

Infection control

Infection control is the discipline concerned with preventing nosocomial infection or healthcare-associated infection.

It deals with:

- the spread of infections,
- the prevention (via hand hygiene/hand washing, cleaning/disinfection/sterilization, vaccination,)
- monitoring (suspected spread)
- management (interrupt of outbreaks)

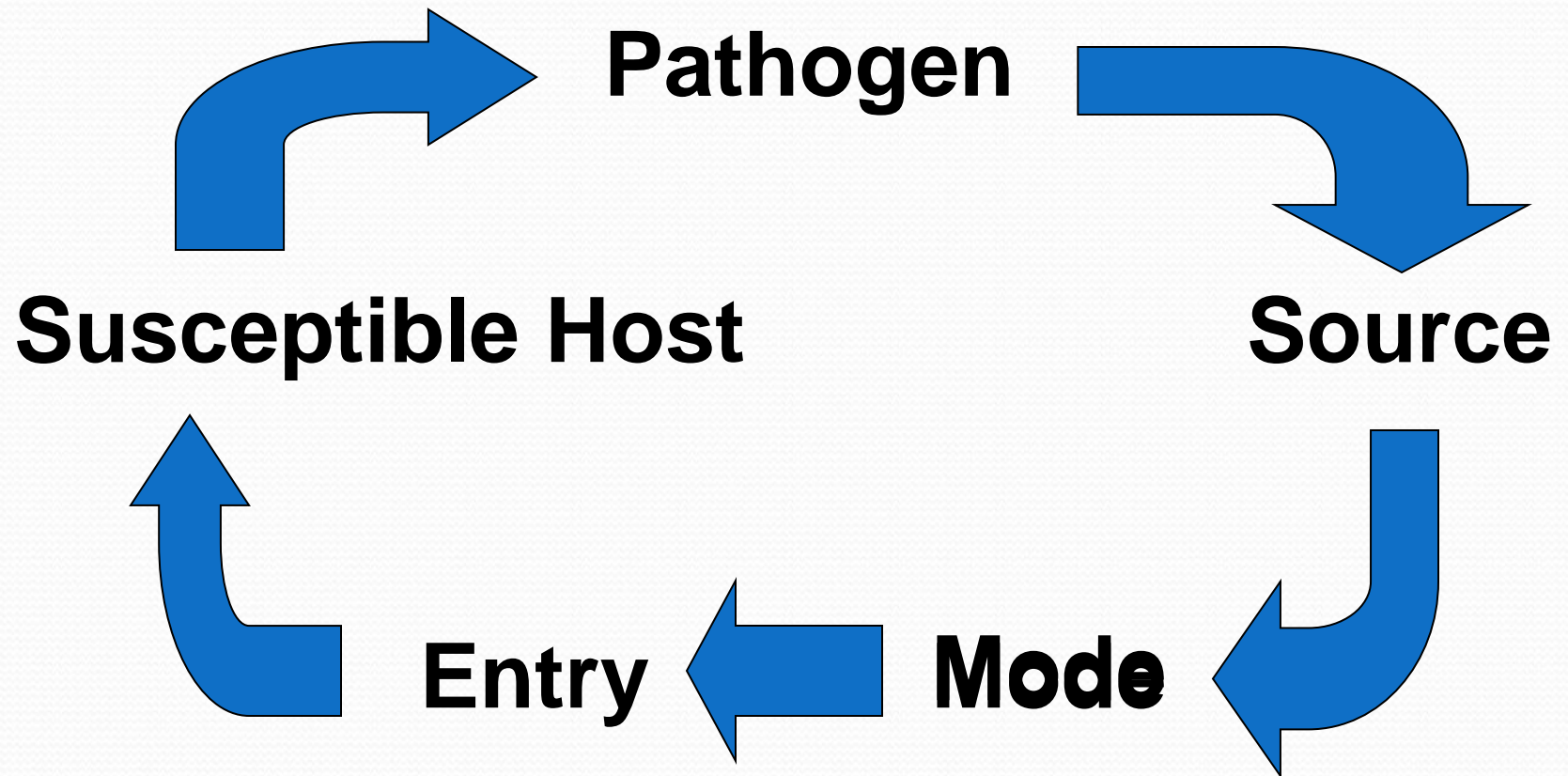
Why is infection control important in dentistry?

