

INFECTION CONTROL IN DENTISTRY

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Introduction

Health care personnel refer to all paid/unpaid persons working in health care settings who have the potential for exposure to infectious materials [e.g. blood, tissue, specific body fluids and medical supplies, equipment or environmental surfaces contaminated with the infectious substances]. Rationale for infection control is to control iatrogenic nasocomial infections among patients and potential occupational exposure of care providers to disease causing microbes during provision of care. The term Disease Control or Infection Control does not mean total prevention of iatrogenic nasocomial infections or occupational exposure to blood and other potentially infectious materials, it only means reducing the risks of disease.

Prevention and reduction in potential risks of disease spread is only practical. The members of dental profession are at greater risk in contracting infectious diseases like aids, hepatitis, viral infections etc than the general public. This, therefore is important for education and training of infection control to coordinators, educators, consultants, dental staff at all levels of education.

Routes of Transmission of Disease Causing Organisms

Through aerosol/droplet - inhalation of air borne micro organisms that can remain suspended in the air for long period of time.

Through contact of skin (intact /non intact)- in direct contact with blood, oral fluids, or other potentially infectious patient materials.

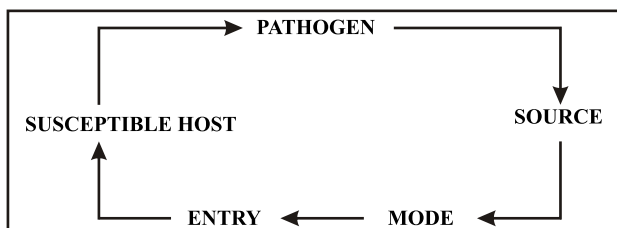
Through contact of mucous membranes of the eyes, nose, mouth, with droplets (e.g. spatter) containing microbes generated by [coughing, sneezing, talking] from an infected person and propelled at a short distance.

Through fomite - indirect contact with a contaminated object [e.g. instruments, operatory equipment, or environmental surfaces]

Pathway of Infection Spread

For any infection to spread-

- Pathogen - disease causing organism.
- Susceptible host
- Source - reservoir where pathogen survives and multiplies.



Transmission, route and entry into host. This pathway has to be interrupted to prevent disease transmission

Prevention of occupational exposure in dental operatory include-

Primary methods like-

- Standard precaution
- Engineering control
- Work practice control
- Administrative control

Standard Precaution

- Personal health elements
- Universal precautions to prevent transmission of disease causing organisms should be followed as recommended by center of disease control. All patients should be treated as infected. All dental health care personnel should be vaccinated [immunized] and appropriate follow up testing [antigen response] should be done. Common infections/ diseases encountered in dentistry are Hepatitis - a, b, c, d, e, g, Acquired Immuno Deficiency Syndrome, Tuberculosis, other Viral, Bacterial infections, etc.

Engineering Control

Removes/ eliminates or isolates the hazard from the worker. They provide safer designs of instruments and devices.

- Injury protection features like self sheathing needles and scalpels.
- Separate containers which are tamper proof to dispose sharp waste.

Work Practice Control

Reduce the risk of blood exposure by changing the manner in which a task is performed

- One handed needle capping.
- Unsheathed needle should not be passed to another dental health worker.
- Instruments should be used to retract /palpate tissue during suturing.

Administration Control

They are procedures, measures, policies that prevent exposure to disease causing organisms e.g. early identification and referral of dental patients suspected of having the disease e.g. in a tuberculosis patient administrative control is ranked higher than engineering control.

Post Exposure Management Program

It is an important component of disease prevention program to prevent infection following exposure to blood because despite the efforts, blood exposure may still continue to occur. This includes education of dental health professionals about principles of post exposure management, importance of prompt reporting. Post exposure prophylaxis efficacy and toxicity. Resources for rapid access to clinical care PEP as well as testing of source care worker, patient and exposed dental health care

personnel.

Universal Precautions

Hand hygiene

Hands are the most common mode of microbial transmission. Hand hygiene reduces the spread of antimicrobial resistance in health care setting and likelihood of health care associated infections.

According to CDC - hands should be cleaned after touching contaminated objects with bare hands before and after patient treatment, before glove placement and after glove removal and of course when hands are visibly dirty.

Hand hygiene/ hand washing is defined as washing hands with plain soap and water. Antiseptic hand wash is defined as washing hands with water and soap/ detergents containing an antiseptic agent, such as triclosan/ chlorhexidine. Other antiseptics like alcohol based hand rub e.g. ethanol, etc. Cut hands have to be washed with soap and water before hand rub is used preoperatively. Alcohol based scrub is most efficient for bacterial reduction followed by antimicrobial soap and least is soap. Finger nails should be short. Hand jewellery, artificial nails should be avoided to prevent glove tearing and bacterial harboring. Hand dryness should be prevented using hand lotions, etc for better glove compatibility.

