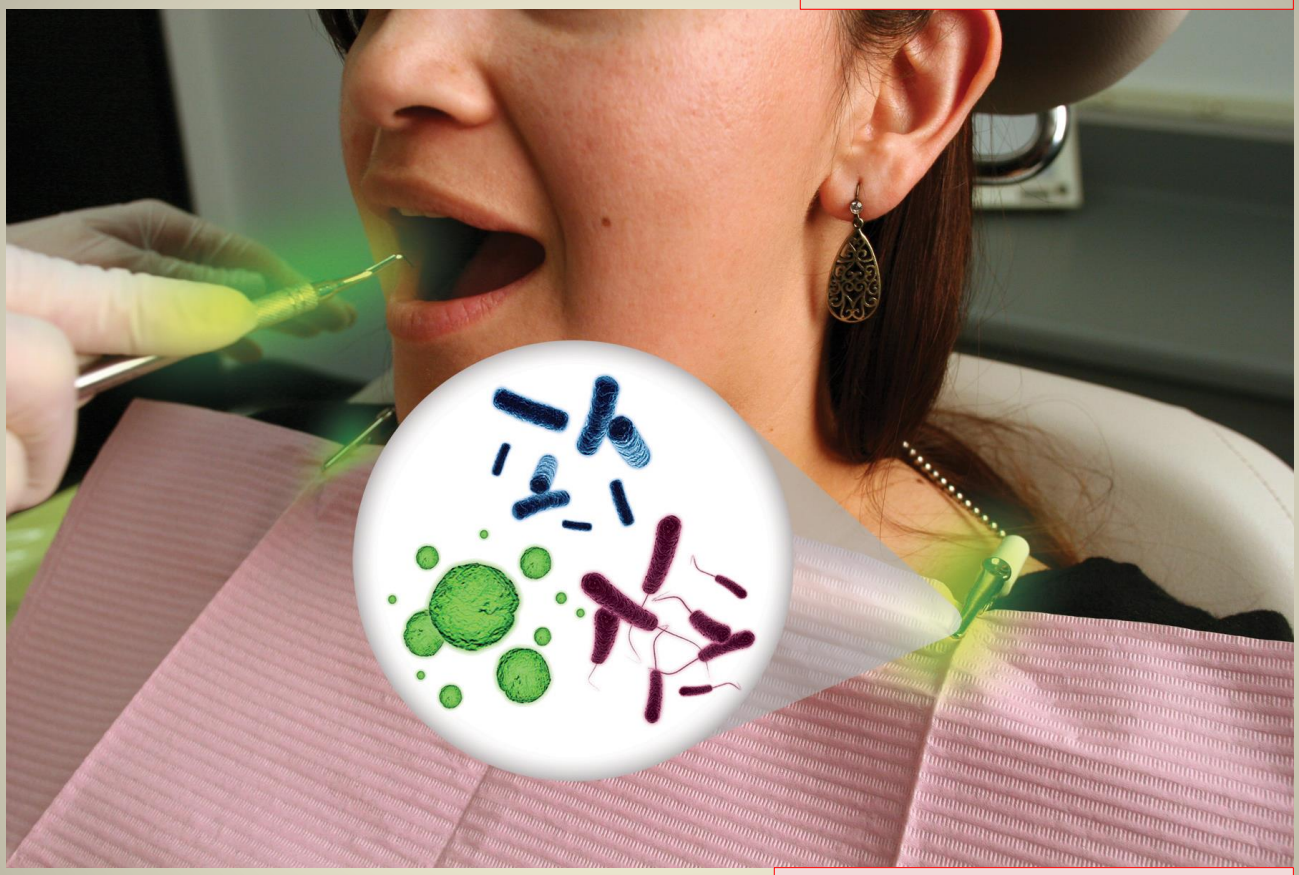
Cross Contamination in the Dental Practice