- Both patients and dental health care persons (DHCP) can be exposed to pathogens
- Contact with blood, oral and respiratory secretions, and contaminated equipment
- Proper procedures can prevent transmission of infections among patients and DHCP

Modes of transmission

- Direct contact with blood or body fluids
- Indirect contact with a contaminated instrument or surface
- Contact with the mucosa, the eyes, nose, or mouth with droplets or spatter
- Inhalation of airborne microorganisms

Chain of infection



Transmission of bloodborne pathogens

hepatitis B virus (HBV),

hepatitis C virus (HCV),

human immunodeficiency virus (HIV)

- the patient do not know about his/her infection
- the infection is spreads easily

Potential routes of transmission of blood-borne pathogens

Patient



DHCP

DHCP



Patient

Patient



Patient

Base of infection control

Shall be considered as infected:

- Every patient and dental health workers
- Every kind of blood, saliva body fluids
- Non-intact skin
- Mucous membrane

The field of infection control

1. Patient
2. Dental health care persons
3. Design of the consulting room
4. Disinfection and sterilization
5. Aseptic technique
6. Use of protecting items
7. Education

Elements of precautions I.

- Hand washing
- Use of gloves, masks, eye protection
- Proper cleaning and decontamination of patient care equipment
- Cleaning and disinfection of environmental surfaces
- Injury prevention

Elements of precautions II.

- Education and training for staff members
- Immunization plan for vaccine preventable diseases.
- Medical condition management
- Health record maintenance

The patients

- Every patient can be exposed to pathogens
- It is not allowed to refuse the treatment of infected, or risk patients

Protection of the patient

- Before treatment give antiseptic rinse
- Use disposable items
- Prohibit to use again or sterilize the disposable items
- Hand pieces have to be sterilized and not only disinfected
- Keep clean the consulting room and the unit
- Proper management of hazardous waste (yellow and black bag, needle collection box)

Risk Patient

- Infected patient (the pathogen is known)
increased risk of transmission
- Patient, who especially susceptible to infections
(immune status)
- Importance of anamnesis

Treatment in case of known pathogen-carrier I.

- Use of alginate impressions is **prohibited**
- Impressions have to be disinfected (in the consulting room and laboratory)
- Treatment should preferably be carried out in a separate room or treat them last
- These patients have to be treated by doctors

Treatment in case of known pathogen-carrier II.

- Use of protective clothes is compulsory
- Make extraoral x-ray (if it is possible)
- Avoid the use of turbine, puster and scalar
- Use of exhaustor is proposed
- Use disposable glass, apron and saliva ejector

Treatment of immune deficient patient

- Use new protective clothes and mask
- After an infectious patient do not treat anybody
- Treat them first
- Importance of anamnesis

Health care persons

Risk for giving over or getting an infection is high (HBV, HCV, HIV)

Compulsory:

- Health aptitude test
- To keep the personal hygiene
- During the treatment do not touch the eyes, nose, mouth, hair
- Clean hand, short nails
- Do not eat or drink in the room
- Specific immunization

Immunisation

Compulsory vaccination : HBV

Recommended vaccinations

- flu once a year
- tetanus every 10 years
- diphtheria every 10 years
- rubeola
- pneumococcus (over 50 years old)
- Screening every year against tuberculosis

Personal Protective Equipment I.

- Wear gloves when contact with blood, saliva, and mucous membranes is possible
- Remove gloves after patient care
- Wear a new pair of gloves for each patient
- Do not wash hand with gloves



Hand hygiene definitions

- Hand washing
 - Washing hands with plain soap and water
- Antiseptic hand wash
 - Washing hands with water and soap or other detergents containing an antiseptic agent
- Alcohol-based hand rub
 - Rubbing hands with an alcohol-containing preparation
- Surgical antisepsis
 - Hand washing with an antiseptic soap and an alcohol-based hand rub before operations by surgical personnel

Special hand hygiene considerations

- Use hand lotions to prevent skin dryness
- Consider compatibility of hand care products with gloves (e.g., mineral oils and petroleum bases may cause early glove failure)
- Keep fingernails short
- Avoid artificial nails
- Avoid hand jewelry that may tear gloves

Personal Protective Equipment II.

