Infection Control in Dentistry

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Cross Infection

The passage of infection from one individual to another in a health care environment:

- direct contact with blood or saliva
- indirect contact
  - injection or inoculation via sharp instruments or an open wound
  - on fingers - patient to patient, via intermediate surfaces: clothing, chair controls, records
  - contaminated instruments
  - aerosol, spray, splutter
Severity of Infection

• Depends on
  – The aggressiveness
  – The number
  – The multiplication and resistance capacity

of the microorganisms
Routes of Transmission

- **Direct contact**
  - With blood, saliva or any other body fluids

- **Indirect contact**
  - Injection or inoculation via sharp instruments or contamination of an open wound
  - On fingers or via intermediate surfaces: clothing, chair controls, records
  - Contaminated instruments
  - Aerosol, spray, splatter
Potentially Pathogens in the Dental Healthcare Environment

- Cytomegalovirus
- Hepatitis B virus
- Hepatitis C virus
- HIV virus
- Herpes simplex 1 és 2 viruses
- SARS-2-COVID-19 virus
- Mycobacterium TBC
- Staphylococci
- Streptococci

Microorganisms that colonize in the oral cavity or in the airways, blood-borne pathogens
Cross infection control

• Infection control procedures ought to prevent cross infection from all types of micro-organisms
• Implementing safe and realistic infection control procedures requires the full compliance of the dental team
• Procedures should be regularly monitored during clinical sessions.
Most dangerous microorganisms causing diseases in the health care environment

- **Hepatitis B virus**
- **Hepatitis C virus**
- **HIV virus**
- **SARS2-COVID-19 virus**
- **Mycobacterium TBC**

**The way of infection is**

- Injury by a sharp contaminated instrument
- Contamination via the nose, the eye, or the skin
- Via aerosol, spray
- Via droplets
- Via air
Hepatitis C

- Transmission is percutaneous via contaminated blood
- About 3.9 million cases in the USA
  - Most of them are asymptomatic men of 45-65 years of age, who were infected via blood derivates before 1987.
- Today
  - 60% of the infected patients are the injection drug users
  - 20% sexually infected
  - 14% unknown origin, but inferior social facilities
  - 10%:
    - 3% tattooing, and bodypiercing persons
    - 0.0001% transfusion
    - 1-2% health care workers
    - Home environment
    - Perinatally contaminated (commonly HIV-positive mother)
- 25% of the alcohol abusers are infected
Figure 1. Reported cases of acute hepatitis C by selected risk factors - United States, 1983-1996
Figure 2. Prevalence of hepatitis C virus (HCV) infection by age and race/ethnicity--United States, 1988-1994

Source: Third National Health and Nutrition Examination Survey, CDC.
In case of exposition the risk for being infected

- Hep B in case of a non vaccinated person:
  - Injured by a sharp instrument: 6-30%
- Hep C:
  - Injured by a sharp instrument: 1.8%
  - Eye, nose, mouth, skin infection is estimated to be low
- HIV:
  - Injured by a sharp instrument: 0.1%
  - Eye, nose, mouth, skin infection: 0-0.1%
Personal protection

- Immunisation
- Hep B
- Hep C?
- HIV?
Personal protection

2. Hand protection:
   - jewellery and watches shouldn’t be worn
   - hand washing should be performed carefully, using a skin disinfectant
   - non-sterile gloves should be worn and changed after every patient

3. Eye protection and face masks
   - protects against foreign bodies, aerosol, splatter

4. Surgery clothing
Schutz- und Berufskleidung
Verschiedene Schutzbrillen
Kopfhaube
Patient protection

• Disposable patient’s bib must be worn during routine care
• Protective glasses
Surgery design

• Simple, uncluttered
• Well ventilated
• Floor covering should be impervious, non-slip and seam free
• Junctions of the floor and the wall and of the working surfaces and the wall should be coved to aid cleaning
Three Hygiene Zones

- Treatment zone
- Outer treatment zone
- Remainder of the room

• Contaminated items should not be returned to the clean areas, than on a waste tray or holding solution
Treatment zone