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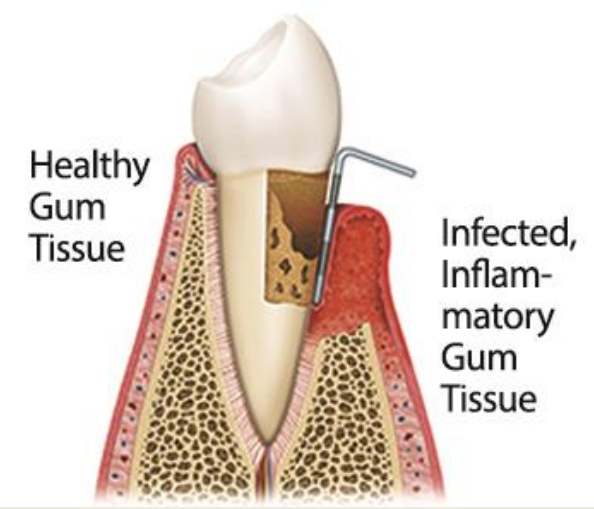
INTRODUCTION

Cross contamination (also called cross infection) is a term defined as an inadvertent transfer of bacteria or other contaminants from one surface/substance or subject to another because of unsanitary handling procedures. In short, cross contamination is a spread of microorganisms from one source to another.

In dentistry, cross contamination can occur by direct contact with microorganisms from patient to patient or patient to dentist and vice versa (droplet transmission and inhalation of airborne pathogens). Also contimaination can occur by indirect contact with contaminated objects or from infected utilities to patients and dental health-care personnel (e.g. infected water and air from an abnormal functioning dental unit).

In a dental office, main infection sources are patient saliva, blood, and other fluids presenting themselves during dental treatment.

In patients, one of the major sources of microorganisms is the dental plaque in supragingival and the periodontal pocket. Bacteria and viruses can also come from the nose, throat, and respiratory tract. Any dental procedure that has the potential to aerosolize saliva can cause airborne contamination with organisms.



Cross contamination includes percutaneous incidents, in particular needle stick injuries, with inadvertent skin wounds to the dentist and staff. Such accidents involve exposure to serious infection agents including the possibility of transmission of Human Immunodeficiency Virus (HIV) and viral hepatitis B and C.

In addition, the dentist's face is at high-risk of infection transmission for cross contamination during dental practices.

This clinical tip document aims to identify cross contamination risks, prevent the possibility of possible infections and reduce the potential for disease transmission.

THE SOURCES OF RISK

The microorganisms transmitted could be pathogenic viruses and bacteria from different habitats and infection routes such as:

- Inhalation of airborne microorganisms suspended in the air from infected oral cavity and respiratory tract.
- Indirect contact with unclean hands or with contaminated objects and surfaces.
- Direct contact with oral mucosa and nasopharyngeal droplet secretions containing microorganisms from an

infected person and propelled by coughing or talking.

- Contact with blood or oral fluids and inoculation (sharps injuries and infected instruments can transmit bloodborne pathogen viruses).

- Inhalation of aerosols or ingestion of contaminated water with infected dental unit water.

KEY TOPICS

Administrative measures:

It is important to develop and maintain written infection prevention protocols and provide supplies necessary for adherence to these protocols.

All patients must be considered potentially contaminated. A detailed patient medical history should be taken to find out systemic illnesses and presence of active contamination.

Infection prevention education and training:

Training should be provided on the principle of both DHCP (dental healthcare personnel) safety and patients safety. Training records should be maintained according to state and federal requirements. It is recommended that dental staff and patients stay home when ill.

PREVENTION ACTIONS BASED ON THE STANDARD TOPICS

Microorganisms are invisible to the naked eye and dental workers can avoid infections with prevention actions and protective measures only.

The following basic precautions should be used:

- Hand hygiene.
- Use of personal protective equipment.
- Respiratory hygiene/cough etiquette.
- Sharps safety.
- Safe injection practices.
- Sterile instruments and devices.
- Clean and disinfected surfaces.
- Dental unit water quality.