Personal protective equipment components

It includes- masks, protective eyewear, face shield because of use of rotatory dental and surgical instruments like ultrasonic scalers, handpiece and air water syringe creates spatter containing water droplets, saliva, blood microbes and debris.

Dental health personal should protect their skin and mucous membrane from getting exposed to this spatter by using PPE (Personal Protection Equipment) and removing it once they are leaving the operatory. Surgical mask - should cover mouth and nose, it should be changed in between patients. Moist mask does not provide any protection. Clean reusable face protection between patients, if visibly soiled, clean and disinfect.

Eye protection glasses should always be worn while working on patient.

Protective clothing-clean full sleeved disposable/ reusable gowns or lab coat which covers skin and personal clothing should be worn whenever working in the operatory and removed before leaving the working area, it should be changed as soon as it becomes visibly soiled.

Instrument Sterilization

Depending on potential risk of disease transmission and intended use patient care instruments, items are divided in three groups.

Type of items	Examples of items	Tissue contact	Mode of disinfection
Critical	Surgical instruments dental burs, scalpels, blades, periodontal scaler	Contact bone, mucosa, blood stream, penetrate mucosa	Heat sterilization/Disposable items should be used
Semi critical	Impression trays, mouth mirror, amalgam condenser, plastic filling instruments, hand piece	Contact mucosa	Heat sterilization or high level disinfection
Non critical	X-ray head/ cone, pulse Oximeter, face bow, blood pressure cuff	Contact intact skin[unbroken]	Low to intermediate level disinfection

Cleaning area	Receiving/ sorting out division cleaning and decontamination of used items.	Automated cleaning ultra sonic cleaner, instrument washer, washer and disinfectant
Packaging area	Inspection Assembling Packaging clean instruments for final sterilization	Puncture resistant heavy duty utility gloves should be worn throughout the procedure. To expose all surfaces hinged instruments should be opened and unlocked Chemical indicators should be placed inside the pack
Sterilization and storage area	Sterilization and Storage of instruments for further use, instruments are sterilized, carefully wrapped, packed and stored. The clean items should be stored in dry, closed and covered container.	Heat sterilization Steam under pressure-gravity displacement, pre vacuum. Dry heat, Unsaturated chemical vapour. Liquid chemical sterilization used for heat sensitive instruments [critical and non critical].
Sterilization monitoring	Indicators Chemical :- Biological:- Mechanical:-	Change in colour, when physical parameters are reached. Use of biological spores (heat resistant microbial spores). Measure cycle time, temperature pressure by gauges, display observation on sterilization.

INSTRUMENT PROCESSING

Area is divided into different work areas to control both quality and personal safety divisions are as follows cleaning, packaging, sterilization and storage areas.

Environmental Surfaces

These are critical although not associated directly with disease transmission but may not get contaminate. They are divided into clinical contact surfaces and housekeeping surfaces.

Clinical contact surfaces (CCS)	House keeping surfaces (HKS)
Instruments, devices, hand gloves, dental chair, door handle, bracket tray, control top.	Wall, sink, floor
These have high potential for direct contamination from spray/spatter or direct contact with gloved hand of dental personal.	These surfaces do not come in contact with patients and devices.
They can later contaminate other instruments.	These have limited risk of transmission.
Surface barriers can be used which reduce the risk to harmful chemical disinfectants [low or intermediate level].	These surfaces should be cleaned with soap and water or low level disinfectants. Fresh disinfecting /cleaning solutions should be prepared daily. Wet clothes and mops should be clean and allowed to dry thoroughly before reusing.

Waste Disposal [biomedical waste management] at point of generation

Yellow bag	Red bag	Blue bag	Black bag	White
Anatomical waste	Soiled waste solid waste	Plastic waste	All general waste	Sharps
Tissues, organs, body parts, cy to toxic drugs, lab culture	Blood and body fluid stained dressing, swab, cotton, etc which is highly contaminated, soiled plaster cast	Specimen container, used gloves, I/V sets and tubing, catheter, urine bags, blood bag.	Paper, card board, disposable cups, metal containers, glass and plastic water bottles	Puncture proof, tamper resistant container with 1% sodium hypochlorite. Burnt/ Broken nozzles of syringe, scalpels, lancets, blades, broken ampules, glass pieces.

Conclusion

All patients should be considered potentially infectious. All preventive measures and precautions should be taken by dental health care personnel while handling patient and patient work to avoid risk of disease transmission and have a safe working unit.

References

Dental infection control, Jeffery.D.render, Infection control and occupational safety, recommendations Dr Anil Kohli and Raghunath