

Basic hygiene during the COVID-19 pandemic in dental practices

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Recent months have been consumed by the COVID-19 pandemic and have also posed huge challenges for the licenced dental sector. There has been a serious lack of personal protective equipment, uncertainty for staff and patients and a continuous stream of new information about the SARS-CoV-2 virus. The struggles caused by the virus and the need to process this new information are still present today. One thing has remained crucial at all times during this crisis and has provided a sense of safety as new measures are established – the principles of basic hygiene. Hygiene measures are based on the assumption that potentially infectious patients may enter the practice or be treated in the practice at any time.

The following will be an examination of the individual aspects of basic hygiene in the dental sector and conclusions will be drawn about the special circumstances of the SARS-CoV-2 pandemic. Specific recommendations for hygiene measures within practices are based on national recommendations, risk assessments and hazard evaluations and are not included in this article due to the highly dynamic nature of the situation and the speed at which information is changing. In Germany, the health authorities as well as the German Dental Association (BZÄK) and the different regional dental associations have specified special measures with regard to SARS-CoV-2.

Basic hygiene in the face of coronavirus

As an enveloped virus, SARS-CoV-2 does not pose any major challenges in terms of hygiene measures when it comes to choosing products and processes. The efficacy of hand, surface and instrument disinfectants can also be determined quickly thanks to the principle of efficacy ranges for disinfectants (e.g. limited virucidal activity). Instrument reprocessing focuses on thermal disinfection, which also covers SARS-CoV-2.

However, a prerequisite for the implementation of basic hygiene is that all relevant microorganisms, and not just SARS-CoV-2 (as an enveloped virus), are considered. Classic bacteria such as *S. aureus*, *S. pyogenes* and fungus such as *C. albicans* as well as other virus strains such as HBV, HIV and influenza continue to be a threat during the events of COVID-19 and need to be taken into account as target organisms. Basic hygiene requirements when selecting disinfectants and procedures are therefore just as important as ever: limited virucidal activity, virucidal for final disinfection, bactericidal, yeasticidal, A0 value of 3000 for reprocessing of invasive medical devices. Practice hygiene and principles must not be limited solely to coronaviruses. The requirement to cover the mouth and nose area in public spaces and the principle of social distancing are new compared with measures for dealing with other infectious agents and are highly important, but they are not specifically addressed in this article. The treatment of Covid-19 patients is also not considered in this article. In this respect, we refer you to national recommendations and advice from professional bodies such as the German Working Group for Hygiene in Dental Medicine (DAHZ).

Different hygiene measures

The respective facility-specific measures for implementing hygiene measures are defined in the hygiene plan. Information and dental-specific templates for a general hygiene plan are available from BZÄK.¹

Personal hygiene

Personal protection starts with correct hand hygiene and also involves wearing face masks covering mouth and nose and wearing gloves. Particular attention needs to be paid to using the right personal protective equipment for different tasks. In the medical field, employees can expect to encounter a whole host of different hazards when performing their duties.

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Fig. 1: Dental handpiece with 4-nozzle spray without air supply.



Fig. 2: Dental handpiece with 4-nozzle spray with an air-water mixture.

Hazard evaluations carried out in collaboration with an occupational safety specialist and the company's medical officer provide information about this. Every workplace with its various operations and associated hazards is assessed and then appropriate guidelines are provided. For example, in the unclean zone of the reprocessing room, the following tasks need to be carried out during instrument preparation: disposal of single-use instruments as well as pointed and sharp objects, cleaning and disinfection of instruments and elimination of the associated risk posed by biological agents. This results in the following protective measures, for example: Firstly, wearing puncture-proof gloves, which are also ideally resistant to cleaning agents and disinfectants. Secondly, disposing of pointed and sharp objects in appropriate containers to avoid injury. Thirdly, wearing protective gowns to protect workwear against contamination with infectious material and wetting. Fourthly, wearing visors or goggles to protect mucous membranes and eyes during cleaning tasks. In addition to basic hygiene, the following measures should be implemented to protect staff and patients:

- Goggles/protective visors/shields, face masks covering mouth and nose, gloves and protective gowns should be worn for the entirety of treatment of the patient. The barrier function of protective clothing is only guaranteed when it is fitted correctly and when it is changed as often as needed.
 - During pauses in treatment, the recommended minimum safety distance between employees should be maintained.
 - Every patient should be asked if they have had any COVID-19 symptoms in the past two weeks by telephone before they attend their dental appointment and again when they enter the practice.
 - There should be no physical contact when greeting a patient.
 - Patients should be instructed to disinfect their hands when they enter the practice and before they leave.
 - Every employee should wear face masks covering mouth and nose inside the dental practice, even when talking to one another.
 - Reception areas can be protected by a liquid-tight partition.
 - The number of people waiting should be kept to a minimum to maintain an appropriate distance between patients.
 - Treatment schedules and appointments should be arranged so that distance rules can be adhered to in the reception and waiting area.
 - People attending with adult patients should wait outside the practice.
 - Patients should be instructed to touch as few surfaces as possible. This applies to door handles, for example.
 - Patients should wear face masks covering mouth and nose when entering and inside the practice.
 - Toys should be removed from the waiting area.
 - Team meetings should take place regularly. This ensures that measures and routines can be discussed, questions can be answered and any changes can be made.
- In the case of employees at increased risk of severe illness from COVID-19, an assessment should be made based on local infection rates of whether or not they are at increased risk from direct contact with patients.



Water and aerosol

Aerosols are used in dental treatments, primarily in the form of sprays (e.g. cooling dental drills). It is essential to use cooling systems to ensure that the heat generated does not damage healthy tissue, e.g. during cavity preparation. To this end, there is the option of either using process water from the treatment units or connecting external cooling media (e.g. bottle system or sterile saline solution). From a hygiene standpoint, there are two major factors to consider here:

1. The water supplied to the treatment units needs to be of drinking water quality. Particular attention needs to be paid to the quality of the process water in the treatment units, especially after long periods of not being used (e.g. due to practice closures). The water must not pose any risk to the patient. Suitable measures also need to be put in place to ensure that no biofilm builds up in the water unit. This can be achieved by using continuous disinfection systems or by regularly disinfecting the water systems. Rinsing procedures need to be established as part of the practice's daily routine before the start of treatment and at the end of the working day to prevent stagnant water. Additional rinsing procedures between patients ensure that any contamination caused by reflux is flushed out and that the waterways are all supplied with fresh water.⁷

2. However, it is not just patients who need to be protected against the infection potential of water with appropriate measures. The cooling water also poses an infection risk to practice personnel due to the fine nebulisation of the water during treatment due to the supply of air and the mixing with saliva. Mouthwash with antiseptic properties (e.g. chlorhexidine, hydrogen peroxide) can reduce oral flora and therefore reduce pathogen exposure in sprays.² High-volume and efficient extraction systems can also reduce the dispersion of aerosols during treatment. Reducing the spray by decreasing or switching off the spray air minimises the risk thanks to reduced aerosol formation. It should also be mentioned that a dental turbine tends to produce more aerosol than an electrically driven high-speed motor due to the higher rotational speeds.

Face masks covering mouth and nose

Person-to-person transmission via droplets (e.g. when talking, coughing, sneezing) is the main form of transmission for coronaviruses, particularly for SARS-CoV-2. Due to the complex supply situation with regard to breathing masks, various methods for reprocessing breathing masks (primarily FFP2 and face masks covering mouth and nose) have been discussed. As these products are initially not developed and manufactured as reprocessable, not only do different reprocessing methods (e.g. damp heat, dry heat, UV, H₂O₂) need to be considered, but also the filtration, particle retention and fit properties after reprocessing. Different recommendations and information are being circulated in Europe and internationally. As a result, it can be concluded that reprocessing is the responsibility of the individual and must be subject to a very critical risk-benefit assessment. Due to the significantly increased availability of breathing masks (FFP2 and face masks), there is no longer any need for reprocessing.