• The highest level of hygiene must be applied
  – where instruments and materials are placed
  – bracket table and mobile cart
  – surrounding worktop
• Unused materials and instruments out of this zone, covered
• Used materials stored here until the patient is dismissed
Einlegen der Instrumente in eine Wanne
Outer treatment zone

- Commonly used items, treated with high level of disinfectant between each patient
  - handpiece housing
  - triple syringe
  - X-ray machine
  - operating light
  - suction hoses
  - spittoon
  - buttons of the chair, taps, sink
  - materials and containers
Remainder of the room

- Non-critical areas of surgery
  - items for individual treatment procedures,
  - instruments and materials should be confined to trays or covered areas
Disinfection of surfaces

- Cleaning with disinfectant and a strong disposable tissue or gauze
- Disinfecting (sprayed surface, and the disinfectant left on the cleaned surface for at least 10 minutes)
Cleaning and sterilization of instruments and equipment

• All instruments contaminated with oral or body fluids are sterilized
  – pre-sterilization cleaning
    • hand cleaning, detergent, brush
    • ultrasonic bath, detergent
    • disinfection, packing
  – sterilization
    • autoclaves
  – Aseptic storage
Kontrolle und Nachreinigung
Nach Ablauf der Desinfektionszeit: Abspülen unter Wasser
Ultraschallbad mit Desinfektionsmittel
Chirurgische Instrumente in Klarsichtsterilisierverpackungen
Heißdampfsterilisator (Autoklav)
Heißluftsterilisator
Metallkassetten ohne Perforation.
Dentalkassette, Deckel und Boden oder Boden perforiert, mit Filterpapier.
Autoklavieren von Normkassetten
### Suggested time and temperature sets for autoclaving

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<td>121-124</td>
<td>15</td>
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<td>115-118</td>
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Einordnen in Bohrerständner
Ultraschall zur Unterstützung der Desinfektion
Endokassette zur übersichtlichen und sterilen Lagerung
Antiretraction valve
Waste disposal

• Sharp disposables should be placed in a solid sharps container
• Contaminated patient borne waste should be placed in a color coded (yellow) waste bin
• Liquid waste must be poured into a drainer toilet that is directly linked to a sewer sanitary system
• Amalgam scrap must be placed in designated containers
• WASTE MUST NOT BE DROPPED INTO THE COMMUNITY WASTE CONTAINERS IT MUST BE TRANSFERRED BY SPECIALIZED COMPANIES!!!
COVID-19

- SARS-CoV-2, the virus that causes COVID-19, is thought to spread primarily between people who are in close contact with one another (within 6 feet) through respiratory droplets produced when an infected person coughs, sneezes, or talks.
- Airborne transmission from person-to-person over long distances is unlikely
Guidance for Dental Settings

Special needs - aerosol and droplet formation

- Contact the patient before treatment
  - Implement Teledentistry and Triage Protocols
    - symptoms, connections, temperature assessment
  - History
- Implement Universal Source Control Measures
- Patient encounters - Waiting room
  with moderate to substantial community transmission
  - Patients and visitors should, ideally, wear their own cloth facemask
  - Dental Healthcare Practitioners (DHCP) should wear a face mask or cloth face covering at all times.
- Physical Distancing
- Hand cleaning facility
- Office.
• Use of rotary dental and surgical instruments, such as handpieces or ultrasonic scalers and air-water syringes.
  – visible spray that can contain particle droplets of water, saliva, blood, microorganisms, and other debris.
  – Surgical masks protect mucous membranes of the mouth and nose from droplet spatter, but they do not provide complete protection against inhalation of infectious agents.

• Implement Universal Use of Personal Protective Equipment (PPE)
  – DHCP should wear a surgical mask
  – eye protection (goggles or a face shield that covers the front and sides of the face), a gown or protective clothing, and gloves during procedures likely to generate splashing or spattering of blood or other body fluids
  – During aerosol generating procedures DHCP should use an N95 respirator or a respirator that offers an equivalent or higher level of protection

• Preprocedure rinsing with an antimicrobial product (chlorhexidine gluconate or cetylpyridinium chloride) may reduce the level of oral microorganisms in aerosols and spatter

• Aerosol generating procedures use four-handed dentistry, high evacuation suction and dental dams to minimize droplet spatter and aerosols
Thank You for Your Attention!!