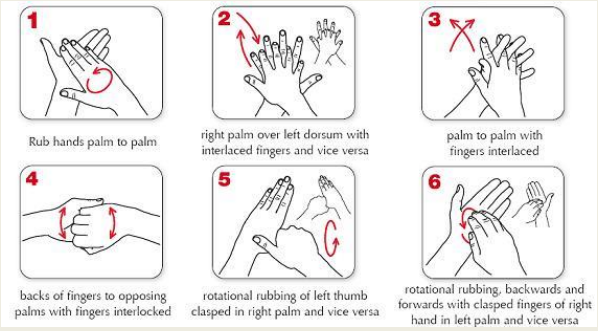
1. Hand hygiene

Hand washing, meticulously performed, is the cornerstone of the 'patient – doctor – auxiliary staff' protection circle aiming at the prevention of cross infection.

Dental personnel are obliged to wash their hands before and after coming in contact with the patient (or the instruments used) independently of wearing gloves or not during the dental procedure.

After removing the gloves, hands must be carefully washed as very often there are pores in latex allowing the penetration of contaminating matter.

Alcohol antiseptic solutions or gels are effective in destroying the germs on the hand surface, provided that their use is preceded by adequate cleaning.



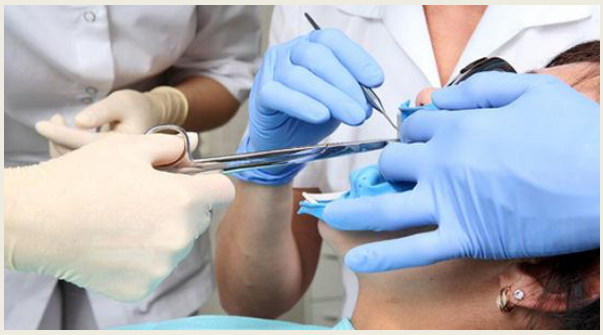
- Hand washing before and after patient contact is absolutely necessary.
- Hand washing before putting on and removing gloves.
- Antimicrobial solutions contribute to destroying germs.

2**. Personal protective equipment**

GLOVES

The dental staff is obliged to always wear gloves during any dental procedure which involves contact with blood or saliva. Appropriate hypoallergic gloves or vinyl and nitrile gloves should be provided.

In patients with confirmed bloodborne viral infection, double gloves are recommended to be used for the protection of the deintist.
If during any dental work it is necessary to use an extra device or material, gloves should be covered with an extra pair of nylon gloves so that contamination of those surfaces is prevented.



- Hand washing is necessary before wearing gloves.
- Gloves are discarded after each patient.
- Double gloves are recommended for patients with blood-borne viral infection.

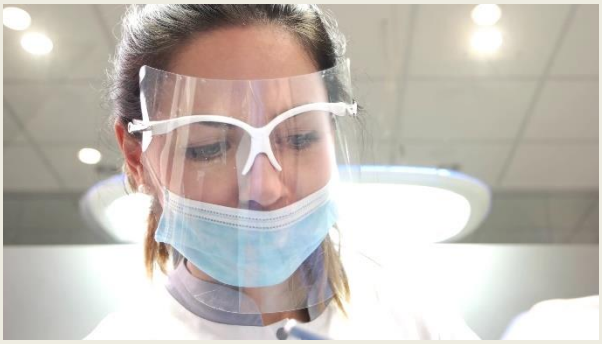
MASK AND GLASSES

During the patient examination or any dental procedure, an appropriate mask and eye protectors are necessary. If the mask gets wet it must be immediately discarded and replaced.

Eye protectors may include various types of glasses or plastic masks or shields made of transparent materials.

The side frame should be wide enough to adequately cover the eye. These protectors must be rinsed with abundant water and be disinfected in case they are soiled in between patients.

- Masks and eye protectors enhance dentist and patient safety



DENTAL CLOTHING

Dental clothes should cover a big part of the staff's body. They must be changed on a daily basis and definitely as soon as they get stained.

If the procedure is expected to involve a large amount of bleeding or the patient is likely to be infected, it is highly recommended that specially designed single-use clothing be used.