- Wear a surgical mask and either eye protection with solid side shields or a face shield to protect mucous membranes of the eyes, nose, and mouth
- Change masks between patients
- Use protective clothes
- Clean reusable face protection between patients; if visibly soiled, clean and disinfect



Process after contaminating with blood (puncture, cuts)

- Wash out the wound immediately
- Consult with a specialist, who recommends HBV/HCV/HIV laboratory tests,
- Specific immunoglobulin against HVB within 24-48 hour (if there was not previous vaccination against HBV)
- Give active immunisation
- Repeated vaccination (if there was previous vaccination)
- Registration is compulsory

Design of the consulting room

- minimum size 12 m², if more chair in one room
minimum size /chair 9 m² (it is for security)
- Paneling's have to be washable (2,10 m)
- Cold and warm medical faucet, wall mount arm hand disinfection container, paper towels, liquid soapcontainer

Hygiene zones

- **Management zone:**
Everything has to be disinfected after every patient
- **Surrounding of the management zone:**
At the end of the work disinfection of every surface
- **Other part of the room** (has not role in the spread of infections)

Handling the hazardous waste

- The sharp and pointed tools have to be collected separately in a solid-walled box
- Contaminated materials with blood or secretions have to be collected in a plastic (yellow) sack
- Without refrigeration the hazardous waste is allowed to keep only for 48 hours
- For the transport of hazardous waste should be a contract

Yellow and black sack



“Black” = conventional waste



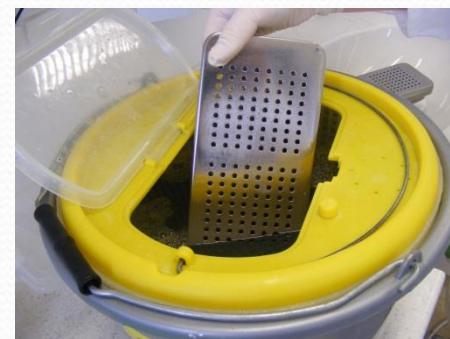
“Yellow” = hazardous waste



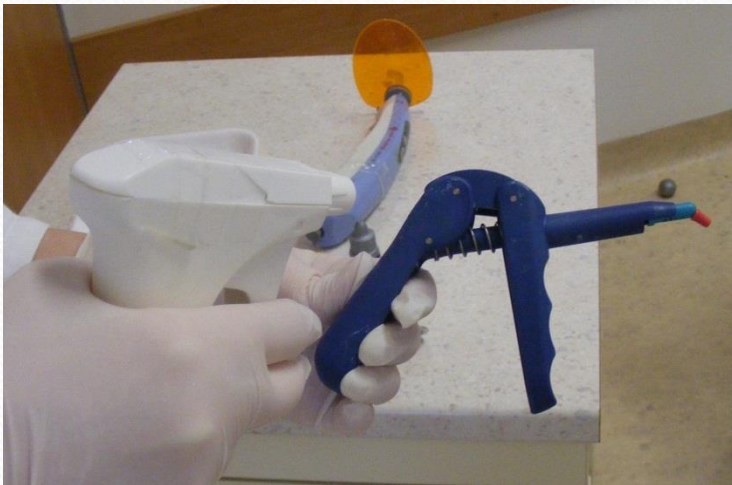
Solid-walled box



Instruments disinfection



Instruments



Surfaces



Noncritical Instruments Washing

- Manual Cleaning
- Clean and disinfect: use a low to intermediate level disinfectant
- Examples: X-ray heads, eyewear



Semi-critical Instruments Disinfection

- Contact mucous membranes but do not penetrate soft tissue
- Heat-sensitive instruments
- Examples: Dental mouth mirrors, amalgam condensers, and dental handpieces



Critical Instruments

Sterilization

- Penetrate mucous membranes or contact with bone, blood, or other normally sterile tissues (of the mouth)
- Steam sterilizer
- Autoclave (sterilization under pressure)
- Examples include surgical instruments, scalpel blades, periodontal scalers, and surgical dental burs



Patients requiring special dental care

Risk patients

- P₁ normal, healthy patients
- P₂ controlled mild systematic diseases
- P₃ multiple systematic diseases or severe cardiac diseases, hypertension or diabetes
- P₄ multiple life threatening systemic diseases

