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

Micoorganisms 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

• 1. 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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<thead>
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<th>Temperature °C</th>
<th>Minimum Impact Time (min)</th>
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<td>121-124</td>
<td>15</td>
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<td>115-118</td>
<td>30</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, onnections, 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