between patient used according to manufacturer's IFU; and visually inspected for residual contamination before sterilization.		
7	Ultrasonic cleaner/instrument washer/water-disinfector is used to remove debris to improve cleaning effectiveness and decrease DHCP exposure to blood.		
8	After cleaning and drying, instruments are appropriately wrapped/packaged for sterilization (e.g. hinged instruments are open, instruments are disassembled if indicated by the manufacturer).		
9	A chemical indicator is used in each package. If this is not visible from outside, an exterior chemical indicator is also used on the package.		
10	The instrument processing area has a workflow pattern designed to ensure that devices and instruments clearly flow from high contamination areas to clean/sterile areas (i.e. there is clear separation of contaminated and clean workspaces).		

G. Dental waterlines, suction lines and water quality

		Yes/No	**Action Plan**
1	DHCP have received training regarding water quality, biofilm formation, water treatment methods and appropriate maintenance protocols for water delivery system.		
2	Waterlines are monitored for damage and/or visible contamination and replaced as needed or as directed by the manufacturer.		
3	All waterlines are purged at the beginning of each workday by flushing them thoroughly with water for at least 2 mins. Before purging is carried out, handpieces, air/water syringe tips and ultrasonic tips are removed from the waterlines.		
4	Sterile water or sterile saline is used when irrigating open surgical sites and whenever bone is cut during invasive surgical procedures. Appropriate devices such as bulb syringes or single-use disposable products, are used to deliver sterile irrigation solutions.		
5	Manufacturer's IFUs regarding testing, maintenance and preventive maintenance of lines, anti-retraction valves and other accessories are followed.		
6	Suction lines are purged between patients by aspirating water or an appropriate cleaning solution with air to produce turbulent flow in the lines.		
7	Suction lines are flushed out with an enzymatic cleaner or appropriate cleaning solution at least once a week or as per manufacturer's IFU.		

H. Special areas (radiography and laboratory)

		Yes/No	**Action Plan**
1	Digital radiography sensors and intra-oral cameras are cleaned and heat sterilized between patients as they come		

	into contact with mucous membranes. Alternatively, the sensors are protected with barriers and these are removed immediately after procedure, whereupon the sensors are cleaned of gross debris and saliva, and then disinfected with a low level disinfectant or as per manufacturer's IFU.		
2	All impressions and appliances should be thoroughly cleaned and rinsed of all debris before being handled in the on-site laboratory or sent to an off-site laboratory.		
3	All items returned from an off-site laboratory to a dental facility are cleaned and disinfected prior to placing in a patient's mouth.		
4	Items used in the laboratory e.g. burs, polishing points, rag wheels, laboratory knives and dental lathes, that frequently become contaminated during adjustments to prostheses and appliances, are reprocessed or discarded after use, as per the manufacturer's recommendations.		