Infectious diseases

Hepatitis

- significantly higher incidence of HBV among dental staff
- a higher rates of HBV especially among oral surgeons, periodontists and endodontists

Infectious diseases

HBV

hepadnavirus

Incubation

45-180 days, most common 75 days

Main route of transmission

parenteral, sexual contact, oral fluid

Immunisation

Passive

immunization

Hepatitis B immune globulin

Associated clinical illness

Epstein-Barr virus

HCV

Flavivirus

Incubation

• 14-180 days; most common 50 days

Main route of transmission

parenteral, sexual contact, oral fluid

Immunisation

Not available

Associated clinical illness

malignant lymphoma,

Sjögren's syndrome

Oral lichen planus

Infectious diseases

Hepatitis

The greatest concentration of hepatitis B infection derive:

- from the gingival sulcus
- from periodontal disease,
- from severe bleeding

Oral hygiene is associated with the risk of HBV.

Infectious diseases

Hepatitis

Oral symptoms: increased bleeding



Modifying treatment steps:

Acute hepatitis: treating only acute cases , keeping infection control, aerosol application should be minimized

Chronic active hepatitis: avoiding drugs metabolizing in the liver, controlling the prothrombine level and the coagulation time, aerosols should be minimized

Infectious diseases

HIV - AIDS and dentistry

Symptoms of HIV in the mouth

- dry mouth or xerostomia (side effect of the medicines)
- enlarged lymph nodes or lymphadenopathy
- oral candidiasis
- hairy leukoplakia that is associated with a viral infection like Epstein-Barr virus
- Kaposi's sarcoma
- oral bacterial infections like periodontal gum disease
- salivary glands that are swollen
- the herpes simplex virus
- warts from the human papilloma virus
- aphthous ulcers

Infectious diseases

Offers for the HIV patients

- Brush teeth twice a day
- Floss once a day
- Use fluoride containing mouthwashes
- Use fluoride containing toothpastes
- While the immune system is still strong visit the dentist twice a year
- When immune system starts to get worse visit the dentist more often

Diseases of heart and vascular system

Infective endocarditis

Life-threatening microbial infection of the endocardium and the heart valves

Oral symptoms: small petechial on the mucosa

Prevention: antibiotic therapy

Modifying treatment steps:

- Instruction, motivation (for the perfect oral hygiene)
- Treatment should not last more than 4-6 hours
- Leave 9 days between the treatments if possible (for the penicillin resistant bacteria to eliminate)

Diseases of heart and vascular system

Hypertension

Abnormal increase in blood pressure

Oral symptoms:

Caused by side effects of drugs: xerostomia, taste alteration, gingival hyperplasia

Prevention: decrease stress

Modifying treatment steps:

- Suspend the treatment over 180/110 Hgmm
- Moderate tilt of the chair
- Avoid adrenaline containing retraction cord
- Patient treated with non-selective beta-blocker max 2 ampulla from 1:100000 rate adrenaline content anesthetic



Diseases of heart and vascular system

Ischemic heart disease

Stable or instable angina, infarct

Oral symptoms:

Caused by side effects of drugs: xerostomia, taste disturbance, gingiva hyperplasia

- Infarct: tongue covered by pellicle
- Right heart failure: rough mucosa, tongue edema
- Left heart failure: red tongue and lips

Prevention: avoid stress, short morning treatments, available nitroglycerin, avoid vasoconstrictors

Modifying treatment steps: in case of instable angina or Occurred infarct earlier than 30 days

- Consultation with specialist (about pain relief, to prevent acute infection, bleeding control)
- Treatment recommended in the hospital

Disease of Blood and hematopoietic system

Iron-deficiency anemia

Oral symptoms:

paresthesia, depapillated tongue , glossitis, cheilitis angularis, ulcer of oral mucosa, leukoplakia

Anaemia perniciousa

Oral symptoms:

oral paresthesia, prolonged wound healing , depapillated red tongue, cheilitis angularis

Sickle cell anemia

Oral symptoms:

delayed teeth eruption , hypoplasia

Modifying treatment steps:

- Avoiding salicylate (acetaminophen, codeine for pain killing)
- Main aim the good oral hygiene