Reusable clothing must be washed in a machine washer at an appropriate procedure, and separately from non-medical clothing.

3. Respiratory hygiene/cough etiquette

Dental personnel should be educated about the signs and symptoms of respiratory illnesses, and make every attempt to minimize transmission of respiratory pathogens via airborne routes in the dental setting.

Signs should be posted at entrances with instructions to patients with symtoms of respiratory infection.

4. Sharps Safety

Sharp items (such as needles, scalers, burs, scalpel blades, etc) contaminated with patient blood and saliva are high potentially infective. Used needles must never be recapped and protecting needle sysem must be adopted. Disposable sharp instruments and needles are recommended.

Single-use devices (disposable devices) are designed to be used on one patient only and then discarded, not reprocessed for use on another patient (e.g., cleaned, disinfected, or sterilized).

"Use single-use devices for one patient only and dispose of them appropriately", is a recommendation from the Centers for Disease Control (CDC) that decreases the chances for cross-contamination and the possible spread of disease.

Single-use devices in dentistry include syringe needles, prophylaxis cups and brushes and plastic orthodontic brackets. Single use dental instruments are designed to replace the reusable instruments. The benefits of using disposable instruments are great and various: lower costs, time savings, ease of use, no maintenance costs and high quality.

Sharp disposable instruments, having been in contact with blood and saliva, should be used with special care so that injuries are prevented.

Place any surgical blade and needle within a solid, hard plastic container for sharp instruments. Do not overfill the plastic container, close tightly and, finally discard. Sharps container must be disposed of according to local regulated medical rules.

5. Safe injection practices

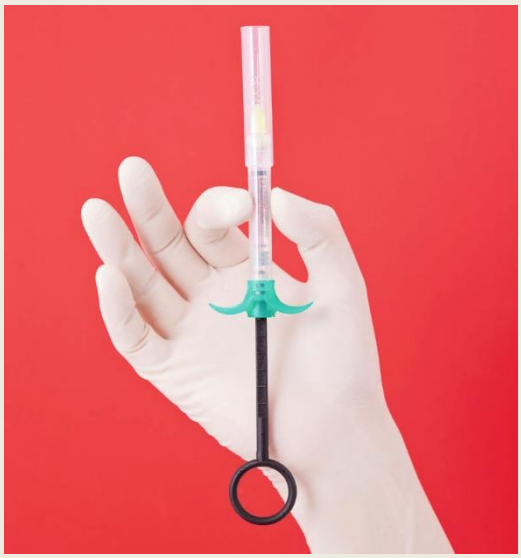
The concept of safe injection practice is illustrated in the “One and Only Campaign”: Use one needle, one syringe, only one time.

Safe injection practices are intended to prevent transmission of infectious diseases and are a set of measures dental healthcare personnel should follow to perform avoiding unsafe practices such as:

- Use of a single syringe (with or without the same needle) to administer medication to multiple patients.

- Reinsertion of a used syringe into a multidose vial to obtain additional medication for subsequent patients.

- Preparation of medication with or close to contaminated supplies or equipment.



6. Sterile instruments and devices

All instruments used to penetrate soft tissues or bones must be cleaned and sterilized immediately after use avoiding contact with solid surfaces.

The main procedure steps are:

Step 1. After the dental procedure, instruments must be discarded in a special container filled with an appropriate disinfectant solution. Instruments made of different material could be treated with different chemical solutions (according to the manufacturers directions).

Step 2. After leaving the instruments within the solution for as long as the manufacturer recommends, wash them undergo thoroughly with mechanical cleaning using the appropriate detergents. If dental materials (cements, pastes, oxides, etc) have been fixed on the instruments, they must be cleaned with ultrasonic devices and appropriate solutions.

Manual cleaning is not recommended due to the high risk involved in causing personal injuries and because it is inferior to mechanical cleaning in terms of quality.