Clothing

The protective clothing used is either available as single-use items or multi-use items. With single-use clothing, it is important to adhere to correct disposal measures to ensure that the wearer does not come into contact with infectious or otherwise harmful material during disposal. If suitable personal protective equipment is reprocessed, observe the manufacturer's instructions, particularly with regard to use of cleaning agents and procedures as well as disinfectants and disinfection procedures. Workwear also needs to be subjected to a disinfecting reprocessing procedure.

Surface hygiene

Surfaces may become contaminated through direct contact with hands or due to the descent of particles containing aerosols. The required frequency of disinfection procedures can be found in the cleaning and disinfection plan and the application times of the respective products must be observed. Suitable agents need to fulfil the bactericidal, yeasticidal and limited

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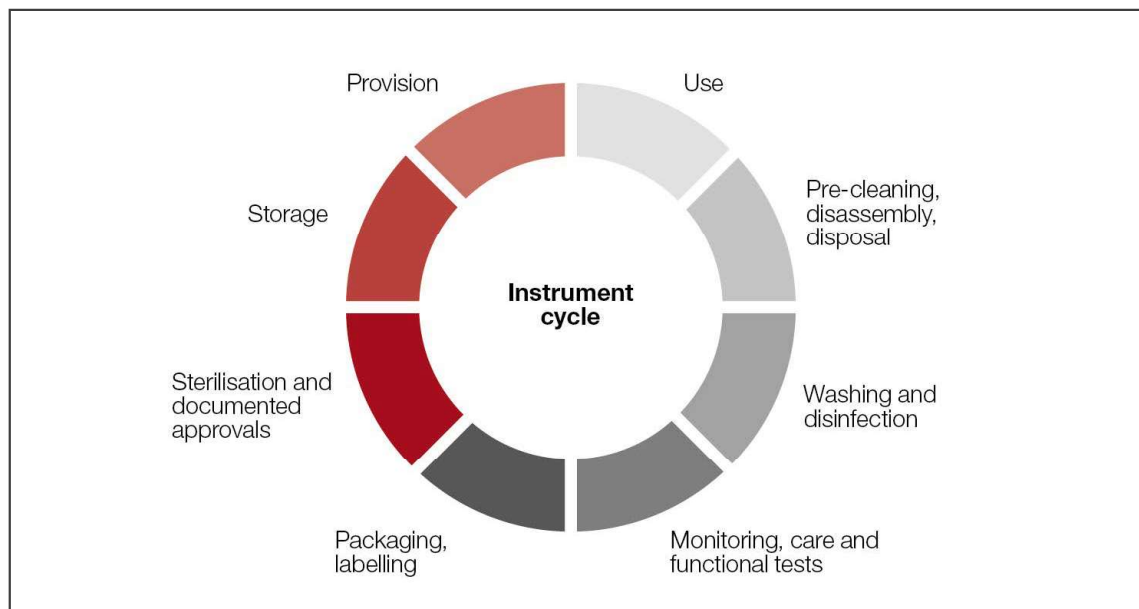


Fig. 3: Instrument cycle.

virucidal activity spectra as a minimum requirement. Alongside the manufacturer information, the usual lists (Association for Applied Hygiene (VAH) and German Industrial Association for Hygiene and the Protection of Surfaces in Industrial and Institutional Applications (IHO)) also provide information on this. When selecting products, it is essential to consider material compatibility with various practice equipment surfaces and materials as well as the activity spectrum. Over recent months, chloride-containing products have also been frequently used due to supply shortages and the effectiveness, stability and material compatibility of these products were not always guaranteed.

Reprocessing

The reprocessing of medical devices follows the standard, facility-specific instrument cycle principles (see Fig. 3). Machine-based reprocessing is the preference in this case.

Summary

Additional coronavirus measures are being introduced based on the special transmission pathways for SARS-CoV-2 and a critical risk-benefit assessment. As a basic principle, hygiene measures need to be carefully attuned to the presence of germs just as they were before. Due

to the novelty of the virus and its special forms of transmission, recommendations are constantly being updated based on scientific findings. It is to be expected and hoped that the resulting measures will be more cautious and take into account risk and benefit assessments.

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