Disease of blood and hematopoietic system

Leukemia

Oral symptoms :

oral infections, bleeding of the gums and oral mucosa, gingival hyperplasia

Modifying treatment steps:

- Knowledge of whole blood (susceptibility to hemorrhage and infection)
- Consultation with specialist
- Antibiotic prophylaxis if the number of white blood cells is less than 200 / uL
- Searching for bacterial foci before chemotherapy
- Extraction at least 10 days before chemotherapy

Disease of Blood and hematopoietic system

Anticoagulant (Deep vein thrombosis, atrial fibrillation, heart valve, preventing infarction)

- Heparin
- Warfarin
- Enoxaparin (Lovenox)

Thrombocyte aggregation inhibitors (infarction, stroke prevention)

- Aspirin
- Non-steroidal anti-inflammatory drugs (Ibuprofen)

Need to check the INR value (2-3) before oral surgery treatment

Respiratory diseases

Chronic obstructive pulmonary disease

Chronic decrease of the air flow in the respiratory system

Modifying treatment steps:

- Sitting position
- Avoid cofferdam
- Avoid barbiturate, narcotics, antihistamine, anticolinerge drugs
- Avoid erytromycin, ciprofloxacin, macrolides antibiotic if the patient taking Theophyllin
- Consultation with specialist if the patient taking steroid

Respiratory diseases

Asthma bronchial

Recurrent episodes of moderate to severe wheezing cough

Modifying treatment steps:

- Avoid aspirin, non-steroid inflammatory agents, narcotics, barbiturates
- Avoid macrolides antibiotics if the patient taking Theophyllin
- Consultation with specialist if the patient taking steroid
- During the treatment observed symptoms

Endocrine disorders

Diabetes Mellitus

Oral symptoms:

- Periodontal status worse than the average
- Gingival proliferation
- Slow wound healing amount
- Common infections
- Xerostomia



increased caries

Modifying treatment steps:

- Breakfast date
- Consider meals enforceability
- Glucose nearby



Pregnancy and lactation

Oral symptoms:

- Pregnancy gingivitis
- Epulis



Modifying treatment steps:

- Only acute care in the first trimester (Lidocaine crosses the placenta)
- avoid the first trimester (afterwards where it is absolutely necessary to use)
- Avoid drugs that harmful for fetus or infant,

Radiotherapy or chemotherapy involving the head and neck region

Before treatment:

- to maintain good oral hygiene
- searching bacterial foci
- extraction carried out 2-3 weeks before the radiotherapy, in case of chemotherapy 5-7 days before

During Treatment:

- Use alcohol free oral rinse
- Treat the symptoms of Xerostomia
- Treat the sensitive teeth with fluoride

In what cases can Lidocaine not be use ?

- In case of hypersensitivity to the active ingredient or adjuvant
- In case of severe hepatic dysfunction.
- If heart rate is extremely low.
- Some cardiac conduction disturbances (II-III. degree AV block).
- Significantly reduced left ventricular function.
- Adams-Stokes syndrome with instantaneous collapses
- Angle-closure glaucoma
- Hyperthyroidism
- Epilepsy in case of after Lidocaine use

Use of Lidocaine should be considered

Due to the content of adrenaline

- Hypertension,
- Heart disease,
- Cerebral vascular disease
- Severe hyperthyroidism
- Epilepsy,
- Conduction disturbances,
- Respiratory failure,
- In case of liver damage if administered dose can result high plasma levels.

Treatment of patients taking Bisphosphonate

Bisphosphonate treatment can meet:

- Osteoporosis,
- Skeletal metastases of malignant tumors,
- Multiple myeloma
- Rheumatoid Arthritis
- Fibrous dysplasia ,
- Paget's disease,
- Osteogenesis imperfecta

Treatment of patients taking Bisphosphonate

- Before extraction, or oral surgery the patients should not stop taking the drug
- Prophylaxis is necessary almost 1-2 days before the treatment (eg, amoxicillin + clavulanate 2x1.0 g / day, in the case of penicillin allergy clindamycin 4x300 mg / day for at least 14 days)
- Aim of the treatment : minimal-invasive solutions, keeping the teeth
- For denture wearing patients, the base plate has to overspread with soft acrylic to avoid micro mucosal injury