Step 3. Instruments should be packaged in special bags or perforated cassettes and sterilized in an autoclave in according to the default parameters set by the manufacturer, e.g. 132°C for 4 minutes or 121°C for 30 minutes (the above times do not include warm up or air removal). Use electronic or physical instrument indications for the completion of the cycle and the sterilization.

7. Clean and disinfected environmental surfaces.

Protect all working surfaces. Frequently touched surfaces must be cleaned and disinfected on a routine basis.

Any surfaces, devices, electric switches, door handles, taps, handles and device tubes not able to be sterilised or disinfected, should be meticulously covered with appropriate materials.

These protective coverings should be replaced after every contact and every patient.

- Surfaces not being able to be sterilized should be covered with appropriate protective material.

8. Dental unit water quality

Dental unit waterlines can promote bacterial growth. Consult with the dental unit manufacturer to monitor and mantain the quality of dental water meeting EPA regulatory standards for drinking water.

TAKING PROTECTIVE MEASURES AFTER ENDING WORK

• Before cleaning the working surfaces, wear gloves, so that hands are covered and are not exposed to blood and other biological fluids left on surfaces or instruments.

• Remove any protective covers. If the cover has been stained with blood, place it in a suitable disposable bag. Use an appropriate disinfectant on the cover.

• Clean and sterilize all the instruments and disinfect the working surfaces with an appropriate disinfectant solution: phenolic, alcoholic or quaternary ammonium compounds.

• All handpieces must be sterilized in between patients. Chemical sterilization is not safe. Ultrasonic handpieces, scrapers and air syringes must be washed and sterilized.

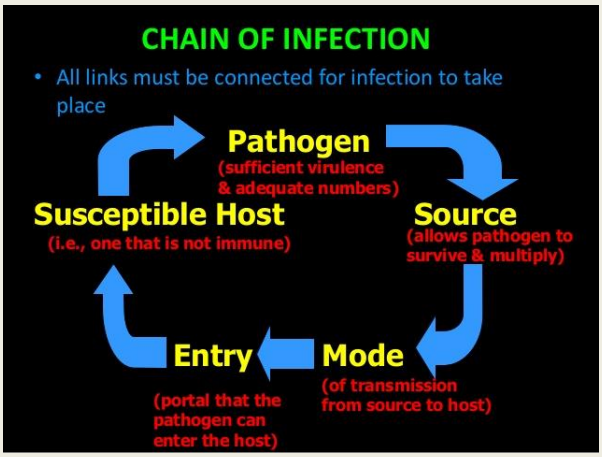
• Any impression or mapping should not be sent to the lab before being cleaned or disinfected.

• Gloves should be removed and hands washed with a disinfectant and water. If more patients are waiting to be examined, place back the protective covers and repeat the procedure.

Several ways to control the spread of contaminating matter between two patients have been recommended:

• Protection from any oral fluids contact
• Chemical disinfection
• Thermal sterilization
• Disinfection using microwaves
• Single use handpieces

Among the above techniques, moist heat using saturated water vapours (autoclave) offers the best results as regards the sterilization of handpieces in a very short time.



FIRST AID IN CASE OF AN EXPOSURE TO INFECTED MATERIAL

To prevent exposure to an infection after having been pierced with an infected needle or other sharp instrument used on a patient diagnosed with HIV infection, prompt and meticulous washing of the injured area should be performed. Place a gauze with a disinfectant solution on the injury (e.g. Cidex, formaldehyde, povidone iodine or 75% alcohol etc.) for at least 15 minutes.

CONCLUSIONS

Cross-contamination continues to be a major problem for every dental practice. Cross contamination can place the dentist, the office personnel and the patients, at a risk of contracting serious illness.

Infection control lapses (e.g., reuse of syringes on more than one patient or to access a medication container that is used for subsequent patients, reuse of lancets) have resulted in bloodborne pathogen transmission.

Prevention and taking the necessary precautions are the basic requirement that can help keep the menace of cross contamination and cross infection away.

REFERENCES

This paper was mainly edited based on the following works:

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- 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

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